#545-79

INSTITUTE FOR RESEARCH ON POVERTY DISCUSSION PAPERS

ARE SALES TAXES PROGRESSIVE?

Timothy M. Smeeding

UNIVERSITY OF WISCONSIN-MADISON

Are Sales Taxes Progressive?

Timothy M. Smeeding
Institute for Research on Poverty
Department of Economics
University of Utah

June 1979

This research was supported by funds granted to the Institute for Research on Poverty at the University of Wisconsin-Madison by the Department of Health, Education and Welfare pursuant to the provisions of the Economic Opportunity Act of 1964. The author has benefitted particularly from the comments of Jon R. Miller, and also from conversations with Sheldon Danziger, Lance Girton, Robert Haveman, and Joseph Pechman.

ABSTRACT

According to a recent article by Edgar Browning (1978) sales taxes are alleged to be progressive elements in a tax system where government transfers are an important source of income. While Browning has called attention to the importance of absolute price level changes in determining tax burdens we demonstrate that his progressive pattern of sales tax incidence is only correct in a very special and very unrealistic case. Until one can demonstrate that higher sales taxes do not result in higher consumer prices, that differences in consumption patterns by income level do not create significant differences in tax burdens by income level, and finally that government transfers are fully indexed against increases in the general level of prices while factor incomes are not indexed at all, Browning's results are not very useful and must be rejected. We demonstrate that if sales taxes result in higher consumer prices, the conventional methodology for assigning sales tax burdens according to income-specific consumption of taxed commodities is the correct method for allocating the annual burden of these taxes by income level. Moreover, this conventional methodology captures any indexing of incomes which takes place in the economy.

Are Sales Taxes Progressive?

In a recent paper Edgar K. Browning (1978) reaches this unconventional conclusion:

> Applied tax incidence studies have concluded that the burden of the entire tax system is approximately proportional to income, a conclusion that depends **critically** on the assumption that sales and excise taxes are regressive. This paper shows that sales and excise taxes are progressive elements in the tax system when analyzed in a general-equilibrium model where government transfers are an important source of income. Consequently, the entire tax system is highly progressive under competitive assumptions about tax incidence. Moreover, the degree of progressivity is virtually unaffected when noncompetitive assumptions about tax incidence are employed (p. 649).

If Browning is correct, virtually every textbook on the principles of economics and public finance, and every otherwise highly regarded study of federal, state, and local tax incidence by income class (Pechman and Okner, 1974; and Musgrave et al., 1974), is in serious error. Moreover, if Browning is correct, many proposed changes in tax policy (e.g., the substitution of a value-added tax for the corporate income tax or the OASDHI payroll tax, the introduction of a general expenditure tax) would probably increase--not decrease--the progressivity of the tax system. In this review article Browning's analysis will be challenged.

In the first section of the paper, the main features of Browning's arguments and their relation to the commonly accepted methodology for allocating the burden of sales taxes and other forward-shifted taxes will be reviewed. The second section examines Browning's methodology, particularly his analytical assumptions. A simulation model of the tax system used in section three highlights the differences between Browning's estimates of effective tax burdens and those developed in this paper. I will show that the alleged progressivity of sales taxes is the result of conceptual and arithmetic errors in his analysis.

1. INTRODUCTION TO THE BROWNING MODEL

In presenting his argument, Browning relies on the familiar general equilibrium model of Harberger (1962), as refined by McClure (1970), and as illustrated by McClure and Thirsk (1975), to examine the imposition of a general sales tax. The singular important addition to these models is the consideration of government transfers as a separate source of income, distinct from factor (capital and labor) income. Browning harshly criticizes the conventional procedure for allocating sales tax burdens in proportion to consumption outlays, i.e., on the "uses side" of income. Browning claims that, once transfer income is explicitly included as a source of income in the tax model, the conventional procedure would be strictly correct only "if the overall price level rises in proportion to the size of the tax (total tax revenue as a percent of national income) and if transfers in money terms are unaffected (pp. 751-752)."

It is commonly believed that changes in tax incidence are created solely by changes in relative prices--not changes in absolute prices (McClure, 1970). Browning argues that "if government transfers are fixed in money terms, tax incidence will depend on what happens to the absolute price level (p. 651)." By assuming, however, that transfers alone exactly maintain their real value in the face of increases in the general level of prices via either explicit or implicit indexing by government authorities, and by assuming no differences in comsumption by income level, Browning is able to ignore changes in the absolute level of prices. He asserts, "assuming that the real value of transfers is unaffected by tax policy not only appears realistic but it also has the advantage that tax incidence is

once again independent of the absolute price level (p. 653)." Differences in the uses of income are conveniently disregarded by means of a key assumption, i.e., that average propensities to consume are identical for all income classes. Under the scenario which Browning has created, the entire burden of sales and excise taxes are allocated according to factor income alone--sales tax incidence depends almost solely on the nontransfer share of each family's income. Quite simply, the larger the part transfers play as a source of income, the more a family can escape the burden of sales and excise taxes because transfers are by definition protected against real income loss.

Browning applies his model to the U.S. tax structure by reestimating the income-specific tax burdens cited by Pechman and Okner (1974, Table 4-9), holding overall average taxes as a percentage of income constant at Pechman and Okner's 1966 levels for each type of tax. Not surprisingly, because the ratio of transfers to total income declines as income rises, a progressive sales tax emerges. Whereas Pechman and Okner found effective sales and excise tax rates declining from 8.9 to 3.2 percent of income in 1966 as one moves up the income scale, Browning concludes that they rise from 2.2 to 5.7 percent of income as income increases. Hence sales taxes are progressive.

Browning then demonstrates the income-class-specific burden of property taxes, corporate income taxes, and payroll taxes under varying incidence assumptions. Maintaining his assertion that transfers are fully indexed, the greater the amount of each of these taxes which appear as price increases, the greater the amount which can be treated in exactly the same way as sales and excise taxes. In other words, the greater

the assumed degree of forward shifting, the more progressive the tax burden. Browning concludes that the tax system in the United States is "substantially more progressive than is suggested by existing incidence studies . . . there is a clear possibility that the more regressive the appropriate tax incidence assumptions, the smaller the tax burden on the poor (p. 669)."

2. ANALYSIS OF THE BROWNING MODEL

Most applied economic analyses can be judged on the basis of three interrelated criteria: the soundness of the formal analytic technique employed, the judiciousness of the assumptions which simplify the application of the analysis, and the quality of the data. In this paper, I will have little to say concerning Browning's analytic technique per se. The formal and theoretic difficulties related to estimating the pattern of incidence of finite real world taxes in the context of a model which is properly equipped to deal with infinitesimally small taxes levied in the world of a competitive, fully employed economy has been analyzed by others.[1] Rather, I intend to focus on three issues: the nature of Browning's indexing assumptions, their implications, and their accuracy; the distinction between levels of taxation and changes in these levels; and finally Browning's reasons for ignoring differential uses of income in his incidence analyses. Data problems which lead Browning to state most cautiously the exact quantitative importance of his findings suggest that his analysis can be best demonstrated by relying on a simplified simulation analysis of tax burdens. Such an analysis is carried out in section 3.

Indexing of incomes. The first area of concern is Browning's indexing assumptions. Throughout his paper, he emphasizes that transfers change when the price level changes, due to explicit or implicit indexing provisions. In light of this emphasis on price level changes stemming from imposition of a change in a general sales tax, it is curious that he adopts a version of the Harberger model in which the monetary authorities act to keep the absolute price level unchanged. By assuming the price level fixed, he neatly subverts the issue of indexing. To obtain a clearer picture of the nature of Browning's analysis, and to spotlight the implications of his indexing assumptions, we need to examine an aggregate and fully equivalent version of his equation (2)[2]:

$$\frac{dI^*}{I^*} = F\, dP_L + G\, dP_K + H\, \frac{dT}{T} - \frac{dP}{P} \,. \qquad (1)$$

The left hand side of (1) is the percentage change in real disposable income,[3] which is equal to the sum of the percentage changes in the price of labor (P_L), price of capital (P_K), and transfers (T), weighted by their respective shares F, G, H (such that F + G + H = 100 percent), less the percentage change in the price level.

Suppose that, as Browning suggests and as emphasized in (1), the general sales tax is fully forward shifted through an equal percentage increase in the general price level. Under these conditions, $\frac{dI^*}{I^*}$ falls and $\frac{dP}{P}$ rises to maintain equality in (1). Simplifying, we find that (1) is reduced to:

$$F\, dP_L + G\, dP_K + H\, \frac{dT}{T} = 0 \,. \qquad (2)$$

Let us further suppose that transfer recipients are protected fully against real income loss. In such a regime, the burden of the tax by definition falls entirely on factors of production. Specifically, because Browning assumes that the real value of transfers remains unchanged, $\frac{dT}{T}$ must rise to offset the increase in prices. However, if F, G, and H do not change after the imposition of the tax, $\frac{dT}{T}$ rising is equivalent to P_L and P_K falling, if (2) is to be maintained. In other words, if Browning's conclusions are to hold, one must accept two key assumptions: (a) $dP_L < 0$ and $dP_K < 0$, i.e., the returns to capital and labor must fall in nominal terms while the general price level increases ($\frac{dP}{P} > 0$); and (b) $\frac{dT}{T} = \frac{dP}{P}$ for all T, i.e., that all transfers are fully indexed against increases in the general level of prices.

These assumptions deserve a bit of empirical attention. While it is difficult to isolate unbiased empirical estimates of P_K and P_L[4], it should be obvious that the returns to capital and labor have not fallen in nominal terms over the past decade(s). In fact, there is considerable evidence that the returns to labor have increased in real terms since 1967[5]. Thus assumption (a) above is clearly erroneous.

The evidence underlying the second assumption, $\frac{dT}{T} = \frac{dP}{P}$, is less clear-cut. There are several types of transfer payments which need to be separately examined. First, we consider cash transfers. Average Social Security (OASDI) payments have increased much faster than the Consumer Price Index (CPI) since 1967. Not an insignificant portion of this increase has been due to changes in the earnings levels of new retirees over and above legislative increases in benefit levels, however. Only since 1974 have OASDI and Supplemental Security Income (SSI) benefits been explicitly indexed to the CPI. However,

total SSI payments have not kept up with inflation. While federal guarantees have matched the increase in the CPI, state supplements and hence total SSI benefits have not.[6] The average state maximum AFDC payment for a family of four is an excellent proxy for T because it represents explicit legislative judgment as to how much a state would be willing to give a family with no other income. Browning argues that "it is clear that legislatures make ad hoc adjustment in response to price level increases (p. 652)." Hence comparing AFDC "guarantees" with price level changes provides a good test of this hypothesis.[7] However, between 1967 and 1977, these AFDC guarantees have increased by 61.0 percent while consumer prices rose by 81.5 percent (U.S. Department of Health, Education, and Welfare, 1967; 1977). Like SSI, AFDC benefits have not kept up with price increases either.

The remaining important cash transfer program is Unemployment Insurance. Ironically, unemployment insurance is informally indexed to the general level of wages in each state. By including Unemployment Insurance benefits as indexed transfers, Browning is implicitly saying that for these benefits to increase, as his full indexing assumption dictates, some measure of the price of labor (i.e., state average wage levels) must also be indexed against price level increases. Of course, this is entirely inconsistent with assumption (a) above, i.e., $dP_L < 0$.

In-kind transfers, including education, have generally kept up with the rate of price increase in the economy.[8] In fact, Medicare and Medicaid, roughly 65 percent of all noneducational in-kind benefits, have increased somewhat faster than the CPI since 1967. Of course, the benefits of these highly indexed transfers are limited to the consumption of a specific commodity, not offsetting income losses incurred while ill, or price

increases in other products which the household might comsume. Food stamps have been indexed to the CPI since 1964, yet they represent less than 3 percent of all the noneducational transfers included in Browning's transfer income measure. Hence, depending on the particular mix of transfers which a family unit receives, $\frac{dT}{T} \gtrless \frac{dP}{P}$ are all consistent with the evidence presented above.

While one might legitimately quibble about the extent to which education transfers should be included in total family income at government cost,[9] and while one might further argue about Browning's distributors for transfer benefits,[10] it seems fair to conclude that, while some cash and most in-kind transfers have generally kept up with the level of prices in the economy, these increases have not been as uniform or complete as Browning's assumptions would seem to indicate. Certain cash transfers (OASDI) have increased in value more rapidly than consumer prices, others (public assistance) have not kept up with the price level, while still others (in-kind benefits) have generally increased at the same rate as consumer prices. On the other hand, real hourly compensation has increased substantially more than the general level of prices. Based on this evidence, it seems clear that Browning's indexing assumptions are, at the very least, inaccurate.

Levels of tax vs. changes in tax. The distinction between levels of taxes and changes in these levels highlights a more practical problem with Browning's analysis. Even if indexing provisions for all transfer programs fully capture present changes in sales taxes, these provisions do not correct for levels of sales taxes in existence for decades.[11] At best, Browning's conclusions apply only to the progressivity or regressivity of changes in sales and excise taxes. His conclusions do not apply to the progressivity or regressivity of tax levels which existed prior to

the time when governments took inflation into account in determining transfer benefit levels, or prior to the time when transfers were an important component of total income. In this context, one might conclude by quoting Browning himself, "as a practical matter, there seems to be no way to determine exactly how much of a given rise in prices is due to taxation or how much money transfers will rise in response (p. 653)."

"Uses" of income. Finally, and perhaps most importantly, Browning chooses to ignore differences in taxation caused by differential uses of income--the usual method for allocating sales and excise tax burdens. His assumption that consumption patterns by income class do not significantly differ from the national average is probably defensible. However, the differences in uses of income may only be ignored if average propensities to consume (APCs) do not differ significantly by income level. Browning cites 1960-61 U.S. Bureau of Labor Statistics (1971, Table B017) data which indicate that consumption expenditures for families with incomes under $3000 averaged 116 percent of their after tax income, while the national average was 91 percent. More relevant to the issue at hand (since Browning uses 1972 data) are the 1972 Bureau of Labor Statistics (1976, Table 1a) figures which indicate that consumption expenditures as a percent of before tax total income[12] varied from 144 percent for families with incomes under $5000 to 48 percent for families with incomes of $20,000 or more. On the average, families consumed 67 percent of their before tax incomes in 1972. In light of these large differences in consumption by income levels, Browning must defend his assumptions:

> Although this issue deserves further investigation, there are several reasons for believing that differences in the percentage of income consumed have little quantitative significance for the study of tax incidence. First, sales taxes are not truly general

> taxes, as they always exempt certain classes of consumer goods and the relative prices of these goods will be reduced. Second, while it may be true that sales taxes tend to favor saving on the uses side of household budgets, there are other taxes, like the corporation income tax and property taxes, that penalize saving relative to consumption. Overall, it is far from clear that those who consume a large proportion of their income are harmed relative to others. Third, differences in consumption relative to income are derived in part from the annual accounting period used in measuring income. According to the permanent-income hypothesis, if income were measured over longer time periods there would be little, if any, difference in the percentage of income consumed at different income levels. Finally, even ignoring these three factors, moderate differences in the percentage of income consumed introduce only small burdens and benefits on the uses side, as suggested by the numerical example above, because it is only the deviation from the average that is relevant (p. 664).

Browning's four reasons for dismissing the uses of income as having little quantitative significance deserve detailed analysis because, if differential uses of income can be ignored, Browning's case for allocating sales taxes according to the sources of income is strengthened.

First of all, sales taxes are not general taxes. For instance, about half of the states exclude food for home consumption from the sales tax base. Because low-income families spend a larger part of their budget on food than do high-income families, they may escape some sales tax. On the other hand, most states exempt medical care, and many services, e.g., private education, legal aid, or housecleaning, from their sales tax base. Because higher-income people spend larger proportions of their budgets on such nontaxed services, they may escape some of the sales tax as well. While relative price effects will favor untaxed commodities over taxed commodities, the burden of the sales tax will only differ by income level according to budget shares allocated to taxed versus nontaxed items at each income level. As Browning himself argues, there is not much evidence that consumption patterns for taxed and nontaxed commodities differ by income level.

Browning's second statement--on taxes which penalize saving versus consuming--is irrelevant for analyzing the incidence of sales taxes. Rather, it depends on the incidence of taxes on savings, i.e., taxes on capital. To the extent to which such taxes are reflected in higher consumer prices, heavy consumers are again penalized relative to heavy savers.

Browning's third reason for ignoring the uses of income side is simply not valid either conceptually or empirically. First, on a conceptual level we seek only to estimate taxes in an annual accounting framework. To the extent that people move up or down the income distribution from year to year, and to the extent that their earnings, consumption, and savings patterns differ, their tax burdens will differ over time. Unfortunately the question of how multiyear tax burdens relative to multiyear or "permanent" income differ from annual tax burdens relative to annual income is unanswered at this time. There is evidence to suggest that over longer--even lifetime--income accounting periods, there are significant differences in savings and consumption by income levels. Higher-income people consume less and save more as a proportion of their lifetime incomes than do low-income people (Menchik, 1979). Such evidence tends to indicate that there will be sales tax burden differences due to higher consumption shares for low income people even in a lifetime income framework.

Browning's final point is that, even ignoring the other factos which he mentions--and we agree that they should be ignored--"moderate" differences in tax burdens on the uses side. Unfortunately, differences such as those cited earlier where APCs vary from 1.40 in the lowest

quintile to .55 in the highest quintile do make a great difference in the pattern of effective sales and excise rates, as we shall see.

In summary, it seems clear that Browning's indexing assumptions and his decision to ignore the uses of income in allocating sales and excise tax burdens cannot be justified based on his arguments and the evidence presented above. While he does not consider alternative assumptions which might jeopardize his avowed commitment to realism (pp. 652-653), it seems that such alternatives should be considered.

When Browning's critical assumption of fully indexed transfers and zero-indexed factor income is relaxed, many outcomes are possible. If neither factor prices nor transfers change in nominal terms--a zero-indexing situation--the burden of the tax is borne in proportion to consumption, and differences in the uses of income become important. Furthermore, in a world of real economic growth and contraction, in the presence of inflation, the right-hand side of (2) may be nonzero. Here, if sales and excise taxes are allocated on the sources side of income, an infinite combination of indexing assumptions is possible, and these assumptions are consistent with a variety of tax burden conclusions. However, relying on the uses of income to allocate the burden of sales, excise, and other forward-shifted taxes in such a world avoids the differential indexing problem altogether. Moreover, to the extent to which transfers and factor incomes are indexed against previous tax-induced changes in the CPI, these effects will be reflected in changes in the incomes of those who are being taxed. The next section of the paper clarifies these assertions.

3. SIMULATING TAX BURDENS

In his attempts to apply his model to real world tax burdens, Browning faces several difficulties. Most important, he uses 1972 macrodata estimates of income where families (of two or more persons) are ranked by census money income, unadjusted for underreporting errors, and before taxes and in-kind transfers have been accounted for. Browning then makes his underreporting and in-kind income adjustments based on the original census income-ranking of families.[13] To this population, income concept, and ranking, he applies Pechman and Okner's 1966 tax rates for all consumer units (including single-person families) which were based on individual family unit microdata which allows ranking of families by income quintiles after all income receipts have been counted. Such estimates may be quite inaccurate and, of course, similar problems face this author, were he to attempt a similar exercise. However, a sufficiently accurate picture of the effect of the distributional burden of sales and excise taxes can be achieved by means of a simple but realistic simulation.

Let us assume that we have a five-family economy where each family has an income similar to the relative amount of income in each of Browning's quintiles. Because Browning (Pechman and Okner) present only quintile (decile) specific "average" tax rates, the simulation model introduces no inaccuracies in actual tax burden patterns by income level as long as income: Labor income (LI), capital income (KI), and transfer income (TI) are distributed in the same way as Browning distributes them. In Table 1 we present such an economy, where total income (TLI) = LI + KI + TI, factor income (FI) = LI + KI, and transfer income is TI.[14] Note that we have not explained how these transfers were financed. TLI represents only total

Table 1

Effective Sales and Excise Tax Burdens in a Simulated Economy

Quintile	Basic Data:[1] Labor Income (LI)	Capital Income (KI)	Transfer Income (TI)	Total Income (TLI) TLI = FI + TI	Case 1 TX_{S1}[2]	$\frac{TX_{S1} \cdot 100}{TLI}$	Case 2 TX_{S2}[3]	$\frac{TX_{S2} \cdot 100}{TLI}$	$TX_{S2} = TX_{S1} - \Delta TI + \Delta TX$ TX_{S1}	$-\Delta TI$	ΔTX
Lowest	$ 1,400	$ 600	$ 4,000	$ 6,000	$ 300	5.0%	$ 120	2.0%	$ 300	$-200	$ 20
2	5,000	1,000	3,000	9,000	450	5.0	360	4.0	450	-150	60
3	9,000	1,000	2,000	12,000	600	5.0	600	5.0	600	-100	100
4	14,500	1,500	2,000	18,000	900	5.0	960	5.3	900	-100	160
Highest	21,500	4,500	1,000	27,000	1,350	5.0	1,560	5.8	1,350	- 50	260
Total	51,400	8,600	12,000	72,000	3,600	5.0	3,600	5.0	3.600	-600	+600

Quintile	Case 3 TX_{S3}[4]	$\frac{TX_{S3}}{TLI + \Delta TI} \cdot 100$	Case 4 APC from[5] TLI	Consumption (C)	TX_{S4}[6]	$\frac{TX_{S4} \cdot 100}{TLI}$
Lowest	$ 310	5.0%	1.2	$ 7,200	$ 530	8.8%
2	458	5.0	.85	7,600	560	6.2
3	605	5.0	.70	8.400	620	5.2
4	905	5.0	.60	10,800	795	4.4
Highest	1,353	5.0	.55	14,900	1,095	4.1
Total	3,630	5.0	.68	48,900	3,600	5.0

Notes: 1. For derivation of Basic Data see Table A-1 at end.

2. $TX_{S1} = .05\ TLI$

3. $TX_{S2} = .06\ FI$

4. $TX_{S3} = .05\ (\Delta TI + TLI) = .05\ \Delta TI + TX_{S1}$

5. Source U.S. Bureau of Labor Statistics (1976) Table 1a.

6. $TX_{S4} = .0736C$

receipts to which all types of taxes are to be compared in order to determine overall and quintile-specific effective tax rates for sales and excise taxes (TXS) paid, i.e., $\left(\frac{TXS}{TLI}\right)$.

Table 1 presents four different cases (J = 1, 2, 3, 4) wherein the effects of sales and excise taxes (TX_{SJ}) equal in the aggregate to 5.0 percent of TLI[15] are levied. It is assumed at first that sales and excise taxes produce proportionate increase in consumer prices.[16] The four cases may be distinguished as follows:

Case (J)	Indexing Assumptions FI, TI	Uses of Income Assumptions for each quintile (n)
1	NO, NO	$\overline{APC}$ all n
2	NO, YES	$\overline{APC}$ = 1 all n
3	NO, YES	$\overline{APC}$ = 1 all n
4	NONE, NONE	APC varies by n

A "NO" in the second column indicates that the income source in question is not indexed. A "YES" for TI indicates that transfers are exactly indexed against income changes in an instantaneous fashion. There is no lag in compensating transfer recipients for taxes paid in the form of higher consumer prices.[17] In Case 4, "NONE" indicates that there are no indexing restrictions imposed on either FI or TI. It will be shown below that whatever the timing or pattern of price increases, and whatever the timing or pattern of the indexing mechanism's response, Case 4 fully captures such changes.

For Case 1 in the third column, "$\overline{APC}$ all n" implies that the average propensity to consume (APC) from TLI is constant across all income quintiles.

Hence, quintile specific differentials in consumption (including consumption differences for taxed versus nontaxed goods) are not allowed. In Cases 2 and 3, consumption is further restricted to equal TLI in each quintile, i.e., "$\overline{APC}$ = 1 all n." Finally, in Case 4, there are no outside restrictions imposed on the pattern of APCs by income class. In fact, APCs are allowed to vary by quintile as found in relevant consumer expenditure studies. Let us examine the pattern of tax incidence which results in each of these cases.

Case 1. In Case 1, the tax burden is fully allocated on the uses side of income. The effective tax rate for each income quintile is 5.0 percent--a proportional tax rate. This is equivalent to the incidence of sales and excise taxes in both Browning's and our own model, provided that incomes are not indexed, provided that there are no interquintile differences in consumption on the uses side, and provided that sales and excise taxes are assumed to result in proportionately higher prices for taxed goods.

It is important to note that if something less than 100 percent of the tax burden is assumed to be forward shifted, this case would not generally be equivalent either to a proportionate tax on factor income or to a proportionate tax on total income. To the extent to which sales and excise taxes result in lower factor returns--not higher consumer prices--tax burden patterns by quintile may change. Three factors will determine the burden of this part of the tax: (a) the proportion of sales and excise taxes assumed to fall on factor income, (b) the mix of FI and TI, and (c) tax-induced changes in the value of transfer income. For instance, if 100 percent of these taxes were assumed shifted onto factor incomes, the revenue from a 5.0 percent tax on TLI would be equivalent

to that of a 6.0 percent tax on FI in Table 2, assuming that transfers retain their real value, i.e., they do not decrease in money terms. In this case effective tax rates will increase with income because the ratio of FI to TLI increases with income.[18]

However, such a result is inconsistent with our indexing assumptions for Case 1. If transfers retain their money values while other incomes fall, effective tax rates on factor income must rise to keep transfers constant. Transfers are de facto "indexed" in such a world. In order to arrive at the exact pattern of tax burdens specified in Case 1, we must instead assume either that all types of income fall in value by the effective tax rate, i.e., 5.0 percent, or that transfer incomes make up equal proportions of each quintile's total income. The pattern of equal proportionate tax burdens shown in Case 1 will exist only if either of these very particular conditions exist.

This exercise is important for two reasons: First, we have set up a case in which sales and excise taxes are proportionate to income as a benchmark from which other cases may differ. Second, income quintile-specific patterns of tax incidence have been shown to be generally dependent on absolute price level changes as indicated by one's choice of incidence assumptions. In a "no indexing" world, proportionate sales and excise tax burdens result only under very peculiar sets of assumptions regarding either the uses or the sources side of income or both (in the case where less than 100 percent of the tax falls on either uses or sources of income). By varying from this special case, other patterns of tax burden can be derived.

Cases 2 and 3. Case 2 presents a situation in which $\overline{APC}$ again, but further, $\overline{APC} = 1$, by assumption. In addition, TI is now indexed fully against inflation while FI is not indexed at all. The resulting highly progressive pattern of tax incidence (TX_{S2}) and effective tax rates $\left(\frac{TX_{S2} \cdot 100}{TLI}\right)$ are almost exactly equivalent to the pattern of tax rates which Browning presents in his article (p. 661, Table 3).[19] How did Browning arrive at such a conclusion? There are two answers, each of which depends crucially on the presumed incidence of the sales tax and the indexing mechanism employed.

First, assuming that the entire sales and excise tax burden falls on factor income alone, and assuming no changes whatsoever in the absolute level of consumer prices (i.e., the CPI),[20] and further assuming that each quintile's shares of capital and labor income proportionately bear the burden of the tax, Browning is able to allocate the total tax burden as a proportionate tax on factor income and the progressive pattern of tax rates indicated by TX_{S2} results. In this case differences in the uses of income can be totally ignored, as Browning has done.

As a second answer, suppose that Browning were forced to face the more realistic, generally accepted, but completely opposite incidence assumption whereby sales and excise taxes are fully forward shifted onto consumers. Assuming that higher taxes produced higher absolute prices,[21] how could we arrive at this same pattern of tax incidence, i.e., TX_{S2}? The final three columns at the top of Table 1 indicate the way in which

these results occur. TX_{S2} (Browning's actual amount of tax paid) would have to be the combination of three separate income changes. First, ignoring income specific differences in consumption, all income recipients pay sales taxes of TX_{S1}, i.e., 5.0 percent of their total incomes. Second, because prices have increased by 5.0 percent ($\overline{APC} = 1$, hence $C = TLI$), Browning's indexing assumptions indicate that transfers need to be increased by 5.0 percent, or $600. This is represented by ΔTI in the second-last column. Third, in order to finance ΔTI of $600 or 5.0 percent, a factor income tax of 1.0 percent need be levied on FI. This is the ΔTX in the final column. In sum, $TX_{S2} = TX_{S1} - \Delta TI + \Delta TX$.

These two polar examples have again illustrated the fact that sales and excise tax incidence is dependent on the response of the absolute level of consumer prices to tax changes in Browning's model. Browning's pattern of tax incidence (TX_{S2}) is directly produced via proportionate taxes on factor income only if absolute prices do not change in response to the imposition of a sales tax. To the extent to which such taxes do create increases in absolute prices, the pattern of tax and transfer changes demonstrated in the final three columns at the top of Table 2 must be realized in order to arrive at the same pattern of effective tax rates. In other words, to the extent to which sales and excise taxes result in higher prices,[22] the tax is paid (TX_{S1}) in the form of higher consumer prices, and CPI registers this increase. In response, indexed transfers (all of them in this case) rise exactly in proportion to the price increase (ΔTI), and these transfer increases are paid for via a proportionate tax on factor income (ΔTX). What is wrong with this peculiar combination of events?

We can explore this situation more fully by examining the following expression:

$$\frac{TX_{S2}}{TLI} = \frac{TX_{S1} - \Delta TI + \Delta TX}{FI + TI} \tag{3}$$

which follows from the last three columns at the top of Table 1.

Equation (3) is peculiar in a number of ways. For example, a change in "income", i.e., an addition to transfers (ΔTI), appears in the numerator of equation (3). However, the change in transfers represents an increase in income, not a reduction in taxes per se. Similarly, in determining the effective tax rate for sales and excise taxes, it is entirely inconsistent to include other taxes, i.e., factor income taxes (ΔTX) "paid" to transfer recipients, in the numerator of the effective tax rate expression. Conceptually, if ΔTI and ΔTX should be included in the numerator as changes in taxes, then so should TI and those other taxes on factor income originally used to finance TI, say TX, in the first place. However, if we were to carry out such a maneuver we would end up with the following type of expression:

$$\frac{TX + \Delta TX - TI - \Delta TI}{FI} \tag{4}$$

In fact, we would have an expression not of tax incidence or effective tax rates, but an expression of "net tax-transfer rates". While such an expression might be useful in determining the net incidence of the entire tax-transfer system in a given year, it is surely out of place in a study of tax incidence per se.[23]

It is interesting to note that, if effective tax rates are computed relative to factor income, i.e., $\left(\frac{TXS}{FI}\right)$, even under Browning's restrictive assumptions sales taxes are at most proportionate to income. In this case $\frac{TX_{S2}}{FI} = .06$ for all FI. Hence if researchers would prefer to base their tax rate estimates on factor income--the ultimate source of all taxes--one would, at best, find a proportionate sales tax incidence pattern and not a progressive sales tax incidence pattern.

The correct and consistent expression for determining the effective sales tax rates under Browning's indexing assumptions is the following:

$$\frac{TX_{S3}}{TLI + \Delta TI} = \frac{TX_{S1} + .05(\Delta TI)}{FI + TI + \Delta TI} \qquad (5)$$

where the effective sales tax rate equals the amount of tax originally paid (i.e., TX_{S1}) plus the amount of tax paid on purchases from "new" transfer income, $.05(\Delta TI)$. The compensating transfer payments ΔTI are included with other transfer income (TI) as new income in the denominator of the tax rate. Case 3 represents this tax burden. Note that the tax burden is exactly the same as the tax burden in Case 1. In other words, in determining effective sales and excise tax rates, it makes no difference whether transfers are indexed or not. Under Browning's uses side assumptions, i.e., $\overline{APC}$ all n, the tax burden is proportionate to income when correctly specified. In fact, there is no reason for separating ΔTI ($.05\Delta TI$) from TI (TX_{S1}) in the first place.

In summary, if sales taxes are assumed to result in higher consumer prices, any and all income indexing effects--whether they affect transfer income or factor income--will have already been accounted for in

recording FI and TI. Indexing of income does not affect tax incidence except to the extent to which transfer indexing means higher factor income taxes, and the burden of these taxes will be reflected in other higher factor taxes which will also be recorded.[24] There is no need to, or reason for, explicitly accounting for transfer indexing. Browning's progressive pattern of tax incidence (TX_{S2} and $\frac{TX_{S2} \cdot 100)}{TLI}$ applies only if the entire burden of the sales tax is assumed to fall fully on factor income. As demonstrated, to produce a progressive pattern of sales tax incidence, one must accept two crucial assumptions: (a) that consumer prices do not increase in response to the tax, and (b) that transfer incomes retain their real (money) value in the face of declining factor incomes. Only in this case will a progressive pattern of sales tax incidence emerge.

Case 4. Finally, Case 4 considers the situation in which APCs vary by income level, again assuming that the burden of the sales tax is fully forward shifted as in other tax incidence studies. The APCs from TLI employed in this study are taken from the U.S. Bureau of Labor Statistics 1972 Consumer Expenditure Survey (1976). Since this data indicates that overall consumption is about 68 percent of total income, the total sales tax base shrinks to $48,900 where C = .68 TLI. Assuming tax revenues constant at $3600, effective sales and excise tax rates rise to an average of 7.4 percent of consumption. Applying this uniform tax rate to each quintile's (person's) consumption tax base, we derive TX_{S4}. The resulting tax burden is decidedly regressive, with effective tax rates falling from 8.8 to 4.1 percent of TLI as incomes rise, and quite similar to that found in Pechman and Okner (1974, Table 4-9). Obviously, large differences in effective tax rates come about due to differences in the uses of income.

In sum, these simulations indicate that effective sales and excise tax rates depend both on the incidence assumptions made and on one's assumptions regarding the uses of income. When realistic consumption patterns are included in the analysis, effective sales and excise rates become quite regressive, not proportional to income as in Cases 1 and 3. Browning's effective tax rates $\left(\frac{TX_{S2} \cdot 100}{TLI}\right)$ are only correct if one can assume that sales and excise taxes fall fully on factor incomes in a regime where tax-induced changes in consumer prices are zero and transfers retain their money (real) values while all other incomes fall in both money and real terms. If sales and excise taxes are assumed to be fully (or even only partially) forward shifted, Browning is correct only if one can assume (a) that APCs do not vary by income class, (b) that transfers and only transfers are fully indexed against increases in tax burdens in the current period, and finally (c) that changes in transfer income and extra taxes needed to finance these changes in transfers can be included as changes in sales tax paid, not as changes in family income or other taxes. None of these three assumptions would seem to be defensible given our previous analysis.

Browning also considers the incidence of other taxes (corporate income taxes, property taxes, payroll taxes), portions of which are assumed to be treated "as if the tax were an excise tax" (p. 661)." While, as Browning admits, such taxes are treated by other analysts by allocating the tax in proportion to consumption, as in Case 4, under the Browning regime they are treated in the same way as he treats other sales and excise taxes, i.e., as in Case 2. In other words, it seems that where

earlier analysts have implicitly assumed that some portion of these taxes are forward shifted to consumers in the form of higher prices, thus allocating the tax on the uses side of income, Browning avoids the uses side either by accepting the forward shifting assumption, which results in a tax transfer scheme similar to that in the last four columns at the top of Table 2, or by simply assuming that higher consumer prices do not result at all, rather factor returns fall by the amount of the tax.[25] In either case, his results are the same. To the extent that such taxes are treated as excise taxes, by applying his methodology as in Case 2 above, the "forward-shifted" portions of these taxes become quite progressive.[26]

On the other hand, applying the usual methodology for allocating sales and excise tax burdens by APCs which vary by income quintile, i.e., Case 4, the forward-shifted portions of these taxes are quite regressive. The portion of all three taxes which is "competitively" allocated falls on factor income for both Browning and other analysts, e.g., Pechman and Okner. A further numerical illustration of these burdens would add little to what has already been said above.

4. CONCLUSION

This review article has reexamined the alleged progressivity of sales taxes by subjecting Edgar Browning's methodology, assumptions, and his implicit and explicit mechanics to close scrutiny. We have shown that sales and excise taxes are only progressive under the special case where sales taxes do not result in higher consumer prices and factor incomes fall by the amount of the tax while transfer incomes do not change.

These assumptions are clearly unrealistic and not relevant to tax incidence in the United States in the 1970s, as demonstrated in Section 2 above. Browning has called attention to an important issue in empirical studies of tax incidence, i.e., the role of absolute price changes in determining tax burdens. However, until someone demonstrates that higher taxes do not result in higher consumer prices, that differences in consumption patterns by income level do not create significant differences in tax burdens by income level, and finally that transfers are fully indexed while factor incomes are not indexed at all, Browning's results are not very useful and must be rejected. Are sales taxes progressive? No, they are not.

Table A-1

A Comparison of Size Distributions and Sources of Income, 1972

	Quintile	Total	Labor	Capital	Transfer
I. Browning*			($ Billions)		
	Lowest	77.0	18.4	8.3	50.3
		(100)	(24)	(11)	(65)
	Second	111.0	66.4	12.9	31.7
		(100)	(60)	(12)	(28)
	Third	150.1	111.3	13.2	25.6
		(100)	(74)	(9)	(17)
	Fourth	197.3	156.0	16.5	24.8
		(100)	(79)	(8)	(13)
	Highest	350.4	266.4	55.1	28.9
		(100)	(76)	(16)	(8)
		885.8	618.5	106.0	161.3
		(100)	(70)	(12)	(18)
II. Simulation			($ Actual)		
	Lowest	6,000	1,400	600	4,000
		(100)	(23)	(10)	(67)
	Second	9,000	5,000	1,000	3,000
		(100)	(56)	(11)	(33)
	Third	12,000	9,000	1,000	2,000
		(100)	(75)	(8)	(17)
	Fourth	18,000	14,500	1,500	2,000
		(100)	(81)	(8)	(11)
	Highest	27,000	21,500	4,500	1,000
		(100)	(79)	(17)	(4)
		72,000	51,400	8,600	12,000
		(100)	(71)	(12)	(17)

Note: Percentages shown in Parentheses

*Browning (1978, p. 656, Table 1)

NOTES

[1]Ballantine and Eris (1975), Mieszkowski (1969). For a formal general equilibrium treatment of income redistribution by means of taxes and transfers, see Diamond (1978).

[2]Equation (1) is derived from Browning's aggregate sources of income equation, $I = P_L L + P_K K + T$, where all values are initially in nominal terms. The result is obtained by (a) dividing both sides of the equation by P, the aggregate consumer price level, and (b) taking total differentials and rearranging terms. Browning's equation (2) contains an error. The third term on the right hand side of his (2) should be $h_i \frac{dT_i}{T_i}$, rather than $h_i dT_i$, as Browning considers <u>percentage</u> changes in the variables. The dP_L and dP_K terms need not be divided by P_L and P_K, as these values are normalized to 1 by assumption (Browning, 1978, pp. 659-660).

[3]The * superscript is added to indicate real magnitudes, a confusing notational omission in Browning's presentation of his Equations (1) and (2).

[4]The question which needs to be addressed is to what extent are the various sources of income-labor, capital, and transfers indexed? In order to arrive at a reasonable answer to this question it is necessary to abstract from changes in factor endowments and their utilization, and to concentrate on changes in returns to these factors alone. In terms of (1), one would ideally hope to obtain exact measures of P_L, P_K, T, and comparable changes in the price level, abstracting from changes in F, G, and H. While there is no simple unbiased estimate of the return to capital, P_K, proxies for P_L and T are used below.

[5]As a reasonable estimate of P_L, consider the economy-wide average hourly compensation for all employees. Between 1967 and 1977 P_L increased from $3.65 to $4.23 in real terms: an increase of 14.9 percent (Economic Report of the President, 1979, Table B-12).

[6]Between January 1974 and June 1978, SSI payments have increased 54.6 percent while state supplements have increased only by 19.4 percent. While this data refers to actual payments--not maximum allowable payments (see fn. 7 below), the differences in these rates of increase indicate that state supplements have not kept up with either federal benefits or the CPI.

[7]Actual AFDC benefit levels and changes in these benefit levels do not make good proxies for T, because they combine changes in benefit standards with changes in the number of participants and changes in the length of time the average AFDC family participates.

[8]One might legitimately argue that some in-kind transfers should be excluded from the analysis altogether, or at a minimum that their quantitative significance should be reduced, for at least three reasons. First, in-kind transfers are not perfect substitutes for cash income, although Browning treats them as such. To the extent to which transfer beneficiaries would accept lesser amounts of cash in lieu of in-kind benefits, their value is overstated. It has been estimated that medical care and public housing transfer recipients would be willing to trade $1 of in-kind benefits for 55-70¢ in cash (Peskin, 1977). Second, discounting of benefits seems particularly important in the case of compulsory in-kind transfers which have a significant "collective goods" component, such as public education. Due to the omission of other

"public goods" from income, there is some question whether these "transfers" should be included in such an analysis as this at all. Despite the fact that Browning's analysis depends heavily on the magnitude of the transfer income component and despite the fact that public education benefits make up almost 40 percent of this "transfer" income, he writes "public schools are included as in-kind transfers but if they are deleted the results would not be significantly affected (p. 656, fn. 9)." Third, in-kind taxes such as compulsory military service and jail terms for consuming illegal substances (e.g., marijuana) are not included in the definition of taxes used in this study.

However, because "correct" size of transfer benefits is not at issue here, and because most of this analysis applies whether in-kind benefits are included or not, we will accept the magnitude of Browning's transfer income definition to simplify our analysis. For a different view, see Smeeding (1979).

[9]If they are excluded, the transfer share of total income drops from 18 percent to 12 percent.

[10]A complete review of Browning's methodology regarding transfer income shares is beyond the scope of this paper. For a critique of Browning's distributors for in-kind transfers see Smeeding (1979).

[11]Since 1970, only 6 states have increased their general sales tax rates. Since 1974, the first year in which major income transfers were formally indexed against price level increases, only 2 states (Arizona and Massachusetts) have increased their general sales tax rates. See Advisory Commission on Intergovernmental Relations (1977, pp. 174-75).

Moreover, it is doubtful that even a change in a sales tax at the state or local level would cause a response in a national price index sufficient to compensate transfer recipients in that locality. However, if significant portions of the corporate income tax and business property taxes are forward shifted, or if we were to substitute a value-added tax for the corporate income tax, national price indexes would increase to some extent.

[12]Since families are ranked by before-tax census income, it is the correct measure in this situation. In this case, using after-tax income is both inconsistent (since taxes have not yet been determined) and inaccurate (since family income rankings based on after-tax income will be different from rankings based on before-tax income).

[13]Once families are reranked by income from all sources, there will be considerable movement of families from quintile to quintile. For an estimate of the importance of the ranking problems faced by Browning, see Smeeding (1979).

[14]Table A-1 in the Appendix verifies the close similarity between these distributions.

[15]This means that total taxes collected equal 5.0 percent of TLI. No restrictions are placed on differences in aggregate or quintile-specific consumption or tax rates by such an assertion. For instance, the overall APC from TLI could be .67. In such a case, sales and excise taxes of 5.0 percent of TLI would be equivalent to an overall average tax rate of 7.5 percent on consumption. In Cases 2 and 3 below, however, further restrictive assumptions on APCs are made, consistent with Browning's determination of effective sales and excise tax rates (pp. 660-661).

[16]How much of a proportionate increase in prices depends on the relationship between consumption and TLI. Under the stated assumptions, where sales and excise taxes are equal to 5.0 percent of TLI, consumer prices will increase by 5.0 percent only if APC = 1.

[17]In reality, indexing of transfers only takes place after a 6- to 12-month waiting period. Although such lags are clearly important in a world of constantly rising consumer price increases, the introduction of such lags would needlessly complicate the analytic issues which we are attempting to isolate here. Lags in inflation-compensating income changes are only included in Case 4 where no restrictions or indexing are assumed.

[18]This is if we further assume that only differences in the quintile-specific composition of income (FI vs. TI) affect tax incidence. In such a world a proportionate 6.0 percent tax on factor incomes results in a tax pattern identical to that identified in Table 1 as TX_{S2} in the adjacent column under the heading Case 2. However, such a pattern of taxation further implies strict assumptions regarding the mobility of factors which are used to produce taxed vs. nontaxed products. Browning assumes that all factors are fully mobile--hence a proportionate tax on factor income results (p. 653). We will return to this point later in the paper.

[19]For Browning, overall taxes equal to 5.1 percent of TLI result in a tax of 6.2 percent on FI, since the ratio of FI to TLI for his 1972 income estimates (see Table 1, p. 656) is .82, which is exactly the ratio of overall effective tax rates. In the simulation example presented above, the ratio of FI to TI is 83 percent. Hence a 5.0 percent tax on TLI has a yield which is exactly equivalent to a 6.0 percent tax on FI, very close to Browning's figures.

[20]Together these assumptions imply full indexing of transfers, since transfers remain constant in money terms while the general level of prices also remains constant, despite the fact that factor incomes fall substantially.

[21]From his later analyses, in which he deals with the "regressive assumptions" made by Pechman and Okner, Browning must accept the fact that some portion of sales, payroll, corporate income, or property taxes result in higher consumer prices. Further, if Browning did not at least partially subscribe to the view that higher taxes mean higher absolute prices, there would be no need to consider the uses of income at all, given his indexing assumptions. But then there would be no need for developing the elaborate arguments for ignoring the uses side of income which were reviewed in the previous section of this paper.

[22]We will rely on the polar example of a fully forward-shifted tax in this case. The exact magnitude of the tax and transfer changes implicit in Browning's model depend on the extent to which prices rise in response to the tax.

[23]Note that to the extent to which total taxes exceed total transfers, remaining taxes used by government to purchase goods and services need to be allocated by income class. Of course this creates a substantial problem for tax incidence studies because once transfers have been netted out, in the absence of taxes earmarked for transfers, the allocation of the remaining tax burden by income class is completely arbitrary.

[24]That is, the ΔTX will be reflected in other taxes, TX, which are implicitly the source of transfer income to begin with.

[25]Under "competitive" incidence assumptions, the usual rule-of-thumb is to allocate the entire burden of the corporate income tax in proportion to capital ownership. But if both capital and labor are mobile between sectors as Browning assumes (p. 653), given suitable substitution elasticities between the factors, the competitive case results in a proportionate tax on both capital and labor income. On the other hand, in a "noncompetitive" world where some portion of the corporate income tax is to be treated "as if the tax were an excise tax", by ignoring the uses side he again implicitly treats the tax as a proportionate tax on capital and labor income. In other words, with fully mobile factors of production under certain factor substitution elasticities, in Browning's world there is no difference in tax burdens between competitive and noncompetitive incidence assumptions. Both result in a proportionate factor income tax.

[26]In fact, by assuming that one-half of all three taxes (corporate income tax, the property tax, and the payroll tax) are forward shifted, Browning ends up with a pattern of tax rates which is more progressive than the pattern which is found under "competitive" tax burden assumptions (i.e., that corporate income and property taxes fall fully on capital income and that payroll taxes fall fully on labor income). In the limit, if all of the burden of these taxes was forward shifted in Browning's world, an even more progressive incidence pattern would emerge!

REFERENCES

Advisory Commission on Intergovernmental Relations. 1977. Significant Features of Fiscal Federalism 1976-77 Edition, Volume II - Revenue and Debt. Washington: U.S. Government Printing Office.

Ballantine, J. and Eris, I. 1975. "On the General Equilibrium of Tax Incidence." Journal of Political Economy, 83, no. 3 (June): 633-644.

Browning, Edgar. 1978. "The Burden of Taxation." Journal of Political Economy, 86, no. 4 (August): 649-671.

Diamond, Peter. 1978. "Tax Incidence in a Two Good Model," Journal of Public Economics, 9, no. 4 (December): 283-299.

Economic Report of the President. 1979. Washington: U.S. Government Printing Office.

Harberger, Arnold C. 1962. "The Incidence of the Corporation Income Tax." Journal of Political Economy, 70, no. 3 (June): 215-40.

McLure, Charles., Jr. 1970. "Tax Incidence, Macroeconomic Policy, and Absolute Prices," Quarterly Journal of Economics, 84 (May): 254-67.

_____, and Thirsk, Wayne R. 1975. "A Simplified Exposition of the Harberger Model I: Tax Incidence." National Tax Journal, 28 (March): 1-28.

Menchik, Paul. 1979. "The Importance of Material Inheritance: The Financial Link Between Generations" in Modeling the Distribution and Intergovernmental Transmission of Wealth, James Smith, ed., National Bureau of Economic Research. Chicago: University of Chicago Press, forthcoming.

Mieszkowski, Peter. 1969. "Tax Incidence Theory: The Effects of Taxes on the Distribution of Income." Journal of Economic Literature, 7, no. 4 (December): 1103-24.

Musgrave, Richard A., Case, Karl E., and Leonard, Herman. 1974. "The Distribution of Fiscal Burdens and Benefits." Public Finance Quarterly, 2 (July): 259-311.

Pechman, Joseph A., and Okner, Benjamin A. 1974. Who Bears the Tax Burden? Washington: Brookings Institution.

Peskin, Janice. 1977. "In-kind Income and the Measurement of Poverty." Technical Paper VII. U.S. Department of Health, Education and Welfare. Washington: Government Printing Office.

Smeeding, Timothy M. 1979. "On the Distribution of Net Income: Comment," Southern Economic Journal, 46, no. 1 (January): 932-944.

U.S. Bureau of Labor Statistics. 1971. Consumer Expenditures and Income: Survey Guidelines. Bulletin 1684. Washington: Government Printing Office.

_____. 1976. Consumer Expenditure Survey Series: 1972 and 1973. Report 455-3. Washington: Government Printing Office.

U.S. Department of Health, Education and Welfare. 1967. "OAA and AFDC: Tables on Percent of Basic Needs Met for Specified Types of Cases." Washington: U.S. Government Printing Office.

_____. 1977. "AFDC Standards for Basic Needs, July 1973." NCSS Report D-2. Washington: U.S. Government Printing Office.