IMPACT OF FEDERAL PROCUREMENT ON PERSONAL INCOME DISTRIBUTION

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CHAPTER I

SCOPE AND METHOD

The increase in Federal spending -- both for defense and nondefense purposes -- has heightened people's interest in the consequent economic impacts of these new expenditures. Most economists generally acknowledge that such changes in spending affect the economy chiefly by altering aggregate income.[1] However an alteration in Federal expenditures may also change personal distribution of income. For a long time now, there has been little systematic analysis in studying this distributional impact, and the past studies possess numerous shortcomings.[2]

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[1]For further discussion of government's role in income determination, see Paul A. Samuelson, Economics An Introductory Analysis (sixth edition; New York: McGraw-Hill Book Company, 1964), pp. 242-244.

[2]Virtually the entire pertinent literature consists of the following: Charles Stauffacher, "The Effect of Governmental Expenditures and Tax Withdrawals upon Income Distribution, 1930-1939," Public Policy (Cambridge, Mass.: Harvard University Press, 1941), II, pp. 232-261; Tibor Barna, Redistribution of Incomes Through Public Finance in 1937 (Oxford University Press, 1945); John H. Adler and Eugene R. Schlesinger, "The Fiscal System, the Distribution of Income, and Public Welfare" and "Appendix," in Kenyon E. Poole (ed.), Fiscal Policies and the American Economy (New York: Prentice Hall, 1951), pp. 359-421; (continued on next page)

The present research directs itself toward filling this gap. Specifically its purpose is to measure the income redistribution that occurs given a change in the level or composition of expenditures of the Federal government. The analysis is further concentrated on the distributional impact of Federal purchases of goods and services and the policy implications that follow from such a measurement.[3]

The redistributional effect of total Federal expenditures occurs via both direct and indirect mechanisms. Direct spending redistribution takes the form of transfers and subsidies to specific persons. Compensation paid to the unemployed is an example. Because of its social welfare orientation, this direct government-to-individual route tends to result in a progressive impact on income distribution.[4]

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[2](continued from last page) Rufus S. Tucker, "The Distribution of Government Burdens and Benefits," American Economic Review, XLIII (May, 1953), pp. 518-543; Alfred H. Conrad, "Redistribution Through Government Budgets in the United States," in Alan T. Peacock (ed.), Income Redistribution and Social Policy (London: Jonathan Cape Co., 1954), pp. 178-268; Richard A. Musgrave and Darwin A. Daicoff, "The Incidence of Michigan Taxes," Michigan Tax Studies: Staff Papers (Michigan Secretary of Finances; Michigan: 1958), pp. 131-184; W. Irwin Gillespie, "Effect of Public Expenditures on the Distribution of Income," in Richard A. Musgrave (ed.), Essays in Fiscal Federalism (Washington: Brookings Institution, 1965), pp. 122-186; and Neal Singer, Income Redistribution Through the Federal Budget in 1959 (unpublished Ph.D. dissertation; Stanford: 1965).

[3]Income effects of Federal grants-in-aid to lower level governments and direct transfer payments are not considered.

[4]A progressive impact is defined as one (continued on next page)

However there still remains the bulk of Federal expenditures (62 percent in 1966) whose distributional impact follows a more round-about path. This spending represents payments to the private sector for purchases of goods and services by the public sector. If these purchases cause greater relative demand shifts for highly skilled inputs than for lower skilled ones (and hence shift income proportionately from low to high income recipients), a regressive distributional impact results.

In the preceding explanation of the income redistribution process, a rather specific concept of income is used: a person's income equals total payments received for the use of his resources in the production process. Thus,

$$(1) \qquad Y_i = L_i + K_i \quad \text{where}$$

L_i - labor income

K_i - property income

It is this definition of income -- the sum of factor payments to an individual -- which is used here.

The choice of the income concept to employ is important to the analysis, for it defines the methodology that must be followed. Other researchers in this area have chosen, on the whole, a quite different

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[4](continued from last page) which shifts the Lorenz curve of income distribution toward greater equality. Such an impact favors the lower income classes. A regressive impact has the reverse effect.

income concept. To wit, an individual's income equals the flow of satisfactions (benefits) derived from both private and social goods and services. Thus income includes factor payments but also the value of the benefits of public goods. Using this definition, income redistribution results from the provision of a free good to certain persons by the government thereby changing one person's economic position relative to another's.

This latter type of income redistribution is not the subject of the present analysis. Specifically purchases of goods and services by the Federal government alter the relative rates of return to labor and capital through changes in their respective demand curves. The measurement of this redistribution of income is the prime concern of the research.

I. A BRIEF SURVEY OF THE LITERATURE

Two distinct types of income distribution impacts have been described. First of all, changes in public expenditures have an effect on factor earnings -- in a fully employed economy, for example, increases in Federal missile procurement raise the wage rates of highly skilled factors relative to those of the lesser skilled, for reasons to be described later. Secondly, there is the distributional effect of the free goods provided by government. The free use of the Federal highway system raises the real income of the user. The

individual thus derives benefits from the public goods, and these are added to his money income to obtain real income. The present study concerns itself with the former type of distributional impact exclusively.

However for an overall appraisal of the income redistribution effected by government expenditures, both impacts must be studied. The two methods of research complement each other. They are not substitutes or rivals. Thus the following discussion presumes that there is no single method of analysis of changes in the size distribution of income brought about through alterations in Federal expenditures.

But before moving onto the specific analysis perhaps an evaluation of the past literature may clarify exactly what each approach attempts to add to an overall understanding.

The benefit approach views government spending as providing goods and services from which individuals derive satisfaction or benefits. In their research, Messrs. Gillespie, Conrad, Adler, Barna, Musgrave, Brownlee, Schlesinger, and Tucker followed the benefit alternative.[5] The following might serve as a general pattern used in their research.

All the researchers noted above implicitly or explicitly

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[5]For further details, see footnote 2.

assume that:

> 1. All government purchases of goods and services are productive of benefits which are otherwise not available to spending units or only at a different price.
>
> 2. The benefits may be given a value equal to their cost to the government.
>
> 3. These values accrue to individual spending units as an increase in consumption in the period in which the expenditure is made.[6]

Government expenditures are divided into transfer and purchase components. Transfers are regarded as negative taxes and treated analogously. They are allocated directly to the persons or groups designated to receive them. However the distributional effect of public procurement is treated quite differently.

Clearly the provision of certain public goods and services increases a person's real income. However the measurement of such additions to income is conceptually difficult since the exclusion principle does not hold for the purchase of social goods. That is to say, the individual cannot be excluded from the enjoyment of the public good since his satisfaction is independent of his own contribution. In the private marketplace enjoyment of a commodity depends upon willingness of the buyer to pay the stipulated price. In this way, he reveals the value he assigns to it. But the enjoyment of

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[6]Conrad, op. cit., p. 120.

social goods cannot be made subject to price payments since the services are made equally available to all.[7] Therefore individual preferences will not be revealed, and hence the true value of the public good cannot be ascertained.

To surmount this difficulty, researchers employing the benefit approach equate cost of the social good with value of the benefits. This cost (= benefits) is distributed to individual income classes with the aid of one or more allocation indexes (see Table I). In the case of highways, for example, this index would measure the proportion of highway users in each income class. Summarizing, to determine government expenditure incidence: (1) the beneficiary groups on whose behalf expenditures are made must be located, (2) the average cost of providing the service to each group must be found, and (3) the distribution of the beneficiaries by income class size has to be determined.[8]

Table I provides a tabulation of the allocation indexes used by the various authors for each major category of Federal spending. Even a cursory review reveals a lack of consistency in the authors' choice of allocators for any one expenditure item. Noticeable also

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[7]Richard A. Musgrave, The Theory of Public Finance (New York: McGraw-Hill Book Company, 1959), p. 9.

[8]Gillespie, op. cit., p. 131.

TABLE I

BASES FOR ALLOCATION OF GOVERNMENT EXPENDITURES BY INCOME CLASS

Item	Adler 1947/48	Tucker 1948	Conrad 1950	Musgrave 1958	Brownlee 1960	Gillespie 1960
1 National Defense	Y	Y	1) Y 2) T_x	---	---	1) F 2) Y_n 3) $Y - T_x$ 4) Y_I
2 International Affairs	Y	Y	1) Y 2) T_x	---	---	1) F 2) Y_n 3) $Y - T_x$ 4) Y_I
3 Space	---	---	---	---	---	1) F 2) Y_n 3) $Y - T_x$ 4) Y_I
4 Postal Service	Y	Y	---	---	---	C

TABLE I (continued)

Item	Adler	Tucker	Conrad	Musgrave	Brownlee	Gillespie
5 Health, Hospitals	$\frac{1}{Y_o - 4000}$	Y	Same as #12	1) C 2) Y_n 3) Y_I	1) P 2) $\frac{1}{Y}$	1) F 2) Gen. Hosp. Patients 3) Mental Hosp. Patients 4) Housing exp.
6 Transportation, Commerce	Y	C, Y	Y	1) $Y_{div.}$ 2) $Y_{Business}$	P	1) C 2) $C_{Transportation}$
7 General Gov't.	Y	Y	1) Y 2) T_x	Same as #5	P	Same as #1
8 Natural Resources	Y	Y	Y	Same as #5	P	C
9 Labor	Y	$Y_{w\&s}$	covered wages	Same as #5	P	$Y_{w\&s}$
10 Interest	M	M, Y_{div}	liquid assets	Same as #5	P	Y_{div}, M

TABLE I (continued)

Item	Adler	Tucker	Conrad	Musgrave	Brownlee	Gillespie
11 Housing, Urban Renewal	$P_{yo-4000}$	P_{rent}	$F_{low\ rent\ housing}$	Same as #5	P	F_{rent}
12 OASI, RRB, CSCRD	$P_{yo-4000}$	$Y_{w\&s}$ P_{OASI} beneficiaries	Social security receipts	Same as #5	P	P_{OASI} P_{UC}
13 Veterans	$P_{yo-5000}$	$P_{vets\ 25-55}$	$P_{male\ vets}$	---	---	$G_{OASI\ WW\ II\ vets}$
14 Agriculture	Y_{farm}	Y_{farm}	1) Y_{farm} 2) $Y_{farm}P_{farm}$	Same as #5	---	$C_{food}P_{farm}$
15 Highways	Y	C, C_{auto}	Expenditures for transp.	C, $C_{oil\ \&\ gas}$	C_{gas}, C	$C_{oil\ \&\ gas}$ real property value Transp. Exp.

TABLE I (continued)

Item	Adler	Tucker	Conrad	Musgrave	Brownlee	Gillespie
16 Public Welfare	$\frac{1}{\text{yo-4000}}$	$P_{\text{on welfare}}$	by use of means test	yo-3000	P	$G_{\text{public assistance}}$
17 Education	P	$Y_{\text{Families with child under 18}}$	P	$Y_{\text{Families with school age children}}$	P, $Y_{\text{Families with school children}}$	$Y_{w\&s}$ $P_{\text{school children}}$

Meaning of Symbols:

- Y - income
- T_x - taxes
- F - families
- Y_n - private income
- $Y - T_x$ - disposable income
- Y_I - capital income
- C - consumption
- yo-4000 - income below $4000
- P - population
- $Y_{w\&s}$ - wage & salary income
- M - capital assets

Source: The allocation indexes used by each author were found in their respective studies cited in footnote 2, page 1 of this paper.

is the inverse correlation between the dollar size of the item and the degree of sophistication of the allocating index. Expenditures on highways and on national defense are examples. The persons who use the public roads and/or the products transported over such roads can be clearly classified as the beneficiaries. However, how does one allocate the benefits of security to individuals? As Mr. Gillespie states:

> These unallocable or 'general' expenditures such as for national defense provide no clear basis on which costs may be distributed.[9]

There remain several other features of the previous literature utilizing the benefit approach which must be noted. One difficulty is that all benefits are assumed to accrue in the year of the expenditure. No consideration is given to spending on goods yielding benefits over time. Such an assumption may distort the actual distributional impact.

More generally, the authors have allocated the benefits of Federal spending to income classes. In effect, they have analyzed a global benefit-cost ratio for each income bracket. However to measure the change in private income brought about by expenditures

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[9] Ibid., p. 160. The general expenditures for 1960, on a National Income basis, are (1) national defense, $46.7 billion, (2) general government control, $1.4 billion, (3) international affairs, $2.2 billion, and (4) civilian safety, police, and prisons, $48 million.

of the Federal government, it is necessary to estimate the distribution of income with and without a government. Previous studies do not attempt to make such an estimation.

The second procedure employed to distribute Federal expenditures by income class is the cash flow approach.[10] This method states that the persons whose incomes are raised by highway spending are the factors of production whose money incomes are increased by the government's demand for highways.

Past research employing the cash flow approach to analyze the impact of government spending on income distribution by income class consists solely of the work done by Mr. Charles Stauffacher.[11] Mr. Stauffacher was concerned with the net impact of the total Federal budget on income distribution for the period 1930-1939. Since the present study's main emphasis is on Federal procurement spending, only that portion of his work pertaining to such expenditures is reviewed here. He divides Federal purchases of goods and services between expenditures on personal services and supplies and materials. The former he distributes by an index of Federal employment by

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[10]Selma Mushkin, "Federal Grants and Federal Expenditures," National Tax Journal, X (Sept., 1957). Mrs. Mushkin uses the cash flow method to estimate the Federal spending impact on the regional distribution of income.

[11]Stauffacher, loc. cit.

income class while payments for materials and supplies are allocated by an "industrial index."[12] Mr. Stauffacher constructed this index by first estimating the industrial composition of Federal purchases and then applying to each industry a distribution of earnings of workers in that industry. (The earnings distribution were provided by the Bureau of Labor Statistics.) Summing over industries gives a distribution of factor earnings for defense-related employment. Mr. Stauffacher concludes that the dynamic element of Federal expenditures during the thirties was the increased spending on direct and work relief. However he postulates that for the 1940's the dynamic element would be defense spending.[13] Thus the mechanism of income redistribution would move from the direct route of transfers to an indirect path characterized by government purchases of goods and services from private industry.

Since the cash flow approach has received such little previous attention, the present study uses the basic method of analysis employed by Mr. Stauffacher. However there are significant changes that improve the ability of the cash flow method to illuminate the Federal government's role in redistributing income. For one thing, Mr. Stauffacher implicitly assumes that the factors hired by the

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[12] Ibid., p. 252.

[13] Ibid., p. 260.

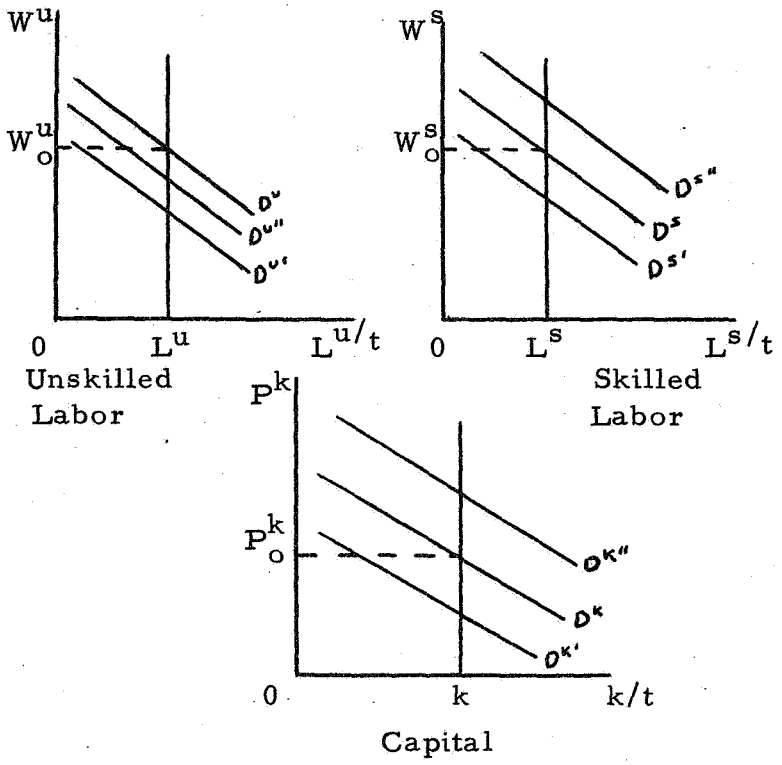
private sector for Federal contracts have a zero opportunity income. Thus, he measures the total amount of factor income and not the change in income due to the change in Federal purchases. There may have been greater justification than at present for using this assumption in an analysis of the depression years of the 1930's, the period covered by Mr. Stauffacher. However, in a fully employed economy, there are alternative incomes for the factors hired to meet Federal demand. This forgone income must be measured and subtracted from what the government pays these inputs (directly or indirectly) to ascertain the true Federal impact on factor payments.

The research presented here attempts to measure this alternative income. But before explaining the framework used, a model of fiscal impact is needed to specify more precisely the government's impact on income distribution.

II. A SIMPLE THEORY OF FISCAL INCOME REDISTRIBUTION

To aid in the analysis, a rather simple model of fiscal impact on income redistribution is constructed. It is assumed that at time (t - 1) a private economy exists in which each individual receives an income equal to the returns on his human and nonhuman capital. Other assumptions include full employment, the presence of three factors, skilled and unskilled labor and capital and hence only two

income classes (since all capital earnings are assumed to be distributed in proportion to labor income and thus are neutral in impact), and only one private good whose production requires the use of all three inputs. Graphically:



where: W^u_o - wage rate for unskilled labor at (t - 1)

W^s_o - wage rate for skilled labor at (t - 1)

p^k_o - price/unit of capital at (t - 1)

$W^u_o L^u$ - labor income of unskilled at (t - 1)

$W^s_o L^s$ - labor income of skilled at (t - 1)

$p^k_o K$ - return to capital at (t - 1) that is distributed to the owners of capital

The supply curves are assumed vertical since all factors are assumed to be noncompeting. Thus any change in the earnings/unit of an input can be multiplied by its fixed supply to obtain its new income

At time (t) the individuals form a government to satisfy their social wants. Specifically two public goods are demanded, a defense good and a nondefense good. Through taxation of private incomes, resources are transferred to the public sector. If the tax rates are progressive, the income share of the rich (i.e. upper income classes) will fall relative to that of the poor (i.e. lower income classes). Hence redistribution favoring the poor results. This effect is the tax impact of the Federal budget on private income distribution.

Following the tax, less private goods are produced and hence there is a smaller demand for all factors. Thus D^u, D^s, and D^k shift to $D^{u'}$, $D^{s'}$, and $D^{k'}$ respectively. Simultaneously, public goods are introduced into the economy. Assuming that these goods require the use of all three factors, the Federal spending causes an increase in $D^{u'}$, $D^{s'}$, and $D^{k'}$ to $D^{u''}$, $D^{s''}$, and $D^{k''}$. If the government's demand is capital-intensive and skilled-labor-intensive relative to private demand, the effect is to reduce the demand for unskilled labor. Thus the share of income going to the rich rises relative to that of the poor. However, if Federal demand is unskilled-labor-intensive, the lower income classes' share rises relative to that of the upper income classes.

The net impact for each income class is simply the difference between the tax and procurement effects for that class.

The model presented in Chapter II attempts to implement the above-stated theory. The model is marginalist in approach in that it is set up to measure the income redistribution caused by small changes in Federal procurement. However to allow for more clearly delineated policy implications, the model is applied to total Federal procurement. In effect, this procedure assumes that a 100 per cent change in Federal purchases can be analyzed in the same manner as, say, a 10 per cent change. A shortcoming of this approach is that it assumes that the relative prices of private goods and services are constant when total Federal procurement is added to or taken from the economy. Prices may well change. It is felt, however, that the procedure can adequately measure the income impact of total Federal purchases. This last point is brought out more fully in Chapter II.

The theory of fiscal income redistribution presented above is quite general in nature. More specifically, Federal procurement generates demand for capital goods, military personnel, civilian government personnel, and private employees working on Federal contracts and subcontracts. The present study considers all of these demands. To do so requires the measurement of the opportunity costs these factors bear by being employed (directly or indirectly)

by the Federal government. Because of data limitations, the measurement of the alternative cost of military personnel is treated somewhat differently than the other demands.

As explained more fully in Chapter II some of the data requirements of the model presented there are: (1) the labor force distributed by occupation by industry, (2) the labor force cross-classified by income and occupation, and (3) average annual earnings for each occupation. These breakdowns exist only for the civilian labor force. However, assuming that the occupational breakdown of military personnel is similar to that of civilians and that military personnel would be distributed among industries as civilians now are, a distribution of the total labor force (civilian and military) by occupation by industry can be formed. The above assumptions do not appear to be totally unjustified. In Table II following, a crude attempt is made to split the civilian and military labor force into skilled and unskilled components. The data suggest that the disparity between the civilian and military skill mix is not great.

From the above-mentioned assumptions, it follows that the relative income distribution of military personnel by occupation would be similar to that of the civilian labor force. Finally, average annual earnings can be calculated from the occupational income distributions. Thus, in effect, the opportunity cost of a soldier is assumed to be equal to that borne by a civilian employed by, say,

TABLE II

SKILL MIX OF CIVILIAN AND MILITARY LABOR

Civilian Occupation Group	1960 Per cent Distribution	Skilled Per cent	Unskilled Per cent
Manager, officials, etc.	12		
Professionals, etc.	12	46	
Craftsmen	15		
Sales workers	7		
Operatives	20		
Clerical	15		54
Laborers	8		
Service workers	11		
Total	100		

Military Occupation Group	1963 Per cent Distribution	Skilled Per cent	Unskilled Per cent
Electronics	17		
Other technical	8	52	
Mechanics	21		
Crafts	6		
Administrative	18		
Service	19		48
Untrained	21		
Total	100		

Source: Military data from Norman S. Paul, "Defense Manpower Requitements," Convertibility of Space and Defense Resources to Civilian Needs, Vol. Z. of Selected Readings in Employment and Manpower, U. S. Senate (Washington: Government Printing Office, 1964), pp. 618-632.

the Department of Defense (given the same skill level of both).

CHAPTER II

TESTING AN EMPIRICAL MODEL

I. THE HYPOTHESES

In an attempt to measure the impact of Federal purchases of goods and services on personal income distribution, the following hypotheses are presented for testing:

(1) In any given recent reay, the impact of Federal purchases of goods and services on income distribution is regressive.

(2) This impact is a result of an indirect mechanism of redistribution, characterized by the effect of Federal purchases on factor demand schedules.

(3) The regressive effect is increased if the Federal procurement mix shifts toward purchases requiring highly skilled inputs. It is decreased if the purchases are concentrated on goods and services requiring inputs of a lower skill and hence lower wage scale.

II. THE MODEL

Empirically it is necessary to measure the change in income distribution when Federal purchases of goods and services are subtracted from an economy with such purchases. The question being

asked is, "How do the Lorenz curves of income distribution shift?" Ideally two distributions are required:

(A) National income by income class
(B) National income by income class -- with no Federal sector.

Distribution (A) is the simpler of the two to derive. It can be constructed for 1960 from data published in the 1960 Census of Population and the Bureau of Labor Statistics' 1960-1961 Survey of Consumer Expenditures. The Census data provide a distribution of earnings of persons in the total labor force (civilian and military).[1] From the Survey of Consumer Expenditures, a relationship between average earnings and average capital income is derived.[2] (See Figure 1). Thus the average worker in the ($0-1000) earnings class has $90 of capital income. The $90 of capital income added to the midpoint of the earnings bracket ($90+$500 = $590) gives an average total income (labor plus capital income) for the first earnings class. The number of workers in that class are then multiplied by the new midpoint to give total income earned in the first earnings class. The same procedure is repeated for the remaining classes, thus

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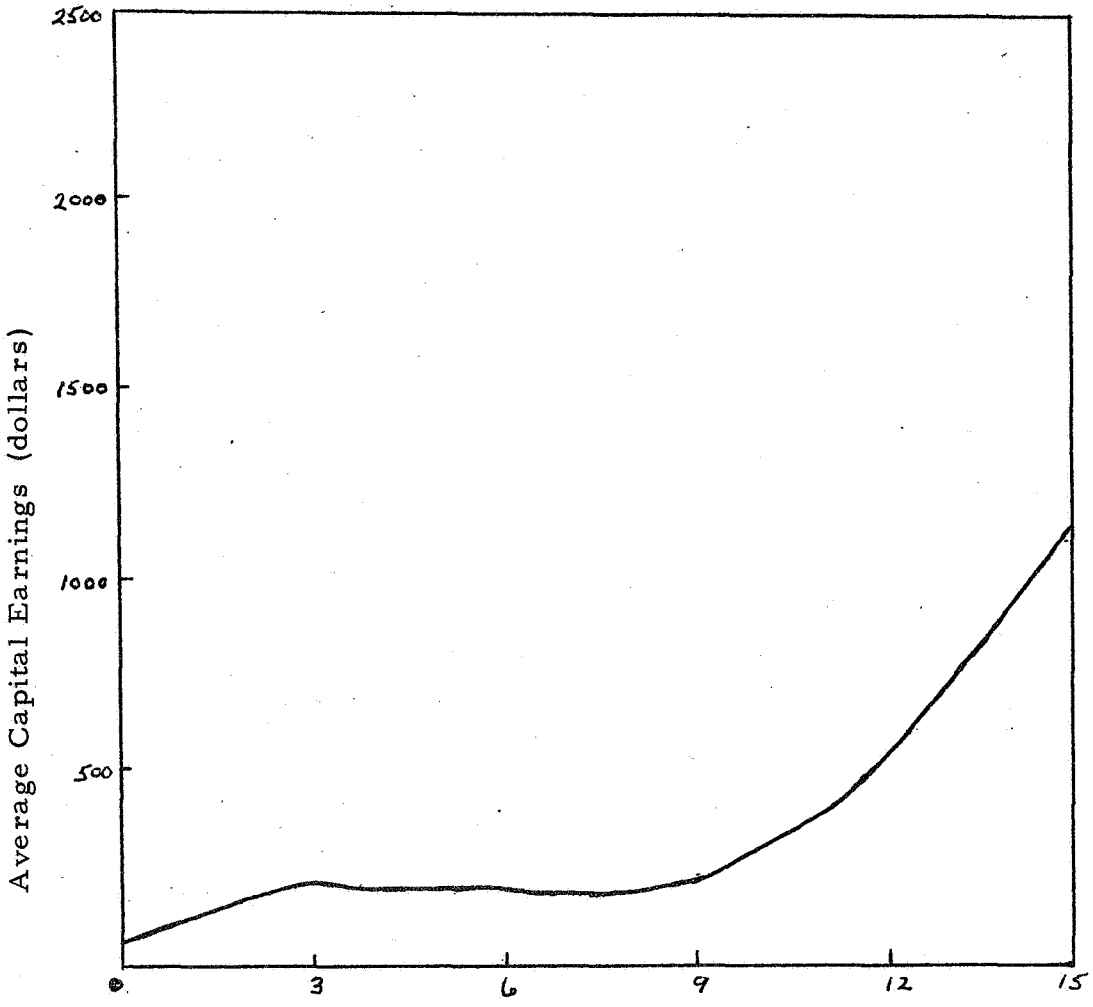
[1]U. S. Department of Commerce, Bureau of the Census, 1960 United States Census of Population, Summary, I (Washington: Government Printing Office, 1962), Table 208 and 222.

[2]U. S. Department of Labor, Bureau of Labor Statistics, 1960-61 Survey of Consumer Expenditures (Washington: Government Printing Office, 1966), pp. 12-13.

FIGURE I

RELATIONSHIP BETWEEN AVERAGE CAPITAL AND LABOR INCOME



obtaining a distribution of labor plus capital income. Percentages are taken of the above distribution and applied to the national income control total giving a distribution of national income by income class. This is Distribution (A).

Theoretically it is not possible to construct Distribution (B) unless the income, demand, and supply elasticities for all goods and inputs are known. These elasticities are necessary to understand how the economy would adjust without a Federal government final demand sector. However a proxy for Distribution (B) can be constructed.

This proxy for Distribution (B) is obtained through the use of a general equilibrium model of the American economy. By using this model, it is possible to measure the changes in income distribution if the Federal government's final demand were redistributed in the rest of the economy so as to keep total final demand constant. The factors hired (directly or otherwise) by Federal authorities are released for increased production of goods and services for private demand. Rather simple assumptions are made regarding consumers' reactions to the tax rebates that this analysis implies. Also industry production functions are specified and estimated to ascertain how firms produce the extra private output demanded by consumers. Thus in terms of general equilibrium economics, firms enter product markets as sellers and factor markets as buyers; households are

buyers in the product market and sellers in the factor market. Through a simultaneous clearing of the markets, the whole process hangs together.

Briefly, the following steps are taken: (1) factor shares of national income originating in each of twenty-four industries are estimated; (2) changes in factor incomes given a change in Federal final demand are determined; and (3) the earnings distribution is adjusted for changes in factor incomes.

Factor Share Estimation

A Cobb-Douglas production function is specified for each of the industries in a consolidated version of the 1958 input-output table.[3]

$$(1) \quad (V.A.)_j = L_{1j}^{\alpha 1j} L_{2j}^{\alpha 2j} \cdots L_{ij}^{\alpha ij} K_j^{1 - \sum_i \alpha ij}$$

where: $(V.A.)_j$ - value added by industry j

L_{1j} - professional workers employed in industry j

K_j - capital employed by industry j

α_{1j} - fraction of value added by industry j paid to professional workers.

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[3]Department of Commerce, Office of Business Economics, "The Transactions Table of the 1958 Input-Output Study and Revised Direct and Total Requirements Data," Survey of Current Business, VL (Sept., 1965), pp. 33-39.

The remaining labor groups (L_{2j}, etc.) are managers, officials, and proprietors; salesworkers; clerical and kindred workers; craftsmen, foremen, and kindred workers; operatives (semiskilled); service workers; and laborers and farm workers. A Cobb-Douglas production function is utilized primarily because of its analytic simplicity. As is well known, the shares of value-added paid out to the various productive factors are constant regardless of their unit prices and are equal to the exponents of equation (1). This function has, however, been found useful in a wide variety of empirical applications. By assumption, constant returns to scale exist, or the several factor shares sum to unity.

In order to estimate the coefficients of the production functions, an occupation by industry matrix (L_{ij}) is formed using information found in Table 209 of the 1960 Census of Population, Characteristics of the Population, A Summary, Vol. I.[4] Assuming that average earnings are the same in all industries for any one occupation, the numbers of persons in the j^{th} industry are multiplied by the average earnings of a person in the i^{th} occupation ($\overline{W}_i$). Algebraicly:

$$(2) \qquad W_{ij} = \overline{W}_i L_{ij}$$

---

[4]See Table IX in the Appendix for the occupation by industry matrix.

where W_{ij} measures the total earnings of the i^{th} occupation in the j^{th} industry.

The assumption of average earnings being the same over all industries for any one occupation is required since data is not available giving earnings by occupation by industry. This assumption implies the existence of perfect factor markets. However it must be noted that there may be risk premium differentials between wage rates of employees hired for non-government work and those of persons employed on Federal contracts. If employees on Federal projects have less job security, then they will demand a wage differential compensating them for the higher risk of being laid off.

Thus by using average wages, the results of the analysis can be understated. The extent of the understatement cannot be measured. However as a partial remedy, the labor groups used here are quite large and heterogeneous. The effect is to dilute the extent of any risk premium differential paid to any single occupation within each labor group.[5]

By dividing total earnings of each occupation in each industry by the summed earnings of all occupations ($\sum_i W_{ij}$) in each industry, the fraction of total earnings going to each occupation in each

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[5]For a detailed description of the estimation of the average annual earnings for each occupational group, see the Appendix.

industry (φ_{ij}) is obtained.[6]

$$(3) \quad \varphi_{ij} = W_{ij} \Big/ \sum_i W_{ij}$$

From the National Income and Product accounts, the feaction of value added by industry j paid to labor ($\sum_i \alpha_{ij}$) is determined:[7]

$$(4) \quad \sum_i \alpha_{ij} = \frac{\text{labor income in industry j}}{\text{National income originating in industry j}}$$

Equation (4) gives the control totals of value added paid to labor in each industry. To obtain each occupation's value added (α_{ij}), it is only necessary to multiply the share of earnings for each occupation found in (3) by the fraction of total value added to labor in each industry. Thus:

$$(5) \quad \alpha_{ij} = \varphi_{ij} \sum_i \alpha_{ij}$$

Capital's share of value added by industry j equals $1 - \sum_i \alpha_{ij}$

Hence a matrix (S_{aj}) of shares of value added going to the various factors in the different industries is formed.[8] Table III presents

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[6]See Table XI in the Appendix

[7]Labor's share of income is here assumed to include 75% of national income originating in unincorporated businesses. For a more complete discussion, see the Appendix.

[8]The subscript (a) is used in (S_{aj}) to denote the inclusion of all factors, labor and capital.

TABLE III

FACTOR SHARES OF NATIONAL INCOME BY INDUSTRY BY OCCUPATION: 1960 (S_{aj})

Industry	Total	Professional, technical, & kindred workers
Total	1.0000	.1322
Agriculture, forestry, & fisheries	1.0000	.0108
Mining	1.0000	.0855
Contract Construction	1.0000	.0555
Manufacturing	1.0000	.0905
furniture, lumber and wood products	1.0000	.0205
primary metal industries	1.0000	.0688
fabricated metal industries, including ordnance	1.0000	.1273
machinery except electrical	1.0000	.1131
electrical machinery	1.0000	.1849
motor vehicles and equipment	1.0000	.0678
other transportation equipment	1.0000	.2178
food and kindred products	1.0000	.0312
textile mill products	1.0000	.0248
apparel and other fabricated textile products	1.0000	.0159
printing, publishing and allied industries	1.0000	.1039
chemicals and allied products	1.0000	.1487
rubber products	1.0000	.0725
misc. manufacturing industries	1.0000	.0731
Transportation	1.0000	.0351
Communications	1.0000	.0959
Electric, gas and sanitary services	1.0000	.0579
Wholesale and retail trade	1.0000	.0248
Finance, insurance and real estate	1.0000	.0183
Services	1.0000	.3181
Government	1.0000	.5211

TABLE III (continued)

Industry	Managers, officials, proprietors including farm	Clerical and kindred workers
Total	.1594	.0949
Agriculture, forestry, & fisheries	.5365	.0033
Mining	.0769	.0484
Contract Construction	.1302	.0305
Manufacturing	.0668	.0795
furniture, lumber and wood products	.0916	.0483
primary metal industries	.0376	.0704
fabricated metal industries, including ordnance	.0798	.0983
machinery except electrical	.0747	.0910
electrical machinery	.0578	.0978
motor vehicles and equipment	.0280	.0616
other transportation equipment	.0437	.1058
food and kindred products	.0965	.0699
textile mill products	.0419	.0568
apparel and other fabricated textile products	.0651	.0591
printing, publishing and allied industries	.0938	.1177
chemicals and allied products	.0718	.0821
rubber products	.0678	.0814
misc. manufacturing industries	.0652	.0732
Transportation	.1325	.1377
Communications	.0746	.2520
Electric, gas and sanitary services	.0412	.0786
Wholesale and retail trade	.2686	.0982
Finance, insurance and real estate	.1062	.1425
Services	.0784	.0872
Government	.0955	.2099

TABLE III (continued)

Industry	Sales Workers	Craftsmen foremen and kindred workers
Total	.0603	.1330
Agriculture, forestry, & fisheries	.0012	.0047
Mining	.0038	.2130
Contract Construction	.0033	.5395
Manufacturing	.0318	.1944
furniture, lumber and wood products	.0163	.1860
primary metal industries	.0096	.3029
fabricated metal industries, including ordnance	.0184	.2547
machinery except electrical	.0188	.2834
electrical machinery	.0127	.1671
motor vehicles and equipment	.0057	.1940
other transportation equipment	.0049	.3407
food and kindred products	.0569	.1433
textile mill products	.0117	.1332
apparel and other fabricated textile products	.0252	.0643
printing, publishing and allied industries	.1644	.2667
chemicals and allied products	.0388	.1331
rubber products	.0214	.1480
misc. manufacturing industries	.0230	.1468
Transportation	.0072	.1953
Communications	.0103	.1866
Electric, gas and sanitary services	.0052	.1921
Wholesale and retail trade	.2472	.0788
Finance, insurance and real estate	.0862	.0087
Services	.0082	.0794
Government	.0009	.0659

TABLE III (continued)

Industry	Operatives and kindred workers	Service workers, including private household
Total	.1295	.0445
Agriculture, forestry, & fisheries	.0118	.0008
Mining	.3718	.0039
Contract Construction	.0627	.0021
Manufacturing	.3026	.0066
furniture, lumber and wood products	.3573	.0059
primary metal industries	.2419	.0079
fabricated metal industries, including ordnance	.2948	.0069
machinery except electrical	.2491	.0059
electrical machinery	.3055	.0058
motor vehicles and equipment	.2863	.0073
other transportation equipment	.2069	.0072
food and kindred products	.3357	.0092
textile mill products	.5341	.0085
apparel and other fabricated textile products	.6816	.0045
printing, publishing and allied industries	.0842	.0043
chemicals and allied products	.1694	.0075
rubber products	.3726	.0068
misc. manufacturing industries	.3079	.0056
Transportation	.3408	.0165
Communications	.0044	.0048
Electric, gas and sanitary services	.0658	.0042
Wholesale and retail trade	.0918	.0604
Finance, insurance and real estate	.0015	.0107
Services	.0528	.1504
Government	.0190	.0752

TABLE III (continued)

Industry	Laborers including farm	Capital
Total	.0342	.2121
Agriculture, forestry, & fisheries	.1255	.3054
Mining	.0000	.1967
Contract Construction	.0850	.0912
Manufacturing	.0293	.1985
furniture, lumber and wood products	.1353	.1388
primary metal industries	.0709	.1900
fabricated metal industries, including ordnance	.0242	.0956
machinery except electrical	.1035	.1505
electrical machinery	.0108	.1576
motor vehicles and equipment	.0163	.3330
other transportation equipment	.0138	.0592
food and kindred products	.0369	.2204
textile mill products	.0223	.1667
apparel and other fabricated textile products	.0055	.0788
printing, publishing and allied industries	.0053	.1597
chemicals and allied products	.0224	.3262
rubber products	.0231	.2064
misc. manufacturing industries	.0275	.2777
Transportation	.0610	.0738
Communications	.0018	.3696
Electric, gas and sanitary services	.0384	.5166
Wholesale and retail trade	.0196	.1106
Finance, insurance and real estate	.0031	.6228
Services	.0108	.2147
Government	.0124	.0000

Source: The figures are derived from data published in the 1960 Census of Population, Characteristics of the Population, A Summary, Vol. 1, Table 209 and the Survey of Current Business (July, 1961), pp. 17-19.

such a matrix for 1960.

Calculation of Factor Income Changes

Turning now to the next step, certain vectors of value added by industry (P_j) are specific. These vectors differ according to various assumptions adopted regarding changes in final demand. A value added by industry vector is constructed by first solving the matrix equation:

$$(6) \qquad \left\{O_j\right\} = \left[I - b_{xy}\right]^{-1} \left\{F_j\right\}$$

where O_j - a vector of total direct and indirect 1960 outputs for each industry j.

$[b_{xy}]$ - a consolidated version of the 1958 Office of Business Economics' input-output table showing the direct purchases from industry x per dollar of output by industry y.[9]

F_j - a vector of total 1960 final demand for each industry j,

and then multiplying the 1960 outputs by the 1958 ratios of value added to total output, i.e.

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[9]The consolidation is necessary in order that the input-output study data conform with the industrial breakdown of the national income data. The foreign sector is omitted since the present study is concerned solely with income redistribution caused by Federal purchases of domestic goods and services. Also the 1960 final demand figures are deflated to 1958 values since the input-output table is in 1958 prices. For the direct requirements, see Table XII in the Appendix.

$$(7) \quad \left[V.A._j/O_j\right]_{1958} \left[O_j\right]_{1960} = \left[P_j\right]_{1960}$$

The above stated procedure implicitly assumes that the 1958 industrial structure was similar enough to that of 1960 in that it could be applied to 1960 data. The assumption of a constant value added per unit of output also implies constant prices for the output of industry j. In the closing pages of Chapter I, the constancy of output prices was posited for small changes in output. The question then arose as to how meaningful it is to assume output price constancy when total Federal procurement is eliminated. However since the changes in output and hence value added are small for most industries (except for a few such as government), there does not appear to be much danger in making the assumption. But if output changed quite radically, the case for a constant $\left[V.A._j/O_j\right]$ is weakened. The procedure of equations (6) and (7) is repeated three times giving a total of four value added by industry vectors:

P_j^1 - value added by industry j under present conditions,

P_j^2 - value added by industry j assuming that Federal final demand is discontinued and is allocated to industry j in proportion to existing distributions of value added in other final demand sectors,

P_j^3 - value added by industry j assuming that Federal defense/space final demand is discontinued and is allocated to

industry j in proportion to existing distributions of value added in other final demand sectors,

P_j^4 - value added by industry j assuming that Federal defense/space final demand is allocated to industry j in proportion to the existing distribution of non-defense Federal government expenditures.[10]

The foregoing estimation of the different value added vectors represents an important portion of the method used in this research. For the first time, an attempt is made to take account of the fact that the factors hired (directly and indirectly) by the Federal government have an opportunity cost. This opportunity cost must be measured and deducted from those factors' total income to arrive at a meaningful measure of the impact of government purchases on income distribution. The assumptions regarding the allocation of Federal procurement are admittedly unsophisticated for they do not take note of the varying income elasticities for different goods.[11]

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[10] For value added by industry under each assumption, see Table XIV in the Appendix; for the control totals of 1960 final demand and the final demand under each assumption, see Tables VII and XIII in the Appendix. Federal government final demand is divided between defense/space and nondefense expenditures to test for any differential impact on income distribution of these two categories of Federal purchases. The Appendix explains the procedure for this division further.

[11] Implicitly it is assumed that all income elasticities are equal to unity since for a rise in income, (continued on next page)

However the fact remains that previous writers in the field have wholly neglected the measurement of the opportunity incomes.[12]

The next step is to find the change in value added by industry (ΔP_j) due to the assumptions regarding the allocation of Federal purchases. This is obtained by consecutively subtracting the second, third and fourth value added vectors from the first. Thus,

$$(8) \quad \Delta P_j = P_j^1 - P_j^2 \text{ or } P_j^1 - P_j^3 \text{ or } P_j^1 - P_j^4$$

Now by combining the matrix of shares of income received by each factor in each industry with the change in value added due to the assumed change in Federal procurement, the change in value added paid to each factor (ΔP_a) is derived. Algebraically,

$$(9) \quad \left\{\Delta P_j\right\} \cdot \left[S_{aj}\right] = \left\{\Delta P_a\right\}$$

Dividing the change in income of input (a) by the quantity of (a), which is assumed fixed, the change in earnings per unit of factor (a) is obtained. This change in earnings/unit measures the change in wage rates and the rental per unit of capital caused by the Federal government's final demand. In terms of the theory of fiscal impact set forth in Chapter I, these price changes represent the (vertical)

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[11](continued from last page) individuals are assumed to spend it on goods in the same proportions as before the rise.

[12]See footnote 2 of Chapter I for reference to these authors.

increases or decreases of each factor's demand curve.[13] This procedure is repeated for each assumption made regarding the allocation of Federal final demand.

For the results to support the hypothesis of a regressive Federal impact, the changes in the skilled factors' and capital's incomes should be negative while the reverse should hold for changes in the lower skilled inputs' incomes.

Adjustment of Earnings Distribution

A further test of the hypothesis concerns what happens to the concentration of the distribution of income when certain Federal purchases are no longer assumed to exist. The difference between Distributions (A) and (B) measures the income redistribution caused by Federal purchases Distribution (A) was described above. Distribution (B) is obtained by adjusting the earnings distributions of (A) for the per cent changes in earnings found in equation (9) above.

Perhaps examples might best explain this last part of the estimating procedure:

> Assume a ten percent decrease in earnings per unit for professional workers and hence a ten percent drop in total earnings for that factor.

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[13] Remembering of course that the supply of each factor is held constant.

Assume three income brackets for simplicity.

(1) Earnings Bracket 0-1000

Professional Workers Before 10% Decrease	20
Professional Workers After 10% Decrease	20 + 3.33 = 23.33

(2) Earnings Bracket 1000-2000

Professional Workers Before 10% Decrease	30
Professional Workers After 10% Decrease	30 - 3.33 + 11.10 = 37.77

(3) Earnings Bracket 2000-3000

Professional Workers Before 10% Decrease	50
Professional Workers After 10% Decrease	50 - 11.10 = 38.90

For earnings bracket one, anyone whose income was initially less than \$1000/.9 = \$1,111 is now in this first bracket. Hence (111/1000) (30) = 3.33 workers move from the second earnings class to the first. For earnings bracket two, anyone whose earnings were initially less than 2000/.9 = \$2,222 is now in this bracket. Thus (222/1000) (50) = 11.10 workers move from the third to the second bracket. Therefore the numbers in the three classes become 23.33, 37.77, and 38.90 respectively. The same procedure is then repeated for the remaining labor groups. Then the distributions are summed over all occupations to obtain a new labor income distribution.

Capital income is treated somewhat differently. Given the average amount of capital earnings received by each wage earner in each bracket (page 24 above), it is assumed that a rise of 10 percent

in capital income means a rise of 10 percent in each bracket. Figure 1 above would shift upward by 10 percent. The new midpoint for the [$0-1000] earnings bracket would be $500 + $90 + $9 = $599. The number of workers in each class are then multiplied by the new midpoint to get a distribution of total factor earnings. Percentages are calculated and applied to the national income control total obtaining a distribution of national income by class size. This is Distribution (B).

The above procedure is repeated for each assumption regarding the allocation of Federal purchases.

For the hypotheses stated at the beginning of this chapter to hold, the concentration of the new income distribution, i.e. (B) must have lessened. The change in the Gini coefficient of concentration and the measure of relative dispersion must be negative.[14]

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[14] For further details on the measures of concentration of income distribution, see the Appendix.

CHAPTER III

RESULTS AND CONCLUSIONS

I. LIMITATIONS OF THE STUDY

Perhaps a word of warning is in order before the results of the analysis are presented. The most basic limitation to bear in mind is that there is no single size distribution of income which can definitely establish whether income inequality has changed. Any particular income distribution yields a picture of income inequality which is determined to a significant degree by the selection of definitions of income, income receiving unit, and income period. The above fact is easily recognized in this study by observing that there are at least two methods to measure the impact of government expenditures on personal income distribution. These methods complement each other since they attempt to clarify different parts of the overall picture. The benefit approach measures the effect of free goods in income distribution while the cash flow method quantifies the impact of government demands on factor returns.

The present study is cross-sectional in nature. 1960 is the only year analyzed. Thus there is the limitation that the results cannot be applied directly to other years. Data deficiencies prevented

study of later years, especially those of the Vietnam War. However the basic conclusions appear to have relevance for years later than 1960. Another deficiency pertains to the assumptions regarding the allocation of the Federal fiscal demand to the other demand sectors. If the income elasticities of all goods were known, a more realistic distribution of the Federal government's final demand could be attained. However, again the main results appear to still hold.

The remaining limitations are mainly those of data. Hence, since there is no distribution of earnings crossclassified by industry and occupation, the average wage for each occupation is assumed to hold over all industries. The use of an average wage may overstate the results since it doesn't take account of the possible existence of a risk premium differential paid to employees of defense-related firms. The possible overstatement is reduced by utilizing rather large, heterogeneous occupational groups which tend to eliminate the importance of the pay differential. The treatment of the opportunity income of military personnel is crude. However the available data suggest a military skill-mix not too unlike its civilian counterpart. Thus the income shares paid to each factor remain unchanged as do the final results when military personnel are included. Civilian government employees represent the aggregate of all levels of government since an occupational breakdown for Federal and state and local workers doesn't exist. However, again the incomplete data

that is available suggest a similarity between the skill mixes of the two levels of government. Hence the basic results still hold (see Table X in the Appendix). The final necessary assumption is that the 1958 interindustry coefficients accurately reflect economic conditions in 1960.

II. THE RESULTS

The principal hypothesis maintains that Federal purchases of goods and services have a regressive impact on personal income distribution. The effect of Federal purchases is thought to be regressive on income mainly because of its differential impact on factor earnings. If Federal final demand requires more capital intensive (human or otherwise) factors than labor inputs, then the earnings of these capital intensive inputs are raised relative to those of the nonskilled.[1]

In testing the proposition regarding Federal procurement, the opportunity incomes of the inputs hired for Federal contracts must be deducted from what these factors actually earn to ascertain the changes in income brought about by Federal demand. Further, Federal final demand is divided into defense and nondefense categories

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[1]When the phrase "capital intensive" is used, it refers to both human and nonhuman capital.

in order to test for differential distribution effects due to changes in the procurement mix. Specifically, it is suggested that defense purchases require more capital intensive inputs relative to nondefense demand. Thus defense purchases should make for a more regressive income impact than total Federal purchases.

The basic results are summarized in Tables IV and V. For the hypothesis pertaining to Federal purchases to hold, the Gini coefficient of concentration and the measure of relative dispersion should decrease when Federal final demand is allocated to the remaining demand sectors.[2] The Gini coefficients decrease from .485 to .479 for labor income and from .486 to .483 for national income. However, the measures of relative dispersion do not change in value at all. Also, note that while the differences in the Gini coefficients are negative, they are very small (-.006 for labor income and -.003 for national income). These figures indicate that Federal government purchases of goods and services have a neutral impact on the distribution of labor and national income. This conclusion is rather startling since Federal procurement represents almost 10 percent of 1960 Gross National Product.

Table V provides further evidence of the neutral effect of

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[2]A decrease in income inequality if the Federal demand is assumed away is equal to an increase in inequality if the government were introduced into a non-government economy.

TABLE IV

MEASURES OF INCOME INEQUALITY

Item	Gini Coefficient of Concentration	Changes in the Gini Coefficient	Relative Dispersion $V = S/\overline{X}$
National Income	.486		.78
Labor Income	.485		.76
National Income (A-1)[1]	.483	-.003	.78
Labor Income (A-1)	.479	-.006	.76
National Income (A-2)[2]	.483	-.003	.78
Labor Income (A-2)	.477	-.008	.76
National Income (A-3)[3]	.486	.000	.78
Labor Income (A-3)	.484	-.001	.77

[1]Assumes Federal final demand is allocated to other demand sectors on a pro rata basis.

[2]Assumes Federal defense final demand is allocated as in 1 above.

[3]Assumes Federal defense demand is allocated to Federal non-defense demand on a pro rata basis.

TABLE V

NATIONAL INCOME RECEIVED BY EACH FACTOR IN 1960
UNDER THREE ASSUMPTIONS

Factor	National Income (billions of $)	Percent Change A-1*	Percent Change A-2	Percent Change A-3
Professional, technical, and kindred	53.5	-9.0	-5.4	7.1
Managers officials proprietors including farm	64.5	2.6	2.6	2.4
Clerical and kindred	38.4	-2.1	-1.0	2.6
Sales workers	24.4	7.0	4.9	-2.0
Craftsmen, foremen, and kindred	53.8	-2.6	-2.6	-3.7
Operatives and kindred	52.4	-0.4	-1.7	-6.1
Service workers including private household	18.0	-1.7	-1.1	1.7
Laborers including farm	13.8	1.4	1.4	2.2
Capital	85.7	4.5	3.1	-2.4

* See Table IV for explanation of the assumptions.

Federal demand in income distribution. Here the percent changes in income for each factor are shown. Again, for the hypothesis to hold, the changes in income should be negative for the capital intensive factors and positive for lower skilled ones. Thus, a professional's income should and does decrease while a laborer's income should and does increase. However the significant feature is that the size of the income changes is very small (less than 5.0 percent) with the exceptions of professionals and sales workers. (The relevant figures in Table V are those pertaining to Assumption 1.)

The most probably explanation for this neutral impact of Federal purchases is that the numerous interindustry effects wash-out most of any income change. To produce fighter aircraft requires skilled inputs, but in producing the planes, further demand is generated in industries requiring mainly unskilled labor. This fact is brought out clearly by studying the direct and total requirements table of an input-output study. In varying degrees, the output of every industry depends on every other industry. Thus the highly interdependent nature of the United States economy makes for a neutral impact on personal income distribution when the industrial composition of final demand is altered.

The second hypothesis that Federal defense purchases have a more regressive impact than total Federal procurement fares no better than the first proposition. (See Assumption 2 of Tables IV

and V). The Gini coefficient does decline farther (-.008) when only defense demand is allocated to the remaining sectors, but the change is again insignificant. This is not surprising since defense demand comprises 78 percent of 1960 Federal purchases, and the total procurement was neutral in effect. Thus, both defense and total Federal purchases have a neutral impact on income distribution.

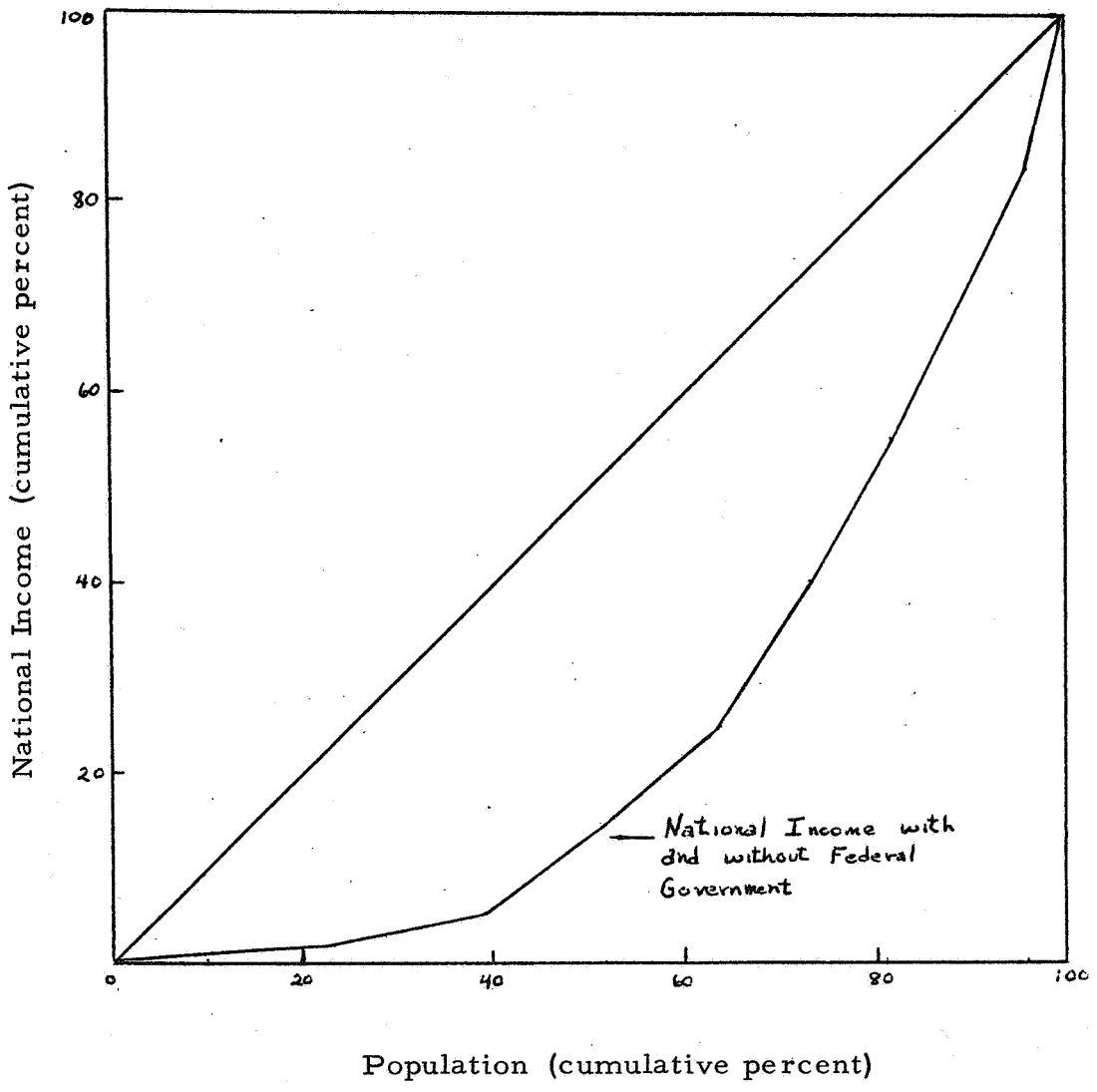
Even when defense demand is allocated only to the nondefense sector, there is very little change in the measures of income concentration (Assumption 3, Tables IV and V). Figure 2 presents graphical evidence of the neutrality of Federal purchases on income distribution. Here the Lorenz curves of national income under each of the three assumptions regarding the disposition of Federal demand are given. There is no change -- the same curve can represent all of them.

The conclusion drawn from the above discussion is that Federal procurement expenditures have a neutral impact on income distribution. The significance of this result is reinforced when notice is taken that the neutrality obtains over a wide range of possible assumptions regarding the industrial reallocation of Federal final demand.

Before concluding this section, there is one interesting sidelight that should be mentioned. For Assumptions 1 and 2, nonhuman capital's income share rises when the hypothesis suggests it should fall (+4.5 percent for Assumption 1 and +2.9 percent for Assumption

FIGURE 2

DISTRIBUTION OF NATIONAL INCOME: 1960



2). There is a logical explanation for this phenomenon. Even though there is no capital income originating in the government industry, the Federal government does generate capital income in the form of giving progress payments and plant and equipment to Federal contractors free of interest.[3] Hence these contractors have their total interest requirements reduced by these Federal payments since otherwise they would have to raise this capital through the private market. Now, when the Federal government's final demand is allocated to other sectors of the economy, the capital demand curves are shifted upward instead of downward. Therefore there is a positive income change. This occurs because the same total final demand is produced, but now there are no unmeasured capital outlays of the government. Thus firms must go into the capital market more heavily than before in producing the same total output.

IV. POLICY IMPLICATIONS

In terms of Richard Musgrave's public sector model,[4] the above research appears to have some interesting implications. Briefly reviewed, the managers of the three branches of government,

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[3]Mrray L. Weidenbaum, "Arms and the American Economy: A Domestic Convergence Hypothesis," American Economic Review, LVIII (May, 1968), p. 429.

[4]Musgrave, op. cit., pp. 3-26.

Allocation, Distribution, and Stabilization, are assumed to prepare their budgets independently of each other. Each takes as given that the others will perform their respective jobs. In theory, " . . . the degree of income redistribution is determined independently of the scope of resource allocation for the satisfaction of social wants . . . In practice the two issues are mixed with each other."[5]

The present analysis attempts to explore the above interrelation of functions. The results point toward neutrality of Federal purchases (the Allocation function) on income redistribution. Hence, at least for 1960, the Distribution and Allocation functions were determined independently of each other.

But it has been suggested by President Johnson that the Federal government will have to hire the "hard-core" unemployed if private industry cannot. If this development occurs, the government would be attempting redistribution of income through purchases of goods and services. In Mr. Musgrave's terminology, the Allocation branch would be used to attain the Distribution branch's goals. The data for assumptions 1, 2, and 3 of Tables IV and V indicate that redistribution of income might not be attained. The results show that there is no change in income distribution given that Federal procurement expenditures are allocated to other sectors of final demand. Thus if

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[5] Ibid., p. 40.

the government wishes to change the size distribution of income, it is suggested that it do so using direct transfer payments and not purchases of goods and services.

V. AREAS FOR FURTHER RESEARCH

The method employed in this research lends itself to other questions in the income distribution field. First of all the unit of government does not have to be limited to the Federal sector. States or regions wishing to understand better the impact of changes in government expenditures can follow much of the analysis developed above. Instead of a national interindustry study, a regional input-output study is required as is regional income data. The closing of a military base or the loss of a major Federal contract are only two examples of the type of change that might be analyzed regionally.

It was indicated quite early in the research that a relevant income measure of redistribution must be net of the opportunity income which the inputs hired for government contracts can earn. The studies using the benefit approach also must be aware that there is an alternative cost to be deducted from the total value of the benefits of free goods. Previous research generally has not considered opportunity costs as relevant for analysis. However the magnitude of any income redistribution is clearly overstated if the concept is not utilized. Therefore to obtain more nearly correct results the oppor-

tunity cost measure is extremely relevant.

In general there is a need for much more study of problems concerned with income distribution. Many of this nation's social problems are aggravated by the fact that there are individuals who are very poor. When Congress enacts legislation to help these people, it should be aware of such factors as the impact on income distribution.

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APPENDIX

The following procedure is utilized in estimating the average annual earnings of the various occupations:

(1) From the 1960 United States Census of Population, Summary, Vol. I, Table 208, "Earnings in 1959 of Persons in the Civilian Labor Force by Occupation and Sex for the United States: 1960," the number of persons in each earnings class is multiplied by the class midpoint and the product summed over classes for each occupation. This step gives total money earnings for each occupation.

(2) To obtain the midpoints of the $10,000 and over earnings bracket, a Pareto curve is fitted to each occupation's distribution of earnings. (See Figure 3). Use is made of the formula: $\bar{X} = S\ (V/V-1)$ where V equals the slope of the line passing through points A and B of Figure 3.[1] Thus $V = {}^{c-d}/_{b-a}$ where:

$\bar{X}$ - the estimated mean in the open end interval
X - lower limit of the open end interval, i.e. $10,000

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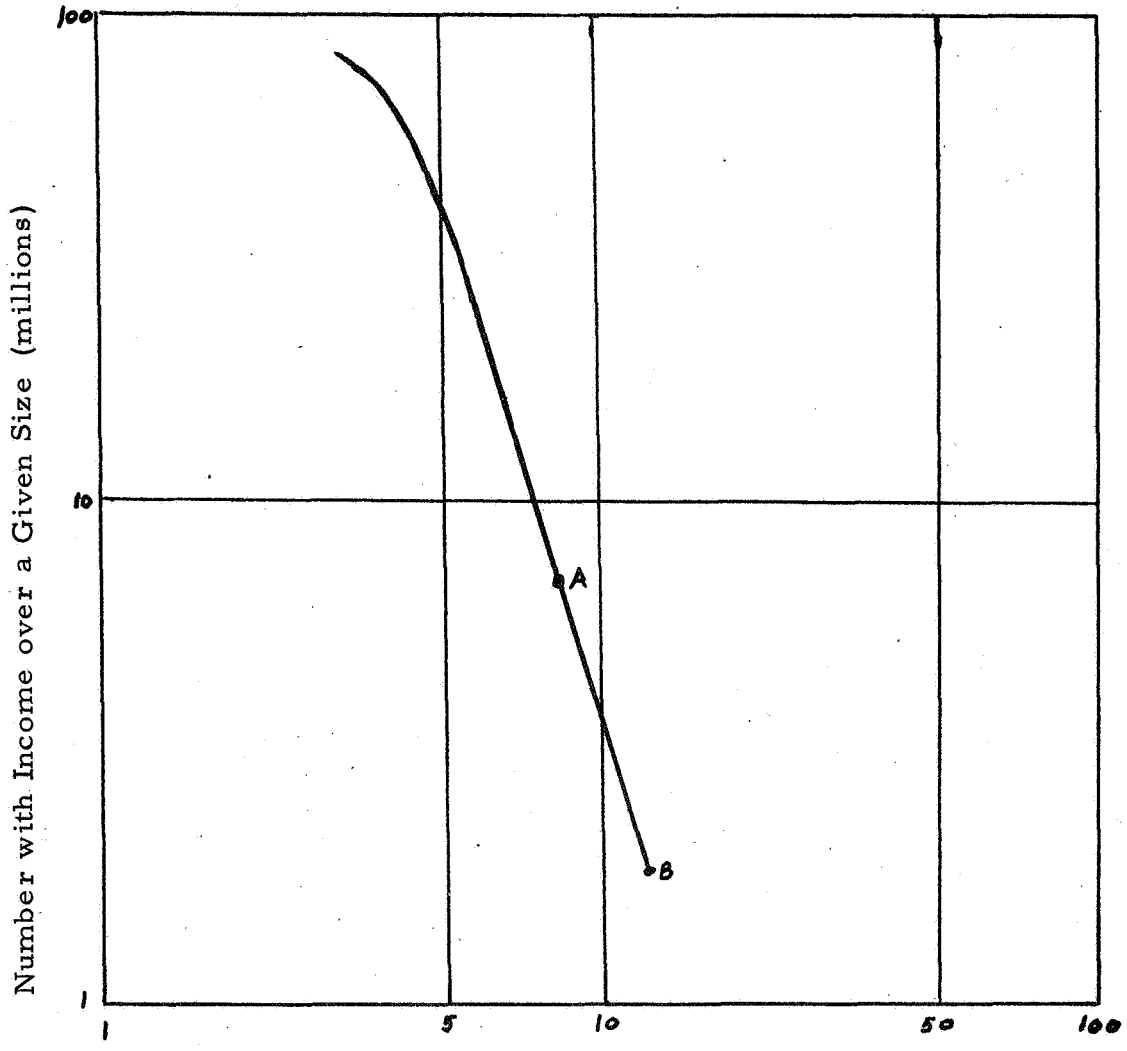
[1] U. S. Department of Commerce, Bureau of the Census, Trends in the Income of Families and Persons in the United States: 1947-1964 (Technical Paper No. 17; Washington: Government Printing Office, 1967), p. 36; for further comments see: R. G. D. Allen, Mathematical Analysis for Economists (New York, St. Martin's Press, Inc., 1964), pp. 407-408; Lawrence R. Klein, An Introduction to Econometrics (Englewood Cliffs, N.J.: Prentice-Hall Inc., 1962), pp. 152-153.

FIGURE 3

PARETO CURVE SHOWING DISTRIBUTION OF PERSONS BY INCOME LEVELS IN 1960 FOR THE U. S.



a - logarithm of the lower limit of the interval preceding the open end bracket.
b - logarithm of the lower limit of the open end interval.
c - logarithm of the sum of the frequencies in the open end interval and the one preceding it.
d - logarithm of the frequency in the open end interval.

Table VI gives the estimated midpoints of the various occupations for 1960.

(3) Dividing the total money earnings for each occupation found in (1) above by the number of persons in each occupation gives the average annual earnings. Thus $(\bar{W}_i)$ is obtained for each occupation.

In estimating labor's share of national income, it is assumed that labor's share equals compensation to employees plus 75 percent of unincorporated business income. The 75 percent figure is obtained by applying the ratio of the property income share to the labor income share of the economy excluding unincorporated business income to the unincorporated business income.[2] Compensation of employees

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[2]For further discussion of labor's income share, see: Irving B. Kravis, The Structure of Income, Some Quantitative Essays (Philadelphia, Pa.: University of Pennsylvania Press, 1962), p. 124; D. Gale Johnson, "Allocations of Agricultural Income," Journal of Farm Economics, XXX (Nov., 1948), pp. 724-729. Mr. Kravis gives four possible measures of the labor income component of unincorporated business income:

(1) The rate of yield on entrepreneurial capital equals the rate on corporate capital.
(2) The annual value of the labor services of an entrepreneur equals what he could have earned elsewhere.
(3) Assume a constant proportion between labor's and capital's income shares.

(continued on next page)

TABLE VI

ESTIMATED MIDPOINT OF THE $10,000+ INCOME CLASS FOR 1960

Occupation	1960 Average Earnings (dollars)	Midpoint of $10,000 income class (dollars)
Professional, technical, and kindred workers	6338	16,483
Managers, officials, proprietors including farm	6985	20,256
Clerical and kindred workers	3536	12,048
Sales workers	4508	16,246
Craftsmen, foremen, and kindred workers	5274	12,602
Operatives and kindred workers	3771	11.894
Service workers including private household	2153	12,242
Laborers including farm	2621	11,948

Source: Derived from 1960 U. S. Census of Population, Summary, Vol. 1, Table 208, "Earnings in 1959 of Persons in the Civilian Labor Force by Occupation and Sex, for the United States: 1960."

by industry and unincorporated business income by industry for 1960 are found in the Survey of Current Business.[3] Adding together compensation of employees and three-fourth of unincorporated business income by industry gives national income going to labor by industry.

The control totals for 1960 final demand that are applied to the 1958 percentage composition of final demand (Table VII) is presented below.

TABLE VII

1960 FINAL DEMAND COMPONENTS IN 1958 PRICES

	(billions)	
Personal Consumption Expenditures	$ 316.1	
Gross Private Domestic Investment	72.4	
Federal Government Purchases	51.4	
Defense/Space*	43.1	
Nondefense	8.3	
State and Local Government Expenditures		43.5
Total		483.4

*The category "defense/space includes Department of Defense, Atomic Energy Commission, and National Aeronautics and Space Agency. The term "nondefense" includes all other Federal procurement.

Source: Paul Biederman (ed.), Economic Almanac, 1967-68 (National Industrial Conference Board; New York: Macmillan Company, 1967), p. 116.

[2](continued from last page)

(4) Apply the ratio of labor's income share to corporate capital's income share to unincorporated business income.

[3]U. S. Department of Commerce (continued on next page)

Federal government procurement is divided between defense/space and nondefense expenditures to test for any differential impact on income distribution of these two categories of Federal purchases. The industrial composition of defense expenditures is not presented in the original 1958 input-output data, although such a breakdown does exist for 1965.[4] At first it was thought that the 1965 data could be applied to the 1960 control total for defense/space. But this idea proved unfruitful since there had been numerous industrial changes in defense demand in the interim period. The approach adopted consisted of allocating nondefense demand to industries and then finding the defense/space industry breakdown as the residual. This proved to be relatively easy. Specifically: (a) the July, 1961, Survey of Current Business gives the nondefense expenditures for construction and wages and salaries[5]; (b) nondefense construction expenditures are allocated to the construction industry while nondefense wages and salaries go to the government industry. These two items represent 73 percent of the 1960 nondefense final demand.

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[3](continued from last page) Office of Business Economics, Survey of Current Business, XLI (July, 1961), pp. 25-26.

[4]Richard P. Oliver, "The Employment Effect of Defense Expenditures," Monthly Labor Review, XC (Sept., 1967), pp. 9-16.

[5]U. S. Department of Commerce, Office of Business Economics, Survey of Current Business, XLI (July, 1961), pp. 19-20.

(c) The distribution of the remaining 27 percent of nondefense final demand was aided by the "Gross Obligations Incurred, Fiscal Year 1964" series found in the Treasury Bulletin.[6] This source provides an industrial breakdown of gross obligations incurred by nondefense agencies. A percentage distribution is obtained and applied to the remainder of the unallocated nondefense demand. Table VIII gives an industrial breakdown of final demand by sector.

The difference between Distributions (A) and (B) as measured by the Gini coefficient of concentration and the relative dispersion show the impact on income distribution of Federal purchases of goods and services.

The Gini coefficient of concentration is used as a numerical estimate of the relative equality of a distribution.[7] It is a measure of income concentration derived from the Lorenz Curve. The Lorenz Curve is obtained by plotting the cumulative percent of persons (on the X axis) against the cumulative percent of the aggregate

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[6]U. S. Department of the Treasury, "Gross Obligations Incurred, Fiscal Year 1964," Treasury Bulletin (Sept., 1967), p. 22.

[7]Named for Corrado Gini, an early twentieth century mathematician who worked on the problem of measuring equality of income distributions. For further discussion and references see Mary Jean Bowman, "A Graphical Analysis of Personal Income Distribution in the United States," American Economic Review, XXXV (Sept. 1945).

TABLE VIII

INDUSTRIAL COMPOSITION OF FINAL DEMAND: 1958

Industry	Personal Consumption Expenditures	Gross Private Domestic Investment
Agriculture, forestry, and fisheries	.0170	.0172
Mining	.0010	-.0018
Contract construction	.0000	.5940
Manufacturing	.3678	.2931
furniture, lumber, and wood products	.0095	.0157
primary metal industries	.0001	-.0027
fabricated metal industries including ordnance	.0030	.0128
machinery except electrical	.0017	.1447
electrical machinery	.0159	.0399
motor vehicles and equipment	.0324	.0490
other transportation equipment	.0027	.0193
food and kindred products	.1612	.0040
textile mill products	.0051	-.0014
apparel and other fabricated textile products	.0432	-.0020
printing, publishing, and allied industries	.0086	.0002
chemicals and allied products	.0008	-.0004
rubber products	.0046	.0003
misc. manufacturing industries	.0790	.0137
Transportation	.0305	.0106
Communications	.0138	.0058
Electric, gas, and sanitary services	.0284	.0000
Wholesale and retail trade	.2169	.0613
Finance, insurance, and real estate	.1824	.0194
Services	.1389	.0004
Government	.0033	.0000
Total	1.0000	1.0000

TABLE VIII (continued)

Industry	Federal Government Purchases	
	Total	Defense/ Space
Agriculture, forestry, and fisheries	.0192	
Mining	.0042	
Contract construction	.0876	.0888
Manufacturing	.3201	.4885
furniture, lumber, and wood products	.0009	.0030
primary metal industries	.0087	.0118
fabricated metal industries including ordnance	.0489	.0740
machinery except electrical	.0204	.0296
electrical machinery	.0381	.0592
motor vehicles and equipment	.0060	.0089
other transportation equipment	.1403	.2130
food and kindred products	.0010	.0030
textile mill products	.0011	.0030
apparel and other fabricated textile products	.0028	.0030
printing, publishing, and allied industries	.0018	.0030
chemicals and allied products	.0145	.0237
rubber products	.0023	.0030
misc. manufacturing industries	.0333	.0503
Transportation	.0282	.0385
Communications	.0033	.0030
Electric, gas and sanitary services	.0068	.0118
Wholesale and retail trade	.0126	.0178
Finance, insurance, and real estate	.0022	.0030
Services	.1212	.1775
Government	.3946	.1716
Total	1.0000	1.0000

TABLE VIII (continued)

Industry	Federal gov't. Purchases Nondefense	State and Local gov't. Expenditures
Agriculture, forestry, and fisheries	.1299	-.0007
Mining	.0260	.0015
Contract construction	.1948	.3844
Manufacturing		.0703
furniture, lumber, and wood products		.0046
primary metal industries		.0000
fabricated metal industries including ordnance		.0014
machinery except electrical		.0069
electrical machinery		.0027
motor vehicles and equipment		.0109
other transportation equipment		.0009
food and kindred products		.0068
textile mill products		.0002
apparel and other fabricated textile products		.0023
printing, publishing, and allied industries		.0043
chemicals and allied products		.0060
rubber products		.0019
misc. manufacturing industries		.0213
Transportation	.0130	.0100
Communications	.0130	.0047
Electric, gas, and sanitary services		.0121
Wholesale and retail trade		.0046
Finance, insurance, and real estate		.0106
Services	.0260	.0247
Government	.5974	.4778
Total	1.0000	1.0000

Source: Derived from "The Transactions Table of the 1958 Input-Output Study," Survey of Current Business, VL (Sept., 1965), pp. 33-39.

money income accounted for by these persons (on the Y axis), as shown in Figure 4. If all units had exactly the same income, the Lorenz Curve would be represented by the diagonal shown in the diagram. Curves drawn to the actual data usually fall to the right of this line. The greater the area between the diagonal line and the Lorenz Curve, the greater is the inequality in the distribution of income.

The Gini Coefficient of Concentration is defined as the ratio of the area between the diagonal and the Lorenz Curve to the total area beneath the diagonal.[8] In Figure 4, it is the shaded area divided by the total area beneath the 45° ray.

The coefficient's value can range from +1 to -1, ±1 representing perfect equality. The sign is important. Positive values denote that most or all of the area between the Lorenz Curve and the diagonal is below the 45° ray and hence indicates a regressive distribution. The opposite obtains if the Gini Coefficient is negative.[9]

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[8]U. S. Department of Commerce, Bureau of the Census, Trends in the Income of Families and Persons in the United States: 1947-1964 (Technical Paper No. 17; Washington: Government Printing Press, 1967), pp. 34-36.

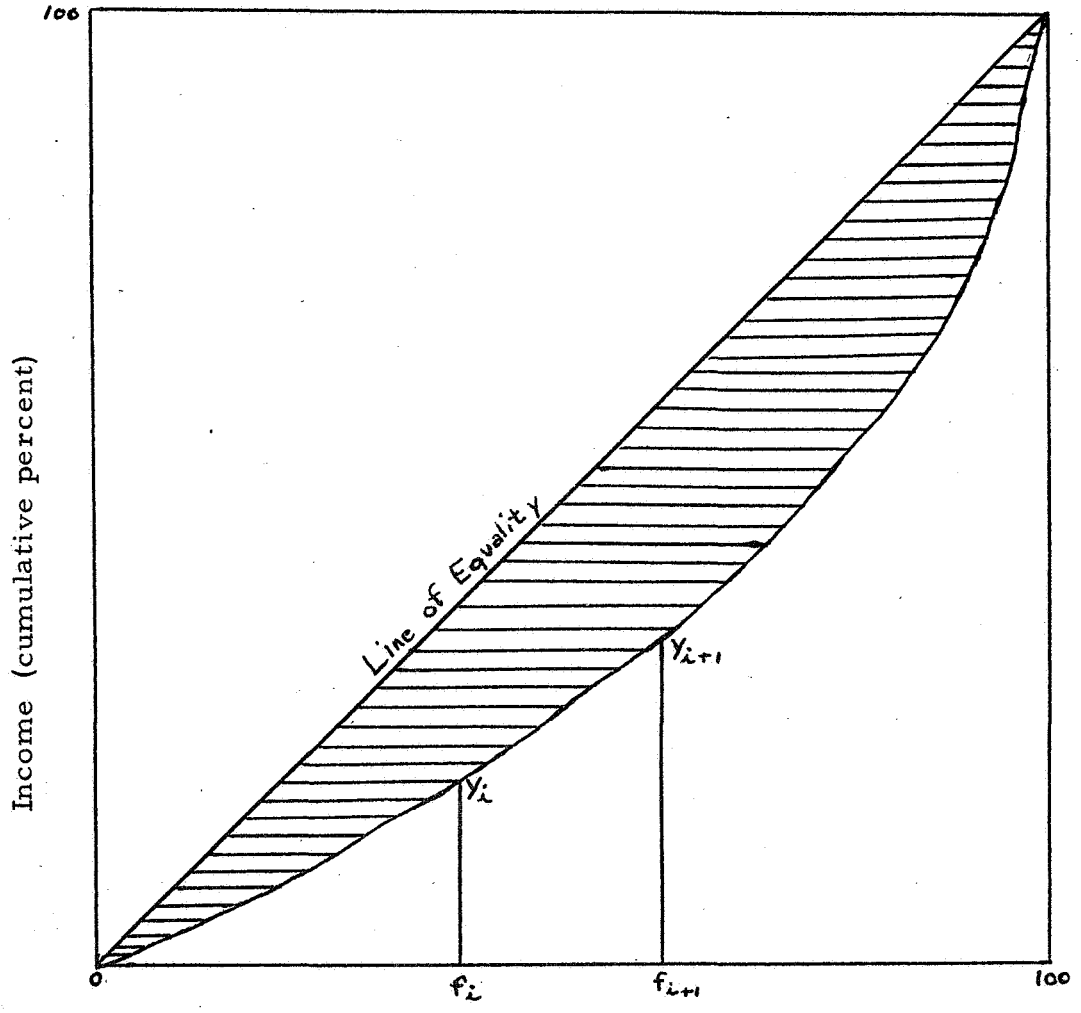
[9]The actual computation of the Gini coefficient (L) follows from the formula

$$L = \frac{1/2 - \text{area under curve}}{1/2} = 1 - 2\,(\text{area under curve}).$$

(continued on next page)

FIGURE 4

COMPUTATION OF GINI INDEX OF CONCENTRATION



The second measure of inequality is the relative dispersion of the distribution. The formula is

$$V = S/\bar{X}$$ where S - standard deviation of the distribution

$\bar{X}$ - the mean of the distribution

The closer to zero the relative dispersion comes, the nearer the distribution is to perfect equality. Perfect inequality is obtained when the measure equals the square root of the number of income classes.

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[9](continued from last page) Assuming that the curve between any two points of Figure 4 is approximated by a straight line and summing over (k) intervals gives

$$L = 1 - 2\sum_{i=1}^{k} (f_{i+1} - f_i) \frac{(Y_i + Y_{i+1})}{2}$$. For further reference see footnote 8 above.

TABLE IX

INDUSTRY GROUP OF THE EMPLOYED BY OCCUPATION FOR THE UNITED STATES: 1960

Industry	Total Employed	Professional, technical, and kindred workers
Total: 14 and over	61,456	7,217
Agriculture, forestries, and fisheries	4,347	56
Mining	648	49
Contract Construction	3,788	176
Manufacturing	17,196	1,329
furniture, lumber and wood products	1,049	17
primary metal industries	1,202	68
fabricated metal industries including ordnance	1,267	126
machinery except electrical	1,545	148
electrical machinery	1,459	227
motor vehicles and equipment	827	57
other transportation equipment	961	166
food and kindred products	1,790	47
textile mill products	934	18
apparel and other fabricated textile products	1,143	12
printing, publishing, and allied industries	1,123	104
chemicals and allied products	846	134
rubber products	379	23
misc. manufacturing industries	2,671	182
Transportation	2,710	67
Communications	808	88
Electric, gas, and sanitary services	883	74
Wholesale and retail trade	11,650	228
Finance, insurance, and real estate	2,663	90
Services	10,911	2,868
Government*	5,670	2,192

TABLE IX (continued)

Industry	Managers, officials, proprietors, including farm	Clerical and kindred workers
Total: 14 and over	7,892	9,278
Agriculture, forestries, and fisheries	2,530	31
Mining	40	49
Contract Construction	373	173
Manufacturing	890	2.094
furniture, lumber, and wood products	62	66
primary metal industries	34	125
fabricated metal industries including ordnance	72	174
machinery except electrical	89	214
electrical machinery	64	215
motor vehicles and equipment	21	93
other transportation equipment	30	144
food and kindred products	133	191
textile mill products	27	72
apparel and other fabricated textile products	46	83
printing, publishing, and allied industries	85	212
chemicals and allied products	59	133
rubber products	20	46
misc. manufacturing industries	148	326
Transportation	230	472
Communications	62	415
Electric, gas, and sanitary services	48	180
Wholesale and retail trade	2,242	1,620
Finance, insurance and real estate	472	1,252
Services	641	1,409
Government*	364	1,583

TABLE IX (continued)

Industry	Sales workers	Craftsmen, foremen, and kindred workers
Total: 14 and over	4,627	8,721
Agriculture, forestries, and fisheries	9	29
Mining	3	145
Contract Construction	15	2,049
Manufacturing	657	3,431
furniture, lumber, and wood products	17	170
primary metal industries	14	362
fabricated metal industries including ordnance	25	302
machinery except electrical	34	446
electrical machinery	22	247
motor vehicles and equipment	7	195
other transportation equipment	5	311
food and kindred products	122	262
textile mill products	12	113
apparel and other fabricated textile products	28	60
printing, publishing, and allied industries	232	322
chemicals and allied products	49	145
rubber products	10	57
misc. manufacturing industries	80	439
Transportation	20	449
Communications	13	206
Electric, gas, and sanitary services	9	296
Wholesale and retail trade	3,196	871
Finance, insurance, and real estate	594	51
Services	105	860
Government*	6	334

TABLE IX (continued)

Industry	Operatives and kindred workers	Service workers, incl. private household
Total: 14 and over	11,872	7,157
Agriculture, forestries, and fisheries	103	13
Mining	355	7
Contract Construction	333	19
Manufacturing	7,471	284
furniture, lumber, and wood products	456	13
primary metal industries	405	23
fabricated metal industries including ordnance	490	20
machinery except electrical	548	23
electrical machinery	631	21
motor vehicles and equipment	403	18
other transportation equipment	264	16
food and kindred products	858	41
textile mill products	636	18
apparel and other fabricated textile products	894	10
printing, publishing, and allied industries	142	13
chemicals and allied products	257	20
rubber products	199	6
misc. manufacturing industries	1,288	42
Transportation	1,097	93
Communications	7	13
Electric, gas, and sanitary services	141	16
Wholesale and retail trade	1,419	1,635
Finance, insurance, and real estate	13	154
Services	799	3,992
Government*	134	931

TABLE IX (continued)

Industry	Laborers, incl. farm
Total: 14 and over	4,510
Agriculture, forestries, and fisheries	1,576
Mining	0
Contract Construction	650
Manufacturing	1,040
furniture, lumber, and wood products	248
primary metal industries	171
fabricated metal industries including ordnance	58
machinery except electrical	43
electrical machinery	32
motor vehicles and equipment	33
other transportation equipment	25
food and kindred products	136
textile mill products	38
apparel and other fabricated textile products	10
printing, publishing, and allied industries	13
chemicals and allied products	49
rubber products	18
misc. manufacturing industries	166
Transportation	282
Communications	4
Electric, gas, and sanitary services	119
Wholesale and retail trade	439
Finance, insurance, and real estate	37
Services	237
Government*	126

Source: 1960 U. S. Census of Population, Summary, Vol. 1, Table 209.

*Because of data limitations government employees include those civilians working for all levels of government. The data that do exist suggest that the skill mixes of Federal and state and local employees are quite similar. See Table X.

TABLE X

SKILL MIX OF GOVERNMENT EMPLOYEES

Occupation	White Collar (thousands)	Blue Collar (thousands)	Federal		State and Local	
			Thousands	Percent	Thousands	Percent
Professionals Managers Clerical Sales workers	4,145		1,469	74	2,676	73
Craftsmen Operatives Service workers Laborers		1,525	516	26	1,009	27
Total			1,985	100	3,685	100

Source: Statistical Abstract of the U.S., 1966.
(Washington: Government Printing Office, 1966, p. 421.

TABLE XI

PERCENT EARNINGS OF PERSONS IN 1960 BY OCCUPATION, BY INDUSTRY: LABOR'S AND CAPITAL'S SHARES OF NATIONAL INCOME: 1960

Industry	Total 14 and over (millions of $)	Professional, technical and kindred workers
Total: 14 and over	$272,501	16.78
Agriculture, forestry, and fisheries	22,875	1.55
Mining	2,889	10.64
Contract Construction	18,204	6.11
Manufacturing	74,612	11.29
furniture, lumber, and wood products	4,142	2.38
primary metal industries	5,111	8.49
fabricated metal industries including ordnance	5,666	14.08
machinery except electrical	7,052	13.32
electrical machinery	6,561	21.95
motor vehicles and equipment	3,542	10.17
other transportation equipment	4,526	23.15
food and kindred products	7,518	4.00
textile mill products	3,739	2.97
apparel and other fabricated textile products	4,558	1.72
printing, publishing, and allied industries	5,348	12.37
chemicals and allied products	3,861	22.07
rubber products	1,599	9.14
misc. manufacturing industries	11,389	10.12
Transportation	11,232	3,79
Communications	3,676	15.22
Electric, gas, and sanitary services	3,921	11.98
Wholesale and retail trade	51,844	2.79
Finance, insurance, and real estate	11,720	4.84
Services	44,868	40.51
Government	26,660	52.11

TABLE XI (continued)

Industry	Managers, officials, proprietors, incl. farm	Clerical and kindred workers
Total: 14 and over	20.23	12.04
Agriculture, forestry, and fisheries	77.24	0.48
Mining	9.57	6.03
Contract Construction	14.32	3.36
Manufacturing	8.34	9.92
furniture, lumber, and wood products	10.64	5.61
primary metal industries	4.64	8.69
fabricated metal industries including ordnance	8.82	10.87
machinery except electrical	8.79	10.71
electrical machinery	6.86	11.61
motor vehicles and equipment	4.20	9.24
other transportation equipment	4.64	11.25
food and kindred products	12.38	8.97
textile mill products	5.03	6.82
apparel and other fabricated textile products	7.07	6.41
printing, publishing, and allied industries	11.16	14.01
chemicals and allied products	10.65	12.18
rubber products	8.54	10.26
misc. manufacturing industries	9.03	10.13
Transportation	14.31	14.87
Communications	11.84	39.97
Electric, gas, and sanitary services	8.52	16.27
Wholesale and retail trade	30.20	11.04
Finance, insurance, and real estate	28.15	37.78
Services	9.98	11.11
Government	9.55	20.99

TABLE XI (continued)

Industry	Sales workers	Craftsmen, foremen, and kindred workers
Total: 14 and over	7.65	16.88
Agriculture, forestry, and fisheries	0.17	0.67
Mining	0.47	26.51
Contract Construction	0.36	59.36
Manufacturing	3.97	24.25
furniture, lumber, and wood products	1.89	21.60
primary metal industries	1.18	37.40
fabricated metal industries including ordnance	2.04	28.16
machinery except electrical	2.21	33.36
electrical machinery	1.51	19.83
motor vehicles and equipment	0.85	29.08
other transportation equipment	0.52	36.21
food and kindred products	7.30	18.38
textile mill products	1.40	15.98
apparel and other fabricated textile products	2.74	6.98
printing, publishing, and allied industries	19.56	31.74
chemicals and allied products	5.76	19.76
rubber products	2.70	18.65
misc. manufacturing industries	3.18	20.33
Transportation	0.78	21.09
Communications	1.64	29.60
Electric, gas, and sanitary services	1.08	39.74
Wholesale and retail trade	27.79	8.86
Finance, insurance, and real estate	22.86	2.31
Services	1.04	10.11
Government	0.09	6.59

TABLE XI (continued)

Industry	Operatives and kindred workers	Service workers incl. private household
Total: 14 and over	16.43	5.65
Agriculture, forestry, and fisheries	1.70	0.12
Mining	46.29	0.49
Contract Construction	6.90	0.23
Manufacturing	37.76	0.82
furniture, lumber, and wood products	41.49	0.68
primary metal industries	29.87	0.97
fabricated metal industries including ordnance	32.59	0.76
machinery except electrical	29.33	0.69
electrical machinery	36.27	0.69
motor vehicles and equipment	42.93	1.09
other transportation equipment	21.99	0.77
food and kindred products	43.06	1.18
textile mill products	64.10	1.02
apparel and other fabricated textile products	73.99	0.49
printing, publishing, and allied industries	10.02	0.51
chemicals and allied products	25.14	1.12
rubber products	46.95	0.85
misc. manufacturing industries	42.63	0.77
Transportation	36.79	1.78
Communications	0.69	0.76
Electric, gas, and sanitary services	13.61	0.86
Wholesale and retail trade	10.32	6.79
Finance, insurance, and real estate	0.41	2.83
Services	6.72	19.15
Government	1.90	7.52

TABLE XI (continued)

Industry	Laborers including farm	Labor's Payments: 1960 (millions of $)
Total: 14 and over	4.34	328,824
Agriculture, forestry, and fisheries	18.06	11,920
Mining	0.00	4,431
Contract Construction	9.35	20,442
Manufacturing	3.65	97,415
furniture, lumber, and wood products	15.71	4,362
primary metal industries	8.75	8,577
fabricated metal industries including ordnance	2.68	8,016
machinery except electrical	1.59	10,696
electrical machinery	1.28	8.535
motor vehicles and equipment	2.44	5,594
other transportation equipment	1.47	6,312
food and kindred products	4.73	8,034
textile mill products	2.68	3,849
apparel and other fabricated textile products	0.60	4,492
printing, publishing, and allied products	0.63	5,515
chemicals and allied products	3.32	6,175
rubber products	2.91	1,707
misc. manufacturing industries	3.81	15,550
Transportation	6.59	16,501
Communications	0.28	4,952
Electric, gas, and sanitary services	7.94	4,232
Wholesale and retail trade	2.21	61,160
Finance, insurance, and real estate	0.82	15,964
Services	1.38	39,267
Government	1.24	52,540

TABLE XI (continued)

Industry	1960 National Income	Labor's Share (10)/(11)
Total: 14 and over	414,774	.7928
Agriculture, forestry, and fisheries	17,161	.6946
Mining	5,516	.8033
Contract Construction	22,494	.9088
Manufacturing	121,544	.8015
furniture, lumber, and wood products	5,065	.8612
primary metal industries	10.589	.8100
fabricated metal industries including ordnance	8.863	.9044
machinery except electrical	12,591	.8495
electrical machinery	10,132	.8424
motor vehicles and equipment	8,387	.6670
other transportation equipment	6,709	.9408
food and kindred products	10.305	.7796
textile mill products	4,619	.8333
apparel and other fabricated textile products	4,876	.9212
printing, publishing, and allied industries	6,563	.8403
chemicals and allied products	9,165	.6738
rubber products	2,151	.7936
misc. manufacturing industries	21,529	.7223
Transportation	17,816	.9262
Communications	7,855	.6304
Electric, gas, and sanitary services	8,755	.4834
Wholesale and retail trade	68,768	.8894
Finance, insurance, and real estate	42,325	.3772
Services	50,000	.7853
Government	52,540	1.0000

TABLE XI (continued)

Industry	Capital's Share 1 - (12)
Total: 14 and over	.2072
Agriculture, forestry, and fisheries	.3054
Mining	.1967
Contract Construction	.0912
Manufacturing	.1985
furniture, lumber, and wood products	.1388
primary metal industries	.1900
fabricated metal industries including ordnance	.0956
machinery except electrical	.1505
electrical machinery	.1576
motor vehicles and equipment	.3330
other transportation equipment	.0592
food and kindred products	.2204
textile mill products	.1667
apparel and other fabricated textile products	.0788
printing, publishing, and allied industries	.1597
chemicals and allied products	.3262
rubber products	.2064
misc. manufacturing industries	.2777
Transportation	.0738
Communications	.3696
Electric, gas, and sanitary services	.5166
Wholesale and retail trade	.1106
Finance, insurance, and real estate	
Services	.6228
Government	.0000

Source: Derived from Table IX.

TABLE XII

DIRECT REQUIREMENTS PER DOLLAR OF GROSS OUTPUT: 1958

Industry	Agriculture forestry, & fisheries	Mining
Agriculture, forestry, and fisheries	.30159	.00000
Mining	.00199	.06883
Contract Construction	.01187	.00061
Manufacturing	.11825	.08876
furniture, lumber, and wood products	.00201	.00195
primary metal industries	.00004	.01012
fabricated metal industries including ordnance	.00232	.00597
machinery except electrical	.00399	.02756
electrical machinery	.00058	.00427
motor vehicles and equipment	.00112	.00146
other transportation equipment	.00045	.00085
food and kindred products	.05808	.00000
textile mill products	.00124	.00037
apparel and other fabricated textile products	.00083	.00000
printing, publishing, and allied industries	.00023	.00018
chemicals and allied products	.02283	.01122
rubber products	.00364	.00555
misc. manufacturing industries	.02089	.01926
Transportation	.01642	.03182
Communications	.00261	.00073
Electric, gas, and sanitary services	.00511	.01542
Wholesale and retail trade	.03858	.02243
Finance, insurance, and real estate	.05183	.10986
Services	.02350	.02585
Government	.00019	.00073
Intermediate Inputs	.57195	.36506
Value Added	.42805	.63494
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Contract Construction	Manufacturing
Agriculture, forestry, and fisheries	.00344	.07299
Mining	.01097	.03866
Contract Construction	.00012	.00219
Manufacturing	.38488	.39499
furniture, lumber, and wood products	.06115	.01463
primary metal industries	.05296	.06987
fabricated metal industries including ordnance	.01313	.03238
machinery except electrical	.01406	.02416
electrical machinery	.02565	.02121
motor vehicles and equipment	.00001	.02237
other transportation equipment	.00004	.01242
food and kindred products	.00025	.03323
textile mill products	.00007	.03267
apparel and other fabricated textile products	.00001	.01004
printing, publishing, and allied industries	.00013	.00645
chemicals and allied products	.00635	.02331
rubber products	.00547	.00976
misc. manufacturing industries	.11559	.08248
Transportation	.03054	.02846
Communications	.00183	.00353
Electric, gas, and sanitary services	.00254	.00946
Wholesale and retail trade	.09200	.03532
Finance, insurance, and real estate	.01058	.01432
Services	.04306	.02552
Government	.00022	.00184
Intermediate Inputs	.58017	.62747
Value Added	.41983	.37253
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Furniture lumber, and wood products	Primary metal industries
Agriculture, forestry, and fisheries	.07613	.00000
Mining	.00031	.09030
Contract Construction	.00130	.00484
Manufacturing	.41163	.38153
furniture, lumber, and wood products	.24020	.00128
primary metal industries	.02166	.27400
fabricated metal industries including ordnance	.03105	.02618
machinery except electrical	.00564	.02013
electrical machinery	.00191	.00920
motor vehicles and equipment	.00038	.00183
other transportation equipment	.00076	.00084
food and kindred products	.00214	.00029
textile mill products	.02006	.00077
apparel and other fabricated textile products	.00153	.00088
printing, publishing, and allied industries	.00275	.00139
chemicals and allied products	.00458	.01038
rubber products	.01533	.00290
misc. manufacturing industries	.05454	.03146
Transportation	.04150	.04539
Communications	.00351	.00352
Electric, gas, and sanitary services	.00648	.02504
Wholesale and retail trade	.04966	.03813
Finance, insurance, and real estate	.01503	.01213
Services	.01808	.01246
Government	.00091	.00136
Intermediate Inputs	.62453	.61469
Value Added	.37547	.38531
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Fabricated metal industries, including ordnance	Machinery except electrical
Agriculture, forestry, and fisheries	.00000	.00012
Mining	.00037	.00086
Contract Construction	.00089	.00123
Manufacturing	.50762	.44191
furniture, lumber, and wood products	.00610	.00295
primary metal industries	.02064	.12890
fabricated metal industries, including ordnance	.05954	.04487
machinery except electrical	.05206	.14998
electrical machinery	.02467	.05044
motor vehicles and equipment	.00740	.01599
other transportation equipment	.04357	.00968
food and kindred products	.00000	.00004
textile mill products	.00057	.00029
apparel and other fabricated textile products	.00098	.00094
printing, publishing, and allied industries	.00163	.00074
chemicals and allied products	.00427	.00148
rubber products	.00914	.01120
misc. manufacturing industries	.03706	.02440
Transportation	.01630	.01243
Communications	.00333	.00582
Electric, gas, and sanitary services	.00662	.00554
Wholesale and retail trade	.03475	.04011
Finance, insurance, and real estate	.01329	.01677
Services	.01520	.01833
Government	.00118	.00115
Intermediate Inputs	.59955	.54427
Value Added	.40045	.45573
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Electrical machinery	Motor vehicles and equipment
Agriculture, forestry, and fisheries	.00000	.00000
Mining	.00072	.00066
Contract Construction	.00091	.00311
Manufacturing	.42621	.60170
furniture, lumber, and wood products	.00981	.00083
primary metal industries	.09235	.09933
fabricated metal industries, including ordnance	.05370	.06843
machinery except electrical	.02755	.03047
electrical machinery	.15575	.02784
motor vehicles and equipment	.00337	.29787
other transportation equipment	.00452	.00127
food and kindred products	.00000	.00000
textile mill products	.00067	.00614
apparel and other fabricated textile products	.00091	.00714
printing, publishing, and allied industries	.00091	.00053
chemicals and allied products	.00572	.00180
rubber products	.01620	.02867
misc. manufacturing industries	.05475	.03139
Transportation	.01293	.02025
Communications	.00361	.00206
Electric, gas, and sanitary services	.00548	.00474
Wholesale and retail trade	.04197	.03226
Finance, insurance, and real estate	.01279	.00688
Services	.03125	.02770
Government	.00255	.00193
Intermediate Inputs	.53841	.70130
Value Added	.46159	.29870
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Other transportation equipment	Food and kindred products
Agriculture, forestry, and fisheries	.00000	.34413
Mining	.00031	.00084
Contract Construction	.00147	.00375
Manufacturing	.47889	.25104
furniture, lumber, and wood products	.01078	.00164
primary metal industries	.07812	.00060
fabricated metal industries, including ordnance	.08020	.02873
machinery except electrical	.05073	.00027
electrical machinery	.04418	.00055
motor vehicles and equipment	.00803	.00000
other transportation equipment	.16457	.00000
food and kindred products	.00000	.17022
textile mill products	.00080	.00014
apparel and other fabricated textile products	.00104	.00224
printing, publishing, and allied industries	.00074	.00198
chemicals and allied products	.00147	.00354
rubber products	.00686	.00232
misc. manufacturing industries	.03137	.03881
Transportation	.01121	.04226
Communications	.00404	.00256
Electric, gas, and sanitary services	.00570	.00573
Wholesale and retail trade	.02579	.03871
Finance, insurance, and real estate	.00907	.01022
Services	.00705	.03208
Government	.00110	.00097
Intermediate Inputs	.54464	.73230
Value Added	.45536	.36770
Total	1.00000	1.00000

TABLE XII (continued)

Industry	textile mill products	Apparel and other fabricated textile products
Agriculture, forestry, and fisheries	.10618	.00907
Mining	.00149	.00006
Contract Construction	.00055	.00049
Manufacturing	.52069	.53737
furniture, lumber, and wood products	.00055	.00079
primary metal industries	.00071	.00012
fabricated metal industries, including ordnance	.00110	.00140
machinery except electrical	..00550	.00006
electrical machinery	.00031	.00000
motor vehicles and equipment	.00008	.00000
other transportation equipment	.00008	.00006
food and kindred products	.00306	.00000
textile mill products	.35844	.31464
apparel and other fabricated textile products	.00550	.17035
printing, publishing, and allied industries	.00071	.00104
chemicals and allied products	.01359	.00256
rubber products	.00612	.00548
misc. manufacturing industries	.12495	.04087
Transportation	.02702	.00859
Communications	.00181	.00292
Electric, gas, and sanitary services	.01052	.00323
Wholesale and retail trade	.04005	.03758
Finance, insurance, and real estate	.01186	.01772
Services	.01257	.01309
Government	.00110	.00189
Intermediate Inputs	.73384	.63201
Value Added	.26616	.36799
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Printing, publishing and allied industries	Chemicals and allied products
Agriculture, forestry, and fisheries	.00000	.00242
Mining	.00000	.04895
Contract Construction	.00358	.00052
Manufacturing	.34834	.40801
furniture, lumber, and wood products	.00049	.00294
primary metal industries	.00122	.03350
fabricated metal industries, including ordnance	.00244	.01200
machinery except electrical	.00350	.01260
electrical machinery	.00098	.00138
motor vehicles and equipment	.00016	.00000
other transportation equipment	.00138	.00009
food and kindred products	.00000	.01183
textile mill products	.00155	.00026
apparel and other fabricated textile products	.00000	.00294
printing, publishing and allied industries	.12997	.00259
chemicals and allied products	.0.473	.20297
rubber products	.00122	.00725
misc. manufacturing industries	.19069	.11767
Transportation	.01530	.03505
Communications	.01310	.00458
Electric, gas, and sanitary services	.00448	.02486
Wholesale and retail trade	.02458	.03013
Finance, insurance, and real estate	.04753	.02029
Services	.04948	.01882
Government	.00741	.00285
Intermediate Inputs	.51830	.59648
Value Added	.48620	.40352
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Rubber products	Misc. manufacturing industries
Agriculture, forestry, and fisheries	.00000	.01609
Mining	.00367	.14002
Contract Construction	.00107	.00181
Manufacturing	.39786	.32476
furniture, lumber, and wood products	.00199	.01278
primary metal industries	.00413	.01031
fabricated metal industries including ordnance	.01574	.01878
machinery except electrical	.00519	.00455
electrical machinery	.00397	.00670
motor vehicles and equipment	.00000	.00081
other transportation equipment	.00291	.00108
food and kindred products	.00015	.00865
textile mill products	.09228	.00532
apparel and other fabricated textile products	.00321	.00137
printing, publishing, and allied industries	.00321	.00334
chemicals and allied products	.04920	.05587
rubber products	.03163	.01179
misc. manufacturing industries	.18426	.18341
Transportation	.02277	.03479
Communications	.00321	.00265
Electric, gas, and sanitary services	.01085	.01256
Wholesale and retail trade	.03636	.02976
Finance, insurance, and real estate	.01696	.01484
Services	.02765	.03580
Government	.00122	.00239
Intermediate Inputs	.52162	.61546
Value Added	.47838	.38454
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Transportation	Communications
Agriculture, forestry and fisheries	.00114	.00000
Mining	.00089	.00000
Contract Construction	.03835	.02820
Manufacturing	.09912	.03551
furniture, lumber, and wood products	.00080	.00000
primary metal industries	.00267	.00216
fabricated metal industries, including ordnance	.00175	.00028
machinery except electrical	.00439	.00000
electrical machinery	.00473	.01499
motor vehicles and equipment	.00270	.00000
other transportation equipment	.01431	.00047
food and kindred products	.00307	.00000
textile mill products	.00071	.00056
apparel and other fabricated textile products	.00058	.00075
printing, publishing, and allied industries	.00230	.01124
chemicals and allied products	.00107	.00000
rubber products	.00789	.00066
misc. manufacturing industries	.05214	.00440
Transportation	.06470	.00178
Communications	.00832	.01387
Electric, gas, and sanitary services	.00451	.00590
Wholesale and retail trade	.03083	.00628
Finance, insurance, and real estate	.05297	.02774
Services	.04222	.05210
Government	.02438	.00403
Intermediate Inputs	.36744	.17541
Value Added	.63256	.82459
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Electric, gas, and sanitary services	Wholesale and retail trade
Agriculture, forestry, and fisheries	.00000	.00164
Mining	.08499	.00009
Contract Construction	.02731	.00831
Manufacturing	.02874	.04811
furniture, lumber, and wood products	.00015	.00189
primary metal industries	.00337	.00025
fabricated metal industries, including ordnance	.00783	.00237
machinery except electrical	.00059	.00260
electrical machinery	.00084	.00202
motor vehicles and equipment	.00005	.00223
other transportation equipment	.00005	.00087
food and kindred products	.00000	.00568
textile mill products	.00010	.00035
apparel and other fabricated textile products	.00000	.00098
printing, publishing, and allied industries	.00025	.00252
chemicals and allied products	.00050	.00108
rubber products	.00040	.00254
misc. manufacturing industries	.01462	.02274
Transportation	.01844	.00424
Communications	.00233	.01085
Electric, gas, and sanitary services	.16750	.02054
Wholesale and retail trade	.01189	.01696
Finance, insurance, and real estate	.00828	.07104
Services	.01323	.06428
Government	.4599	.01434
Intermediate Inputs	.50870	.26039
Value Added	.49130	.73961
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Finance insurance and real estate	Services
Agriculture, forestry, and fisheries	.02478	.00031
Mining	.00178	.00053
Contract Construction	.06863	.01267
Manufacturing	.02089	.22023
furniture, lumber, and wood products	.00034	.00029
primary metal industries	.00035	.00052
fabricated metal industries including ordnance	.00031	.01642
machinery except electrical	.00128	.01556
electrical machinery	.00058	.01946
motor vehicles and equipment	.00021	.01725
other transportation equipment	.00034	.02103
food and kindred products	.00072	.00244
textile mill products	.00049	.00274
apparel and other fabricated textile products	.00068	.00461
printing, publishing, and allied industries	.00514	.07589
chenicals and allied products	.00086	.00261
rubber products	.00111	.00655
misc. manufacturing industries	.00848	.04387
Transportation	.00711	.00551
Communications	.00737	.03250
Electric, gas, and sanitary services	.00426	.01425
Wholesale and retail trade	.01510	.02759
Finance, insurance, and real estate	.12290	.06161
Services	.03467	.06751
Government	.01236	.00976
Intermediate Inputs	.31985	.46147
Value Added	.68015	.53853
Total	1.00000	1.00000

TABLE XII (continued)

Industry	Government
Agriculture, forestry, and fisheries	.01312
Mining	.00311
Contract Construction	.02532
Manufacturing	.01038
furniture, lumber, and wood products	.00000
primary metal industries	.00004
fabricated metal industries, including ordnance	.00050
machinery except electrical	.00004
electrical machinery	.00004
motor vehicles and equipment	.00044
other transportation equipment	.00000
food and kindred products	.00546
textile mill products	.00004
apparel and other fabricated textile products	.00008
printing, publishing, and allied industries	.00105
chemicals and allied products	.00050
rubber products	.00013
misc. manufacturing industries	.00206
Transportation	.01681
Communications	.00076
Electric, gas, and sanitary services	.00943
Wholesale and retail trade	.00218
Finance, insurance, and real estate	.00340
Services	.00378
Government	.00023
Intermediate Inputs	.11170
Value Added	.88830
Total	1.00000

Source: Derived from "The Transaction Table of the 1958 Input-Output Study and Revised Direct and Total Requirements Data," Survey of Current Business, Vol. 45, No. 9, Sept. 1965, pp. 33-39.

TABLE XIII

FINAL DEMAND SECTORS BY INDUSTRY IN 1958 PRICES;
TOTAL FINAL DEMAND UNDER EACH OF THREE ASSUMPTIONS

Industry	Personal Consumption Expenditures	Gross Private Domestic Investment
Total	316.1	72.4
Agriculture, forestry, and fisheries	5.4	1.2
Mining	0.3	-0.1
Contract Construction	0.0	43.0
Manufacturing	116.3	21.2
furniture, lumber, and wood products	3.0	1.1
primary metal industries	*	-0.2
fabricated metal industries, including ordnance	0.9	0.9
machinery except electrical	0.5	10.5
electrical machinery	5.0	2.9
motor vehicles and equipment	10.2	3.5
other transportation equipment	0.9	1.4
food and kindred products	51.0	0.3
textile mill products	1.6	-0.1
apparel and other fabricated textile products	13.7	-0.1
printing, publishing, and allied industries	2.7	*
chemicals and allied products	0.3	*
rubber products	1.5	*
misc. manufacturing industries	25.0	1.0
Transportation	9.6	0.8
Communications	4.4	0.4
Electric, gas, and sanitary services	9.0	0.0
Wholesale and retail trade	68.6	4.4
Finance, insurance, and real estate	57.7	1.4
Services	43.9	*
Government	1.0	0.0

TABLE XIII (continued)

Industry	Federal Government Purchases	Federal Defense/Space Purchases
Total	51.4	43.1
Agriculture, forestry, and fisheries	1.0	*
Mining	0.2	*
Contract Construction	4.5	1.7
Manufacturing	16.5	15.9
furniture, lumber, and wood products	0.1	0.1
primary metal industries	0.4	0.4
fabricated metal industries, including ordnance	2.5	2.5
machinery except electrical	1.0	1.0
electrical machinery	2.0	2.0
motor vehicles and equipment	0.3	0.3
other transportation equipment	7.2	7.2
food and kindred products	0.1	0.1
textile mill products	0.1	0.1
apparel and other fabricated textile products	0.1	0.1
printing, publishing and allied industries	0.1	0.1
chemicals and allied products	0.8	0.8
rubber products	0.1	0.1
misc. manufacturing industries	1.7	1.7
Transportation	1.4	1.3
Communications	0.2	0.1
Electric, gas, and sanitary services	0.4	0.4
Wholesale and retail trade	0.6	0.6
Finance, insurance and real estate	0.1	0.1
Services	6.2	6.0
Government	20.3	15.7

TABLE XIII (continued)

Industry	Federal Nondefense Purchases	State & Local Government Expenditures
Total	8.3	43.5
Agriculture, forestry, and fisheries	1.0	*
Mining	.2	0.1
Contract Construction	1.5	16.7
Manufacturing	.6[a]	3.0
furniture, lumber, and wood products		0.2
primary metal industries		0.0
fabricated metal industries, including ordnance		0.1
machinery except electrical		0.3
electrical machinery		0.1
motor vehicles and equipment		0.5
other transportation equipment		*
food and kindred products		0.3
textile mill products		*
apparel and other fabricated textile products		0.1
printing, publishing, and allied industries		0.2
chemicals and allied products		0.3
rubber products		0.1
misc. manufacturing industries		0.9
Transportation	.1	0.4
Communications	.1	0.2
Electric, gas, and sanitary services		0.5
Wholesale and retail trade		0.2
Finance, insurance, and real estate		0.5
Services	.2	1.1
Government	4.6	20.8

TABLE XIII (continued)

Industry	Total Final Demand	Final Demand Assumption 1 *
Total	483.4	483.4
Agriculture, forestry, and fisheries	7.6	7.2
Mining	0.5	0.3
Contract Construction	64.2	65.4
Manufacturing	157.0	154.0
furniture, lumber, and wood products	4.6	4.9
primary metal industries	0.2	- 0.2
fabricated metal industries, including ordnance	4.4	2.1
machinery except electrical	12.3	12.4
electrical machinery	10.0	8.8
motor vehicles and equipment	14.5	15.6
other transportation equipment	9.5	2.5
food and kindred products	51.7	56.6
textile mill products	1.6	1.6
apparel and other fabricated textile products	13.8	15.0
printing, publishing, and allied industries	3.0	3.2
chemicals and allied products	1.4	0.6
rubber products	1.7	1.7
misc manufacturing industries	28.6	29.5
Transportation	12.2	11.8
Communications	5.2	5.5
Electric, gas, and sanitary services	9.9	10.4
Wholesale and retail trade	73.8	80.2
Finance, insurance, and real estate	59.7	65.3
Services	51.2	49.3
Government	42.1	33.8

TABLE XIII (continued)

Industry	Final Demand Assumption 2	Final Demand Assumption 3
Total	483.4	483.4
Agriculture, forestry, and fisheries	8.2	12.0
Mining	0.5	1.4
Contract Construction	65.9	67.8
Manufacturing	151.3	140.6
furniture, lumber, and wood products	4.8	4.5
primary metal industries	- 0.2	- 0.2
fabricated metal industries, including ordnance	2.0	1.9
machinery except electrical	12.2	11.3
electrical machinery	8.6	8.0
motor vehicles and equipment	15.3	14.2
other transportation equipment	2.5	2.3
food and kindred products	55.6	51.6
textile mill products	1.6	1.5
apparel and other fabricated textile products	14.7	13.7
printing, publishing, and allied industries	3.0	2.8
chemicals and allied products	0.6	0.6
rubber products	1.6	1.5
misc. manufacturing industries	29.0	26.9
Transportation	11.7	11.3
Communications	5.5	5.5
Electric, gas, and sanitary services	10.2	9.5
Wholesale and retail trade	78.8	73.2
Finance, insurance, and real estate	64.2	59.6
Services	48.7	46.1
Government	38.3	56.5

[a1] Allocation proved impossible since no data exist on nondefense purchases of manufactured goods

* See Table IV for a description of Assumptions 1, 2, and 3.

Source: Based on data found in the Survey of Current Business, Vol. 45, No. 9 (Sept., 1965), pp. 33-39.

TABLE XIV

VALUE ADDED AND CHANGES IN VALUE ADDED UNDER EACH OF THREE ASSUMPTIONS (millions of 1958 dollars)

Industry	1960 Value Added	Recalculated 1960 Value Added Assumption 1*
Agriculture, forestry, and fisheries	23.85	25.04
Mining	12.51	12.38
Contract Construction	32.53	33.21
Manufacturing	138.71	134.59
furniture, lumber, and wood products	5.82	5.97
primary metal industries	11.83	10.87
fabricated metal industries, including ordnance	10.61	9.45
machinery except electrical	11.26	10.98
electrical machinery	10.16	9.28
motor vehicles and equipment	7.38	7.80
other transportation equipment	7.42	3.41
food and kindred products	18.42	20.05
textile mill products	3.91	4.13
apparel and other fabricated textile products	6.73	7.25
printing, publishing, and allied industries	6.22	6.27
chemicals and allied products	5.08	4.76
rubber products	3.49	3.49
misc. manufacturing industries	30.38	30.38
Transportation	19.99	19.80
Communications	9.81	10.14
Electric, gas, and sanitary services	10.96	11.25
Wholesale and retail trade	76.70	81.65
Finance, insurance, and real estate	66.52	71.22
Services	45.23	44.64
Government	45.88	38.77
Total	482.69[a1]	482.69

TABLE XIV (continued)

Industry	Recalculated 1960 Value Added	
	Assumption 2	Assumption 3
Agriculture, forestry, and fisheries	25.39	26.67
Mining	12.38	12.57
Contract Construction	33.42	34.13
Manufacturing	132.84	126.51
furniture, lumber, and wood products	5.93	5.78
primary metal industries	10.75	10.48
fabricated metal industries, including ordnance	9.37	9.17
machinery except electrical	10.95	10.25
electrical machinery	9.14	8.68
motor vehicles and equipment	7.62	7.11
other transportation equipment	3.46	3.28
food and kindred products	19.73	18.50
textile mill products	4.05	3.81
apparel and other fabricated textile products	7.10	6.66
printing, publishing, and allied industries	6.13	5.83
chemicals and allied products	4.72	4.60
rubber products	3.40	3.25
misc. manufacturing industries	30.49	29.11
Transportation	19.67	19.23
Communications	10.06	9.81
Electric, gas, and sanitary services	11.10	10.61
Wholesale and retail trade	80.47	75.88
Finance, insurance, and real estate	70.20	66.12
Services	44.16	42.11
Government	42.68	58.49
Total	482.69	482.69

TABLE XIV (continued)

Industry	Δ in Value Added ΔP_j^1 †	Δ in Value Added ΔP_j^2
Agriculture, forestry, and fisheries	1.19	1.54
Mining	- .13	- .13
Contract construction	.68	.89
Manufacturing	-4.12	-5.87
furniture, lumber, and wood products	.15	.11
primary metal industries	- .96	-1.08
fabricated metal industries, including ordnance	-1.16	-1.24
machinery except electrical	- .28	- .31
electrical machinery	- .88	-1.02
motor vehicles and equipment	.42	.24
other transportation equipment	-4.01	-3.96
food and kindred products	1.63	1.31
textile mill products	.22	.14
apparel and other fabricated textile products	.52	.37
printing, publishing, and allied industries	.05	- .09
chemicals and allied products	- .32	- .36
rubber products	.00	- .09
misc. manufacturing industries	.50	.11
Transportation	- .19	- .32
Communications	.33	.25
Electric, gas, and sanitary services	.29	.14
Wholesale and retail trade	4.95	3.77
Finance, insurance, and real estate	4.70	3.68
Services	- .59	-1.07
Government	-7.11	-3.20

TABLE XIV (continued)

Industry	Δ in Value Added ΔP_j^3
Agriculture, forestry, and fisheries	2.82
Mining	.06
Contract Construction	1.60
Manufacturing	-12.20
furniture, lumber, and wood products	- .04
primary metal industries	- 1.35
fabricated metal industries, including ordnance	- 1.44
machinery except electrical	- 1.01
electrical machinery	- 1.48
motor vehicles and equipment	- .27
other transportation equipment	- 4.14
food and kindred products	.08
textile mill products	- .10
apparel and other fabricated textile products	- .07
printing, publishing, and allied industries	- .39
chemicals and allied products	- .48
rubber products	- .24
misc. manufacturing industries	- 1.27
Transportation	- .76
Communications	- .00
Electric, gas, and sanitary services	- .35
Wholesale and retail trade	- .82
Finance, insurance, and real estate	- .40
Services	- 3.12
Government	12.61

TABLE XIV (continued)

*Assumption 1: Federal final demand is discontinued and is allocated to industries in proportion to existing distributions of value added in other final demand sectors.

Assumption 2: Federal defense/space final demand is discontinued and is allocated to industries in proportion to the existing distributions of nondefense expenditures.

Assumption 3: The same as 2 except defense/space expenditures are allocated to industries in proportion to existing distribution of value added in other final demand sectors.

$^{\dagger}\Delta P_j^1 = P_j^1 - P_j^2$

$\Delta P_j^2 = P_j^1 - P_j^3$

$\Delta P_j^3 = P_j^1 - P_j^4$

[a] Due to rounding errors and statistical errors in the published data, 1960 value added does not equal, exactly, total final demand.