

INCIDENCE OF MONTANA STATE AND LOCAL TAXES

By

LI-TEH SUN

Bachelor of Arts  
Chung Hsing University  
Taipei, Taiwan  
1962

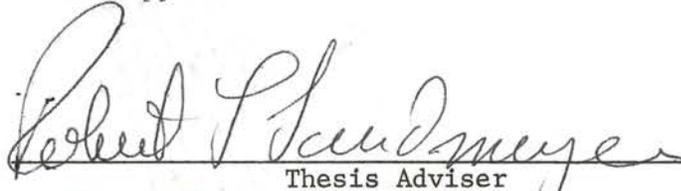
Master of Science  
Oklahoma State University  
Stillwater, Oklahoma  
1968

Submitted to the Faculty of the Graduate College  
of the Oklahoma State University  
in partial fulfillment of the requirements  
for the Degree of  
DOCTOR OF PHILOSOPHY  
May, 1972

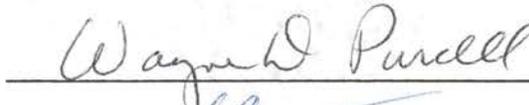
AUG 16 1973

INCIDENCE OF MONTANA STATE AND LOCAL TAXES

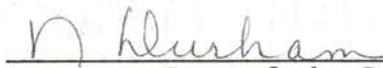
Thesis Approved:

  
\_\_\_\_\_  
Thesis Adviser

  
\_\_\_\_\_

  
\_\_\_\_\_

  
\_\_\_\_\_

  
\_\_\_\_\_  
Dean of the Graduate College

## ACKNOWLEDGMENTS

Many institutions of human society had flourished in the past, but they either had faded or are fading away. Those institutions that are truly beneficial to mankind will not only outlive others but enhance their prominences as time goes forward. Education is one of these beneficial institutions. It appears to me, however, that the educational benefits to the individual cannot be fully recognized until he has the personal experience of writing and completing a dissertation. The experience is not merely an addition to knowledge; more importantly, it is an education of character.

My own effort alone was not sufficient to gain this kind of experience. The combined endeavors of many other persons made it possible. But in this acknowledgment, I can only express my thankfulness to those whose contributions to the completion of my degree were most apparent.

Research on the empirical part of the present study commenced when I was a member of a research team at the University of Montana. I benefited greatly from the guidance and suggestions of Dr. William D. Diehl, who directed the Montana Fiscal Affairs Study. Dr. Samuel B. Chase, Jr., Director of the Montana Economic Base Study, also made valuable comments on an early draft of my work on the distribution of Montana income.

Here at Oklahoma State University, I am deeply indebted to Dr. Robert L. Sandmeyer, my thesis adviser, for his guidance, counsel, encouragement, and patient efforts to improve my writing, without which the present study would not have been completed.

Deep and sincere gratitude is given to Dr. Rudolph W. Trenton, the academic adviser of my graduate program and a member of my advisory committee. Without his continuous encouragement, guidance, assistance, and friendship, I would not have been able to fulfill my educational goals.

Other members of my committee, Dr. Wayne D. Purcell and Dr. Ansel M. Sharp, also deserve special thanks for their helpful suggestions and timely comments.

Sincere appreciation is extended to Dr. Richard H. Leftwich, who heads the Department of Economics. His timely encouragement was most helpful, and his personal example of scholastic attainments was inspiring.

Appreciations are also extended to other faculty members in the Department of Economics who have instructed me. Their lessons have not only proved to be valuable but rewarding, and their friendliness will long be remembered.

Mrs. Marguerite S. Howland, head documents librarian, deserves special thanks for her assistance and friendship. She was always able and willing to help me locate the material that I looked for.

My friends, Messrs. Jong Heum Park, Ying-chi Wang, Hong-I Yang, and Shan-lee Yang and their wives also deserve special thanks for their support, encouragement, and friendship. Also, I am most grateful to my

parents, Mr. and Mrs. Beh-yu Sun. They have made it possible for me to concentrate exclusively on the completion of my terminal degree.

I am thankful for Mrs. Joyce King for her careful typing of the final copy of this dissertation, for Mmes. Judy Brasil and Wei-sung Huang for their typing of the early drafts.

Finally, I would like to extend my appreciation to several of my friends who virtually had been "living" in the library during the period when I worked on the present study. Their hard-working spirit has always reminded me of the effort that I needed in completing this study. Their company, on the other hand, has made the Friday evening visits to the Colvin Physical Educational Center a source of joy and relaxation.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Scope and Purpose of the Study . . . . .	2
Nature of the Problem . . . . .	3
Terms and Methods . . . . .	5
Limitations . . . . .	6
Plan of Presentation . . . . .	8
II. THEORETICAL BACKGROUND . . . . .	10
Theory of Tax Incidence . . . . .	10
Specific Shifting Assumptions . . . . .	24
Summary . . . . .	40
III. INCOME DISTRIBUTION IN MONTANA . . . . .	42
Income Concepts and Their Components . . . . .	42
Some General Problems in Estimation . . . . .	44
Estimation of Montana Income Distribution . . . . .	51
IV. MONTANA TAX PAYMENT DISTRIBUTION . . . . .	64
Montana State and Local Taxes . . . . .	64
Allocative Method and Data . . . . .	66
Allocation of Taxes by Income Bracket . . . . .	70
V. INCIDENCE OF MONTANA TAXES . . . . .	89
Incidence Ratios of the Taxes . . . . .	89
A Comparison of Findings . . . . .	97
BIBLIOGRAPHY . . . . .	109
APPENDIX A - INCOME CONCEPTS AND THEIR COMPONENTS . . . . .	118
APPENDIX B - METHOD OF ADJUSTMENT OF CERTAIN ALLOCATIVE SERIES FROM FAMILY MONEY TO ADJUSTED GROSS INCOME BRACKET . . . . .	122

LIST OF TABLES

Table	Page
I. Distributions of Montana Incomes and Their Components in 1967 . . . . .	52
II. Montana State and Local Tax Revenue in Fiscal 1967 . . . . .	65
III. Allocative Series of Montana Taxes . . . . .	71
IV. Montana Tax Payment Distributions . . . . .	73
V. Incidence Ratios of the Montana Taxes . . . . .	90
VI. Individual Incomes in an Hypothetical Four-Person Economy . . . . .	105
VII. An Hypothetical Example of the Difference in Tax Incidence Resulted from Using Different Income Concepts to Classify Income Groups in the Income Distribution Series and the Tax Allocative Series . . . . .	107

## CHAPTER I

### INTRODUCTION

Increasing demand for public services presents problems which could be ignored in an earlier period. As long as public revenue needs of states and localities were modest the impact of tax measures was not of great consequence to anyone. This is no longer the case as events in recent years clearly demonstrate. Bond elections often fail to find a majority and governors are elected on platforms promising no new taxes. In this atmosphere of uncertainty concerning new sources of revenue the incidence of state and local taxes becomes an important issue for both legislators and taxpayers. A legislator would like to know how the cost of providing public goods and services is distributed among individual taxpayers. The taxpayer is equally concerned with the incidence of a tax because it affects his economic well-being not only directly through the income he surrenders, but also indirectly through the higher prices of the taxed products he buys.

Although the importance of tax incidence has long been recognized and the theoretical issues involved have been discussed even before the days of David Ricardo,<sup>1</sup> empirical research on this subject is only about

---

<sup>1</sup>For a historical review of tax incidence theory, see Edwin R. A. Seligman, The Shifting and Incidence of Taxation, 3rd ed. (New York: The Columbia University Press, 1910).

three decades old.<sup>2</sup> Tax incidence research on the state and local level is even more recent; the first empirical results were published in 1958.<sup>3</sup> More statistical data on the state and local level are now available and empirical research has focused on specific taxes. Improved data sources now make it possible to investigate empirically the incidence problem in some specific states.

Two major reasons account for the selection of Montana for this incidence study. In the first place, there has been no comprehensive study of tax incidence for Montana and such a study may provide useful information for the legislators and residents of that state. In the second place, the author had an opportunity to obtain data for Montana which are frequently not available for a state.

#### Scope and Purpose of the Study

This study examines the tax burden distribution in Montana. The demand for public expenditure is not a part of the present investigation. Research into expenditure benefits is equally important but this study focuses its attention on tax incidence because the data concerning the distribution of tax burden seem to be more reliable than those concerning the distribution of expenditure benefits, many people who take government services for granted tend to be more concerned with the

---

<sup>2</sup>See, for instance, Robert B. Pettengill, "Division of the Tax Burden Among Income Groups in the United States in 1936," American Economic Review, XXX (March, 1940), pp. 60-71, and Helen Tarasov, "Who Does Pay the Taxes?" Social Research, Supplement, IV (1942), pp. 1-79.

<sup>3</sup>See Richard A. Musgrave and Darwin W. Diacoff, "Who Pays the Michigan Taxes?" Michigan Tax Study: Staff Papers (Lansing, Michigan: Michigan Secretary of Finance, 1958), pp. 131-83.

incomes they surrender, and as pointed out by Musgrave and others,

In expenditure determination, the objective is to render certain services and to do so efficiently; the distribution effects of public demand for resources are secondary. In tax determination, the distribution of the money burden is of primary importance.<sup>4</sup>

The purpose of this study is to find out who, in the final analysis, pays how much of the state and local taxes in Montana. Inquiries like this would be naturally associated with people's concern over equity in taxation. Equity, nevertheless, is mainly a matter of value judgment. Having its end as scientific and objective, this study will not attempt to answer the question whether a certain Montana tax or the Montana tax structure as a whole is fair or unfair. However, since the whole problem of tax incidence centers around the question of tax equality, a few tentative statements on equity can be made provided that the ability-to-pay principle of taxation is accepted and income is used as the index of equality.

#### Nature of the Problem

The general problem of tax incidence is to locate the ultimate money burden of a tax or to trace the effect of taxation on individual incomes. Since the one who bears the final money burden of a tax suffers a reduction in his income, these two aspects of the problem are very much the same. The main problem in this study, however, can be better understood by pointing out the exact meaning of the terms in

---

<sup>4</sup>R. A. Musgrave, J. J. Carroll, L. D. Cook, and L. Frane, "Distribution of Tax Payments by Income Groups: A Case Study for 1948," National Tax Journal, IV (March, 1951), p. 8.

question, "Who, in the final analysis, pays how much of the Montana state and local taxes."

Traditionally, the term "who" in the question would refer to either the capitalist, the landlord, or the worker. In the days of the classical economists, the discussion of tax incidence was in terms of incidence on wages, profits, and rents. In modern days, however, there has been a growing tendency for people to receive incomes from a variety of sources and, therefore, distinction between various factor shares has lost much of its previous analytical exactness. In the meantime, it is neither feasible nor necessary to study the incidence of taxes for every individual in the state. Therefore, the term "who" is considered to represent a group of individuals classified by the size of their income received in a year.

The words "in the final analysis" are used to convey the idea that for every economic unit there will usually be a difference between its statutory tax liability and its actual tax liability, and that in the analysis of tax incidence concern is with the latter. An economic unit will often adjust to the changed economic conditions as a result of taxation. Its income position may become better or worse depending on whether or not it can recoup the income surrendered. A producer subject to a specific sales tax may recover the tax he pays through an increase in the price of the product he sells. A worker liable to the individual income tax may change his job to keep the level of his disposable income unchanged. In these cases, the initial taxpayers do not finally bear the burden of the taxes.

The terms "pays how much" should be understood in relation to the incomes these groups receive. To compare the absolute amount of tax

payments among income groups, without also comparing incomes they receive, is to a large extent meaningless. Therefore, this study is concerned with the tax liability relative to income for different income groups.

"The Montana state and local taxes" encompass all the tax revenues collected by the state and local governments in Montana during the fiscal year 1966-67.<sup>5</sup> Most of the data concerning the collection of these taxes can be found in the Census of Governments and State Tax Collections published by the U. S. Bureau of the Census.

#### Terms and Methods

The terminology used in most of the empirical studies of tax incidence is often confusing. It is necessary, therefore, to define a few important and frequently used terms in this study at the outset. "Tax incidence" is defined as a set of the ratios of final tax payments to incomes received by income size bracket. When the ratios of this set increase for higher income brackets, the incidence of the tax (or taxes) is said to be progressive. The higher income groups in this case bear a relatively heavier tax burden, in relation to their incomes, than the lower income groups. Tax incidence can, likewise, be proportional (neutral) or regressive depending upon whether the tax-to-income ratios are constant or decreasing as the size of income bracket increases.

The term "tax burden" is defined in a customary manner as the final location of a tax which rests with an individual or a group of individuals and thus causes a reduction in the latter's money income. If tax

---

<sup>5</sup> Individual income tax collections are for the calendar year 1967.

incidence is regressive, tax burden distribution concentrates on the lower income groups, therefore, these groups bear heavier tax burden than other groups.

Another closely related term is "tax payment distribution." This is the absolute amount of taxes collected from each income group without comparing these payments with the incomes received by the group.

It is evident that the estimation of over-all tax incidence in Montana involves the derivation of a measurement of income and the estimation of tax payment distribution for each tax by the size of income bracket. The derivation of the measurement of income is chiefly a matter of collecting, calculating, extrapolating, and interpolating related data. In order to derive distributions of tax payments, tax incidence theory must be relied upon in making specific shifting assumptions of the various taxes under consideration.

#### Limitations

The modern theory of tax incidence suggests that an empirical incidence study would reveal the effect of taxation on the distribution of income. Such a result cannot be determined empirically because the distribution of income before the imposition of a tax or taxes is not known.<sup>6</sup> Any measured tax-induced change in income distribution may have

---

<sup>6</sup>Please refer to the theoretical discussion by A. R. Prest, "Statistical Calculation of Tax Burden," Economica, N.S., XXII (August, 1955), pp. 234-45. His main idea is that a hypothetical removal of the public sector does not give us the "original" distribution of income before the taxation is introduced. See also W. Irwin Gillespie's admittance of the analytical weakness of his own approach in "Effect of Public Expenditures on the Distribution of Income," in Richard A. Musgrave ed. Essay in Fiscal Federalism (Washington, D. C.: The Brookings Institution, 1965), p. 129, and p. 167; and Bent Hansen's

been due to changes in technology, tastes and preferences or federal tax policy. For this reason the present study disregards the effect of Montana taxation on the distribution of income.

Although government transfer payments are included in the measurement of income, expenditure benefits are not part of the present study. The uses of tax revenue have a significant impact on tax incidence. In the broadest sense, all government expenditure benefits received by an individual can be considered as income (being material and psychic) which serve to satisfy his wants. The inclusion of these benefits in the denominators of the tax incidence formula would significantly change the over-all tax incidence. Without including these benefits, for instance, it may be found that the over-all tax incidence is progressive. With the inclusion of these benefits, the incidence may become proportional or even regressive if the higher income groups have been benefited more from the government expenditures than the lower income groups. To the extent that the exclusion of the expenditures may distort the true picture of tax incidence, this study must plead guilty.

Another limitation concerns the statistical data used in this study. Though there are enough acceptable data available to permit a significant study, its empirical results will still depend on the reliability of the data. Because of the complexity of the problem involved a variety of sources are relied upon. These sources are not

---

maintenance that "empirical investigations into incidence are practically non-existent" in his The Economic Theory of Fiscal Policy (London: George Allen and Unwin, LTD., 1958), pp. 99-100.

altogether satisfactory and specific to the State of Montana. Some allocative data at the Montana state and local level are not available. In such cases, allocative data on the national level are used. It is not unreasonable to assume that consumer behavior (such as cigarette smoking, insurance buying), and income-earning patterns (such as interest earnings from the holding of U. S. savings bonds, or sales of capital assets) of an average Montana resident follow the pattern found for an average U. S. resident. To the extent that this assumption is in error the results must become more tentative in nature.

The results of this study depend a great deal on assumptions made concerning the shifting of taxes. These assumptions are not derived from the empirically verified facts. They are based on theoretical deductive reasoning, therefore, caution should be taken in interpreting the results of this study. It should be remembered that whether or not the results reflect a fair approximation to the actual situation depends to a great extent on the reasonableness of the assumptions on shifting of taxes.

#### Plan of Presentation

Chapter II is divided into two sections. The theory of tax incidence is discussed in the first section. The purpose of this discussion is to set a theoretical background for the empirical part of the study. The second section of Chapter II is devoted to a discussion of the assumptions made concerning shifting the various Montana state and local taxes.

Chapter III deals with the concepts of income and the estimation of income distribution in Montana. In the discussion of income concepts,

emphasis will be focused on the fact that the use of different income concepts can significantly affect the relative tax burden distribution among income groups so that a proper selection of income concept is needed.

Chapter IV will provide estimates of tax payment distribution for the various Montana state and local taxes. Each specific tax collection will be derived or estimated, then these totals will be allocated to each income bracket.

In Chapter V the over-all and specific tax incidence of Montana taxes is obtained. These results are then compared with a few previous state tax studies whenever it is feasible.

## CHAPTER II

### THEORETICAL BACKGROUND

#### Theory of Tax Incidence

##### Traditional Approach

The traditional partial analysis of the theory of tax incidence was developed essentially as an application of neoclassical price theory to the field of taxation.<sup>1</sup> The traditional economists defined tax incidence either as the final resting place, or as the ultimate and direct money burden, of a tax.<sup>2</sup> They used the term "effects" to refer to all other indirect income and output changes resulting from taxation. In defining terms in this manner, the problem of tax incidence was centered around the question of whether a particular tax could be shifted from the person who initially paid it to others who did not. Since this kind of tax shifting takes place mainly through price

---

<sup>1</sup>It may be recalled that the assumptions involved in this partial equilibrium theory are: (1) the general level of income remains constant; (2) the demand (schedule) for the taxed product does not change as a result of the tax; and (3) the relative prices of products other than the taxed one do not change. The major assumptions of the neoclassical price theory include: (1) the firm tries to maximize profits; (2) tastes, resources, and technology are constant; and (3) full employment prevails.

<sup>2</sup>See, for instance, Hugh Dalton, Principles of Public Finance, 4th ed. (New York: Augustus M. Kelley Publishers, 1967 reprint), p. 36; and Otto von Mering, The Shifting and Incidence of Taxation (Philadelphia: The Blakiston Company, 1942), p. 3.

changes, attention was given to the economic behavior of individuals or firms in response to an imposition of a tax.

For the most part the traditional neoclassical approach to the theory of tax incidence proceeded to explore the effects of taxation on the supply side of the market.<sup>3</sup> If a tax causes a decrease in supply and an increase in price, it is considered to be at least partially shifted. Should the tax cause no change in supply and price, it rests with the initial taxpayer. Under whatever the state of competition, for instance, the traditional supply analysis has led to the conclusion that a general income tax on net profits could not be shifted, so that the burden of such a tax falls on the firm. It is argued that a general income tax causes no change in the supply of a commodity. In the first place, although the tax will reduce profits, it will not alter the relative profitableness of various investment. Thus, there will be no transfer of capital in the production of any given product. Additionally, a tax levied on profits cannot touch the marginal producer, for he makes no profits. He continues to supply as much as he did before the imposition of the tax. Since the supply of a commodity is not changed, its price remains constant and there will be no mechanism for shifting the tax.

Tax shifting is, therefore, a rather complicated price phenomenon. However, a number of principles concerning the shifting and incidence of

---

<sup>3</sup>There are some exceptions like Antonio de Vite de Marco who examined the effects on the demand side of the market; see his First Principles of Public Finance, English translation by E. P. Marget (London: Jonathan Cape, 1950), Chapter 4 of Book II, especially pp. 148-65.

a tax can be presented. Given the assumptions of full employment and profit maximization on the part of the firm, the extent to which a tax may be shifted depends upon the following factors: (1) the nature of the tax; (2) price elasticities of supply and demand for the taxed product and for its factor of production; (3) cost conditions of the taxed industry; (4) the market structure and time period in which a firm operates; and (5) the influence of a tax on a firm's costs of production or profits.

The nature of a tax has a strong influence on its shiftability. Generally speaking, the more direct a tax, the more difficult it is to shift. A direct tax usually applies to a tax base close to the individual, such as his income and wealth. Due to the lack of a further market transaction after taxation, it is difficult for the taxpayer to pass the burden onto someone else through a change in prices or in services supplied. On the other hand, an indirect tax such as a retail sales tax offers a better opportunity of being shifted because the taxed product will be sold after the tax is levied.

A broad-based tax is usually easier to shift than a narrow-based tax. A narrow-based tax on a certain commodity may cause the consumer to demand some other untaxed product as a substitute if the seller increases the price of the taxed commodity. Since the seller finds it difficult to raise the price he has to bear the burden of the tax. A broad-based tax on all products, however, would reduce the opportunity for consumers to find an untaxed substitute. In this case, the sellers of the taxed products have a better chance to increase prices and thereby pass on at least a part of the tax burden to consumers.

If consumers' demand for a taxed commodity is price inelastic, the firm can raise the price of the taxed commodity and shift the tax forward in whole or in part to the consumer. If, however, the demand is price elastic, an increase in product price, which is needed to cover the tax, would cause the consumer to reduce consumption and, therefore, the tax is difficult to shift. In general, the more inelastic the demand for a product in response to a change in the price, the greater is the possibility of tax shifting. Similarly, the more inelastic the supply of the taxed product, the less likely the burden would be shifted to others either by a rise in price or by a reduction in supply.

The above statement of price elasticity concerns the demand and supply condition in the product market. The position of a resource owner in the factor market is determined by the elasticity of supply of the factor. If the supply of a factor is inelastic, the firm would be able to lower its factor-demand price (cost) so that the tax could be shifted backward to the resource owner. On the other hand, if the factor supply is price elastic, the firm may have to bear the burden of the tax. When the firm tries to buy these factors at a lower price, the quantity supplied would drop. In general, the more inelastic the factor supplied, the greater is the opportunity for tax shifting.

Cost conditions of the taxed industry can also significantly affect a firm's ability to shift the tax. This point will be illustrated by assuming that a unit tax is imposed on the output of the firms operating under pure competition in the long run. The impact of this

tax will then be examined under conditions of increasing, decreasing and constant costs.

An increasing cost industry is the one in which the entry of new firms will, because of the increase in resource prices, drive the whole set of cost curves of existing firms upward. The exit of existing firms in such an industry will, therefore, shift the cost curves of the remaining firms downward. A unit tax which increases the costs per unit of output for all firms in the industry would generally force the firms to drive price upward to the amount of the tax. However, because of the tax-induced increase in costs after the imposition of the tax, some high-cost marginal firms are forced to leave the industry. Industry output will decline. The declining output causes the industry's total demand for resources to fall. Resource prices are then dropped. This will decrease the costs (which are net or exclusive of the tax) of production for all firms in the industry and offset the initial tendency of price rise brought about by the imposition of the tax. Equilibrium for the remaining firms in the industry will be reestablished by a price rise which is less than the amount of the tax. The unit tax in this case is, therefore, partially shifted.

Reasoning along similar lines, it can be maintained that in a constant cost industry, price will rise by the amount of the tax. Therefore, the unit tax is fully shifted forward to the consumer. In a decreasing cost industry, however, the increase in price will be greater than the amount of the tax; it is thus more than fully shifted.<sup>4</sup>

---

<sup>4</sup>Harold M. Groves expresses doubts concerning this kind of tax shifting. He believes that decreasing costs are usually the result of changes in population, technology, or resources, not the result of the expansion of output. These reasons for decreasing costs do not

Other factors determining shiftability of a tax are the market structure and time period in which a firm operates. These factors will be discussed by assuming an imposition of a unit tax on firms which operate under different market structures and time periods.

Under pure competition, none of the tax could be shifted in the very short run since no single firm could alter the competitive price. In the short run, the situation is somewhat different. The unit tax increases the average and marginal costs of the firms so that the firm would want to sell the product at a higher price. Since the individual firm is still a price-taker, it would not be able to increase the price in response to the tax imposition. The firm may, however, reduce output; total industry output would also drop because high cost firms drop out. This curtailment of industry output may cause the price to rise, but the amount of price increase would usually not be able to cover the tax. Moreover, in the short run the firm would continue to produce as long as the marginal revenue (price) can cover the variable costs. It is generally believed, therefore, that firms under pure competition in the short run would bear some burden of a unit tax. In the long run, more marginal firms would leave the industry. The reduction in industry output could raise the price enough for each firm to cover the tax. The extent to which the tax may be shifted depends on the long run cost conditions of the taxed industry, which was noted before.

In the short run, as in the case of pure competition, the monopolistic competitive firms may have to absorb the tax, even though

---

disappear because of the tax. Therefore, the increase in product price after the tax cannot be greater than the amount of the tax. See Financing Government, 4th ed. (New York: Henry Holt and Company, 1954), pp. 112-13.

product differentiation could allow some shifting. In the long run, the exit of some firms, because of rising costs after taxation, may reduce the industry output to the extent that the increase in price could fully cover the tax. The tax is thus shifted forward to the consumer.

A unit tax imposed on the output of a monopolist drives his marginal and average costs upward. For profit maximization in the short run he will raise the price and reduce the output. In this way, at least a part of the tax will be shifted forward to the consumer. The long run shifting of a unit tax will depend upon the monopolist's long run cost conditions. Like the case under pure competition, the greatest price rise (hence the amount of tax shifting) occurs with decreasing costs, the next to the greatest price rise with constant costs, and the smallest price rise with increasing costs. However, the increase in price under monopoly will fall short of the amount of the tax for both constant and increasing costs; and it may fall short of, or exceed, the tax for decreasing costs. These results--which differ from those of pure competition--are essentially due to the fact that a portion of the tax is absorbed by the reduction of the monopolist's profits and the amount of the reduction may not be the same under various cost conditions.

The reaction of an oligopolist following the imposition of a unit tax would depend upon the behavior of his competitors, which to a great extent also determines his ability to shift the tax. The oligopolist would probably increase the price to the full amount of the tax if he believes that the others would do the same. A tax serves as an excuse to adjust prices in this case. However, the oligopolists may not increase the price after the taxation and bear a partial or full burden

of the tax. This will be the case particularly when the tax-induced change of the marginal cost does not alter the profit maximization price level under the situation of an oligopoly gap where a kinked demand curve exists. In the long run, the possibility of tax shifting under oligopoly resembles that under monopoly.

Another important factor determining shiftability of a tax is whether the tax influences a firm's costs or profits. If a tax affects a firm's variable costs, it is most likely to be shifted even in the short run. A tax which influences the fixed costs of the firm is not likely to be shifted in the short run, but will be shifted in the long run. If only excess (economic) profits are influenced by the tax, it is usually not shifted. This is the case because the tax does not change the firm's profit maximization position. However, a part of the tax will be shifted if it imposes on profits as defined by an accountant; this definition of profit usually includes such cost items as imputed wages of management, rent on owned capital, and reward for risk-taking.<sup>5</sup>

The preceding analysis of tax shifting concerns essentially a tax imposed on business firms. A few other factors must be considered in dealing with shifting of a tax which is imposed on individuals. Given the assumption of rational behavior on the part of the individual, the extent to which a tax (on income, consumption, or wealth) may be shifted

---

<sup>5</sup>In the previous discussion of several shifting factors such as cost condition, market structure, and time period, some general principles were established with respect to the shiftability of a tax. At that time, a unit tax on output was assumed throughout the discussion. It appears clear now that if other kinds of taxes such as profit tax and lump sum tax were assumed, conclusions made therein concerning the shifting of a tax would have to be modified in one way or another.

depends primarily upon the preference patterns of the individual-- preference between income and leisure, between present and future consumption (or accumulation), between leisure and consumption, between holding cash and holding assets, and/or preference between living in one political jurisdiction or another. A tax on individuals' interest income, for instance, will likely be shifted if it changes their preference pattern so that more present consumption is preferred than either future consumption or accumulation. The changed preference in this case will reduce the supply of money capital and bring about an increase in interest rates. Therefore, the tax is shifted forward to the borrower of the loanable funds. Similarly, a tax on work income will be shifted if it causes individuals to prefer more leisure so that wages rise as a consequence of the reduction in the supply of labor.

Not all the above several factors are equally important in determining the shiftability of a particular tax (imposed on firms or on individuals). In reality, one factor may be more important than the others, depending upon the kind of tax under consideration. Also, other factors not yet mentioned and which do not conceptually fit into the traditional supply analysis may have to be accounted for. These factors include: (1) whether it is a large or a small political jurisdiction that imposes the tax; (2) whether the tax is of an open or a hidden nature; (3) whether the tax is paid through withholdings or by direct assessment; and (4) whether or not the government regulates prices and factor earnings.

In addition, it should be noted that when the assumptions of full employment, profit and utility maximization are relaxed, all the above mentioned shifting factors would have to be qualified. For instance,

it has been argued that many firms do not attempt to achieve profit maximization positions. Therefore, these firms have "unrealized gains" --i.e., the amount of incremental profits (or of reduced losses) which could be obtained if the firms were operating at a profit-maximizing level instead of their actual positions. A tax on net profits of these firms would give them the incentive to raise the prices of products so as to move closer to the profit-maximizing position. In this way, the tax could be shifted forward to consumers--a conclusion that is contrary to the one under the assumption of profit maximization.

#### Modern Approach

The traditional theory of tax incidence has been criticized by modern writers such as Bent Hansen, Richard A. Musgrave, and Osmo V. Jaskari.<sup>6</sup> They point out that there are several major difficulties associated with the partial equilibrium approach. First, the distinction between direct incidence and indirect effects of a tax is arbitrary, because in a general equilibrium system these changes are all part of the total adjustment and cannot be separately identified.

Second, the concept of incidence as the ultimate burden of a tax starts from the false premise that any tax eventually involves a transfer of goods and services from the private to the public sector. In fact, taxes may be imposed, removed, and substituted for each other without involving resource transfers from the private to the public sector.

---

<sup>6</sup>Hansen, pp. 90-98; Richard A. Musgrave, The Theory of Public Finance (New York: McGraw-Hill Book Company, 1959), pp. 227-31; Osmo V. Jaskari, A Study in the Theory of Incidence of Taxation (Helsinki, Finland: Finnish Academy of Sciences, 1961), pp. 10-21.

Third, too little attention has been given to the expenditure side of the budget even though the use of tax revenues has a significant influence on the shifting of a tax. For example, government expenditures which are financed by an output tax on certain products may provide cost-saving benefits to business firms. In this way, instead of an increase in prices after the imposition of the tax, prices may remain constant so that shifting does not occur as it does in the partial analysis.

Fourth, if partial equilibrium is applied to the demand side of the market, conflicting conclusions on tax shifting may be reached. For instance, the supply analysis has led to the conclusion that a general income tax on net profits cannot be shifted. However, the demand analysis would show that this is only one of several possible cases. A general income tax on net profits will reduce dividend income of individuals. Since this income is not evenly distributed among all income groups, the tax would cause the demand pattern of individuals to change. Demand for certain products may be increased while others reduced. Those firms whose demand is increased will be able to raise prices so that the profit tax can be shifted forward to the consumer.

The difficulties of a partial equilibrium approach to tax incidence have caused modern writers to formulate the theory in a general equilibrium framework.<sup>7</sup> This approach is most clearly outlined by

---

<sup>7</sup>This statement does not imply that there was no attempt by both the classical and neoclassical economists to develop a general theory of tax incidence. David Ricardo, Knut Wicksell, Leon Walras, and others made such an attempt, but they did not succeed in formulating the theory in a clear and unambiguous manner. Moreover, though modern writers have criticized the traditional partial theory, it should not be implied that they do not use the partial approach. Please refer to Musgrave, pp. 385-401.

Musgrave.<sup>8</sup> Musgrave observes the economic consequences of a change in budget policy in an economy, and describes the result under three categories: (1) resource transfer--resources are transferred from private to public use or from public to private use; (2) incidence--the change in distribution of income; (3) output effects--possible change in the level of output or real income. Budget incidence is viewed as one of the effects of a change in budget policy, which can be caused by changes in taxes and/or expenditures. Tax incidence is therefore defined as the change in the distribution of income as a result of a change in tax policy. A change in tax policy refers either to a change in tax rates (specific tax incidence) or the substitution of one tax for another assuming equal yields for both (differential tax incidence).

According to Musgrave and others, notably Carl S. Shoup, the concept of differential incidence is of great significance.<sup>9</sup> This concept allows for the existence of a public sector in the beginning, which is necessary in a general equilibrium framework. Differential incidence also has the advantage of not being inherently associated with an inflation or deflation process found in the concept of specific tax incidence. This advantage is important, because if a change in tax policy results in inflation or deflation, the recorded final distribution of income would not only be the result of the tax change, but also of the inflation or deflation process. The differential concept also implies that different taxes of the same yield may result in different

---

<sup>8</sup>Musgrave, Chapters 10, 15, and 16.

<sup>9</sup>Carl S. Shoup, Public Finance (Chicago: Aldine Publishing Company, 1969).

distributions of income available for private use. Furthermore, a change in tax policy does not have to increase the "total" economic burden to the private sector if the real expenditures are held constant.

Musgrave's approach to the theory of tax incidence deals essentially with the change in relative income of individuals or groups of individuals as a result of tax policy. He spells out clearly how individual incomes are affected by various taxes under different market structures in both product and factor markets and for both classical and Keynesian systems. Instead of tracing the final burden of a tax, a study of tax incidence will answer the question whether the incidence is neutral (leaving the income distribution unchanged), progressive (causing income distribution to change in favor of lower income recipients or groups), or regressive (shifting the after-tax income distribution in favor of higher income recipients).

"The crux of incidence analysis, in the general equilibrium context lies in determining whether, and in what respect, any given tax is general or discriminatory."<sup>10</sup> In the general equilibrium setting, a general tax, which applies to all the transactions on either the buyer's or the seller's side of the market, would in principle not alter the relative prices of products and of factors of production. The incidence of a general tax would thus be neutral because unchanged relative prices after the tax would leave the size distribution of income unchanged. A discriminatory tax, which applies to certain transactions only, will cause the relative factor and product prices to change. The incidence

---

<sup>10</sup>Musgrave, p. 348.

of a discriminatory tax will, therefore, be either progressive or regressive.

The modern theoretical concept of tax incidence is of special interest to anyone who wants to measure the different result in income distribution between two alternative tax measures. As a practical measure, however, it is difficult to determine the effects of tax policies on the relative income positions of individuals or specific income groups. Any change in income distribution that is observed may be caused by changes in tax policies or by other influences whose effects cannot be determined from the data.<sup>11</sup> Therefore, the operational definition of tax incidence as a set of the ratios of final tax payments to incomes received by income size bracket must be relied upon in this empirical study. Partial equilibrium analysis is relied upon in order to make assumptions concerning the shifting of Montana taxes while at the same time the modern emphasis on income distribution is not neglected. The role of the general and partial equilibrium theory in an empirical tax incidence study can be elucidated in the following quotation:

If the full fruitfulness of general equilibrium analysis, or for that matter flow of funds accounting, input-output analysis, and so on, is to be realized in actual policy making and tax reforms, sufficient empirical content must be added to convince "practical" businessmen and politicians of the correctness of the predictions of incidence and effects. An exposition based on logical consistency alone may never be able to prevail over pragmatic and anti-theoretic prejudices. Conventional partial equilibrium tax incidence theory does contain operational concepts. It is phrased in business language so that when revenue is needed for a specific project

---

<sup>11</sup>Hence, even Musgrave himself admits that his calculation of differential tax incidence "is little more than a gesture of respect to our conceptual discussion." See Musgrave, Carroll, Cook, and Frane, p. 10.

in a specific institutional setting a convincing picture of the distribution of the burden can be drawn with some confidence and some public acceptance. This same degree of acceptance on part of the citizen has not been won by the more abstract theories and may never be won until more evidence from within the realm of experience can be brought to bear upon predictions for specific tax problems.<sup>12</sup> (*Italics mine.*)

#### Specific Shifting Assumptions

If several factors are weighted heavily toward the shifting of a particular tax, it is concluded that the tax will be shifted. A tax is most likely to be shifted if (1) it is indirect and broad-based; (2) the taxed firm operates under pure competition in the long run; (3) the costs of the taxed industry are constant or decreasing; (4) demand for the taxed product is inelastic while the supply of it is elastic; (5) the tax applies to a wide political jurisdiction; (6) the firm has unrealized gains before the imposition of the tax; (7) the tax significantly affects the cost of production of the firm; (8) the tax changes individuals' preferences so that supply of labor and/or funds are reduced; (9) the tax is of an open nature and is collected by direct assessment; and (10) the tax is imposed on firms of a monopolistic nature whose pricing policies are regulated by governmental agencies.

In making the following shifting assumptions concerning Montana state and local taxes, however, the consideration of the above factors may not be sufficient and applicable.<sup>13</sup> Therefore, it will be necessary

---

<sup>12</sup>Robert P. Collier, "Some Empirical Evidence of Tax Incidence," National Tax Journal, XI (March, 1958), p. 55.

<sup>13</sup>Some factors are not applicable from an empirical point of view. For instance, the corporation income tax is levied on all corporations under whatever state of competition. Since data are not available for the collection of the tax from corporations classified under each of the

to refer to the practices and findings of existing empirical studies as well as to rely on some personal judgments.

### Individual Income Tax

This tax is direct and broad-based and is applied to every income recipient in the state (a large political jurisdiction). Under the prevailing institutional arrangements--which prevent a person from freely combining leisure and work--a person cannot change the length of the work week because of a tax change. The supply of labor would change very slightly after the tax is changed.<sup>14</sup> Moreover, there is not enough empirical knowledge to determine the actual direction and extent of changes in labor supply. Likewise, there is no empirical evidence with regard to individuals' change of preference after a tax is levied. It is reasonable to assume, therefore, that the individual income tax does not affect either the supply of labor or supply of funds. Under conditions of full employment the partial monopoly of licensed professions and labor unions may increase fees and raise wages through collective bargaining; however, the amount and direction of such tax shifting is still largely unknown. Therefore, it is assumed that the individual income tax burden is borne by income recipients or taxpayers in the form of lower net income.

---

four market structures, it is impossible to consider the market structure as a factor in determining the shifting of the Montana corporation income tax.

<sup>14</sup>See, for instance, Marvin Koters, "Effects of an Income Tax on Labor Supply," in Arnold C. Harberger and Martin J. Bailey ed., The Taxation of Income from Capital (Washington, D. C.: The Brookings Institution, 1969), pp. 301-24.

## Corporation Income Tax

The traditional partial equilibrium analysis has led most economists to believe that the corporation income tax is not shifted and therefore its burden is borne by the firm or by its owners (dividend receivers). Since the tax is imposed on net income, it has no effect on a corporation's costs of production and profit maximization position. Moreover, the tax is direct and broad-based.

Owing partly to empirical findings and partly to theoretical contentions, modern writers on this subject have questioned these conclusions. Carl S. Shoup, for instance, has argued that at least a part of the corporation income tax will be shifted forward when the tax is imposed on a corporation that "has a large proportion of its taxable income earmarked for preferred dividends, with none of its operating profit going to interest or rentals, and with a low turnover rate" of the property used in the business.<sup>15</sup> Krzyzaniak and Musgrave, using statistical data for the years 1935 to 1942 and 1948 to 1959, have

---

<sup>15</sup> Carl S. Shoup, "Incidence of the Corporation Income Tax: Capital Structure and Turnover Rates," National Tax Journal, I (March, 1948), p. 17; see also "Some Considerations on the Incidence of the Corporation Income Tax," Journal of Finance, VI (June, 1951), pp. 188-96. Besides Shoup, other writers arguing the shifting of a portion of the tax include: (1) Richard Goode, The Corporation Income Tax (New York: John Wiley and Sons, Inc., 1951), and "Rates of Return, Income Shares, and Corporate Tax Incidence," in Marian Krzyzaniak, ed. Effects of Corporation Income Tax (Detroit: Wayne State University Press, 1966), pp. 207-46; (2) Eugene M. Lerner and Eldon S. Hendriksen, "Federal Taxes on Corporation Income and the Rate of Return on Investment in Manufacturing, 1927 to 1952," National Tax Journal, IX (September, 1956), pp. 193-202; (3) Don M. Soule, "Shifting of the Corporation Income Tax: A Dynamic Analysis," Journal of Finance, XIV (September, 1959), pp. 390-402; and (4) Marian Krzyzaniak, "Effects of Profit Taxes: Deduced from Neoclassical Growth Models," in Krzyzaniak, ed., pp. 17-106.

estimated the effect of changes in the corporation income tax rate upon the gross rate of return to capital in the corporate sector. They came to the conclusion that the corporation income tax was probably shifted by more than 100 percent--i.e., the owners of capital actually gain as a result of a rise in the corporation income tax.<sup>16</sup> They believe that this conclusion was probably due to the fact that, instead of waiting for the working of market forces such as the flow of investment, the corporation, through the conscious decisions of management, would increase prices immediately after an imposition or a rise in rates of the corporation income tax.

In contrast to these writers, others maintain that the corporation income tax is not shifted. Arnold C. Harberger, for instance, developed a general equilibrium model of a two sector (corporate and non-corporate) economy, in which the corporation income tax was viewed as a tax on the use of capital in the corporate sector. In this model, the incidence of the corporation income tax was shown to depend critically on three elasticities of substitution: (1) substitution between the products of the two sectors; (2) substitution between labor and capital in the production of the product in the corporate sector; (3) substitution between labor and capital in the production of the product in the non-corporate sector. Then, by applying a range of plausible values to these three elasticities, Harberger determined that in the long run the plausible range for capital's share of the total corporation income

---

<sup>16</sup>Marian Krzyzaniak and Richard A. Musgrave, The Shifting of the Corporation Income Tax (Baltimore: The John Hopkins University Press, 1963); see also comments on their findings in Richard E. Slitor, "Corporate Tax Incidence: Economic Adjustments to Differentials Under a Two-Tier Tax Structure," in Krzyzaniak, ed., pp. 136-206.

tax burden rested between 90 and 120 percent.<sup>17</sup> In addition, Cragg, Harberger, and Mieszkowski have challenged the conclusion drawn by Krzyzaniak and Musgrave.<sup>18</sup> By introducing the two additional explanatory variables (an employment rate and a war-time dummy variable) in the regression equations used by Krzyzaniak and Musgrave, they concluded that capital owners would bear approximately 100 percent of the burden of the corporation income tax.

Although all the above mentioned studies center around the issue of shifting of the federal, not of the state, corporation income tax, it is believed that the conclusions are also valid for the Montana corporation income tax. In this study, like other studies of this nature, both extremes and a middle position will be considered by making three alternative shifting assumptions: (1) the tax is not shifted and the burden is entirely on the dividend receiver or firm; (2) the tax is shifted forward to consumers; and (3) its burden is evenly shared between dividend receivers and consumers.<sup>19</sup>

#### Property Tax

Because of the variety of properties subject to tax, it would be in error to treat this tax as only one tax and to discuss the shifting of

---

<sup>17</sup>Arnold C. Harberger, "The Incidence of the Corporation Income Tax," Journal of Political Economy, LXX (June, 1962), pp. 215-40.

<sup>18</sup>John C. Cragg, Arnold C. Harberger, and Peter Mieszkowski, "Empirical Evidence on the Incidence of the Corporation Income Tax," Journal of Political Economy, LXXV (December, 1967), pp. 811-21.

<sup>19</sup>The possibility of backward shifting to wage earners is not considered, not because it is not plausible, but because the result would differ little from the case of forward shifting to consumers. This is so, because empirically the percentage distribution of wages and salaries by income brackets is very similar to that of consumption expenditures.

"the" property tax as such. For this reason, it is necessary to make shifting assumptions according to the type of property taxed. The total property tax yield could be divided into real and personal property taxes. The latter can further be subdivided by ownership and considered separately as taxes on households, businesses, and farmers.

Property tax on household residential real property--and for that matter all real property tax--essentially consists of two parts: taxes on the value of land and on the value of improvements. According to traditional incidence theory, a tax on land values cannot be shifted because the supply of land is perfectly inelastic and the land itself is indestructible. The tax, nevertheless, will reduce the attractiveness of investment in land as compared to other assets; therefore, land prices will fall, and the tax will be capitalized. The question of tax capitalization is, however, irrelevant in the study of tax incidence by income brackets. The reduced value of land will still be borne by the owners of land even if the land is transferred and the tax capitalized. In other words, the distribution of final property tax payments by income brackets will not change. Consequently, it is reasonable to assume that the household real property tax on land rests with home owners.

Likewise, it is tenable to assume that the tax on the value of improvements occupied by owners rests with the owner. Unlike the case of taxing land, this assumption is essentially based on the fact that even though an individual can move out of the tax jurisdiction or reduce the value of improvements, it is not likely to be true for all property owners as a group. This is the case, because the tax is imposed in all counties and states, which greatly reduces the

opportunity of shifting. Moreover, the tax is direct; and there is no price transaction mechanism to enable the owner-occupant to shift the tax.

The above conclusion is changed in the case of renter-occupied real property. In this case, shifting the tax from owners to renters is relatively easy.<sup>20</sup> In order to see how this shifting takes place, assume that a property tax is imposed where one did not previously exist. The tax will increase costs of producing housing services and discourage investment in land and improvements. The reduced supply of capital assets in the housing industry would cause the prices of obtaining housing services (rent) to rise regardless of the fact that higher rates of interest lead to some substitution of labor for capital. Through higher rental rates, the tax is shifted to the renter.<sup>21</sup> Additionally, demand for housing in general is relatively price inelastic, and there is a price mechanism available for the owners of

---

<sup>20</sup>The traditional distinction between taxes on land and improvements is not made in this and the following discussions of real property tax shifting. In almost every case, such distinction is both theoretically and empirically impossible. Please refer to Dick Netzer, Economics of the Property Tax (Washington, D. C.: The Brookings Institution, 1966), p. 35, pp. 211-12.

<sup>21</sup>Some qualifications will have to be made when a general equilibrium analysis is applied to the shifting of the tax in this case. As Dick Netzer points out, factors such as the effects of transfers of resources from the housing industry to other untaxed industries have to be considered. The increase in the supply of resources in other industries reduces the prices of their products. This will benefit the renters and offset their losses due to forward shifting of the tax (see Netzer, pp. 36-46). In the present study, however, such benefits are disregarded because the extent of these benefits are unknown and because all the assumptions made are in a partial equilibrium setting.

the houses to shift taxes to their tenants. The tax on renter-occupied real property will be, therefore, assumed to rest on the renter.

The case for shifting real property taxes levied on business firms is very similar to the situation of a renter. Firms are able to pass the tax to consumers through market transactions. However, due to out-of-state competition, the demand for goods produced in Montana is not as inelastic as the demand for rental housing. For this reason, the tax on business real property is assumed to rest evenly on the owner of the property and on the consumer.

The only difference between taxing business and farm real estate is the degree of competition in farming. The owner of farm land typically has no influence on the price of the product he sells and cannot shift a tax forward. Montana is not primarily a state exporting farm products. There is strong competition in farm markets from neighboring states and all other farming states in the nation. Therefore, it is assumed that three-fourths of the tax rests with farmers and the rest is passed on to the consumer.

It is generally agreed that taxes on household personal properties (consumer durables) are not shifted. These properties are held for use and not for sale, nor are there any close substitutes for them. Many of these items are considered necessities, demanded jointly with real property, and relatively price inelastic. Therefore, it is reasonable to assume that the tax rests with the property owner.

A tax on business personal properties (producer durables) is a cost of production for the firm. It has the similar impact as the tax on real business property. However, since personal property is easily moved and closely related to the volume of production; it would be

easier to shift than the tax on real property. It is assumed that the tax on business personal property is shifted fully to the consumer.

The tax on farm personal property can be treated just like the case of taxing business personal property. However, personal property on many farms is also owned for the final consumption purposes. Therefore, it is assumed that one half of the tax is shifted to consumers and the other half rests with the owner.

#### Highway User Tax

The highway user tax consists of (1) motor fuel tax; (2) motor vehicle license tax; and (3) motor vehicle operator's license tax. The incidence of the operator's license tax is easy to determine. The tax is directly imposed on the operator. As long as he wants to operate a motor vehicle, he cannot shift the tax since he cannot transfer his license. His decision concerning the operation of a vehicle would probably not be affected by the amount of tax he pays because in most cases transportation by means of private cars is a necessity in the United States. Moreover, the tax is imposed in every state of the nation: the possibility of obtaining a license free of charge is ruled out. Therefore, it is assumed that the operator bears the burden of this tax.

In the case of the motor fuel and motor vehicle license taxes, it is necessary to distinguish between the portion paid by households, business firms and farmers. With respect to the portion paid by households, the burden is assumed to rest with the direct user and owner, because there is no further market transaction after the taxes are paid by households. The business and farm portion of the tax enters into the

cost of production and is assumed to be shifted forward to consumers.

#### Alcoholic Beverage and Cigarette Taxes

Although the taxes (both excise and license parts) are collected from retailers, they are universally believed to rest with the consumer of these products because demand for alcoholic beverages and cigarettes is highly price inelastic--since drinking and smoking are essentially a matter of habit, the taxes are imposed in every city and state, and the market for these products is monopolistic-competitive. Therefore, it is assumed that these taxes are borne entirely by the consumer.

#### Insurance Premiums Tax

Insurance companies pay a tax of 2.5 percent of gross premium incomes collected in Montana.<sup>22</sup> It is believed that this tax is shifted to the policy-holder because the demand for insurance is rather price-inelastic. Concerning life and property insurance, the purchaser is motivated more by the consideration of future security, by the salesmanship, and by the mortgage and loan requirements than the change in a few percent of the premium paid. Liability insurance is bought mainly to comply with the financial responsibility laws (in addition to the owner's protection). Furthermore, a tax on gross premiums becomes a cost item for the insurer which leads him to charge a higher premium. This is based on two reasons. Firstly, insurance premium rates charged

---

<sup>22</sup>The term "gross" is used to mean that the operating costs of insurance companies are not deducted in the calculation of tax base. One may use the term "net" to mean that cancellations, returns premiums, refunds to industrial policyholders, and saving coupons are deducted from total premium income.

to policy-holders are regulated. The regulation is originally for the purpose of preventing insurers from charging excessive and unfair discriminatory rates. But, it also renders a reasonable return to them because a well-developed insurance industry is clearly beneficial to the general public. Secondly, in Montana the premium tax is deductible when the insurer meets certain requirements. One such requirement is that the insurer has 50 percent or more of its capital stock invested in Montana securities.

#### Public Utility Taxes

Tax experts in general agree that taxes on public utilities are fully shifted forward to the consumer of utility services. Two reasons account for this contention. Demand for public utilities is considered to be price-inelastic, especially for such services as electric energy, natural gas, telephone and telegraph. The utility industries are subject to government regulations. Utility rates are set to cover business expenses, including taxes, and provide a reasonable rate of return on investment. It is assumed, therefore, that the consumer of utility services bears the entire burden of the taxes.

#### Inheritance and Estate Taxes

Since these taxes are direct and the transfer of the estate does not involve any form of price transaction, the taxes cannot be shifted. In general, the burden of the taxes is therefore upon the beneficiaries--the people who receive the wealth. Most writers, nevertheless, point out the possibility that the deceased rather than the beneficiary bears the burden. This happens when the deceased attempts to build up

a certain fixed amount of after-tax estate value for his beneficiaries, and "sacrifices" more during his lifetime than would have been the case without the tax. From the empirical point of view, however, the "amount" of these sacrifices is unknown. Therefore, in this study, it is assumed that these taxes are all borne by the beneficiaries.

### Severance Taxes

These are taxes imposed on the removal of natural products--e.g., oil, gas, minerals, timber, etc.,--from land or water and measured by value of quantity of products removed or sold. In 1967, Montana levied a tax of 2 to 2.5 percent on the total value of the petroleum produced. The gross value is the value of the petroleum at the well head. Other natural products subject to taxation include metals, coal, vermiculite (micaceous minerals), and cement. Since these taxes are either based on the gross value of production or a fixed amount per unit of output, they can easily affect the cost of production of the firm. Therefore, it is reasonable to assume that these taxes are shifted forward to consumers because demand for these products is rather price-inelastic. However, it has been argued that small producers of these natural products, notably oil producers, who are unable to raise prices charged to large refiners, virtually bear all the burden of the tax. This consideration would justify an alternative assumption, which attributes one half of the tax burden to the producer.<sup>23</sup>

---

<sup>23</sup>Since the distribution of income of these small producers may be quite similar to the distribution of consumption expenditures by income bracket, empirically these two assumptions are considered to be the same later in the estimation of final tax payments distribution in the present study.

### Hunting and Fishing License Taxes

Hunting and fishing license taxes are assumed to be borne entirely by the license holder for the following reasons: (1) it is a direct tax and there is no further price transaction by means of transferring the license; (2) the demand for the license is price-inelastic because other factors such as leisure time, sporting equipment, current income and personal tastes are more important in determining the demand for licenses.

### Business License and Other Taxes

These taxes include livestock and grain inspection fees, chain store license tax, physician and dentist license fees, and all other miscellaneous fees and license charges. It is generally believed that many of these license taxes are considered to be costs of doing business and could be passed onto the consumer. It is assumed, therefore, that one half of these taxes is shifted forward to the consumer and the other half rests with the business firms.

### Assumptions on Tax Export and Import

The above discussion of various specific shifting assumptions has implicitly suggested that the possibility of "tax exporting" from Montana to other states is not a matter of concern in the present study.<sup>24</sup> In earlier state tax studies the amount of state and local

---

<sup>24</sup>Tax exporting may be defined as the amount of Montana state and local taxes that can be ascribed as being borne by residents outside Montana. Charles E. McLure, Jr., however, defines the term as "the

taxes that are shifted to out-of-state residents was estimated.

Musgrave and Daicoff found that a little over 70 percent of Michigan taxes were actually borne by Michigan taxpayers.<sup>25</sup> Brownlee concluded that almost one third of Minnesota state and local tax collections are borne by non-residents.<sup>26</sup> Similarly, Groves and Knight estimated that the state and local tax burden borne by Wisconsin residents was 79 percent of the total.<sup>27</sup>

The major part of a state's tax exporting consists of (1) federal income tax offsets or deductibility of state and local taxes, (2) non-resident ownership of corporation stocks of the taxing state, and (3) the sale of a taxing state's products to out-of-state residents. The second and third components are quite obvious. The first one may need some explanation. Since some state and local taxes paid by individuals or corporations are deductible for federal income tax purposes, they could be considered as causing the taxing state's total tax burden to decrease. Take for instance the individual, who files an itemized federal income tax return, pays state income tax of \$100 and has a marginal federal income tax rate of 20 percent. In this case,

---

loss in real incomes suffered by non-residents of the taxing state as a result of the tax in question." See his "The Interstate Exporting of State and Local Taxes: Estimates for 1962," National Tax Journal, XX (June, 1967), p. 51.

<sup>25</sup>Musgrave and Daicoff, p. 146.

<sup>26</sup>O. H. Brownlee, "Estimated Distribution of Minnesota Taxes and Public Expenditure Benefits," Studies in Economics and Business, No. 21 (Minneapolis, Minnesota: The University of Minnesota Press, 1960), p. 1.

<sup>27</sup>Harold M. Groves and W. Donald Knight, Wisconsin's State and Local Tax Burden: Impact, Incidence, and Tax Revision Alternatives (Madison, Wisconsin: University of Wisconsin Tax Study Committee, 1959), p. 46.

deductibility of the state tax against the federal tax base reduces his federal tax by \$20. The net additional tax burden resulting from the state tax levy is, therefore, only \$80, not \$100. The \$20 tax is "exported" to become the burden of the federal government or other states.

There are two major reasons for considering the question of tax exporting in a state tax study. In the first place, the concern of the tax study could be with the contribution by the federal government and residents of other states to the revenues of the taxing state. Out-of-state residents, for instance, who buy products of the taxing state, are contributors to state and local revenues of the taxing state. In fact, some taxes have induced businesses of the taxing state to increase the prices at which they sell products to out-of-state residents. Therefore, when considering the removal of such taxes, it should be remembered that the reduction in the revenues of the taxing state, for a given amount of products sold, would be greater than the amount contributed by residents of the taxing state alone. In the second place, since the amount of tax export varies with the kind of tax under consideration, it necessarily affects the over-all incidence of the taxing state. For instance, if the amount of the corporation income tax which is exported is very high and this fact was neglected the study would show a heavier tax burden on higher income groups. This is the case because the distribution of dividends, according to which the corporation income tax is usually allocated among income groups (assuming forward shifting), is concentrated on higher income groups. Likewise, because of the progressive nature of the individual income tax,

omission of the federal tax offsets would generally result in a heavier burden on higher income classes than is usually the case.

Obviously, these are good reasons for estimating tax exports in the study of state tax incidence. However, due to empirical difficulties, none of the above noted state tax studies has made an estimation of "tax importing."<sup>28</sup> By neglecting tax importing, the over-all tax burden of the taxing state is understated.

Even though most empirical difficulties can be overcome, it is questionable whether tax imports and exports should be estimated separately. It has been argued that there is some doubt whether an individual, or a group of individuals, who takes the advantages of tax deduction, actually gains. Buchanan and Pauly have maintained that those who take advantage of tax deductions may lose and some general taxpayers may eventually gain.<sup>29</sup> Tax deductions cause a decrease in the total tax yield. Since individuals in higher income groups would have higher deductions, their evaluation of public goods would exceed the tax-price paid for these goods. This would cause their demand for public goods to increase, which induces a need for total tax yield to increase or at least not to decrease. Assuming, however, that the public expenditures remain constant, the decreased amount in the original total tax yield has to be compensated in one way or another.

---

<sup>28</sup> Tax importing may be defined as the amount of taxes borne by the residents of the taxing state as a result of their holding of out-of-state corporation stocks, purchasing out-of-state commodities, and having increased share of the federal tax liability due to the federal tax deductibility of state and local taxes in other states.

<sup>29</sup> James M. Buchanan and Mark V. Pauly, "On the Incidence of Tax Deductibility," National Tax Journal, XXIII (June, 1970), pp. 157-67.

In a progressive tax system, the higher income groups have to contribute more to the total tax bill. Therefore, they may find themselves in a worse situation after the deduction than before it because they would eventually have to be taxed at a higher marginal tax rate than before. If this contention is true, the question of tax exporting becomes much less significant even from the theoretical point of view. It would be useless to estimate the amount of federal tax offset which is a major portion of tax exporting. The deduction-induced decrease in total federal tax yield would result in an over-all increase in the federal income tax rates. This would offset the previous amount of tax deductions and leave the total state tax burden unchanged.

In the case of Montana, there are additional reasons to disregard the problem of tax exporting. In the first place, Montana, unlike such states as Michigan, Minnesota, and Wisconsin, does not have any industry that dominates the national market. In the second place, it was found by McLure that the over-all exporting rate of Montana state and local taxes in 1962 came very close to the average exporting rate for all the states in the United States.<sup>30</sup> This indeed supports the assumption that in Montana, state and local tax exports equal imports so that it is not necessary to estimate them separately. However, it must be admitted that empirical difficulties alone would prevent any attempt to estimate Montana tax imports.

#### Summary

In this chapter the theory of tax incidence was briefly discussed.

---

<sup>30</sup>McLure, pp. 63-64.

Then it was argued that the modern general equilibrium concept of tax incidence was the most meaningful one. However, as far as the empirical study of tax incidence was concerned, it is necessary to rely heavily upon the traditional partial theory. It was this latter theory that provides the necessary information to make all the specific tax shifting assumptions of the present study. It was further contended that for the state of Montana a meaningful incidence study would not have to investigate empirically the question of tax export and/or import. This chapter constitutes the theoretical background of the present study.

## CHAPTER III

### INCOME DISTRIBUTION IN MONTANA

The definition of income can significantly influence the measured incidence of taxes. This is the case even if there is perfect knowledge concerning the direction and amount that each tax is shifted. The first part of this chapter is concerned with a discussion of the concept of income used in the present study. Some general estimation problems will then be clarified. Finally, the series of Montana income distribution, which will be used as the denominator of the incidence formula, will be estimated.

#### Income Concepts and Their Components

Income, from an economist's point of view, is an expression of economic power to command goods and services for the satisfaction of human wants. In general, it consists of money itself. In many cases, however, it may be anything that is satisfaction-yielding and can be valued in terms of money. Goods and services (such as room and board) received by individuals without payment is a case in point.

Robert M. Haig and Henry C. Simons contend that the "accretion" concept of income should be used for the purpose of individual income taxation. Haig says that income is "the money value of the net

accretion to one's economic power between two points of time."<sup>1</sup>

Similarly, Simons defined income as :

. . . the algebraic sum of (1) the market value of rights exercised in consumption and (2) the change in the value of the store of property rights between the beginning and end of the period in question.<sup>2</sup>

According to this definition, all additions to wealth (economic power measured in terms of money) are included, no matter in what form they are received or from what source they accrue. Income, therefore, is the sum of not only factor earnings such as wages, salaries, rents, interests and profits, but also transfers such as gifts, inheritance, social security benefits, gambling profits and cash prizes. It also consists of income in kind, imputed income and both realized and unrealized capital gains.<sup>3</sup>

Ideally, the accretion concept of income should be used as the base for the tax incidence formula. This concept appropriately reflects an individual's ability to pay taxes, which is a matter of concern in a tax incidence study. Other concepts of income might distort the true picture of tax incidence by omitting one or more components. For example, if transfer payments are excluded from the income base, as is

---

<sup>1</sup>Robert M. Haig, "The Concept of Income: Economic and Legal Aspects," in Richard A. Musgrave and Carl S. Shoup, ed., Readings in the Economics of Taxation (Homewood, Illinois: Richard D. Irwin, Inc., 1959), p. 59.

<sup>2</sup>Henry C. Simons, Personal Income Taxation (Chicago: The University of Chicago Press, 1938), p. 50.

<sup>3</sup>In this income concept, many deductions and exemptions, which may be incorporated in the actual tax legislation, are disregarded.

the case in some measures of income, the tax burden on lower income groups would be overstated.<sup>4</sup>

Since available income distribution data are gathered for purposes other than the estimation of tax incidence, it is impossible to obtain an income series consistent with the accretion concept. Therefore, an income series approximating the accretion concept must be derived from the existing income data. This concept will be called "broad income" to distinguish it from the accretion as well as all other statistically available income concepts. Broad income in the present study will, therefore, be defined as the Montana adjusted gross income plus the following income components received by Montana residents: transfer payments, imputed rents, long term capital gains, federal bond interest, food and fuel produced and consumed on farms, and dividends of national banks.<sup>5</sup>

Obviously, there are other components such as imputed interest, retained corporate profits, a portion of income in kind, and other labor income which should be added to adjusted gross income in order to obtain a true measure of the accretion concept of income. However, these components are not estimated because of the unreliability of the data.

#### Some General Problems in Estimation

There are four general problems associated with estimating the distribution of broad income for Montana. Each of these problems arises

---

<sup>4</sup>For a brief review of various measures of income and their components, please refer to the expository table of Appendix A in the present study.

<sup>5</sup>Each of these components will be defined later in this chapter when they are derived or estimated.

because of the nature and limitation of statistical data. The first problem concerns the way of classifying individuals and families by income bracket. Ideally, a series of broad income distribution (by income bracket, not by factor share, family size, sex, or age) will simultaneously show two things: (1) the number of individuals and families in each of the income brackets that are classified by the size of broad income; (2) the amount of broad income received by individuals and families in each of these broad income brackets. Therefore, this series would show that in the, say, \$3,000 to \$5,000 broad income bracket there are 45,000 individuals and families who receive \$250 million broad income in Montana in a certain year.

Unfortunately, available statistical data do not permit the derivation of such a series. The available as well as up-to-date data include Montana adjusted gross income distribution by federal adjusted gross income brackets and state aggregates of some income components which are excluded from Montana adjusted gross income.<sup>6</sup> No data are available for the allocation of any one income component by broad income bracket. It is true that crude methods (such as the one discussed in Appendix B of the present study) can be applied to the existing data for the adjustment of income concept in classifying income groups. These methods are rather unreliable should they be used

---

<sup>6</sup>In filing Montana individual income tax returns, the derivation of Montana adjusted gross income is based on the amount of federal adjusted gross income reported in federal individual income tax returns. This is the reason why the Montana returns are classified by federal adjusted gross income bracket for statistical reporting purpose. The reader may want to refer to columns (5) and (6) of the expository table in Appendix A for a few minor definitional differences between the Montana and federal adjusted gross income.

to change a series of adjusted gross income distribution from the one by adjusted gross income bracket to the one by broad income bracket. This is the case mainly because to shuffle around such a large magnitude as the total Montana adjusted gross income--82 percent of the total Montana broad income--entails a possibility of making serious errors. Therefore, under the condition of data availability, an alternative device is used so that the ideal pattern of broad income distribution will not be retained but the purpose of equitably measuring tax incidence ratio can still be fulfilled. This is what will be done in deriving the income base for the present study:

(1) Take, as the base, the distribution of Montana adjusted gross income from published data concerning Montana individual income tax returns.

(2) Obtain, or estimate, the amount of each income component excluded from the Montana adjusted gross income but included in the Montana broad income.

(3) Allocate each of the above state totals by federal adjusted gross income bracket.

(4) Add, bracket by bracket, every distribution series obtained from (3) to the original Montana adjusted gross income distribution in (1).

The final result obtained from the above procedure will show the distribution of Montana broad income by federal adjusted gross income bracket. That is to say, in this new distribution series, individuals and families are still classified by the size of their federal adjusted gross income. However, when the total income of a particular bracket is derived, it is the amount of broad income, not adjusted gross income,

that is counted as the income receipts of the individuals and families in this particular adjusted gross income bracket. In this way, though frequency (and percentage) distribution of individuals and families remains unchanged for each bracket, total income in each bracket is increased by the amount that is due to the definitional difference between the Montana adjusted gross and the Montana broad income. Take an imaginary income distribution series for example. The original series may show that in the \$3,000 to \$5,000 federal adjusted gross income bracket there are 50,000 individuals and families who receive \$200 million Montana adjusted gross income; but the new series would show that these same individuals and families in the same \$3,000 to \$5,000 federal adjusted gross income bracket may receive \$240 million broad income. The difference of \$40 million represents the total amount of those income components that are excluded from the Montana adjusted gross income but included in Montana broad income. In a sense, therefore, the final result will not provide what may be called "the distribution of income" as the term is commonly understood and used. A proper term, which is also less confusing, may well be "the distribution of Montana residents' ability to pay their state and local taxes by the size of their incomes for the income taxation purpose."

The reader may wonder at this point about the necessity of going through a series of estimating processes to derive "something" that seems to lack analytical neatness. However, a closer look at the issue reveals that such a process is essential on the basis of sound theoretical reasoning. As noted earlier, regardless of how the term "incidence" is defined, definition of income is always crucial. Incomplete measures of individual income, which exclude many important sources of

consumption and changes in wealth, distort ability to pay. Criticism on the use of the narrowly-defined income as a denominator of the incidence ratio in some earlier empirical studies is, therefore, well-grounded.<sup>7</sup> Moreover, to measure the incidence ratio with its concomitant consideration of individuals' ability to pay and to categorize these individuals into various groups are two distinctive issues. That broad income is used in the first case while adjusted gross income is used in the second can be accepted on a purely theoretical ground. The advantage of classifying individuals and families by the size of adjusted gross income is that they represent various income groups which are directly subject to taxation under prevailing income tax laws.<sup>8</sup> The advantage of using broad income as the income base is obvious since it gives a better perspective to the question of tax equity.

Consequently, even without data limitations the above estimating process can still be recommended in so far as the purpose of the study is to obtain a reasonable income base to be used as a denominator in the tax incidence formula. This is the reason why it is such a common practice that almost every comprehensive empirical incidence study has made use of different income concepts in measuring tax incidence ratios

---

<sup>7</sup>For some criticism in this respect, see Rufus S. Tucker, "Distribution of Tax Burden in 1948," National Tax Journal, IV (September, 1951), pp. 269-85; David Brainin and John J. Germanis, "Comments on 'Distribution of Property, Retail Sales, and Personal Income Tax Burden in California: An Empirical Analysis of Inequity in Taxation' by Gerhard N. Rostvold," National Tax Journal, XX (March, 1967), pp. 106-11; and Werner Z. Hirsch, The Economics of State and Local Government (New York: McGraw-Hill Book Company, 1970), pp. 67-68.

<sup>8</sup>This advantage should not be overlooked since allocative data for the distribution of certain major Montana taxes such as income and property taxes are available only by adjusted gross income bracket.

and in classifying income groups. Musgrave and Daicoff use a "money income" concept to classify income groups while they use "money income," "money and real income," and "money income after federal taxes" to derive incidence ratios or effective rates.<sup>9</sup> Groves and Knight utilize "adjusted gross income" to categorize individuals and families, but "revised adjusted gross income," "broad income," "income after federal taxes" are used to derive tax to income ratios.<sup>10</sup> W. Irwin Gillespie also adopts the same practice; "family money income" is used for the classification of income groups, but "adjusted broad income" and "broad income" are used as the income bases in calculating incidence ratios.<sup>11</sup>

The second estimation problem concerns the selection of a year. The year 1967 was chosen for two reasons. Since data on the distribution of Montana adjusted gross income are available only for odd-numbered years, the calendar year 1967 was the latest period for which income data were available when the research for the present study was undertaken. As far as the tax data are concerned, the most recent publication of the Census of Governments, which provides information on the collection of important Montana taxes, covered the fiscal year 1967.<sup>12</sup>

---

<sup>9</sup>Musgrave and Daicoff, p. 163.

<sup>10</sup>Groves and Knight, p. 49.

<sup>11</sup>Gillespie, pp. 126-27, and pp. 133-35.

<sup>12</sup>Consequently, later in this study as tax incidence is measured, tax payment distribution of fiscal year 1967 (except individual income tax which is for the calendar year 1967) will be divided by the income distribution of calendar year 1967. Generally, for most taxes, the amount of collection in fiscal year is somewhat lower than calendar year; thus the measured tax to income ratios will be lower than they would be had the larger tax collection of a calendar year been used.

The third problem deals with the number of income brackets to use. It is always possible to combine brackets but almost impossible and always unreliable to separate them. In other words, to reduce the number of income brackets and at the same time to widen bracket intervals for a certain distribution is always much more reliable and feasible than to increase the number of brackets and narrow bracket intervals. Due to this principle, together with two other considerations, it was decided to use six brackets in classifying income groups. First, certain tax allocative data are available only by six income brackets. Second, wider bracket intervals make it possible to disregard the problem of "bracket movers."<sup>13</sup>

Finally, since the distribution of income components (and tax payments) are not available at the state level it was necessary to use data for the United States. In using these data, it is assumed that income-earning patterns (such as earnings from holdings of U. S. savings bonds and sales of capital stocks) and consumer behavior (such as cigarette smoking and food consumption) of an average Montana resident follow the pattern found for an average U. S. resident. Moreover, some of these allocative data are not available for the calendar or fiscal

---

This possible under-estimation of tax incidence ratio for some taxes will not be corrected, however. In the first place, the underlying income or tax total is relatively unimportant for the purpose of the present study, which is primarily to estimate the relative "distribution" of the tax burden among income groups. In the second place, some data such as those of local property tax collection is not available for such a correction.

<sup>13</sup>Because of the change of income concepts in classifying income groups, certain individuals and families may move out of their original income brackets. For a detailed explanation, please refer to Appendix B in the present study or Gillespie, p. 126.

year 1967, therefore, earlier years had to be relied upon. When these data are used, it is assumed that relative distribution patterns among income groups have not changed since then. Both of these assumptions are widely used in all the existing tax incidence studies of a state or local nature.<sup>14</sup>

### Estimation of Montana Income Distribution

#### Adjusted Gross Income Distribution

The distribution of Montana adjusted gross income in 1967 was derived from data supplied by the Montana individual income tax returns.<sup>15</sup> The original reported distribution by 38 federal adjusted gross income brackets (ranging from "under \$600" to "\$100,000 and over") was reduced to six brackets (from "under \$3,000" to "\$15,000 and over"). By widening the bracket intervals, the amount of Montana adjusted gross income and the number of individuals and families in each bracket are increased. The results are presented respectively in lines one and nine of Table I.

---

<sup>14</sup> According to the estimating problems that have been settled, two more points can be mentioned in passing. First, it is apparent that the last three estimation problems are also common to the estimation of tax payment distributions. Therefore, they will not be noted again when tax payment distributions are estimated later in the study. Second, it can be seen that this incidence study will eventually show final taxes paid by Montana individuals and families in each of the six federal adjusted gross income brackets; but when these tax payments are divided by the income base in each bracket, bracket totals of Montana broad income are used to make the division. In other words, each incidence ratio will reflect final tax payments as a percent of broad income received by the individuals and families in a particular federal adjusted gross income bracket.

<sup>15</sup> Montana State Board of Equalization, Twenty-Third Biennial Report (Helena, 1968), p. 18.

TABLE I  
DISTRIBUTIONS OF MONTANA INCOMES AND THEIR COMPONENTS IN 1967

Incomes and Their Components	Units <sup>a</sup>	Federal Adjusted Gross Income Bracket (Dollars)						Total
		Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and Over	
(1) Adjusted Gross Income	thousand dollars percent	\$138,938 9.7	\$201,308 14.0	\$335,978 23.3	\$280,528 19.5	\$224,814 15.6	\$256,572 17.8	\$1,438,138 100.0
(2) Transfer Payments	thousand dollars percent	104,357 58.3	29,356 16.4	21,480 12.0	13,067 7.3	7,697 4.3	3,043 1.7	179,000 100.0
(3) Imputed Rent	thousand dollars percent	6,702 11.4	3,586 6.1	4,468 7.6	11,641 19.8	16,874 28.7	15,521 26.4	58,793 100.0
(4) Long-Term Capital Gains	thousand dollars percent	2,602 5.6	1,672 3.6	2,091 4.5	2,509 5.4	4,228 9.1	33,357 71.8	46,458 100.0
(5) Federal Bond Interest	thousand dollars percent	1,676 14.2	1,369 11.6	1,451 12.3	1,428 12.1	1,982 16.8	3,894 33.0	11,800 100.0
(6) Food and Fuel Produced and Con- sumed on Farms	thousand dollars percent	2,592 35.5	1,788 24.5	1,424 19.5	635 8.7	540 7.4	321 4.4	7,300 100.0
(7) Dividends of National Bnks	thousand dollars percent	150 3.8	142 3.6	209 5.3	224 5.7	336 9.3	2,846 72.3	3,937 100.0

TABLE I, Continued

Incomes and Their Components	Units <sup>a</sup>	Federal Adjusted Gross Income Bracket (Dollars)						Total
		Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and Over	
(8) Broad Income	thousand dollars	\$257,017	\$239,221	\$367,101	\$310,033	\$256,501	\$315,554	\$1,745,426
	percent	14.7	13.7	21.5	17.8	14.7	18.1	100.0
(9) Individuals and Families	number of returns	97,740	50,803	54,074	32,656	19,025	9,292	263,590
	percent	37.0	19.3	20.5	12.4	7.2	3.5	100.0

<sup>a</sup>Details may not add to totals due to rounding.

Source: See the text and footnotes.

It is assumed, for the purposes of the present study, that the number of returns provide a good estimate of the number of families and unrelated individuals in each income bracket. In fact, the total number of returns does not differ much from the total number of families and unrelated individuals as reported in other sources.<sup>16</sup> This same frequency distribution of income tax returns will be used in the series of broad income distribution as well, since the latter series also uses the adjusted gross income to classify individuals and families.

### Transfer Payments

Transfer payments are receipts of individuals and families from government (other than government interest) and business for which no services are rendered currently.<sup>17</sup> The total transfer of payments of \$179,000 thousand shown in line two of Table I is taken from state personal income data.<sup>18</sup>

---

<sup>16</sup>For instance, in 1970 the total number of families and unrelated individuals amounts to 264,515 according to the population census. Since the number of tax returns would usually be greater than the number of families and individuals, the latter number in 1967 would be slightly smaller than 263,590. See, U. S. Bureau of the Census, U. S. Census of Population: 1970, General Population Characteristics, advance report, PC (V2)-28, Montana (Washington, D. C.: U. S. Government Printing Office, September, 1970), p. 3.

<sup>17</sup>These payments include not only cash transfers but also things such as the value of free stamps issued under the surplus food and cotton stamp programs. For detailed components of transfer payments, see U. S. Department of Commerce, National Income: 1954 Edition (Washington, D. C.: U. S. Government Printing Office, 1954), p. 212, Tb. 36; and \_\_\_\_\_, Personal Income, By States, Since 1929 (Washington, D. C.: U. S. Government Printing Office, 1956), pp. 131-36.

<sup>18</sup>U. S. Department of Commerce, Survey of Current Business, XLVIII (August, 1968), p. 20, Tb. 52.

Data from the Office of Tax Analysis of the U. S. Department of the Treasury are used in allocating transfer payments to the various income brackets. This source provides distribution series of many components of transfer payments and each of these series records the distributive pattern of the components by federal adjusted gross income bracket. Unfortunately, the distribution of business transfer payments is not available. Since business transfer payments only amount to about ten percent of total transfer payments, it is reasonable to assume that the combined distribution of all other components adequately reflects the distribution pattern of all transfer payments.<sup>19</sup> The results of allocating transfer payments to the various income brackets are presented in line two of Table I.

#### Imputed Rent

Imputed rent is the gross rental value of owner-occupied non-farm houses less the actual expenses incurred in home ownership. This value is calculated in terms of the net return which the individual homeowner could have realized by offering his home for rent. The amount of imputed rent for Montana is not available from any published source. The first thing to do in estimating the total amount of imputed rent is

---

<sup>19</sup>The combined distribution consists of (1) public benefits and pensions, (2) old-age, survivors, and disability insurance benefits, (3) other public pensions and retirements, (4) unemployment benefits, (5) private and public relief, (6) cash gifts from others, (7) veteran's pensions and compensation, and (8) mustering out pay. The bracket intervals of these distributions are broadened from the original data. See U. S. Department of the Treasury, Office of Tax Analysis, Project: Total U. S., Addition to Subproject C, unpublished computer printouts, prepared by Computers for Industry and Business, Inc., on the basis of BLS-USDA 1961 survey, p. 2088, Tb. 3.

to determine the total value of owner-occupied houses. The best alternative employment of this amount is then estimated and the result is imputed rent for Montana in 1967.

To determine the total value of owner-occupied houses, the following steps are taken:

(1) From the frequency distribution of owner-occupied homes by the value of these homes, a total of \$1,079,628,000 is obtained to be the value of these homes in Montana in 1960.<sup>20</sup>

(2) This value needs to be updated. To do this, it is assumed that the increase in the real value of homes from 1960 to 1967 was proportional to the increase in the number of homes which, in turn, was in proportion to the growth of population between 1960 and 1967. The latter growth rate in Montana was 2.9 percent.<sup>21</sup> This results in an increase in the total value of homes in 1967, at the 1960 price level, to \$1,110,937 thousand.

(3) It is necessary to account for the rise in the price level from 1960 to 1967. By referring to the price index for housing and rent, the total value of owner-occupied homes in 1967 is inflated to \$1,212,225 thousand.<sup>22</sup>

---

<sup>20</sup> Calculated from U. S. Bureau of the Census, U. S. Census of Housing, 1960, Vol. 1, Pt. 5, No. 28 (Washington, D. C.: U. S. Government Printing Office, 1963), p. 28-10, Tb. 7.

<sup>21</sup> Calculated from U. S. Bureau of the Census, Statistical Abstract of the United States: 1969, 90th ed. (Washington, D. C.: U. S. Government Printing Office, 1969), p. 12.

<sup>22</sup> Board of Governors of the Federal Reserve System, Federal Reserve Bulletin, LV (February, 1967), p. A-64.

It is assumed, then, that the rental value of owner-occupied homes can be reflected by one of its best employment alternatives--buying U. S. Government long-term savings bonds. In 1967, the average interest yield for these bonds was 4.85 percent per annum.<sup>23</sup> Applying this rate to the total value of Montana owner-occupied homes, an amount of \$58,793 is obtained to be the imputed rent for Montana in 1967.

The next step is to allocate imputed rent to the various income brackets. It is assumed that the owners of high-value homes would pay higher rents if they decided not to own homes, and that the value of their homes can be reflected by real property taxes they paid. The distribution of real property tax payments can be derived from the data concerning the real estate tax deduction recorded in the income tax returns. The percentage distribution of the latter is as follows (from the lowest to the highest of the six income brackets used in the present study): 3.7, 6.5, 13.8, 20.7, 28.0, and 27.3.<sup>24</sup> But this distribution does not properly reflect the true distributive pattern of real property tax payments mainly because it was derived only from data concerning those taxpayers who itemized their deductions. Specifically, it is believed that, since lower income recipients usually choose the standard deduction, much of their real property taxes are not included in the above percentage distribution. Consequently, an adjustment that accounts for this exclusion is needed. The adjustment is made by estimating the difference in the frequency distribution by income bracket

---

<sup>23</sup>Ibid., p. A-32.

<sup>24</sup>Internal Revenue Service, Statistics of Income 1966: Individual Income Tax Returns (Washington, D. C.: 1966), p. 65, Tb. 29, col. 5 (hereafter: 1966 Individual Returns).

between the persons who itemized their real property tax deductions and those who owned their homes. The result of the estimation has produced the following adjustment factors for the previously derived percentage distribution (from the lowest bracket): +7.7, -0.4, -6.2, -0.9, +0.7, and -0.9 percent.<sup>25</sup> The allocated imputed rent by income bracket on the basis of the above-derived adjusted distribution of real property tax is presented in line three of Table I.

#### Long-Term Capital Gains

Due to the lack of data, the estimation will be confined to realized gains. Capital gains refer to the increase in the market value of capital assets such as corporate stocks, bonds, and real estate. Long-term capital gains are gains on those assets held for more than six months. Short-term capital gains result from transactions involving assets held less than six months. The individual income tax law of Montana has the same provisions as the federal law in regard to taxing capital gains. Short-term capital gains in excess of any long-term capital loss are treated as ordinary income and counted fully in the Montana adjusted gross income. One half of the net long-term capital gains in excess of any short-term loss is counted in adjusted gross income; the other half is non-taxable. Since one half of the

---

<sup>25</sup>Calculated from the following sources: U. S. Bureau of the Census, U. S. Census of Population, 1960, Vol. 1, Pt. 1 (Washington, D. C.: Government Printing Office, 1964), p. 1-225, Tb. 95; Internal Revenue Service, 1960 Individual Returns, p. 14, Tb. 0; University of Michigan, 1960 Survey of Consumer Finances, p. 59, Tb. 3-8; and \_\_\_\_\_, 1967 Survey of Consumer Finances, p. 55, Tb. 3-8.

long-term capital gains is excluded from adjusted gross income, it will have to be estimated and included in the income measurement of the present study.

The excluded amount can be assumed to exactly equal the amount that is included in adjusted gross income, therefore, it is only necessary to estimate the amount already counted in adjusted gross income. In order to estimate this latter figure, data furnished by the Internal Revenue Service were relied upon. These data reported the amount of both long-term and short-term gains received by Montana residents in 1967 at a total of \$49,555 thousand.<sup>26</sup> They also provide information concerning the breakdown between long-term and short-term gains for the United States, as a whole, with the long-term gains being 93.75 percent of the total.<sup>27</sup> Assuming that this percentage is also true for Montana, a total of \$46,458 thousand is obtained to be the amount of Montana long-term capital gains which is already included in adjusted gross income.

The next step is to allocate the same amount of \$46,458,000 by income bracket. The best source for this allocation is also furnished by the Internal Revenue Service. This source provides distribution of long-term capital gains by federal adjusted gross income bracket for both taxable and non-taxable returns.<sup>28</sup> The breakdown of Montana long-term capital gains according to the distributive series derived from the above source is shown in line four of Table I.

---

<sup>26</sup> Internal Revenue Service, 1967 Individual Returns, p. 114, Tb. 38.

<sup>27</sup> Calculated from Ibid., p. 4, Tb. 1.4.

<sup>28</sup> Ibid., p. 39, Tb. 13, col. 9.

### Federal Bond Interest

Federal bond interest consists of interest earnings derived from holding bonds and other obligations of the U. S. Government. It is not taxable under the Montana individual income tax law and is not included as part of adjusted gross income for Montana. Therefore, this component must be added to adjusted gross income in deriving broad income.

Since the total amount of federal bond interest received by Montana residents is not available from any published source, it was necessary to estimate it. It was assumed that the amount of such interest received by Montana residents is proportional in their holdings of U. S. savings bonds. It was also assumed that this latter holding is proportional to the holdings of U. S. series E and H savings bonds. By the following procedure, it was estimated that federal bond interest received by Montana residents was \$11,800,000 in 1967.

The total amount of federal bond interest for the U. S. as a whole equals \$11,813.5 million.<sup>29</sup> Out of this total, about 21.7 percent was held by individuals and families.<sup>30</sup> This provides a total of \$2,563.5 million of federal bond interest that was received by individuals and families. It was found that Montana residents over the years purchased about 0.46 percent of the total U. S. sales of series E and H savings

---

<sup>29</sup>This figure is the average of fiscal 1967 and 1968 and calculated from U. S. Department of the Treasury, Annual Report of the Secretary of the Treasury on the State of Finances: Statistical Appendix, Fiscal Year Ended June 30, 1968, document No. 3245a (Washington, D. C.: U. S. Government Printing Office, 1969), p. 211, Tb. 44.

<sup>30</sup>Calculated from data concerning the ownership of federal securities outstanding as of June 30, 1967; see *Ibid.*, p. 215, Tb. 47.

bonds.<sup>31</sup> The U. S. total of \$2,563.5 million is then multiplied by this percentage to obtain the above estimate of federal bond interest for Montana in 1967.

The next step is to allocate federal bond interest to the various income brackets. For lack of any better sources, it is allocated according to the distribution of interest income reported in the statistical data concerning individual income tax returns.<sup>32</sup> The result is presented in line five of Table I.

#### Food and Fuel Produced and Consumed on Farms

The value of food and fuel produced and consumed on farms is taken from a U. S. Department of Agriculture publication concerning farm income.<sup>33</sup> This value for Montana in 1967 is at the amount of \$7,300 thousand.<sup>34</sup>

The allocation of this total by income bracket is based on the distribution of rural farm families. The latter distribution is

---

<sup>31</sup>Calculated from Ibid., p. 207, Tb. 41.

<sup>32</sup>Internal Revenue Service, 1967 Individual Returns, p. 12, Tb. 4, col. 31.

<sup>33</sup>In this publication, however, the amount represents the "value of home consumption"--a term differs from the one used in this study. The present term is used because it is consistent with the one used by the U. S. Department of Commerce in its national income series, and it signifies that this value is derived only from the agriculture sector of the economy. See U. S. Department of Agriculture, Farm Income, State Estimates, 1949-1968, FIS 214 Supplement (Washington, D. C.: August, 1969).

<sup>34</sup>Ibid., p. 26, Tb. 6.

available only for 1960 and by family money income bracket.<sup>35</sup> No attempt was made to update this series for 1967, not only because the distribution pattern of rural farm families seems to have been quite stable, but also because there is no reliable data for updating. However, some adjustment was made to change the series from the family money income bracket to the adjusted gross income bracket.<sup>36</sup> The adjustment factors for all six brackets were estimated to be +3.8, -2.5, -0.7, -0.3, -0.2, and -0.1 percent respectively. When these factors were combined with the original percentage distribution (31.6, 27.0, 20.2, 9.0, 7.6, and 4.5) of rural farm families, the adjusted distribution series was acquired. On the basis of this series, food and fuel produced and consumed on farms is broken down by income bracket, which is presented in line six of Table I.

#### Dividends of National Banks

Dividends of national banks are individuals' earnings from holding capital stock of national banks located in Montana. These earnings are not taxable under the Montana individual income tax law. Since they are not included in Montana adjusted gross income, they must be obtained in deriving the income estimate used in the present study.

The total of these dividends received by Montana residents amounted

---

<sup>35</sup>U. S. Bureau of the Census, U. S. Census of Population: 1960, Vol. 1, Pt. 28 (Washington, D. C.: U. S. Government Printing Office, 1963), p. 28-107, Tb. 65.

<sup>36</sup>A discussion of this adjustment method is found in Appendix B of the present study.

to \$3,937 thousand in 1967.<sup>37</sup> The total is allocated to the various income brackets by relying on information concerning the percentage distribution of dividends in general by income bracket. This information was obtained from the 1967 issue of the Statistics of Income.<sup>38</sup> The allocation of dividends of national banks by income bracket is recorded in line seven of Table I.

#### Broad Income Distribution

It is now possible to derive a series of Montana broad income distribution by federal adjusted gross income bracket. It is obtained by adding, bracket by bracket, all the estimated income components and their bracket breakdowns to the distribution of Montana adjusted gross income--i.e., lines two to seven of Table I are added to line one of the same table. The final results are presented in line eight of Table I. The distribution shown therein will be used as the denominators of the tax incidence formula in deriving incidence ratios later in the study.

---

<sup>37</sup>U. S. Department of the Treasury, Annual Report of the Comptroller of the Currency: 1967, pp. 204-205, Tb. B-27.

<sup>38</sup>Calculated from Internal Revenue Service, 1967 Individual Returns, p. 12, Tb. 4, col. 29.

## CHAPTER IV

### MONTANA TAX PAYMENT DISTRIBUTION

The purpose of this chapter is to derive a series of tax payment distributions which will be used in determining tax incidence ratios. The first part of the chapter is devoted to a brief discussion of Montana state and local taxes. This is followed by a description of the method of allocating state and local taxes by income bracket. Finally, the actual allocation of each tax to the various federal adjusted gross income brackets is explained.

#### Montana State and Local Taxes

Fiscal 1967 revenue from the various Montana state and local taxes is presented in Table II. The total amount of tax revenues shown in this table is greater than a comparable figure of \$212,819 thousand reported in the 1967 Census of Governments. The individual income tax figure (\$27,102 thousand) used in this study is for calendar 1967 and is derived from the Biennial Report of the Montana State Board of Equalization while the census figure (\$24,224 thousand) is for fiscal 1967. The Montana source for the personal income tax is used in lieu of the Census of Governments figure since the former provides a breakdown of individual income tax payments by adjusted gross income bracket. All the other tax collection figures in the table are for fiscal 1967 and are the same as the figures in the census.

TABLE II  
MONTANA STATE AND LOCAL TAX REVENUE  
IN FISCAL 1967  
(In Thousands of Dollars)

Taxes	Revenue
Individual Income	27,102
Corporation Income	7,729
Property	119,237
Highway User	31,464
Alcoholic Beverages	5,748
Cigarettes	6,262
Insurance Premiums	3,220
Public Utilities	1,938
Inheritance and Estate	2,802
Severance	3,515
Hunting and Fishing License	2,438
Business License and Others	4,241
Total	215,697

Source: Montana State Board of Equalization, Twenty-Third Biennial Report (Helena, 1968), p. 18; U. S. Bureau of the Census, State Tax Collections in 1968, Series GF68-No. 1 (Washington, D. C.: U. S. Government Printing Office, 1968), p. 25, Tb. 9; and \_\_\_\_\_, Census of Governments, 1967, Vol. 7, No. 26 (Washington, D. C.: U. S. Government Printing Office, 1970), p. 24, Tb. 18.

Several comments are in order concerning the tax categories used in Table II. Although a more detailed breakdown for many of these taxes is available, the categories reported in this table will be used in determining incidence ratios later in the study. However, in the procedure of estimating the distribution of tax payments by income bracket, some taxes will be subdivided so as to facilitate their proper allocations to the various income brackets.

It should be noted that the figures in Table II for corporation income, highway user, alcoholic beverage and cigarette taxes include the respective collections of license fees required for the establishment of these businesses. A small amount of the aircraft fuel tax (\$497,000) is also counted in highway user taxes. In addition to the amount of local property taxes collected by local governments, total property tax collections include state property tax revenues of \$5,145 thousand. Likewise, the sum of the business license and other taxes consists of the state collection of \$2,136 thousand and the local collection of \$2,105 thousand that is classified as "other and unallocable" in the Census of Governments.

#### Allocative Method and Data

With the exception of the individual income tax, available statistical data do not provide a breakdown of the amount of a tax collected from each of the various income groups. For example, it is known from Table II that in 1967 Montana residents paid \$6,262 thousand in cigarette taxes. However, information with respect to the portion paid by individuals and families in the various income brackets is not available. Therefore, it is necessary to develop a method of allocating

each tax to the various income brackets so that a series of tax payment distributions can be obtained.

In order to appropriately distribute the cigarette tax to the various income brackets, it is not necessary to determine at the outset the absolute amount of the tax collected from each of the six income groups. If the relative share of the tax among these six income groups can be ascertained, it will then be possible to apportion cigarette tax collections by income groups.

It was assumed in Chapter II that the burden of the cigarette tax rested with cigarette consumers. The relative share of the tax burden among various income groups is in direct proportion to the distribution of consumption expenditure on cigarettes by income bracket. The latter distribution can be derived from the existing data. Accordingly, the cigarette tax can be allocated to the various income brackets.

Therefore, the derivation of tax payment distribution for a certain tax consists of the following steps: (1) On the basis of the specific shifting assumption(s) made in Chapter II, the amount of the tax paid by various groups of final taxpayers--consumers, property owners, business firms, dividends receivers, or others--is determined. (2) An allocative (or more than one) series is derived which is most representative of the actual distributive pattern of this particular tax among income classes. (3) In accordance with the above derived series, the total or a portion of the tax is allocated to the various income brackets.

From an empirical point of view, the task of this chapter is essentially to obtain various allocative series. Two important sources of data are relied upon. One is the often-cited income tax return data

published by the Internal Revenue Service. The other, edited by Fabian Linden and published by the National Industrial Conference Board, concerns the consumption expenditure patterns of American households.<sup>1</sup> The first source provides allocative data related to the distribution of certain income and tax categories such as dividends, farm profits, non-corporate business income and real property tax. Since the bracket classification is in terms of adjusted gross income, no major problems are encountered in the use of these data.

However, one point should be noted in using the income tax return data. The distributions of income and tax categories by adjusted gross income bracket shown in the data are often reported separately for taxable returns and non-taxable returns. Taxable returns are those returns which have an individual income tax remaining after the allowable tax credits are deducted; and non-taxable returns have no income tax remaining after tax credits. The distribution of these categories based on non-taxable returns usually is concentrated on low income recipients. Therefore, the distribution based on taxable returns data alone will be more progressive as compared to both taxable and non-taxable return data. Apparently, for the allocation of the taxes other than the individual income tax to the various income brackets, it is irrelevant whether or not a particular family or individual has individual income tax liability. Consequently, those allocative series

---

<sup>1</sup>Fabian Linden, ed., Expenditure Patterns of the American Family (New York: National Industrial Conference Board, 1965). This study was sponsored by Life and based on a survey conducted by the U. S. Department of Labor. Some of the data presented in this publication is summarized in the Conference Board, Inc., A Guide to Consumer Markets: 1971/1972 (New York: The Conference Board, Inc., 1971), p. 148.

of the present study which are derived from income tax return data are based on both taxable and non-taxable return data.<sup>2</sup>

Using data provided by the National Industrial Conference Board presents two problems. First of all, the bracket classification of the distributive series is in terms of the size of family money income. The data must be adjusted to correspond to adjusted gross income brackets. It is done through the use of an adjustment method discussed in Appendix B of the present study. Additionally, these distributive data provide only "per family and single consumer's" annual expenditure for the various goods and services in each of the six income brackets. For the tax allocative purpose, however, reliance should be placed upon "total" annual expenditure in each of the income brackets. Therefore, the Conference Board data as actually used for the present study are converted to series of percentage distributions of total expenditures by income brackets. This is done by first multiplying per family and single consumer's annual expenditure for each family money income bracket by the number of Montana individuals and families in these

---

<sup>2</sup>In deriving allocative series from income tax return data there are two minor computational problems worth mentioning. First, the adjusted gross income bracket of \$7,000 to \$7,999 in the data spans the \$5,000 to \$7,499 and \$7,500 to \$9,999 income brackets used in the present study. In order to divide the magnitudes of income or tax in the former bracket between the two latter brackets, a rough linear interpolation is employed. This interpolation is based on the magnitudes of income or tax in the \$6,000 to \$6,999 and \$8,000 to \$8,999 brackets. Additionally, in the case of deriving the distribution of real estate tax deductions from non-taxable returns, the data do not permit a division of the amount of deductions for the \$5,000 to \$9,999 income range. This amount is usually very small, and therefore, is interpolated on the basis of the relative amounts in the \$5,000 to \$7,499 and \$7,500 to \$9,999 income brackets of the taxable returns.

brackets.<sup>3</sup> The bracket totals are then lumped together to obtain the total expenditure of all families and individuals. Finally, each bracket total is converted to a percentage figure by dividing it by the total expenditure of all families and individuals.

#### Allocation of Taxes by Income Bracket

##### Individual Income Tax

It was assumed in Chapter II that the individual income taxpayers bears the burden of the personal income tax. The allocation of total income tax payments to the six federal adjusted gross income brackets is rather straightforward. The Montana State Board of Equalization biennially reports the net income tax payment by each federal adjusted gross income bracket. Therefore, it is only necessary to widen the bracket interval and to sum the bracket total of tax payments from this report. The result is shown in line one of Table IV. For reference, the percentage distribution of this tax payment is also calculated and shown in line one of Table III.

---

<sup>3</sup> Since tax allocative series take the form of percentage distributions, in order to simplify computations each multiplier (i.e., the number of individuals and families in a family money income bracket) is represented by a percentage figure. The figures for the six family money income classes in ascending order are 27.9, 17.4, 22.6, 16.3, 10.8, and 5.0 respectively. They were estimated by T. S. Park of the University of Montana in his unpublished work on the Montana money income distribution for 1967. His estimation is based on the trend line between 1949 and 1959 Montana distribution of families and unrelated individuals and the 1967 U. S. distribution of families and unrelated individuals.

TABLE III  
 ALLOCATIVE SERIES OF MONTANA TAXES  
 (In Percentage)

Allocated Items	Federal Adjusted Gross Income Bracket (dollars)						Total
	Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and over	
(1) Individual Income Tax	4.4	9.2	18.8	18.1	18.8	30.7	100.0
(2) Dividends Received	3.8	3.6	5.3	5.7	9.3	72.3	100.0
(3) Non-corporate Business Income	3.4	5.4	8.7	9.2	14.6	58.7	100.0
(4) Farm Income	12.0	14.9	18.5	15.3	17.9	21.4	100.0
(5) Estate and Trust Income	5.7	5.6	7.4	5.7	11.2	64.4	100.0
(6) Real Estate Tax Deductions	3.7	6.5	12.9	21.6	28.0	27.3	100.0
(7) Total Consumption Expenditures	12.9	12.7	23.3	21.1	17.9	12.1	100.0
(8) Consumption Expenditure on Gasoline	9.4	13.8	27.4	23.5	17.8	8.1	100.0
(9) Consumption Expenditure on Alcoholic Beverages	8.8	11.5	22.5	22.9	19.7	14.6	100.0
(10) Consumption Expenditure on Tobacco Products	15.2	15.5	25.9	21.6	14.6	7.2	100.0
(11) Consumption Expenditure on Insurances	7.9	11.0	23.7	22.7	19.9	14.8	100.0
(12) Consumption Expenditure on Gas and Electricity	19.6	14.1	24.1	19.6	14.2	8.4	100.0
(13) Consumption Expenditure on Telephone and Telegraph	15.4	13.2	23.7	20.5	16.7	10.5	100.0
(14) Consumption Expenditure on Train and Bus Transportation	23.9	13.9	18.3	15.5	12.8	15.6	100.0
(15) Consumption Expenditure on Recreation and Equipment	8.1	11.1	22.1	22.8	21.6	14.3	100.0
(16) Consumption Expenditure on House Rent	26.4	20.1	24.7	15.0	9.2	4.6	100.0
(17) Consumption Expenditure on Food	15.3	13.7	23.7	20.7	16.6	10.0	100.0
(18) Consumption Expenditure on Rental Car and Bus Transportation	26.0	17.9	19.0	14.8	10.8	11.5	100.0

TABLE III, Continued

Allocated Items	Federal Adjusted Gross Income Bracket (dollars)						Total
	Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and over	
(19) Consumption Expenditure on Airplane Transportation	6.6	8.4	11.9	14.6	21.3	37.2	100.0
(20) Automobile Ownership	8.6	11.6	21.0	20.7	22.5	15.6	100.0
(21) Persons 14 Years Old and Over	47.2	15.9	17.3	9.9	6.5	3.2	100.0

Sources: (1) Montana State Board of Equalization, Twenty-Third Biennial Report (Helena, 1968), p. 18. (2) Internal Revenue Service, Statistics of Income, 1967: Individual Income Tax Returns (Washington, D. C.: U. S. Government Printing Office, 1969), p. 24, Tb. 7, Col. 29. (3) Ibid., p. 23, Tb. 7, Cols. 7 and 15. (4) Ibid., p. 23, Tb. 7, Col. 11. (5) Ibid., p. 24, Tb. 7, Col. 43. (6) Internal Revenue Service, Statistics of Income, 1966: Individual Income Tax Returns (Washington, D. C.: U. S. Government Printing Office, 1968), p. 65, Tb. 29, Col. 5. (7) Fabian Linden, ed., Expenditure Patterns of the American Family (New York: National Industrial Conference Board, 1965), p. 18, row 1. (8) Ibid., p. 118, row 6. (9) Ibid., p. 18, row 5. (10) Ibid., p. 18, row 6. (11) Ibid., p. 58, row 18; p. 78, row 80; p. 118, row 16, p. 126, row 2; and p. 142, row 20. (12) Ibid., p. 58, rows 29 and 30. (13) Ibid., p. 58, row 35. (14) Ibid., p. 118, rows 26 and 28. (15) Ibid., p. 18, row 28. (16) Ibid., p. 58, row 4. (17) Ibid., p. 18, row 2. (18) Ibid., p. 118, rows 28 and 29. (19) Ibid., p. 118, row 27. (20) Dorothy S. Projector and Gertrude S. Weiss, Survey of Financial Characteristics of Consumers (Washington, D. C.: Board of the Governor of the Federal Reserve System, 1966), p. 136, Tb. A16. (21) U. S. Bureau of the Census, Current Population Reports, Series P-60, No. 60, "Income in 1967 of Persons in the United States," (Washington, D. C.: U. S. Government Printing Office, 1969), p. 18, Tb. 1.

TABLE IV  
MONTANA TAX PAYMENT DISTRIBUTIONS  
(In Thousands of Dollars)<sup>a</sup>

Taxes	Federal Adjusted Gross Income Bracket (dollars)						Total
	Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and Over	
1. Individual Income	1,198	2,484	5,105	4,915	5,092	8,308	27,102
Corporate Income:							
2. Case (A), No Shifting	294	278	410	441	719	5,588	7,729
3. Case (B), Fully Shifted Forward	997	982	1,801	1,631	1,383	935	---
4. Case (C), Half Shifted Forward	645	630	1,105	1,036	1,051	3,262	---
5. Property: Total	13,878	14,480	23,100	21,967	22,166	23,647	119,237
6. Household Real Property	3,836	3,624	5,391	5,903	6,438	5,759	30,950
7. Business Real Property	1,434	1,489	2,623	2,471	2,579	6,772	17,369
8. Farm Real Property	2,897	3,401	4,669	3,970	4,242	4,521	23,700
9. Household Personal Property	1,107	1,309	2,231	2,269	2,469	1,866	11,250
10. Business Personal Property	3,595	3,539	6,493	5,880	4,988	3,372	27,868
11. Farm Personal Property	1,009	1,118	1,693	1,474	1,450	1,357	8,100
12. Highway User: Total	3,803	4,267	7,630	6,704	5,651	3,409	31,464
13. Motor Vehicle Operator's License	388	131	142	81	53	26	821
14. Motor Fuel	2,425	2,997	5,559	4,759	3,637	1,879	21,256

TABLE IV, Continued

Taxes	Federal Adjusted Gross Income Bracket (dollars)						Total
	Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and Over	
15. Motor Vehicle License	957	1,097	1,870	1,791	1,855	1,319	8,890
16. Aircraft Fuel	33	42	59	73	106	185	497
17. Alcoholic Beverages	506	661	1,293	1,316	1,132	839	5,748
18. Cigarettes	952	971	1,622	1,353	914	451	6,262
19. Insurance Premiums	232	314	664	639	583	788	3,220
20. Public Utilities	391	268	424	355	277	224	1,938
21. Inheritance and Estate	160	157	207	160	314	1,804	2,802
22. Severance	453	446	819	742	629	425	3,515
23. Hunting and Fishing License	197	271	539	556	527	349	2,438
24. Business License and Others	346	384	679	643	689	1,501	4,241
All Taxes:							
25. Except Corporation Income Tax	22,116	24,703	42,082	39,350	37,974	41,745	207,968
26. With Case (A)	22,410	24,981	42,492	39,791	38,693	47,333	215,697
27. With Case (B)	23,113	25,685	43,883	40,981	39,357	42,680	---
28. With Case (C)	22,761	25,333	43,187	40,386	39,025	45,007	---

<sup>a</sup>Details may not add to totals due to rounding.

Source: See text and Table III of the present study.

Corporation Income Tax

It may be recalled that three alternative assumptions were made in regard to the shifting of the corporation income tax. One assumption is that all the tax rests with the owners of corporations. The owners (stockholders) receive dividends from corporations and bear the tax in proportion to the amount of dividends received. Therefore, in this case it is appropriate to allocate the total \$7,729,000 corporation income tax to the various income brackets according to the percentage distribution of dividends received by income bracket. The latter distribution is derived from the income tax return data and is shown in line two of Table III. Allocation of the corporation income tax in accordance with this distribution is presented in line two of Table IV.

An alternative assumption is that the corporation income tax is shifted forward. Forward shifting means that consumers of goods and services provided by the corporation bear the burden of the tax. Since the corporation provides many kinds of goods and services, it is most likely that the consumer bears the tax in direct proportion to his total consumption expenditures on all goods and services. Therefore, the tax is allocated to the various income brackets according to the distribution of total consumption expenditures on all goods and services which is shown in line seven of Table III. The result is recorded in line three of Table IV.

On the basis of a third assumption, one half of the amount of the tax is apportioned to the various brackets according to the distribution of dividends and the other half, in accordance with the distribution of total consumption expenditures. Line four of Table IV shows the result based on this assumption.

Property Tax

It was decided that different shifting assumptions should be made for the various types of property taxed. With the exception of the tax on farm property, however, data are not available to obtain the exact amount of each portion of the tax collected from the various types of property. Therefore, before the property tax can be allocated to the several income brackets it is necessary to estimate the breakdown between real and personal, household and business portion of the tax. Since the breakdown is an estimation, the results should not be regarded as the amount actually collected from each type of property. However, the underlying data for these estimates are reliable and the estimating method is reasonable.

The first step in determining the individual amount of four of the six component parts of the property tax is to divide total property tax collections into real and personal property components. The latter is done by multiplying the total by ratios of the assessed value of real and personal property to the total assessed value of all property.<sup>4</sup> Of the total assessed value of Montana properties subject to taxes, 49.6 percent is locally assessed real property, 28.8 percent is locally assessed personal property, and 21.6 percent is state-assessed property.<sup>5</sup> The state-assessed property is comprised mainly of (1) the

---

<sup>4</sup>The assessed value referred to here is consistent with the definition used by the U. S. Bureau of the Census. In Montana, because of the use of property classification law, this value is referred to as the taxable value. At any rate, this is the amount against which the millage is applied.

<sup>5</sup>U. S. Bureau of the Census, Census of Governments, 1967, Vol. II, Taxable Property Values (Washington, D. C.: U. S. Government Printing Office, 1968), p. 102, Tb. 18 (hereafter: U. S. Bureau of the Census, Property Value).

franchise, roadway, roadbed and rolling stocks of railroads; (2) the franchises and transmission lines of public utilities; and (3) net proceeds of metal mines. Since the breakdown between the real and the personal portion of the value of state-assessed properties is not available it is assumed that they are distributed equally. Based on this type of reasoning, the assessed value of real property amounts to 60.4 percent of the total and the remainder (39.6 percent) is the assessed value of personal property. By applying these percentages to the total it is estimated that real property tax collections amounted to \$72,019 thousand and personal property tax collections were \$47,218 thousand.

The next step is to separate total real property tax payments into the portions borne by households, businesses, and farmers. The farmers' portion (\$23,700 thousand) is available from published data.<sup>6</sup> Therefore, it is necessary only to estimate the household portion of the tax payments. Thereafter, the business portion can be obtained by subtracting the household and farm portion from the total.

The estimation of the household portion of the real property tax is derived by multiplying the assessed value of non-farm residential properties by the average mill rate levied on them.<sup>7</sup> Following this procedure, it is estimated that the amount of real property taxes

---

<sup>6</sup>This figure is the average of calendar 1966 and 1967 figures. See U. S. Department of Agriculture, Farm Real Estate Taxes: Recent Trends and Developments, RET-8 (Washington, D. C.: December, 1968), p. 5, Tb. 2.

<sup>7</sup>The assessed value of non-farm residential real properties amounted to \$170 million and the average mill rate was 18.206 percent. See U. S. Bureau of the Census, Property Value, p. 34, Tb. 4, and Montana Taxpayers Association, Montana Taxpayer, Vol. XIII, No. 9 (Helena: October, 1969), p. 1.

collected from household real property owners is \$30,950 thousand.<sup>8</sup> The business portion of the real property tax is the residual and amounts to \$17,369 thousand.

A similar procedure is followed for the purpose of dividing personal property taxes into three component parts. Farm personal property tax payments amounted to \$8,100 thousand.<sup>9</sup> The assessed value of household personal properties in Montana is \$61,792 thousand. This figure includes \$15 million of household durable goods, \$41.6 million of motor vehicles and \$5,192 thousand of intangibles and other unallocable items.<sup>10</sup> As before, the product (\$11,250 thousand) of the average mill levy rate (18.206 percent) and the assessed value provides an estimate

---

<sup>8</sup> It is believed that this estimate is quite reliable. Suppose the farm real property tax collection in fiscal 1967 is estimated. The assessed value of Montana farm real property in fiscal 1967 amounts to 141.1 million dollars. This figure includes \$139 million of acreage and farms and \$2.1 million of vacant lots and others. The average mill rate applied to this value is equal to 16.5 percent (the average mill levy is lower in rural areas than in urban areas). The product of the mill rate and the assessed value is then the estimated total of farm real property tax collection. This product is \$23,300 thousand. It is quite close to the published figure of \$23,700, which is the average of calendar 1966 and 1967.

<sup>9</sup> The total farm property tax payment in fiscal 1967 amounts to \$31.8 million. This is the average of the figures for calendar years 1966 and 1967, which appear in U. S. Department of Agriculture, Farm Income: State Estimates, 1949-1969, FIS 216 Supplement (Washington, D. C.: August, 1970), p. 77, Tb. 9 and p. 79, Tb. 9. It is already known that the farm real property tax payment amounts to \$23.7 million. The difference of \$8.1 million between the above two figures, therefore, represents the farm personal property tax payment in fiscal 1967.

<sup>10</sup> Taken and derived from U. S. Bureau of the Census, Property Value, p. 157, Tb. 22. The assessed value for motor vehicles is 80 percent of the total value of \$52 million. The percentage figure is derived from the data concerning the ownership of passenger cars held by non-farm individuals, farmers, and producers. These data are provided by Raymond W. Goldsmith in The National Wealth of the United States in the Postwar Period (Princeton, N. J.: Princeton University Press, 1962, p. 260, Tb. B-36; p. 307, Tb. B-86; p. 358, Tb. B-129; and p. 348, Tb. B-119). (See also Dick Netzer, p. 230, and p. 303). The assessed value

of the amount of household personal property tax payments. By subtracting the farm and household portion of the personal property tax from the total of personal property tax payments (\$47,218,000), an estimate of the amount of business personal property tax payments is obtained. This figure amounts to \$27,868 thousand.

Now it is possible to allocate all the property tax components to the various income brackets. As may be recalled, the portion of the tax on owner-occupied household real property was assumed to rest with the owner and the portion on property occupied by renters falls on the renter. Therefore, in allocating the household real property tax it is necessary to estimate the relative share of the tax burden between owner-occupants and renter-occupants. The Census of Housing data are relied upon for this purpose. From these data it is found that the number of owner-occupied housing units is 61.7 percent of the total, and the remainder (38.3 percent) is rental houses.<sup>11</sup> These percentages are assumed to reflect the relative share of the total value of houses between the two types of dwellings.<sup>12</sup> Using this procedure it is

---

for intangibles and others is 23.6 percent of the total value of \$22 million. This percentage is the ratio of the assessed value of household personal property (including the motor vehicle value) to the total assessed value of all personal properties.

<sup>11</sup> Calculated from U. S. Bureau of the Census, Census of Housing: 1960, Vol. I, Pt. 5, No. 28 (Washington, D. C.: U. S. Government Printing Office, 1963), p. 28-7, Tb. 4. These percentage figures are for the year 1960. They are not updated for two reasons. First, data for updating seem unreliable. Second, these percentages come quite close to the 1967 figure for the U. S.--i.e., 61 percent being owner-occupied houses (see University of Michigan, 1967 Survey of Consumer Finances, Ann Arbor, 1967, p. 55, Tb. 3-8).

<sup>12</sup> This procedure is necessary because the Census of Housing data do not permit an estimation of the total value of renter-occupied houses. Unlike the owner-occupied houses which are reported through a frequency distribution of the number of houses by the value of these

estimated that the owners' share of the tax is \$19,096 thousand, and the renters' share amounts to \$11,854 thousand.

Income tax return data on the distribution of real estate tax deductions are relied upon in allocating the owner's portion of the household real property tax to the various income brackets. This distribution is presented in line six of Table III. The distribution of consumption expenditure on house rent (line 16 of Table III) is used in allocating the renter's part of the household real property tax to the several income brackets. Line six of Table IV shows the distribution of household real property tax payments.

A somewhat different method is used to allocate the tax on household personal properties. Here, the division between the owner's and the renter's share is irrelevant in regard to the motor vehicle portion of the tax payment (\$7,571 thousand). Therefore, this portion is distributed to the various income brackets on the basis of the distribution of automobile ownership by income bracket (line 20 of Table III). The rest of the household property tax is allocated to the income brackets in the same manner as the allocation of household real property tax payments. The distribution of household personal property tax payments is exhibited in line nine of Table IV.

It was assumed that a half of the business real property tax rested with the owner and that the other half of the tax as well as the total amount of the business personal property taxes were shifted to the consumer. The portion of the tax which is shifted forward to consumers

---

houses--so that total house value can be estimated from this distribution--the renter-occupied houses are classified by the amount of gross rent.

is allocated to the six income brackets according to the distribution of total consumption expenditures. In allocating the business part of the real property tax, it is necessary to distinguish between the portion of the tax which is paid by corporations (52.8 percent) and the portion of the tax which is paid by non-corporate businesses (47.2 percent).<sup>13</sup> In turn, the corporate share (\$4,585,400) is distributed in accordance with the distribution of dividends received by the various income groups and the distribution of non-corporate business income (Table III, line three) is relied upon in allocating the non-corporate portion (\$4,099,100) of the tax. The distribution of business real property tax payments is presented in line seven of Table IV and that of business personal property tax payments in line ten of the same table.

In regard to the tax levied on farm property, it was assumed that three-fourths of the real property tax and one-half of the personal property tax rested with the farmer, whereas one-fourth of the real property tax and the other half of the personal property tax was shifted forward to the consumer. The portion of the real and personal property tax which falls on the farmer is apportioned to the various income brackets in accordance with the distribution of farm income (Table III, line four). The portion of the real and property tax which rests with the consumer is allocated to the six income brackets in accordance with the distribution of consumption expenditure on food

---

<sup>13</sup>These percentages are calculated from the data concerning the amount of business receipts obtained by Montana corporations, proprietorships and partnerships in 1967. See Internal Revenue Service, Statistics of Income, 1967: Business Income Tax Returns (Washington, D. C.: U. S. Government Printing Office, 1970), p. 97, Tb. 2.6, p. 202, Tb. 3.6 and p. 304, Tb. 5.7.

shown in line 17 of Table III. The distributions of farm property tax payments are presented in lines 8 and 11 of Table IV.

All of the six component parts of the property tax have now been allocated to the various income brackets. Therefore, the distribution of the property tax payments can be determined by adding all the components bracket by bracket. Line five of Table IV shows this distribution.

#### Highway User Tax

It was assumed that the motor vehicle operator's license tax (\$821,000) rested with the operator. The tax should therefore be allocated to the various income brackets in accordance with the distribution of persons holding a driver's license by income bracket. Since these figures are not available from any published source it is necessary to make an estimate. It is assumed that the percentage of the population 14 years of age and over by income class provides a reasonable estimate. This latter distribution is derived from the Current Population Reports and is shown in line 21 of Table III. The distribution of motor vehicle operator's license tax payments is presented in line 13 of Table IV.

It was assumed that the household portion of the motor fuel and motor vehicle license taxes rested with the households and the business and farm portion was shifted forward to the consumer. Raymond W. Goldsmith's data are relied upon to determine the household share (80 percent) as well as the business and farm share (20 percent) of the

tax.<sup>14</sup> The household portion of the motor fuel tax (\$17,005 thousand) is allocated to the various income brackets in accordance with the distribution of consumption expenditure on gasoline (Table III, line eight). On the other hand, the household portion of the motor vehicle license tax (\$7,112 thousand) is distributed among income groups in accordance with the distribution of automobile ownerships.

Since it was assumed that the business and farm portion of both the motor fuel and license taxes was shifted forward to the consumer, it is allocated to the various income brackets according to the combined distribution of total consumption expenditures and consumption expenditures on bus and rental car transportation (Table III, lines 7 and 18). The distributions of motor fuel and motor vehicle license tax payments are shown in lines 14 and 15 of Table IV, respectively.

It is assumed that the business and farm share of the aircraft fuel tax can be shifted forward to the consumer.<sup>15</sup> Therefore, the tax is allocated to the various income brackets according to distributive patterns of expenditure on airplane transportation (line 19 of Table III). The result is shown in line 16 of Table IV.

The distribution of highway user tax payments is recorded in line 12 of Table IV.

---

<sup>14</sup> See footnote 12 of this chapter.

<sup>15</sup> It appears somewhat peculiar to categorize the tax on aircraft fuel under the heading of highway user taxes. This categorization is used for two reasons: (1) the bulk of the highway user taxes is collected from the tax on gasoline which is similar to fuel used in aircraft; (2) the Census Bureau classifies both the taxes on gasoline and aircraft fuel under the "motor fuel" category.

### Alcoholic Beverage and Cigarette Taxes

Alcoholic beverage and cigarette taxes were assumed to rest with the consumer of these products. The allocation of the alcoholic beverage tax by income bracket is made according to the distribution of consumption expenditure on alcoholic beverages as presented in line nine of Table III. The result is recorded in line 17 of Table IV. The cigarette tax is apportioned to the various income brackets in accordance with the distribution of consumption expenditure on cigarettes (Table III, line ten). This is presented in line 18 of Table IV.

### Insurance Premium Tax

The insurance premium tax was assumed to rest with policy-holders. In order to allocate this tax to policy-holders by income bracket, it is necessary to estimate the portion of the tax paid by businesses (including farmers) and the portion paid by households.

In order to determine the relative share of premiums collected from households and businesses statistical data provided by the Insurance Information Institute and the Institute of Life Insurance are relied upon. Data from these sources indicate that 56 percent of the total amount of insurance premiums is for life and health insurance whereas, 44 percent is for property and liability insurance.<sup>16</sup>

Two percent of ordinary life insurance was purchased by business firms for owners and key employees. In turn, 62.6 percent of total life and health insurance premiums is for ordinary life insurance. Therefore,

---

<sup>16</sup> Calculated from Insurance Information Institute, Insurance Facts (New York, 1966), p. 10 and p. 13.

it is estimated that 1.3 percent (two percent of 62.6 percent) of life and health insurance premiums is collected from businesses.<sup>17</sup> On the basis of this information it is reasonable to assume that 0.7 percent (1.3 percent of 56 percent) of the tax on life and health insurance premiums is collected from business firms. The remainder is shifted backward to employees or rests with households in case that policies are bought directly by them.

Data from the Insurance Information Institute make it possible to estimate that business firms pay 28.5 percent of total property and liability insurance premiums.<sup>18</sup> Of the remaining 71.5 percent of property and liability insurance premiums, 41 percent is in the form of automobile insurance premiums. According to Goldsmith, nearly 20 percent of the total value of automobiles is owned by business firms. Consequently, an additional 8.2 percent (20 percent of 41 percent) of property and liability insurance premiums may be assigned to business. The share of total property and liability insurance premiums that are collected from business firms is estimated to be 36.7 percent (28.5 percent plus 8.2 percent). Therefore, 16.1 percent (36.7 percent of 44 percent) of total property and liability insurance premiums is collected from business firms. By adding this figure to business' share of life and health insurance premiums, it is determined that 16.8 percent of total insurance premiums are collected from business firms. Therefore, the household share of total insurance premiums is 83.2 percent.

---

<sup>17</sup> See Institute of Life Insurance, Life Insurance Fact Book (New York, 1968), p. 19 and p. 22.

<sup>18</sup> Derived from Insurance Information Institute, p. 10.

On the basis of these percentage figures, the business portion of the insurance premiums tax is estimated to be \$541 thousand. This amount is apportioned to the six income brackets in accordance with the distribution of dividends received. The household portion of the tax (\$2,679 thousand), however, is allocated to the various income brackets according to the distribution of consumption expenditures on property, automobiles, and health and life insurance (Table III, line 11). Line 19 of Table IV records the distribution of insurance premiums tax payments by income bracket.

#### Public Utilities Taxes

It was assumed that public utilities taxes are shifted forward to the consumer of utility services. In allocating these taxes to the various income brackets, they are subdivided into three portions. The taxes on electric energy and natural gas (\$749 thousand) are allocated to the various income brackets in accordance with the distribution of consumption expenditures on gas and electricity shown in line 12 of Table III. The telephone and telegraph portion of the taxes (\$471 thousand) is distributed according to the relative consumption expenditures on telephone and telegraph among income groups (line 13 of Table III). Finally, the taxes on motor carriers, freight line companies, and private car lines (\$718 thousand) are allocated to the six brackets in direct proportion to the distribution of consumption expenditures on train and bus transportation (Table III, line 14). The final result is exhibited in line 20 of Table IV.

### Inheritance and Estate Taxes

It was assumed that inheritance and estate taxes were borne by the beneficiaries. In many of the existing tax studies, these taxes are allocated only to the highest income bracket of the entire income range. However, such an allocation is believed to be quite unsatisfactory because persons in other income brackets are by no means excluded from receiving a wealth transfer that is large enough to be taxed. In the present study, therefore, these taxes are distributed among income groups in accordance with the distribution of income derived from estates and trusts (Table III, line five). Line 21 of Table IV shows the estimated distribution of inheritance and estate tax payments.

### Severance Taxes

Two alternative assumptions were made with respect to the shifting of severance taxes. First, these taxes were assumed to be entirely shifted to the consumer. Second, one half of these taxes was assumed to be shifted forward and the other half rested with small producers of natural resources. Under the first assumption, the allocation of severance taxes by income bracket is made in accordance with the distribution of total consumption expenditures. To correctly allocate the producer's part of these taxes under the second assumption, it would be necessary to have an income distribution series of small producers. But, data for deriving such a series are not available. Therefore, due to a lack of proper data it is necessary to ignore the second assumption concerning shifting of severance taxes. Consequently, line 22 of Table IV is obtained simply by allocating severance taxes to the various

income brackets in accordance with the distribution of total consumption expenditures.

#### Hunting and Fishing License Taxes

License holders were assumed to bear the burden of the hunting and fishing license taxes. In allocating these taxes to the various income brackets, details of relative expenditures on hunting and fishing among income groups should be relied upon. Such details are not obtainable from published sources. Therefore, the data concerning the distribution of consumption expenditures on recreation and equipment (Table III, line 15) are used to allocate these taxes. The estimated result of these tax payment distributions is shown in line 23 of Table IV.

#### Business License and Other Taxes

Business license and other taxes were assumed to be divided evenly between consumers and business firms on which they are imposed. The portion which rests with consumers is distributed among income brackets in accordance with the distribution of total consumption expenditures. On the other hand, the business portion of these taxes is allocated to the various income brackets according to the distributive pattern of non-corporate business income. Line 24 of Table IV exhibits the estimated distribution of these tax payments.

## CHAPTER V

### INCIDENCE OF MONTANA TAXES

The empirical results of the present study are presented in this chapter. The incidence ratios of the various Montana state and local taxes will first be derived. This is followed by a discussion of the incidence of each of these taxes as well as the over-all incidence of the Montana tax system. Thereafter, the findings of this investigation will be briefly compared with those of similar studies. In this part of the chapter, attention will be given to the reasons that may explain the differences in results obtained in this and the other studies.

#### Incidence Ratios of the Taxes

The incidence ratios of all the Montana state and local taxes considered in the present study are presented in Table V. It is derived from the data presented in Table IV and line eight of Table I of this study. For example, the incidence ratio of the cigarette tax is 0.442 percent for the "\$5,000 to \$7,499" income bracket (in line eight of Table V) and is obtained by dividing \$1,622 thousand in line 18 of Table IV by \$367,101 thousand in line eight of Table I. Each percentage figure in Table V, therefore, represents the ratio of the final tax payments to broad income received for a particular adjusted gross income bracket.

TABLE V  
INCIDENCE RATIOS OF THE MONTANA TAXES  
(In Percent)

Taxes	Federal Adjusted Gross Income Bracket (Dollars)						Total
	Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and Over	
1. Individual Income	0.466	1.038	1.391	1.585	1.985	2.633	1.553
Corporation Income:							
2. Case (A), No Shifting	0.114	0.116	0.112	0.142	0.280	1.771	0.443
3. Case (B), Fully Shifted Forward	0.388	0.410	0.491	0.526	0.539	0.296	---
4. Case (C), Half Shifted Forward	0.251	0.263	0.301	0.334	0.410	1.034	---
5. Property	5.400	6.053	6.293	7.085	8.642	7.494	6.831
6. Highway User	1.480	1.784	2.078	2.162	2.203	1.080	1.803
7. Alcoholic Beverages	0.197	0.276	0.352	0.424	0.441	0.266	0.329
8. Cigarettes	0.370	0.406	0.442	0.436	0.356	0.143	0.359
9. Insurance Premiums	0.090	0.131	0.181	0.206	0.227	0.250	0.184
10. Public Utilities	0.152	0.112	0.115	0.115	0.108	0.071	0.111
11. Inheritance and Estate	0.062	0.066	0.056	0.052	0.122	0.572	0.161
12. Severance	0.176	0.186	0.223	0.239	0.245	0.135	0.201
13. Hunting and Fishing License	0.077	0.113	0.147	0.179	0.205	0.111	0.140
14. Business License and Others	0.135	0.161	0.185	0.207	0.269	0.476	0.243

TABLE V, Continued

Taxes	Federal Adjusted Gross Income Bracket (Dollars)						Total
	Under 3,000	3,000 to 4,999	5,000 to 7,499	7,500 to 9,999	10,000 to 14,999	15,000 and Over	
All Taxes:							
15. Except Corporation Income Tax	8.605	10.326	11.463	12.692	14.805	13.229	11.915
16. With Case (A)	8.719	10.443	11.575	12.834	15.085	15.000	12.358
17. With Case (B)	8.993	10.737	11.954	13.218	15.344	13.525	---
18. With Case (C)	8.856	10.590	11.764	13.026	15.214	14.263	---

Source: Based on Tables I and IV of the present study.

The incidence of the individual income tax is progressive throughout the income brackets. That is to say, the incidence ratio of the tax (or tax-to-income ratio) increases as the taxpayers' income rises. The lowest income group pays 0.466 percent of their broad income for the individual income tax. The incidence ratio increases as income increases until reaching the highest income bracket where the tax takes up 2.633 percent of broad income. On the average, 1.553 percent of the broad income of all individuals and families goes for the payment of the total individual income tax liability.

Under two of the three shifting assumptions, the incidence of the corporation income tax is generally progressive throughout the income scale. The highest degree of progression takes place under the assumption that the tax rests with the owners. In this case, only 0.114 percent of the income of the lowest income bracket goes to pay the corporation income tax whereas, the incidence ratio for the highest income bracket is 1.771. Nevertheless, the incidence ratio (0.112) for the "\$5,000 to \$7,499" income bracket in this case is lower than all other brackets. A somewhat milder progression is found in the case which assumes that one half of the corporation income tax is shifted forward to the consumer. The incidence ratios for the highest and the lowest income brackets are 1.034 and 0.251 percent respectively. Under the assumption that the tax is fully shifted forward, the incidence of the tax is very mildly progressive up to the highest income bracket. The incidence ratio is smaller for the highest income bracket when compared to all others. The average incidence ratio for the corporation income tax is 0.443.

Contrary to the findings of most other studies, the incidence of the property tax is progressive up to the highest income bracket. The "under \$3,000" income group bears the lightest relative tax burden; and the persons in the "\$10,000 to \$14,999" bracket pays the greatest amount of the tax in relation to their income. The incidence ratio of the property tax for this latter group is the highest of all the taxes considered. Moreover, because of the relative importance of the property tax, the average incidence ratio for all the individuals and families (6.831 percent) is also the highest of all the taxes.

The distribution of highway user taxes is very slowly progressive up to the "\$10,000 to \$14,999" bracket and becomes quite regressive thereafter. The relative tax burden of those in the lowest income bracket is heavier than for those in the highest income bracket. Additionally, the incidence ratio for individuals and families in the middle income range (\$7,500 to \$14,999) is twice as large as it is for individuals and families in the highest income bracket. So far as the average highway user tax burden is concerned, the taxes take up 1.803 percent of the total broad income of all the individuals and families.

The incidence of the alcoholic beverage tax is mildly progressive for the three lower income brackets. It is almost proportional in the middle income range and becomes regressive at the top end of the income scale. Though it is regressive at the top end, the highest income group still bears a higher tax burden in relation to their income, than the lowest income group. Also, like most of the other taxes, the incidence ratio (0.441 percent) for the "\$10,000 to \$14,999" income bracket is the highest of the entire income scale.

The incidence ratio for the cigarette tax increases from the first to second income bracket. The incidence of this tax can be considered proportional for the second through fourth income brackets after which it becomes regressive. On the average, 0.359 percent of Montana broad income is paid to the state and local government in the form of cigarette taxes. It is interesting to note that this figure is very close to that obtained for the alcoholic beverage tax.

The incidence of the insurance premiums tax is progressive throughout the entire income range. The incidence ratio for the highest income bracket is almost three times as much as that for the lowest income bracket. However, on the average, the insurance premiums tax takes up only 0.184 percent of the total broad income of all individuals and families in Montana.

With the exception of the second, third, and fourth income brackets, the burden distribution of public utilities taxes among income groups is very mildly regressive. The incidence ratio of the second income bracket is slightly smaller than the third and fourth brackets whose ratios are identical. The highest income group pays only 0.071 percent of their income for these taxes while the incidence ratio for the lowest income group is 0.152 percent. The average incidence ratio for public utilities taxes is 0.111. This is the lowest average incidence ratio of all taxes considered in the present study.

The incidence of the inheritance and estate taxes is progressive when comparing the first four income brackets with the last two income brackets. Relative to their income, the lowest income group pays about 11 percent of the amount paid by the highest income group. However, the incidence for the first four income brackets is approximately

proportional. The average incidence ratio of these taxes is slightly higher than that of public utility taxes.

A very mildly progressive incidence up to the highest income bracket is found with respect to severance taxes. The lowest income class bears slightly heavier tax burden in relation to their income than the highest income class. However, the burden of these taxes in general is evenly distributed among income groups. The difference between the highest and the lowest incidence ratio is only 0.108 percent, which is less than the average ratio (0.201 percent) of the six income brackets.

The incidence of the hunting and fishing license taxes is similar to that of severance taxes. It is progressive up to the highest income bracket. The taxes, however, do not take less income from the highest income bracket as compared to the lowest income bracket and the average incidence ratio of 0.140 percent is smaller than that of the severance tax.

With respect to the business license and other taxes, the incidence is progressive throughout the entire income range. The taxes take 0.135 percent of individual income at the low end of the income range and 0.476 percent at the top end of the income scale. On the average, 0.243 percent of the total broad income of all individuals and families goes to the payment of these taxes.

Table V also presents the over-all incidence of the Montana tax system. The over-all incidence is progressive before reaching the highest income bracket. At the high end of the income scale, the incidence becomes somewhat regressive. The heaviest tax burden relative to income is borne by individuals and families in the "\$10,000 to

\$14,999" income bracket. However, the over-all incidence ratio of this income bracket is about six percent higher than that of the lowest income bracket. In other words, the payments of the Montana state and local taxes take more than 15 percent of the income of the "\$10,000 to \$14,999" bracket whereas they take roughly nine percent of the income of the lowest bracket. The average incidence ratio for the Montana state and local tax system is 12.358.

The three alternative shifting assumptions used in allocating the corporation income tax to the various income brackets do not change the over-all pattern of the incidence of the Montana tax system described above. However, different shifting assumptions do cause some changes in the degree of progression and/or regression. The assumption that none of the tax is shifted does affect the over-all incidence in a more progressive way than the other two assumptions. Under this assumption, the incidence ratios of the highest two income brackets are nearly equal. However, under the other two shifting assumptions, the incidence ratio of the highest bracket is clearly smaller than that of the second highest bracket.

It is now possible to say a few words concerning the equity of the Montana state and local tax system. Since income is generally considered as the best index of the ability to pay taxes, the over-all incidence ratios in Table V indicate that the Montana taxes are equitably distributed except for the highest income bracket. In order to achieve a more equitable tax system, the Montana state and local governments may want to raise the individual income tax rates of those individuals and families whose annual adjusted gross income is \$15,000

and over. Alternatively, they may want to change the rates of other taxes or enact a new tax so that the tax-to-income ratio of the highest bracket would be increased more than the ratios of the other income brackets.

#### A Comparison of Findings

The conclusion that the Montana tax system is generally progressive seems to be consistent with Gillespie's findings.<sup>1</sup> However, the conclusions reached in the present study run counter to other similar studies. In these studies, the over-all incidence of state and local taxes was found to be rather regressive.<sup>2</sup> Therefore, the present investigation concludes by making some inquiries into these differential results.

Since the present and other studies made use of different income concepts (in deriving the total income of each bracket and/or in classifying income groups) and different income class intervals, it is not possible to trace the exact causes that account for the differential results between this and some other studies. However, four reasons can be advanced as possible explanations for the different conclusions which were reached. The first reason concerns the differences in the tax systems being investigated. The last three reasons are related to some

---

<sup>1</sup>Gillespie, p. 165.

<sup>2</sup>See Musgrave, Carroll, Cook, and Frane, p. 26, Tb. 6, line 8; Musgrave and Daicoff, p. 138, Tb. 5, p. 139, Tb. 6, and p. 140, Tb. 7; Groves and Knight, p. 56, and p. 55, Tb. 8; Brownlee, p. 4, Tb. 3; Samuel B. Chase, Jr., Maryland Tax Study (College Park, Maryland: The University of Maryland, 1965), p. 83; Tax Foundation, Inc., Allocation of the Tax Burden by Income Class (New York, 1960), p. 17, Tb. 10; and Tax Burdens and Benefits of Government Expenditures by Income Class, 1961 and 1965 (New York, 1967), p. 14, Tb. 3.

aspects of assumptions, allocative methods, and general procedure used in this and other studies. They explain why some of the other studies have reached the conclusion that the incidence of state and local taxes is regressive.

The generally progressive results of this study can first be attributed to the nature of the Montana tax system. The system contains an individual income tax whose rate structure is more progressive than most of other states. In 1967, only Alaska and New York adopted a steeper schedule of individual income tax rates than Montana.<sup>3</sup> Since the individual income tax is an important source of tax revenue for Montana, the over-all incidence of the tax system would be affected by this progressive tax. In addition, Montana did not impose a general retail sales tax in 1967.<sup>4</sup> This would cause the incidence of Montana taxes to be less regressive in comparison with other states. The reasons are obvious. First, in most of the other states, the general retail sales tax has been a very important source of tax revenue.<sup>5</sup>

---

<sup>3</sup>Please refer to Commerce Clearing House, Inc., State Tax Guide: All States (New York: Commerce Clearing House, Inc., 1967), pp. 1501-1770.

<sup>4</sup>A 2-percent general retail sales tax became effective in Montana on July 1, 1971. See Commerce Clearing House, Inc., State Tax Review, Vol. 32, No. 13 (March 30, 1971), p. 1.

<sup>5</sup>The 45 states levying the sales tax (excluding Delaware, Mississippi, Montana, New Hampshire, and Oregon) derived about 32 percent of their state tax revenue from sales taxes in 1967. Out of the total tax revenue of both the state and local governments in the U. S. in 1967, 17 percent consisted of tax revenue from the general retail sales tax. See U. S. Bureau of the Census, State Government Finances in 1968 (Washington, D. C.: U. S. Government Printing Office, 1969), p. 20, Tb. 7; and \_\_\_\_\_, Governmental Finances in 1966-67 (Washington, D. C.: U. S. Government Printing Office, 1968), p. 20, Tb. 4.

Second, sales tax collections in empirical incidence studies are distributed to the various income brackets in accordance with the distribution of total consumption expenditures by income bracket and the latter distribution is often much more regressive than many of the other major allocative series.

In addition, an important practice of some other tax studies tends to produce regressive findings. It is common practice to estimate tax exporting for various state and local taxes considered without simultaneously considering tax importing. This results in an over-estimation of the tax burden of lower income groups in relation to their income. This is the case because all these studies estimate a higher exporting rate of those taxes (e.g., individual and corporation income taxes) whose incidences are usually progressive, but a much lower exporting rate of those taxes (e.g., sales and use, property, and gross receipts taxes) whose incidences tend to be regressive.<sup>6</sup> In the Michigan Tax Study, for example, it was estimated that nearly 80 percent of the corporation franchise tax was shifted out of Michigan, but only about 20 percent of the sales tax and 10 to 40 percent of the property

---

<sup>6</sup>As may be recalled, the problem of tax exporting and/or tax importing is not handled in the present study due to the limitations of statistical data, resources and research time. That is to say, throughout the study the amount of tax export for the various Montana taxes is assumed to be equal to the amount of tax import. Therefore, it is not known how the results of this study may be altered when tax exporting and/or tax importing are estimated. In addition, if tax importing in other studies is estimated, the results might not be changed to a noticeable extent--as in the case if a higher importing rate of progressive taxes were obtained. The point made here, however, is that by looking at the estimates of tax exporting alone, heavier over-all tax burden is inevitably placed on the lower income groups. Therefore, this point should not be considered as a criticism on the estimating methods of tax exporting used in other studies.

tax were assumed to be exported.<sup>7</sup> To cite another example, Minnesotans were assumed to bear only two percent of the iron ore occupation tax, and one shifting assumption was that the tax was distributed in accordance with the distribution of dividend receivers by income bracket--a highly progressive allocative base.<sup>8</sup>

Another reason for the more regressive findings of other studies, in contrast to those of the present one, is the way the property tax is allocated to the various income brackets. Though other taxes are increasing in relative importance, the property tax is still the most important source of tax revenue at the state and local level throughout the United States.<sup>9</sup> Therefore, the distributive pattern of the property tax by income bracket has a very important impact on the over-all incidence of a state tax structure.

In the present study the generally progressive pattern of the over-all tax incidence follows the pattern of the property tax incidence whereas, in other similar studies, the regressive over-all incidence could be attributed to the regressiveness of the property tax. The conclusion that the property tax is regressive is due primarily to the way the tax is allocated to the various income brackets. In the two studies done by the Tax Foundation, for example, one half of the total

---

<sup>7</sup> See Musgrave and Daicoff, p. 135, Tb. 2.

<sup>8</sup> Brownlee, p. 27 and p. 28, Tb. 10.

<sup>9</sup> The property tax revenue accounts for nearly 43 percent of the total tax revenue of the state and local governments in the United States for fiscal 1966-67, and in Montana the percentage is even higher. See U. S. Bureau of the Census, Governmental Finances in 1966-67 (Washington, D. C.: U. S. Government Printing Office, 1968), p. 18, Tb. 3.

property tax revenue is allocated in accordance with the distribution of consumption expenditure on housing and the other half according to the total consumption expenditures on all goods and services. With respect to the allocation of the first half, it implicitly assumes that a half of total property tax collections is derived from household real properties. This assumption not only tends to exaggerate the importance of the tax on residential real properties--since the amount of the residential real property tax collection usually is less than 50 percent of the total property tax collection--but entirely disregard the tax on household personal properties. However, the distributive pattern of the household personal property tax, essentially owing to the tax on automobiles, is often more progressive (or less regressive) than the distribution of consumption expenditure on housing.

The allocation of the other half of total property tax collections, on the other hand, is based on a rather regressive assumption that the entire amount of the business and farm portion of the tax is shifted forward to the consumers. It is regressive because the percentage distribution of total consumption expenditures concentrates more on lower income groups than the distribution of either business income or farm income (on the basis of which the business and farm portion of the property tax is allocated to the various income brackets).<sup>10</sup>

---

<sup>10</sup>On the basis of the allocative series derived for the present study, the use of the 50-50 allocative method causes the pattern of the Montana property tax incidence to change considerably. The incidence ratios for the six income brackets in ascending order become 6.658, 6.455, 7.503, 7.923, 7.904, and 4.534 percent respectively. It is clear that a much more regressive (or less progressive) incidence results. In determining the above ratios, the distribution of consumption expenditure on housing for the six income brackets in ascending order is 15.8, 13.2, 22.9, 20.1, 16.1, 11.9 percent respectively (derived from Linden, p. 18, row 7).

Finally, regressive findings of some other studies are often due to the fact that these studies do not make allowance for using different income measures to classify income groups in the income distribution series and the tax allocative series. Generally speaking, if, for the purpose of determining income brackets, the income measure of "allocative" series is narrower than that of an "income" series, the resulting incidence ratios of lower income brackets will be higher than would be the case if the same income measure is used in both series. In the Michigan Tax Study, for example, family money income is used for the classification of income groups in the income distribution series. But, because certain tax allocative series (e.g., the distributions of dividends, capital income, and non-corporate business income) are derived from income tax return data, adjusted gross income is used to classify income brackets for some of the "allocative" series. It is apparent that no adjustment was made to convert these allocative series by adjusted gross income bracket into family money income brackets.<sup>11</sup> Consequently, for an income bracket at the lower end of the scale (e.g., "under \$2,000" or "\$2,000 to \$2,999"), the percentage of individuals and families in this income bracket for the allocative series would be

---

<sup>11</sup>The fact that no such adjustment was made in the Michigan study is clear when actually trying to derive a distribution of tax payments presented in the study. For this purpose, the distribution of the inheritance tax can be selected because its derivation is most straightforward. The allocation to the various income brackets of total inheritance tax collections shown in Table 3 of the Michigan study (see Musgrave and Daicoff, p. 136) is based on the percentage distribution of capital income (Ibid., p. 166, Tb. A5) and the amount of \$1,660 thousand federal offset that is solely deducted from the tax allocated to the highest income bracket (Ibid., p. 135 and p. 180). However, the percentage distribution of capital income is derived from income tax return data without any adjustment made concerning the concept of income used in classifying income groups.

higher compared to the income series.<sup>12</sup> There are two reasons for reaching this conclusion. First, there are many individuals and families at the lower end of the income scale who have family money income but do not qualify achieving an adjusted gross income. Second, there are also many individuals and families at the lower end of the income scale whose family money income may be well over a certain bracket limit, but whose adjusted gross income is below this limit.

Since a number of tax payment distribution series are wholly or partially based on the unadjusted allocative series, the higher percentage figures for lower income brackets in the latter series bring about larger tax payments for these brackets. As these larger tax payments are further divided by the total income of their corresponding brackets of the income distribution series, higher incidence ratios are produced for the lower income brackets--regardless of whatever concept of income is used in deriving the total income of a particular income bracket. Therefore, the over-all tax incidence as is measured in the Michigan study becomes more regressive (or less progressive) than in the case

---

<sup>12</sup>In the present study, for instance, the percentage of individuals and families in the lowest income bracket is 37.0 in the case when the adjusted gross income is used to classify income groups; but the figure is 27.9 as the family money income is used for the bracket classification. See also Appendix B of the present study for an actual case as an allocative series is converted from the one by family money income bracket into adjusted gross income bracket. It is seen in the worksheet that after the adjustment the percentage for the lowest income bracket increases from 13.0 to 15.2. Therefore, if no adjustment is made, the original 13.0 percent, which is for the lowest "family money income bracket", is understated. This may also indicate that in the Michigan study, at least the percentage of individuals and families (as well as income components used in the allocative series) for the lowest (family money) income bracket is overstated; and depending upon the distributive pattern of an allocative, two, or even three income brackets at the lower end of the income range may be overstated.

had the same income concept been used for the bracket classification in both the income distribution and the tax allocative series.

Limitations of time and data prevent the present researcher from investigating an important empirical problem related to the point just mentioned: To what extent regressive findings of the Michigan, and other similar studies may be changed if the same income measure is used for the classification of income bracket in the income distribution and the tax allocative series. However, it is interesting to see, with the help of a simple numerical example, how and to what extent tax incidence ratios may be distorted if in classifying income group one income concept is used in the income series and a different one in the tax allocative series. Such an example may also clarify a few points made in the two preceding paragraphs.<sup>13</sup>

Suppose there is an hypothetical four-person economy whose distribution of annual incomes are known and presented in Table VI. For simplicity, it is assumed that the only definitional difference

---

<sup>13</sup>The numbers (the amount of incomes, etc.) used in the example, though essentially for the purpose of illustration, are by no means designed in such a way as to bring about the results as expected. The relative magnitudes among these numbers do not usually deviate much from the real world situation. For instance, there are two forms of the percentage distribution of dividends by income bracket in the example. The first one is the distribution by family money income bracket and the second, by adjusted gross income bracket. The percentage figure for the low income bracket in the first distribution is smaller than in the second distribution. However, the percentage for the middle income bracket in the first distribution is larger than in the second. This is also the case for the real world situation as shown by statistical data. The percentage distribution of dividends received by U. S. families and individuals in 1961 by the three equivalent family money income brackets used in the numerical example (in ascending order) is 12.20, 21.99, and 65.81 percent respectively whereas, by the three adjusted gross income brackets, the percentages are 17.11, 18.70, and 64.19 respectively (derived from U. S. Department of the Treasury, Office of Tax Analysis, p. 2059 and p. 2088).

between family (including unrelated individuals) money income and adjusted gross income is transfer payments. Since adjusted gross income does not include transfer payments, it is "narrower" than family money income.

TABLE VI  
INDIVIDUAL INCOMES IN AN HYPOTHETICAL  
FOUR-PERSON ECONOMY  
(In Dollars)

Individuals	Family Money Income (1)	Adjusted Gross Income (2)	Transfer Payments (3)	Dividends Received (4)
A	3,500	1,500	2,000	10
B	5,500	4,000	1,500	30
C	9,000	8,000	1,000	60
D	12,500	12,500	0	100
Total	30,500	26,000	4,500	200

Suppose again that the task is set for studying the incidence of the only tax in the economy. The tax amounts to \$500 total annual collections. It is agreed that the burden of this tax rests with dividend receivers and should be distributed accordingly. Two additional agreements concerning the details of the incidence study are also reached:

(1) there are only three income brackets which are "under \$5,000",

"\$5,000 to \$9,999," and "\$10,000 and over;" (2) the family money income concept is used for denominators of the incidence formula.

In determining incidence ratios, series of income distribution and tax payments distribution should first be obtained. The distribution of family money income by the above three income brackets can readily be acquired and is shown in row one (by family money income bracket) and row two (by adjusted gross income bracket) of Table VII. In deriving tax payments distribution (numerators), however, a tax allocative series should be relied upon. This series is the distribution of dividends and can be acquired from income data shown in column four of Table VI. However, the series in the present case can be expressed in two forms. The first one is by family money income bracket (Table VII, row three) and the second, by adjusted gross income bracket (Table VII, row four). Tax payments distributions according to these two versions of the allocative series are shown in rows five and six of Table VII respectively.

Two "correct" sets of incidence ratios of this tax can now be obtained. If the denominators are the distribution of family money income by family money income bracket, the numerators should be the distribution of tax payments derived on the basis of the allocative series by the same family money income bracket. Should the family money income distribution be by adjusted gross income bracket, the same adjusted gross income bracket should be used in the tax allocative series. In these two cases, the incidence of the tax is found to be uniformly progressive (Table VII, rows seven and eight), though the degree of progressivity differs. However, if the income distribution series is by family money income bracket and the tax allocative series

TABLE VII

AN HYPOTHETICAL EXAMPLE OF THE DIFFERENCE IN TAX  
INCIDENCE RESULTED FROM USING DIFFERENT INCOME  
CONCEPTS TO CLASSIFY INCOME GROUPS IN THE  
INCOME DISTRIBUTION SERIES AND THE TAX  
ALLOCATIVE SERIES

Items	Income Brackets (In Dollars)			
	Under 5,000	5,000 to 9,999	10,000 and Over	Total
Family Money Income Distribution: (dollars)				
(1) by Family Money Income Bracket	3,500	14,500	12,500	30,500
(2) by Adjusted Gross Income Bracket	9,000	9,000	12,500	30,500
Tax Allocative Series (Distribution of Dividends): (Percent)				
(3) by Family Money Income Bracket	5	45	50	100
(4) by Adjusted Gross Income Bracket	20	30	50	100
Tax Payment Distribution: (dollars)				
(5) by Family Money Income Bracket-- According to (3)	25	225	250	500
(6) by Adjusted Gross Income Bracket-- According to (4)	100	150	250	500
Incidence Ratios: (Percent)				
(7) by Family Money Income Bracket-- (5) divided by (1)	0.71	1.55	2.00	1.64
(8) by Adjusted Gross Income Bracket-- (6) divided by (2)	1.11	1.67	2.00	1.64
(9) by Income Bracket of Different Income Concepts--(6) divided by (1)	2.86	1.03	2.00	1.64

by adjusted gross income bracket--as in some cases in the Michigan Tax Study--distortion of incidence ratios results. The tax incidence in this third case (row nine of Table VII) is no longer uniformly progressive. Though it is still progressive between the middle and high income brackets, it is rather regressive when the low income bracket is compared with both the middle and high income brackets.

In the above example, it is not difficult to pinpoint the reason for the distortion that leads to regressive findings. The individual B in the example is a "bracket mover." If family money income is used for the classification of income bracket, he is placed in the middle income bracket. Should adjusted gross income be used to classify income group, he would belong to the low income group. The incidence in the third case is found to be regressive because in deriving incidence ratios, individual B's money income is counted in the middle income bracket, but his tax payment in the low income bracket.

## BIBLIOGRAPHY

- Beard, Winston C. "Premium Tax Rates and Life Insurance Investment." The Insurance Law Journal, No. 516 (January, 1966), 14-22.
- ✓ Beaton, James R. "Family Tax Burdens by Income Levels." National Tax Journal, XV (March, 1962), 14-25.
- Bittker, Boris I., Charles C. Galvin, Richard A. Musgrave, and Joseph A. Pechman. A Comprehensive Income Tax Base? A Debate. Branford, Connecticut: Federal Tax Press, Inc., 1968.
- ✓ Black, Duncan. The Incidence of Income Tax. London: MacMillan and Company, LTD., 1939.
- Board of Governors of the Federal Reserve System. Federal Reserve Bulletin, LV (February, 1967).
- Brainin, David, and John J. Germanis. "Comments on 'Distribution of Property, Retail Sales, and Personal Income Tax Burden in California: An Empirical Analysis of Inequity in Taxation' by Gerhard N. Rostvold." National Tax Journal, XX (March, 1967), 106-111.
- ✓ Bridges, Benjamin, Jr. "Current Redistributive Effects of Tax-Transfer Programs." Public Finance, XXV, No. 1 (1970), 62-76.
- ✓ Brownlee, O. H. "Estimated Distribution of Minnesota Taxes and Public Expenditure Benefits." Studies in Economics and Business, No. 21. Minneapolis: University of Minnesota Press, 1960.
- ✓ Buchanan, James M., and Mark V. Pauly. "On the Incidence of Tax Deductibility." National Tax Journal, XXIII (June, 1970), 157-167.
- ✓ Calmus, Thomas W. "The Burden of Federal Excise Taxes by Income Classes." The Quarterly Review of Economics and Business, X (Spring, 1970), 17-23.
- Cauley, Troy J. Public Finance and the General Welfare. Columbus, Ohio: Charles E. Merrill Books, Inc., 1960.
- Chase, Samuel B., Jr. Maryland Tax Study. College Park: University of Maryland, 1965.
- ✓ Collier, Robert P. "Some Empirical Evidence of Tax Incidence." National Tax Journal, XI (March, 1958), 35-55.

Commerce Clearing House, Inc. State Tax Guild: All States. New York: Commerce Clearing House, Inc., 1967.

\_\_\_\_\_. State Tax Review, Vol. XXXII, No. 13 (March 30, 1971).

/ Conrad, Alfred H. "On the Calculation of Tax Burden." Economica, N. S., XXII (November, 1955), 342-348.

Dalton, Hugh. Principles of Public Finance. 4th ed., reprint. New York: Augustus M. Kelley Publishers, 1967.

Diehl, William D. Montana Fiscal Affairs Study. Missoula: University of Montana, 1970.

Goldsmith, Raymond W. The National Wealth of the United States in the Postwar Period. Princeton, N. J.: Princeton University Press, 1962.

Goode, Richard. "Rates of Return, Income Shares, and Corporate Tax Incidence." Effects of Corporation Income Tax. Ed. Marian Krzyzaniak. Detroit, Michigan: Wayne State University Press, 1966. 207-246.

\_\_\_\_\_. The Corporation Income Tax. New York: John Wiley and Sons, Inc., 1951.

Gorman, John A. "The Relationship Between Personal Income and Taxable Income." Survey of Current Business, L (May, 1970), 19-21.

Gragg, John G., Arnold C. Harberger, and Peter Mieszkowski. "Empirical Evidence on the Incidence of the Corporation Income Tax." Journal of Political Economy, LXXV (December, 1967), 811-821.

Groves, Harold M. Financing Government. 4th ed. New York: Henry Holt and Company, 1954.

\_\_\_\_\_. ed. Viewpoints on Public Finance. New York: Henry Holt and Company, 1947.

Groves, Harold M., and W. Donald Knight. Wisconsin's State and Local Tax Burden: Impact, Incidence and Tax Revision Alternatives. Madison: University of Wisconsin Tax Study Committee, 1959.

/ Hady, Thomas F. "The Incidence of the Personal Property Tax." National Tax Journal, XV (December, 1962), 368-384.

Haig, Robert M. "The Concept of Income: Economic and Legal Aspects." Readings in the Economics of Taxation. Ed. Richard A. Musgrave and Carl S. Shoup. Homewood, Illinois: Richard D. Irwin, Inc., 1959.

- Hall, James K. "Incidence of Death Duties." American Economic Review, XXX (March, 1940), 46-59.
- Hansen, Bent. The Economic Theory of Fiscal Policy. London: George Allen and Unwin, LTD., 1958.
- Harberger, Arnold C. "The Incidence of the Corporation Income Tax." Journal of Political Economy, LXX (June, 1962), 215-240.
- Herber, Bernard P. Modern Public Finance. Homewood, Illinois: Richard D. Irwin, Inc., 1967.
- Hirsch, Werner Z. The Economics of State and Local Government. New York: McGraw-Hill Book Company, 1970.
- Institute of Life Insurance. Life Insurance Fact Book. New York: Institute of Life Insurance, 1968.
- Insurance Information Institute. Insurance Facts. New York: Insurance Information Institute, 1966.
- Jaskari, Osmo V. A Study in the Theory of Incidence of Taxation. Helsinki, Finland: Finnish Academy of Sciences, 1961.
- Kahn, C. Harry. Personal Deductions in the Federal Income Tax. Princeton, N. J.: Princeton University Press, 1960.
- Kosters, Marvin. "Effects of an Income Tax on Labor Supply." The Taxation of Income from Capital. Ed. Arnold C. Harberger and Martin J. Bailey. Washington, D. C.: The Brookings Institution, 1969. 301-324.
- Krzyzaniak, Marian. "Effects of Profit Taxes: Deduced from Neoclassical Growth Models." Effects of Corporation Income Tax. Ed. Marian Krzyzaniak. Detroit, Michigan: Wayne State University Press, 1966. 17-106.
- Krzyzaniak, Marian, and Richard A. Musgrave. The Shifting of the Corporation Income Tax. Baltimore: The John Hopkins University Press, 1963.
- Lerner, Eugene M., and Eldon S. Hendriksen. "Federal Taxes on Corporation Income and the Rate of Return on Investment in Manufacturing, 1927 to 1952." National Tax Journal, IX (September, 1956), 193-202.
- Liebenberg, Maurice. "Nomographic Interpolation of Income Size Distribution." Review of Economics and Statistics, XXXVIII (August, 1956), 258-272.
- Linden, Fabian, ed. Expenditure Patterns of the American Family. New York: National Industrial Conference Board, 1965.

- Lindholm, Richard W., ed. Public Finance. New York: Pitman Publishing Corporation, 1959.
- Marco, Antonio de Vite de. First Principles of Public Finance. English translation by E. P. Marget. London: Jonathan Cape, 1950.
- Matthias, Russell H., and Charles B. Robison. "State Regulation of Insurance Rates." The Insurance Law Journal, No. 355 (August, 1952), 537-542.
- Maxwell, James A. Financing State and Local Government. Washington, D. C.: The Brookings Institution, 1965.
- ✓ Mering, Otto von. The Shifting and Incidence of Taxation. Philadelphia: The Blakiston Company, 1942.
- ✓ Mieszkowski, Peter M. "On the Theory of Tax Incidence." Journal of Political Economy, LXXV (June, 1967), 250-262.
- Montana State Board of Equalization. Twenty-Third Biennial Report. Helena: Montana State Board of Equalization, 1968.
- Montana Tax Study Task Force. Montana Tax Study. Missoula: University of Montana, 1966.
- Montana Taxpayers Association. Montana Taxpayer, Vol. XIII, No. 9. Helena, Montana: Montana Taxpayer Association, 1969.
- ✓ Morgan, James N. "The Anatomy of Income Distribution." Review of Economics and Statistics, XLIV (August, 1962), 270-283.
- ✓ Musgrave, Richard A. "Pareto Optimal Redistribution: Comment." American Economic Review, LX (December, 1970), 991-993.
- ✓ \_\_\_\_\_ . "The Distribution of Government Burdens and Benefits: General Equilibrium Aspects of Incidence Theory." American Economic Review, LXIII (May, 1953), 504-517.
- \_\_\_\_\_ . The Theory of Public Finance. New York: McGraw-Hill Book Company, 1959.
- ✓ Musgrave, Richard A., and Darwin W. Daicoff. "Who Pays the Michigan Taxes?" Michigan Tax Studies: Staff Papers. Lansing: Michigan Secretary of Finance, 1958. 131-183.
- ✓ Musgrave, Richard A., J. J. Carroll, L. D. Cook, and L. Frane. "Distribution of Tax Payments by Income Groups: A Case Study for 1948." National Tax Journal, IV (March, 1951), 1-53.
- McLure, Charles E., Jr. "The Interstate Exporting of State and Local Taxes: Estimates for 1962." National Tax Journal, XX (June, 1967), 49-77.

National Bureau of Economic Research. An Appraisal of the 1950 Census Income Data. Princeton, N. J.: Princeton University Press, 1958.

Netzer, Dick. Economics of the Property Tax. Washington, D. C.: The Brookings Institution, 1966.

Newman, Herbert E. An Introduction to Public Finance. New York: John Wiley and Sons, Inc., 1968.

✓ Newman, Peter. "A Study of the Distribution of the Tax Burden in the United States, 1955-1959." Unpublished paper. Ann Arbor: University of Michigan, September, 1961.

Okner, Benjamin A. Income Distribution and the Federal Income Tax. Michigan Governmental Studies No. 47. Ann Arbor: University of Michigan Press, 1966.

Orr, Larry L. "The Incidence of Differential Property Taxes on Urban Housing." National Tax Journal, XXI (September, 1968), 253-262.

✓ Peacock, Alan T., ed. Quantitative Analysis in Public Finance. New York: Praeger Publishers, 1969.

✓ Pettengill, Robert B. "Division of the Tax Burden Among Income Groups in the United States in 1936." American Economic Review, XXX (March, 1940), 60-71.

✓ Prest, Alan R. "Statistical Calculation of Tax Burden." Economica, N.S., XXII (August, 1955), 234-45.

\_\_\_\_\_. "The Budget and Interpersonal Distribution." Public Finance, XXIII, No. 1 (1968), 80-98.

Projector, Dorothy S., and Gertrude S. Weiss. Survey of Financial Characteristics of Consumers. Washington, D. C.: Board of the Governor of the Federal Reserve System, 1966.

Robertson, Jack E. "Comparative Tax Burdens for a Midwestern City." National Tax Journal, XV (September, 1962), 308-313.

Sales Management, Inc. Sales Management: The Marketing Magazine, Vol. C, No. 12 (June 10, 1968).

Seligman, Edwin R. A. The Shifting and Incidence of Taxation. 3rd ed. New York: The Columbia University Press, 1910.

Sharp, Ansel M., and Bernard F. Sliger. Public Finance. Homewood, Illinois: The Dorsey Press, 1964.

✓ Shephard, Ronald W. "A Mathematical Theory of the Incidence of Taxation." Econometrica, XII (January, 1944), 1-18.

- ✓ Shoup, Carl S. "Incidence of the Corporation Income Tax: Capital Structure and Turnover Rates." National Tax Journal, I (March, 1948), 12-17.
- \_\_\_\_\_. Public Finance. Chicago: Aldine Publishing Company, 1969.
- ✓ \_\_\_\_\_ . "Some Considerations on the Incidence of the Corporation Income Tax." Journal of Finance, VI (June, 1951), 188-196.
- ✓ Silverman, H. A. Taxation: Its Incidence and Effects. London: MacMillan and Company, LTD., 1931.
- Simons, Henry C. Personal Income Taxation. Chicago: The University of Chicago Press, 1938.
- Slitor, Richard E. "Corporate Tax Incidence: Economic Adjustments to Differentials Under a Two-Tier Tax Structure." Effects of Corporation Income Tax. Ed. Marian Krzyzaniak. Detroit, Michigan: Wayne State University Press, 1966. 136-206.
- Soltow, Lee, ed. Six Papers on the Size Distribution of Wealth and Income. New York: Columbia University Press, 1969.
- ✓ Soule, Don M. "Shifting of the Corporation Income Tax: A Dynamic Analysis." Journal of Finance, XIV (September, 1959), 390-402.
- Tarasov, Helen. "Who Does Pay the Taxes?" Social Research, supplement, IV (1942), 1-79.
- ✓ Tax Foundation, Inc. Allocation of the Tax Burden by Income Class. New York: Tax Foundation, Inc., 1960.
- \_\_\_\_\_. State Tax Studies: 1959-1967. New York: Tax Foundation, Inc., 1967.
- ✓ \_\_\_\_\_ . Tax Burdens and Benefits of Government Expenditures by Income Class, 1961 and 1965. New York: Tax Foundation, Inc., 1967.
- ✓ Tucker, Rufus S. "Distribution of Tax Burden in 1948." National Tax Journal, IV (September, 1951), 269-285.
- ✓ \_\_\_\_\_ . "The Distribution of Government Burdens and Benefits." American Economic Review, LXIII (May, 1953), 518-543.
- University of Michigan. 1960 Survey of Consumer Finances. Ann Arbor: University of Michigan Press, 1961.
- \_\_\_\_\_. 1967 Survey of Consumer Finances. Ann Arbor: University of Michigan Press, 1968.

- U. S. Bureau of the Census. Census of Governments: 1967, Vol. II, Taxable Property Values. Washington, D. C.: U. S. Government Printing Office, 1968.
- 
- \_\_\_\_\_. Census of Governments: 1967, Vol. VII, No. 26. Washington, D. C.: U. S. Government Printing Office, 1970.
- 
- \_\_\_\_\_. Census of Housing: 1960, Vol. I, Pt. 5, No. 28. Washington, D. C.: U. S. Government Printing Office, 1963.
- 
- \_\_\_\_\_. Current Population Reports, Series P-60, No. 60. "Income in 1967 of Persons in the United States." Washington, D. C.: U. S. Government Printing Office, 1969.
- 
- \_\_\_\_\_. Governmental Finances in 1966-67. Washington, D. C.: U. S. Government Printing Office, 1968.
- 
- \_\_\_\_\_. Income Distribution in the United States. A 1960 Census Monograph by Herman P. Miller. Washington, D. C.: U. S. Government Printing Office, 1966.
- 
- \_\_\_\_\_. State Government Finances in 1968. Washington, D. C.: U. S. Government Printing Office, 1969.
- 
- \_\_\_\_\_. State Tax Collections in 1968. Washington, D. C.: U. S. Government Printing Office, 1968.
- 
- \_\_\_\_\_. Statistical Abstract of the United States: 1969. Washington, D. C.: U. S. Government Printing Office, 1970.
- 
- \_\_\_\_\_. Trends in the Income of Families and Persons in the United States: 1947 to 1960. Technical Paper No. 8. Washington, D. C.: U. S. Government Printing Office, 1963.
- 
- \_\_\_\_\_. U. S. Census of Population: 1960, Vol. 1, Pt. 1. Washington, D. C.: U. S. Government Printing Office, 1964.
- 
- \_\_\_\_\_. U. S. Census of Population: 1970, General Population Characteristics. Advanced Report, PC (V2)-28. Washington, D. C.: U. S. Government Printing Office, 1970.
- U. S. Department of Agriculture, Economic Research Service. Farm Income, State Estimates: 1949-1968. FIS 214 Supplement. Washington, D. C.: U. S. Department of Agriculture, August, 1969.
- 
- \_\_\_\_\_. Farm Income, State Estimates: 1949-1969. FIS 216 Supplement. Washington, D. C.: U. S. Department of Agriculture, August, 1970.
- 
- \_\_\_\_\_. Farm Real Estate Taxes: Recent Trends and Developments, Series RET-8. Washington, D. C.: U. S. Department of Agriculture, December, 1968.

- U. S. Department of Commerce, Office of Business Economics. National Income: 1954 Edition. Washington, D. C.: U. S. Government Printing Office, 1954.
- 
- \_\_\_\_\_. Personal Income, By States, Since 1929. Washington, D. C.: U. S. Government Printing Office, 1956.
- 
- \_\_\_\_\_. Survey of Current Business, XLVIII (August, 1968).
- 
- \_\_\_\_\_. The National Income and Product Accounts of the United States, 1929-1965: Statistical Tables. Washington, D. C.: U. S. Government Printing Office, 1966.
- U. S. Department of Labor, Bureau of Labor Statistics. Consumer Expenditures and Income, Urban United States: 1960-61, BLS Report No. 237-38 and various supplements. Washington, D. C.: U. S. Government Printing Office, 1965.
- U. S. Department of the Treasury. Annual Report of the Comptroller of the Currency: 1967. Washington, D. C.: U. S. Government Printing Office, 1968.
- 
- \_\_\_\_\_. Annual Report of the Secretary of the Treasury on the State of Finances: Statistical Appendix, Fiscal Year Ended June 30, 1968. Washington, D. C.: U. S. Government Printing Office, 1969.
- U. S. Department of the Treasury, Internal Revenue Service. Statistics of Income: 1967, Business Income Tax Returns. Washington, D. C.: U. S. Government Printing Office, 1970.
- 
- \_\_\_\_\_. Statistics of Income: 1960, Individual Income Tax Returns. Washington, D. C.: U. S. Government Printing Office, 1962.
- 
- \_\_\_\_\_. Statistics of Income: 1966, Individual Income Tax Returns. Washington, D. C.: U. S. Government Printing Office, 1968.
- 
- \_\_\_\_\_. Statistics of Income: 1967, Individual Income Tax Returns. Washington, D. C.: U. S. Government Printing Office, 1969.
- U. S. Department of the Treasury, Office of Tax Analysis. Project: Total U. S., Addition to Subproject C. (Unpublished computer print-out data, prepared by Computers for Industry and Business on the basis of the BLS-USDA 1961 survey.)

## APPENDIXES

APPENDIX A

INCOME CONCEPTS AND THEIR COMPONENTS

INCOME CONCEPTS AND THEIR COMPONENTS

Income Concepts	"Accretion" Income (1)	"Broad" Income (2)	Personal Income (3)	Family Money Income (4)	Adjusted Gross Income		Money Income After Taxes (7)	Cash Income (8)
					Federal (5)	Montana (6)		
Definition of Income	The algebraic sum of consumption expenditures and the change in net worth during a given period of time	The sum of consumption expenditure and the change in net worth in 1967 whenever reliable estimates of components can be obtained	The current income received by residents from all sources, inclusive of transfers from government and business but exclusive of transfers among persons	Total money earnings received from all sources during the survey years	Gross income after deduction of certain items such as business expenses, sick pay, moving expenses	Same as (5) with minor difference as shown below	All money earnings from all sources after deduction of personal taxes	Effective buying income minus all non-cash income
The concept includes the following major income components:								
Wages and Salaries	yes	yes	yes	yes	yes	yes	yes	yes
Monetary Interests								
Private interests	yes	yes	yes	yes	yes	yes	yes	yes
State bond interest	yes	yes	yes	yes	no	yes	yes	yes
Federal bond interest	yes	yes	yes	yes	yes	no	yes	yes
Imputed Interests	yes	no	yes	no	no	no	no	no
Rents								
Monetary rent	yes	yes	yes	yes	yes	yes	yes	yes
Imputed rent	yes	yes	yes	no	no	no	no	no
Dividends								
Dividends of national banks	yes	yes	yes	yes	yes	no	yes	yes
Other dividends	yes	yes	yes	yes	yes	yes	yes	yes
Undistributed Corporate Profits	yes	no	yes	no	no	no	no	no

INCOME CONCEPTS AND THEIR COMPONENTS, Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inventory Valuation Adjustment	yes	no	yes	no	no	no	no	no
Capital Gains								
Long-Term Realized Capital Gains	yes	yes	no	no	Partly yes	Partly yes	yes	yes
Short-Term Realized Capital Gains	yes	yes	no	no	yes	yes	yes	yes
Unrealized Capital Gains	yes	no	no	no	no	no	no	no
Transfer Payments	yes	yes	yes	yes	no	no	yes	yes
Other Labor Income	yes	no	yes	yes	no	no	yes	yes
Income in Kind								
Room and Board to Employee	yes	no	yes	no	no	no	yes	yes
Food and Fuel Produced and Consumed on Farms	yes	yes	yes	no	no	no	no	no
Personal Contribution to Social Income	yes	yes	no	yes	yes	yes	yes	no
Personal Taxes								
Federal	yes	yes	yes	yes	yes	no	no	no
State and Local	yes	yes	yes	yes	no	yes	no	no
For What Purpose was the Concept Developed?	To tax individual income in theory	For the present tax incidence study	To measure the productive activity and performance of the economy	To demonstrate certain economic characteristics of the population in a certain area	To file federal income tax returns	To file Montana individual income tax returns	To provide information on family spending pattern and to revise the Consumer Price Index	To provide market demand information to business so as to promote sales
By Whom Was the Concept Developed?	Henry C. Simons, Robert M. Haig, and others	Same as (1) plus the present writer	Office of Business Economics, U.S. Department of Commerce	Bureau of the Census, U.S. Department of Commerce	Internal Revenue Service, U.S. Treasury Department	Internal Revenue Service and Montana State Board of Equalization	Bureau of Labor Statistics, U.S. Department of Labor	Sales Management, Inc.
How the Concept was Formed or Data were Compiled	Economic theory	Economic theory and existing statistical data	Derived from business and governmental sources	Derived from questionnaire and interviews during the survey year	Federal individual income tax returns	Federal and Montana individual income tax returns	Personal interview during the survey year	Revise and update from government sources
Availability of Data on Montana Income Distribution Years Covered	no none	yes 1967	no none	yes decennial	yes annual	yes biennial	no none	yes annual

INCOME CONCEPTS AND THEIR COMPONENTS, Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of Income Size Brackets	none	6	none	13	17	38	none	7
Lowest Income Size Brackets	none	Under \$3,000	none	Under \$1,000	Under \$600	Under \$600	none	\$0-2,999
Highest Income Size Brackets	none	\$15,000 and over	none	\$25,000 and over	\$200,000 or more	\$100,000 and over	none	over \$25,000
Total Amount of Income For Montana in 1967 (thousands of dollars)	none	1,745,426	1,939,000	1,586,417	1,413,401	1,438,138	none	1,564,288

Sources: Column (1), Robert M. Haig, "The Concept of Income: Economic and Legal Aspects," in Robert M. Haig, ed., The Federal Income Tax (New York: Columbia University Press, 1921), reprinted in Richard A. Musgrave and Carl S. Sharp, ed., Readings in the Economics of Taxation (Homewood, Illinois: Richard D. Irwin, Inc., 1959; Henry C. Simons, Personal Income Taxation (Chicago: University of Chicago Press, 1938). Column (2), based on columns (1), (3), (4), (5), (6), (7), and estimations made in the present study. Column (3), U. S. Department of Commerce, National Income 1954 Edition: A Supplement to the Survey of Current Business (Washington, D.C.: U. S. Government Printing Office, 1954, pp. 58-60) and U. S. Department of Commerce, Survey of Current Business, Vol. 48, No. 8 (August, 1968), p. 20, Tb. 52. Column (4), U. S. Bureau of the Census, U. S. Census of Population: 1960, Vol. I, Characteristics of the Population, Part 28, Montana (Washington, D.C.: U. S. Government Printing Office, 1963), p. XXXVII and pp. 28-107, Tb. 65. Column (5), Internal Revenue Service, U. S. Treasury Department, Statistics of Income 1967: Individual Income Tax Returns (Washington, D.C.: U. S. Treasury Department, 1969), p. 122 and p. 170. Column (6), Montana State Board of Equalization, Twenty Third Biennial Report (Helena, Montana, 1968), p. 18 and Commercial Clearing House, Inc., State Tax Reporter: Montana, and Revised Codes of Montana, 1947. Column (7), Bureau of Labor Statistics, U. S. Department of Labor, Consumer Expenditures and Income: Urban United States, 1960-61, BLS Report No. 237-38 (April, 1964), pp. 1-10, or any supplement to these reports. Column (8), Sales Management, Inc., Sales Management: The Marketing Magazine, Vol. 100, No. 12 (New York: Bill Publishers, Inc., June 10, 1968), p. B and pp. C5-C7.

APPENDIX B

METHOD OF ADJUSTMENT OF CERTAIN ALLOCATIVE  
SERIES FROM FAMILY MONEY TO ADJUSTED  
GROSS INCOME BRACKET

Federal adjusted gross income was used for the classification of income groups in the income and tax payment distribution series. However, the nature of statistical data does not permit the derivation of every allocative series (both for the allocation of income components and tax payments) with the same federal adjusted gross income concept. Therefore, it is necessary to develop a method to adjust the difference in distribution resulting from different income concepts used in the classification of income groups.

Due to the lack of reliable data for the derivation of adjustment factors, the method employed here is a crude one. It would be in error to claim that the result of the adjustment process used in this study would truly represent the exact state of distribution by federal adjusted gross income bracket. The adjustment will reduce possible errors since the logic behind the method itself is reasonable.<sup>1</sup> Moreover, others have employed a similar method for the same purpose except in the reverse order--i.e., from adjusted gross income to family money income brackets.<sup>2</sup>

In developing the adjustment method, attention should first be given to the difference between the family money and adjusted gross income concepts. There are a number of definitional differences (as represented by different income components) between these two concepts.

---

<sup>1</sup>For some criticism on the studies where no such adjustment was made, see Peter Newman, A Study of the Distribution of the Tax Burden in the United States, 1955-1959, unpublished paper (Ann Arbor: University of Michigan, September, 1961), p. 49, par. 4.14. See also the final section of Chapter V in the present study.

<sup>2</sup>Ibid., pp. 48-49, pars. 4.11-4.13.

However, so far as the magnitudes and distributive patterns are concerned, transfer payments are the sole important difference.<sup>3</sup> Family money income includes transfer payments while adjusted gross income does not. Since the distribution of transfer payments is concentrated in lower income brackets, it would be expected that the frequency distribution of income recipients would tend to concentrate more on the lower brackets when a certain distributive series is adjusted, with the same income size brackets, from family money to adjusted gross income bracket.

An example may clarify the point just noted. Suppose an individual has a money income of \$3,500. If he is classified by family money income bracket (using the same bracket intervals and number of bracket used in the text), he would be placed in the "\$3,000 to \$4,999" bracket. Suppose again, out of this \$3,500, he received \$1,000 in the form of old-age and retirement payments. If he is classified by adjusted gross income, however, he would be in the "under \$3,000" bracket. Because of a change in income concept in the classification of income groups, this individual moves down one bracket and, therefore, gives a higher percentage to the lowest (under \$3,000) income bracket.

Empirically, it is not as yet possible to know how many individuals and families have moved away from their original income after the change in income concept. It is also not likely to be known how much

---

<sup>3</sup>Other components such as federal bond interest and capital gains could also be considered. Because of lack of distributive data by family money income bracket, they are not considered here in developing the adjustment method.

income they have taken with them.<sup>4</sup> There are, however, many individuals and families who still remain in their original brackets even after the change in the concept of income. It is possible, as well as reasonable, therefore, to assume that the ratio of the number of "bracket movers" to the total number of individuals and families in a bracket is equivalent to the ratio of transfer payments to total amount of (family money) income in this particular bracket. In other words, it may be assumed that a change in bracket classifications from family money to adjusted gross income would cause the total amount of transfer payments in a certain bracket to move out and be counted in the next lower bracket. This assumption is the clue, as well as the base, for the method of adjustment used in the present study.

The adjustment factors based on this assumption can now be derived. It is found that about 40 percent of the family money income received in the "under \$3,000" family money income bracket was in the form of transfer payments in 1960. For other brackets in ascending order, the percentages are 13.5, 5.8, 5.5, 4.0, and 2.2 respectively.<sup>5</sup> Since the data for updating this series are unreliable, these percentages are used as the adjustment factors. The work sheet on page 127 is an illustration of the adjustment procedure. It is used to derive a series

---

<sup>4</sup>Unlike the above instance, it is known for sure that by using the adjusted gross income bracket, this individual will not merely take \$1,000, but \$3,500 away from the total income of the original "\$3,000 to \$4,999" bracket.

<sup>5</sup>Calculated from (1) U. S. Bureau of the Census, U. S. Census of Population: 1960, Vol. I, Pt. 28 (Washington, D. C.: U. S. Government Printing Office, 1963), p. 28-107, Tb. 65; and (2) U. S. Department of Commerce, Survey of Current Business, XLI (August, 1961), p. 18, Tb. 52.

for the allocation of the cigarette tax, which was originally distributed by family money income brackets, by federal adjusted gross income bracket.

**WORK SHEET FOR THE ADJUSTMENT OF CERTAIN ALLOCATIVE SERIES  
FROM FAMILY MONEY TO ADJUSTED GROSS INCOME BRACKETS**

Adjustment Procedure Explanation Income Bracket	Percentage Distribution of Cigarette Expenditures by Family Money Income Bracket (1)	Adjustment Factors (Percent of Transfer Payments in Total Family Money Income) of Each Family Money Income Bracket (2)	Percent of Persons (Income of Expenditures) Moving Away From Original Bracket as Income Concept Changes (3) = (1) x (2)	Percentage Distribution After the Persons Were Moved Away From Their Original Bracket But Before They Move to the Next Lower Bracket (4) = (1) - (3)	Percentage Distribution of Cigarette Expenditures by Federal Adjusted Gross Income (i.e., After the Bracket Movers Move Into the Next Lower Bracket) (5) = (3) + (4)
Under \$3,000	13.0	40.0	0 <sup>a</sup>	13.0	= 15.2
\$ 3,000 - 4,999	16.2	X 13.5	= 2.2	14.0	= 15.5
\$ 5,000 - 7,499	26.2	X 5.8	= 1.5	24.7	= 25.9
\$ 7,500 - 9,999	22.2	X 5.5	= 1.2	21.0	= 21.6
\$10,000 - 14,999	15.0	X 4.0	= 0.6	14.4	= 14.6
\$15,000 and over	7.4	X 2.2	= 0.2	7.2	= 7.2
<b>TOTAL</b>	<b>100.0</b>				<b>100.0</b>

<sup>a</sup> No one will move out of the lowest bracket.

Source: Col. (1), please refer to notes on Table III.  
Cols. (2) to (5), see the exposition in the Appendix.

VITA 2

Li-teh Sun

Candidate for the Degree of

Doctor of Philosophy

Thesis: INCIDENCE OF MONTANA STATE AND LOCAL TAXES

Major Field: Economics

Biographical:

Personal Data: Born in Hong Kong, China, December 5, 1939, the son of Beh-yu and Ruey-jeng Sun.

Education: Completed the elementary education from Chung Jeng Public School, Taipei, Taiwan, in 1952; graduated from Cheng Kung Middle School, Taipei, Taiwan, in 1958; received the Bachelor of Arts degree from Taiwan Provincial Chung Hsing University, Taipei, Taiwan, with a major in economics, in June, 1962; received the Master of Science degree from Oklahoma State University, with a major in economics, in May, 1968; completed the requirements for the Doctor of Philosophy degree at Oklahoma State University in May, 1972.

Professional Experience: Military service in the Army of the Republic of China, 1962-1963; graduate assistant in the Department of Economics, Oklahoma State University, 1965-1969; research associate and instructor in the Bureau of Business and Economic Research, University of Montana, Missoula, Montana, 1969-1970.