PART IX

Family Income and the Income Tax Base

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The purpose of this paper is to build a statistical bridge between distributions of taxpayers by statutory net income and of 'consumer units', i.e., families and single consumers, by total money income.[1] Like most bridges, this one can be used for a traverse in either direction or for a meeting in the middle. That is, with it the distribution of consumer units can be estimated from an income tax distribution; a tax base can be estimated from a distribution of consumer units; and estimates of the distribution by total money income or by net income can be made from income tax data in combination with data from a consumer income field study.

1 Sources: BLS-BHE Survey and Statistics of Income

The tables that constitute this statistical bridge were developed by study of the urban and rural nonfarm sample data[2] for 1941 collected in 1942 by the Bureau of Labor Statistics and the Bureau of Home Economics in the Survey of Spending and Saving in Wartime.[3] They embody the corrections for interview-refusals and substitutions made by the Bureau of Labor Statistics in the preparation of its forthcoming report, and have been checked against *Statistics of Income for 1941, Part 1,* based on income tax returns.[4]

a *Number of family heads*

A general impression of the reliability of the bridge data may be gained by comparing the number of taxable family heads estimated from the Survey sample with the data by net in-

[1] Since this paper was written the Individual Income Tax Act of 1944 has been passed, substantially simplifying the individual income tax system. The far-reaching effects of such changes will probably modify the applicability of some considerations presented here; see the Appendix.

[2] The nonfarm sample consisted of families and single persons selected from urban and rural areas. The rural population was represented in the sample to a different extent than urban dwellers and the combined data for nonfarm consumers were obtained by weighting the figures for each group separately and adding the results. For a detailed discussion of the sample design used in the Survey, see the forthcoming report of the Bureau of Labor Statistics.

[3] In accordance with the interviewers' pledge, the names and addresses of the persons providing information are unknown to the Treasury. The income tax estimates, therefore, come not from the actual tax returns filed (which were not examined), but from reconstructions based on the summary figures supplied to the Division of Tax Research by the Bureau of Labor Statistics and the Bureau of Home Economics, containing no information identifying individual families.

[4] For the provisions of the Revenue Act of 1941 that affect the data discussed in this paper, see the Appendix.

come brackets in *Statistics of Income for 1941, Part 1.*[5] The sample yields some 950 thousand more taxable[6] family heads than those estimated from *Statistics of Income* (Table 1, line 9). Owing to uncertainty about the combined incomes of husbands and wives filing separately, the allocation of the discrepancy by income brackets is uncertain; but most of it is probably below the $3,000 net income boundary.[7]

A discrepancy of this sort and in this direction[8] would naturally be expected from the sample, for several reasons: (1) the processing of the sample took account of only part of the deductions, since the data contained no information on capital losses, and since excise and sales taxes and certain other deduction items were so buried in the expenditure data as to be too difficult to find;[9] (2) the sample yields rather high estimates of entrepreneurial income relative to other sources; (3) the ascrip-

[5] As used in this paper, 'family head' means either a married couple or an unmarried (or widowed or divorced) person maintaining dependents in his household. The income ascribed to the 'family head' includes the income of husband and wife, all property income received by the family (since the data do not permit allocation among the members), and earnings of dependent minors. Minors earning over $400 are treated, however, as emancipated *de facto*, and thus as family members having separate incomes and 'potential tax returns'. All deductions for the family are ascribed to the head.

[6] With respect to nontaxable returns, *Statistics of Income* is presumably incomplete from $2,000 downward since incomes below $1,500 were exempt from filing requirements. In the $2,000-3,000 net income bracket, *Statistics of Income* shows 1.657 million nontaxable joint returns, etc., to which should be added about .01 million separate-husband returns, and from which should be subtracted an unknown number of farm returns. The sample gives 1.05 million. In the $3,000-4,000 bracket, *Statistics of Income* shows about 0.03 million, the sample about 0.04. In the $2,000-3,000 bracket differences in taxable and nontaxable returns are thus in opposite directions; the sample shows 6.1 million taxable and nontaxable combined, while *Statistics of Income* (with subtraction of taxable but not of nontaxable farmers) shows about 6.1 million also.

[7] The tax incentive to file separately in 1941 began at $3,500 of combined net income for couples without dependents, $3,900 for couples with one dependent, $4,300 for couples with two dependents, etc; so that almost all separate returns must be allocated to groups above $3,000.

[8] Oddly enough, the number of nonfarm family heads who reported to the Bureau of Labor Statistics and Bureau of Home Economics that they had made payments on 1941 taxes in early 1942 indicated some 0.8 million fewer taxable heads than the number in *Statistics of Income.* This probably indicates that many who paid did not report. For nearly half the cases reported, however, tax payments imply a tax liability within 1 percent of the net income of the liability estimated from 1941 income and expenditure data.

[9] Allowing 2 percent of net income for deductions not specifically accounted for in the study: i.e., taxes other than personal, interest, and contributions, reduced the number taxable about 0.4 million. For the effect of such an allowance on aggregate taxable income, see note 13.

TABLE 1

Number of Taxable Nonfarm Family Heads Estimated from *Statistics of Income* and from the BLS-BHE Survey Sample, 1941 (millions)

	NET INCOME PER FAMILY HEAD						
	$2,000 & under[a]	$2,001 - 3,000	$3,001 - 4,000	$4,001 - 5,000	$5,000 & under	Over $5,000	Total
1 From survey sample[b]	2.32	5.04	1.49	0.54	9.39	0.86	10.25
On basis of *Statistics of Income:*							
2 Heads represented by joint returns, etc. (from *Statistics of Income*)[c]	2.25	4.62	1.36	0.40	8.63	0.81[c]	9.45
Minus:							
3 Estimated taxable farm family heads[d]	0.14	0.18	0.08	0.05	0.45	0.03	0.48
Equals:							
4 Nonfarm heads allocable with certainty by net income	2.11	4.44	1.28	0.35	8.18	0.78	8.97
Plus:							
5 Heads not allocable with certainty[e]	[e]	[e]	[e]	[e]	[e]	[e]	0.33[e]
Equals:							
6 Total nonfarm heads taxable							9.30
7 Excess of number from survey sample over heads allocable with certainty (line 1 — line 4)	0.21	0.60	0.21	0.19	1.21	0.08	1.28
Minus:							
8 Hypothetical allocation of doubtful cases[e]	0.02	0.04	0.10	0.12	0.28	0.05	0.33
Equals:							
9 Net excess	0.19	0.56	0.11	0.07	0.93	0.03	0.95

Since figures are rounded, they will not always add to totals.

[a] Returns on Form 1040A (tabulated by gross rather than net income) are classified as above or below $2,000 net income on the assumption that net is 95 percent of gross, using linear interpolation.

[b] See App. Table 1.

[c] Includes joint returns, separate returns of husband or wife where other spouse has no separate income, and incomes of unmarried (chiefly widowed and divorced) persons heading families. Husbands filing separate returns with separate incomes exceeding $5,000 are also included (since combination with their wives' incomes must mean an increase). Community-property husbands are included and tabulated on the assumption that the combined income of husband and wife is double the husband's separate income.

[d] Based on distribution of farm family heads reporting to the Bureau of Home Economics in June 1942 that they had paid (1941) federal income taxes in 1942; net income calculated from tax paid in light of family structure.

Notes to Table 1 concluded on page 240.

tion in the sample study of all earnings of unemancipated minors to parents, though in accordance with the law and regulations, may not accord with the practice of taxpayers.[10]

These factors probably explain about half the excess of .95 million (Table 1, line 9)—net of a rough allowance for the small effects of the omission of capital gains and underreporting of property income in the family income sample data. The standard error of the sample estimate, 10.25 million heads, is about .4 million,[11] which is approximately the same as the remaining difference. Accordingly, it is not unlikely that the discrepancy is an accident of sampling; though there remains a rather weak presumption that some hundreds of thousands of taxable family heads reported themselves nontaxable or failed to file returns. Neither the comparison of numbers nor of taxable amounts lends any substantial support to the view that taxpayers who file taxable returns have any marked tendency to understate their incomes; at least any large understatement would apparently occur in tax returns and family income data alike.

b *Estimated taxable income of family heads*

In estimating the amount of taxable income shown by the sample, it is of course necessary to exclude the open-end bracket with net incomes over $5,000, since the sample cannot yield a reliable average net income for this bracket. For the aggregate taxable income below $5,000, however, one would expect an estimate more accurate than for the number of taxpayers, since for the marginal cases, presumably, net income and exemption are approximately equal (Table 2), so that relatively little taxable income is involved. At first glance, the discrepancy seems serious; the 'net excess' below $5,000 in taxable income

10 Under the Individual Income Tax Act of 1944 this difficulty does not arise, since the earnings of all minors are treated as part of their gross income, not as part of their parents' gross income; see the Appendix.

11 See Appendix Table 5 for the general magnitude of the standard error to be associated with the different numbers of persons or returns estimated from the sample.

Notes to Table 1 concluded:

e Husbands below $5,000 of separate net income whose wives also filed returns, allocated by estimated combined net income of husband and wife. Allocation is frankly arbitrary; it is simply one of a large group of allocations compatible with data for aggregate incomes of husbands and wives filing separately, chosen to minimize the net excess in net incomes of $3,000-5,000.

TABLE 2

Aggregate Taxable Income[a] of Nonfarm Family Heads Estimated from *Statistics of Income* and from the Survey, 1941 (billions)

	NET INCOME PER FAMILY HEAD						
	$2,000 & under[b]	$2,001 - 3,000	$3,001 - 4,000	$4,001 - 5,000	$5,000 & under	Over $5,000	Total
1 Survey sample[c]	0.52	3.51	2.42	1.30	7.75	c	c
On basis of *Statistics of Income:*							
2 Taxable income represented by joint returns, etc. (from *Statistics of Income*)[d, e]	0.49	3.23	2.04	1.00	6.76	8.76	15.52
Minus:							
3 Taxable income represented by farm families[e]	0.03	0.13	0.12	0.12	0.40	0.18	0.58
Equals:							
4 Taxable income of nonfarm family heads allocable with certainty by net income	0.46	3.10	1.92	0.88	6.36	8.58	14.94
Plus:							
5 Taxable income not allocable with certainty[f]	f	f	f	f	f	f	0.78
Equals:							
6 Total taxable income of family heads							15.72
7 Excess of amount from survey sample over amount allocable with certainty (line 1 — line 4)	0.06	0.41	0.50	0.42	1.39	c	c
Minus:							
8 Hypothetical allocation of doubtful amount[f]	0.01	0.04	0.19	0.34	0.58	0.20	0.78
Equals:							
9 Net excess	0.05	0.37	0.31	0.08	0.81	c	c

Since figures are rounded, they will not always add to totals.

[a] Excess of net income over exemption and credit for dependents—'surtax net income'.

[b] Returns on Form 1040A (tabulated by gross rather than net income) are classified as above or below $2,000 of net income on the assumption that net is 95 percent of gross, using linear interpolation.

[c] Based on assignment of arbitrary averages of net income for each income bracket in each exemption-status group. 'Over $5,000' not estimated for reasons stated in text.

[d] Net income minus sum of exemptions and credits for dependents for all family heads covered in line 2 of Table 1.

[e] Obtained by assigning arbitrary average incomes and exemptions to all cases in the corresponding lines of Table 1.

[f] Taxable income of husbands and wives filing separate returns with separate net incomes below $5,000. Allocation is by assignment of arbitrary average incomes and exemptions to all heads in line 5 of Table 1. See also Table 1, note e.

(Table 2, line 9) is 10 percent, the same as the excess in the number of taxable heads (Table 1). But for some reason, *Statistics of Income for 1941, Part 1,* yields an underestimate of 1941 tax liability, as indicated by actual collections, that is of the same general magnitude as the difference, a considerable part of which must lie below the $5,000 boundary.[12] Furthermore, an allowance of 2 percent of net income as estimated from the sample for deductions not dealt with in processing the sample would reduce apparent taxable income about $0.5 billion.[13] Accordingly, the apparent overestimate from the sample is readily explained.

While this comparison does indicate certain limitations, there is nothing about it to disturb our confidence in the general reliability of the 1941 income and expenditure data or of *Statistics of Income* data—or in the honesty of taxpayers. In view of the sampling limitations of the Survey and the fact that in the reconciliation process each set of materials was handled strictly in the light of internal evidence without any conscious effort to improve the matching (except for the hypothetical allocation

[12] *Statistics of Income* shows an aggregate tax liability for all taxpayers under the Individual Income Tax for 1941 of $3,908 million—about 17 percent of aggregate surtax net income.

Collections of 'current' (i.e., 1941) taxes during 1942, according to the *Treasury Bulletin,* were $3,905 million. But they must have accounted for a good deal less than the total liability on 1941 incomes, for several reasons: (1) A substantial sum was collected as 'back taxes' on 1941 incomes during 1943 and 1944. Total 'back taxes' on individual incomes in 1943 were $290 million, a large proportion of which must have been on 1941 account. (2) Men inducted into the armed forces before December 1942 acquired the right to defer any unpaid portion of 1941 taxes until after their demobilization. (3) Obviously a small fraction of each year's tax liability must eventually prove uncollectible because of insolvencies, disappearances, etc. The collection record suggests a tax liability exceeding that in *Statistics of Income* by something on the order of $200 million, or 5 percent—probably more rather than less. Since we do not know where on the scale of progressive tax rates this additional liability falls, the corresponding amount to taxable income cannot be estimated with any precision, but it may be placed as of the general order of magnitude of $1.0 billion.

Since the reported total *number* of taxable returns rests on an actual count made in the office of each Collector of Internal Revenue, this difference in apparent tax liability cannot be traced to the total number taxable. Part may be due to sampling errors in allocating the total number taxable by income brackets, however, and in estimating credits for dependents (see Sec. 2b). Part undoubtedly can be traced to additional assessments on the basis of information at source, audit, and supplementary information supplied by taxpayers—most of which took place after the sample for *Statistics of Income* had been drawn.

[13] More precisely, such an adjustment would involve $0.08 billion below $2,000 of net income, and $0.26, $0.10, and $0.05 billion, respectively, for the $2,000-3,000, $3,000-4,000, and $4,000-5,000 brackets.

of couples filing separate returns), the reconciliation is reasonably close for family heads.

c *Number of single consumers*

A similar comparison for single consumers reveals a discrepancy so marked that the single consumer data from the Survey of Spending and Saving cannot be accepted as building a statistical bridge comparable to that developed for families. *Statistics of Income for 1941, Part 1,* Table 5, shows 4,216 thousand men and 2,981 thousand women as taxable in 1941 under 'Not heads of families'. These 7,197 thousand include both single consumers and family members who for tax purposes are treated as single. The sample (see App. Table 1) indicates only 5,450 thousand such taxable 'single' persons, or 'single taxpayers', of whom only 1,980 thousand are single consumers. Since the income data for family heads match *Statistics of Income* data so well, it would seem that most of the missing 1,747 thousand are likely to be single consumers rather than family members.[14]

As the Bureau of Labor Statistics points out in its forthcoming report, a number of single persons were missed in the 1942 field survey—in particular, single consumers of 1941 who entered the armed forces in 1941 or early 1942; workers in lumber camps, or on ships, and probably some residents of trailer and mining camps, hotels, and lodging houses. A field sample of single consumers that would match tax data could probably be obtained only if the sampling procedure were modified and the degree of mobility were lower than that prevailing in this period.

2 The Statistical Bridge

a *Over-all data for nonfarm family members*

The 27.9 million nonfarm families in the country yield 36.6 million 'potential income tax returns' (Tables 3 and 4).[15] In-

[14] Since, in the sample, only earnings can be allocated among family members, a certain amount of dividends, interest, rents, etc., belonging to family members who might file single person returns is erroneously attributed to the family head. But it is hard to believe that many family members whose separate earnings were below the taxable limits had earnings and property income combined that was taxable.

[15] For maximum utilization of the sample data the cross-tabulations are presented on a mandatory-return basis, which assumes that every person over 18, except the spouse of a family head, regardless of income, and every emancipated minor (income over $400) will 'potentially' file an income tax return; see also note 4.

TABLE 3

Estimated Potential Income Tax Returns* from All Members of Nonfarm Families, including Heads but excluding their Spouses, by Total Family Money Income and Approximate Statutory Net Income, 1941

(thousands of returns)

TOTAL FAMILY MONEY INCOME	Total	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH APPROXIMATE NET INCOME							
		Zero or negative	$1 - 500	$501 - 1,000	$1,001 - 2,000	$2,001 - 3,000	$3,001 - 4,000	$4,001 - 5,000	Over $5,000
$0- 999	7,140	780	3,810	2,550					
1,000-1,999	10,540	180	1,270	1,720	7,370				
2,000-2,999	9,700	40	1,140	1,170	2,710	4,650			
3,000-4,999	6,520		870	1,080	1,350	1,420	1,460	330	
5,000 & over	2,650		240	380	600	220	100	200	910
Total	36,550	1,000	7,330	6,900	12,030	6,290	1,560	540	910

*Potential returns are those assumed to be reported under the Revenue Act of 1941 if all persons except dependents and spouses of family heads were required to file, regardless of income. For some of the provisions of this Act, see the Appendix.

Since figures are rounded, they will not always add to totals.
Estimated from data collected by the Bureau of Labor Statistics and the Bureau of Home Economics in Survey of Spending and Saving in Wartime, June 1942.

TABLE 4

Estimated Potential Income Tax Returns* from Heads of All Nonfarm Families, by Total Family Money Income and Approximate Statutory Net Income of Family Head, 1941

(thousands of returns)

TOTAL FAMILY MONEY INCOME	Total	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH APPROXIMATE NET INCOME							
		Zero or negative	$1 - 500	$501 - 1,000	$1,001 - 2,000	$2,001 - 3,000	$3,001 - 4,000	$4,001 - 5,000	Over $5,000
$0- 999	6,130	780	2,840	2,510					
1,000-1,999	9,100	180	320	1,310	7,290				
2,000-2,999	7,390	40	120	260	2,340	4,640			
3,000-4,999	3,840		10	50	610	1,370	1,460	330	
5,000 & over	1,430				170	100	70	200	880
Total	27,890	1,000	3,290	4,130	10,400	6,110	1,530	540	890

*See notes to Table 3.

come recipients are appreciably more numerous, as wives and dependent minors with separate incomes are here treated as adjuncts to the 'family head'. Potential returns per family rise as we go up the family money income scale, for two reasons. First, the proportion of families with more than one potential return rises with family income.[16] Second, the average number of potential returns in families with more than one return also rises.[17]

In consequence chiefly of this splintering of income among family members, the 1,430 thousand families with $5,000 or over total money income produced (according to the sample) only 910 thousand returns with over $5,000 net income, together with 1,740 thousand returns with lower net income (see Table 3). At the other end of the income scale, of 15,230 thousand potential returns with net income below $1,000 only 7,140 thousand originated in families with under $1,000 total money income. Of 8,420 thousand potential returns from family heads with less than $1,000 net income, 2,290 thousand originated in families with over $1,000 total money income (Table 4). Accordingly, it is grossly incorrect to think of a family as represented by a single return with a net income slightly below its total money income; indeed, it is incorrect even to think of the rank order of families by total money income as coinciding with the rank order of their heads by net incomes.[18]

b *Net income and exemption status*

Since tax liability depends on both net income and exemption status, it is of the essence to classify potential returns in this

[16] See App. Table 2. Of families with less than $1,000 total money income, only 12 percent have more than one potential return, while of families with over $5,000, 48 percent have more than one. Needless to say, this is due in part to the assumption that minors represent potential returns if (and only if) their earnings were over $400—obviously unlikely to be true of families with very low total income.

[17] See App. Table 2 in conjunction with Table 3. There is a drop from 1.40 to 1.20 additional returns per family having such returns from the $0-999 to the $1,000-1,999 bracket; but from there the ratio rises steadily to 1.79 in the over $5,000 bracket.

[18] This may be readily seen from Table 4. On the family money income scale, the first 1,430 thousand of the 27,890 thousand rank numbers must be assigned to the families with $5,000 or over total money income. On the net income scale for family heads, the first 890 thousand are occupied by some of these family heads; but 200 thousand have net income rank numbers between 890 and 1,430 thousand; 70 thousand, between 1,430 and 2,960 thousand; 100 thousand, between 2,960 and 9,070 thousand; and an appreciable number, below 9,070 thousand.

TABLE 5

Estimated Potential Income Tax Returns* from All Nonfarm Consumer Units by Approximate Statutory Net Income and Apparent Exemption Status, 1941

(thousands of returns)

APPROXIMATE STATUTORY NET INCOME	TOTAL ALL RETURNS	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH APPARENT EXEMPTION STATUS										
		NUMBER OF DEPENDENTS CLAIMED BY FAMILY HEAD						SINGLE-PERSON EXEMPTION				
		None	1	2	3	4	5 or more	Total	Family head ineligible for head-of-family exemption	Other earner	Single consumer	Total
$0 or negative	1,760	760	120	80		30	10	1,000			760	760
1- 500	8,860	1,920	460	340	220	120	140	3,200	100	4,040	1,530	5,670
501-1,000	8,260	1,910	890	500	250	190	280	4,030	100	2,770	1,350	4,220
1,001-2,000	13,110	4,580	2,450	1,530	980	440	300	10,280	120	1,630	1,080	2,830
2,001-3,000	6,530	2,320	1,910	1,180	420	120	140	6,090	20	190	230	440
3,001-4,000	1,620	670	490	230	100	30	10	1,530		20	70	90
4,001-5,000	540	210	110	120	30	50	20	540				
Over 5,000	930	360	200	140	20	120	20	860	20	20	20	70
Total	41,600	12,730	6,640	4,120	2,020	1,090	930	27,530	360	8,660	5,040	14,070

*See notes to Table 3.

way. Unfortunately, the sample does not permit locating dependents over 18 but physically or mentally incapacitated;[19] the one way to handle the matter is to suppose (with only approximate correctness) that dependent children under 18 make up the whole body of dependents (Table 5).

The general accuracy of this tabulation may be checked in both the Census of 1940 and *Statistics of Income for 1941*. Judging from the Census,[20] the sample credits potential taxpayers with rather more dependents under 18 than actually existed. On the other hand, *Statistics of Income* yields 0.65 as the average number of dependents per taxable family head, while the sample yields 0.66. Any overstatement in the number of dependents under 18 claimed is apparently roughly offset by incapacitated dependents over 18.

On the whole, families with more dependents were somewhat less likely to have very low net incomes. But by reason of the additional $400 of tax-free net income allowed for each additional dependent in 1941, the proportion taxable (see Table 6) is much lower among large families. While those with three or more dependents made up 15 percent of all family heads, they made up only 4 percent of all taxable family heads, and apparently none of the sample cases with 6 or more dependents was taxable.

From Table 5 the difference in tax base that would arise from any contemplated variation in exemptions and credits for de-

[19] Under the new definition of dependent in the Individual Income Tax Act of 1944 this difficulty does not arise; see the Appendix.

[20] By number of children under 18 the number of nonfarm families containing more than one person is distributed as follows (in thousands):

	NUMBER OF CHILDREN IN FAMILY				
	None	One	Two	Three or more	Total
Census as of April 1, 1940 incl. 'subfamilies'	12,626	6,082	3,987	3,563	26,257
Estimate from sample, as of June 1941	13,090	6,640	4,120	4,040	27,890

The differences are partly conceptual and partly due to the presumptively fuller coverage of children under 5 in the sample (see Bureau of Labor Statistics *Bulletin 724*, pp. 22-3). On the other hand, a few children under 18 do not appear as 'dependents' in the sample because their earnings exceeded $400. The difference between the Census and sample estimates of the number of children is of the order of 2 million (out of a total over 30 million), and with all allowances the sample estimate seems to be 2-5 percent high.

Census data are taken directly from *Sixteenth Census—1940—Population and Housing: Families—General Characteristics*, pp. 10, 24, 28, except the figure 12,626, appearing under 'None'; for its derivation, see the Appendix.

TABLE 6

Estimated Potential Income Tax Returns* from All Nonfarm Consumer Units by Taxable and Nontaxable Returns, by Approximate Surtax Net Income and Apparent Exemption Status, 1941

(thousands of returns)

APPROXIMATE SURTAX NET INCOME	TOTAL ALL RETURNS	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH APPARENT EXEMPTION STATUS										
		NUMBER OF DEPENDENTS CLAIMED BY FAMILY HEAD						SINGLE-PERSON EXEMPTION				
		None	1	2	3	4	5 or more	Total	Family head ineligible for head-of-family exemption	Other earner	Single consumer	Total
Taxable												
$1- 500	7,440	2,070	1,280	620	90			4,070	130	2,080	1,160	3,370
501-1,000	3,770	1,440	820	230	50	10	20	2,570	50	750	400	1,200
1,001-1,500	1,890	860	320	130	20	20		1,360	30	220	280	530
1,501-2,000	920	440	200	70	10	20		740		140	40	180
2,001-3,000	700	330	150	50	40	50		620		20	60	80
3,001-4,000	360	210	100	20				340			20	20
Over 4,000	630	260	110	120		70	20	570	20	20	20	60
Total taxable	15,710	5,610	2,980	1,240	210	170	40	10,260	230	3,240	1,980	5,450
Nontaxable	25,830	7,110	3,620	2,860	1,810	920	890	17,200	140	5,430	3,060	8,630
Grand total	41,520	12,720	6,600	4,100	2,020	1,090	930	27,460	360	8,660	5,040	14,060

*See notes to Table 3.

pendents can be estimated roughly. If the exemptions in question do not happen to come out in multiples of $1,000 (1941 dollars), reasonably accurate interpolations can be made by plotting graphs representing the various columns of the table.[21] The result may readily be cast into the form of a surtax net income table like Table 6.

3 Applications of the Statistical Bridge

a *Distribution of family heads by money income (tax data)*

Since *Statistics of Income* is an annual series, it has long been tempting to compile from its tables an annual series of distributions of families and single consumers by size of total money income; but conceptual differences have stood in the way. With bridge tables such as those presented here, reasonable guesses can be made, though for highly accurate results there ought in principle to be a whole set of bridge tables representing different levels of employment. The most serviceable table in this connection is Table 4.

Basic Table 5 of *Statistics of Income* (the 'family relationships' table) is the natural starting point. The first step is to decide upon a level of net income regarded as equivalent to $5,000 in 1941 dollars. The number of families whose heads have net incomes above this level may be determined by adding (and if need be, by interpolating) the number of returns in the columns for 'joint returns, etc.' and for 'single persons, heads of families', and allocating the couples filing community-property returns and separate returns as well as possible by levels of combined net income. Similarly, the number of family heads may be estimated for net income ranges equivalent to $4,000-5,000, $3,000-4,000, etc., of 1941 dollars. The distribution of farm family heads by net income must be estimated from some source or other and subtracted out; the residue will make up the lower border (i.e., the column totals) of a table corresponding to Table 4. Allowance must be made for incompleteness of tax returns at the lower end of the net income scale; all columns

[21] A convenient system is to graph dollars per family vertically, cumulative numbers of families horizontally. On this basis, areas of course represent aggregate sums of exemptions used, income taxable, etc. For more detailed graphing, some additional points may be obtained from Table 6, by adding to the surtax net income per family head $1,500 for the exemption of the family head plus $400 per dependent.

below $1,000 (or perhaps even $2,000) of net income must be combined and an estimate of nonfiling family heads in the resulting combined column be added.

Once the lower border of the table is established, the column totals may be allocated in the same proportions as in Table 4. Addition across each line gives the desired estimate of the distribution by total family money income. If other sets of field data can be processed to yield a conversion table in the form of Table 4, the estimate can be improved by using the conversion table derived from the most closely comparable year.

b *Distribution of single consumers by money income (tax data)*

Statistics of Income gives also in Basic Table 5 a distribution by net income of single persons not heads of families and married persons not living with spouse. As noted above, this distribution includes both single consumers and family members taxable as single persons. If the number of family members can be estimated, subtraction will yield the number of single consumers in each net income bracket above the filing requirement. For years in which the level of employment approximates that of 1941, the distribution of such family members in Appendix Table 4 may be used, with adjustment for the income levels equivalent to the stated 1941 levels. Since there is no question of the splintering of the income of single consumers among several persons, a net income distribution for single consumers may be converted into a distribution by total money income without first-magnitude error by assuming each individual to have average deductions.[22]

c *Estimation of tax base from money income distributions (survey data)*

In view of the conceptual and quantitative differences between total money income and statutory net income, and of the rich

[22] See App. Table 3. The distribution of the single consumers tabulated by total money income would have been much the same if estimated from the distribution by net income on the supposition that every net income represented a total money income about one-tenth higher. Under the 1944 Act, below $5,000 of gross income there will presumably be available—instead of a net income distribution of single taxpayers—a distribution by 'adjusted gross income', which would prove more useful; see the Appendix. Above the $5,000 level, the distribution may be by net income, as heretofore, and possibly also by 'adjusted gross income'.

data in *Statistics of Income,* one would not ordinarily recommend inferring the number of persons taxable and their taxable income from the distribution of total money income as a method of revenue estimation. But such an estimate of the number taxable may be useful (1) to test the compatibility of a given distribution by money income with a given tax base estimate; (2) to estimate for a future period on the hypothesis of a particular type of change in income distribution; (3) to estimate the effects of a radical reduction of exemptions, change in income concept underlying taxes, or change in the concept of a taxable 'income recipient'.

For such a purpose, the family conversion table (Table 4) may be worked in reverse. The left column of the table form (i.e., the line totals) may be filled in from the given distribution of family heads by total money income, with appropriate allowance for the number of current dollars regarded as equivalent to a 1941 dollar. The line totals may then be distributed among the cells in the proportions indicated in Table 4, and column totals found by addition. The effect of family size may be allowed for roughly by carrying the resulting figures for the number of family heads in each net income bracket over into a table in the form of Table 5, and allocating by number of dependents within each net income bracket in the proportions found there.[23] Given such a cross-tabulation by net income and exemption status, it is easy to estimate the amount of income subject to tax.[24]

d *Estimation of aggregate income in the open-end group (survey and tax data)*

So far, the discussion has dealt with one-way trips from one end of the statistical bridge to the other. As mentioned at the outset, there is also the possibility of working from both ends to the middle—of using the bridge material, both income tax and field survey family income data, to make a 'best' estimate of the distribution by total money income *or* of the distribution by net income.

[23] Needless to say, it cannot be guaranteed that the resulting numbers of family heads with different numbers of dependents will add up to totals that correspond reasonably well with the column totals of Table 5. If the discrepancy is acute, adjustments will be necessary; unfortunately it seems impossible to avoid having these adjustments become somewhat subjective.

[24] A suitable method can readily be derived from the one described in note 19.

On the net income side, the main advantage of such a combination is to estimate the distribution of nontaxable incomes at the lower end of the scale, below the reach of filing requirements and information at source. From Census, Social Security, and other data the number of such incomes can be obtained residually with moderate confidence. But their distribution by income brackets (which affects their concentration near the tax margin) can be obtained only by field study or possibly from Social Security data. If field data that gave highly reliable sampling results could be gathered in the $5,000-10,000 family income range, it might be possible also to draw useful inferences about the pairing of incomes of husbands and wives filing separate returns; but it is probably utopian to expect more of a field study than sufficient data to give a reliable break at the equivalent of $5,000 in 1941 dollars.

On the money income side, the aggregate income ascribable to the open-end group at the upper end of the scale can never be reliably measured by a field study since the sample in the open-end group is inevitably so small that sampling accidents governing the inclusion or exclusion of a few very high incomes may shift the average drastically.[25] On the other hand, the income tax data provide aggregates of different types of income and exemption which may be cumulated down from the top of the income scale. From this data, supplemented by the bridge material for families whose heads and/or other family members have net incomes below the critical level while their family money income is above it, an aggregate suitable for inclusion in the family money income distribution may be built up.

It might be supposed that by combining the field study data and income tax data in this manner, an aggregate income figure could be obtained which after conceptual adjustments would come reasonably near to the Department of Commerce estimate of income payments.

It turns out, however, that this is not the case. The aggregate income for 1941 indicated by the Survey alone falls considerably short of the Commerce figure. The discrepancy might be expected to be attributed largely to the inadequacy of the Survey data for upper income groups, say above $5,000 of family

[25] For estimates of probable errors, see the forthcoming report of the Bureau of Labor Statistics.

money income, and might be thought to be eliminated if *Statistics of Income* data for that income range are substituted for Survey data. The data from *Statistics of Income* need to be adjusted as shown in the accompanying tabulation.

	(billion)
Initial figure	$11.3[a]
Net income of community-property families with separate net incomes below & combined net incomes above $5,000	.5[b]
Net income of husbands & wives filing separate returns, with separate incomes below & combined net incomes above $5,000	.3[c]
Family members with family money income over $5,000, & with individual net incomes below $5,000	
Family heads	1.7[d]
Others	1.4[e]
Single consumers with total money incomes above & net incomes below $5,000	.1[f]
Aggregate net income	$15.3[g]
Plus:	
Difference between net income & total money income	1.4[h]
Total money income	$16.7

[a] Compiled total from *Statistics of Income* for net income reported on all types of returns with individual net income exceeding $5,000.

[b] Net income of husbands and wives filing community-property returns with separate net incomes of $2,500-5,000.

[c] Product of an estimated number of cases (see Table 1, line 8) of 50,000 and an estimated average net income of $5,500-6,500.

[d] Frequencies from last line of Table 4 multiplied by arbitrary average net incomes.

[e] Frequencies from last line of App. Table 4 multiplied by arbitrary average net incomes.

[f] Of the $0.3 billion total net income of single taxpayers in the $4,000-5,000 bracket in *Statistics of Income,* part must be excluded as representing family members, and part as representing single consumers with total money income under $5,000.

[g] Sum of the foregoing.

[h] Deductions other than capital losses, less capital gains for taxpayers with separate net incomes over $5,000 (adding $1.0 billion to the $11.3 billion initial figure), plus 10 percent of the $3.9 billion of net income added to the initial figure. The ratio of 10 percent is reached by dividing the excess of deductions (excluding capital losses) over capital gains by aggregate net income for all taxpayers with separate net incomes of $4,000-6,000, on the ground that the additional $3.9 billion of net income represents persons in about this range.

The last figure, however, is even less than the aggregate—itself an underestimate—for this income class estimated from the Survey.[26] Hence, if the calculation is accepted, the striking conclusion follows: *A considerable share of the aggregate income one would expect in the light of the Department of Commerce*

[26] The Survey does not pretend to have located more than about 90 percent of the Department of Commerce aggregate (the latter measured after conceptual adjustments), though the discrepancy might be narrowed somewhat if the low Survey estimate of single consumers were raised substantially. For discussion of this difference see the forthcoming report of the Bureau of Labor Statistics.

figures is not to be found when tax and field study data are combined.

An estimate based on income tax data and Department of Commerce aggregates thus tends to give residually an excessive aggregate of income in the low brackets. On the other hand, an estimate based on field data and Department of Commerce aggregates tends to give residually an excessive aggregate of income in the high brackets. The inference is either that both tax and family income field data tend to understate income,[27] or that there is some element of duplication in the Department of Commerce data, or both.

It is highly probable that scattered items over which individual family members other than the head retain control are underreported in both sets of data; e.g., earnings of minors, income from roomers, scattered small dividend and interest receipts not reported at source, income from odd jobs, part-time salesmanship, writing, lectures. Items subtracted at source from earnings are also likely to be understated. But where the invisible income goes is still something of a mystery. Pending further evidence, the investigator is well advised to admit he cannot allocate all income, rather than introduce arbitrary allocation adjustments. Future field studies should be so designed as to reveal clues to the mystery.

4 Conclusions

1) For nonfarm family heads, the distribution by net income bracket in the bridge tables of this paper matches well enough with corresponding data from *Statistics of Income for 1941, Part 1,* to give confidence in the reliability of the bridge tables and in the general compatibility of the two sets of evidence.

2) Figures for single consumers, however, suggest that the 1941 consumer income and expenditure data for single persons are not reconcilable with tax data.

3) By reason of the splintering of income among family members, the number of consumer units whose total money income exceeds a stated figure such as $5,000 is much larger than the number of taxpayers whose net income exceeds that figure.

[27] For evidence that there is no major understatement on tax returns to which family income studies are immune, see Sec. 1a, b.

4) The rank order of family heads by net income (let alone by taxable income) diverges very considerably from the rank order by total family money income.

5) Even when both tax and family income field data are examined, a substantial residue of income payments remains unallocated, and there is a genuine mystery concerning the allocability of the Department of Commerce aggregates among consumer units.

Appendix

Effect of Individual Income Tax of 1944 (Simplification Act)

The use of field data in conjunction with income tax statistics naturally depends upon the particular tax system involved; in the case of the bridge tables of this paper, that provided by the Revenue Act of 1941. The Individual Income Tax Act of 1944 has made changes that will affect the problem considerably. A few points are indicated above in notes; this Appendix gives a more detailed account.

1 Simplification of the Concept of 'Dependent' and the Treatment of His Income

One major difficulty in analyzing the field data is to determine for each family group the number of dependents and the part of their income that should be assigned for tax purposes to the person on whom they depend. So far as this difficulty is a question of the allocation of property income, it arises from the character of the field study data and may prove insurmountable. But on the earnings side, the simplification brought about by the 1944 Act will tend to cure it.

Under the new definition, any person closely related to and receiving over half his support from a taxpayer 'for the calendar year in which the taxable year of the taxpayer begins' may be claimed as a dependent, so long as the dependent's gross income does not exceed $500. (If it exceeds $500, the person in question would be under obligation to file a return, and would be regarded as a separate taxpayer, not a dependent.) The dependent's income need not be reported either by

himself or by the taxpayer.[1] Age and capacity for self-support no longer have any bearing upon dependency. Incidentally, the rule of support permits claiming as dependent a family member (other than spouse) who was born or died during the year, without reference to the proportion of the year he was alive.[2] These rules make the analysis of family income schedules from the tax standpoint very simple, and at the same time introduce additional obstacles to the derivation of family income distributions from income tax data. The principal earner can claim as dependents all family members with individual gross incomes below $500, and need not report any part of their share of income. Family members receiving over $500 must be regarded as separate potential taxpayers. In principle, some family members receiving less might be ruled out as potential taxpayers on the ground that their own small income provided over half their support;[3] however, as this may not accord with the practice of taxpayers, this complication may be ignored.

[1] A dependent who is entitled to a tax refund (having had wages subject to withholding or having paid estimated tax under a declaration that turned out to overstate his income) may file a return to recover this refund without prejudicing his right to be claimed as a dependent. In such a case, the same person will presumably be represented in two places in the tax statistics: the income of the dependent will figure in the total reported on nontaxable returns; and the dependent's exemption will be claimed both on his own return and on that of the taxpayer who claims him as dependent.

[2] Since both birth and death put economic burdens on the family extending beyond the period in which the family member is alive, a sprinkling of such cases among dependents will probably not greatly impair the economic significance of this basis of classification; though it is awkward to have no account taken of burdens associated with a death late in the preceding year or a birth early in the following year.

Persons who are part-year dependents because they leave the family to marry or to establish themselves as single consumers are taken care of by rules against duplication. The exemption of a newly married person cannot be claimed on both a joint return filed with his spouse and the return of his parent. The new single consumer can be claimed as a dependent only if his earnings by the end of the year have not accumulated to a sum that makes him taxable, and he is not taking that exemption on his own *taxable* return; though, as noted above, his exemption may be claimed twice if his own return is nontaxable.

[3] Example: Suppose that a married couple earn $1,600 between them, and have a grown daughter earning $400, to whose support they contribute $300. In principle, the daughter is excused from filing and may not be claimed as a dependent; so the parents should report $1,600 of income (less presumptive deductions of $160) and $1,000 of surtax exemption, leaving $440 subject to surtax. In practice, however, they would probably claim $1,500 of surtax exemption, eliminating all surtax liability.

2 Change of Key Income Concept

Under the 1941 Act, the income concept most significant for tax purposes was statutory net income, though a large group filing the 'short form' were taxed on the basis of 'gross income'—a somewhat more indefinite notion. Under the 1944 Act, the 'short form' technique applies to a much larger group of taxpayers, and is based on a concept of 'adjusted gross income' which is much closer[4] to the concept 'total money income' commonly measured in family income field studies.

For the purpose of working from tax statistics back to distributions of 'total money income', tabulations based on 'adjusted gross income' are much more serviceable than net income tabulations. It may prove feasible, furthermore, to tabulate on an 'adjusted gross' basis both the taxpayers who are taxed on that basis and those who are taxed on a net income basis.

For the purpose of working from family income field study data toward tax estimates, taxpayers who will continue to compute deductions and net income and to be taxed on this basis must be sorted out. To this end, it may be desirable to convert all incomes to net, using the presumptive 10 percent where actual deductions will not be claimed.

[4] Whereas statutory net income is the residual left after the subtraction of both trade and business deductions (including the expenses of acquiring an income) and personal deductions (taxes paid, interest, contributions, etc.), 'adjusted gross income' and 'money income' are residuals left by subtraction of the former but not the latter. The chief other differences are on the side of capital gains and losses, which continue to affect income for tax purposes.

Provisions of the Revenue Act of 1941 concerning the Filing Requirements, Personal Exemption, and Credit for Dependents that apply to the Data used in this Paper

Requirements for filing returns:	
Individuals, married and living with husband or wife; husband and wife with separate incomes each to file a return unless income of each is included in joint returns:	
Combined gross income of, or exceeding[a]	$1,500
Individuals, single, or married and not living with husband or wife	
Gross income of, or exceeding[a]	750
Personal exemption:	
Individuals, married and living with husband or wife, or head of family	1,500
Individuals, single, or married and not living with husband or wife, and not head of family	750
Credit for dependents[b]	400

[a] Regardless of the amount of net income or deficit.

[b] If head of a family only because of dependent(s) for whom taxpayer is entitled to credit, such credit is allowed for each such dependent except one.

Number of Nonfarm Families and Subfamilies with no Children Under 18

The computation taking into account nonfarm families and subfamilies is as follows (references being to *Sixteenth Census—1940—Population and Housing: Families—General Characteristics*):

Number of nonfarm families with no children under 18 (p. 10)		14,379
Plus:		
Number of subfamilies (all subfamilies were assumed to have no children under 18) in		
Nonfarm families with one subfamily (p. 28)	1,229	
Nonfarm families with 2 or more subfamilies (p. 28) $2 \times 58 = 116$		
Total subfamilies		1,345
Equals:		
All families and subfamilies		15,724
Minus:		
Number of nonfarm families consisting of just one person (and therefore no children)		3,098
Equals:		
Number of nonfarm families and subfamilies with more than one person containing no children under 18		12,626

APPENDIX TABLE 1

Estimated Potential Income Tax Returns,[a] Nonfarm Consumer Units by Taxable and Nontaxable Returns, by Approximate Statutory Net Income and Apparent Exemption Status, 1941

(thousands of returns)

APPROXIMATE STATUTORY NET INCOME	TOTAL ALL RETURNS	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH APPARENT EXEMPTION STATUS			
		HEAD-OF-FAMILY EXEMPTION[b]	SINGLE-PERSON EXEMPTION		
			Family head ineligible for head-of-family exemption	Other earner	Single consumer	Total
Taxable returns						
$0 or negative						
$1- 500						
501-1,000	2,020		70	1,380	580	2,020
1,001-2,000	5,130	2,300	120	1,630	1,080	2,830
2,001-3,000	5,480	5,040	20	190	230	440
3,001-4,000	1,600	1,500		20	70	90
4,001-5,000	540	540				
Over 5,000	930	860	20	20	20	70
Total taxable	15,690	10,250	230	3,240	1,980	5,450
Nontaxable returns						
$0 or negative	1,760	1,000			760	760
$1- 500	8,860	3,200	100	4,040	1,530	5,670
501-1,000	6,220	4,030	40	1,390	770	2,190
1,001-2,000	7,980	7,980				
2,001-3,000	1,040	1,040				
3,001-4,000	30	30				
4,001-5,000						
Over 5,000						
Total nontaxable	25,900	17,280	140	5,430	3,060	8,620
Grand total	41,600	27,530	360	8,660	5,040	14,070

Since figures are rounded, they will not always add to totals.

Estimated from data collected by the Bureau of Labor Statistics and the Bureau of Home Economics in Survey of Spending and Saving, June 1942.

[a] Potential returns are those assumed to be reported under the Revenue Act of 1941 if all persons except dependents and spouses of family heads were required to file, regardless of income. For some of the provisions of this Act, see the Appendix.

[b] For definitions, see note 5 of text.

APPENDIX TABLE 2

Estimated Number and Percentage of Single and Multiple Return Nonfarm Families, by Total Family Money Income, 1941

(thousands of families)

TOTAL FAMILY MONEY INCOME	NUMBER OF FAMILIES			PERCENTAGE DISTRIBUTION		
	Single return families	Multiple return families	All families	Single return families	Multiple return families	All families
$0- 999	5,410	720	6,130	24.7	12.1	22.0
1,000-1,999	7,900	1,200	9,100	36.0	20.1	32.6
2,000-2,999	5,670	1,720	7,390	25.9	28.8	26.5
3,000-4,999	2,180	1,660	3,840	9.9	27.8	13.8
5,000 & over	760	680	1,430	3.5	11.3	5.1
Total	21,920	5,970	27,890	100.0	100.0	100.0

Since figures are rounded, they will not always add to totals.

Same source as App. Table 1.

Single return families are defined as families in which the entire money income was received by husband, wife, and minor children earning less than $400. Multiple return families are those in which the entire money income included earnings from members who for income tax purposes would be treated as single persons filing independent returns.

APPENDIX TABLE 3

Estimated Potential Income Tax Returns,* Nonfarm Single Consumers by Total Money Income and Approximate Statutory Net Income, 1941

(thousands of returns)

TOTAL MONEY INCOME	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH APPROXIMATE NET INCOME								
	Total	Zero or negative	$1 - 500	$501 - 1,000	$1,001 - 2,000	$2,001 - 3,000	$3,001 - 4,000	$4,001 - 5,000	Over $5,000
$0- 999	3,310	750	1,510	1,050					
1,000-1,999	1,270	10	20	260	980				
2,000-2,999	370			40	100	230			
3,000 & over	90						70		20
Total	5,040	760	1,530	1,350	1,080	230	70		20

Since figures are rounded, they will not always add to totals.

Same source as App. Table 1.

*See note a to App. Table 1.

Appendix Table 4

Estimated Potential Income Tax Returns,* Family Members other than Head or Spouse, Nonfarm Families, by Total Family Money Income and by Earnings, 1941

(thousands of returns)

TOTAL FAMILY MONEY INCOME	NUMBER OF POTENTIAL INCOME TAX RETURNS WITH EARNINGS								
	Total	Zero or negative	$1 - 500	$501 - 1,000	$1,001 - 2,000	$2,001 - 3,000	$3,001 - 4,000	$4,001 - 5,000	Over $5,000
$0- 999	1,010		970	50					
1,000-1,999	1,450		950	410	90				
2,000-2,999	2,300		1,010	910	370	10			
3,000-4,999	2,680		860	1,020	740	50			
5,000 & over	1,220		240	380	430	120	20		20
Total	8,660		4,040	2,770	1,630	190	20		20

Since figures are rounded, they will not always add to totals.

Same source as App. Table 1.

*See note a to App. Table 1.

Appendix Table 5

Approximate Order of Magnitude of Standard Error in Population Figures

(figures in thousands of consumer units)

POPULATION FIGURE	APPROXIMATE STANDARD ERROR	PERCENTAGE ERROR
50	30	60
100	40	40
500	100	20
1,000	140	14
5,000	290	6
10,000	370	4
15,000	390	3

Computed by use of the formula for the standard error: $\sigma = \sqrt{\frac{p\,(1-p)}{n}}$, where p is the estimated proportion of the population of 30 million consumer units (families plus single consumers), and n is the effective sample size, 1,500 cases, computed by proper weighting of the urban and rural nonfarm samples.