INCIDENCE OF STATE AND LOCAL TAXES IN MICHIGAN

By

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ABSTRACT

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"Evaluating a state's fiscal system and devising rational tax policy are greatly hindered by a lack of fundamental quantitative information."[1] The purpose of this study is to remedy this situation for Michigan by providing policy-makers and the voting public with quantitative estimates of the incidence of Michigan's state and local tax structure for 1970.

Analysis is performed within a partial equilibrium framework which abstracts from both expenditure and employment effects. In addition, taxes borne by non-residents or exported taxes are subtracted from the total revenue collections. Therefore, the calculations indicate the degree to which the various governmental units of Michigan tax Michigan residents.

In order to insure that the resulting calculations are not dependent on either a particular set of shifting assumptions or a particular definition of income, alternative shifting assumptions as well as alternative

definitions of income are examined. Shifting assumptions are examined in terms of a least progressive set and a most progressive set. Alternative definitions of income consist of money income as defined by the Bureau of the Census and "broad income" as developed and estimated in the study.

Three major conclusions are derived from the study. First, Michigan's state and local tax structure was monotonically regressive for 1970. Second, alternative shifting assumptions, as defined in the study, produce only modest differences in the total incidence results. Third, incidence calculations based on "broad income" are more regressive than identical calculations based on money income.

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[1]Irving J. Goffman, "Incidence of Taxation in Canada," Public Finance, XIX (1964), p. 44.

"To My Parents"

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

RATIONALE OF THE STUDY AND SOME CONCEPTUAL ISSUES

Rationale

The primary objective of this study is to estimate the combined incidence of Michigan's state and local taxes on Michigan residents during fiscal 1970. By focusing on that portion of Michigan's state and local taxes borne by Michigan residents, this study provides policy-makers and the voting public within the state with the quantitative estimates necessary to assess the impact of the entire state and local tax structure.

The secondary objective of this paper is to analyze the sensitivity of different shifting assumptions. This is necessitated by the fact that tax shifting assumptions, which are a crucial aspect of incidence calculations, are often imprecise and uncertain. The sensitivity analysis measures the statistical impact that a particular shifting assumption or group of assumptions has on the resulting incidence calculations. The tax shifting assumptions used in this study, when possible, are based on empirical work

previously done. Where such empirical work is lacking, untested predictions from economic theory are utilized.

As an additional part of the secondary objective, this study analyzes the sensitivity of two different definitions of income. The definitions differ in terms of the various income components which are included, with one definition being considerably broader than the other. The sensitivity analysis of both the shifting assumptions and the definition of income provides important insights into those variables which directly affect the incidence calculations.

Although Michigan's state and local governmental units periodically change their tax laws, such changes are usually made without the benefit of current tax incidence information. The only previous study which comprehensively estimated Michigan's tax incidence applied to the 1956 tax structure.[1] There are two basic reasons which justify an up-dating of the 1956 study. First, the income brackets in the 1956 study are highly inadequate relative to the 1970 distribution of income. Available data limited the 1956 study to seven income brackets. The largest was $10,000 or more and contained only 10 percent of Michigan's households.[2] In 1970, the distribution of income indicates

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[1] R. A. Musgrave, and D. W. Daicoff, "Who Pays Michigan Taxes?" Michigan Tax Study: Staff Papers (Lansing, Michigan, 1958), pp. 131-83.

[2] Ibid., p. 162.

that approximately 45 percent of Michigan families received income in excess of $10,000. Second, numerous tax changes have been enacted since the completion of the 1956 study. These changes include both the enactment of new taxes, such as state personal and corporate income taxes, as well as the repeal of former taxes, such as the business activity tax. Clearly, rational decision-making requires, at the very least, up-to-date and fundamental quantitative information on the distribution of the tax burden. The present study attempts to remedy this deficiency.

Previous Studies and Methodological Issues

The economic and the political interest in the distribution of tax burdens has stimulated at least 13 separate studies in the United States. Of the previous studies which have been undertaken on this issue, seven[3]

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[3]James R. Beaton, "Family Tax Burdens by Income Levels," National Tax Journal, Vol. XV, No. 1 (March, 1962), pp. 14-25; G. A. Bishop, "The Tax Burden by Income Class, 1958," National Tax Journal, Vol. XIV, No. 1 (March, 1961), pp. 41-58; W. I. Gillespie, "Effects of Public Expenditures on the Distribution of Income," in Essays in Fiscal Federalism, ed. by R. A. Musgrave (Washington, 1965), pp. 122-86; R. A. Musgrave, et al., "Distribution of Tax Payments by Income Groups: A Case Study for 1948," National Tax Journal, Vol. IV, No. 1 (March, 1951), pp. 1-53; National Tax Foundation, Tax Burdens and Benefits of Government Expenditures by Income Class, 1961-1965 (New York, 1967); J. A. Pechman and B. A. Okner, Who Bears the Tax Burden? (Washington, D.C.: The Brookings Institution, 1974); Morgan Reynolds and Eugene Smolensky, "The Post Fisc Distribution: 1961 and 1970 Compared," National Tax Journal, Vol. XXVII, No. 4 (December, 1974), pp. 515-30.

were national in scope and six[4] were limited to a particular state. Although considerable effort has been made in calculating tax burdens by income class in these studies, the diversity of state and local tax structures prevents the results of the studies from being applied to Michigan's 1970 tax structure. For example, at the time the studies were made, Montana did not impose a sales tax, as Michigan did; California exempted food from the sales tax, while Michigan did not; and the 1956 Michigan structure did not include an income tax as the 1970 tax structure did. The significance of the previous studies, therefore, is limited to methodological and conceptual issues.

The initial, and indeed, the fundamental issue faced by all incidence studies concerns the framework within which the taxes are analyzed. In all previous studies, a neoclassical partial equalibrium framework was utilized. This approach makes two broad assumptions. First, it is assumed that taxes and expenditures are neutral with respect to resource allocation. Second, it

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[4]Musgrave and Daicoff, "Who Pays Michigan Taxes?"; California Assembly Interim Committee on Revenue and Taxation, Taxation of Property in California (Sacramento, 1964); A. Thomas Eapen and Ann N. Eapen, Incidence of Taxes and Expenditures of Connecticut State and Local Governments Fiscal Year 1967 (a paper prepared for the Connecticut Revenue Task Force, 1970); Li-teh Sun, "Incidence of Montana State and Local Taxes" (unpublished Ph.D. dissertation, Oklahoma State University, 1972); University of Wisconsin Tax Study Committee, Wisconsin's State and Local Tax Burden (Madison, Wisconsin, September, 1959); Oswald H. Brownlee, Estimated Distribution of Minnesota Taxes and Public Expenditures (Minneapolis: University of Minnesota, 1960).

is assumed that output effects, that is, the effects that taxes and expenditures have on employment, and thus on output, are insignificant.

The first assumption has been criticized as being unrealistic. The critics of this assumption argue that taxes and expenditures are not neutral with respect to resource allocation. Since the allocation of resources directly affects the income distribution, the existing income distribution then is partially determined by the present pattern of taxation and expenditures. Therefore, in the absence of the present tax-expenditure system, the relative importance of the various income brackets would differ from that which is observed. Although this criticism is valid, it is considerably more important for national studies which include federal taxes, than for state studies which exclude federal taxes. In terms of national statistics, state and local taxes represent only about one-third of the total tax burden.[5] The objection cannot be completely removed since it is methodlogically not feasible to determine what the distribution of income would be in the absence of the present tax-expenditure system. Therefore, state studies minimize the objection but do not eliminate it.

The second assumption, that output effects are insignificant, has been criticized as being inadequate

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[5]Pechman and Okner, Who Bears the Tax Burden? p. 18.

relative to a general equilibrium approach. In an attempt to satisfy partially this objection, five studies attempted to estimate expenditure incidence as well. In all five cases, however, the procedure resulted merely in adding two separate partial equilibria together; that is, tax incidence was estimated independent of expenditures and expenditure incidence was estimated independent of taxes. The results of each were then added together. This procedure, of course, does not satisfy a pure general equilibrium model which requires that the interaction of taxes and expenditures be simultaneously examined.

Some authors have argued that expenditures can be assumed away by comparing two sets of taxes with the same yield and then by assuming that the expenditures would be the same under either set of taxes. This procedure was first used by Musgrave[6] and is referred to as "differential incidence." Differential incidence compares a particular tax structure with a hypothetical proportional income tax of equal yield to determine whether the particular structure is neutral (leaving the distribution of income unchanged), progressive (favoring lower-income classes) or regressive (favoring upper-income classes).

It should be pointed out, however, that this procedure, as Musgrave himself admits, "is little more

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[6]Musgrave, et al., "Distribution of Tax Payments by Income Groups," pp. 37-39.

than a gesture of respect to our conceptual discussion."[7] A complete appraisal would recognize the weaknesses of the partial equilibrium approach and argue that neither economic tools nor adequate data are available to use the general equilibrium framework. At the same time, an economist can legitimately argue that since general equilibrium is composed of many partial equilibria, the more that is understood about each partial equilibrium, the better the understanding of the total process of shifting.

Another important conceptual problem concerns the definition of income. Although previous studies differed as to the precise definition of income, all used a form of current income. In the context used, current income implies the amount received within a one-year period rather than some form of annual average or expected income. This distinction is important in the light of the recent discussion regarding the permanent income hypothesis. The concept of permanent income argues that consumption is a function of "long-run" expected income, and therefore studies which estimate incidence based on a measure of current income and current consumption present incorrect results.

From a tax policy point of view, the use of permanent income is highly questionble. Permanent income

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[7] Ibid., p. 10.

is an imprecise ex ante concept; that is, policy makers lack the tools to measure precisely the permanent income of every individual, which would be necessary for the implementation of practical tax policy.[8] In addition, even if permanent income could be measured, the use of such a concept would still be limited. To paraphrase Dick Netzer, should tax policy ignore the heavy current tax burdens on the grounds that equity will result in the long run?[9] If such a tax structure is undesirable, then current income remains the most practical and useful measure in which to estimate tax burdens.

In conclusion, previous studies have shown remarkable consistency concerning the basic model within which tax burdens were calculated. Since this study will also use partial equilibrium analysis in conjunction with a measure of current income, it is important to repeat the advantages of this framework. First, the numerous data problems associated with a tax burden study are reduced to a manageable level. Second, policy-makers and the public are provided with a useful study upon which rational decisions can be made.

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[8]Thomas Mayer, "The Distribution of the Tax Burden and Permanent Income," National Tax Journal, Vol. XXVII, No. 1 (March, 1974), pp. 141-46. In this article, the author estimated tax burdens on the basis of permanent income. The bold assumptions which were made by the author as a result of insufficient data crystalize the practical problems of the concept.

[9]Dick Netzer, "The Incidence of the Property Tax Revisited," National Tax Journal, Vol. XXVI, No. 4 (December, 1973), p. 528.

Concept of Tax Incidence

"Tax incidence" is a term which is used synonymously with "tax burden" in this study. It is defined as the reduction in real income that results from the imposition of a tax.[10] In other words, it is the proportion of a person's income paid (directly or indirectly) to the taxing authorities in a defined period of time. According to the nomenclature suggested by Ursula Hicks,[11] this definition of incidence can be referred to as "formal incidence." It is therefore distinguishable from "effective incidence," which analyzes all economic adjustments resulting from a particular tax through time and space.

The concept of formal incidence is very important in limiting the scope of the investigation. No attempt is made to measure the burden that may result from the reallocation of resources or the misallocation of resources (often referred to as "excess burden") as a consequence of the imposition of a tax. In addition, no attempt is made to estimate the incidence of the expenditures which are supported by the taxes. Formal incidence is solely concerned with pursuing the shifting process of taxation through the economic system to the point of final payment.

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[10] Pechman and Okner, Who Bears the Tax Burden? p. 3.

[11] Ursula K. Hicks, "The Terminology of Tax Analysis," in A.E.A. Readings in the Economics of Taxation, Vol. IX, ed. by R. A. Musgrave and C. S. Shoup (Homewood, Ill.: R. D. Irwin, Inc., 1959), p. 225.

Therefore, no conclusion can be drawn about the overall incidence of governmental activities from the results of this study.[12]

All taxes have a legal or statutory bearer, the person or corporation responsible for making the cash payment to the taxing unit. It is often the case that the statutory bearer is not the ultimate bearer of the tax. For example, the retailer is the statutory bearer of the sales tax in Michigan, but the consumer is often the ultimate bearer. Incidence is therefore interrelated with the concept of tax shifting. Shifting may be defined as the difference between the amount levied on the statutory bearer and the amount ultimately paid by the statutory bearer. If the statutory bearer is the ultimate payer of the entire tax, then no shifting is said to exist. Clearly, the resulting incidence calculations are dependent upon the shifting assumptions. In those instances where a substantial doubt exists as to who is the ultimate bearer of a particular tax, more than one shifting assumption is examined. The estimates resulting from the use of different assumptions are then compared.

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[12]For a recent study on Michigan's expenditure incidence, see a forthcoming Ph.D. dissertation being undertaken by Donald Peppard at Michigan State University.

Definition of a Tax

The definition of a "tax" merits a brief explanation. There is no general agreement as to what should or should not be considered a "tax." It has been argued that a tax should be defined as "any compulsory contribution to public funds."[13] This definition is all-encompassing and therefore includes such direct benefit items as bridge toll fees and motor vehicle registration fees. At the other end of the spectrum is the definition of a "tax" as a "compulsory contribution from the person to the government to defray the expenses incurred in the common interest."[14] This definition excludes any contribution where a direct benefit occurs.

The definition of a tax as used in this study lies between these two extremes. The inclusion or exclusion of a particular state or local revenue source is based on a subjective evaluation of three criteria. They are: (1) the degree to which the revenue is used to defray the expenses of the common interests, (2) the amount of tax collected, and (3) the availability of reasonable expenditure data upon which to distribute the revenue source among the income brackets. For example, bridge toll fees in Michigan rank low on all three criteria. That is, such fees are

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[13] G. F. Shirras and L. Rostas, The Burden of British Taxation (Cambridge: Macmillan Co., 1942), p. 1.

[14] E. R. Seligman, Essays in Taxation (New York: Macmillan Co., 1925), p. 32.

not collected to defray the expenses of the common interest, the amount collected is small and, in addition, reasonable expenditure data do not exist upon which to distribute the tax. Therefore, bridge toll fees are excluded.

Examples of other revenue items excluded from consideration are: special assessments, institutional fees, pari-mutuel wagering, concession privilege fees, mobile home fees and hunting and fishing licenses. In the case of special assessments, the levy is based on front footage. Data are not available which relates front footage with income. In the case of pari-mutuel wagering, the tax burden depends on the amount of money which is wagered by each income class. Again, data on this are unavailable. Fortunately, in terms of the total amount of revenue collected, the excluded items constitute a small percentage. Therefore, any error which may be introduced as a result of the definition of a tax is small in relation to the total state and local tax structure.

Table 1 presents the list of taxes which are included in the study. For each tax, the rate of the levy as well as the amount collected is presented.

Determination of Income Brackets

Tax burdens are calculated in this study on the basis of 14 income brackets. The number and size of the income brackets examined are a function of both the primary income data available and the primary expenditure data used in the study.

Table 1.--State and Local Revenue Sources, Michigan, Fiscal Year 1970.

Tax	Rate of Tax in 1970	Revenue Fiscal 1970 (Millions of Dollars)
Property tax		
Local	Variable	1,660.9
Utility property	47.32 mills	46.4
Sales	4 percent	740.0
Use	4 percent	88.6
Cigarette	11¢ per pack	85.3
Beer, wine and alcohol	See footnote (a)	127.5
Motor vehicle taxes		
Gasoline	7¢ per gallon	256.8
Diesel fuel[b]	7¢ per gallon	16.9
Motor weight tax	55¢ per 100 lbs. (passenger)	122.7
License fees		9.1
Title fees		4.8
Other licenses and fees		4.1
Income taxes		
Individual	2.6 percent	409.0
Corporations	5.6 percent	188.0
Financial institutions	7.0 percent	9.6
Local	City residents, 1 percent except Detroit, 2 percent: non-residents .5 percent	130.2
Corporate franchise[c]	5 mills	125.7
Intangibles	money, 4 mills; income from securities, 3.5 percent	36.4
Insurance		
Insurance premiums	See footnote (d)	44.1
Insurance privilege[e]	5 mills	2.5
Inheritance	Direct heirs, 2 to 8 percent Others, 10 to 15 percent	26.5
County documentary stamp tax[f]	55¢ per $500 of market value	3.8
Unemployment compensation	2.7 percent[g]	125.8
	TOTAL	4,264.7

[a]Includes beer excise of $6.30 per gallon (with exceptions); wine excise of $.50 per gallon for imported grapes, $.04 per gallon for domestic grapes; liquor excise of 4 percent; liquor specific tax of 4 percent; liquor purchase revolving fund; fees for liquor retailers, manufacturers and wholesalers.

[b]Includes liquified petroleum gas, .07 per gallon; marine fuel, .07 per gallon; aviation fuel, .03 per gallon.

[c]Includes corporation organization fee, security issue fee and financial institution privilege fee.

[d]Rate equals 2 percent of gross premiums for life, casualty, surety and fidelity policies and 3 percent of gross premiums for fire, marine and auto policies.

[e]Includes insurance retaliatory and insurance examination fees.

[f]Revenue indicates calendar 1970.

[g]Basic rate of 2.7 percent adjustable on the basis of experience from 0 to 4.6 percent depending on the balance in the solvency account.

Sources: Michigan State Tax Commission for property tax data; other data are from Michigan Department of Treasury, Annual Report, Fiscal 1970 (Lansing, Michigan, 1971); State of Michigan, Detail of the Executive Budget for Fiscal Year Ending June 30, 1973 (Lansing, Michigan, 1973).

The primary source of income data is the 1970 Census. Although considerable effort is made to expand the "money" definition of income provided by the Bureau of the Census, the size of the income brackets examined in this study are identical to the brackets provided by Census. Therefore, the income data available has determined the size of the income brackets.

Expenditure data were obtained primarily from special tabulations of expenditure surveys conducted by the Survey Research Center of the University of Michigan. The survey samples were inadequate to provide meaningful results for more than 14 income brackets examined. The expenditure data, therefore, also determined the number of income brackets.

Concept of Tax Exporting

Since this study estimates tax incidence solely on Michigan residents, the amount of the tax shifted to non-residents is deducted. The amount of taxes paid by non-residents is called exported taxes. Exported taxes consist of three types: (1) taxes shifted to persons who are non-residents of Michigan through their purchases of products on which a Michigan tax has been included in the purchase price, (2) taxes borne by businesses which result in lower dividends to non-residents,[15] and (3) taxes

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[15]The estimating procedures for (1) and (2) vary with the tax and the type of business being taxed. Therefore, the estimating procedures are specifically discussed in other chapters of this study.

shifted to the Federal Government by Michigan residents or corporations via a reduction in their Federal income tax liability as a direct result of payment of their state and local taxes. This is referred to as a federal tax off-set.

It should be noted that exported taxes were not deducted in the previous state incidence studies undertaken for Montana[16] and California.[17] In both of these cases, the authors stated that a lack of data prevented estimates of exported and imported taxes from being made. Therefore, both studies assumed that the amount of taxes exported equaled the amount that was imported. The implication of this assumption is that imported taxes must be included if exported taxes are excluded. The question of imported taxes is not relevant to the purpose of this study. This paper is concerned solely with the tax incidence of Michigan imposed taxes on Michigan residents. Therefore, only exported taxes are estimated. This is the same position taken in the other four previously mentioned state incidence studies.

Federal Tax Off-Sets

When a state or local unit of government levies property, income, sales, use, or gasoline taxes, the

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[16]Li-teh Sun, Incidence of Montana State and Local Taxes.

[17]California Assembly Interim Committee on Revenue and Taxation, Taxation of Property in California.

payment of the tax by an individual is an allowable deduction on the federal income tax return. The dollar burden of state and local taxes is decreased, therefore, as a result of a reduction of federal taxes. In effect, a portion of state and local taxes is shifted to the Federal Government. For example, suppose a family in the 30 percent marginal federal income tax bracket pays $100 in state personal income tax. The family pays the state $100, but as a result, the family's federal income tax is $30 less than it otherwise would have been in the absence of the state tax. The family's total tax burden is increased by only $70. In effect, $30 is shifted to the Federal Government. Although the above example is stated in terms of a family, similar reasoning applies to a corporation. Therefore, federal tax off-sets are estimated for both families and corporations.

The calculation of the individual federal tax off-set for an income bracket is a function of both the federal marginal tax rate for the bracket and the percentage of itemized tax returns filed within the bracket. A hypothetical example will explain the reason for this. Let us assume that Michigan increases its income tax rate. Family "A" did not itemize its federal return before the increase and also did not itemize after the increase. Clearly, this family has no federal tax off-set and paid the entire tax increase. On the other hand, if family "B" itemized both before and after the tax increase, then

family "B" would receive a federal tax off-set, and the amount of the off-set would depend upon "B's" federal marginal tax rate. (Clearly, rational behavior is also assumed, that is, a family would itemize only if it was beneficial to do so.) Therefore, the individual federal tax off-set for each income bracket is calculated by multiplying the average marginal tax rate for the bracket by the percentage of itemized returns within the bracket. Specific calculations (for each income bracket) are presented in Appendix A at the end of the study.

The calculation of the corporate tax off-set is based on the corporate marginal tax rate. During 1970, the marginal corporate tax rate was 48 percent for corporations reporting a net income in excess of $25,000. Therefore, 48 percent is used as the corporate federal tax off-set. This means that 48 percent of the state and local taxes which are assumed to be borne by corporations are considered to be shifted to the Federal Government. The federal tax off-set applies only to the unshifted portion of the tax since it would be impossible to shift simultaneously the same tax dollar to both the consumer and the Federal Government.

Organization of the Study

Chapter II discusses the income base with special attention to the development of a comprehensive definition of income. The third chapter presents a general discussion

of tax incidence theory and outlines the specific shifting assumptions examined in the study. For several taxes, alternative assumptions are made. This procedure is necessary to insure that incidence calculations are not dependent on a particular set of assumptions.

Chapters IV, V, and VI explain both the data used and the methodological procedures employed to distribute the various state and local taxes among the income brackets. The final chapter calculations total incidence of Michigan's state and local taxes and comments on the redistributive nature of the total tax structure.

CHAPTER II

THE INCOME BASE

The calculations of tax incidence on the basis of income implicitly associate considerable importance to the definition of income. Income can be defined as consumption during a given period of time plus the change in net worth. This definition is well accepted in economic literature. Robert Haig defined income as, "the increase or accretion in one's power to satisfy his wants in a given period in so far as that power consists of (a) money itself, or (b) anything susceptible of valuation in terms of money."[1] Henry Simons defined income in much the same way as "the algebraic sum of (1) the market value of rights exercised in consumptions, and (2) the change in the value of the store of property rights between the beginning and the end of the period in question."[2] The combination of both definitions is often referred to as the Haig-Simons

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[1]Robert M. Haig, "The Concept of Income--Economic and Legal Aspects," in The Federal Income Tax (New York: Columbia University Press, 1921).

[2]Henry C. Simons, Personal Income Taxation (Chicago: University of Chicago Press, 1938), pp. 61-62.

definition of income. This definition is all-encompassing. In addition to wages, salaries, rents, interest, dividends, etc., the definition includes all income in kind as well as all changes in net worth, whether realized or unrealized. Haig recognized the practical problems of a broad definition and tempered it with the phrase "if it is practicable to evaluate it."[3] In addressing himself to what is practicable, Richard Musgrave observed that "services rendered by housewives constitute income as significant as wages spent on help or wages forgone by staying home. While a line must be drawn somewhere short of including all services rendered to oneself, the particular line of division remains arbitrary."[4]

Two definitions of income are examined in this study. Since the primary source of income data is the 1970 Census, the first definition is based on the Census definition of money income, adjusted for unshifted business taxes. This definition will be referred to as adjusted money income. The second definition expands adjusted money income by adding several components of income which are excluded from Census data. This definition will be referred to as the broad definition of income. Calculations

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[3]Haig, The Federal Income Tax, p. 24.

[4]R. A. Musgrave, The Theory of Public Finance (New York: McGraw-Hill, 1959), p. 170.

based on both definitions provide insights into the importance of the definition of income in estimating tax incidence.

Adjusted Money Income

The Bureau of the Census defines income as the algebraic sum of various items[5] reported separately for persons 14 years old and over. The Census presents the distribution of income on the basis of "families" and "unrelated individuals." Henceforth, the term families will refer to both families and unrelated individuals.

The 1970 Census presents calendar 1969 income data, while the tax figures to be used in this study are primarily given for fiscal 1970. Therefore, the income distribution is adjusted for the small increase in population and income as a result of the slightly different time period. Comparing the number of families reporting income for 1969 with the official 1970 Census count indicates that an additional 33,000 families should be added. The increase in population is assumed to possess the identical income distribution in 1969. This adjustment will have no effect on the distribution of income by income brackets, but it

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[5]The definition includes such items as wages and salaries, farm and non-farm net self-employment income, social security or railroad retirement payments, public assistant (Aid to Dependent Children, Old Age Assistance), interest, dividends, rents, public or private pensions, unemployment insurance benefits, periodic payments from estates and trust funds, alimony, and other periodic income.

will affect slightly the absolute tax burden calculations. The income data and the tax collections are, however, highly compatible for estimating relative tax burdens among the income classes which is the ultimate objective of the study.

The distribution of money income which is presented in Table 2 is calculated by multiplying the distribution of families by the mean income for each bracket. The distribution of families by income bracket was obtained from data published by the Bureau of the Census. Mean income values, which are presented in Table 3, were obtained from tapes provided by the Bureau of the Census. The tapes consisted of approximately a 1 percent state sample of Census returns and are referred to as "Public Use Samples."

Table 2 indicates that for 1970 the lowest money income bracket (under $1,000) represented 6.27 percent of the families in the state but accounted for only 0.21 percent of the money income. The table also indicates that the highest income bracket (above $25,000) represented 4.16 percent of the families and accounted for 15.67 percent of the income.

The distribution of income presented in Table 2 now should be adjusted for unshifted business taxes before incidence calculations are made. The necessity for making such an adjustment can best be explained by the use of an example. Suppose 50 percent of a firm's property tax is determined to be unshifted. Suppose further that the

Table 2.--Distribution of Money Income for Michigan, 1970.

Income Brackets (Thousands) of Dollars)	(1) Families (Units in Hundreds)	(2) Unrelated Individuals (Units in Hundreds)	(3) Distribution of Units (Hundreds)	(4) Percent of Total Units	(5) Adjustment for Population Increase (Hundreds)	(6) Adjusted Distribution of Units (Hundreds)	(7) Mean Income (Dollars)	(8) Total Money Income (Millions of Dollars)	(9) Percentage Distribution of Money Income
Under $1	395	1,421	1,816	6.27	21	1,837	$ 346	$ 63.56	.21
1-2	523	1,553	2,076	7,17	24	2,100	1,453	305.13	1.01
2-3	718	847	1,565	5.41	18	1,583	2,444	386.89	1.28
3-4	766	590	1,356	4.68	15	1,371	3,412	467.79	1.55
4-5	799	432	1,231	4.25	14	1,245	4,431	551.66	1.83
5-6	887	388	1,275	4.40	15	1,290	5,398	696.34	2.31
6-7	1,014	355	1,369	4.73	16	1,385	6,404	886.95	2.94
7-8	1,257	356	1,613	5.57	18	1,631	7,415	1,209.39	4.01
8-9	1,492	290	1,782	6.16	20	1,802	8,395	1,512.78	5.02
9-10	1,527	202	1,729	5.97	20	1,749	9,397	1,643.54	5.46
10-12	3,051	263	3,314	11.45	38	3,352	10,838	3,632.90	12.06
12-15	3,632	182	3,814	13.18	44	3,858	13,270	5,119.57	16.99
15-25	4,676	126	4,802	16.59	55	4,857	18,326	8,900.94	29.55
Over 25	1,166	39	1,205	4.16	14	1,219	38,943	4,747.15	15.76
TOTALS	21,903	7,044	28,947	99.99	332	29,279		30,124.59	99.98

Sources:

Column (1) U.S. Bureau of the Census, Census of Population: 1970, General Social and Economic Characteristics, Final Report PC(1)--C24 Michigan (Washington, D.C.: U.S. Government Printing Office, 1972).
Column (2) Same as Column (1).
Column (3) Sum of Column (1) and Column (2).
Column (4) Percentage distribution of Column (3).
Column (5) Population increase is apportioned in the same manner as indicated in Column (4).
Column (6) Sum of Column (3) and Column (5).
Column (7) Special tabulation of Public Use Samples, 1970 Census, see Table 3.
Column (8) Column (6) times Column (7) equals income distribution.
Column (9) Percentage distribution of Column (8).
(TOTALS may not equal source totals due to rounding.)

Table 3.--Source[a] of Income by Income Bracket for Families and Unrelated Individuals (Mean Income Values in Dollars).

Income Brackets (Thousands of Dollars)	Total Mean	Wages and Salaries	Non-Farm Self-Employment	Farm Self-Employment	Social Security	Public Assistance	Other
Under $1	$ 346	$ 102	$ 6	$ 3	$176	$ 27	$ 32
1-2	1,453	375	17	5	727	159	169
2-3	2,444	829	50	29	924	203	409
3-4	3,412	1,525	80	36	893	200	679
4-5	4,431	2,501	123	58	829	213	798
5-6	5,398	3,614	166	92	617	114	795
6-7	6,404	4,848	296	70	429	57	704
7-8	7,415	6,150	283	105	320	43	514
8-9	8,395	7,333	284	86	219	37	437
9-10	9,397	8,295	342	56	211	25	468
10-12	10,838	9,779	388	62	158	21	429
12-15	13,270	12,018	499	87	162	16	487
15-25	18,326	16,340	938	96	146	11	795
Over 25	38,943	26,585	7,691	236	180	8	4,243

[a]Sources of income as defined by the Bureau of the Census.

Source: Special tabulation prepared from U.S. Bureau of the Census, Census of Population: 1970, "Public Use Sample Tapes."

ultimate payer of the unshifted portion is determined to be the owner of the firm. The income reported by the owner is then lower than would be the case in the absence of the tax. In fact, the income is lower by exactly 50 percent of the firm's property tax. The following numerical presentation emphasizes this conclusion. Before the imposition of a tax, it is assumed that the firm received $1,000 in net income (after expenses). A property tax of $100 is now levied on the firm. By assumption, $50 is assumed shifted to the consumer. Therefore, net income before property tax will be $1,050. Subtracting the $100 in property tax as an expense reduces net income (after expenses) to $950. The owner would report his income to be $950 when his income would have been $1,000 in the absence of the tax. Therefore, the owner's income will be adjusted by the unshifted portion of the tax or $50. This concept holds equally well for all unshifted business taxes.

Clearly, this adjustment depends on the shifting assumptions. For example, if all business taxes are assumed to be shifted forward to the consumer, then this particular adjustment is unnecessary. The statistical importance of the adjustment varies directly with the amount of business taxes assumed to be borne by the business owners. The calculations resulting from this adjustment process are presented along with the final incidence estimates in Chapter VII.

Broad Definition of Income

The broad definition of income is estimated by adding several components of income which are not included in the Census definition of money income. The additional income components are: (1) undistributed corporate profits, (2) imputed rent on owner-occupied dwellings (nonfarm), (3) room and board furnished to employees, (4) employer contributions to social security and private health and pension plans, (5) services furnished without charge by financial intermediaries, (6) realized and unrealized capital gains, and (7) imputed farm income (farm rental income as well as food and fuel consumed on the farm). For each of these additional income components, the general procedure involves estimating the total amount of income which can be attributed to the income component and then distributing the amount among the income brackets. The specific individual procedures employed in this study are presented in the following discussion.

1. Undistributed corporate profits

The national total of undistributed corporate profits for 1970 amounted to $16,238 million.[6] Michigan's percentage of the national total is estimated to be equal to the ratio of dividends received by Michigan residents

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[6]U.S. Department of Commerce, Survey of Current Business (July, 1971), p. 39.

to total national dividends. This ratio equals 3.835 percent.[7] Thus, the amount of undistributed corporate profits attributed to Michigan is estimated to equal $622.73 million.

Undistributed corporate profits are distributed among the income brackets on the basis of the distribution of reported dividend income. This procedure assumes that if undistributed corporate profits were distributed among the stockholders, the resulting distribution of income among the income brackets would be identical to the distribution of reported dividend income. The technical process employed to estimate the distribution of reported dividend income is presented in Appendix B.

2. Imputed rent on owner-occupied dwellings (nonfarm)

This items is included on the grounds that the owner has the option of renting his home, and in such cases where this actually occurs the net rental payments would clearly be considered income. Therefore, the owner who rents from himself increases his income by the net rental payments which he pays to himself. The amount of imputed rent attributed to Michigan in 1970 is $702 million.[8] The distribution of this amount is made on the

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[7]U.S. Department of Commerce, Bureau of Economic Analysis, unpublished data of National Income Accounts.

[8]U.S. Department of Commerce, Bureau of Economic Analysis, National Income Accounts for Michigan, unpublished data.

basis of the total value of owner-occupied homes in each income bracket. The distribution of owner-occupied home values is presented in Appendix C.

3. Room and board furnished employees

In 1970 the national estimate of the income from this source amounted to $2.8 billion.[9] The ratio of Michigan's total employment to national total employment is used as a proxy for Michigan's share of this type of income.[10] Although this is a rough proxy, the limitations of other data for allocating purposes together with the relatively small dollar value of this item justifies the procedure from a practical standpoint.

Michigan's share of this income for 1970 is estimated to equal $120.44 million. This amount is distributed on the basis of wages and salaries, based on the assumption that such services are in lieu of wages and salaries.

The distribution of wages and salaries is calculated in two steps. The first step weights the mean value of wages and salaries for each income bracket from Table 3 by

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[9]U.S. Department of Commerce, Survey of Current Business (July, 1971), p. 21. (Food equaled $2.6 billion and lodging equaled $0.2 billion.)

[10]Michigan employment in 1970 was 3.385 million (includes agriculture, nonagriculture, and employees engaged in labor disputes). Executive Office, Research Division, Economic Report of the Governor, 1973 (Lansing, Michigan, 1973), p. 128. National employment in 1970 was 76.627 million. U.S. Department of Labor, Employment and Earnings, Vol. 19, No. 9 (Washington, D.C., March, 1971), p. 21.

the corresponding distribution of units (families and unrelated individuals) from Table 2. This calculation estimates the total amount of wages and salaries received by each income bracket. The second step calculates the percentage of total wages and salaries received by each bracket. Appendix D presents the calculations.

4. Employer contributions to social security and private health and pension plans

This item is divided into two sub-items: social insurance payments and contributions to health and pension plans. Social insurance is defined as employer contributions under social security, federal and state unemployment insurance, railroad retirement and a few other minor social insurance programs. The national estimate for employer contributions to social insurance for 1970 amounted to $29.7 billion.[11] The percentage of these contributions attributed to Michigan is estimated by using the ratio of total employment in the state to national total employment. This proxy is justified on the grounds that employers are required to pay social security for almost all employees. In this way, Michigan's share of social insurance payments is estimated to be $1,277.5 million. Employer contributions in Michigan for private health and pension plans for 1970 amounted to $2,265

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[11] U.S. Department of Commerce, 1971 Statistical Supplement to the Survey of Current Business.

million.[12] Therefore, the total amount of imputed income attributed to Michigan resulting from employers' contributions to social insurance and private health and pension plans is estimated to be $3,542.5 million. This amount is distributed on the basis of the distribution of wages and salaries.

5. Services furnished without payment by financial intermediaries

This item is included on the grounds that banks perform a service by providing a convenient means of payment via checking, which individuals pay for in lieu of interest. It is assumed in this study that this type of service should be included as non-money income. By including this item, this study is assuming that banks pay their depositors interest and in return depositors pay the banks for services rendered. In 1970, the estimated amount of national income from this source amounted to $15.2 billion.[13] The amount of the national total attributed to Michigan is estimated by taking the ratio of Michigan demand deposits to national demand deposits. Accordingly,

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[12]U.S. Department of Commerce, Bureau of Economic Analysis, National Income Accounts for Michigan, unpublished data. The data incidated that employer contributions to private pension plans in Michigan equaled $847 million, and employer contributions to private health and welfare plans in Michigan equaled $1,418 million, for a total of $2,265 million.

[13]U.S. Department of Commerce, Survey of Current Business (July, 1971), p. 41.

the amount of imputed income from services of financial institutions attributed to Michigan for 1970 is estimated to be $319.2 million.[14] The amount attributed to Michigan is apportioned among the income brackets on the basis of the national distribution of demand deposits.[15]

6. Realized and unrealized capital gains

The amount of realized and unrealized capital gains attributed to Michigan residents in 1970 is estimated to be $3,876.96 million. This estimate is based on the assumption that total accrued capital gains equaled approximately six times the amount of reported realized capital gains.[16]

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[14]Michigan demand deposits equaled $5.216 billion as of June 30, 1970. Michigan Statistical Abstract 1970 (8th ed.; East Lansing, Michigan, 1970), p. 466. National demand deposits were estimated to be $244.5 billion. This is an average based on December 31, 1969 and December 31, 1970 amounts. U.S. Bureau of the Census, Statistical Abstract of the United States: 1971 (92nd ed.; Washington, D.C., 1971). Therefore, estimated income equaled: $5.216 billion divided by $244.5 billion times $15.2 billion, or $319.2 million.

[15]Special tabulation supplied by Michigan Research Center, University of Michigan, from G. Katona, L. Mandell, and J. Schmiedeskamp, 1970 Survey of Consumer Finances (University of Michigan, 1971).

[16]The assumption is based on John G. Gurley, "Federal Tax Policy--A Review Article," National Tax Journal, Vol. XX, No. 3 (September, 1967), p. 320. See also Slawson, "Taxing As Ordinary Income the Appreciation of Publicly Held Stock," Readings in Federal Taxation, eds. Frank E. A. Sander and David Westfall (Mineola, N.Y.: The Foundation Press, Inc., 1970), p. 499; and Kul B. Bhatia, "Accrued Capital Gains, Personal Income and Saving in the United States, 1948-1964," Review of Income and Wealth, Series 16, No. 4 (December, 1970), p. 374. For example, Bhatia estimated that total accrued capital gains equaled 6.2 times realized capital gains in 1964.

Realized capital gains are estimated from data supplied by the Internal Revenue Service (IRS).[17] Specifically, IRS data indicated that reported taxable capital gains for Michigan residents for 1970 amounted to $345.05 million.[18] In addition, the IRS estimated that reported taxable capital gains for 1962 represented 53.4 percent of the total amount of realized capital gains.[19] The total amount of realized capital gains is, therefore, estimated by assuming that taxable capital gains ($345.05 million) equals 53.4 percent of all realized capital gains or $646.16 million. Therefore, six times $646.16 million equals $3,876.96 million. Capital gains are apportioned among the income brackets on the basis of the distribution of taxable capital gains.[20]

As a percentage of personal income, the above estimate of capital gains is highly consistent with

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[17]U.S. Treasury Department, Internal Revenue Service, Statistics of Income--1970, Individual Income Tax Returns (Washington, D.C.: Government Printing Office, 1972).

[18]Ibid., p. 230.

[19]U.S. Treasury Department, Internal Revenue Service, Statistics of Income--1962, Sales of Capital Assets Reported on Individual Income Tax Returns (Washington, D.C.: Government Printing Office, November, 1966).

[20]U.S. Treasury Department, Statistics of Income 1970. The distribution of taxable gains is adjusted for the difference between adjusted gross income and money income. The adjustment procedure is identical to the one used to adjust dividends. See Appendix B.

estimates made by Pechman and Okner. Specifically, $3,876.96 million equals 10.54 percent of Michigan's 1970 personal income. Pechman and Okner estimated that for 1966 accrued capital gains on corporate stock, nonfarm real estate, farm assets, and business inventories equaled 10.01 percent of national personal income.[21]

7. Imputed farm income

Imputed farm income consists of estimated imputed rental value of owner-occupied farm dwellings and estimated imputed income resulting from the consumption on farms of self-produced food and fuel. In 1970, imputed rental income is estimated to be $27.43 million.[22] In 1970, income resulting from the consumption of self-produced food and fuel is estimated to be $5.79 million.[23] Therefore, total imputed farm income is estimated to be $43.22 million.

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[21]Pechman and Okner, Who Bears the Tax Burden? pp. 90-91.

[22]Gross rental value is estimated to be $105.5 million based on Michigan Department of Agriculture, Michigan Agricultural Statistics (July, 1972), p. 36. Net rental value (i.e., gross rental value minus depreciation, taxes, interest, and maintenance) of non-farm dwellings is estimated to equal 35.48 percent of gross rental value. U.S. Department of Commerce, Survey of Current Business (July, 1971), p. 41. Therefore, it is estimated that net rental value equals $105.5 million times 35.48 percent or $37.43 million.

[23]Imputed gross income from food and fuel is estimated to be $23.4 million. Michigan Department of Agriculture, Michigan Agricultural Statistics (July, 1972), p. 36. It is assumed that net imputed income equals 24.74 percent of gross income. This percentage equals the ratio of "total net farm income" divided by "total gross farm

The procedure used to distribute imputed farm income among the income brackets is divided into two parts. First, imputed rental income is apportioned among the income brackets on the basis of the distribution of families living on farms weighted by nonfarm house values. Second, imputed income from food and fuel is apportioned among the income brackets on the basis of the distribution of families living on farms. The specific calculations are presented in Appendix E.

Statistical Results of the Broad Definition of Income

The calculations resulting in the distribution of the broad definition of income are presented in Table 4. Specifically, columns (2) through (8) present the distribution for each of the seven additional income components. The sum of the seven components and the percentage breakdowns are presented in columns (9) and (10) respectively. The data indicate that of the $9.2 billion resulting from the additional income components, 37.24 percent is attributed to the largest income bracket (over $25,000). This percentage is significantly larger than the 15.76 percent attributed to the highest income bracket under money income. However, the percentage is still lower than would

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income" for Michigan farmers for 1970. Ibid., p. 36. Therefore, imputed net income from food and fuel is estimated to equal 24.74 percent times $23.4 million or $5.79 million.

Table 4.--Determination of the Broad Definition of Income for Michigan, 1970 (Millions of Dollars).

Income Brackets (Thousands of Dollars)	(1) Money Income	(2) Undistributed Corporate Profits	(3) Imputed Rent (Nonfarm)	(4) Room and Board for Employees	(5) Employer Contributions to Social Security and Health Plans	(6) Services of Financial Institutions
Under 1	63.56	0	12.43	.10	2.83	2.37
1-2	305.13	1.99	18.74	.39	11.34	8.98
2-3	386.89	4.55	16.15	.64	18.78	8.10
3-4	467.79	12.08	17.13	1.01	29.76	10.45
4-5	551.66	15.07	16.29	1.52	44.64	12.92
5-6	696.34	16.38	16.50	2.26	66.60	6.72
6-7	886.95	19.12	20.15	3.26	96.00	14.79
7-8	1,209.39	15.32	23.52	4.88	143.47	11.27
8-9	1,512.78	15.01	32.43	6.43	189.17	13.13
9-10	1,643.54	14.01	35.31	7.06	207.59	17.25
10-12	3,632.90	24.72	85.85	15.95	469.03	31.65
12-15	5,119.57	36.87	121.80	22.56	663.51	37.15
15-25	8,900.94	99.20	204.35	38.63	1,136.08	76.39
Over 25	4,747.15	348.42	81.29	15.77	463.71	68.04
Totals	30,124.59	622.74	701.94	120.46	3,542.51	319.21

Table 4.--Continued.

Income Brackets (Thousands of Dollars)	(7) Realized and Unrealized Capital Gains	(8) Imputed Farm Income	(9) Total Additional Income	(10) Percentage of Total Additional Income	(11) Broad Income (Money Income Plus Additional Components)	(12) Percentage Distribution of Broad Income
Under 1	0	1.96	19.69	.21	83.25	.21
1-2	13.96	2.10	57.50	.62	362.63	.92
2-3	34.89	1.93	85.04	.92	471.93	1.20
3-4	53.11	1.95	125.49	1.36	593.28	1.51
4-5	69.01	1.82	161.27	1.75	712.93	1.81
5-6	88.78	2.06	199.30	2.16	895.64	2.28
6-7	99.64	2.17	255.13	2.77	1,142.08	2.90
7-8	89.17	2.46	290.09	3.14	1,499.48	3.81
8-9	68.62	2.63	327.42	3.55	1,840.20	4.68
9-10	88.01	2.54	371.77	4.03	2,015.31	5.12
10-12	131.82	5.06	764.08	8.28	4,396.98	11.17
12-15	203.93	5.85	1,091.67	11.83	6,211.24	15.78
15-25	479.97	7.60	2,042.22	22.13	10,943.16	27.81
Over 25	2,456.05	3.10	3,436.38	37.24	8,183.53	20.80
Totals	3,876.96	43.23	9,227.05	99.99	39,351.64	100.00

Sources: See text.

be expected a priori considering the very heavy concentration of retained earnings and capital gains in the highest income bracket. The explanation for the smaller than expected percentage attributed to the highest income bracket can be traced to the income component "employer contributions to social security and health plans." The amount and distribution of this item moderates the unequal distribution attributed to the other income components.

The resulting percentage distribution of the broad definition of income is presented in Table 4, column (12). The data indicate that relative to the percentage distribution of money income, the broad definition of income attributes a larger percentage to the income bracket "over $25,000" and smaller percentages to the remaining income brackets. That is, the broad definition of income results in a greater inequality in the distribution of income.

The broad definition of income is incomplete when compared with the Haig-Simons definition. A partial listing of the excluded items will emphasize the point. They are: income generated through services rendered to oneself, imputed interest on mutual life insurance policies, imputed income from durable goods, gifts and bequests, fringe benefits such as employee discounts or expense accounts, as well as certain public assistance programs such as food stamps and medicare.

In defense of the income data developed in this study, two propositions are presented. First, data

limitations, particularly in regards to a breakdown by income class, prevent additional estimates from being calculated. Second, a priori reasoning suggests that the excluded items would not significantly affect the percentage distribution of income. For example, imputed income resulting from expense accounts is probably concentrated in the higher-income brackets, imputed income resulting from employee discounts is probably concentrated in the middle-income brackets, and imputed income from public assistance programs is concentrated in the lower-income brackets. It is assumed, therefore, that the net effect of excluding the various income components does not significantly distort the percentage distribution of income presented in Table 4.

With few exceptions, the income data developed in this study are theoretically compatible with the definition of "family income" developed by Pechman and Okner.[22] That is, both definitions include money income (such as wages, salaries, rents, interest, etc.), non-money income (such as imputed rent and imputed wages) and capital gains (realized and unrealized). Theoretical differences occur in the treatment of imputed interest and undistributed corporate profits. Imputed interest resulting from services provided by financial institutions is not included in "family income" but is included in this study. In the

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[22]Pechman and Okner, Who Bears the Tax Burden?

case of undistributed corporate profits, Pechman and Okner include the item as a proxy for accrued capital gains on corporate stock. Therefore, undistributed corporate profits per se are not included. That is, Pechman and Okner assume that undistributed corporate profits and accrued capital gains on corporate stock are one and the same.[23] Thus, undistributed corporate profits are included as part of their estimate of total accrued capital gains. It is the position of this study that over a short period of time (i.e., one year) undistributed corporate profits and accrued capital gains on corporate stock are distinct forms of income. Therefore, broad income as developed in this study includes undistributed corporate profits independent of the estimate for capital gains.

As a practical matter, the income data developed by Pechman and Okner are superior to the income data developed for this study. The superiority results directly from the MERGE file which was created by the authors. The MERGE file consisted of 87,000 individual tax returns plus 30,000 household interviews provided by the U.S. Office of Economic Opportunity. This massive amount of individual data enabled the authors to adjust individual income components for underreporting and nonreporting. Such adjustments were not possible in this study.

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[23]The authors state, "over long periods of time, capital gains on corporate securities are roughly equal to retained earnings." Pechman and Okner, Who Bears the Tax Burden? p. 13.

CHAPTER III

SHIFTING ASSUMPTIONS

Tax incidence calculations are based upon tax shifting assumptions. Determining appropriate shifting alternatives is the primary objective of this chapter. Organizationally, the chapter is divided in two parts. The first part presents a brief exposition of some of the variables which influence tax shifting, while part two presents the specific shifting assumptions upon which the empirical results are based. For most of the taxes, more than one shifting assumption is examined. This procedure provides the basis for the previously mentioned sensitivity analysis.

General Discussion

Tax shifting, which is a complicated process, is initially dependent upon the basic underlying analytical framework. As previously mentioned, the basic framework employed in this study excludes both employment effects and misallocation effects (i.e., excess burden). In addition, it should be recalled that this paper is solely concerned

with the degree to which taxes that are imposed in one political unit (i.e., Michigan) are shifted when that political unit is subject to considerable outside influences (i.e., non-Michigan). Therefore, the basic framework is composed of two sectors, a domestic sector and a foreign sector. A technical presentation of a two-sector model is provided in Appendix F.

Given the above framework, the more important variables which affect the degree to which a domestic tax can be shifted are: (1) the degree to which firms attempt to maximize profits, (2) the degree of product competition between the domestic sector and the foreign sector, (3) the degree to which the supply of production can vary within the domestic sector, (4) the difference in tax rates between the two sectors, (5) the elasticities associated with the final product, and (6) the extent of regulation of the industry.

Unless otherwise indicated, the following discussion is based on the assumption that the tax in question is a tax on a factor of production, in particular, capital. There are two reasons for this assumption. First, it will simplify the exposition. Second, it provides a general analysis, since some of the above variables do not influence the incidence of an excise tax.

The first variable which affects tax shifting concerns the degree to which firms attempt to maximize

profits.[1] Under the neoclassical model, it is assumed that all firms operate at the price/output combination which maximizes profits. The importance of this assumption will be illustrated by example. Short-run neoclassical analysis argues that a tax on capital (i.e., property tax) would not be shifted. The essence of the argument is that a capital tax becomes part of fixed costs and fixed costs do not influence the most profitable price and output combination. The simple model below demonstrates this conclusion.

1. $P = P(Q)$, demand function
2. $R = Q.P(Q) = R(Q)$, revenue function
3. $C = FC + C(Q)$, cost function
4. $X = R-C = R(Q) - FC - C(Q)$, profit function, where P is price, Q is quantity, R is revenue, C is costs, FC is fixed costs, and X is profit.

Maximum profits are achieved when marginal cost equals marginal revenue.

5. $\frac{\partial X}{\partial Q} = \frac{\partial R}{\partial Q} - \frac{\partial C}{\partial Q} = 0$, where $\frac{\partial R}{\partial Q}$ is marginal revenue and $\frac{\partial C}{\partial Q}$ is marginal cost.

The introduction of a tax on capital, T, changes the cost and profit functions,

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[1]The author is indebted to James Haughey, "Property Tax Exporting in the Detroit Urban Area: Estimates for 1965-66" (doctoral dissertation, University of Michigan, 1971) for the presentation of this and the next page.

$$(3^*)\quad C = FC + T + C(Q) \text{ and}$$

$$(4^*)\quad X = R(Q) - FC - T - C(Q)$$

but the profit maximization condition remains the same since the tax does not vary with output. In summary, the supply is not altered and the tax is not shifted.

Profit maximization is not the only explanation of pricing behavior. Some economists have argued that the existence of market power coupled with the apparent separation of management from ownership provides managers with the freedom to maximize something other than, or in addition to, profits. Williamson has presented several models where the objective of managers, and thus of firms, is to maximize the manager's utility function (i.e., size of staff, size of office, salary, etc.) subject only to a minimum profit constraint.[2] Baumol has presented a model which maximized the dollar value of sales, subject only to a minimum profit constraint.[3] Simon has argued that managers are not homogeneous in nature and thus managers in different departments within the same firm may have different objectives. The marketing department may attempt to maximize dollar sales, the production department may attempt to maximize physical output, and the financial

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[2]Oliver E. Williamson, The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm (Englewood Cliffs, N.J.: Prentice-Hall, Inc.), 1964.

[3]William J. Baumol, Economic Theory and Operations Analysis (Englewood Cliss, N.J.: Prentice-Hall, Inc., 1965), pp. 295-310.

department may attempt to maximize profits. The resulting price depends on the balancing of the internal objectives.[4]

The relaxation of the profit maximization assumption increases the shifting possibilities. Under any of the above alternatives, a tax on capital will alter the supply of output and therefore will be at least partially shifted. The greater the degree of concentration, the greater the opportunity for pricing policies other than profit maximization to exist. In other words, the greater the opportunity for firms to administer prices. The degree to which prices are actually administered becomes an important element in tax shifting. Galbraith[5] and O'Connor[6] have argued that a considerable proportion of U.S. corporations, manufacturing in particular, are price administered. O'Connor, for example, divides the economy about evenly into monopolistic and competitive sectors. He concludes that "most corporations (in the monopolist sector) operate on the basis of an after-tax profit target (normally between 10 and 15 percent)."[7] If O'Connor's opinion of corporate behavior in the monopolist sector is correct,

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[4]Herbert A. Simon, "Theories of Decision Making in Economics," American Economic Review, IL (June, 1959), p. 253.

[5]John Kenneth Galbraith, New Industrial State (Boston: Houghton Mifflin, 1967).

[6]James O'Connor, The Fiscal Crisis of the State (New York: St. Martins Press, 1973).

[7]Ibid., p. 19.

then taxes imposed on firms within that sector are not only subject to shifting in the short-run, but are in fact, 100 percent shifted. That is, these firms are able to adjust price and output in such a manner that after-tax profit targets are retained. Clearly, a large range of shifting possibilities exist.

The second variable concerns the degree to which product competition exists between the two sectors. In general, the greater the degree of foreign product competition, the greater the probability that the domestic tax cannot be shifted. A large foreign sector reduces domestic suppliers to price-takers. The price of the product is, therefore, determined independent of the domestic tax. If the tax were solely imposed in the domestic sector, then domestic suppliers could not shift the tax. Even if identical taxes were imposed in both sectors which precipitated a commodity price increase, domestic suppliers would still bear the domestic tax. That is, the new higher price would exist in the absence of the domestic tax and therefore the profits received by domestic firms would be higher in the absence of the domestic tax.

The introduction of multiplant firms complicates the analysis surrounding foreign product competition. For example, if firms set a common price for the same product which is produced at different plants, even though each plant is taxed at a different rate, some plants will not shift all of their taxes, while others will shift more than

all of their taxes. The degree to which the domestic tax is shifted depends on the number of multiplant firms which operate at least one plant in the domestic sector. The greater the number of such firms, the greater the probability that the domestic tax influences price and output, and thus the greater the probability that some of the tax is shifted.

Foreign product competition is not relevant to an analysis of a domestic excise tax. Although an excise tax may increase the price of the product, the only potential method by which domestic consumers could avoid the higher price is by purchasing the product in the foreign sector. Based on both legal and practical reasons, this possibility is assumed to be insignificant.

Another variable affecting tax shifting concerns the degree to which the supply of capital can vary within the domestic sector. The greater the degree to which supply can vary, the smaller the probability that the tax is borne by capital. Domestic supply can vary for either of the following two reasons. Supply may vary as a result of an absolute change in the total amount of capital (i.e., both sectors). For example, if the total supply of capital is a function of the rate of return, then a tax imposed on capital would decrease the return and thus reduce the total supply. The reduction in capital would result in a decrease in output which would result in higher product prices. Therefore, at least some of the tax would be

shifted. A second reason results from the nature of the model. Domestic supply may vary even if the total supply of capital is assumed fixed. Under this condition, the change in supply depends on the degree of mobility of capital between the two sectors. The greater the degree of mobility, the greater the probability that a tax imposed solely in the domestic sector is not borne by capital.

The degree to which the supply of capital can vary is equivalent to short-run or long-run economic analysis. Short-run analysis assumes that capital is fixed and immobile. Therefore, a tax on capital does not alter the profit maximization condition and thus is not shifted. In the long run, a tax on capital is subject to shifting, since long-run analysis assumes that capital is a variable input and thus alters the marginal cost/marginal revenue relationship.

In analyzing individual taxes which are imposed on particular segments of the economy, a subjective evaluation is employed to determine whether short-run or long-run analysis is more appropriate. That is, whether capital as a practical matter is variable within the domestic sector.

The fourth variable concerns the difference in tax rates between the two sectors. The applicability of this variable is limited to those situations where the domestic sector affects the price and/or output of the commodity. Such conditions arise, for example, when either domestic supply constitutes a significant percentage of the total

(both sectors) production and firms attempt to operate on a cost-plus basis, or when a significant number of multi-plant firms operate at least one plant in the domestic sector and firms attempt to price on a cost-plus basis.

In effect, the analysis can be simplified into one assumption: the price of the product equals cost plus the "average tax rate." Therefore, if the domestic rate is less than or equal to the foreign rate, then the domestic tax is shifted. If the domestic rate exceeds the foreign rate, then the difference between the average rate and the domestic rate is borne by capital. Since the "average rate" is between the foreign rate and the domestic rate, then only a portion of the difference between the two rates is borne by domestic capital.

The elasticities of supply and demand for the final product are additional variables affecting tax shifting. Diagram "A" illustrates the importance of the elasticity of supply and Diagram "B" the importance of the elasticity of demand. The analysis assumes capital is fixed and immobile (i.e., short run) and it also assumes the imposition of an excise tax. In both diagrams, the tax revenue equals ACHF; BCHG is borne by the firms, and ABGF is passed on to the consumer.

Case (1) of Diagram A illustrates an example where supply is relatively elastic, while case (2) illustrates an example where supply is relatively inelastic. By observation, a larger proportion of the tax is shifted in case (1).

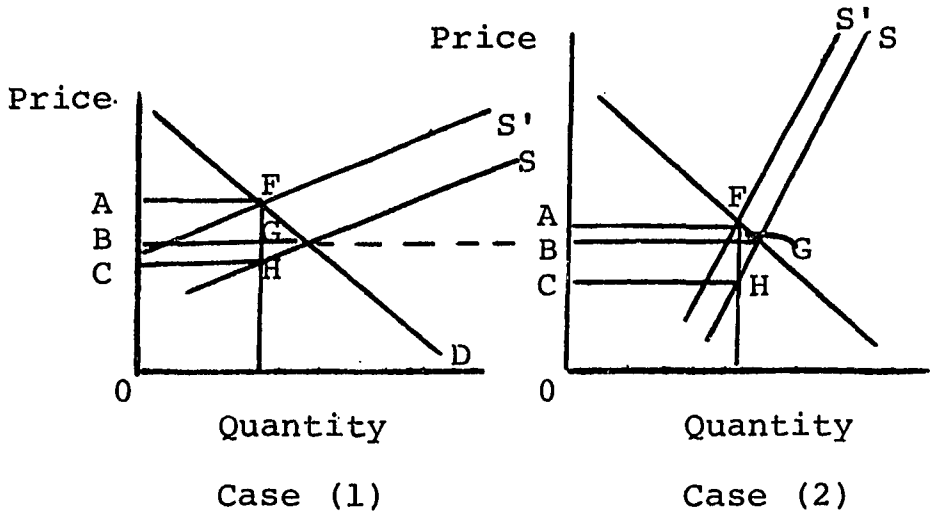

Diagram A. Elasticity of Supply

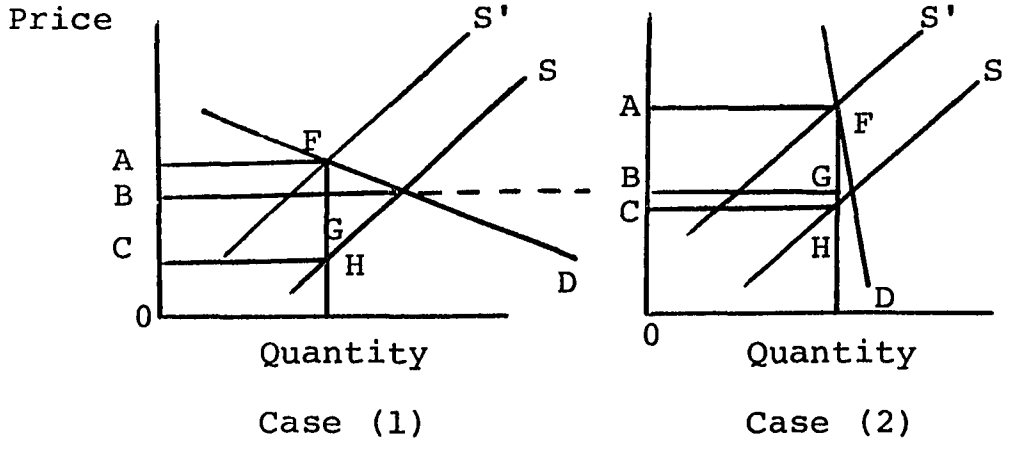

Diagram B. Elasticity of Demand

Case (1) of Diagram B illustrates an example where demand is relatively elastic, while case (2) illustrates a relatively inelastic demand. Again by observation, a larger proportion of the tax is shifted in case (2).

Therefore, the more elastic the supply, the greater the proportion of the tax which is shifted. The more elastic the demand, the smaller the proportion of tax which is shifted.

The last variable refers to the degree of state regulation. The greater the degree of state regulation, the greater the probability that a tax is shifted. Utility rate determination is the classic example of extreme state regulation. The very process of rate determination, which includes all taxes as costs of operation and then adds a rate of return, guarantees that the tax is shifted by 100 percent.

In conclusion, the degree to which domestic taxes are shifted depends on several variables. The importance of each particular variable fluctuates according to both the type of tax and the segment of the economy being taxed. It is the intent of this study to make an informed judgment concerning the degree to which each tax is shifted, while concomitantly recognizing that such a judgment is susceptible to error. In those cases where the error is deemed to be particularly serious, alternative shifting assumptions are made.

Specific Shifting Assumptions

As a framework in which to analyze the appropriate shifting alternatives, taxes are divided into six general classes.

I. The property tax[8]

II. Taxes levied on individuals

- A. Personal income tax (state and city)
- B. The inheritance tax
- C. Registration (weight tax) and license fees on individually-owned automobiles
- D. Intangibles tax levied on individuals
- E. County documentary stamp tax (non-business)

III. Payroll tax (unemployment compensation)

IV. Consumption taxes

- A. General sales tax
- B. Use tax
- C. Cigarette tax
- D. Taxes on alcoholic beverages
- E. Gasoline taxes (motor fuel)
- F. Insurance premium and privilege taxes

V. Business cost taxes

- A. General sales tax
- B. Use tax

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[8]The property tax is given its own classification because of its overriding importance in the state. For fiscal 1970, property taxes accounted for approximately 40 percent of all state and local tax revenues.

C. Motor fuel tax paid by business

D. Registration (weight tax) and motor carrier fees on commercial vehicles

E. Intangibles tax paid by business

F. Corporate franchise fee

G. County documentary stamp tax (business property)

VI. Business profit taxes

A. Corporate income tax (state and city)

B. Financial institutions income tax

The classification presented above makes an implicit assumption concerning second-stage shifting which must be explained. Second-stage shifting refers to a tax which is statutorily levied on one business, and in the process of shifting, the tax is partially shifted to another business, which in turn shifts the tax again. For example, the general sales tax is statutorily levied on the retailer. If the retailer shifts the tax to the consumer (first-stage shifting), then part of the tax is paid by other businesses acting as consumers. The portion of the tax shifted to individual consumers is analyzed as a consumption tax. The portion of the tax shifted to other businesses acting as consumers is analyzed as a business cost tax and is susceptible to additional shifting (second-stage shifting). Therefore, the sales tax is classified as both a consumption tax and a business cost tax.

For practical purposes, the process of second-stage shifting must be truncated. Taking the logic to the ultimate extreme, it could be argued that part of the cigarette tax is ultimately paid by individuals through their purchase of automobiles. For example, an auto lobbyist, while wining and dining a client, purchases cigarettes for the client. The tax becomes part of the expense account, which becomes part of the cost of doing business and, which may be passed on in the price of the car. The same argument could be made for the tax on alcohol. Therefore, for purely practical reasons, only two taxes are assumed to exhibit significant second-stage shifting. They are the general sales tax and the motor fuel tax. The justification for limiting second-stage shifting is based on the size and relative importance of the taxes.

Property Tax

Traditional incidence theory divides the property tax into two parts: the tax on land and the tax on improvements. Taxes leived on land are held to be particularly resistant to shifting because of the inelastic supply of land. The theory states that the tax on the land is capitalized in the value of the land. That is, the tax reduces the return on land, which reduces the market value of the land, and therefore, the tax is borne by the owner. Taxes leived on improvements are assumed to be shifted to

the consumer (tenant). The theory states that a tax on improvements will initially tend to reduce profit margins, which will in turn tend to restrict the supply of new improvements until the market resumes its normal rate of return. Therefore, traditional theory holds that the portion of property taxes which are shifted equals the taxes levied on the improvements.

Economists differ on the applicability of traditional theory. John Due argues that if businesses consider the entire amount of any property tax as an expense of doing business, then in the long run all of the tax could be shifted, even the portion on land.[9] On the other hand, M. Gaffney[10] argues that improvements fall differentially hard on capital extensive firms and industries. Since capital intensive firms must compete with labor intensive firms, then any attempt to shift the tax (on improvements) will be very uneven with the more capital intensive firms being less able to shift the tax. In addition, the introduction of market power and thus non-profit maximizing behavior complicates the analysis. Therefore, it is often difficult to state precisely the degree to which taxes are shifted.

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[9]John F. Due, Government Finance: An Economic Analysis (Homewood, Ill.: Richard D. Irwin, Inc., 1963), p. 291.

[10]Mason Gaffney, "The Property Tax is a Progressive Tax," Proceedings of the National Tax Association, LXIV (1971).

The property tax is by far the most important and complex tax within the Michigan tax structure. In an attempt to handle the complicated shifting questions, the tax is divided into seven parts:[11] (1) owner-occupied residences, (2) rented residences, (3) non-automobile manufacturing, (4) agriculture, (5) automobile manufacturing, (6) commercial, and (7) utilities.

1. Owner-occupied residences. Since the property owner has no market or mechanism which would enable the tax to be shifted, the tax is assumed to be borne by the owner.[12]

2. Rented residences. Previous incidence studies[13] have resolved the tax shifting problem by referring explicitly to the traditional property tax theory. In such cases, the assumption was made that land represented one-fourth of the total property value. Therefore, it was assumed that three-fourths of the tax was shifted to the tenant and one-fourth was borne by the owner. However, the introduction of market power tends to increase the probability that a larger percentage of the tax is shifted. For

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[11]The seven sub-parts are the same as those used in the 1956 Michigan study.

[12]It is theoretically argued that property taxes may inhibit home improvements, and in such cases part of the tax would be shifted to the home improvement industry. It is assumed that such behavior is insignificant.

[13]For example, see Musgrave, et al., "A Case Study for 1948"; Musgrave and Daicoff, "Who Pays Michigan Taxes"; or Wisconsin Tax Study.

example, the enactment of zoning laws may prohibit additional competition and thus provide the owner with a degree of market power. If under these circumstances the owner operates on a cost-plus basis, then all of the tax will be shifted. It seems reasonable, therefore, to conclude that the amount shifted to the tenant is in the range of 75 to 100 percent. Based on this conclusion, two assumptions are made: (a) 100 percent of the tax is shifted to the tenant, and (b) 75 percent is shifted to the tenant and 25 percent is borne by the owner.

3. Non-automobile manufacturing (NAM). Of the seven property classifications examined in this study, the tax levied on NAM property has generated the greatest diversity of opinion. A brief review of some of the previous arguments will illustrate the extensiveness of the diversity. First, traditional analysis implies that a large portion of the tax is shifted to the consumer since NAM property has a relatively low ratio of land to total property value. Second, the California Study referred to previously assumed that businesses consider all property taxes as an expense of doing business and therefore in the long-run will shift all of the tax to the consumer.[14]

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[14]California Assembly Interim Committee on Revenue and Taxation, Taxation of Property in California (Sacramento, 1964). In fairness to the California Study, industrial property was not separately analyzed but was included in general business category.

Third, Musgrave, in the 1956 study, argued that since industrial firms are subject to considerable out-of-state competition, and thus are price-takers, then all of the tax is borne by the owners. Fourth, in an attempt to reach a middle ground concerning the problem of out-of-state competition, the Wisconsin Study argued that the differential rate between one state and another is the important variable. In this case, it was argued that since all states impose state taxes to some degree, then the cost of production includes a "common denominator."[15] In summary, previous conclusions have ranged from zero shifting to complete shifting.

The diversity of opinion centers on the importance of out-of-state competition. The greater its importance, the greater the degree to which the tax is borne by the firm. For example, out-of-state competition is very important to a small firm consisting of a single plant. This firm is a price-taker. That is, the firm cannot affect the price of the product. In the absence of the Michigan tax, the price of the product would remain the same, and therefore the Michigan tax is borne by the firm. However, firms consisting of many plants, several of which are not located in Michigan, reduce the importance of

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[15] University of Wisconsin Tax Study Committee, Wisconsin's State and Local Tax Burden (Madison, 1959). The Wisconsin Study recognized the difficulties of trying to estimate the "common denominator," and therefore assumed that the tax was completely shifted.

out-of-state competition. A Michigan tax affects the firm and not just the plants located in Michigan. If the firm has market power, then the Michigan tax could affect the price of the product and therefore could be entirely shifted.

Available evidence[16] indicates that large firms operate on some form of markup basis. Since large firms dominate this sector, it is reasonable to conclude that a major portion of the tax is shifted and that the amount is probably in the neighborhood of 75 percent. However, since this particular percentage is somewhat arbitrary, three different assumptions are examined: (a) all of the tax is shifted to the consumer, (b) 75 percent of the tax is shifted to the consumer, and 25 percent is borne by the owners, and (c) 50 percent is shifted to the consumer and 50 percent is borne by the owners.[17]

4. Agriculture. For analytical purposes, the tax levied on agricultural property can be can be divided into two parts: the tax levied on the farm residence and the tax

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[16]Abraham Kaplan, Joel D. Dirlam, and Robert F. Lanzillotti, Pricing in Big Business (Washington, D.C.: The Brookings Institution, 1958).

[17]Another shifting possibility concerns backwards shifting. The degree of such shifting depends on the elasticity of the supply of labor as well as on the degree of unionization. Since Michigan is a highly unionized state, and since unions contract on a regional and national basis, it is assumed that the possibility of such shifting is insignificant.

levied on the farm operations. The tax levied on the residence is assumed to be entirely borne by the farmer. The tax levied on farm operations is assumed to be substantially borne by the owner. Two important arguments support the latter conclusion. First, as in the case of non-automobile manufacturing (NAM), agricultural production is subject to considerable out-of-state price competition. However, unlike NAM, farmers do not generally possess market power. Therefore, with the exception of a few products which are produced within the state in significant enough quantities to have market power, the prices of agricultural products are given. Farm income is lower than would otherwise be the case in the absence of the tax. Second, farm operations primarily consist of a high ratio of land to total property value. Traditional tax theory would, therefore, also support the conclusion that the tax is borne by the owner.

In conclusion, the tax levied on agricultural property is considered to be substantially borne by the owner. The exact percentage is not known, but it is reasonable to assume that the range is between 75 percent and 100 percent. Therefore, two assumptions are examined: (a) 75 percent is borne by the owner and 25 percent by the consumer, and (b) all of the tax is borne by the owner.

5. Automobile manufacturing. There are several principles that can be applied to the auto industry which tend to indicate a high degree of shifting. The auto

industry is both nationally concentrated and capital intensive. The first observation indicates the existance of substantial market power, which in turn implies a substantial ability to shift the tax. The second observation indicates a low land to total property ratio which, based on traditional theory, supports substantial shifting. In addition, each of the three major American auto companies maintains significant operations in Michigan, which tends to reduce the potential out-of-state competition.[18] Based on these observations, it is assumed that: (a) all of the tax is shifted to the consumer, and (b) 75 percent of the tax is shifted to the consumer and 25 percent is borne by the owners of capital.

6. Commercial. Although commercial businesses are not generally subject to out-of-state competition, they are subject to intrastate competition. The existence of intrastate competition coupled with the fact that differential tax rates exist from one locality to another implies that something less than complete forward shifting (on improvements) takes place. On the other hand, the broad range of businesses covered increases the probability of market imperfections, which implies that in some cases all of the tax may be shifted (even the portion on land). Both conclusions result directly from the nature of the sector, which can be characterized as monopolistic competition.

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[18] It is fairly safe to state that out-of-state competition is limited to the small car market.

That is, the market consists of a combination of competitive and monopoly elements. Each firm has some degree of monopoly power resulting from a differentiated product. The differentiation may result from the brand names sold by the firm, the services offered (i.e., credit) by the firm or even the location of the firm. For example, a grocery store located in a middle-class suburb would not generally possess market power. However, the identical grocery store located in a lower-class urban area may enjoy significant market power, particularly if the individuals living in the area do not have ready access to transportation facilities. The greater the degree of differentiation, whether real or spurious, the greater the degree of market power. It seems reasonable that the range of shifting is in the neighborhood of 75 to 100 percent. Therefore, two assumptions are made: (a) all of the tax is shifted to the consumer, and (b) 75 percent of the tax is shifted to the consumer and 25 percent is borne by the owners.

7. Utilities. As discussed previously, utilities are the classic example of state regulation. It is assumed all of the tax is borne by the consumer.

Taxes Levied on Individuals

Taxes in this category are assumed to be borne by the individuals on which they are levied. In the case of the personal income tax, several theoretical arguments have been postulated which contradict this assumption. It has been argued that the tax may reduce the supply of labor.

However, there are two factors which significantly invalidate this argument. First, institutional factors generally prevent individuals from choosing freely between work and leisure, and second, available empirical investigations indicate that the supply of labor is very insensitive to tax changes.[19] In addition, it is argued that the personal income tax may require businesses to pay higher salaries in order to compete successfully for top executives. Considering the motivational factors of executives, it seems highly unrealistic that a few dollars in state income taxes will constitute the marginal decisive factor in a significant number of instances.

In the cases of both the inheritance tax and the intangibles tax, the tax is levied directly on the money received.[20] The taxes may encourage certain individuals to leave the state. However, such an occurrence will merely imply that the tax is not collected: it does not imply that the tax is shifted.

The registration fee (weight tax) levied on individually-owned automobiles and individual automobile license fees are assumed to be borne by the individuals on

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[19]Marvin Kosters, "Effects of an Income Tax on Labor Supply," in Arnold C. Harberger and Martin J. Bailey, eds., The Taxation of Income from Capital (Washington, D.C.: The Brookings Institution, 1969).

[20]The inheritance tax is levied on inheritances, the intangible tax is levied on intangible property, i.e., money, interest, dividends, and non-dividend paying securities.

which they are levied. The only other possible alternative is to assume that the taxes deter automobile consumption and therefore would be partially shifted to the auto industry. This possibility is assumed insignificant and therefore ignored.

The portion of the county documentary stamp tax collected from the transfer of individual owner-occupied homes is assumed to fall on the new individual owner. The fact that the tax is determined after the price has been agreed upon, coupled with the very small rate, justifies this assumption.

Payroll Tax (Unemployment Compensation)[21]

Economists differ on the burden of unemployment compensation. Two equally plausible arguments can be made. First, it could be argued that all of the tax is borne by the employees in terms of lower wages. This conclusion is based on the logic that payroll taxes in general are viewed by businesses as part of the wage settlement and therefore are ultimately paid by the worker.[22] Alternatively, it could be argued that in certain sectors of the economy the tax could be passed on to the consumer. This conclusion

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[21]Workmen's compensation is not included on the grounds that such payments are more in the nature of insurance payments than taxes.

[22]John A. Brittain, The Incidence of Social Security Payroll Taxes, Brookings Institution Reprint 197 (Washington, D.C.: The Brookings Institution, 1971).

is based on the possible effect of collective bargaining agreements between large labor unions and large firms. Under such circumstances, labor unions may be able to prevent the tax from entering into the agreement and thereby force the large firms, which are assumed to have market power, to raise prices. Since both arguments are realistic, two assumptions are examined in this study. They are: (a) all of the tax is borne by employees in terms of reduced wages, and (b) 50 percent is borne by employees and 50 percent is borne by consumers.

Consumption Taxes

The following discussion applies to the general sales, motor fuel (gasoline), alcohol, cigarette and insurance premium taxes. The use tax exhibits certain unique characteristics which requires a separate discussion.

Consumption taxes are assumed to be shifted to the consumer. In the context used, consumer implies first-stage shifting. Therefore, businesses are included in the meaning of the term. There are two general lines of reasoning which support this conclusion. The first line is based on institutional observations. For example, the legislative intent of such taxes is that they be shifted to the consumer. In the particular case of the sales tax, merchants universally adopt the practice of listing the tax separately, which increases the probability of shifting. In addition, all of the taxes exhibit characteristics which indicate that the demand of the products is inelastic. The

sales tax is broad based, alcohol and cigarette consumption are strongly influenced by habit, and motor fuel and insurance consumption can be classified as necessities in the modern world. Therefore, the legislative intent, the separate billing, and the appearance of inelastic demand schedules all provide the necessary circumstances which are strongly conducive to joint action on the part of merchants to shift taxes.

The second general line of reasoning supporting complete shifting follows traditional theoretical analysis. Traditional tax theory states that the imposition of such taxes will initially shift the average cost schedule upwards. The resulting new short-run equilibrium will be at a higher price and lower output. The important point is that part of the tax is borne by the firm in terms of lower profits. In the long run, firms will drop out of the market until the decrease in supply results in the re-establishment of the pre-tax rate of return. Therefore, in the long run all of the tax is shifted.[23]

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[23]The traditional analysis is not universally accepted. The popular notion was first challenged by Harry Gunnison Brown, "The Incidence of a General Output or a General Sales Tax," Journal of Political Economy, XLVII (April, 1939), 254-62. Brown argued that a general sales tax merely reduced the return to factors of production, and thus the tax was borne by factors of production. More recently, Earl Rolph expanded Brown's thesis to include all excise taxes; see Earl Rolph, "A Proposed Revision of Excise Tax Theory," Journal of Political Economy, LX (April, 1952), 102-07; see also Earl Rolph and George Break, Public Finance (New York: The Ronald Press Co., 1961), pp. 287-309. Briefly, Rolph argues that while an excise tax raises the price and lowers the output of the tax

Use Tax

Previous empirical studies have implicitly combined the use tax with the general sales tax. However, the use tax, which is levied on a somewhat different variety of items, bears little resemblance to the general sales tax. For example, the tax is levied on such items as: (1) retailers who purchase merchandise for resale and later make use of it themselves, (2) used car transactions made by individuals not usually engaged in the automobile business, (3) out-of-state acquisition of merchandise for use, storage or consumption, (4) telephone and telegraph service, and (5) income from tangible personal property which is rented to others for lease or storage for a period in excess of six consecutive days. In terms of dollar collections, approximately 21 percent is collected from telephone and telegraph services, approximately 18.5 percent is collected from auto transactions, and the remaining 60.5 percent from everything else. Clearly, under these circumstances, the use tax should not be combined with the general sales tax. In an attempt to handle the use tax, the following assumptions are made: (a) taxes collected from telephone and telegraph service are assumed to be completely

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commodity, it will also increase the output and lower prices of untaxed commodities. He concludes that consumers may be no worse off since what they lose on one hand they will gain with the other hand. For a retort to the Brown-Rolph hypothesis, see Challis A. Hall, Jr., review of Public Finance by Earl R. Rolph and George F. Break, The American Economic Review, LII (March, 1962), pp. 267-69.

borne by the consumer, (b) taxes collected from auto transactions are assumed to be completely borne by individuals, and (c) the remaining portion of the use tax is assumed to have been paid by businesses.[24] It is treated in the same manner as other business cost taxes.

Business Cost Taxes

In general, taxes on business costs are considered to be completely shifted. Since, by definition, such taxes are a cost of doing business, then in the long run the taxes must be recovered for the business to remain in operation. This conclusion is severely altered, however, when the framework concerns the taxes levied by only one state. Much of the analysis presented in previous sections has equal relevance in the discussion of these taxes. For example, property taxes levied on businesses can be classified as business cost taxes. In the discussion of the property tax, it was pointed out that the degree of competition within the industry coupled with the existence of out-of-state competition significantly affected the ability to shift the tax. Since the same basic arguments can be applied to all business cost taxes, it is possible

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[24]Data limitations mandated that a choice be made between assuming: (a) the remaining use tax was similar to the general sales tax, or (b) the remaining portion was similar to a business cost tax. Since several of the components of the use tax are business cost in nature and since the relationship between the use tax and sales tax is weak at best, the business cost approach was selected as the best procedure.

for something less than complete shifting to take place. Therefore, two assumptions are examined: (a) all of the tax is shifted to the consumer, and (b) 75 percent of the tax is shifted to the consumer and 25 percent is borne by the owners.

The Corporate Income Tax[25]

Traditional analysis argues that a corporate income tax initially depresses returns to corporate capital. This results in capital movement from the corporate sector to the noncorporate sector where the return is higher. The influx of new capital in the noncorporate sector reduces the return to capital within the sector. The process continues until the rates of return are equalized. Therefore, the return to all capital falls even though the tax was only levied on corporate capital.[26]

The conclusion is altered if it is assumed that corporate capital does not move to the noncorporate sector. That is, corporate investors may not consider the

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[25]Income taxes are collected from both corporations and financial institutions. The distinction is made solely on the basis that a higher rate is applied to financial institutions than to corporations in general. For the purposes of this study, it is assumed that only one income tax is levied and the collections equal the sum of the two separate taxes. The relatively small sum which is collected from the financial institutions' income tax implies that this procedure will prevent needless complications while introducing a small if not insignificant bias.

[26]The analysis assumes that the total supply of savings remains unchanged.

noncorporate sector as a viable alternative for investment. Empirically, there is no evidence to support capital movement. For example, the importance of the corporate sector has grown in spite of post-World War II rate of corporate taxation.[27] If corporate capital does not move, then the tax would be borne entirely by corporate owners.

Up to this point, the analysis has implicitly assumed that the corporate income tax does not affect price and output decisions. The existence of market power, however, could invalidate this assumption and diametrically alter the conclusion. For example, if firms operate on a cost-plus basis, and if, further, firms consider the income tax as a business cost, then all of the tax could be shifted to the consumer in terms of higher prices.

In an attempt to resolve the issue, many scholars have addressed the question empirically. Probably the most famous study was conducted by Marian Krzyzaniak and R. A. Musgrave[28] (K-M hereafter). Their model, which estimated a relationship between the corporation tax rate and the gross-of-tax rate of return on corporate capital in manufacturing, indicated that the corporate income tax was more than 100 percent shifted. This article, however, has

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[27] See Joseph A. Pechman, Federal Tax Policy (rev. ed.; Washington, D.C.: The Brookings Institution, 1971), pp. 114-15.

[28] M. Krzyzaniak and R. A. Musgrave, The Shifting of the Corporation Income Tax (Baltimore: John Hopkins, 1963).

been highly criticized, with the bulk of the criticism centering on the model's specification. For example, Cragg, Harberger, and Mieszkowski[29] (C-H-M hereafter) introduced an employment variable and a war dummy variable into the K-M model and found that the tax variable was not a statistically significant variable in estimating the gross return to capital.

A brief statement regarding other studies affirms the general uncertainty concerning the shifting question. R. W. Kilpatrick[30] included industrial concentration ratios in his model and concluded that the tax is shifted and that the order of magnitude was around 100 percent. Gordon[31] included a variable which accounted for changes in the productivity of capital over time, and concluded that shifting within the manufacturing sector as a whole is very small. Hall[32] estimated the incidence of the corporate income tax and concluded that the tax was not shifted.

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[29]J. G. Cragg, A. C. Harberger, and P. Mieszkowski, "Empirical Evidence on the Incidence of the Corporation Income Tax," Journal of Political Economy, 75 (December, 1967), 811-21.

[30]R. W. Kilpatrick, "The Short-Run Forward Shifting of the Corporation Income Tax," Yale Economic Essays, Vol. 5 (Fall, 1965), pp. 355-420.

[31]R. J. Gordon, "The Incidence of the Corporation Income Tax in U.S. Manufacturing 1925-62," American Economic Review, Vol. 57 (September, 1967), pp. 731-58.

[32]C. A. Hall, Jr., "Direct Shifting of the Corporation Income Tax in Manufacturing," American Economic Review, Papers and Proceedings, Vol. 54 (May, 1964), pp. 258-71.

Clearly, the results of the various investigations present contradictory conclusions.

The reason behind the extreme diversity in the results can be traced to differences in model specifications. John Due asserts "the basic limitation of all of these studies, however, is the inability to isolate the tax effect from other effects."[33] That is, the corporate tax rate is only one of many variables which may influence the return to corporate capital. Therefore, an empirical study must prove both a statistical relationship between the corporate income tax and corporate returns, as well as a causational relationship.

In order to dramatically illustrate the specification problem, a specific result obtained by K-M is presented and then altered according to C-H-M. K-M estimated the following statistical relationship between the gross rate of return to corporate capital (Y_{gt}) and the effective tax rate (Z_t^*).[34]

$$Y_{gt} = \underset{(.098)}{.386} + \underset{(.347)}{.291}\, C_{t-1} - \underset{(.386)}{.494} V_{t-1} - \underset{(.400)}{1.971} J_t - \underset{(.212)}{220} G_t + \underset{(.104)}{.481} Z_t^* \quad (r^2 = .87)$$

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[33] John F. Due, Government Finance, An Economic Analysis (3rd. ed.; Homewood, Ill.: Richard D. Irwin, Inc., 1963), p. 220.

[34] Krzyzaniak and Musgrave, The Shifting of the Corporation Income Tax, Table 6-1.

where:

Y_{gt} = gross-of-tax rate of return on corporate capital in manufacturing

C_{t-1} = change from year t-2 to year t-1 in the ratio of consumption to GNP

V_{t-1} = ratio of inventories to sales in manufacturing in year t-1

J_t = ratio of tax accruals (other than the corporate income tax) minus government transfer to GNP in year t.

G_t = ratio of government purchases of goods and services

Z^*_t = the effective tax rate in year t and is calculated by dividing total tax liabilities by the total profits of the relevant group of corporations in year t.

K-M conclude that the tax variable (Z^*_t) significantly influences the gross rate of return to capital implying that the corporate tax is shifted.

C-H-M argue that "making highly plausible and theoretically justified modifications in the K-M (model) leads to a reversal of the main conclusions."[35] Specifically, C-H-M include an employment variable, E_t, and a war dummy variable, W_t, and obtain the following equation:[36]

$$Y_{gt} = \underset{(.246)}{-.537} + \underset{(.265)}{.358}\, C_{t-1} + \underset{(.345)}{.134} V_{t-1} - \underset{(.326)}{1.577} J_t - \underset{(.156)}{.050} G_t + \underset{(.113)}{.073} Z^*_t + \underset{(.244)}{.934} E_t + \underset{(.015)}{.041} W_t \quad (r^2 = .95)$$

where:

E_t = the employment rate in year t

W_t = a dummy variable for the mobilization and war years of 1941, 1942, 1950, 1951, and 1952

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[35] Cragg, Harberger, and Mieszkowski, "Empirical Evidence on Incidence of Corporation Income Tax," p. 812.

[36] Ibid., p. 818.

The equation clearly indicates that the coefficient of the tax variable Z_t^* is not statistically different from zero. Therefore, C-H-M conclude that "the tax rate has not had a significant influence on before-tax rates of profit."[37]

In summary, the distinction between a statistical relationship and a causational relationship cannot be over-emphasized. K-M argue that their statistical relationship between the corporate income tax and corporate profits is a causational relationship. C-H-M attempt to prove that K-M's statistical relationship is spurious and thus is not a causational relationship.

It is the conclusion of this study that a causational relationship between the corporate income tax and corporate profits has been neither proven nor disproven. Based on this conclusion, a complete range of shifting assumptions is justifiable.[38] Therefore, the following three assumptions are made: (a) all of the tax is shifted to the consumer,

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[37] Ibid.

[38] Informed sources estimate that the largest 25 corporate taxpayers paid approximately 50 percent of Michigan's corporate tax in 1970. It could be argued that the 25 firms are self-restrained monopolists or oligopolists which use a tax increase as an excuse for exercising their market power. Such reasoning would imply that in the short run, at least 50 percent of the corporate income tax is shifted. Such reasoning may be valid, however, this author concurs in the conclusion reached by R. Goode that "the case for short-run shifting of a large fraction of the corporate income tax remains unproved." Richard Goode, "Rates of Return, Income Shares, and Corporate Tax Incidence," in Effects of Corporation Income Tax, ed. Marian Krzyzaniak (Detroit: Wayne State University Press, 1966), p. 227.

(b) 50 percent of the tax is shifted to the consumer and 50 percent is borne by the stockholders, and (c) all of the tax is borne by the stockholders.

CHAPTER IV

THE PROPERTY TAX

The major purpose of this chapter is to detail the specific methodology used for allocating the property tax among the 14 income brackets. The procedure is divided into two general sections. First, estimates are made of the amount of tax paid by each of the seven sub-classes of property. The second section discusses tax exporting and the method by which the taxes are allocated among the income brackets.

Estimating the Taxes Paid by Each Property Sub-Class

The seven classes of property examined in this study are: (1) owner-occupied homes, (2) rented residences, (3) automobile manufacturing, (4) non-automobile manufacturing, (5) utility, (6) commercial, and (7) agricultural. Property tax collections for fiscal 1970 (excluding state-assessed utilities) amounted to $1,660.9 million. The proportion of the total collections paid by each sub-class is estimated from data supplied by the Michigan State Tax

Commission together with independent surveys conducted by the author.

Data supplied by the Commission consisted of a county breakdown of the total market value of nine classes of property. They were: agriculture (real), commercial (real), commercial (personal), industrial (real), industrial (personal), residential (real), residential (personal), timber cut-over (real), and utility (personal).[1] Since the classes or property supplied by the Commission do not correspond to the classes of property examined in this study, the following two-step approach reconciles the differences. The first step estimates the amount of taxes collected from each class of property as defined by the Commission, while the second step adjusts these tax collections to correspond to the sub-classes of property examined in this study.

The amount of taxes collected from each class of property as defined by the Commission is estimated by assuming that each class bears that proportion of the total county property tax collections that is equal to its percentage of property value (of the respective class) within each county. For example, assume that $100 in property taxes are collected in County "A". Assume further that property assessments indicate that 50 percent of the property value is classified as residential (real) and

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[1]For definitions, see Appendix G.

50 percent is classified as agricultural. The procedure assumes that 50 percent of the tax is paid by each class of property. Applying this procedure to all 83 Michigan counties results in an estimate of the taxes paid by each sub-class within each county. Summing the taxes paid by each sub-class across the counties results in an estimate of the total taxes collected from each sub-class. Based on this process, Table 5 presents an approximate percentage breakdown by sub-class.

Table 5.--Estimated Percentage Distribution of Property Taxes by Class of Property as Defined by the State Tax Commission Before Adjustment for City Taxes.

Classes	Percentage
Agricultural (Real)	5.45
Commercial (Real)	11.79
Industrial (Real)	11.59
Residential (Real)	48.00
Timber cut-over (Real)	.31
Commerical (Personal)	5.14
Industrial (Personal)	13.31
Residential (Personal)	.06
Utility (Personal)	4.34
	99.99

Source: Derived from unpublished data provided by the Michigan State Tax Commission.

The above procedure, in effect, assumes that each class of property has imposed upon it a rate of tax equal to the average rate for the county. Since, in general, the rate of tax is higher in cities than in rural areas, and since very little agricultural or timber cut-over property is located in cities, the procedure over-estimates the taxes collected from agricultural and timber cut-over property. For example, returning to County "A", the following additional conditions are assumed: (1) only one city is located within the county, (2) none of the agricultural property is located within the city, and (3) the city collects $10 in city operating property taxes. Clearly, under these conditions, the millage levied by the city resulting in the city operating taxes is not levied on the agricultural property. Therefore, of the $100 of total property tax collected in the county, $55 should be attributed to residential property (instead of $50) and only $45 should be attributed to agricultural property (instead of $50). In this example, the tax attributed to agricultural property should be reduced by an amount equal to 50 percent (the initial percentage) times the city operating collections ($10) or $5. This simple numerical example illustrates that the procedure employed to calculate Table 5 over-estimates the taxes paid by agricultural and timber cut-over property and under-estimates the taxes paid by the other sub-classes.

Table 5 over-estimates the tax paid by agricultural property by the amount equal to 5.45 percent (the initial percentage) times the city operating property tax collections. Since city operational property taxes for fiscal 1970 amounted to $368.264 million, agricultural property is over-estimated by $20.07 million or 1.21 percent of total property tax collections. Therefore, the percentage attributed to agricultural property is reestimated to be 4.24 percent (5.45 percent minus 1.21 percent). Similar reasoning is applied to timber cut-over property. The amount subtracted from both agricultural and timber cut-over property is proportionally redistributed among the other classes of property. The estimated distribution of property taxes by class of property as defined by the Commission, adjusted for city operating taxes, is presented in Table 6.

Given the distribution of taxes by class of property as defined by the Commission, it is possible to adjust these figures in order to estimate the taxes collected from the classes of property examined in this study. Since various adjustment procedures are employed, each class of property is discussed individually.

Owner-Occupied Homes

The definition of residential property as defined by the Commission includes rented residences. Therefore, the amount so attributed to residential (real) as shown in Table 6, over-estimates the amount actually levied on

Table 6.--Estimated Distribution of Property Taxes by Class of Property as Defined by the State Tax Commission.

Classes	Millions of Dollars	Percentage
Agricultural (Real)	70.496	4.24
Commercial (Real)	198.540	11.95
Industrial (Real)	195.022	11.74
Residential (Real)	808.100	48.66
Timber cut-over (Real)	4.045	.24
Commercial (Personal)	86.544	5.21
Industrial (Personal)	224.044	13.49
Residential (Personal)	.976	.06
Utility (Personal)	73.110	4.40
Total	1,660.877	99.99

(Totals may not equal source totals due to roundings.)

Source: Derived from unpublished data supplied by the Michigan State Tax Commission.

owner-occupied homes. To correct for this over-estimation, the amount of taxes collected from rented single family residences are subtracted from the estimated amount attributed to residential (real).

The general procedure used (to estimate the taxes collected from rented single family residences) is as follows. The ratio (of the number of rented single unit living quarters to the total number of single unit living quarters) is multiplied by the estimated amount of taxes levied on residential (real) within each "county group." The sum of the "county groups" results in the estimated taxes levied on rented single unit living quarters. Subtracting the amount levied on rented residences from the total residential class results in the estimate of taxes levied on owner-occupied homes. The procedure implicitly assumes that the average tax levied on a rented residential unit equals the average tax levied on all residential units within a "county group."

The data for this procedure were obtabined from a special tabulation from data tapes provided by the Bureau of the Census and referred to as Public Use Samples of Basic Data for the 1970 Census--County Groups. The definition of single unit living quarters includes both detached and attached single unit homes. This definition includes houses with open space on all sides, duplexes and row houses.

County groups were created by the Census for the general purpose of providing data on smaller areas than provided by general "public use samples." County groups combine data of counties with similar economic and social characteristics. In some cases, counties in more than one state may be combined in one county group. In a few instances, Michigan counties are included in county groups which also include counties in Ohio and Indiana. This does not present any problems, since the non-Michigan counties can be ignored without any adverse effects.

Based on the above procedure, the amount of property taxes collected from rented residences classified as residential (real) is estimated to be $69.1 million. Therefore, when this amount is subtracted from total residential (real), it is estimated that real property taxes paid by owner-occupied homes is $739.0 million. Including real and personal property, the total amount of property taxes collected from owner-occupied residences is estimated to be $740.0 million.

Rented Residences

The amount of property tax collected from rented residential property is estimated by summing the taxes estimated to have been collected from: (1) rented single family dwellings, and (2) apartments. The first item is estimated in the section on owner-occupied homes, while the second item is estimated from a survey conducted by the

author. The survey was necessitated as a result of the definition of commercial property. Total commercial property is defined as real and personal property used for commercial purposes such as wholesale, retail, services, lodges, etc., as well as apartment buildings. Therefore, the survey is used to estimate the proportion of commercial property taxes which is collected from apartment buildings.

The survey requested information from 108 local assessors.[2] In each request the local assessor was asked for the total commercial value as well as the amount attributed to apartments in the assessing unit. The survey requested data for either 1972 or 1973. Current data was requested based on the author's opinion that the rate of response would be higher and more accurate. This opinion was based on two observations. First, assessors change periodically and thus to ask an assessor for 1970 records was considered an unrealistic request. (In most cases apartments are not listed separately and thus the request required a special tabulation.) Second, many cities have instituted computer operations in only the last few years. Therefore, the chance that a taxing jurisdiction presently maintains a computer operation is increased and thus the accuracy is improved. It is assumed that the relationship

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[2]Local units were divided into three groups: large cities defined as greater than $100 million in SEV, other cities, and townships. A stratified random sample was employed stressing city units since commercial property is concentrated in cities.

between the value attributed to apartments and the value of total commercial property has not changed in the ensuing two year period.

Of the 108 requests made, 43 responses were received. From the 43 responses, it is estimated that 20.08 percent of the taxes levied on "commercial" property are levied on apartment buildings. Therefore, it is estimated that $57.2 million in "commercial" property should be classified as rented residential. The total amount of taxes levied on rented residences is estimated to be $126.3 million.[3]

As explained above, the State Tax Commission defines certain classes of property. Based on these definitions, adjustments were made so that the classes of property coincided with the classes of property analyzed in this study. The survey taken by the author to estimate the relationship between apartment value and commercial value indicated that not all of the units abide by the Commission definitions. For example, a few units indicated that they include apartments under residential instead of commercial property. To the extent that this practice is performed, several of the estimates in the study could be biased. For example, when apartments are included in residential instead of commercial, this classification will tend to

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[3]The amount equals $69.1 million in taxes levied on rented single family residences plus $57.2 million in taxes leveied on apartment buildings.

over-state residential property taxes and understate commercial property taxes. The unorthodox responses were limited, however, to small townships. Therefore, it is assumed that the bias is insignificant and thus no further adjustments are made.

Utility Property

The amount of property taxes levied on utilities is estimated by summing: (1) the amount of taxes collected from the real and personal property of railroads, telegraph and telephone companies, (2) taxes levied on utility personal property not included in part (1), and (3) taxes levied on utility real property not included in part (1).

The first part amounted to $46.4 million. This amount is known with certainty since the tax assessment is done by the State Tax Commission. The second part is estimated to be $73.1 million, as shown previously in Table 6. The third part is estimated to be $15.9 million, from a survey of utility companies conducted by the author. Therefore, the amount of real and personal property taxes collected from utility companies is estimated to be $135.4 million.

The survey was necessitated as a consequence of the definition of industrial real property which includes utility real property. The survey requested that each utility indicate both the amount of real property taxes and the amount of personal property taxes paid. From the survey a relationship between utility personal property tax

and utility real property tax is estimated. This relationship is used in conjunction with the estimate of utility personal property taxes to estimate the amount of real property taxes paid by utilities.

The survey requested information from 18 gas and electric companies, of which 14 companies responded. Of the total property taxes collected from utilities, the survey data indicate that personal property represents 82.09 percent and real property represents 17.91 percent. Therefore, real property is estimated to equal 21.82 percent of personal property. Since utility personal property taxes are estimated to equal $73.1 million, then utility real property taxes are estimated to equal 21.82 percent times $73.1 million or $15.9 million.

Industrial Property

Industrial property for the purposes of this study is divided into two parts: automobile manufacturing and non-automobile manufacturing. There are two reasons for this division. First, the prominent position of the auto industry within Michigan's economy supports separate consideration. Second, the concentration of the auto industry nation-wide together with its relative concentration within Michigan leads to different shifting alternatives.

The automobile manufacturing category consists of the four major auto companies. It is estimated that the amount of real and personal property taxes paid by the

four major auto companies in Michigan was $170.6 million. This estimate was derived from data supplied by the auto companies. Specifically, each of the four auto companies were asked for their respective property tax payments. Three of the four companies responded. The companies which responded requested that the amount not be individually divulged. The amount paid by the non-responding company was estimated from the data provided by the three which did respond.

The definition of industrial property used by the State Tax Commission includes taxes levied on automobile manufacturing as well as taxes levied on utility (real) property. Therefore, in estimating the amount of taxes collected from non-automobile manufacturing property, both of these amounts are subtracted from the estimate of taxes collected from all industrial property as shown in Table 6. Automobile manufacturing is estimated above to be $170.6 million. The amount of utility (real) property taxes included in the industrial classification is estimated above to be $15.9 million. Therefore, the amount of real and personal property taxes levied on non-automobile manufacturing property is estimated to be $232.6 million.

Commercial Property

Commercial property as defined by the State Tax Commission includes apartment buildings. Therefore, the estimated amount of property taxes attributed to apartment

buildings should be subtracted from the total amount of taxes attributed to commercial property (real and personal) as indicated in Table 6. As previously estimated, apartment buildings account for $57.2 million. Since Table 6 estimates total commercial taxes to be $285.1 million, the amount of tax collected from commercial property, excluding apartments, is estimated to be $227.9 million.

Agricultural Property

For purposes of this study, agricultural property is defined as the sum of agricultural and timber cut-over property as shown in Table 6. The amount of taxes collected from agricultural property is therefore estimated to equal $74.5 million.

Table 7 presents a summary of the distribution of property taxes by the seven classes of property examined in this study. The table indicates a large diversity in the size of the seven sub-classes ranging from 43.34 percent for owner occupied residences to only 4.36 percent for agricultural property. The actual dollar figures presented in the table provide the basis for allocating the property tax among the income brackets.

Allocating the Property Tax Among the Income Brackets

The estimated amount of property tax collected from each sub-class of property as shown in Table 7 is now

Table 7.--Distribution of Property Taxes[a] By Sub-Class as Defined in This Study.

	Millions of Dollars	Percentage
Residential		
Owner-occupied	$ 740.0	43.34
Rented	126.3	7.40
Industrial		
Automobile manufacturing	170.6	9.99
Non-automobile manufacturing	232.6	13.62
Commercial	227.9	13.35
Utility (includes state administered)	135.4	7.93
Agricultural	74.5	4.36
	$1,707.3	99.99

[a]Real and personal.

Source: See text.

allocated among the income brackets. In order to distribute only that portion of each sub-class which is borne by Michigan residents, the amount of each sub-class which is exported is subtracted from the respective total collections. As a result of varing procedures, each sub-class is discussed separately.

Owner-Occupied Homes

The amount of tax collected from owner-occupied homes is distributed on the basis of the percentage

distribution of house value by income class adjusted for the senior citizens' exemption allowance.[4]

In 1970, Michigan granted senior citizens an exemption from property taxes for the first $2,500 in state euqalized valuation provided the family's income was less than $6,000. Data detailing the relationship between income and home value for both senior citizen homeowners and all homeowners (including senior citizens) were obtained from data tapes provided by the Bureau of the Census.[5]

The percentage distribution of house value adjusted for the senior citizens' exemption is calculated by subtracting from the total house value within an income class the amount of property exempt from taxation resulting from the exemption. The remaining taxable property in each class is summed and a percentage distribution calculated. Since the senior citizen adjustment applies only to the income brackets below $6,000, the adjustment procedure is applied to the six lowest income brackets.

Specific calculations are presented in Table 8. Since the Census data represent an approximate 1 percent state sample, the actual dollar figures represent only 1 percent of the state's totals. The percentage

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[4]In 1970 the state granted homestead tax exemptions for senior citizens, blind persons, and certain veterans. Since data are not available for blind persons and veterans by income class, they are ignored.

[5]U.S. Bureau of the Census, Census of Population: 1970, "Public Use Sample Tapes."

Table 8.--Percentage Distribution of Owner-Occupied House Values Adjusted for Senior Citizen Property Tax Exemption (Dollar Amounts in Thousands).

(1) Income Bracket Money Income	(2) Estimate of Total Property Value	(3) Estimate of Exempt Property Resulting from the Senior Citizen's Exemption	(4) Estimate of Taxable Property	(5) Percentage
Under $1	$ 5,869	$1,162	$ 4,707	1.46
1-2	8,843	2,145	6,698	2.08
2-3	7,431	1,895	5,736	1.78
3-4	8,076	2,034	6,042	1.88
4-5	7,696	1,317	6,379	1.98
5-6	7,799	1,004	6,795	2.11
6-7	9,518	0	9,518	2.96
7-8	11,082	0	11,082	3.44
8-9	15,309	0	15,309	4.76
9-10	16,657	0	16,657	5.18
10-12	40,522	0	40,522	12.60
12-15	57,466	0	57,466	17.86
15-25	96,437	0	96,437	29.98
Over 25	38,366	0	38,366	11.93
Totals	$331,272	$9,557	$321,714	100.00

Column (2) Number of owner occupied houses times the average value of the house.
Column (3) Number of owner occupied houses with a senior citizen head valued at less than $5,000 times $3,000 plus the remaining number of owner occupied houses times $5,000. Houses valued at less than $5,000 could not benefit from the full amount of the exemption.
Column (4) Column (2) minus Column (3).
Column (5) Percentage distribution of Column (4).

Source: Data derived from U.S. Bureau of the Census, Census of Population: 1970, "Public Use Sample Tapes."

distribution as shown in Column (5) is used to distribute the property taxes collected from owner-occupied homes among the income brackets.

Exported taxes consist entirely of the amount resulting from the federal tax off-set, as the non-resident payment of residential property taxes is assumed insignificant. It is estimated that $136.1 million of the property tax is shifted to the federal government because of the off-set. The calculations are presented in Table 9.

Tables 8 and 9 are presented to illustrate this particular procedure, as well as to emphasize the numerous preliminary calculations are performed concurrently with final incidence estimates.

Residential Rented

The portion of the tax shifted to the tenant is distributed on the basis of rental payments. The exact procedure weights the average rental payment for each income class by the number of renters in the respective class. The amount is summed and a percentage distribution determined. The data relating income and average rental payment which were obtained from a special tabulation of "Public Use Sample Tapes" are presented in Table 10.

The portion of the tax assumed borne by the owner is divided into two parts: incorporated and unincorporated business. Since data are not available which indicate the relationship in ownership between the two types of

Table 9.--Distribution of Property Tax Payments Paid by Owner-Occupied Homes After Adjusting for the Federal Tax Off-Set (Dollar Amounts in Thousands).

Income Bracket Money Income	Property Tax Distribution Before Federal Adjustment	Federal Tax Off-Set (Percentage)	Federal Tax Off-Set Amount	Property Tax Payments After Federal Adjustment
Under $1	$ 10,804	0	$ 0	$ 10,804
1-2	15,392	0	0	15,392
2-3	13,172	.4	53	13,119
3-4	13,912	1.69	235	13,677
4-5	14,652	4.61	675	13,977
5-6	15,614	7,03	1,098	14,516
6-7	21,904	7.80	1,709	20,195
7-8	25,456	9.67	2,462	22,994
8-9	35,224	11.41	4,019	31,205
9-10	38,332	12.20	4,677	33,655
10-12	93,240	13.66	12,737	80,503
12-15	132,164	17.99	23,776	108,388
15-25	221,852	22.46	49,828	172,024
Over 25	88,282	39.50	34,871	53,411
Totals	$740,000		$136,140	$603,860

Sources: Derived from Table 8 and Appendix A.

Table 10.--Rental Payment by Income Bracket, Michigan, 1970.

Income Bracket (Thousands of Dollars)	Rental Payments (Dollars)							
	Under $30	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Under $1	12	21	28	19	53	52	48	20
1-2	16	32	69	68	86	84	56	30
2-3	9	14	24	30	77	56	59	30
3-4	3	10	21	23	41	57	60	32
4-5	2	4	19	24	42	56	50	42
5-6	5	5	21	25	48	45	70	45
6-7	2	3	13	23	45	70	54	43
7-8	3	4	17	32	41	58	62	41
8-9	3	4	12	24	54	54	52	41
9-10	1	5	9	20	26	37	25	39
10-12	2	5	13	26	48	63	73	49
12-15	0	4	8	20	49	34	53	41
15-25	2	0	4	16	23	35	40	30
Over 25	0	1	2	1	3	4	2	4
Totals	60	112	260	351	636	705	704	487

Table 10.--Continued.

Income Brackets (Thousands of Dollars)	Rental Payments (Dollars)							
	100-119	120-149	150-199	200-249	250-299	Over 300	Total Units in Sample	Average[a]
Under 1	29	34	29	7	3	2	357	88
1-2	37	35	34	7	5	3	562	80
2-3	44	41	23	8	3	3	421	89
3-4	60	38	31	5	2	1	384	92
4-5	44	50	35	6	1	0	375	95
5-6	58	54	29	11	1	0	417	95
6-7	56	74	42	5	2	0	433	99
7-8	60	68	57	8	0	1	452	100
8-9	66	77	67	13	1	3	471	105
9-10	68	65	69	12	1	0	377	111
10-12	99	118	113	18	4	7	638	113
12-15	81	108	139	28	1	2	568	120
15-25	53	97	148	49	25	9	531	142
Over 25	5	9	21	12	13	17	94	219
Totals	760	868	838	189	62	48	6,080	

[a]The average values were calculated based on the following assumptions: (1) the mid-point of the rental bracket represented the bracket, (2) the bracket below $30 was assumed $20, and (3) the bracket above $300 was assumed $400.

Source: U.S. Bureau of the Census, Census of Population-1970, "Public Use Sample Tapes" (1 percent state sample).

businesses, it is assumed that 60 percent is owned by incorporated businesses and 40 percent is owned by unincorporated businesses.[6] The amount borne by incorporated businesses is distributed on the basis of adjusted IRS data of dividend income. The distribution of dividends is used to distribute the tax based on the rationale that unshifted taxes will lower net profits and ceteris paribus will lower dividend payments. The amount borne by unincorporated businesses is distributed on the basis of adjusted IRS data of rental income. Since unincorporated businesses are merely individuals engaged in the business of renting property, then unshifted property taxes will lower the rental income of the individuals, and thus the use of rental income as the distributive series.

The amount of exported taxes is estimated by applying the individual federal tax off-set to the tax borne by unincorporated businesses and by applying the federal corporate tax off-set to the tax borne by incorporated businesses.[7] The portion of the tax borne by the

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[6]This is a bold assumption. In calculating the total amount of property taxes levied on rented dwellings used for living quarters, it was estimated that 55 percent was levied on single family units and 45 percent was levied on apartment structures. Assuming that apartment buildings are almost entirely owned by incorporated businesses and assuming a significant portion (i.e., 25 percent) of rented single family homes are owned by incorporated businesses, then the percentage breakdown follows.

[7]It is assumed that the owners of both the incorporated and the unincorporated businesses are Michigan residents. Thus it is assumed that taxes are not exported through the income components.

tenant is not adjusted for exporting for two reasons. First, the federal income tax does not allow renters to deduct property taxes paid indirectly through rent. Second, it is assumed that the amount of property taxes paid by non-residents (i.e., renting a second home) is insignificant.

Non-Automobile Manufacturing

The portion of the tax shifted to the consumer is distributed on the basis of total consumption,[8] while the portion of the tax borne by the owner is distributed on the basis of dividend income. It is assumed that all industrial property is owned by corporations. Therefore, the portion of the property tax which is borne by the owners, is borne entirely by dividend receivers.

Non-automobile manufacturing property taxes can be exported in three different ways: through product sales, non-resident dividend receivers, and the corporate federal tax off-set. If the price of the product includes Michigan taxes, and if the product is sold to a non-Michigan resident, then the Michigan taxes which are included in the price of the product are considered exported. This study assumes that only 7.63 percent of the taxes assumed to be shifted to consumers are borne by Michigan consumers. That is, if all of the property tax collected from

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[8]See Appendix H "Estimating the Distribution of Total Consumption."

non-automobile manufacturing property is assumed to be shifted to the consumer through higher product prices, then only 7.63 percent of the total amount of such taxes is assumed to fall on Michigan residents.

This percentage was obtained by dividing total Michigan receipts (including sales and rentals) by total national receipts of the 64 largest industrial non-auto corporations operating in Michigan.[9] Clearly, the estimate does not include either utility or automobile companies, since both of these operations are examined separately. The estimation procedure assumes a national pricing policy on the part of such firms. That is, the procedure assumes that industrial products must compete in a national market and thus pricing of the product is determined on a national basis. For example, if Michigan increases its property tax rate and if the tax is passed on to the consumer through higher product prices, then this study assumes all of the products made by the firm are increased in price and not just those produced in Michigan. Therefore, Michigan residents pay only that portion of the tax in relation to the total purchases of the product made within the state. If a national pricing policy is not assumed, then Bethleham Steel (for example) would have one price for Michigan produced steel and another price for Pennsylvania produced steel. Since such a pricing policy is not

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[9]Data were obtained from individual examination, by the author, of Michigan's Franchise Fee Returns.

observed, a national pricing policy assumption is valid for such industrial operations.

Taxes which are assumed borned by the owners (stockholders) are considered to be exported if the stockholder is a non-Michigan resident. For example, if higher Michigan property taxes result in lower profits and thus lower dividends, then all stockholders receive lower dividends, not just Michigan stockholders. Therefore, Michigan stockholders as a group receive lower dividends in proportion to their ownership of the corporation. It is estimated that Michigan residents own only 3.835 percent of the stock of non-automobile manufacturing firms.

This estimate is obtained by dividing total dividends received by Michigan residents by total national dividends. This procedure assumes that non-automobile manufacturing firms are nationally owned. That is, Atlantic Richfield, Dow Chemical, Jones and Laughlin Steel, etc., are so large and ownership so widespread throughout the nation that Michigan ownership can be represented by the proportion of total U.S. dividends from all sources received by Michigan residents.

In addition to the two methods of exporting mentioned above, taxes may also be exported by the federal corporate tax off-set. The corporate tax off-set is applied to those taxes borne by Michigan stockholders.

Automobile Manufacturing

The portion of the tax shifted to consumers is distributed on the basis of new automobile consumption.[10] The portion shifted to the stockholder is distributed on the basis of dividend income.

Automobile manufacturing property taxes can be exported in the same manner as non-automobile manufacturing property taxes are exported, i.e., through sales, dividends and the federal corporate tax off-set. In this case, it is assumed that 7.23 percent of the taxes shifted to the consumer through sales are paid by Michigan residents. This percentage equals the ratio of Michigan receipts to total receipts for the four major automobile companies.[11]

The higher concentration of automobile production in Michigan tends to imply a higher concentration of ownership than the state to national dividend ratio would indicate. For example, it is probable that small investors tend to purchase stock issued by corporations which are associated with their employment. In addition, several prominent American families, which are known for their substantial holdings of automobile stock, are residents of

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[10]Special tabulation supplied by Survey Research Center, University of Michigan, from Gary Hendricks, Kenwood Youmans, and Janet Keller, Consumer Durables and Installment Debt (University of Michigan, 1973). The data consisted of a four year average (1966-1969) of the purchase price of automobiles by income class for the nation.

[11]Data were obtained from individual examination, by the author, of Michigan's Franchise Fee returns.

Michigan. Although a priori reasoning supports a higher concentration of ownership, data are unavailable which would indicate the exact percentage. Therefore, it is assumed that Michigan stockholders own 4.335 percent of such companies. This is an arbitrary increase of 1/2 of 1 percent above the state to national dividend ratio used for non-automobile manufacturing, which is the same percentage increase assumed by Musgrave and Daicoff in the 1956 Michigan Study.

Commercial

The portion of commercial property taxes assumed shifted to the consumer is distributed on the basis of total consumption. It is assumed that 3 percent of the amount shifted to consumers is paid by non-residents (i.e., tourists).[12]

The portion of the tax assumed borne by the owner (unshifted) is divided into two parts: unincorporated business and incorporated business. It is estimated that incorporated business accounts for 74.6 percent, and unincorporated business accounts for 25.4 percent of the

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[12]This is the same percentage calculated for the sales tax. Specifically, the Michigan Tourist Council estimated that non-resident tourists spent $682.5 million during fiscal 1970. The Tourist Council also estimated that 17.6 percent of the tourist dollar was spent on lodging. It is assumed that all tourist consumption except lodging was spent on taxable sales items. Therefore, 82.4 percent times the amount spent by tourists times 4 percent (sales tax rate) divided by total sales tax collections equals 3.0 percent.

taxes levied on commercial property. The estimates equal the percentage breakdown of total receipts of the two forms of commercial business activity.[13]

The amount borne by unincorporated owners is distributed on the basis of nonfarm self-employment income. This amount is subject to the individual federal tax off-set. It is assumed that all unincorporated businesses are locally owned. Therefore, none of the taxes are exported as a result of non-resident ownership.

The portion borne by incorporated owners is distributed on the basis of dividend income. The amount is subject to both the federal corporate tax off-set and exporting through non-resident ownership. It is estimated that 43.3 percent of the tax borne by incorporated owners is exported to non-residents as a result of non-resident ownership. This estimate is based on several assumptions. First, it is assumed that business receipts can be used as a proxy to indicate the distribution of property taxes among different categories of commercial businesses. Second, it is assumed that one-half of the receipts from incorporated wholesale and retail trade results from nationally owned corporations. Third, it is assumed that all other incorporated commercial business receipts

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[13]Internal Revenue Service, Statistics of Income--1970, Business Income Tax Returns (Washington, D.C.: U.S. Government Printing Office, 1973), p. 1, Table 1A. Commercial businesses include: wholesale and retail trade, services, finance, insurance, and real estate.

(i.e., services) result from businesses that are entirely Michigan owned. The assumptions imply that 55 percent of incorporated commercial property is locally owned and 45 percent is nationally owned. From previous discussions, this study assumes that of businesses which are nationally owned, Michigan residents hold 3.8 percent of the stock. Therefore, non-resident ownership is estimated to equal 96.2 percent (non-resident ownership) times 45 percent, which equals 43.3 percent.

Utility

The tax is distributed on the basis of utility expenditures. The data were obtained from a special tabulation supplied by Survey Research Center, University of Michigan.[14]

It is assumed that the tax is entirely borne by Michigan residents. There are two reasons for this assumption. First, since all of the tax is assumed shifted to the consumer, the possibility of exporting by the corporate federal tax off-set is eliminated. Second, it is assumed that non-resident purchases of Michigan based utilities is insignificant.

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[14]Special tabulation supplied by Survey Research Center, University of Michigan, from Institute of Social Research, "A Panel Study of Income Dynamics" (University of Michigan, 1972). The data consisted of a four-year average (1968-1971) for the North Central region of the U.S.

Agriculture

The portion of the tax borne by the owner is distributed on the basis of farm income while the tax borne by the consumer is distributed on the basis of food expenditures. Farm income data were obtained from a special tabulation of Census data as explained in Appendix D. Food expenditure data were obtained from a special tabulation supplied by the Survey Research Center, University of Michigan.[15]

Agricultural taxes may be exported by either the individual tax off-set or by product sales. The individual federal tax off-set is applied to the taxes borne by the owner. Of the taxes shifted to the consumer, it is estimated that Michigan residents bear 86.5 percent of the tax while the remaining 13.5 percent is exported to non-residents. This estimate is based on the assumption that Michigan exports that portion of a particular crop in which the Michigan to National production ratio exceeds the Michigan to National population ratio. The exported production is then compared with the crop's cash receipts received by Michigan farmers. Therefore, 13.5 percent represents an estimate of the dollar proportion of

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[15] Ibid.

Michigan's total agricultural production which is sold to non-residents.[16]

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16 Agricultural data were obtained from the U.S. Department of Agriculture, Agricultural Statistics--1972 (Washington, D.C.: Government Printing Office, 1972), and Michigan Department of Agriculture, Michigan Agricultural Statistics (Lansing, Michigan, July, 1972).

CHAPTER V

STATE AND LOCAL PERSONAL INCOME TAXES

State Personal Income Tax

During fiscal year 1970 Michigan levied a 2.6 percent state individual income tax with a $1,200 personal exemption (double for senior citizens and the blind. In addition to the personal exemption, the state income tax granted credits for property taxes and city income taxes.[1]

The distribution of the state's individual income tax by income class is calculated in a three-step approach. First, the total tax collections, including credits, are distributed on the basis of estimated taxable income.[2] The second step estimates the distribution of both the property tax and city income tax credits by income class. The third step subtracts the estimated credits from the

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[1]Credits were also granted for gifts to colleges and universities. However, this credit is ignored for lack of data. The total amount of this credit is estimated to be less than $1 million.

[2]The calculations of taxable income, property tax and city income tax credits are fairly complicated procedures and are therefore discussed individually.

tax distributed in step one. These calculations estimate the distribution of state individual income tax net of credits among the income brackets.

Estimating the Distribution of Taxable Income

The following six-step process explains the procedure used to estimate the percentage distribution of taxable income. First, for each income bracket an estimate of the average adjusted gross income is calculated. This is necessary since income taxes are based on adjusted gross income and not on money income upon which tax burdens are estimated. A proxy for average adjusted gross income is derived from Table 3 (Chapter II), which indicates the sources of income by income class. It is assumed that wages and salaries, farm, nonfarm, and other income approximates adjusted gross income. The proxy will slightly over-state adjusted gross income since such items as veteran's benefits, workmen's compensation and certain pensions should not be included. Estimates of average adjusted gross income based on money income are presented in Table 11.

The second step estimates total adjusted gross income for each income class by family size. This is done by multiplying average adjusted gross income by the number of families for each family size. The distribution of family size and income is presented in Table 12. This

Table 11.--Average Adjusted Gross Income Based on Money Income.

Income Brackets (Thousands of Dollars)	Estimated Average Adjusted Gross Income (Dollars)
Under $1	$ 143
1-2	567
2-3	1,317
3-4	2,319
4-5	3,479
5-6	4,667
6-7	5,918
7-8	7,052
8-9	8,139
9-10	9,161
10-12	10,659
12-15	13,092
15-25	18,169
Over 25	38,755

Source: Derived from Table 3, Chapter II, p. 24.

step results in a 14 by 10 matrix, with each cell estimating the total adjusted gross income for a given income bracket and a family size.

Step three estimates the amount of income which is exempt as a result of the personal exemption for each family size within each income bracket. In the case of the state's personal income tax, the exemption is $1,200. Therefore exempt income for a family of one equals $1,200 times the total number of single member families; total exempt income for families of two equals $2,400 times the number of two member families, etc. This step also results in a 14 by 10 matrix.

Table 12.--Distribution of Families by Size and Income.

Income Bracket (Thousands of Dollars)	Family Size										
	1	2	3	4	5	6	7	8	9	10	Totals
Under 1	142,089	18,253	7,562	5,946	3,286	2,137	1,397	495	177	236	181,578
1-2	155,341	31,890	7,733	5,357	3,371	1,881	1,245	404	205	227	207,654
2-3	84,698	47,419	10,954	6,384	3,269	1,819	1,134	419	204	228	156,528
3-4	58,974	46,909	11,841	7,108	4,789	2,908	1,812	588	298	353	135,580
4-5	43,192	47,010	13,303	7,670	4,476	3,283	2,412	992	405	375	123,118
5-6	38,760	43,381	17,526	11,441	7,061	4,387	2,795	1,009	557	566	127,483
6-7	35,517	43,559	20,998	15,042	9,783	5,471	3,724	1,412	653	786	136,945
7-8	35,606	45,677	26,933	22,807	14,067	8,326	4,700	1,528	883	878	161,405
8-9[a]	28,969	48,874	30,353	29,633	18,521	11,936	6,020	2,107	901	850	178,164
9-10[a]	20,151	45,926	33,101	31,345	20,902	12,199	5,610	1,964	840	793	172,831
10-12[a]	26,296	82,598	59,134	69,142	45,891	25,905	13,789	4,581	2,113	1,976	331,425
12-15[a]	18,228	92,567	76,789	79,186	54,422	33,352	16,492	5,479	2,527	2,364	381,406
15-25	12,629	108,061	94,970	101,944	74,860	45,517	25,195	8,941	4,183	4,207	480,507
Over 25	3,938	26,677	21,489	25,068	19,495	11,731	6,562	2,214	1,112	1,329	119,615

Sources: [a]U.S. Bureau of the Census, Census of Population: 1970, "Public Use Sample Tapes."
U.S. Bureau of the Census, Census of Population: 1970, Detail Characteristic Final Report, PC(1)-D24 Michigan (Washington, D.C.: U.S. Government Printing Office, 1972).

The fourth step subtracts total exempt income from total adjusted gross income for each family size within each income bracket and then sums across the income bracket. That is, the matrix calculated in step 3 is subtracted from the matrix calculated in step 2 and then summed across the income brackets. If total exempt income exceeds total taxable income for a particular cell, then the amount of taxable income is zero. This procedure prevents larger families with unused personal exemptions from off-setting the taxable income of smaller families.[3]

The fifth step adjusts for the additional personal exemptions granted senior citizens and blind persons. Total additional exemptions are estimated to be 303,000. This is the number of additional exemptions claimed by senior citizens and blind for federal income tax purposes. The distribution of senior citizens by income class was obtained from a special tabulation of Census data.[4] The

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[3]A mathematical presentation of the first four steps would state:

taxable income of the i^{th} income bracket =

$$\sum_{j=1}^{10} n_{ij}[A_i - (Pxj)]$$

where: $j = 1 \ldots 10$, equals the family size
n_{ij} = the number of families in the i^{th} income bracket with a j^{th} family size
A_i = estimated average adjusted gross income of the i^{th} income bracket
Pxj = personal exemption times the family size

[4]U.S. Bureau of the Census, Census of Population: 1970, "Public Use Sample Tapes."

number of additional exemptions for each income class is multiplied by the amount of additional income which is exempt as a result of the additional exemption. For example, the estimated adjusted gross income for the income class $2,000-2,999 is $1,317. The initial $1,200 exemption leaves only $117 remaining in taxable income. Therefore an additional $1,200 exemption can only reduce taxable income by $117. Thus the estimated reduction in taxable income resulting from the double exemptions for the income bracket $2,000-2,999 equals $117 times the number of senior citizens attributed to the bracket. This amount is subtracted from the taxable income calculated in steps one through four.

The final step calculates the percentage distribution of taxable income. The results of these calculations are presented in Table 13.

Estimating the Distribution of the Property Tax Credit

Michigan's income tax provided for credits for property taxes paid. The amount of credit was a function of the amount of property taxes paid as follows:[5]

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[5]Effective for one year beginning January 1, 1970 the credit was changed to 12 percent of the property taxes paid up to a maximum of $15. Since the credits are claimed on the income tax returns filed in April of 1970, the 1969 formula is more applicable for estimates pertaining to fiscal 1970 which is the time period for this study.

Table 13.--Percentage Distribution of Taxable Income Based on a $1,200 Personal Exemption Adjusted for Senior Citizens and the Blind.

Income Bracket (Thousands of Dollars)	Percentage (Distribution)
Under $1	0
1-2	0
2-3	.03
3-4	.15
4-5	.62
5-6	1.21
6-7	1.95
7-8	3.00
8-9	3.35
9-10	4.63
10-12	11.15
12-15	18.18
15-25	34.26
Over 25	21.48
	100.01

Source: Derived from Tables 11 and 12.

Total Property Taxes Paid	Credit
$100 or less	20 percent of the amount
$100.01-$150.00	$20 plus 10 percent of the excess above $100
$150.01-$200.00	$25 plus 5 percent of the excess above $150
$200.01-$10,000.00	$27.50 plus 5 percent of the excess
Above $10,000.00	4 percent of property taxes

For renters, the law assumed that 17 percent of gross rent equaled the amount of property taxes paid.

The estimation of the credit takes into consideration two separate problems. First, the credit was not a negative credit. That is, to receive a credit a family had to have income tax liability. The second problem

concerned the fact that separate calculations are necessary for homeowners and renters.

The credit for homeowners is calculated by comparing the average tax liability per family per income class with the estimated allowed credit for eleven different brackets (values) of property. For example, if the income tax was zero, then no credit is awarded. If the income tax is positive but less than the estimated credit, then only the positive income tax is included. If the income tax liability exceeds the credit, then all of the credit is included. The procedure estimates the allowable credit per income class per house value per unit. That is, given an income class and house value, the estimated positive credit is calculated per unit. The average credit per unit is weighted and then summed across the income class. This results in the estimated credit claimed by each income class.

The procedure is based on two assumptions, both of which are necessitated by data limitations: (1) the average income tax liability for an income class is independent of the value of the home, and (2) the average property tax for a given property bracket equals the mid-point of the property class times the state's average millage rate. Data detailing the distribution of house values by income

brackets was obtained from a special tabulation of Census data.[6]

The following specific example illustrates the procedure. Referring to Table 14, the homes listed between $5,000-7,499 are assumed to average $6,250, or the mid-point of the bracket. The assessed value is 50 percent of the market value or $3,125. Estimated property taxes equal $148, or the state average millage rate of 47.32 mills times the assessed value. Therefore, based on the credit formula, the estimated credit for all homes valued between $5,000-7,499 is $25 (rounded to dollars).

The table indicates that the estimated credit for homes of less than $5,000 was only $14. Therefore, only a $14 credit is awarded. For other property brackets the credit equaled or exceeded the income tax liability. Since only the income tax liability can be claimed, then $25 is the estimated credit for the other property values. The credit per unit is then weighted by the number of units in each respective cell and summed.

The average credit for each property bracket is lower for senior citizens because the homestead exemption lowered their total property taxes. Adjustments were made for income brackets below $6,000 as a result of the homestead exemptions. The estimated distribution of homeowners' property tax credits is presented in Table 16.

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[6]U.S. Bureau of the Census, "Public Use Sample Tapes" (see Appendix C).

Table 14.--Estimated Home-Owners Property Tax Credit.

Property Value Brackets	Assumed Mean	Assessed Value	Estimated Property Tax 47.32 mills	Estimated Credit From Formula	Estimated Credit Per Unit $4,000-4,999[a]
Less than $5,000	$ 3,000	$1,500	$ 71	$14	$14
$5,000 - $7,499	6,250	3,125	148	25	25
$7,500 - $9,999	8,750	4,375	207	28	25
$10,000 - $12,499	11,250	5,625	266	31	25
$12,500 - $14,999	13,750	6,875	325	34	25
$15,000 - $17,499	16,250	8,125	384	37	25

[a]The estimated average tax liability for the income bracket $4,000-4,999 is $25. The $25 figure is calculated by multiping the total taxable income of the class by 2.6 percent and then dividing by the total number of families.

Source: Derived from data provided in Appendix Table C-2.

The general procedure used to estimate renters' property tax credits is similar to the procedure used for home-owners' credits. Table 10, which presents the relationship between rental payments and income, consists of a 14 by 14 matrix. Each cell represents a 1 percent state sample of the number of families with a given income and given rental payment. For each unit within a cell the average property tax credit is estimated. For example, referring to Table 15, the annual rent for the monthly rental bracket $30-$39 is $240 or $35 times 12. Estimated property tax equals $71.40 or 17 percent[7] of the rent. Average credit computed from the credit formula equals $14. The credit per unit is weighted by the number of units in each cell and summed across the respective income brackets. The estimated distribution of renters' property tax credits is presented in Table 16.

Estimating the Distribution of City Income Tax Credits

Similar to property tax credits, city income tax credits are a function of the amount of taxes paid. Specifically, the city income tax credit is based on the following formula:

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[7]Based on data provided in Table 10, total rental payments are estimated to equal $768.0 million. If it is assumed that all property taxes levied on rental property (Table 14) are shifted, then this study estimates the percentage of property taxes to rent to be 16.41 percent. Therefore, the 17 percent assumption is highly accurate.

Table 15.--Estimating Renters' Property Tax Credit.

	Monthly Rent			
	Under $30	$30-39	$40-49	$50-59
Estimated Annual Rent	$240	$420	$540	$660
17 percent of Rent	41	71	92	112
Estimated credit from formula	8	14	18	21

Source: Derived from data provided in Table 10.

Table 16.--Estimated Distribution of Income Tax Credits (All Figures in Thousands of Dollars).

Income Brackets	Homeowners Property Tax Credit	Renters Property Tax Credit	City Income Tax Credit	Total Credits
Under $1	$ 0	$ 0	$ 0	$ 0
1-2	0	0	0	0
2-3	56	42	28	126
3-4	327	230	112	669
4-5	1,175	898	224	2,297
5-6	1,638	1,113	343	3,094
6-7	2,052	1,184	515	3,751
7-8	2,463	1,239	759	4,461
8-9	3,414	1,324	1,003	5,741
9-10	3,635	1,081	1,107	5,823
10-12	8,579	1,856	2,384	12,819
12-15	11,530	1,693	3,241	16,464
15-25	17,999	1,703	5,027	24,729
Over 25	6,296	362	1,757	8,415
Total	$59,164	$12,725	$16,500	$88,389

Source: See text.

City Income Taxes Paid	Credit
$100 or less	20 percent of the city income taxes
$100.01 - 150.00	$20 plus 15 percent of the excess above $100
$150.01 - 200.00	$27.50 plus 10 percent of the excess above $150
Above $200.00	$32.50 plus 5 percent of the excess above $200

Estimating the credit by income class is complicated by the fact that the rate of tax varied between cities and between residents and non-residents. In general, the rate was 1 percent on resident individuals and corporations and 1/2 of 1 percent on non-residents. In the case of Detroit, the rate was 2 percent on resident individuals and corporations and 1/2 of 1 percent on non-residents. As a result of the varying rates, city income tax credits are estimated separately for Detroit residents, residents of other cities and non-residents.

The estimating procedure assumes that average city taxable income within an income bracket is identical for all three sub-groups. Average city taxable income, which is calculated in the same manner as state taxable income except that the city personal exemption of $600 is substituted for the state's personal exemption of $1,200, is then multiplied by the appropriate tax rate. This procedure results in an estimate of the average city income tax paid. The estimated credit is calculated from the credit table and multiplied by the number of families in each bracket receiving the credit. For example, the

City Income Taxes Paid	Credit
$100 or less	20 percent of the city income taxes
$100.01 - 150.00	$20 plus 15 percent of the excess above $100
$150.01 - 200.00	$27.50 plus 10 percent of the excess above $150
Above $200.00	$32.50 plus 5 percent of the excess above $200

Estimating the credit by income class is complicated by the fact that the rate of tax varied between cities and between residents and non-residents. In general, the rate was 1 percent on resident individuals and corporations and 1/2 of 1 percent on non-residents. In the case of Detroit, the rate was 2 percent on resident individuals and corporations and 1/2 of 1 percent on non-residents. As a result of the varying rates, city income tax credits are estimated separately for Detroit residents, residents of other cities and non-residents.

The estimating procedure assumes that average city taxable income within an income bracket is identical for all three sub-groups. Average city taxable income, which is calculated in the same manner as state taxable income except that the city personal exemption of $600 is substituted for the state's personal exemption of $1,200, is then multiplied by the appropriate tax rate. This procedure results in an estimate of the average city income tax paid. The estimated credit is calculated from the credit table and multiplied by the number of families in each bracket receiving the credit. For example, the

Detroit city rate is 2 percent. Therefore, 2 percent times the estimated average city taxable income per income bracket equals the average tax. The credit is calculated and then multiplied by the number of Detroit families within each income bracket. An identical procedure is used for estimating the credits received by residents of other cities, except that the 1 percent rate is substituted for Detroit's 2 percent rate. In the case of non-residents, the number of families within each income bracket was not available. Therefore, the number of non-resident families by income bracket is estimated based on two assumptions. First, it is assumed that 16.91 percent[8] of the families in the state paid the non-resident city income tax. Second, it is assumed that the distribution of non-resident families is the same as the total state distribution of families. That is, it is assumed that 16.91 percent of the total number of families within each income bracket paid non-resident city income tax.

Table 16 presents a breakdown of both the distribution of income tax credits by type of credit and the distribution of total credits. The data indicate that

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[8]Data indicate that if everyone in the state would have paid 1/2 of 1 percent based on city taxable income, then $117.06 million would have been collected. Based on a survey of city treasurers conducted by the author, it is estimated that $19.79 million was collected from non-residents. Therefore, it is assumed that 16.9 percent ($19.79 divided by $117.06) of the families in the state paid the non-resident city income tax.

approximately $88 million would have been collected in the absence of the various credits.

City Income Tax

During fiscal 1970, 13 cities imposed a city income tax for at least part of the fiscal year. As indicated previously, the rate of tax varied from 2 percent for Detroit residents (including corporations) to 1/2 of 1 percent for non-residents. In all cases, a $600 personal exemption (double for senior citizens and the blind) was allowed. The amount of city income tax collections listed in Table 1 overstates the amount paid by individuals since corporate tax payments are included in the total.

As a result of the limited applicability, the differential rates and the inclusion of corporations, the city income tax is divided into four sub-classes. They are: (1) Detroit residents, (2) residents of other cities imposing an income tax, (3) all non-residents, and (4) corporations. In order to estimate the proportion of the total city income tax collections paid by each of the four sub-classes, respective city treasurers were asked for a breakdown of tax collections for residents, non-residents, and corporations. Based on responses from nine city treasurers, an estimated breakdown was calculated and is presented in Table 17.

Collections from each sub-class are separately distributed among the income brackets. The individual

Table 17.--Estimated Distribution of City Income Tax Collections by Type of Taxpayer (Millions of Dollars).

1.	Detroit residents	$ 71.64
2.	Residents of other cities	21.74
3.	Non-residents	19.79
4.	Corporations	17.07
	Total	$130.24

Source: Survey conducted by the author.

tax collections are distributed on the basis of city taxable income adjusted for the difference in the distribution of families by income. City taxable income is calculated in the same manner as state taxable income, with the exception that a $600 personal exemption is substituted for the state's $1,200 personal exemption. For example, the tax collected from Detroit residents is distributed on the basis of city taxable income adjusted by Detroit's distribution of families by income. The same basic procedure is used to distribute the tax collected for residents of other cities. In the case of non-residents, the distribution of families by income is not known. Therefore, it is assumed that the distribution of families is identical to the state distribution. City income taxes paid by corporations are combined with the state's corporate income tax for analysis.

The individual federal tax off-set is applied to the combined distribution of state and city individual income tax payments. This is the only form of tax exporting estimated since it is assumed that the payment of personal income taxes by non-Michigan residents is insignificant.

CHAPTER VI

CONSUMPTION AND OTHER TAXES

Sales Tax

Although the retailer is the statutory bearer of the sales tax, the burden of the tax is borne by the purchaser of the taxable item. Therefore, the tax is divided between individual consumers and business consumers. It is assumed that 83 percent is borne by individual consumers and 17 percent by business consumers.[1] It is also assumed that 3 percent is borne by non-resident individual consumers (i.e., tourists).[2] This means that 80 cents is

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[1]The state's sales tax exempts from taxation all goods purchased for resale, certain industrial processing goods as well as products purchased for farm production. The percentage breakdown resulted from a consensus of opinion of government and business tax experts. In general, the respondents estimated the percentage to be between 15 and 20 percent. The 17 percent figure is an arbitrary compromise.

[2]The Michigan Tourist Council estimated non-resident tourists spent $682.5 million during fiscal 1970. The Council also estimated that 17.6 percent of the tourist dollar was spent on lodging. It is assumed that all other consumption by tourists or 82.4 percent consisted of taxable sales items. Therefore, 82.4 percent of the amount spent by tourists times 4 percent equals the estimated sales tax paid by tourists. This amount divided by total sales tax collections equals 3 percent.

paid by individual Michigan consumers for every dollar in sales tax revenue, three cents is paid by non-resident individual consumers and 17 cents is paid by business.

The taxes borne by individual Michigan consumers are distributed on the basis of sales tax data provided by the Internal Revenue Service.[3] The individual federal tax off-set is applied to the resulting distribution. Taxes paid by businesses acting as consumers are analyzed in the section on business cost taxes.

Use Tax

As indicated previously, the use tax is sub-divided into three parts: telephone and telegraph, automobile sales and business cost. Taxes collected from telephone and telegraph services are distributed on the basis of utility expenditures.[4] Collections from automobile sales are distributed on the basis of new and used automobile expenditures.[5] In both of the above cases, the taxes

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[3]See Estimating the Distribution of Sales Tax by Income Bracket, Appendix I.

[4]Special tabulation supplied by Survey Research Center, University of Michigan, from the Institute of Social Research, "A Panel Study of Income Dynamics" (University of Michigan, 1972). The data consisted of a four year average (1968-1971) for the North Central region of the U.S. Utility expenditures excluded telephone and telegraph. Therefore expenditures on other utilities are assumed a proxy for telephone and telegraph expenditures.

[5]Special tabulation supplied by Survey Research Center, University of Michigan, from Gary Hendricks, Kenwood Youmans, and Janet Keller, Consumer Durables and

are subject to the individual federal tax off-set. The portion assumed to have been paid by businesses is analyzed in the section on business cost taxes.

Motor Fuel Tax

In 1970 Michigan imposed a tax of seven cents per gallon on gasoline, diesel fuel, liquified petroleum gas, and vessel fuel and a three cent per gallon tax on aviation fuel. Collections by type of fuel are presented in Table 18.

Table 18.--Motor Fuel Tax Collections by Type of Fuel, Fiscal 1970 (Millions of Dollars).

Gasoline	$256.800
Diesel	13.174
Liquified Petroleum Gas	.129
Vessel	.009
Aviation	3.557
Total	$273.669

Source: Michigan Department of Treasury, Annual Report Fiscal 1970 (Lansing, Michigan, 1971), p. 65.

Consumers of motor fuel are divided into two parts: individual and business. It is assumed that 77.9 percent of the total consumption of gasoline, diesel fuel, liquified petroleum gas and vessel fuel is made by individual consumers. This percentage equals the vehicle registration weighted by the average fuel consumption per vehicle.

Installment Debt (University of Michigan, 1973). The data consisted of a four-year average (1966-1969) for the nation.

Specifically, 4,064,400 passenger cars and motorcycles were registered in Michigan with an estimated consumption per vehicle of 722 gallons. Commercial vehicle registration equaled 609,564 with an estimated consumption per vehicle of 1,365 gallons.[6] Therefore, individual consumption is estimated to equal 77.9 percent and business consumption 22.1 percent.

Based on data limitations, it is also assumed that aviation fuel is entirely consumed by businesses. Therefore, combining aviation fuel with the other types of fuel results in a percentage breakdown for all motor fuel to be 76.9 percent for individuals and 23.1 percent for businesses.

Taxes paid by individual consumers are subject to exporting through product sales to non-residents (tourists) and the federal tax off-set. It is estimated that non-residents paid 8.4 percent[7] of all motor fuel taxes.

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[6]Vehicle registrations were obtained from Michigan's Department of State. Average consumption per vehicle data were obtained from, U.S. Bureau of the Census, Statistical Abstract of the United States: 1972 (93rd ed.; Washington, D.C.: 1972), p. 549, Table 898.

[7]The Michigan Tourist Council estimated that total spending by non-resident tourists for 1970 was $682.5 million. The Council also estimated that the tourists spent 38.4 percent on transportation. Since transportation included automobile parts and repairs as well as other forms of transportation besides the automobile, it is assumed that 50 percent of the amount spent for transportation was spent on fuel consumption. A seven cent per gallon tax combined with an assumed 40 cent per gallon price implies that 17.5 percent of the amount spent on fuel consumption was paid in taxes. Therefore, the

Therefore, 68.5 percent of all motor fuel taxes is assumed borne by Michigan consumers. This amount is distributed on the basis of an adjusted distribution of state gasoline taxes claimed as a deduction on federal tax returns,[8] and then further reduced by the individual federal tax off-set. Taxes borne by businesses acting as consumers are analyzed in the section on business cost taxes.

Motor Vehicle Weight Tax and Fees

The motor vehicle weight tax is divided between individuals and businesses. Data provided by Michigan's Department of State indicated that $74.9 million was collected from passenger cars and $47.8 million from commerical vehicles. Based on data limitations, it is assumed that collections from passenger cars approximate the individual portion of the tax and collections from commercial vehicles approximate the business portion. Taxes paid by individuals are distributed on the basis of new and used automobile expenditures.[9] Since the automobile

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estimated percentage of taxes paid by tourists equaled the estimated taxes paid divided by the total amount of taxes collected. Specifically, 8.4 percent equals $682.5 million times 38.4 percent times 50 percent times 17.5 percent divided by $273.6 million.

[8]For a more complete explanation of the distributive series, see Estimating the Distribution of Motor Fuel Taxes Paid by Individuals, Appendix J.

[9]Special tabulation supplied by Survey Research Center, University of Michigan, from Hendricks, Youmans, and Keller, Consumer Durables.

weight tax is levied on the basis of weight (i.e., 55 cents per 100 pounds for passenger cars), this procedure implicitly assumes that automobile value is a legitimate proxy for automobile weight.

Motor vehicle fees which consist of such items as driver licenses, title transfers, vehicle plate transfers, and watercraft and snowmobile registrations are also divided between individuals and businesses. It is assumed that all driver license fees and 86.96 percent (the ratio of passenger cars and motorcycles to all vehicle registrations) of the remaining fees are paid by individuals. Therefore, $16.8 million of the various fees are assumed paid by individuals and $1.2 million by business. Motor vehicle fees paid by individuals are distributed on the basis of the total number of automobiles owned by each income bracket.[10]

Motor vehicle weight taxes and motor vehicle fees paid by businesses are estimated to equal $49.0 million ($47.8 million plus $1.2 million). This amount is analyzed in the section on business cost taxes.

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[10]Data were obtained from Jan Zupnick, forthcoming dissertation, "Analysis of the Incidence of Hypothetical Air Pollution Taxes" (Michigan State University). The data consisted of 1971 national statistics. Adjustments were made so that the income brackets corresponded with those examined in this study. Specifically, the number of income brackets was expanded based on the assumption that automobile ownership was proportional to the number of families in a given income bracket.

Intangibles Tax

The intangibles tax is levied on such items as the ownership of stock, land contracts, bank deposits, annuities, and accounts and notes receivable. The rate of tax varies with the type of intangible property. For example, during fiscal 1970, 50 cents per $1,000 was levied on bank deposits while a rate of 3 1/2 percent was levied on interest and dividends.

The Michigan Department of Treasury provides data which consist of tax collections by six classes of taxpayers: individuals, partnerships, investment clubs, corporations, fiduciaries and banks. For analytical purposes, this paper divides intangible taxpayers into two classes: individuals (consisting of the first three items above), and business (consisting of the last three items above). Based on this division, the amount of intangibles tax paid by individuals equaled $14.6 million, or 40.2 percent of the total amount listed in Table 1.[11] Taxes collected from individuals are entirely attributed to the highest income bracket. Taxes paid by businesses are analyzed in the section on business cost taxes.

Attributing individual collections to the highest income bracket is based on the following rationale. First, during fiscal 1970 the state granted a credit for the first $100 ($200 for a joint return) in taxes due. For

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[11]Michigan Department of Treasury, Annual Report, Fiscal 1970 (Lansing, Michigan, 1971), p. 78.

example, a married couple owning $100,000 in securities and earning a 6 percent return would receive $6,000 in dividends. The tax rate of 3 1/3 percent would equal a tax of $210. However, the couple is entitled to a $200 tax credit and thus the tax due is only $10. Second, tax collections are highly concentrated in terms of the size of tax payments. For example, six-tenths of 1 percent of the taxpayers (including business taxpayers) paying over $10,000 accounted for 52.64 percent of the total tax collections.[12] Taxpayers paying $500 or more in tax accounted for 86.06 percent of the total tax collections.[13] In terms of the example given above, a $500 tax bill implies a total dividend income of $20,000. Therefore, based on the allowable credits together with the heavy concentration of taxpayers receiving substantial income from intangible property, it is assumed that individual collections are entirely paid by the highest income bracket. This amount is also subject to individual federal tax off-set.

County Documentary Stamp Tax

The "stamp tax" is levied on the transfer of property. Since the tax collections are a function of the value of the property being transferred, the percentage distribution of all property taxes as shown in Table 14 is used as a proxy to divide the tax between individual

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[12] Ibid.

[13] Ibid.

payments and business payments. Therefore, it is assumed that 43.3 percent (the percentage of total taxes paid by owner-occupied homes) or $1.6 million is paid by individuals. This amount is distributed among the income brackets on the basis of "home values."[14] Business tax payments ($2.2 million) are analyzed in the section on business cost taxes.

Business Cost Taxes

Business cost taxes include portions of all of the following taxes: the general sales tax, use tax, motor fuel taxes, motor vehicle weight tax, intangibles tax, corporate franchise fee, and the county documentary stamp tax. Based in part on previous sections of this study, the specific amount of each tax analyzed as a business cost equals:

1. General sales tax--17 percent of the tax,
2. Use tax--60.5 percent of the tax,
3. Motor fuel taxes--23.1 percent of the tax,
4. Motor vehicle weight tax and fees--$49.0 million,
5. Intangibles tax--59.8 percent of the tax,
6. Stamp tax--56.7 percent of the tax, and
7. Corporate franchise fee.

Except for a few modifications, the same basic analytical procedure is used for all of the business cost

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[14]The raw data on home values are provided in Appendix C, Table C-2.

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taxes. Therefore, in order to simplify the explanation, the sales tax is examined as an illustrative example. The example traces $1.00 of sales tax revenue which is assumed borne by businesses acting as consumers. The procedure begins by dividing the dollar between incorporated and unincorporated businesses. It is assumed that 83.2 percent of the tax (83.2 cents) is a cost to incorporated businesses and 16.8 percent (16.8 cents) is a cost to unincorporated businesses. The division between the two types of businesses is based on the national receipts of the two forms of activity.[15]

The portion paid by unincorporated businesses is subject to two shifting assumptions. For illustrative purposes, this example assumes that 75 percent (12.6 cents) is shifted to the consumer and 25 percent (4.2 cents) is borne by the owners. The amount shifted to the consumer is distributed on the basis of total consumption.[16] It is assumed that unincorporated businesses operate entirely within Michigan thus eliminating exporting through produce sales.[17] The amount borne by the owners is distributed on

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[15]U.S. Treasury Department, Internal Revenue Service, Statistics of Income--1970, Business Income Tax Returns (Washington, D.C.: Government Printing Office, 1972), p. 1, Table 1A.

[16]See Appendix H.

[17]Tourist sales within the state are also ignored.

the basis of nonfarm self-employment income.[18] It is also assumed that unincorporated businesses are entirely owned by Michigan residents, thus eliminating exporting through non-resident ownership. However, the individual federal tax off-set is applied to the amount borne by the owners.

Analyzing the portion paid by incorporated businesses is considerably more complicated. The complications result entirely from the problems associated with estimating tax exporting. Consistent with the above discussion, this example assumes that 75 percent (62.4 cents) is shifted to consumers and 25 percent (20.8 cents) is borne by the owners. Taxes shifted to consumers are again distributed on the basis of total consumption. In this case, however, it is estimated that only 42.0 percent (26.2 cents) of the amount shifted to consumers is paid by Michigan residents with the balance shifted to non-residents through product sales.

The estimated percentage paid by Michigan residents was calculated from a survey, conducted by the author, of 644 corporate franchise fee returns.[19] The returns consisted of 89 corporations[20] paying over $100,000 in

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[18] See Appendix D.

[19] The corporate franchise fee return is the only business tax return which is open to public inspection on an individual company basis.

[20] Actually, there were 105 corporations paying over $100,000. However, 7 returns were unavailable and 9

franchise tax plus a sample of 555 of the remaining corporations. For each return, it was assumed that the amount of tax shifted to Michigan consumers equaled the ratio of Michigan sales to national sales times the franchise tax paid by the corporation. Ideally, the ratio of Michigan sales to national sales would have been used without weighting by the amount of franchise tax paid. Unfortunately, only multi-state companies are required to indicate sales data. Therefore, the franchise tax is used as a proxy for all business cost taxes.

The results of the procedure indicated that the 89 corporations paying over $100,000 accounted for 47.56 percent of the total tax of which 14.3 percent was assumed shifted to Michigan residents. The 555 corporations representing the balance of the corporations in the state accounted for 52.44 percent of the total tax of which 67.1 percent was assumed shifted to Michigan residents. Combining these percentages resulted in the 42.0 percent estimate.

The portion of the tax assumed borne by the owners of incorporated businesses is distributed on the basis of dividend income. There are two methods by which the tax borne by the owners can be exported: the corporate federal tax off-set and non-resident ownership. It is estimated that 50.9 percent (10.6 cents) of the tax borne by the

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returns consisting of utilities and newspapers paying over $100,000 were excluded.

owners is borne by non-resident owners. This estimate is based on several assumptions. First, it is assumed that the franchise fee, which is basically a tax on capital, can be used as a proxy for ownership. Second, it is assumed that corporations paying more than $100,000 in tax are nationally-owned and that all other corporations are entirely owned by Michigan residents. Since the large corporations accounted for 52.9 percent of the total fee collections, it is assumed that of the corporations operating in Michigan, 52.9 percent of the corporate ownership is nationally owned. As indicated previously, it is assumed that only 3.835 percent of nationally owned corporations are Michigan owned. Therefore, it is estimated that Michigan residents own 38.35 percent of the 52.9 percent plus 47.1 percent (the portion assumed entirely Michigan owned) which equals 49.1 percent (10.2 cents). Non-resident ownership is estimated to equal the balance or 50.9 percent.

The 48 percent corporate tax off-set is applied to the portion borne by Michigan owners. This means that of the 20.8 cents assumed borne by corporate owners, 10.6 cents is shifted to non-resident owners and 4.9 cents is shifted to the federal government, leaving only 5.3 cents borne by Michigan owners.

The remaining business cost taxes are analyzed by the same basic procedure. Specifically, the use tax, motor fuel tax, weight tax, and "stamp tax" are analyzed in

exactly the same manner. Since the business portion of the intangibles tax is paid entirely by corporations, the previous discussion applies beginning with the explanation of incorporated businesses.

The franchise fee is also completely paid by corporations. Although the general procedure is the same, the percentage of the tax paid by Michigan consumers is greater. It is estimated that 48.09 percent (rather than 42.0 percent) of the portion of the tax shifted to consumers is paid by Michigan consumers. The difference in the percentages results from the inclusion of utility and newspaper companies. Utilities and newspapers pay an abnormal share of the franchise tax relative to other business cost taxes.[21] Therefore, when the franchise fee was used as a proxy for business cost taxes in general, utilities and newspapers were excluded. However, when analyzing the franchise fee by itself, the companies are included. The estimated higher percentage of tax paid by Michigan consumers results from both the large amount of tax paid by utilities and newspapers as well as from the complete intrastate operations of these firms.

The flow chart which is diagrammed below summarizes the procedure used to analyze business cost taxes. The numbers in the parenthesis review the sales tax example explained above.

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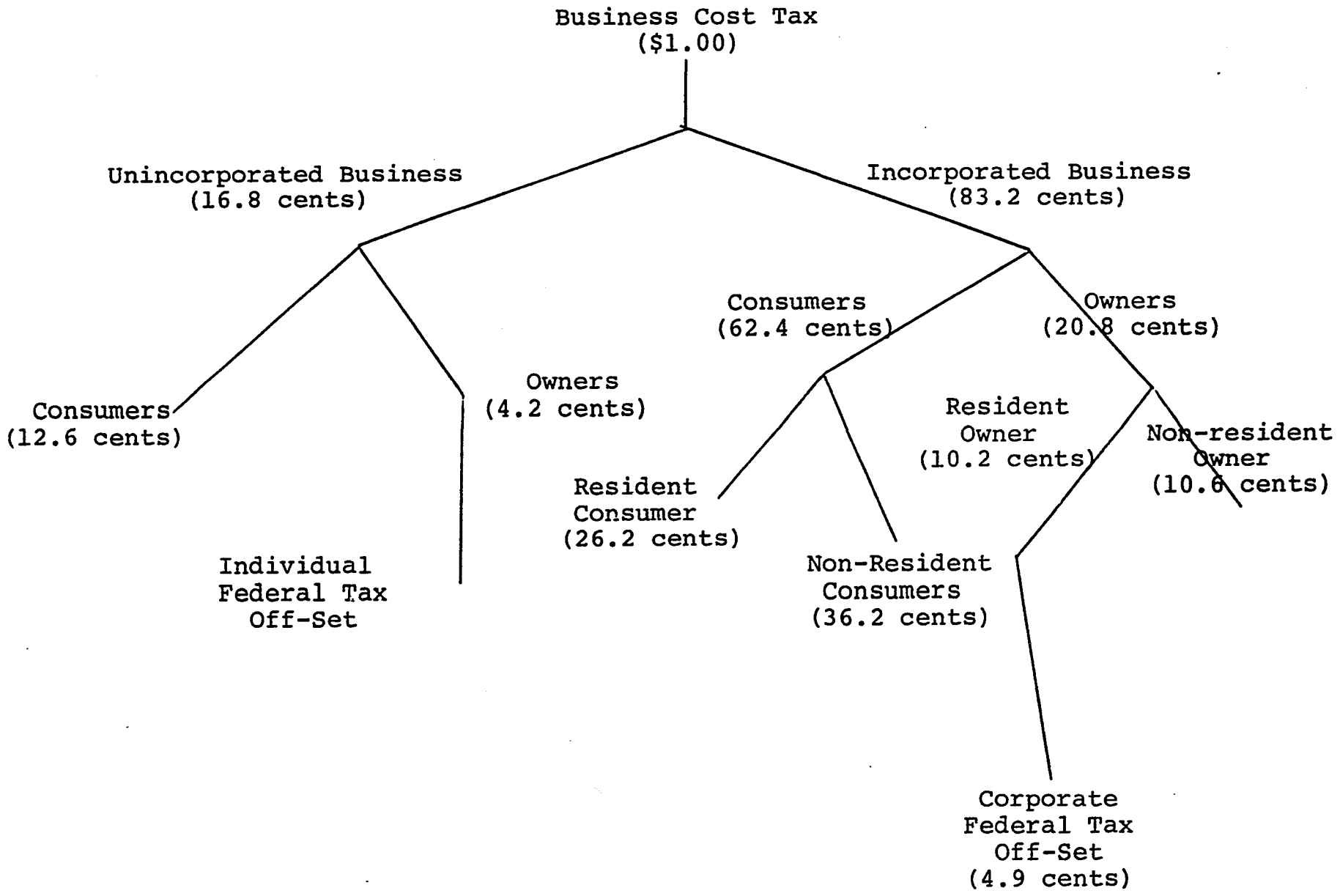
[21]The 7 utilities and 2 newspapers which were excluded accounted for 10.4 percent of the total franchise tax.


Business Cost Tax
($1.00)
Unincorporated Business
(16.8 cents)
Incorporated Business
(83.2 cents)
Consumers
(12.6 cents)
Owners
(4.2 cents)
Consumers
(62.4 cents)
Owners
(20.8 cents)
Individual
Federal Tax
Off-Set
Resident
Consumer
(26.2 cents)
Resident
Owner
(10.2 cents)
Non-resident
Owner
(10.6 cents)
Non-Resident
Consumers
(36.2 cents)
Corporate
Federal Tax
Off-Set
(4.9 cents)

Corporate Income Taxes

Corporate income taxes consist of the state's corporate income tax, the financial institution's income tax and the portion of the city income tax paid by corporations. The total amount equaled $214.7 million for fiscal 1970.

The analysis follows the same basic analytical procedure previously explained for incorporated business cost taxes. For example, it is assumed that 42.0 percent of the taxes shifted to consumers is borne by Michigan consumers. Taxes borne by Michigan consumers are distributed among the income brackets on the basis of total consumption. It is also assumed that 49.1 percent of the tax borne by the owners (stockholders) is borne by Michigan owners. The corporate federal tax off-set is applied to the portion borne by Michigan owners and the remaining amount is distributed on the basis of dividend income.

Unemployment Compensation

Two shifting assumptions are made concerning unemployment compensation. First, it is assumed that the tax is entirely borne by the employees and second it is assumed that the tax is borne equally by employees and consumers. Taxes borne by employees are distributed on the basis of wages and salaries. However, before incidence calculations are made, the tax borne by each income bracket is added to the total income of the income bracket. That is, the procedure assumes that the tax is borne by

employees in terms of reduced compensation. Therefore, total income must be increased by the assumed reduction in compensation (i.e., the tax) in order to accurately reflect the tax incidence. It is assumed that the number of non-resident employees (i.e., living outside the state and working in Michigan) is insignificant. Therefore, taxes borne by employees are subject only to the individual federal tax off-set.

Taxes borne by consumers are distributed on the basis of total consumption. It is estimated that only 51.7 percent of the taxes shifted to consumers is shifted to Michigan consumers. This percentage is derived from the section on business cost taxes. Specifically, the procedure assumes that all of the taxes shifted by unincorporated businesses and 42.0 percent shifted by incorporated businesses are borne by Michigan consumers.[22]

Cigarette and Alcohol Taxes

Both taxes are assumed to be borne entirely by consumers. The cigarette tax is distributed on the basis of cigarette expenditures[23] and the various alcohol taxes

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[22]The section on business cost taxes estimates that unincorporated businesses equal 16.8 percent and incorporated businesses equal 83.2 percent. Therefore, 42.0 percent times 83.2 percent plus 16.8 percent equals 51.7 percent.

[23]Cigarette expenditures by income class were obtained from a special tabulation supplied by Survey Research Center, University of Michigan, from the Institute of Social Research, "A Panel Study of Income Dynamics"

are distributed on the basis of alcoholic expenditures.[24] In both cases, exported taxes are limited to non-resident (tourist) consumption. Since data are unavailable which shows tourist consumption of these particular items, it is assumed 3 percent is paid by non-residents. This is the same percentage assumed to be borne by tourists for the sales tax. Therefore, 97 percent of each tax is assumed to be borne by Michigan residents.

Insurance Premiums and Privilege Taxes

Insurance taxes are assumed to be borne entirely by consumers. The taxes are distributed on the basis of premiums paid for life insurance.[25] Since the tax is only levied on policies purchased within the state, the tax is borne entirely by Michigan consumers.

(University of Michigan, 1972). The data consisted of a four-year average (1968-1971) for the U.S.

[24]Alcoholic expenditures by income class were obtained from a special tabulation supplied by Survey Research Center, Ibid.

[25]Special tabulation for the North Central region of the U.S. supplied by Survey Research Center, University of Michigan, from G. Katona, L. Mandell, and J. Schmiedeskamp, 1970 Survey of Consumer Finances (University of Michigan, 1971). The premiums paid for life insurance are used as a proxy for consumption of all insurance. This procedure has the potential of attributing a larger share of the tax to upper-income brackets, if it is assumed that lower income brackets purchase a larger percentage of other types of insurance (i.e., automobile).

are distributed on the basis of alcoholic expenditures.[24] In both cases, exported taxes are limited to non-resident (tourist) consumption. Since data are unavailable which shows tourist consumption of these particular items, it is assumed 3 percent is paid by non-residents. This is the same percentage assumed to be borne by tourists for the sales tax. Therefore, 97 percent of each tax is assumed to be borne by Michigan residents.

Insurance Premiums and Privilege Taxes

Insurance taxes are assumed to be borne entirely by consumers. The taxes are distributed on the basis of premiums paid for life insurance.[25] Since the tax is only levied on policies purchased within the state, the tax is borne entirely by Michigan consumers.

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[24]Alcoholic expenditures by income class were obtained from a special tabulation supplied by Survey Research Center, Ibid.

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Inheritance Tax[26]

The inheritance tax is levied in accordance with the following schedule.

Net Amounts of Wealth to be Transferred	Rates (Percent)	
	Class I	Class II
$ 0 - $ 50,000	2	10
$ 50,000 - $250,000	4	12
$250,000 - $500,000	5	12
$500,000 - $750,000	6	15
Over $750,000	8	15

Class I beneficiaries include direct heirs such as husbands, wives, grandparents, parents, children and other lineal decendants. All other beneficiaries or indirect heirs are in Class II. Spouses are entitled to a $30,000 exemption while other Class I heirs are entitled to a $5,000 exemption. No exemptions are granted to indirect heirs.

The number of returns filed during fiscal 1970 equaled only 10,789.[27] This means that the average inheritance tax payment equaled $2,453. When the large

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[26]An estate tax is levied by the state in those cases where the maximum credit allowed by the federal estate tax for state death taxes exceeds Michigan's inheritance tax. The amount of tax equals the difference between the federal credit and the state's inheritance tax. The purpose of the estate tax is to obtain for the state the maximum credit provided in the federal estate tax law. Since Michigan's estate tax is levied in a very limited number of cases, and since, when it is levied, it is borne entirely by the federal government, the estate tax is ignored.

[27]Michigan Department of Treasury, Annual Report Fiscal 1970, p. 79.

average payment is taken into consideration with the liberal exemptions granted for direct heirs, it is logical to conclude that the tax is predominantly paid by the upper-income classes. Based on this deduction it is arbitrarily assumed that one-third of the tax is paid by the income class of $15,000 or $25,000 and two-thirds is paid by the income-bracket over $25,000. Although some of the tax is clearly paid by lower income classes, particularly in the case of indirect heirs, the amount is assumed insignificant.

A federal credit is granted for state death taxes. Therefore, part of the inheritance tax is exported to the federal government in terms of a federal tax off-set. Data are not available which estimate the off-set on an income bracket basis. The available data indicate that the average credit for all state death taxes equaled 99.9 percent.[28] Since the credit, in percentage terms, increases with the value of the taxable estate, it is assumed that the percentage off-set is lower than the average for the income bracket $15,000 to $25,000 and higher than the average for the income bracket above $25,000. Therefore, it is arbitrarily assumed that the off-set equals 8 percent for the former bracket and 12 percent for the latter bracket.

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[28]The average credit is calculated by dividing total state credits by the sum of federal estate tax payments plus state credits. U.S. Department of Treasury, Internal Revenue Service, Statistics of Income--1969, Estate Tax Returns (Washington, D.C.: Government Printing Office, 1972), p. 17, Table 5.

Although the tax is applied to the real property of non-residents, the collections from non-residents are considered to be negligible.[30] Therefore, it is assumed that exported taxes are limited to the federal off-set.

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[29]Statement by Gerrit Van Coevering, Deputy Commissioner of Revenue, State of Michigan.

CHAPTER VII

INCIDENCE OF MICHIGAN'S STATE AND LOCAL TAXES

Empirical results of the study are presented in this chapter. Initially, the chapter reviews both the data and the tax shifting assumptions upon which the results are based. The shifting assumptions are divided into two groups or sets; the least progressive set and the most progressive set. Incidence calculations are then made based on both money income as defined by the Bureau of the Census and broad income as developed and estimated in this study. That is, four separate tax incidence calculations are made: the least progressive set of shifting assumptions and the most progressive set under money income, as well as the least progressive set and most progressive set under broad income. This procedure provides the necessary means for comparing the importance of both alternative shifting assumptions and alternative definitions of income.

Effective tax rates presented in this chapter estimate the tax burden of Michigan's state and local taxes on Michigan residents. The estimates do not reflect

the taxes imposed by the federal government nor the taxes imposed by other states. That is, imported taxes or taxes borne by Michigan residents which were levied by a non-Michigan governmental unit are not included. In addition, exported taxes, which are defined as those taxes levied within the state and borne by non-residents (i.e., through their purchase of a product in which a Michigan tax is included in the purchase price) or by the federal government (i.e., federal tax off-set), are subtracted from total taxes collected within Michigan. Therefore, the results indicate the degree to which Michigan taxed its residents during 1970.

The various distributive data series employed in this study are presented in Tables 19 and 20. Specifically, Table 19 indicates the percentage distribution of six income components. Columns 1-3 of Table 19 were obtained from the Bureau of the Census and represent state data. Columns 4-6 were derived from U.S. income tax returns and represent national estimates. The data clearly indicate that dividends and realized capital gains are heavily concentrated in the hands of the wealthy, with the highest income bracket, over $25,000 receiving 55.95 percent and 63.35 percent of the respective total amounts.

Table 20 presents the percentage distribution of various consumer expenditures. Although several sources, such as the Bureau of the Census and the Internal Revenue Service, were employed in the compilation of the data, the

Table 19.--Percentage Distribution of Income Components (Percent).

Income Bracket (Thousands of Dollars)	(1) Wages and Salaries	(2) Farm Self-Employment	(3) Nonfarm Self Employment	(4) Dividends	(5) Capital Gains (Realized)	(6) Rental Income
Under $1	.08	.26	.06	0	0	0
1-2	.32	.50	.18	.32	.36	.09
2-3	.53	2.18	.40	.73	.90	4.10
3-4	.84	2.34	.56	1.94	1.37	7.68
4-5	1.26	3.43	.78	2.42	1.78	7.87
5-6	1.88	5.63	1.08	2.63	2.29	6.62
6-7	2.71	4.60	2.08	3.07	2.57	6.58
7-8	4.05	8.13	2.34	2.46	2.30	5.25
8-9	5.34	7.35	2.59	2.41	1.77	2.78
9-10	5.86	4.64	3.03	2.25	2.27	2.52
10-12	13.24	9.86	6.59	3.97	3.40	4.49
12-15	18.73	15.92	9.75	5.92	5.26	3.79
15-25	32.07	22.12	23.08	15.93	12.38	15.33
Over 25	13.09	13.06	47.49	55.95	63.35	32.89
Total	100.00	100.02	100.00	100.00	100.00	99.99

Sources: Columns (1)-(3), Special tabulation prepared from the U.S. Bureau of the Census, Census of Population: 1970, "Public Use Samples." (State of Michigan data, see Appendix D.) Columns (4)-(6), U.S. Treasury Department, Internal Revenue Service, Statistics of Income 1970--, Individual Income Tax Returns (Washington, D.C.: Government Printing Office, 1972). (National data adjusted for the difference between adjusted gross income and money income, see Appendix B.)

Table 20.--Percentage Distribution of Consumption Expenditures (Percent).

Brackets Income (Thousands of Dollars)	(1) Total Consumption	(2) House Value	(3) House Value Adjusted for Homestead Exemption	(4) Rental Payments	(5) New Automobiles	(6) New and Used Automobiles	(7) Food	(8) Alcohol	(9) Cigarettes	(10) Utilities	(11) Gasoline	(12) Consumption Subject to Sales Tax	(13) Insurance Life	(14) Automobile Ownership By Units	(15) Demand Deposits
Under $1	.84	1.77	1.46	4.91	0	0	1.71	1.07	.89	3.08	.85	.62	.27	1.01	.74
1-2	2.33	2.67	2.08	7.02	.58	.83	2.57	1.69	2.44	4.55	1.81	1.68	.92	2.52	2.81
2-3	2.42	2.30	1.78	5.85	.42	1.10	2.38	1.74	2.98	4.34	2.00	1.87	1.35	3.82	2.54
3-4	2.57	2.44	1.88	5.52	.81	1.69	2.67	2.48	2.95	3.35	2.30	2.07	1.31	5.19	3.28
4-5	2.74	2.32	1.98	5.57	.78	1.68	2.79	2.96	3.50	3.44	2.83	2.28	1.24	5.72	4.05
5-6	3.20	2.35	2.11	6.19	1.43	2.75	3.45	3.42	4.04	3.85	3.40	2.76	1.80	6.85	2.10
6-7	3.82	2.87	2.96	6.70	2.60	3.55	4.28	4.50	4.97	4.30	4.41	3.38	3.66	6.32	4.63
7-8	4.93	3.35	3.44	7.06	4.87	5.50	4.80	5.10	5.98	5.05	5.83	4.48	4.42	7.01	3.53
8-9	5.87	4.62	4.76	7.73	5.43	6.01	6.37	6.96	7.24	6.06	7.16	5.51	4.43	6.75	4.11
9-10	6.11	5.03	5.18	6.54	5.45	5.87	5.95	6.15	6.64	6.36	7.21	5.84	6.41	7.34	5.41
10-12	12.77	12.23	12.60	11.26	13.89	14.73	13.19	14.48	14.08	12.95	14.48	12.55	11.80	10.96	9.91
12-15	16.65	17.35	17.86	10.65	19.48	18.74	16.67	15.78	15.98	15.12	18.14	16.60	16.48	15.45	11.64
15-25	25.56	29.11	29.98	11.78	31.81	27.61	25.41	24.14	22.86	20.71	23.89	26.00	30.77	16.24	23.93
Over 25	10.19	11.58	11.93	3.22	12.45	9.94	7.76	9.54	5.45	6.83	5.69	14.36	15.14	4.83	21.32
Total	100.00	99.99	100.00	100.00	100.00	100.00	100.00	100.01	100.00	99.99	100.00	100.00	100.00	100.01	100.00

Sources: Column (1), Derived from data supplied by U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditures and Income, Survey of Consumer Expenditures 1960-61 (Washington, D.C.: 1965), Report No. 237-38 and Supplement 3. Data consisted of the North Central region of the United States (see Appendix H).

Columns (2)-(4), Special tabulation prepared from the U.S. Bureau of the Census, Census of Population: 1970, "Public Use Samples" (State of Michigan data).

Columns (5) and (6), Special tabulation supplied by Survey Research Center, University of Michigan, from Gary Hendricks, Kenwood Youmans, and Janet Keller, Consumer Durables and Installment Debt (University of Michigan, 1973). The data consisted of a four-year average (1966-1969) for the nation.

Column (7), Special tabulation supplied by Survey Research Center, University of Michigan, from the Institute of Social Research, "A Panel Study of Income Dynamics" (University of Michigan, 1972). The data consisted of a four-year average (1968-1971) for the North Central region of the United States.

Columns (8) and (9), Same as Column (7), except that the data consisted of a four-year (1968-1971) national average.

Column (10), Same as Column (7).

Column (11), Based on national data from both the U.S. Treasury Department, Internal Revenue Service, Statistics of Income--1970, Individual Income Tax Returns (Washington, D.C.: Government Printing Office, 1972) and G. Kanona, L. Mandell, and J. Schmiedeskamp, 1970 Survey of Consumer Finances (University of Michigan, 1971) (see Appendix J).

Column (12), Based on equations supplied by the U.S. Treasury Department, Internal Revenue Service for Michigan (see Appendix I).

Column (13), Special tabulation supplied by Survey Research Center, University of Michigan, from G, Katona, L. Mandell, and J. Schmiedeskamp, 1970 Survey of Consumer Finances (University of Michigan, 1971). The data were based on the North Central region of the United States for 1970.

Column (14), Data were obtained from Jan Zupnick, forthcoming dissertation, "Analysis of the Incidence of Hypothetical Air Pollution Taxes" (Michigan State University). The data consisted of 1971 national statistics.

Column (15), Same as Column (13).

primary source consisted of three expenditure surveys conducted under the auspices of the Survey Research Center, University of Michigan. In some instances the surveys reflect 1970 regional data, in some cases 1970 national data, and in still other cases the data is based on a national four-year average (i.e., 1968-1971). Various data sources imply varying degrees of reliability. It is assumed, therefore, that any errors contained within the data employed are normally distributed with a mean of zero. This means that while some caution should be exercised in interpreting the incidence of a particular tax, it is assumed that the sum of the 22 taxes examined in this study accurately reflects the total tax incidence, subject to a set of shifting assumptions and a definition of income.

A review of the tax shifting assumptions analyzed in this study is presented in Table 21. In those instances where more than one assumption is analyzed, the first assumption reflects the least progressive case and second assumption reflects the most progressive case. For two of the taxes, the property tax levied on non-automobile manufacturing and the corporate income tax, three assumptions are made. In both instances, the third assumption represents a compromise between the least progressive and most progressive cases.

In addition to the shifting assumptions, Table 21 reviews the basis on which the taxes are distributed among the income brackets. For example, the property tax levied

on owner-occupied houses is assumed to be entirely borne by the homeowner and is distributed on the basis of "house value adjusted for homestead exemptions," or Table 20, Column 3.

Before taxes are distributed among the income brackets, however, exported taxes are subtracted from the total tax collections. The amount of each tax borne by Michigan residents is presented in Table 22. Since the amount of exported taxes is a function of the shifting assumptions, Table 22 indicates the degree to which taxes are exported under the various assumptions analyzed in this study. The numerical notation following each tax refers to the shifting assumption explained in Table 21. In addition, Table 22 indicates the amount of taxes exported to the Federal Government and the amount exported to non-residents. Total results of Table 22 indicate that Michigan residents paid approximately 70 percent of the taxes levied in the state, with the exact percentage ranging from 71.92 percent under the least progressive set of assumptions (Case 1) to 69.04 percent under the most progressive set of assumptions (Case 2). It can be concluded that alternative shifting assumptions, as defined in this study, do not significantly influence the degree to which taxes are exported.

Table 21.--Tax Incidence Assumptions Examined in This Study.

Tax	Shifting Assumptions		Basis on Which Tax Is Distributed By Table and Column	
	Borne By	Percent	Table	Column
Property Tax				
Owner-occupied Houses	1. Home-owners	100	20	3
Rented Residences	1. Tenant	100	20	4
	2. Tenant	75	20	4
	Owners	25	19	3 and 4
Automobile Manufacturing	1. Consumers	100	20	5
	2. Consumers	75	20	5
	Owners	25	19	4
Non-Automobile Manufacturing	1. Consumers	100	20	1
	2. Consumers	50	20	1
	Owners	50	19	4
	3. Consumers	75	20	1
	Owners	25	19	4
Commerical	1. Consumers	100	20	1
	2. Consumers	75	20	1
	Owners	25	19	3 and 4
Utility	1. Consumers	100	20	10
Agricultural	1. Consumers	25	20	7
	Owners	75	19	2
	2. Owners	100	19	2
Sales	1. Consumers (Direct)	83	20	12
	Consumers (Indirect)	17	20	1
	2. Consumers (Direct)	83	20	12
	Consumers (Indirect)	12.75	20	1
	Owners	4.25	19	3 and 4
Use	1. Consumers (Direct)	21	20	10
		18.5	20	6
	Consumers (Indirect)	60.5	20	1
	2. Consumers (Direct)	21	20	10
		18.5	20	6
	Consumers (Indirect)	45.4	20	1
	Owners	15.1	19	3 and 4
Motor Fuel	1. Consumers (Direct)	76.9	19	11
	Consumers (Indirect)	23.1	20	1
	2. Consumers (Direct)	76.9	19	11
	Consumers (Indirect)	17.3	20	1
	Owners	5.8	19	3 and 4
Motor Weight and Fees	1. Consumers (Direct)	53.2	20	6
		11.9	20	14
	Consumers (Indirect)	34.9	20	1
	2. Consumers (Direct)	53.2	20	6
		11.9	20	14
	Consumers (Indirect)	26.2	20	1
	Owners	8.7	19	3 and 4
Intangible	1. Individuals (Direct)	40.2	Highest income bracket	
	Consumers	59.8	20	1
	2. Individuals (Direct)	40.2	Highest income bracket	
	Consumers	44.85	20	1
	Business-owners	14.95	19	4
Stamp Tax	1. Individual homeowners	43.4	20	2
	Consumers	56.7	20	1
	2. Individual homeowners	43.4	20	2
	Consumers	42.5	20	1
	Business-owners	14.2	19	3 and 4
Franchise	1. Consumers	100	20	1
	2. Consumers	75	20	1
	Business-owners	25	19	4

Table 21.--Continued.

Tax	Shifting Assumptions		Basis on Which Tax Is Distributed By Table and Column	
	Borne By	Percent	Table	Column
Corporate Income	1. Consumers	100	20	1
	2. Business-owners	100	19	4
	3. Consumers	50	20	1
	Business-owners	50	19	4
Cigarette	1. Consumers	100	20	9
Alcohol	1. Consumers	100	20	8
Insurance Premiums Privilege Taxes	1. Consumers	100	20	13
Unemployment Compensation	1. Consumers	100	20	1
	2. Consumers	50	20	1
	Employees	50	19	1
Inheritance	1. Individuals	33	Income Bracket $15,000-25,000	
		67	Income Bracket over $25,000	
State Personal Income	1. Individuals	100	State taxable income--see text	
City Personal Income	1. Individuals	100	City taxable income--see text	

Table 22.--Breakdown of Michigan Taxes by Amount Borne by Michigan Residents and Amount Exported.

Tax		Total Collections	Exported Taxes: Federal Off-Sets (Millions of Dollars)	Exported Taxes: Non-Residents (Millions of Dollars)	Amount Borne By Michigan Residents	Percentage Borne By Michigan Residents (Percent)
Property Tax						
Owner-Occupied Houses	1.	$740.00	$136.14	$ 0.00	$603.86	81.60
Rented Residences	1.	126.30	0.00	0.00	126.30	100.00
	2.	126.30	11.66	0.00	114.64	90.76
Automobile Manufacturing	1.	170.60	0.00	158.27	12.33	7.23
	2.	170.60	0.89	159.50	10.21	5.99
Non-Automobile Manufacturing	1.	232.60	0.00	214.85	17.75	7.63
	2.	232.60	2.14	219.26	11.20	4.81
	3.	232.60	1.07	217.06	14.47	6.22
Commercial	1.	227.90	0.00	6.84	221.06	97.00
	2.	227.90	15.59	23.53	188.78	82.84
Utility	1.	135.40	0.00	0.00	135.40	100.00
Agricultural	1.	74.50	9.77	2.51	62.21	83.51
	2.	74.50	13.03	0.00	61.47	82.51
Sales	1.	740.00	110.07	82.88	547.05	73.93
	2.	740.00	117.70	81.02	541.27	73.14
Use	1.	88.60	5.67	25.87	57.06	64.40
	2.	88.60	8.92	25.08	54.59	61.61
Motor Fuel	1.	273.70	29.76	53.49	190.44	69.58
	2.	273.70	33.60	52.56	187.54	68.52
Motor Weight and Fees	1.	140.70	0.00	23.65	117.05	83.19
	2.	140.70	2.97	22.92	114.81	81.60
Intangible	1.	36.40	5.78	12.62	18.00	49.44
	2.	36.40	7.06	12.24	17.10	46.97
Stamp Tax	1.	3.80	0.29	1.04	2.47	64.88
	2.	3.80	0.43	1.01	2.37	62.28
Franchise	1.	125.70	0.00	65.25	60.45	48.09
	2.	125.70	7.41	64.93	53.36	42.45
Corporate Income	1.	214.70	0.00	124.53	90.17	42.00
	2.	214.70	50.60	109.28	54.82	25.53
	3.	214.70	25.30	116.90	72.50	33.77
Cigarette	1.	85.30	0.00	2.56	82.74	97.00
Alcohol	1.	127.50	0.00	3.83	123.67	97.00
Insurance Premium	1.	46.60	0.00	0.00	46.60	100.00
Unemployment Compensation	1.	125.80	0.00	0.00	125.80	100.00
	2.	125.80	12.38	0.00	113.42	90.16
Inheritance	1.	26.50	2.83	0.00	23.67	89.32
State Personal Income	1.	409.00	95.79	0.00	313.21	76.58
City Personal Income	1.	113.17	23.41	0.00	89.76	79.31
Totals (1)		$4,264.77	419.51	778.19	3,067.05	71.92
(2)		4,264.77	542.55	777.72	2,944.49	69.04

Totals may not sum due to rounding.

The numbers 1, 2, and 3 refer to tax shifting assumptions explained in Table 21. In summary, assumption 1 is the least progressive and assumption 2 is the most progressive.

Incidence Results

Tax incidence calculations based on money income are presented in Table 23. Several explanations are necessary to fully understand the data which are presented. First, the table estimates the effective tax rates under alternative shifting assumptions for each of the 22 taxes examined in the study. For each tax examined, the first assumption (case 1) estimates the least progressive shifting assumption and the second assumption (case 2) estimates the most progressive shifting assumption. In other words, each cell within the table indicates the percentage of tax to money income borne by an income bracket for a particular tax under a particular shifting assumption. Second, the assumptions are completely consistent with those outlined in Table 21. For example, two assumptions are examined concerning the property tax levied on rented residences. Therefore, consistent with Table 21, the first assumption (case 1) assumes that all of the tax is borne by the tenant and the second assumption (case 2) assumes that 75 percent is borne by the tenant and 25 percent is borne by the owners. Third, several of the taxes indicate the notation 1*. This notation indicates the effective tax rate under the most progressive set of shifting assumptions, even though only one assumption is made for those taxes indicating such notation. For example, although only one assumption is examined for the property tax levied on owner-occupied houses, Table 23 indicates both a case 1

Table 23.--Effective Rates of Michigan's State and Local Taxes Based Upon a Distribution of Money Income.

Tax		Income Brackets (Thousands of Dollars) Tax as a Percentage of Income													
		Under 1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-12	12-15	15-25	Over 25
Property Tax															
Owner-occupied Houses	1 .	16.96	5.04	3.38	2.92	2.53	2.08	2.27	1.89	2.06	2.04	2.21	2.11	1.93	1.12
	1*.	16.93	5.03	3.36	2.89	2.50	2.06	2.25	1.88	2.05	2.04	2.20	2.11	1.92	1.11
Rented Residences	1 .	9.73	2.90	1.90	1.49	1.27	1.12	.95	.73	.64	.50	.39	.26	.17	.09
	2 .	7.29	2.19	1.57	1.35	1.16	.98	.83	.62	.52	.41	.32	.21	.16	.23
Automobile Manufacturing	1 .	.00	.02	.01	.02	.02	.03	.04	.05	.04	.04	.05	.05	.04	.03
	2 .	.00	.02	.01	.02	.02	.02	.03	.04	.03	.03	.04	.04	.03	.04
Non-Automobile Manufacturing	1 .	.23	.14	.11	.10	.09	.08	.08	.07	.07	.07	.06	.06	.05	.04
	2 .	.12	.07	.06	.06	.05	.05	.05	.04	.04	.04	.03	.03	.03	.05
	3 .	.18	.10	.08	.08	.07	.06	.06	.06	.05	.05	.05	.04	.04	.04
Commercial	1 .	2.91	1.69	1.38	1.21	1.09	1.01	.95	.90	.86	.82	.78	.72	.63	.47
	2 .	2.20	1.28	1.07	.97	.89	.82	.78	.72	.68	.65	.62	.57	.52	.58
Utilities	1 .	6.55	2.02	1.51	.97	.84	.75	.65	.56	.54	.52	.48	.40	.31	.19
	1*.	6.53	2.01	1.51	.96	.83	.74	.65	.56	.54	.52	.48	.40	.31	.19
Agricultural	1 .	.66	.23	.41	.37	.41	.50	.34	.40	.31	.20	.19	.19	.15	.12
	2 .	.30	.12	.41	.36	.44	.55	.35	.45	.32	.18	.17	.19	.14	.12
Sales	1 .	6.62	3.75	3.25	2.93	2.65	2.47	2.35	2.24	2.16	2.09	1.99	1.78	1.53	1.22
	2 .	6.40	3.63	3.15	2.84	2.58	2.41	2.30	2.18	2.10	2.03	1.94	1.74	1.50	1.28
Use	1 .	1.27	.53	.43	.34	.30	.28	.26	.25	.23	.22	.21	.18	.15	.10
	2 .	1.17	.48	.39	.31	.27	.26	.25	.23	.21	.20	.19	.17	.14	.13
Motor Fuel	1 .	2.93	1.36	1.17	1.08	1.08	1.00	1.00	.95	.91	.84	.76	.65	.48	.21
	2 .	2.82	1.30	1.12	1.05	1.04	.97	.97	.92	.88	.82	.74	.63	.47	.24
Motor Weight and Fees	1 .	.60	.54	.54	.59	.53	.58	.53	.54	.47	.44	.44	.41	.34	.23
	2 .	.52	.49	.50	.57	.50	.55	.51	.52	.45	.42	.43	.39	.32	.25
Intangible	1 .	.12	.07	.06	.05	.05	.04	.04	.04	.04	.03	.03	.03	.03	.21
	2 .	.09	.05	.05	.04	.04	.04	.03	.03	.03	.03	.03	.02	.02	.21
Stamp Tax	1 .	.06	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.00
	2 .	.06	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01

Table 23.--Continued.

Tax		Income Brackets (Thousands of Dollars) Tax as a Percentage of Income													
		Under 1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-12	12-15	15-25	Over 25
Franchise	1 .	.80	.46	.38	.33	.30	.28	.26	.25	.23	.22	.21	.20	.17	.13
	2 .	.60	.35	.30	.28	.26	.24	.22	.20	.19	.18	.17	.16	.14	.19
Corporate	1 .	1.19	.69	.56	.49	.45	.41	.39	.37	.35	.33	.32	.29	.26	.19
Income	2 .	.00	.06	.10	.22	.24	.20	.19	.11	.09	.07	.06	.06	.10	.64
	3 .	.59	.37	.33	.36	.34	.31	.29	.24	.22	.20	.19	.18	.18	.41
Cigarette	1 .	1.16	.66	.64	.52	.52	.48	.46	.41	.40	.33	.32	.26	.21	.09
	1*.	1.15	.66	.63	.52	.52	.47	.46	.41	.39	.33	.32	.26	.21	.09
Alcohol	1 .	2.08	.68	.55	.65	.66	.60	.63	.52	.57	.46	.49	.38	.34	.25
	1*.	2.07	.68	.55	.65	.66	.60	.62	.52	.56	.46	.49	.38	.33	.24
Insurance	1 .	.20	.14	.16	.13	.10	.12	.19	.17	.14	.18	.15	.15	.16	.15
Premiums	1*.	.20	.14	.16	.13	.10	.12	.19	.17	.14	.18	.15	.15	.16	.15
Unemployment	1 .	1.66	.96	.78	.69	.62	.58	.54	.51	.49	.47	.44	.41	.36	.27
Compensation	1*.	.91	.54	.48	.45	.44	.44	.44	.44	.44	.43	.42	.39	.35	.24
Inheritance	1 .	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.33
	1*.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.32
State Personal	1 .	.00	.00	.01	.02	.14	.39	.62	.78	.64	.92	1.01	1.18	1.27	1.25
Income	1*.	.00	.00	.01	.02	.13	.39	.61	.77	.63	.91	1.01	1.18	1.26	1.23
City Personal	1 .	.00	.00	.04	.13	.21	.25	.29	.31	.33	.34	.34	.33	.33	.23
Income	1*.	.00	.00	.04	.12	.21	.25	.29	.31	.33	.34	.33	.33	.33	.22
Totals	1 .	55.72	21.90	17.28	15.03	13.86	13.04	12.85	11.94	11.47	11.08	10.89	10.06	9.01	6.92
	2 .	49.36	19.14	15.47	13.82	12.90	12.16	12.03	11.12	10.63	10.27	10.13	9.41	8.56	7.75
Income	1 .	.15	.28	1.21	1.29	1.83	2.92	2.37	4.10	3.64	2.28	4.76	7.30	9.58	4.41
Adjustment	2 .	.26	.97	3.34	5.38	6.89	8.82	9.25	11.53	11.30	9.64	19.74	28.17	51.53	80.11
(Millions of Dollars)															

and a case 1*. In this example, the effective tax rates are slightly different between case 1 and case 1*. This difference results from the fact that the definition of income is a function of the shifting assumptions. Specifically, all unshifted business taxes are added to the basic definition of income employed. This concept which is more fully explained in Chapter II, is referred to as the income adjustment. In other words, the effective tax rate for a particular tax is a function of 3 variables; the shifting assumption for the tax under consideration, the basic definition of income, as well as the shifting assumptions of the other taxes included in the study. Income adjustment estimates for each income bracket are presented at the bottom of Table 23. For example, this means that total money income for the income bracket $1,000-$2,000 is increased by $.28 million under the least progressive set of shifting assumptions and by $.97 million under the most progressive set.

Finally, Table 23 indicates the total effective tax rate for the entire tax structure for both the least progressive and most progressive set of shifting assumptions. Specifically, the least progressive result (case 1) is calculated by summing the least progressive shifting assumption or case 1 for each tax. The most progressive result (case 2) is calculated by summing the most progressive assumption or case 2 (1*) for each tax.

Of all the data presented in Table 23, the single most striking result concerns the total effective rate borne by the lowest income bracket, under $1,000. Under the least progressive set of assumptions, the data indicate that this bracket paid 55.72 percent of its money income in state and local taxes. A review of the data upon which this result is based leads to two alternative explanations. First, it could be concluded that many families in this income bracket consumed many times beyond their income. For example, Appendix A, Table C-2 indicates that approximately 1,100 families who received less than $1,000 in money income resided in houses valued between $35,000 and $50,000, while another 200 families resided in houses valued in excess of $50,000.[1] Alternatively, it could be argued that data for the lowest income bracket is poor, since data pertaining to this bracket is significantly affected by a few unusual situations. In any event, the data are sufficiently suspect that further discussion of the results ignores the lowest income bracket.

The most important conclusion derived from Table 30 is that Michigan's 1970 tax structure was clearly regressive. In fact, the structure was monotonically regressive for all income brackets under both sets of shifting assumptions. In addition to being monotonically regressive, the tax structure was significantly regressive.

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[1] An obvious potential explanation is that such families are substantial dissavers.

For example, under the most progressive set of shifting assumptions, the income bracket $1,000-$2,000 paid 19.14 percent of its income in Michigan taxes while the income bracket over $25,000 paid only 7.75 percent. This means that the effective tax rate for the income bracket $1,000-$2,000 was two and one-half times the effective tax for the highest income bracket, over $25,000. This disparity increases to approximately three times under the least progressive set of assumptions.

A review of the individual taxes indicates that regressivity was the rule rather than the exception for Michigan's 1970 tax structure. With only four exceptions,[2] every tax examined was regressive. Even the four exceptions, which include the inheritance tax, the intangibles tax, the city personal income tax, and the state personal income tax, provide little encouragement. The inheritance and intangibles taxes are assumed borne by the upper income brackets and are therefore progressive by assumption. The city personal income tax is only progressive up to the income bracket $9,000 to $10,000 when it becomes proportional until the income bracket over $25,000, when it becomes regressive. The state personal

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[2]The corporate income tax indicates some progressivity under the most progressive shifting assumption. In addition, the property tax on automobile manufacturing indicates some progressivity although, the total tax burden is very small.

income tax is progressive up to the income bracket over $25,000, when even this tax becomes slightly regressive.

One of the primary objectives of this study is to analyze the importance of alternative shifting assumptions. Table 23 indicates that the introduction of alternative shifting assumptions, as defined in this study, produce only modest differences in the total effective tax rates. For example, the effective tax rate for the income bracket $1,000-$2,000 fell from 21.90 percent under case 1 to 19.14 percent under case 2, or an absolute reduction of 2.76 percentage points. For the income bracket $10,000-$12,000, the effective rate fell from 10.89 percent to 10.13 percent, or an absolute reduction of only .76 percentage points. The highest income brackets, over $25,000, exhibits the only increase, rising from 6.92 percent to 7.75 percent, or an absolute change of .83 percentage points. In dollar terms, an increase of .83 percentage points for the highest income bracket, based on an average income of $38,943, implies an increase in total taxes of only $323. It is the conclusion of this study that the degree of regressivity is only modestly[3] affected by alternative shifting assumptions.

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[3] In percentage terms, the difference for a given income bracket between the two sets of shifting assumptions ranged from 14.42 percent to 5.26 percent. For nine of the income brackets the percentage change was less than 8 percent.

A graphic presentation of the effective tax rates under the least and most progressive shifting assumptions is presented in Figure 1. The graph dramatically re-emphasizes two important conclusions. First, the 1970 tax structure was clearly regressive and second, alternative shifting assumptions produce only modest differences.

Tax incidence results based on broad income are presented in Table 24. The format for Table 24 is analogous to Table 23. As expected, the effective tax rates under broad income are significantly lower than those calculated under money income. That is, if the income base is increased while taxes are held constant, then obviously the tax as a percentage of income will fall. The important conclusion, however, concerns the new relationship between the income brackets. Comparing the least progressive set of shifting assumptions (case 1) under both money income and broad income indicates that the tax structure becomes more regressive under a broad definition of income. For example, given the least progressive set of shifting assumptions, the effective tax rate for the income bracket $1,000-$2,000 decreased from 21.90 percent under money income to 18.43 under broad income, or an absolute reduction of 3.47 percentage points. Given the same set of conditions, the effective tax rate for the income bracket over $25,000 fell from 6.92 percent to 4.02, or an absolute reduction of 2.90 percentage points. Therefore, the effective tax rate for the income bracket $1,000-$2,000

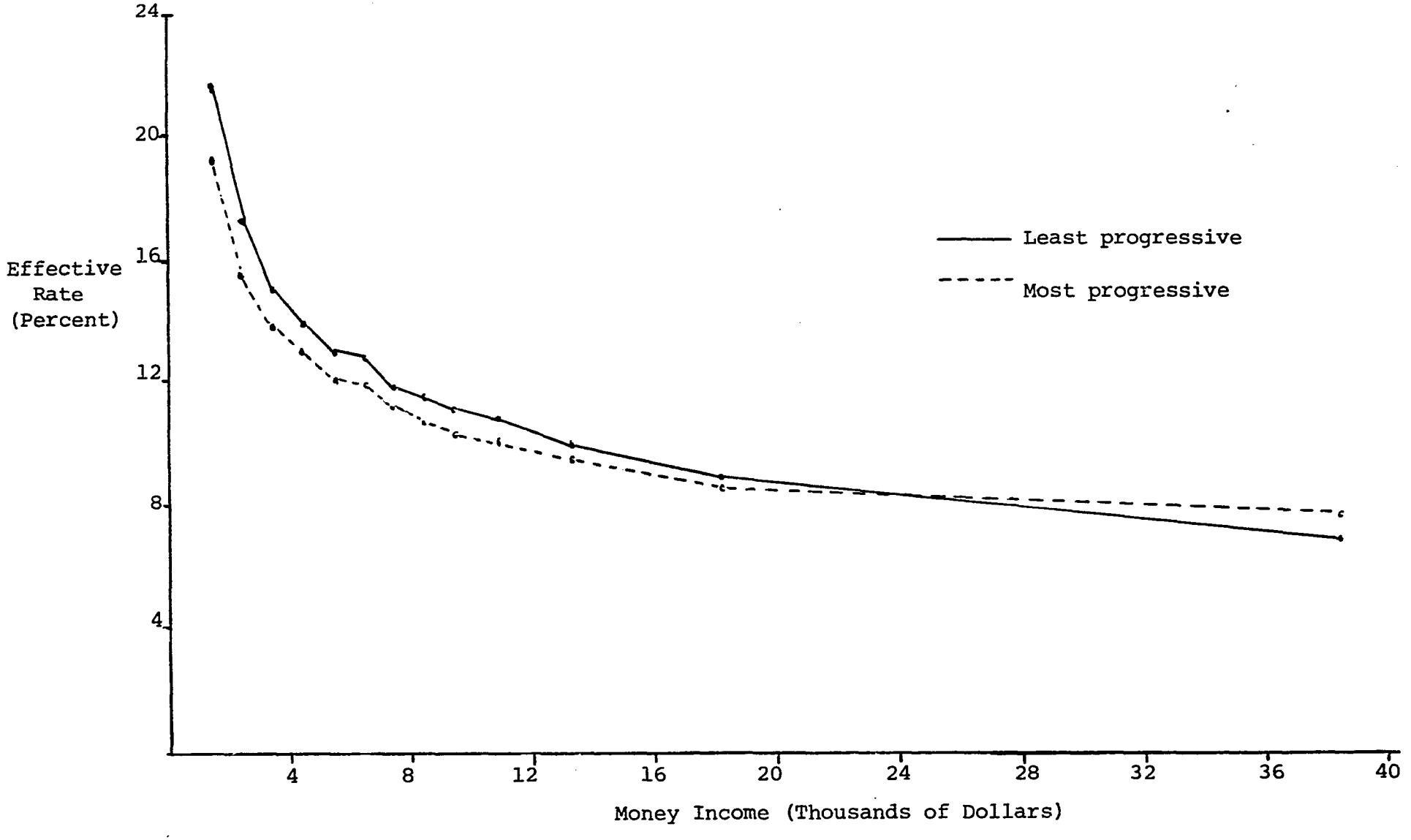

Figure 1. Graphic Presentation of the Effective Tax Rates Under the Most and Least Progressive Shifting Assumptions Under a Money Definition of Income.

Table 24.--Effective Rates of Michigan's State and Local Taxes Based Upon a Distribution of Broad Income.

Tax		Income Brackets (Thousands of Dollars) Tax as a Percentage of Income													
		Under 1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-12	12-15	15-25	Over 25
Property Tax															
Owner-occupied	1.	12.96	4.24	2.77	2.30	1.96	1.62	1.76	1.53	1.69	1.67	1.83	1.74	1.57	.65
Houses	1*.	12.94	4.23	2.76	2.28	1.94	1.60	1.75	1.52	1.69	1.66	1.82	1.74	1.56	.65
Rented	1.	7.44	2.44	1.56	1.17	.98	.87	.74	.59	.53	.41	.32	.22	.14	.05
Residences	2.	5.57	1.84	1.29	1.06	.90	.76	.64	.50	.43	.33	.26	.18	.13	.13
Automobile	1.	.00	.02	.01	.02	.01	.02	.03	.04	.04	.03	.04	.04	.04	.02
Manufacturing	2.	.00	.02	.01	.02	.01	.02	.02	.03	.03	.03	.03	.03	.03	.02
Non-Automobile	1.	.18	.11	.09	.08	.07	.06	.06	.06	.06	.05	.05	.05	.04	.02
Manufacturing	2.	.09	.06	.05	.05	.04	.04	.04	.03	.03	.03	.03	.03	.02	.03
	3.	.13	.09	.07	.06	.05	.05	.05	.05	.04	.04	.04	.04	.03	.02
Commercial	1.	2.23	1.42	1.13	.96	.85	.79	.74	.72	.70	.67	.64	.59	.52	.28
	2.	1.68	1.08	.88	.77	.69	.64	.61	.58	.56	.53	.51	.47	.43	.34
Utilities	1.	5.00	1.70	1.24	.76	.65	.58	.51	.45	.45	.43	.40	.33	.26	.11
	1*.	4.99	1.69	1.24	.76	.65	.58	.51	.45	.44	.43	.40	.33	.26	.11
Agricultural	1.	.50	.19	.34	.29	.32	.39	.27	.32	.25	.16	.16	.16	.12	.07
	2.	.23	.10	.34	.29	.34	.43	.27	.36	.26	.15	.14	.16	.12	.07
Sales	1.	5.06	3.16	2.66	2.31	2.05	1.92	1.83	1.81	1.77	1.70	1.65	1.47	1.24	.71
	2.	4.89	3.06	2.58	2.25	2.00	1.88	1.79	1.76	1.73	1.66	1.61	1.44	1.22	.75
Use	1.	.97	.45	.35	.27	.23	.22	.20	.20	.19	.18	.18	.15	.12	.06
	2.	.90	.41	.32	.25	.21	.20	.19	.19	.17	.16	.16	.14	.12	.07
Motor Fuel	1.	2.24	1.15	.96	.85	.83	.78	.78	.76	.75	.69	.63	.54	.39	.12
	2.	2.16	1.09	.92	.83	.81	.75	.76	.74	.73	.67	.61	.52	.38	.14
Motor Weight and Fees	1.	.46	.45	.44	.47	.41	.45	.41	.44	.39	.36	.37	.34	.27	.13
	2.	.40	.41	.41	.45	.39	.43	.40	.42	.37	.34	.35	.32	.26	.15
Intangible	1.	.09	.06	.05	.04	.04	.03	.03	.03	.03	.03	.03	.02	.02	.12
	2.	.07	.05	.04	.03	.03	.03	.03	.02	.02	.02	.02	.02	.02	.12
Stamp Tax	1.	.05	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.00
	2.	.04	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.00

Table 24.--Continued.

Tax		Income Brackets (Thousands of Dollars) Tax as a Percentage of Income													
		Under 1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-12	12-15	15-25	Over 25
Franchise	1 .	.61	.39	.31	.26	.23	.22	.20	.20	.19	.18	.18	.16	.14	.08
	2 .	.46	.30	.24	.22	.20	.18	.17	.16	.15	.15	.14	.13	.12	.11
Corporate	1 .	.91	.58	.46	.39	.35	.32	.30	.30	.29	.27	.26	.24	.21	.11
Income	2 .	.00	.05	.08	.18	.18	.16	.15	.09	.07	.06	.05	.05	.08	.37
	3 .	.45	.31	.27	.28	.26	.24	.22	.19	.18	.17	.16	.15	.14	.24
Cigarette	1 .	.88	.56	.52	.41	.41	.37	.36	.33	.32	.27	.26	.21	.17	.06
	1*.	.88	.56	.52	.41	.40	.37	.36	.33	.32	.27	.26	.21	.17	.05
Alcohol	1 .	1.59	.58	.45	.52	.51	.47	.49	.42	.47	.38	.41	.31	.27	.14
	1*.	1.58	.57	.45	.51	.51	.47	.48	.42	.46	.38	.41	.31	.27	.14
Insurance	1 .	.15	.12	.13	.10	.08	.09	.15	.14	.11	.15	.12	.12	.13	.09
Premiums	1*.	.15	.12	.13	.10	.08	.09	.15	.14	.11	.15	.12	.12	.13	.09
Unemployment	1 .	1.27	.81	.64	.54	.48	.45	.42	.41	.40	.38	.36	.34	.29	.16
Compensation	1*.	.69	.46	.39	.36	.34	.34	.35	.36	.36	.35	.34	.32	.29	.14
Inheritance	1 .	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.19
	1*.	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.19
State Personal	1 .	.00	.00	.00	.01	.11	.30	.48	.63	.52	.75	.84	.98	1.03	.73
Income	1*.	.00	.00	.00	.01	.10	.30	.48	.63	.52	.75	.83	.97	1.03	.72
City Personal	1 .	.00	.00	.03	.10	.16	.19	.23	.25	.27	.28	.28	.27	.27	.13
Income	1*.	.00	.00	.03	.10	.16	.19	.22	.25	.27	.27	.28	.27	.26	.13
Totals	1 .	42.57	18.43	14.18	11.86	10.73	10.15	9.98	9.64	9.43	9.04	9.00	8.29	7.33	4.02
	2 .	37.72	16.11	12.70	10.93	10.01	9.48	9.37	8.99	8.75	8.39	8.38	7.76	6.97	4.53
Income	1 .	.15	.28	1.21	1.29	1.83	2.92	2.37	4.10	3.64	2.28	4.76	7.30	9.58	4.41
Adjustment	2 .	.26	.97	3.34	5.38	6.89	8.82	9.25	11.53	11.30	9.64	19.74	28.17	51.53	80.11
(Millions of Dollars)															

fell by 15.8 percent, while the effective tax rate for the income bracket over $25,000 fell by 41.9 percent. In other words, under money income, the income bracket $1,000-$2,000 paid approximately three times the effective rate borne by the income bracket over $25,000, while under broad income the income bracket $1,000-$2,000 paid 4.6 times the effective rate borne by the income bracket over $25,000.

A graphic presentation of the effective rates under the least progressive set of shifting assumptions comparing broad income and money income is presented in Figure 2. This graph illustrates the third major conclusion of this study, effective tax rates by income bracket are more regressive under broad income than under money income.

The results from this study do not correspond with the results obtained by Pechman and Okner.[1] Specifically, this study concludes that under either set of shifting assumptions, the tax structure is monotonically regressive. Pechman and Okner concluded that the effective tax rates for all state and local taxes were regressive under certain conditions and U-shaped under other conditions.[2] This disparity in results, however, does not imply that the two studies are in conflict. It does mean that different

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[1]Pechman and Okner, Who Bears the Tax Burden?

[2]Ibid., p. 62.

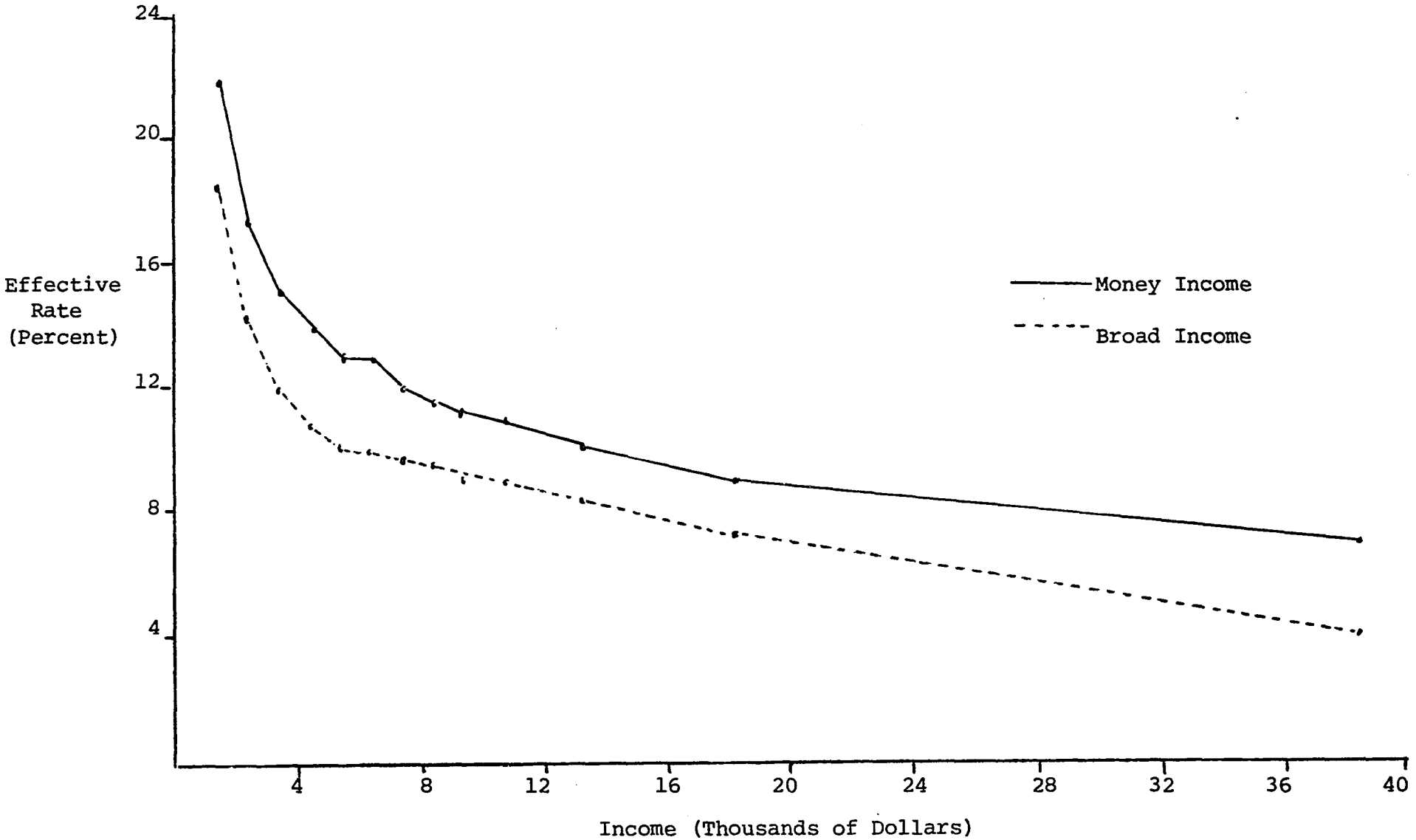

Figure 2. Graphic Presentation of the Effective Tax Rates Under the Least Progressive Shifting Assumptions for Broad Income and Money Income.

frameworks were employed and that different frameworks produce different results. Pechman and Okner examined all state and local taxes, which eliminated any concern on their part for exported taxes. This study examined Michigan's state and local taxes indpendent of all other tax structures and therefore exported taxes are relevant. Since exported taxes equal approximately 30 percent of total tax collections in this study, and since the individual tax off-set is particularly regressive, it is not surprising that dramatic differences could result. Therefore, it is entirely possible that an examination of Michigan's state and local taxes, independent of other tax structures, could produce regressive results, while a study which simultaneously examined all state and local tax structures could indicate U-shaped or partially progressive results.

Summary

Four separate conclusions are reached in this study. First, Michigan's 1970 state and local tax structure was clearly regressive. Second, the structure was monotonically regressive, independent of the tax shifting assumptions examined. Third, alternative shifting assumptions, at least as defined within this study, produce only modest differences in the final results. Finally, broad income, as developed in this study, increases the regressivity of the results compared with money income. These results are summarized in Tables 25 and 26.

Table 25.--Tax as a Percentage of Money Income--Summary Table.

Tax		Income Brackets (Thousands of Dollars) Under 5	5-10	10-15	15-25	Over 25
				(Percentage)		
Property Taxes[a]	1.	9.10	4.68	3.95	3.29	2.07
	2.	8.34	4.35	3.68	3.13	2.31
Consumption Taxes[b]	1.	6.78	4.98	4.04	3.21	2.24
	2.	6.56	4.86	3.94	3.14	2.38
Personal Income Taxes[c]	1.	.15	1.02	1.45	1.59	1.48
	1*.	.15	1.02	1.44	1.59	1.46
Corporate Income and Franchise Fee	1.	.92	.60	.51	.43	.32
	2.	.47	.32	.22	.24	.82
Other Taxes[d]	1.	.84	.55	.46	.49	.81
	2.	.55	.48	.43	.47	.78
Total	1.	17.79	11.83	10.41	9.01	6.92
	2.	16.07	11.03	9.71	8.57	7.75

[a]Equals the sum of the seven sub-classes of property examined in this study.

[b]Includes sales, use, motor fuel, motor weight and fees, cigarette, alcohol, and insurance premiums.

[c]Includes both state and city personal income tax.

[d]Includes intangible, stamp tax, inheritance and unemployment compensation.

Table 26.--Tax as a Percentage of Broad Income--Summary Table.

Tax		Income Brackets (Thousands of Dollars)				
		Under 5	5-10	10-15	15-25	Over 25
		(Percentage)				
Property Taxes[a]	1.	7.26	3.77	3.26	2.68	1.20
	2.	6.67	3.51	3.04	2.54	1.35
Consumption Taxes[b]	1.	5.41	4.01	3.34	2.61	1.30
	2.	5.25	3.91	3.25	2.55	1.39
Personal Income Taxes[c]	1.	.12	.82	1.19	1.30	.86
	1*.	.12	.82	1.19	1.29	.85
Corporate Income and Franchise Fee	1.	.74	.49	.42	.35	.19
	2.	.37	.25	.18	.20	.48
Other Taxes[d]	1.	.67	.44	.38	.40	.47
	2.	.44	.38	.36	.39	.45
Total	1.	14.20	9.53	8.59	7.34	4.02
	2.	12.85	8.87	8.02	6.97	4.52

[a]Equals the sum of the seven sub-classes of property examined in this study.

[b]Includes sales, use, motor fuel, motor weight and fees, cigarette, alcohol, insurance premiums.

[c]Includes both state and city personal income tax.

[d]Includes intangible, stamp tax, inheritance and unemployment compensation.

APPENDICES

APPENDIX A

INDIVIDUAL FEDERAL TAX OFF-SET

APPENDIX A

INDIVIDUAL FEDERAL TAX OFF-SET

An individual federal tax off-set is calculated for each income bracket. The calculations are presented below. Specifically, column (1) lists the percentage of itemized federal returns filed by Michigan residents for 1970. Column (2) presents the average marginal tax rate for each income bracket. Column (3) which is the product of columns (1) and (2) indicates the federal tax off-set based on adjusted gross income. Column (3) is adjusted for the difference between adjusted gross income and money income. That is, many families receive additional money income which is not included in the definition of adjusted gross income. The adjustment procedure is identical to the procedure used to adjust dividend income (see Appendix B). Column (4) presents the estimated individual federal tax off-set based on money income.

Table A-1.--Estimating the Federal Tax Off-Set.

Income Brackets (Thousands of Dollars)	(1) Percentage of Federal Returns Itemized	(2) Average Marginal Rates (Percent)	(3) Federal Tax Off-Set Based on AGI	(4) Adjusted Federal Tax Off-Set Based on Money Income
Under $1	1.05	0	0	0
1-2	3.47	14	.49	0
2-3	12.64	15	1.90	.40
3-4	28.82	16	4.61	1.69
4-5	38.79	18	6.98	4.61
5-6	43.03	18	7.21	7.03
6-7	47.05	18	8.49	7.80
7-8	52.35	20	10.47	9.67
8-9	59.24	20	11.85	11.41
9-10	61.69	20	12.34	12.20
10-12	69.92	20	13.94	13.66
12-15	79.99	23	18.40	17.99
15-25	89.99	25	22.50	22.46
Over 25	96.40	43	41.45	39.50

Source: U.S. Treasury Department, Internal Revenue Service, Statistics of Income--1970, Individual Income Tax Returns (Washington, D.C.: Government Printing Office, 1972).

APPENDIX B

DISTRIBUTION OF DIVIDENDS

APPENDIX B

DISTRIBUTION OF DIVIDENDS

The distribution of dividends is obtained from The Statistics of Income--1970 Individual Income Tax Returns by the Internal Revenue Service. The distribution presents the relationship between adjusted gross income and total taxable dividends for all U.S. taxpayers. There are three problems associated with this data.

1. The data presents national statistics and not state statistics.

2. The data presents taxable dividends and therefore excludes dividends received which are not subject to tax. Each taxpayer is entitled to a $100 exclusion from dividends received. On joint returns, the maximum exclusion was $200 if both husband and wife received eligible dividends, each excluding up to $100 against his respective dividend income.

3. The definition of income is "adjusted gross income" (AGI) which will tend to over-estimate the amount of dividends received by lower income classes since more

people are included in those brackets than would be included under a money income definition.

Solutions:

1. A distribution of dividend income by income class was not available for the state. Therefore it was assumed that the national distribution was a proxy for the state distribution.

2. An adjustment was made to include some of the dividends not reported due to the exclusion provision. For each income bracket the number of returns indicating dividend income was multiplied by $100. For a return to indicate any taxable dividends it must have had at least $100 in addition to the dividends reported. The additional dividends were added to the taxable dividends and a percentage distribution determined. This procedure does not correct for any dividends received under a $100 in value.

3. The distribution of dividends corrected for the exclusion provision is adjusted again for the difference between "adjusted gross income" and "money income."

This adjustment procedure is necessitated by the fact that the distribution of dividends based on AGI overstates the amount of dividends received by the lower income brackets. For example, suppose a family receives $3,500 in AGI of which $10 is dividends and an additional $2,000 in social security. In terms of money income, this family is included in the $5,000-$6,000 income

bracket. However, the $10 in dividend income would be attributed to the income bracket $3,000-$4,000 if no adjustment was made.

The specific adjustment process makes several assumptions. It assumes that a relationship exists between AGI and the distribution of dividend income and that this relationship is linear from one income bracket to another. In addition, the procedure assumes the appropriate adjusted gross income figure for each money income bracket equals the sum of wages and salaries, farm self-employment, non-farm self-employment, and other income presented in Table 3.

Table B-1 presents the specific calculations. The first column indicates the estimated average adjusted gross income based on money income; the second column indicates the average adjusted gross income per return based on IRS data; while the third column indicates the cumulative percentage distribution of dividends based on AGI as provided by IRS.

The following example illustrates the procedure. Based on IRS data the average AGI per return for the income bracket $1,000-$2,000 is $1,483 and corresponds to a cumulative 1.21 percent of the dividends, and likewise $2,000-$3,000 equals $2,466 and corresponds to a cumulative 3.30 percent. The estimated average AGI per family based on money income for the income bracket $3,000-$4,000 amounts to $2,319. Since $2,319 falls in between $1,483 and $2,466, this study assumes that $2,319 corresponds to

Table B-1.--Correlating Adjusted Gross Income and Money Income.

Income Brackets (Thousands of Dollars)	(1) Estimated AGI Based on Money Income (Dollars)	(2) Average AGI per Return Based on IRS Data (Dollars)	(3) Cumulative Distribution of Dividends Adjusted for Dividend Exclusion (Percent)
Under $1	143	555	.31
1-2	567	1,483	1.21
2-3	1,317	2,466	3.30
3-4	2,319	3,480	5.41
4-5	3,479	4,473	7.51
5-6	4,667	5,479	10.18
6-7	5,918	6,454	12.20
7-8	7,052	7,458	14.50
8-9	8,139	8,461	16.68
9-10	9,161	9,442	18.85
10-12	10,659	10,916	22.91
12-15	13,092	13,314	28.65
15-25	18,169	18,219	44.23
Over 25	38,755	41,114	99.99

2.99

Note: Average AGI per return was calculated by dividing total returns into total AGI (excluding taxable capital gains).

Source: See text.

2.99 percent (a strictly linear relationship). From this procedure, an adjusted cumulative distribution of dividends is calculated which is based on the definition of money income. It is then a simple process to calculate the distribution of dividends by income class from the cumulative distribution.

This procedure is subject to several criticisms. First, the various estimates of AGI based on money income (Table B-1, column 1) over-estimate actual AGI for lower income classes because such items as veteran's benefits, workmen's compensation and some pensions which are included are not part of AGI. Second, average AGI per return is not the same as estimated AGI per family. However, the adjustment results in a distribution in which a smaller amount is apportioned to the lower income brackets. The procedure is reasonable even if imperfect, and is therefore accepted as a closer approximation to reality.

The following table, B-2, presents the distribution of dividends adjusted for both the dividend exclusion and the difference in the definition of income.

Table B-2.--Distribution of Dividends.

Income Bracket (Thousands of Dollars)	Dividend (Percent)
Under $1	0
1-2	.32
2-3	.73
3-4	1.94
4-5	2.42
5-6	2.63
6-7	3.07
7-8	2.46
8-9	2.41
9-10	2.25
10-12	3.97
12-15	5.92
15-25	15.93
Over 25	55.95
	100.00

Source: See text.

APPENDIX C

HOUSE VALUES

APPENDIX C

HOUSE VALUES

The distribution of house values was obtained from a special tabulation of Census data (Public Use Samples). The data indicate the average house value for each income class as well as a breakdown on the number of houses in each bracket which are owner-occupied.

The distribution of total house value for each class was calculated by weighting the average house value by the number of homes in the bracket. The total amount was summed and a percentage distribution calculated.

Table C-1 presents the calculations. Table C-2 provides the raw data obtained from the Public Use Samples.

Table C-1.--House Values (1).

Distribution of Home Values			
(1) Money Income (Thousands of Dollars)	(2) Average Home Value (Dollars)	(3) Sample Distribution of the Number of Homes	(4) Percentage Distribution
Under $1	13,617	431	1.77
1-2	13,338	663	2.67
2-3	13,067	584	2.30
3-4	14,474	448	2.44
4-5	14,716	423	2.32
5-6	14,827	526	2.35
6-7	15,108	630	2.87
7-8	15,456	717	3.35
8-9	15,782	970	4.62
9-10	16,674	999	5.03
10-12	18,384	2,203	12.23
12-15	20,996	2,737	17.35
15-25	25,186	3,829	29.11
Over 25	40,258	953	11.58
		16,323	99.99

Column (1) Income was defined as Census income. An entire family was counted as one unit and income equaled total income of the family. In the case of unrelated individuals, the income was the income of the primary individual.

Column (2) See Table C-2.

Source: U.S. Bureau of the Census, "Public Use Sample Tapes," Census of Population: 1970.

Table C-2.--House Value by Income Bracket, Michigan, 1970.

Income Brackets (Thousands of Dollars)	House Value (Thousands of Dollars)												
	Under 5	5-7.5	7.5-10	10-12.5	12.5-15	15-17.5	17.5-20	20-25	25-35	35-50	Over 50	Total Units In Sample	Average House Value (Dollars)[a]
Under 1	43	74	56	67	49	47	23	32	27	11	2	431	$13,617
1-2	64	99	107	112	87	54	42	44	38	11	5	663	13,338
2-3	42	82	105	101	63	63	44	55	23	5	1	584	13,067
3-4	30	60	88	101	65	56	53	65	27	11	2	558	14,474
4-5	40	47	71	94	58	67	44	47	46	7	2	523	14,716
5-6	35	40	77	91	75	64	42	59	30	10	3	526	14,827
6-7	29	64	89	92	85	95	68	62	24	17	5	630	15,108
7-8	27	51	95	131	101	97	76	79	41	14	5	717	15,456
8-9	27	69	117	144	155	138	117	114	74	10	5	970	15,782
9-10	15	66	98	137	143	154	134	156	74	18	4	999	16,674
10-12	30	83	162	236	310	321	319	406	275	51	10	2,203	18,394
12-15	27	61	142	248	284	319	381	629	484	131	31	2,737	20,996
15-25	20	45	112	204	262	391	505	801	952	431	106	3,829	25,186
Over 25	6	4	15	23	36	40	50	114	196	217	252	953	40,258
												16,323	

[a]The average values were calculated based on the following assumptions: (a) the mid-point of the house bracket represented the bracket, (b) the bracket below 5,000 was assumed $3,000, and (c) the bracket over $50,000 was assumed $70,000.

Source: U.S. Bureau of the Census, "Public Use Sample Tapes," Census of Population: 1970 (1 percent state sample).

APPENDIX D

ESTIMATING THE PERCENTAGE DISTRIBUTION OF WAGES AND SALARIES, NONFARM SELF-EMPLOYMENT AND FARM SELF-EMPLOYMENT INCOME

APPENDIX D

ESTIMATING THE PERCENTAGE DISTRIBUTION OF WAGES AND SALARIES, NONFARM SELF-EMPLOYMENT AND FARM SELF-EMPLOYMENT INCOME

Identical procedures are employed to estimate the percentage distribution of wages and salaries, nonfarm self-employment and farm self-employment income. In each case, the mean values of the respective income for each income class reported in Table 3 is weighted by the distribution of units (families and unrelated individuals) reported in Table 2. The amount is summed and a percentage distribution calculated. This procedure is numerically illustrated in Table D-1, which estimates the percentage distribution of wages and salaries.

Table D-1.--Percentage Distribution of Wages and Salaries.

Income Brackets (Thousands of Dollars)	Mean Value of Wages and Salaries (Dollars)	Distribution of Units (Hundreds)	Estimated Total Wages and Salaries (Thousands of Dollars)	Percentage Distribution of Wages and Salaries
Under $1	$ 102	1,816	18,523	.08
1-2	375	2,076	77,850	.32
2-3	829	1,565	129,739	.53
3-4	1,525	1,356	206,790	.84
4-5	2,501	1,231	307,873	1.26
5-6	3,614	1,275	460,785	1.88
6-7	4,848	1,369	663,691	2.71
7-8	6,150	1,613	991,995	4.05
8-9	7,333	1,782	1,306,741	5.34
9-10	8,295	1,729	1,434,206	5.86
10-12	9,779	3,314	3,240,761	13.24
12-15	12,018	3,814	4,583,665	18.73
15-25	16,340	4,802	7,846,468	32.07
Over-25	26,585	1,205	3,203,493	13.09
		28,947	24,472,580	100.00

Sources: See text.

APPENDIX E

DISTRIBUTION OF IMPUTED FARM INCOME

APPENDIX E

DISTRIBUTION OF IMPUTED FARM INCOME

Imputed farm income is divided into two categories: imputed food and fuel consumed in the farm and imputed rent of owner-occupied farm dwellings. The respective distributions are presented in Table E-1.

1. Food and fuel are distributed on the basis of families living on a farm. (Census refers to "Rural farm.")

There is no a priori reason for assuming that as income increases the amount of self-produced food and fuel consumed increases. Common sense would tend to imply just the reverse is ture, lower income families probably consume more of their own self-production relative to income because they are compelled by economic conditions to do so.

In addition, it is reasonable to argue that "an unrelated individual" which is included in the definition of family would not consume the same percentage as a family defined as 20 or more individuals. However, unrelated individuals which are heavily concentrated in the lower income brackets will tend to give a larger percentage to the lower brackets where it probably belongs.

2. Imputed rent of owner-occupied farm dwellings is distributed on the basis of families living on farms weighted by the mean value of non-farm owner occupied homes. This procedure is not assuming that the absolute mean values of non-farm homes is the same as farm homes. It is assuming that the relative relationship between income brackets is the same for both nonfarm and farm homes.

The distribution of families living on farms includes all families. It therefore includes those who rent. From analyzing nonfarm owner-occupied homes it is clear that as income increases a larger percentage of the total families in a particular bracket own their homes. To the extent that this is true for farm families, this procedure will over-state the amount attributed to lower income classes.

Table E-1.--Percentage Distribution of Imputed Farm Income.

(1) Income Bracket (Thousands of Dollars)	(2) Percentage Distribution of Families Living on Farms	(3) Percentage Distribution of Families Living on Farms, Weighted by Nonfarm House Values
Under $1	5.80	4.34
1-2	6.32	4.64
2-3	5.91	4.25
3-4	5.47	4.36
4-5	5.05	4.09
5-6	5.66	4.62
6-7	6.87	4.88
7-8	6.53	5.55
8-9	6.88	5.97
9-10	6.32	5.80
10-12	11.58	11.72
12-15	11.93	13.78
15-25	13.18	18.26
Over 25	3.50	7.75
	100.00	100.00

Sources: Column (2)--U.S. Bureau of the Census, Census of Population: 1970, General Social and Economic Characteristics, Final Report PC(1)-C24 Michigan (Washington, D.C.: U.S. Government Printing Office, 1972).

Column (3)--The distribution in column (2) was weighted by the distribution of average house value provided in Table C-2.

APPENDIX F

TAX SHIFTING WITHIN A TWO SECTOR MODEL

APPENDIX F

TAX SHIFTING WITHIN A TWO SECTOR MODEL

The following tax shifting analysis presents one model with two interacting sectors. One sector represents a single political unit (i.e., Michigan) and is henceforth referred to as the domestic sector. The other sector represents all other political subdivisions (i.e., non-Michigan) and is henceforth referred to as the foreign sector. This presentation provides the necessary means to analyze tax shifting when the domestic sector is subject to considerable foreign influences.

Specifically, the following assumptions are postulated:

1. Total supplies of capital and labor are fixed.
2. The production function is such that an optimal combination of factor inputs exist. Factor inputs are substitutible but with declining marginal physical products. Marginal products are continuous. Constant returns to scale exist.

3. Product and factor markets are perfectly competitive (price flexibility).
4. Perfect mobility of factors such that the returns to factors in both sectors are equalized.
5. Factors receive the value of their marginal products (i.e., profit maximization).
6. Government expenditures are ignored or alternatively government expenditures are identical to the expenditures that individuals would have made in the absence of a tax.
7. The total economy consists of many firms all producing one output "X" with two inputs, capital (K) and Labor (L).

The imposition of a tax refers to a per unit tax on improvement capital.

Model

1.	$S_X = f_1(K,L)$	Domestic production function
1a.	$S_{X*} = f_1(K^*,L^*)$	Foreign production function
2.	$S_{Xt} = S_X + S_{X*}$	Total production of the commodity (S_{Xt}) equals the sum of domestic and foreign production
3.	$D_X = f_2(p_X)$	Domestic demand function
3a.	$D_{X*} = f_3(p_X^*)$	Foreign demand function
4.	$D_{Xt} = D_X + D_{X*}$	Total demand (D_{Xt}) equals the sum of the two markets
5.	$D_K = f_4(w, r, D_{Xt})$	Domestic capital demand function
5a.	$D_{K*} = f_5(w^*, r^*, D_{Xt})$	Foreign capital demand function

6.	$D_{Kt} = D_K + D_{K*}$	Total demand for capital (D_{Kt}) equals the sum of the demand in both markets
7.	$S_K = f_6(r, r^*)$	Domestic supply of capital
7a.	$S_{K*} = \bar{S}_{Kt} - S_K$	The foreign supply of capital is the residual, since by assumption the total supply of capital is $\bar{S}_{Kt}$, which is fixed
8.	$D_L = f_7(w, r, D_{Xt})$	The demand for labor in the domestic market
8a.	$D_{L*} = f_8(w^*, r^*, D_{Xt})$	The demand for labor in the foreign market
9.	$D_{Lt} = D_L + D_{L*}$	Total demand for labor (D_{Lt}) equals the sum of the demand in both markets
10.	$S_L = f_g(w, w^*)$	The supply of labor in the domestic market
10a.	$S_{L*} = \bar{S}_{Lt} - S_L$	The supply of labor in the foreign market
11.	$P_X X = wL + rK$	Cost-revenue equation--Domestic
11a.	$P_X{}^* X^* = w^*L^* + r^*K^*$	Cost-revenue equation--Foreign

In initial equilibrium some given amount of capital and labor exists in both sectors; production takes place in both sectors; commodity price and factor returns are equal between sectors (i.e., $p = p^*$, $w = w^*$, $r = r^*$).

Symbols:

S_X	Quantity of the commodity produced in domestic sector
S_{X*}	Quantity of the commodity produced in foreign sector
K	Quantity of capital in domestic sector

K^*	Quantity of capital in foreign sector
L	Quantity of labor in domestic sector
L^*	Quantity of labor in foreign sector
S_{Xt}	Total commodity production in both sectors
D_X	Quantity of commodity demanded in domestic sector
D_{X^*}	Quantity of commodity demanded in foreign sector
D_{Xt}	Total quantity of commodity demanded in both sectors
p_x	Price of commodity in domestic
p_{x^*}	Price of commodity in foreign sector
w	Return to labor in domestic sector
w^*	Return to labor in foreign sector
r	Return to capital in domestic sector
r^*	Return to capital in foreign sector
D_K	Quantity of capital demanded in domestic sector
D_{K^*}	Quantity of capital demanded in foreign sector
D_{Kt}	Total quantity of capital demanded in both sectors
S_K	Quantity of capital supplied in domestic sector
S_{K^*}	Quantity of capital supplied in foreign sector
$\bar{S}_{Kt}$	Total quantity of capital supplied, which is given
D_L	Quantity of labor demanded in domestic sector
D_{L^*}	Quantity of labor demanded in foreign sector
D_{Lt}	Total quantity of labor demanded in both sectors
S_L	Quantity of labor supplied in domestic sector
S_{L^*}	Quantity of labor supplied in foreign sector
$\bar{S}_{Lt}$	Total quantity of labor supplied, which is given

Case (a) A tax is imposed on improvement capital in the domestic sector.

Equation (7) can be rewritten such that:

(7) $S_K = f_6(r, r^*, T)$ where T = tax on capital in the domestic sector and

$$\frac{\partial S_K}{\partial T} < 0.$$

As a result of the perfect mobility assumption, capital will entirely leave the domestic sector and relocate in the foreign sector. The entrance of new capital into the foreign sector will initially increase the marginal physical product of labor (MPP_L) and thus the return to labor. Therefore, labor will also leave the domestic sector. In conclusion, all production will take place in the foreign sector and no tax is collected.

The graphic presentation below illustrates the conclusion. Figure 1 represents the total product market, Figure 2 the total capital market, and Figure 3 the total labor market. The graphs indicate that an assumed quantity of capital and labor exist in the domestic sector (OK and OL respectively) which corresponds to domestic output (OX). The price of the product and the returns to both factors of production are determined independently of the domestic sector. A tax levied solely in the domestic sector reduces the return to capital and therefore results in capital leaving the domestic sector and entering the foreign sector. Domestic firms can neither raise the price of the

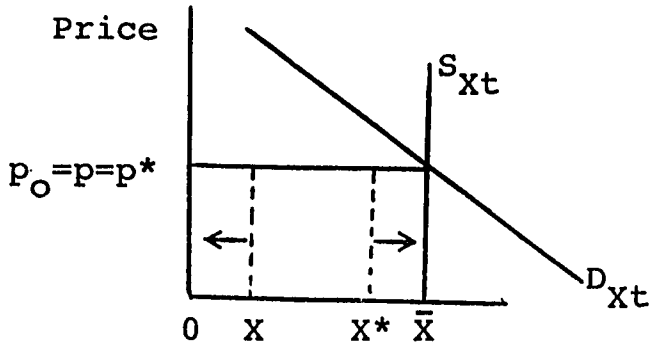

Figure 1. Product Market.

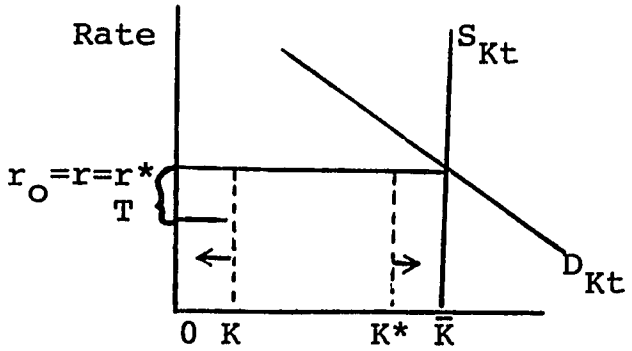

Figure 2. Capital Market.

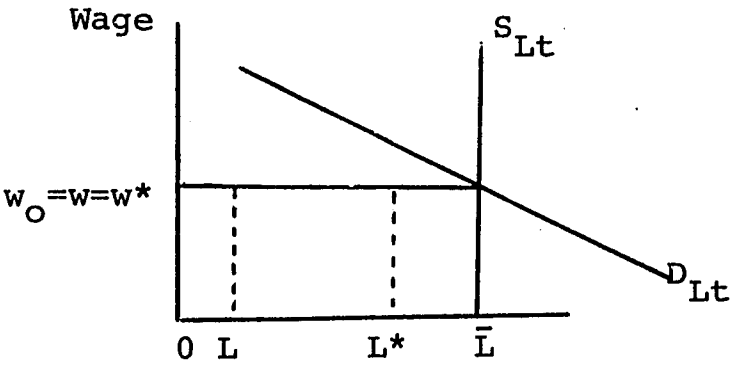

Figure 3. Labor Market.

product nor lower the return of labor. Therefore, it is impossible for domestic firms to increase the before-tax return to capital. All capital leaves the domestic sector.

Case (1b) Identical taxes are imposed in both sectors.

Equation (7) can be rewritten such that:

(7) $S_K = f_6(r, r^*, T, T^*,)$ where T^* = tax on capital in the foreign sector and

$$\frac{\partial S_K}{\partial T} < 0, \quad \frac{\partial S_K}{\partial T^*} < 0, \quad T = T^*$$

Equation (7) indicates that the supply of capital remains the same in both sectors. Since the supply is fixed, the net-return to capital falls (is capitalized). Capital bears the entire burden.

Figure 4 illustrates the classic example of a tax levied on a factor with a perfectly inelastic supply curve. The relationship between domestic capital (OK) and foreign capital (OK*) is unaltered.

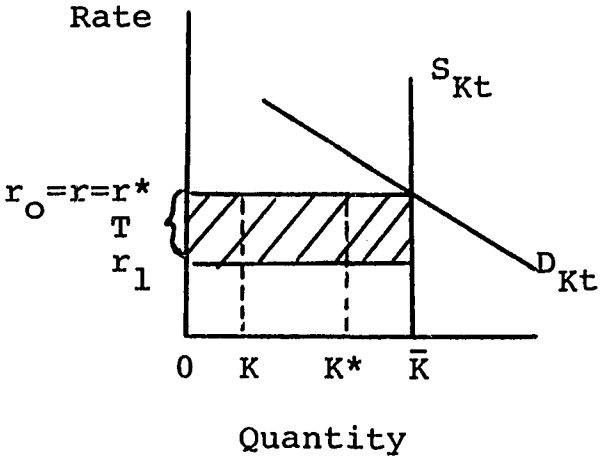

Figure 4. Capital Market.

Case (2) Capital is immobile.

The capital supply functions can be rewritten: $S_K = \bar{S}_K$ and $S_K^* = \bar{S}_K^*$. That is, the supply of capital in the respective sectors equals the supply which is initially present.

Profit maximization behavior requires firms to operate at that output/price relationship which equates marginal cost and marginal revenue. Since it is assumed that capital is both fixed (in terms of units) and immobile, a tax on capital is a fixed rather than a variable cost. Therefore, the tax does not affect the output/price relationship and thus the tax is borne by capital. This conclusion is independent of the sector in which the tax is imposed. Clearly, if the tax is only imposed on the domestic sector, then only domestic capital bears the tax.

Figures 1 and 3 are still relevant. That is, the price of the product and the return to labor are determined outside of the domestic sector. However, unlike the previous examples, the return to capital is determined within the respective sectors. Figure 5 represents the domestic capital market. A tax levied on domestic capital is borne by domestic capital independent of the foreign capital market.

Significance: In the previous example, a tax imposed solely in the domestic sector was not collected. In this example, a tax imposed solely in the domestic sector is collected and borne entirely by capital.

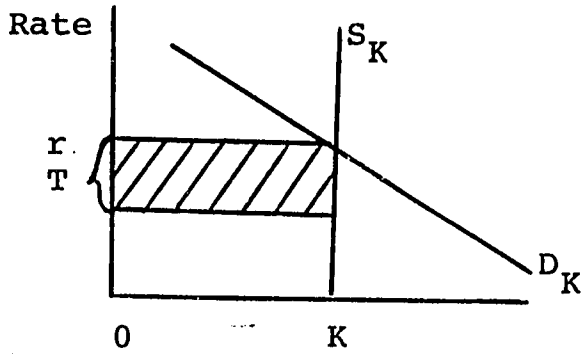

Figure 5. Domestic Capital Market.

Case (3a) A tax is imposed in the domestic sector. Product and labor competition (mobility) between sectors are eliminated. All other initial assumptions are retained.

Equations (7), (10), and (10a) can be rewritten such that:

$$(7) \quad S_K = f_6(r, r^*, T) \qquad \frac{\partial S_K}{\partial T} < 0$$

$$(10) \quad S_L = \bar{S}_L$$

$$(10a) \quad S^*_L = \bar{S}^*_L$$

The supply of labor in the respective sectors equals the supply which is initially present.

As a result of the assumed limited mobility of products and labor, adjustments depend entirely on the movement of capital. In the domestic sector, the supply of capital will fall. This will result in a decrease in the production of the commodity and an increase in its price.

The before-tax return to capital will increase. This results from both an increasing marginal physical product of capital (MPP_K) and the higher commodity price. The effect upon labor is indeterminate. On the one hand, the MPP_L falls while on the other hand, the price of the commodity increases.

In the foreign sector, the influx of new capital will increase production and lower price. The return to capital will fall as a result of a decreased MPP_K and a decreased commodity price. The effect upon labor is, again, indeterminate since the MPP_L and the commodity price move in opposite directions.

As a result of the perfect mobility of capital assumption, the return (net of tax) to capital in the domestic sector must equal the return to capital in the foreign sector. Therefore, the degree to which the tax is borne by capital depends upon the degree to which the additional capital affects output and price in the foreign sector. If it is assumed that the foreign sector is very large relative to the domestic sector, and if as a result of this assumption output and price are only marginally altered in the foreign sector, then it could be concluded that capital bears very little of the tax.

Consumers as a total group may not be worse off. That is, ignoring excess burden, consumers in the domestic sector will be paying a higher price while consumers in the foreign sector will be paying a lower price. However, if

the primary concern is the effect on domestic consumers, then part of the domestically imposed tax is shifted to domestic consumers.

Figures 6 thru 9 illustrate the analysis in the domestic sector. Figure 6 indicates that the return to capital is determined outside the domestic sector. Therefore, the supply of domestic capital is perfectly elastic at the before-tax rate of return indicated in Figure 6. The domestic capital market is illustrated in Figure 7. Figures 8 and 9 indicate that both the product price and wage rate are determined solely within the domestic sector. In addition, Figure 9 indicates the domestic supply of labor is given.

A tax levied solely in the domestic sector results in a reduction in domestic capital which results in a decrease in domestic output. As domestic output falls, the demand for labor falls which reduces the wage rate. In addition, the fall in domestic output results in a higher product price which increases both the wage rate and the before-tax returns to capital. In the foreign sector, the exact opposite effects are occurring. Capital is increasing, output is increasing, the price of the product is falling and the return to capital is falling. The total process continues until the after-tax return to capital is equalized. The particular example diagramed below indicates: (1) The domestic product price is higher (p_1) which implies that some of the tax is paid by

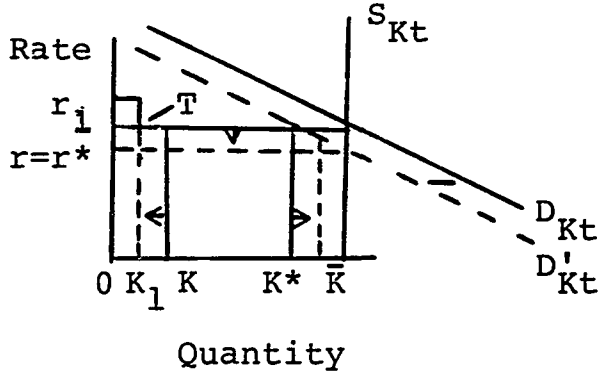

Figure 6. Total Capital Market.

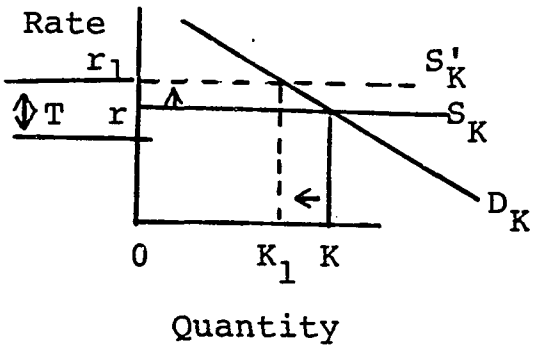

Figure 7. Domestic Capital Market.

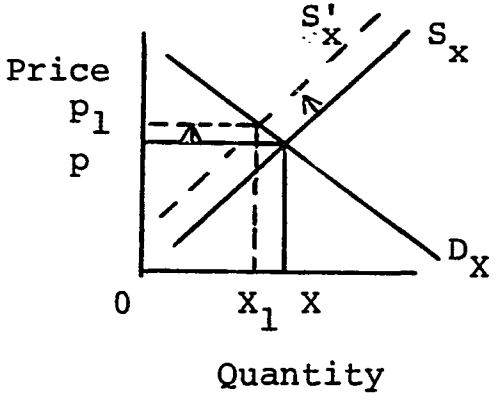

Figure 8. Domestic Product Market.

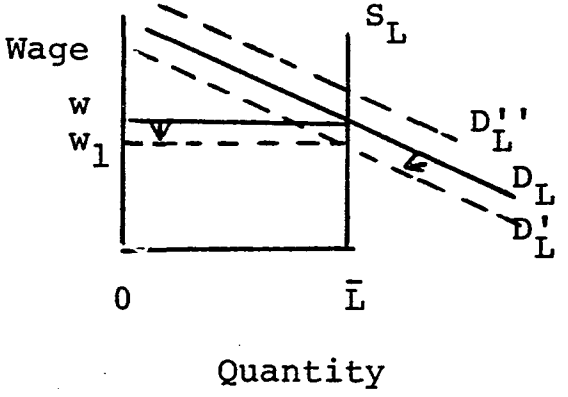

Figure 9. Domestic Labor Market

consumers. (2) The effect upon the domestic wage is indeterminate. If the percentage decrease in the MPP_L exceeds the percentage increase in price, then D_L' would result. That is, the wage rate falls and some of the tax is borne by labor. On the other hand, if the opposite is true, then D_L'' would result and the wage rate would increase. (3) The return to capital (net of tax) is lower, which implies that some of the tax is borne by capital. Specifically in the case of domestic capital, the before-tax return is higher (r_1); the net return is lower since $r + T > r_1$.

Case (3b) Identical taxes are imposed in both sectors. All other assumptions pertaining to case (3a) are retained.

The result in this example is the same as in case (1b). The supply of capital remains the same in both sectors. The tax is borne by capital.

Significance: In the previous examples, a tax imposed solely in the domestic sector was either not collected or entirely borne by capital. In this example, a tax imposed solely in the domestic sector is at least partially (probably highly) shifted to the consumer.

Case (4a) A tax is imposed in the domestic sector. It is assumed that capital is variable and is a function of the net-rate of return. All other initial assumptions are retained.

The capital supply equations can be rewritten such that:

(7) $S_K = f_6(r, T)$

(7a) $S_{K*} = f_{6a}(r^*)$ $\qquad \frac{\partial S_K}{\partial T} < 0$

(7b) $S_{Kt} = S_K + S_{K*}$ or $S_{Xt} = f_{6b}(r)$ when $r = r^*$.

The result in this example is the same as in case (1a). That is, domestic suppliers are still faced with a given product price, a given net-return to capital and a given wage rate. Capital leaves the domestic sector and no tax is collected.

Case (4b) Idential taxes are imposed in both sectors. All other assumptions pertaining to case (4a) are retained.

In addition to equation (7) above, equation (7a) can be rewritten such that:

(7a) $S_{K*} = f_{6a}(r^*, T^*)$ $\qquad \frac{\partial S_{K*}}{\partial T} < 0.$

Since it is assumed that $T^* = T$, then $S_{Kt} = f_{6b}(r, T)$. That is, the total supply of capital is a function of the after-tax return to capital.

The supply of capital will decrease in both sectors. As a result, commodity production will decrease and commodity price will increase.

The degree to which capital bears the tax depends on the elasticities of both the supply and the demand for capital. Figure 10 illustrates, an example where the tax reduced the total supply of capital from OK_0 to OK_1 and raised the before-tax returns from r_0 to r_1. However, the

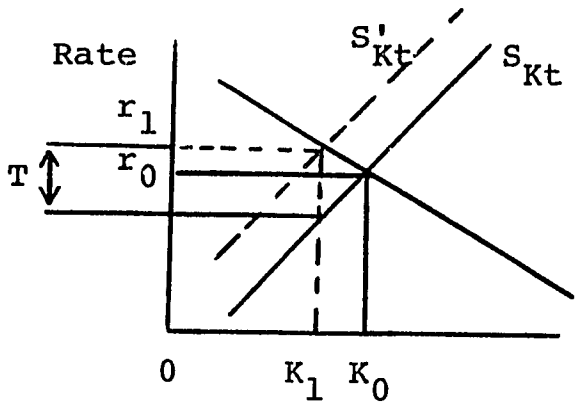

Figure 10. Total Capital Market.

increased return is insufficient to cover the entire tax and therefore some of the tax is borne by capital.

The degree to which labor bears the tax depends on the MPP_L and the commodity price elasticity. That is, as the amount of capital decreases the MPP_L falls and the price of the commodity increases. If the increase in price is sufficient to off-set the decrease in the MPP_L then the wage rate will remain the same and labor will not bear the tax.

Figure 11 illustrates the total product market. The reduction in capital reduced total product output from OX_0 to OX_1 and increased product price from p_0 to p_1. In this example, consumers paid $(p_1 - p_0)\ X_1$ of the tax.

Significance: The three previous examples concluded that if identical taxes were imposed in both sectors, then the burden was entirely borne by capital. In this example, if identical taxes are imposed in both sectors, then at least part of the burden is shifted to the consumer.

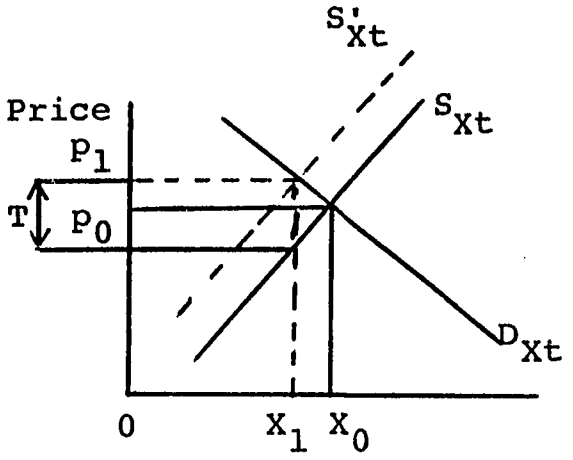

Figure 11. Total Product Market.

Case (5) Introduction of market power.

In this example, the basic two sector model is retained. However, the assumptions are changed to incorporate both union power on the part of labor and non-profit maximization behavior on the part of firms.

The following assumptions are made:

1. Total units of capital and labor are given and immobile.
2. Product competition exists between sectors.
3. Output is variable within limits, that is, each firm can determine the number of hours the factors are employed.
4. Labor by contract is guaranteed a minimum number of hours at a fixed wage per hour independent of output.
5. Above the minimum number of hours, labor is also guaranteed a fixed wage per hour independent of marginal product.

6. Capital is of such a nature that maintenance costs progressively increase with the number of hours employed.
7. Capital receives the residual between the total revenue from the product and the return to labor.
8. Firms produce the maximum output which corresponds to a given net-return to capital (net of maintenance costs).
9. Perfect knowledge exists.
10. Initial equalibrium is such that labor receives only the guaranteed minimum.

Case (5a) A tax is imposed on capital in the domestic sector.

By assumption, the return to labor cannot be reduced. By assumption, the domestic price of the product cannot be increased because of foreign competition. Domestic firms will not attempt to decrease output since that would only further decrease the return to capital. Therefore, domestic capital bears the entire burden.

Case (5b) Identical taxes are imposed in both sectors.

As a result of perfect knowledge, firms will simultaneously decrease output which will increase the product price. Since the return to labor is guaranteed, the reduction in output will be accomplished by decreasing the hourly usage of capital. The gross return to capital is dependent on the commodity price elasticity. If it is

assumed that commodity price elasticity is one, then the gross return to capital will remain the same. However, the net-return to capital will be increasing as a result of decreasing maintenance costs. Equalibrium will be restored when capital again receives the given net-return (net of maintenance costs and taxes). Therefore, if commodity price elasticity is unitary, then the tax is entirely shifted to the consumer.

Significance: In the previous examples, a universal tax (imposed in both sectors) could only be shifted if the units of capital decreased. In this example, a universal tax is imposed, the units of capital remain the same and the tax is at least partially shifted to the consumer.

Conclusion

Although it is difficult to postulate absolutes, it is possible to make certain generalizations. If firms attempt to maximize profits, then the greater the degree to which capital is fixed and immobile, the greater the likelihood the tax is borne by capital. If firms do not attempt to maximize profits, then the greater the probability the tax is not borne by capital. Independent of the pricing motivational behavior, the greater the degree of commodity competition between sectors, the greater the probability that a tax imposed solely in the domestic sector is borne by capital in the domestic sector.

The foregoing presentation is based on two simplified assumptions: that only one commodity exists and that the tax in question is a per unit tax on capital. Neither assumption significantly affects the general conclusions. The introduction of multiple goods into the model merely reduces the probability of an extreme situation. That is, capital is less likely to be either perfectly mobile or perfectly immobile. If an excise tax (i.e., per unit tax on the commodity) were substituted for the per unit capital tax, then the major effect would be to increase the probability that the tax is at least partially shifted to the consumer.

This conclusion results from the fact that a per unit capital tax imposed solely in the domestic sector places domestic suppliers at a disadvantage relative to foreign suppliers. Foreign suppliers could therefore inhibit domestic suppliers from shifting the tax. An excise tax, however, treats all suppliers selling products in the domestic sector the same. Thus an excise tax removes a potential inhibiting variable and therefore ceteris paribus increases the probability of shifting.

APPENDIX G

CLASSES OF PROPERTY AS DEFINED BY THE STATE TAX COMMISSION

APPENDIX G

CLASSES OF PROPERTY AS DEFINED BY THE STATE TAX COMMISSION

Agriculture (Real) are those parcels of land containing more than 5 acres which are used partially or wholly as farm land. The parcels may be with or without buildings.

Timber-Cut-Over are defined as those parcels of land which are stocked with forest products of merchantable type and size. This study includes Timber Cut-Over in the Agricultural (Real) category.

Commercial (Real) are defined as those parcels of land used for commercial purposes (wholesale, retail or service) as well as lodges, boat clubs, ski areas, etc. Apartments are also included as Commercial (Real).

Commercial (Personal) are all merchandise inventories, equipment, furniture and fixtures, etc., on commercial parcels. This also includes outdoor advertising signs and billboards, as well as commercial buildings on leased land.

Industrial (Real) include those parcels of land used for manufacturing and processing purposes, as well as utility real property (generating plants, pumping stations, etc.).

Industrial (Personal) are all inventories of finished goods, goods in the process of manufacture, raw materials, and supplies and machinery and equipment, furniture and fixtures on industrial parcels. This also includes industrial buildings on leased land.

Residential (Real) include those parcels of land, with or without buildings, which are used for, or probably will be used for residential purposes. Resort residences, such as lake lots, are included. Of significant importance to this study are the rented single family homes (i.e., individual homes, duplexes, row houses) which are included.

Residential (Personal) are residential buildings on leased land. All other residential personal is exempt from the property tax.

Utility (Personal) include electric transmission and distribution systems, sub-station equipment, etc., water transmission and distribution systems, as well as oil and gas equipment.

Note: Buildings on leased land are improvements where the owner of the improvement is not the owner of the land. Although this will tend to very slightly increase the

amount of personal property at the expense of real property, it is insignificant to this paper. First, the amount is small and second, the analysis will combine real and personal property.

Source: Michigan State Tax Commission.

APPENDIX H

ESTIMATING THE DISTRIBUTION OF TOTAL CONSUMPTION

APPENDIX H

ESTIMATING THE DISTRIBUTION OF TOTAL CONSUMPTION

Current data indicating total consumption by income class were not available at the time this paper was written. Therefore, based on consumption data for the North Central Region of the United States supplied by the Bureau of Labor Statistics, 1960-1961 Consumer Expenditure Survey, the following consumption function was estimated by ordinary least squares regression.

$$\text{Log}_{10}C = 1.3802 + .6143\ \text{Log}_{10}Y \qquad R^2 = .9722$$

where C = total consumption
Y = total income

(significant at 5 percent)

Based on this equation and the current mean income values for each income bracket, estimates were obtained for the average total consumption per income bracket. The average consumption was weighted by the number of families in each bracket and a percentage distribution of total consumption calculated.

It is important to emphasize that for purposes of this study it is not necessary for the estimated consumption function to predict the actual dollars of current consumption. The only requirement is that the consumption function indicate the relative relationship between the income brackets. Therefore, the actual dollars of consumption may be more or less than would be predicted by the simple equation. As long as it is assumed that the relationship between the income brackets is valid, then the procedure is valid. Table H-1 presents the results of this procedure.

Table H-1.--Estimated Distribution of Total Consumption by Income Bracket.

Income Bracket (Thousands of Dollars)	Percentage of Total Consumption
Under $1	.84
1-2	2.33
2-3	2.42
3-4	2.57
4-5	2.74
5-6	3.20
6-7	3.82
7-8	4.93
8-9	5.87
9-10	6.11
10-12	12.77
12-15	16.65
15-25	25.56
Over 25	10.19
	100.00

Source: See text.

APPENDIX I

ESTIMATING THE DISTRIBUTION OF SALES TAXES BY INCOME BRACKET

APPENDIX I

ESTIMATING THE DISTRIBUTION OF SALES TAXES BY INCOME BRACKET

The basic data used to estimate the distribution of sales tax payments were obtained from six equations provided by the Internal Revenue Service (IRS). The six equations estimate the sales paid by six different family sizes. The equations are the same ones used by IRS for estimating sales tax payments for federal tax deduction purposes for Michigan residents.

	Family Size
$\text{Log}_{10}ST = -.3631 + .6035\ \text{Log}_{10}Y$	1
$\text{Log}_{10}ST = -.2248 + .5993\ \text{Log}_{10}Y$	2
$\text{Log}_{10}ST = -.2731 + .6252\ \text{Log}_{10}Y$	3
$\text{Log}_{10}ST = -.0083 + .5608\ \text{Log}_{10}Y$	4
$\text{Log}_{10}ST = -.1945 + .6210\ \text{Log}_{10}Y$	5
$\text{Log}_{10}ST = -.2591 + .6548\ \text{Log}_{10}Y$	Over 5

where ST = sales tax

Y = income, where income equals adjusted gross income plus pensions, plus social security.

The six equations, therefore, divide each income bracket into six family sizes. It is assumed that the mean income for the income bracket is independent of family size. The mean income for each income bracket then is placed in each of the six equations resulting in the average sales tax for each family size.[1] The average sales tax per family size is weighted by the number of families corresponding to the respective family sizes. The weighted sales tax figures are summed across the income bracket. The total amount attributed to each income bracket is summed and a percentage distribution determined.

The resulting percentage distribution is used to distribute the portion of the sales tax assumed borne by Michigan consumers. The percentage distribution of sales tax payments is presented in Appendix Table I-1.

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[1]For incomes above $20,000, IRS assumed that the sales tax equals sum of first, the tax corresponding to $20,000 resulting from the equations and second, 2 percent for each $1,000 of the amount determined in the first part. This study follows the same procedure for the largest income bracket which is the only income bracket with a mean in excess of $20,000.

Table I-1.--Percentage Distribution of Sales Tax Payments.

Income Bracket (Thousands of Dollars)	Percentage of Total Sales Tax
Under $1	.62
1-2	1.68
2-3	1.87
3-4	2.07
4-5	2.28
5-6	2.76
6-7	3.38
7-8	4.48
8-9	5.51
9-10	5.84
10-12	12.55
12-15	16.60
15-25	26.00
Over 25	14.36
	100.00

Source: See text.

APPENDIX J

ESTIMATING THE DISTRIBUTION OF MOTOR FUEL TAXES PAID BY INDIVIDUALS

APPENDIX J

ESTIMATING THE DISTRIBUTION OF MOTOR FUEL TAXES PAID BY INDIVIDUALS

The basic data were obtained from the Internal Revenue Service which indicated the total gasoline taxes claimed as a deduction for federal tax purposes. Several adjustments are made to the basic data in order to make the distributive series more compatible with data used in the study.

The first step calculates the average tax claimed per return on those returns which itemized local gasoline taxes. It is assumed that families which itemized their deductions did so for reasons other than state gasoline taxes. This is an important assumption for lower income brackets where the percentage of returns which are itemized is significantly lower than in higher income brackets. Based on the above assumption, the data indicate the average tax paid by those who drive per income class. (Income in this case is adjusted gross income.)

The second step adjusts for the difference between money income and adjusted gross income. The same procedure

which is used to adjust dividend income is also employed in this case. This results in an estimate of the average tax paid by those who pay such taxes per money income bracket.

The third step adjusts for those families in each bracket which do not pay gasoline taxes. That is, the third step adjusts for car ownership. This is done by multiplying adjusted average tax by the percentage of families in each bracket owning at least one car. Car ownership data were obtained from a special tabulation supplied by Survey Research Center, Ann Arbor, Michigan. The results of the third step indicate the average tax per family. The data includes those families which did not pay any tax by virtue of the fact that they did not own an automobile.

The fourth step multiplies the average tax per family per income bracket by the number of Michigan families in each bracket. The amount is summed and a percentage distribution calculated.

The percentage distribution calculated in step 4 is used to distribute the motor fuel tax paid by Michigan individual consumers. The data are presented in Table J-1.

Table J-1.--Estimating the Distribution of Gasoline Taxes.

Income Brackets (Thousands of Dollars)	(2) Average Tax Per Return Adjusted for Money Income (Dollars)	(3) Percentage of Families Owning at Least One Car	(4) Average Tax Per Family Including Those Paying No Tax	(5) Percentage Distribution of Gasoline Taxes
Under $1	36.65	25	$ 9.16	.85
1-2	41.49	41	17.01	1.81
2-3	50.04	50	25.02	2.00
3-4	55.30	60	33.18	2.30
4-5	64.26	70	44.98	2.83
5-6	69.43	75	52.07	3.40
6-7	75.92	83	63.01	4.41
7-8	79.38	89	70.65	5.83
8-9	85.33	92	78.50	7.16
9-10	87.64	93	81.51	7.21
10-12	89.90	95	85.41	14.43
12-15	96.80	96	92.93	18.14
15-25	101.26	96	97.21	23.89
Over 25	95.15	97	92.30	5.69
				100.00

Sources: Column (2)--Average tax claimed by those federal returns which itemized their returns adjusted for the difference in adjusted gross income and money income. Taxes claimed on federal returns were obtained from U.S. Treasury Department, Internal Revenue Service, Statistics of Income--1970, Individual Income Tax Returns (Washington, D.C.: Government Printing Office, 1972), p. 123.

Column (3)--Special tabulation supplied by Survey Research Center, University of Michigan, from G. Katona, L. Mandell, and J. Schmiedeskamp, 1970 Survey of Consumer Finances (University of Michigan, 1971).

Column (4)--Column (2) times Column (3).

Column (5)--Column (4) times the distribution of Michigan families Table 2 Column (3) and then summed and percentages calculated.

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