The equity of individual property taxation in Montana

Robert A. Little

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INTRODUCTION

One of the oldest sources of government revenue is the taxation of property. Although the importance of the property tax in the over-all tax system within the United States has declined over the years, in many locations, including Montana, it still provides most of the tax revenue for the operation of local governments and a portion of state government revenues.\(^1\)

Theoretically, the general property tax is a tax on all types of wealth which possess monetary value. Ideally, it is levied at a single rate on the current value of all property located within the same taxing district, and thus is a uniform tax based upon the value of all property owned.\(^2\) At one time or another the general property tax may have existed, but the property tax base has been narrowed by exemptions, assessments which do not measure full value of property, and in Montana, varying tax rates which favor certain types of property or property owners via the classification system.\(^3\) The present applied


\(^2\)A tax based on value is termed an *ad valorem* tax.

\(^3\)See Appendix A for a description of the Montana property classification system.
property tax has, in fact, evolved into a tax on real estate
and improvements, and on various types of personal property
such as household goods and automobiles. ¹

Local governments in Montana are confronted with a
number of problems concerning the property tax. The issues
involved are of no little importance since the tax is still
the "keystone"⁵ of the local governmental revenue structure.
In Montana, property taxes accounted for nearly 60 percent
of total state and local tax revenues in 1964.

The task of assessing most taxable property in
Montana is performed by an elected official in each county,
the county assessor. The qualifications for the office do
not require prior experience or knowledge of appraising
techniques, although the State Board of Equalization does
furnish guidelines in addition to a certain amount of help
from experienced appraisers upon request. Also, in those
counties where the taxable valuation is such that the
assessor's office is large enough to require a staff, one
or more trained appraisers may be present. Even so, the
appraisal of property for the purposes of taxation remains
largely a matter of personal judgment and thus is subject

¹Michigan, House of Representatives, Legislative
Committee, Michigan Tax Study Staff Papers (Lansing, 1958),
pp. 185-186; Earl R. Rolph and George F. Break, Public
Finance (New York: The Ronald Press Co., 1961), pp. 323-
327; and Groves, op. cit., pp. 47-48.

⁵Montana Legislative Council, op. cit., p. ix.
to much controversy and criticism.

One of the problems most frequently and vehemently voiced is the question of the equity or fairness of the burden distribution of the property tax. The present study consists of an empirical analysis of the equity of individual property taxation in Montana. The equity of a tax may be measured in several different ways. Two of the most common are considered in this study. The first concerns the property itself, and the second pertains to the economic status of the taxpayer.

One basis by which to determine whether the property tax may be said to be fair is by its degree of uniformity or non-uniformity according to the value of the property. If taxable properties having equal value are taxed identical amounts, and if properties valued at a certain proportion more or less than others are taxed at those same proportions, then the tax may be considered to be equitable. Part 1 of Chapter III of this study attempts to determine by means of an assessment-to-sales-ratio study if real property\(^6\) is uniformly taxed. This analysis has primarily an intracounty scope for Missoula County, Montana, and also includes supplementary data from Lewis and Clark and Flathead Counties for purposes of comparing intercounty assessments.

The second basis employed in this study to determine

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\(^6\)Real property is defined as real estate and improvements thereon.
the degree of equity of property taxation consists of the relationship between an individual's tax payment and his "ability-to-pay." A taxpayer's ability-to-pay is usually measured by his current net income.

It is assumed that a progressive tax rate schedule usually represents the ability-to-pay principle to a greater degree than does a proportional or regressive schedule of tax rates.

Technically speaking the real property tax is a proportional tax since the tax rate remains constant as the tax base changes. However, if the amount of his tax payment were to be compared to the property owner's income, the tax may not necessarily be proportional with respect to that income.

Part 2 of Chapter III endeavors to discover if property values provide an adequate measure of ability-to-pay, and how closely income is related to property tax liability. This part is concerned with the impact of property taxes for the entire state upon selected income and occupational groups of individual taxpayers by average taxes paid per person, both in dollar amounts and as a percentage of net income.

The entire analysis is limited to equity considerations for individual households only, as opposed to
businesses and other types of property taxpayers. The principal reasons for the above limitation are twofold. First of all, much more data were available for individual property taxes than for those levied on businesses. Secondly, it is generally accepted by economists that some or all of the burden of the property taxes on businesses is commonly shifted to other portions of society, whereas the individual householder is generally unable to shift his property taxes and bears the ultimate burden.

Chapter I of the following study contains a survey of the most closely related previous empirical research done on the subject of the equity of property taxation. Because two measurements of tax equity are considered in the present analysis, Chapter I is separated into two parts. One deals with assessment-sales ratio studies, and the other concerns research into property tax burden distribution.

Chapter II presents the methodology employed in the assessment-sales ratio portion of the analysis. A separate

7Part of the analysis (the assessment ratio study) does include a number of ratios for farm and business properties. However, this portion is extremely limited by non-availability of data, and no ultimate incidence assumptions are ventured.

8For example, the tax may be passed on to the consumer in the form of higher product prices than would have prevailed in the absence of the tax.

9If a general increase in the real property tax rate occurs, however, it is possible that some or all of the increase may be shifted by means of the process of tax capitalization which is discussed in Chapter II.
A separate chapter was not necessary for the methods involved in the burden distribution analysis, however, and this methodology is included in the second part of Chapter III, which indicates the results of this analysis. The first part of Chapter III consists of the analysis and results of the assessment ratio portion.

Chapter IV contains the conclusions of the entire study.
CHAPTER I

PREVIOUS RELATED RESEARCH

A voluminous amount of material has been gathered concerning the subject of the equity of property taxation. Much research has been done in the specific areas with which this study is concerned, especially assessment to sales ratio studies and analyses of the property tax burden distribution. Many varied types of studies have been completed; however this chapter is limited principally to those of an empirical nature which are believed to be most significant and closely related to the present analysis.

I. ASSESSMENT-TO-SALES-RATIO STUDIES

The general method employed in an assessment-sales-ratio study is first to gather a sample of recently transferred real estate about which certain items of information concerning the properties are obtained. This information for each individual property commonly includes the sales price, assessed or appraised valuation, type or use of the property, mortgage information, date of sale, and location of the property. The sample is generally stratified according to location, value, and/or property type, and then the assessed valuation is compared to the sales price for each parcel of property to obtain a ratio of assessed to actual
market value. An average ratio is then calculated for the entire sample as well as each separate stratum. In addition, measures of dispersion may be calculated as well as tests of reliability. The results then should indicate the average level and the degree of uniformity of assessments within the sample area.

A recent analysis of 13,769 real estate sales within the City of Boston during a four-year period from January, 1960, through March, 1964, utilized federal excise tax stamps affixed to recorded property deeds as the source of selling prices. Questionable sales, or those sales for which the revenue stamps were believed to be inaccurate for one reason or another were excluded from the sample. (When the questionable sales were included, the mean assessment ratio was significantly higher than when they were omitted.)

The location of each property was also obtained from the deed, while the use of the property (residential, commercial, etc.) and the assessed valuation were procured from records in the office of the county assessor.

Each property transfer was classified according to (1) the region of Boston in which it was situated, (2) the type of property, and (3) its selling price. Twelve

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1Oliver Oldman and Henry Aaron, "Assessment-Sales Ratios under the Boston Property Tax," National Tax Journal, XVIII (March, 1965), 39. The federal revenue stamps are required to be attached in the amount of $.55 for each $500.00 of the sales price.
regional and type categories as well as eleven different price classes were utilized. These classifications resulted in 1,584 cells\(^2\) for which the average assessment-sales ratio for properties within each cell was computed, along with its standard deviation and the ratio of total assessments to total sales in each cell. Computations were made separately for each year covered by the study to allow evaluation of any price changes which may have taken place over the entire four-year period.\(^3\)

The study found that real property usually was assessed much below its full market value. The average assessment ratio for single-family residences was 44.2 percent, which was about 25 percent below the city-wide average for all property types. An average ratio of 77.8 percent was discovered for commercial property which, although substantially higher than that for residences, was nonetheless much lower than market price. Generally, property in the lowest price class ($0 - $4,999) was assessed at the highest ratio, with the exception of land only.

In addition, varying degrees of inequity were found to exist among regions, types, and price classes. An extremely large standard deviation associated with the average ratio for commercial property may have been due to the

\(^{2}\)12 regional X 12 type X 11 price = 1,584.

\(^{3}\)Oldman and Aaron, op. cit., pp. 39-40.
difficulty of properly assessing many diverse types of business. A tentative explanation of regional inequalities was given as lags in adjusting assessed values to changing market prices in some areas. Overall, systematic inconsistencies were discovered to exist in property assessments although, by statute, such inconsistency was explicitly rejected.

An earlier study of the same area compared assessment inequalities within and between the cities comprising metropolitan Boston. Information concerning 1,500 residential property sales from October 1 through November 12, 1947, was obtained from the Metropolitan Mortgage Bureau, Inc. The necessary information was on cards stating the selling price, assessed valuation, date of sale, location, and type of property. The sales prices, however, were originally obtained from the federal revenue stamps on the deeds and then were verified by the Metropolitan Mortgage Bureau "when possible."

The sample was subsequently sorted by community and by one, two, and three family dwellings. The average

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4Ibid., p. 41.
5Ibid., p. 43.
6Ibid., p. 48.
8Ibid., p. 361.
assessment-sales ratio for urban Boston was 63.0 percent for all types of residences. Of the three suburban areas, two were found to be assessed generally lower than Boston itself and one at about the same level.

The City of Boston exhibited much more nonuniformity of assessments than the suburbs. The average deviation for Boston was 19.2 percentage points for an average relative deviation of 30.5 percent.\(^9\) The average relative deviations associated with the suburban areas were between 18 and 19 percent.\(^{10}\) It was found that the property tax generally fell most heavily upon two and three family dwellings and upon the least valuable houses. High valued suburban property was generally taxed less heavily than low valued urban property.

The author concludes that the study shows a substantial inequality of assessments both within and among the areas analyzed. In addition he states that equalization of real estate taxation is definitely desirable after presenting and opposing an argument by Henry A. Simons that equalization is undesirable since the differentials are

\(^9\)The average deviation is the average amount, expressed in the same units as the average ratio, by which the sample ratios differ from the average ratio. The average relative deviation (or coefficient of dispersion) relates the average deviation to the average assessment ratio, expressed in percentage form, e.g. \(19.2/63.0 = 30.5\%\).

\(^{10}\)Townsend, op. cit., p. 364.
capitalized.\textsuperscript{11}

Assessment ratio studies of other large metropolitan areas have indicated similar inequalities in local property taxation. Two such areas which were studied were Flint, Michigan, and Bethlehem, Pennsylvania.

At Flint, Michigan, an interview technique was employed by the researchers.\textsuperscript{12} A random sample of residents in the city and the urbanized fringe was chosen and questioned concerning the amount of real property taxes paid during the previous year, in addition to being asked to furnish the market value and assessed value of their dwellings.\textsuperscript{13} The results of this study showed that different types of real estate within the same tax rate area were unequally assessed. Also indicated was a substantial variation in assessment ratios between the city and the fringe on equal valued properties. The assessment ratios were

\textsuperscript{11}Ibid., pp. 367-369. Simons' argument is presented in his \textit{Fiscal Aspects of Metropolitan Consolidation} (1943), p. 23. He states that it is better to equalize services since they are not capitalized to the extent that tax differentials are. In rebuttal Townsend claims that there is no evidence that one is capitalized more than the other and also no evidence concerning what proportion of property in a given area is sold. (Property must be sold in order for capitalization to occur.)


\textsuperscript{13}The study did not indicate whether the selected properties had recently been involved in a sale, or if the market values furnished were simply judgments arrived at by the property owners.
generally higher in the city, which the author attempts to justify by stating that more government services are available in the city. However, even though the tax rate in the city may be higher due to more services being available, the assessed value upon which the tax rate is based should be equivalent to that in the fringe areas for properties of equal value.

The Bethlehem, Pennsylvania, assessment-to-sales-ratio study was compiled from data gathered by the Economic Education League of Bethlehem from a random sample of property transfers made during 1954 and 1956. In addition to indicating a great amount of underassessment, the results of this study showed that a high degree of inequality existed among residential property assessments as well as those for commercial property. The average relative deviation from a mean ratio of 24.5 percent for residences amounted to 23.7 percent. For commercial property, the mean assessment ratio was 27.4 percent and the average deviation was 9.1, which resulted in an average relative deviation of 33.2 percent.

Again, the results of the analysis indicated that relatively lower valued properties were assessed at a higher ratio to true value than higher priced properties.

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Generally, homes in older residential districts also appeared to be assessed higher than equally valued properties in newer residential areas.16

An extensive assessment-sales ratio study was done for the state of Washington in 1953 in which 10 types of real property in 39 counties were analyzed. The sales prices of the transferred properties were easily and accurately determined from an affidavit required by state law stating the amount of state excise tax paid on every real estate transfer.17

The sample size for each county was arrived at through the use of a moving average. (i.e.: Average assessment ratios were calculated for cumulative increments of 100 sales. When the variations between average ratios became negligible with each increment, the sample size was considered to be adequate.) The arithmetic mean was found to be the most satisfactory measure of central tendency. Due to the slight skewness of the sample ratios, the median tended to understate the level of assessment.18

The results of the study indicated much nonuniformity in assessment, both within and among the individual counties. The range of the average ratio by counties extended from a

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16Ibid., p. 270.
18Ibid., pp. 183-186.
low of 13.3 percent to 38.5 percent, which also indicated the existence of much underassessment. A further result of the study which was available to the public was that property taxpayers were finally in possession of the facts concerning the levels of assessment and the degree of discrimination; thus were assisted in correcting the greater inequalities discovered.  

Data for an assessment ratio study in Hawaii were taken from a survey conducted by the Public Administration Service in 1958 entitled Real Property Assessment in Hawaii, A Survey Report.  

The mean ratios for Hawaii's 4 counties were found to be within a few percentage points of each other at a level just under 50 percent. Hawaii is one of the few states that does not require full value assessments; however, the average level should legally have been around 70 percent. Therefore, some degree of underassessment was evident. A significant amount of nonuniformity within each county was indicated by a low average relative deviation of 21.6 percent for Honolulu County and a high of 52.5 percent for Kauai County.  

19 Ibid., pp. 186-188.
21 Ibid., pp. 65-68.
Studies undertaken in other states have indicated that nonuniformity of assessments and underassessment of real property appear to be widespread throughout the United States. For example, in New Jersey where property was to be assessed at full value in 1956, the average assessment ratio was 28.9 percent and 80 percent of the taxing districts assessed real property at an average ratio of less than 25 percent of market value. In the same year in Kansas every one of that state's 105 counties violated the requirement of "100 percent of true value" assessments. The high county average was 49 percent and the low was 12 percent. In addition, it was again found that low valued property was generally assessed at a higher rate than urban real estate. And in California, where in 1955 the State Board of Equalization equalized property assessments at 25 percent of market value rather than attempting to raise the current assessment level, a sample of 1960-1962 residential property sales showed a median ratio of 20.8 percent with an average relative deviation of 25 percent. The low county median ratio was 10.0 percent and the


high county's was 26.7 percent.\textsuperscript{24}

A nationwide assessment to sales ratio study conducted by the United States Census Bureau and published in 1962 further substantiates the inequalities in property taxation.\textsuperscript{25}

This study utilized a questionnaire technique to determine selling prices of a sample consisting of 119,000 recently transferred pieces of real estate throughout the United States. The questionnaire was mailed to a stratified random sample of purchasers of real estate in each of 1,356 selected areas, which included about three-fourths of the total population of the United States at that time.\textsuperscript{26}

Additional information gained from the questionnaire included the amount of any existing or new mortgage, the type and use of the real estate sold, the value and nature of any personal property included in the transaction, and whether or not the transfer could be considered a \textit{bona fide} sale.\textsuperscript{27}

\begin{itemize}
\item \textsuperscript{24}California, Legislature, Senate Fact Finding Committee on Revenue and Taxation, \textit{Property Taxes and Other Local Revenue Sources}, Part 9 (Sacramento, March, 1965), pp. 39-40.
\item \textsuperscript{26}Ibid., pp. 12-15. Within Montana the total sample consisted of 3,893 transfers, of which 2,245 were non-farm residential (p. 1).
\item \textsuperscript{27}Ibid., p. 21. The use of the mailed questionnaire as a source of data for assessment ratio studies has not been widespread to date. At least one state, however, in attempting to keep assessments correct and up to date, sends a questionnaire to the grantor or grantee in all real property sales. The questionnaire endeavors to (1) verify
\end{itemize}
assessed values were obtained from the local tax rolls in each of the 1,356 areas sampled.

Although nearly all states by law require full value assessments, the results of this study demonstrated the extensive amount of underassessment prevalent throughout the United States for all types of real property. For example, the United States size-weighted average assessment ratio\(^{28}\) for non-farm residential properties amounted to 31.9 percent. The average ratios for six states were 50.0 percent or higher, and the highest of these was Rhode Island with a ratio of 65.8 percent. The lowest average ratio for non-farm residences was found to be 5.6 percent in South Carolina, which was one of 21 states whose average ratios were less than 25.0 percent of market value.\(^{29}\)

Generally, the average ratios for other types of property (commercial and industrial, vacant lots, farms and vacant

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\(^{28}\) The "size-weighted average" was constructed to eliminate the effect of differences in rates of turnover of various value classes of real estate. Generally it was one or two percentage points lower than the "simple sales based average," which was simply the total assessed value of the sold properties divided by the aggregate of their sales prices. U.S. Census Bureau, op. cit., p. 10.

\(^{29}\) U.S. Census Bureau, op. cit., Table 8, p. 40. Newly constructed housing is excluded.
acreage) were even lower than those for non-farm residential property.

Before proceeding to the studies concerning property tax burden distribution it may be pointed out that most states have at least recognized the inequalities of property taxation (both real and personal), and various recommendations have been made with varying degrees of success. For example, in Montana the 1957 Reclassification law directed reclassification of all taxable lands in the state and reappraisal of all taxable city and town lots and improvements thereon. As early as 1959 the Montana Legislative Council recommended the passage of a "realty certificate act" to provide accurate data for a continuous assessment-sales ratio study to be used to assist local assessors as well as to obtain inter-county equalization.


32 Montana Legislative Council, Property Taxation in Montana, op. cit. Also see the Montana section in Advisory Commission on Inter-governmental Relations, op. cit., Vol. II.
II. STUDIES OF PROPERTY TAX BURDEN DISTRIBUTION

Previous research concerning distribution of the property tax burden has generally employed the relationship between an individual's ability-to-pay and his tax liability as the basis for determining the burden distribution of the tax. Various assumptions have been made concerning the amount of a tax which may be shifted. However, as stated in the introduction, it is generally accepted that individual householders are unable to shift property taxes. 33

The two measurements most frequently used in previous studies of tax burden distribution are per-capita taxes and taxes as percentages of personal income. Per-capita taxes do not measure an individual's ability-to-pay, but rather indicate the comparative revenue yield of various tax systems. 34 For the purposes of the present analysis, simple per-capita tax payments are meaningful only after being converted into tax payments as proportions of income.

One of the earliest and better known studies of

33 A portion of the property tax liability may be shifted to the federal government because of the deductibility of property taxes from the federal personal income tax. This partial shift would hold true only for those taxpayers who itemize deductions, of course.

comparative tax burdens was published in 1951.\textsuperscript{35} The scope of the study encompassed the entire United States and the principal data sources were a series of consumer budget studies by the United States Department of Labor and the 1949 Survey of Consumer Finances prepared by the Survey Research Center at the University of Michigan.

The portion of the study concerned with property taxes assumed that the tax on land and improvements was ultimately borne by the property owner of owner-occupied housing.\textsuperscript{36} Taxpayers were stratified into seven net income brackets and their property tax payments as a percentage of income were averaged for each bracket. Musgrave found the property tax was regressive over the entire scale, especially at the bottom level. Individuals in the lowest income bracket (less than $1,000) paid an average of 5.4 percent of their incomes for property taxes while the average property tax liability in the highest income bracket ($7,500 and over) amounted to 2.7 percent of income. The

\begin{itemize}
\item[\textsuperscript{36}] \textit{Ibid.}, p. 22. The money burden of taxes on any particular taxpayer was defined as the difference between his actual money income net of taxes and the money income he would receive in the absence of taxes. \textit{Ibid.}, pp. 3-4.
\end{itemize}
average for all brackets was 3.1 percent.\(^{37}\)

A later study which compared the burden distributions of various taxes implemented data from the United States Department of Commerce's *Survey of Current Business* for April and July, 1959.\(^{38}\) Again, after stratification of taxpayers by income group, the property tax as a proportion of income was found to be highest for the lowest income group and lowest for the highest income group. Property taxes amounted to 5.9 percent of the incomes of those persons earning less than $2,000, and 2.1 percent of the incomes of persons earning in excess of $15,000.\(^{39}\)

A study which was limited to measuring the effective rate of taxation on urban families of the same size also indicates that state and local property taxes are slightly regressive.\(^{40}\) The author stated the reasons for limiting the study to urban four-person families were to eliminate the effect of including those persons such as farmers whose

\(^{37}\)Ibid., table 11, p. 36. The income brackets were obtained directly from the 1949 *Survey of Consumer Finances*.

In this as well as the other studies considered, only an average tax liability as a percentage of income was provided. No measures of dispersion around the average for any single income group were stated. Therefore there is no method by which the reader may determine if the average given is typical for any bracket.


\(^{39}\)Ibid., table III, p. 50; 52-55.

methods of receiving and spending income varied considerably
from the majority of taxpayers, and also to eliminate dis-
tortions which may have arisen from the fact that various
income classes contain differing proportions of single indi-
viduals and various sizes of families. ¹¹

Data for the study were obtained from the United
States Department of Commerce's State Government Finances in
1959, Summary of Government Finances in 1959, and Survey of
Current Business. The results were presented in per-capita
tax payments only and two measures of family income--
available and gross--were stated for each bracket. ¹² Available
income was the measure used in each bracket to calculate
the tax payment as a proportion of family income. For the
lowest income bracket, which had a midpoint of $2,872 of
available income, the property and severance tax payment
averaged 6.8 percent of income. ¹³ The percent gradually
declines with each step up the income scale, and the highest
income bracket with a midpoint of $35,079 exhibits an average
tax liability of 3.3 percent of available income. If gross

¹¹Ibid., pp. 14-16.

¹²Ibid., table I, p. 15. Available income was
defined on p. 16 as consisting of gross income less federal
personal income taxes less the employee's share of federal
employment taxes plus the stockholder's share of state
corporate income taxes.

¹³Property and severance taxes were not separated
and the author believes that if they were, the property tax
would probably be shown to be less regressive than when in-
cluded with severance taxes. Ibid., p. 15.
income were used in the calculations, the tax rate would have appeared to be much more regressive, because of the progressiveness of the federal personal income tax.

Analyses of property tax burden distribution have also been carried out on a statewide or local basis. One such local study was completed for 1958 for the city of Wichita, Kansas, which had a population of 250,000 at that time. Data were gathered locally by drawing a sample consisting of every hundredth residential property listed on the assessment rolls. After excluding those which were not owner-occupied the total sample amounted to 396 pieces of property. Assessed values of personal property of each owner-occupant were then added, and income information was obtained from personal income tax returns. It was assumed that the taxpayer bore the ultimate incidence of the tax, and once again the results indicated the property tax to be regressive, especially at the lower levels of income. The tax rate on owner-occupied real estate was regressive over the entire income scale, whereas the personal property tax appeared to be roughly proportional for all income levels above the two lowest. In addition to the actual tax

\[44\text{Jack E. Robertson, "Comparative Tax Burdens for a Midwestern City," National Tax Journal, XV (September, 1962), 308-313.}\]

\[45\text{Ibid., pp. 308-309. It was not stated whether incomes were gross or net.}\]

\[46\text{Ibid., table II, p. 311.}\]
rates, an index of regressivity was calculated which showed the residential tax rate in the highest income bracket of over $10,000 to be just 16 percent of the rate which existed in the lowest bracket of under $2,000 income. At the second lowest income level ($2,000-$3,000), the rate was 52 percent of that for the lowest income bracket.

On a statewide basis, a recent study of personal property tax incidence was completed for Minnesota which has a property classification system similar to that in Montana. Data for the study were obtained from a more comprehensive study of Minnesota taxation done by a governor's committee in 1962. The author made various assumptions concerning shifting of the tax for the different classes of personal property. For household goods (the class with which we are most concerned), it was assumed that the owner was unable to shift the burden except for a very small portion to the federal government in the form of a personal income tax deduction.

The author discovered that not only was the Minnesota personal property tax regressive, but also was not uniform

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50 Hady, op. cit., pp. 369-372.
on individuals with equal incomes—primarily because of the classification system and the differing degree of shiftability of the tax on different types of personal property.\textsuperscript{51} In California a recent study shows the real property tax to be regressive in that state also.\textsuperscript{52} The results were based on an annual sample of property values taken by the California State Board of Equalization for purposes of intercounty equalization. The sample selected amounted to 3,900 owner-occupied residences over a three-year period. The measure of income employed was adjusted gross income as derived from California state income tax returns.\textsuperscript{53} Within the sample studied, the average effective rate of real property taxation amounted to 9.0 percent for a family having an income of $2,000 per year, and the average rate for a family with $10,000 income was 3.1 percent. Rostvold also stated that a family with a $4,000 income pays $23 per year more property tax, on the average, than a family earning

\textsuperscript{51}Ibid., p. 384; table IV, p. 377.


\textsuperscript{53}California Senate Fact Finding Committee, op. cit., Chap. VI, p. 71; and Rostvold, op. cit., p. 38.
$5,000 per annum.\textsuperscript{54}

Lastly, a recent study of the tax system in the state of Michigan found the property tax to be regressive upon a sample of 827 Lansing homeowners in 1955. Those families with net incomes of under $2,000 paid an average of 8.8 percent of their incomes for property taxes, while those netting over $10,000 paid just 2.1 percent of their earnings for property taxes.\textsuperscript{55}

The preceding studies have indicated that property taxation generally exhibits a regressive relationship to a taxpayer's ability-to-pay. In every case the tax was found to be regressive to some degree, even though various measures of family income were employed by the different researchers. It appears that those taxpayers who can least afford it pay proportionately more property taxes, on the average, than those families with proportionately higher incomes.

\textsuperscript{54}Rostvold, \textit{op. cit.}, p. 39. Again it may be pointed out that the stated averages may not be typical. See footnote 37, p. 22 of the present analysis.

\textsuperscript{55}Michigan, Legislative Committee, \textit{op. cit.}, Chap. 5, p. 187. It was not stated how the sample was obtained.
CHAPTER II

METHODOLOGY OF ASSESSMENT TO
SALES RATIO STUDY

A. Scope

Many assessment ratio studies have been completed in recent years utilizing various methodologies and statistical procedures. Regardless of the type of statistical process employed in arriving at an average level of assessments and the degree of uniformity of assessments, a prime requisite is a relatively accessible source of data containing consistently accurate information—especially concerning sales prices of transferred properties.

The traditional source of data has been deeds filed in local governmental offices. Sales prices have been estimated from federal revenue stamps affixed to the deeds. The amount of revenue stamps attached to a deed is supposed to be net of any assumed or new mortgage. Thus, a possible source of error in estimating sales value from the stamps may be insufficient or misleading information concerning a mortgage stated on the deed. A second possible source of error is the fact that an excessive amount of revenue stamps may be affixed with the intent of overstating the value of the property for future resale purposes.
Another frequently used data source has been the mailed questionnaire. The 1962 Census of Governments completed by the United States Bureau of the Census utilized this technique for a recent assessment ratio study.\(^1\) One limitation of the mailed questionnaire is the generally low response rate which may bias the sample.\(^2\) A possible source of error is that the respondent may understate or overstate the price paid for the property for any number of reasons. Other possible sources of data include capital gains information on personal income tax returns and real estate sales contracts when available to the researcher. Regardless of the data source employed, if sales prices are not accurate the mean assessment ratio will be biased either up or down, depending upon whether sales prices are understated or overstated. The amount of dispersion about the mean ratio is likely to be increased by inaccurate selling prices, thus exaggerating the indicated degree of nonuniformity of assessments.

A second requirement, if a general increase in the real property tax rate within a district has occurred during

\(^1\)U.S. Census Bureau, *op. cit.*

\(^2\)William J. Goode and Paul K. Hatt, *Methods in Social Research* (New York: McGraw-Hill Book Co., Inc., 1952), pp. 17-183. According to these authors, the mailed questionnaire technique is biased toward those who are interested in the subject, higher in socioeconomic status, and those who have had more education; but the actual degree of such bias is unknown.
the period of property transfers being analyzed, is to determine the degree of capitalization of the increase which may have taken place. This requirement is necessary because of the possible bias which may result in the mean assessment ratio as a consequence of capitalization of tax changes. If capitalization occurs, the general price level of properties sold after the tax increase will be lower than it would have been in the absence of such an increase. The mean assessment to sales ratio would be higher than it was before the increase, and the mean ratio for the entire period will contain an upward bias. In addition, the degree of nonuniformity of assessments may again appear to be increased because the degree of capitalization may well vary significantly among various sold properties.

Finally, if the property transfers studied cover a relatively long time period, it is necessary to determine whether or not property values changed within the area analyzed during the period studied. Current assessment figures must be used if an assessment-sales ratio study is to be valid. However, current assessments may lag by several years. Because of the fact that real estate values may change more rapidly than it is possible to reappraise property within a taxing district, the average assessment ratio at the end of the time period may differ significantly from that at the beginning. If property values have generally risen during the period studied, the mean assessment
ratio will tend to decline. On the other hand, if real estate prices have steadily gone down since the beginning of the period analyzed, the mean ratio will be greater at the end of the entire period than it was at the beginning. Although the mean ratio for each shorter period within the longer period will be accurate for that specific shorter period of time, the mean ratio for the entire time period studied may be biased by a change in property values throughout the period. Furthermore, the ratio changes due to price level increases will add to the over-all variance in the ratios. But this portion of the variance does not indicate assessment inequities among various parcels of property as the remainder of the variance does. In order to arrive at a mean assessment ratio which reflects the value of property at the time the assessments were made, it is thus necessary to adjust for price changes the sales prices of properties sold at different periods within the longer time period to arrive at an average ratio in constant dollar terms.

B. Purpose

In the present study, alternate data sources were utilized to obtain the necessary information concerning the properties transferred. The transactions chosen for the sample covered a period of 22 months, during which time a general change in assessed valuations was imposed with the result that most real estate tax liabilities increased.
Therefore, it was necessary to determine if capitalization of the tax increase had occurred and to determine if property values had generally changed during the period.

It is the purpose of this chapter to present (1) the results of comparisons of alternate data sources, (2) a method by which to determine the amount of any capitalization which may have occurred since a tax rate increase, and (3) a method to determine if property values have changed during the time period studied and, if so, to adjust the average assessment ratio accordingly.

1. Comparison of Alternate Data Sources

The principal reason for employing various sources of data in this study was to obtain consistently accurate sales prices of the properties transferred. In addition, it was desired to use the most readily accessible source which contained all of the necessary information concerning each property, including the selling price, legal description, use and type, date of sale, and mortgage information. The sources found most suitable for this study would then be suggested for use in future sales-ratio studies.

The different data sources compared in this study consisted of warranty deeds on file at the local county clerk's office, real estate sales contracts filed with the

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3The assessed valuations were also necessary, of course, and were in every case obtained from the current assessment rolls on file at the local county courthouse.
Missoula Multiple Listing Bureau, questionnaires mailed by buyers (and sellers whenever possible) of recently transferred property, and capital gains information from 1964 Montana individual income tax returns.

Table 1 presents the mean assessment-sales ratio and measures of dispersion found for each data source.

<table>
<thead>
<tr>
<th>Source</th>
<th>No. of Properties</th>
<th>Average Assess. Ratio</th>
<th>Standard Deviation</th>
<th>Coefficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Listing Bureau contracts</td>
<td>68</td>
<td>36.3%</td>
<td>7.6</td>
<td>20.9%</td>
</tr>
<tr>
<td>Questionnaires</td>
<td>41</td>
<td>34.3</td>
<td>7.5</td>
<td>21.9</td>
</tr>
<tr>
<td>State income tax returns</td>
<td>40</td>
<td>35.3</td>
<td>8.2</td>
<td>23.2</td>
</tr>
<tr>
<td>Fed. rev. stamps</td>
<td>53</td>
<td>39.6</td>
<td>24.7</td>
<td>62.3</td>
</tr>
</tbody>
</table>

The Multiple Listing Bureau is a realtor's clearing house for residential property in the Missoula area. Most local real estate firms are members of the Bureau and submit new listings to it. In turn, any member firm may sell any property listed whether or not it was the original contributor of the property sold.

In Montana, the assessed value for residences is presently set at 40 percent of the appraised value. Ideally, then, the mean assessment ratio would be 40 percent.
The comparisons were made for sales closed during the period from June, 1964 through December, 1964, and are for residential property only, mainly because of the relatively large number of sales for this class of real estate. Between any two sources listed in Table 1, there were a number of sales collected from one which also were obtained from the other; but data for only six transactions were procured from all four sources of information. Comparisons of data obtained from two or more sources are made subsequently.

A statistical analysis of variance was performed for the mean ratios in Table 1, and the differences between them were found to be insignificant at the 95 percent confidence interval. Note, however, the great degree of dispersion discovered for the revenue stamps, which indicates a much greater amount of nonuniformity of assessments than actually existed. The reason for the apparently greater inequity found when revenue stamps were employed as a source of data was that although the stamps were probably applied net of any mortgage, in a number of cases there was no way to determine this fact from the tax stamps alone, since the mortgage information was not stated on the deed. (By checking the real estate sales contract, if the sale was transacted through the Multiple Listing Bureau, it could be determined if any mortgage existed and its amount.) Assuming that the tax stamps were applied net of any mortgage, if deeds were used which stated no information regarding the'
existence of a mortgage but one did, in fact, exist, the mean ratio would have been biased upward. It may have been possible to exclude those ratios that appeared to be excessive, but if tax stamps were the only source of sales prices, this procedure would also have had the effect of biasing the sample by the exclusion of some ratios which, although appearing to be exhorbitant, may have actually been quite accurate. Thus, federal revenue stamps were found to be an inaccurate source of sales prices when used as the single source of data.

Capital gains data from Montana state individual income tax returns proved to be a relatively accurate source of real estate sales prices. However, useable data could be obtained for only 24 percent of the 170 sales investigated by this method. The sellers of the remaining 130 parcels of property reported no sales on their returns, did not describe the property sold, or failed to list some other necessary item of information. Therefore, less than one-fourth of the original property transfers obtained from deeds were useable. Of these 40 useable sales, 24 ratios were identical to those obtained from real estate contracts and 38 varied by less than five percentage points. In addition to the small percentage of useable data available from this source, a further disadvantage of this method is the time lag of about a year after the sale before this information is available.
The mailed questionnaire technique proved to be an accurate source of selling prices. Again, however, the original sample size was substantially reduced because of the response rate to the questionnaire. Out of a total of 138 questionnaires sent to recent grantors and grantees of 93 residential properties, 61—or 44 percent—were completed and returned after both a follow-up telephone call and questionnaire to those persons not responding initially. With respect to properties rather than individuals, the response rate was increased to 66 percent. Although the response was somewhat greater than that generally received from the mailed questionnaire technique, the original sample size was considerably reduced by the number of non-respondents. Thus, if questionnaires were the only method used to gather data, a substantially larger original sample of property transfers would have been needed. The sales prices stated on the questionnaires were further determined to be accurate by comparing them with those sales prices

6See Appendix B for a facsimile of the actual questionnaire used. The form of the questionnaire was a condensed version similar to that used by the Census Bureau for the 1962 Census of Governments. For a facsimile of the questionnaire used by the Census Bureau see U.S. Census Bureau, op. cit., pp. 20-21.

7A sample of buyers and sellers of commercial and rural property were also sent questionnaires, and the total response rate for both property types taken together was somewhat lower: 34 percent by individual and 42 percent by property. Both questionnaire samples were further reduced by responses which for one reason or another were not useable.
which could be obtained from real estate sales contracts for the identical property transfers.

The most accurate and accessible source of data was found to be the real estate sales contracts on file at the Multiple Listing Bureau. The principal reason for this was that the actual selling price of the property and the exact date of the sale\(^8\) were stated, plus a specific listing of any personal property included in the transaction. In addition, the contracts stated whether or not a mortgage existed on the property, and if so the amount was given. (This mortgage information formed the basis for determining the accuracy of the federal revenue stamps attached to deeds.) The use of the sales contracts also virtually eliminated the necessity for determining whether a property transfer was, in fact, a *bona fide* sale. Because the sale was made through a third party it was assumed that the sales price always represented the full market value of the property.\(^9\)

The only significant disadvantage found was the fact that data were almost completely limited to residences.

\(^8\)During the course of the study, it was found in many cases that neither the date the deed was recorded nor the date it was written represented even an approximation of the date on which the actual sale was made.

\(^9\)The asking price was also stated, and the difference between it and the actual selling price generally amounted to a few hundred dollars if any existed at all.
As a result, sole use of this data source would have excluded analysis of the assessments of other types of property.

2. Capitalization

The property transfers studied took place from June, 1964 through March, 1966. A general increase in assessed valuation of real estate was effective beginning in 1965. The 1965 tax notices were sent out in November, 1965. Therefore, any capitalization which may have taken place would have occurred in property sales after that date. If capitalization had occurred it would be expected that those properties whose assessments increased relatively more would be worth relatively less, and vice versa. The assessment ratios for those properties worth relatively less would be higher than they would have been in the absence of the tax increase, and the ratios for those worth relatively more would be lower. This occurrence may well have the effect of exaggerating the amount of nonuniformity of assessments throughout the entire time period involved unless the degree of capitalization is determined and adjustments are made for it. Also, as stated previously, the mean ratio may contain an upward bias if adjustments for capitalization are not made. If capitalization occurs and adjustments are made, then the mean ratio and the dispersion around it after the tax increase will be in identical terms to the
mean ratio which existed prior to the increase, and the over-all ratio will then be free from bias due to any capitalization.

The general experimental design employed in attempting to arrive at a measure of capitalization was a linear regression analysis to determine the amount of short run capitalization which may have occurred. The independent variable \((X)\) was defined as the change in taxes of each property from 1964 to 1965. The dependent variable \((Y)\) was the change in market value of each property over the same period. Thus, the change in market value of a property was made a function of the change in the property tax liability. The sample was limited to 23 residential properties because only those properties sold since receipt of the changed tax notices which appeared on the 1964 assessment rolls under the same description as they appeared on the current 1965 rolls could be used in order to determine the change in assessed values and thus tax liabilities. At the time of the study (early 1966) few such transactions had been made. A further factor limiting the sample size is that only dwellings within the city limits were used so that the same mill levy would be applicable to all property.

The change (in every case an increase) in taxes was arrived at by multiplying the 1965 assessed value of a property by a percentage of 30 percent, as provided by Montana's property classification law, and then multiplying
the result obtained by the 1965 mill levy. The 1964 tax liability ($T_0$) was then subtracted from the 1965 tax liability ($T_1$). In order to arrive at a change in market value of each property due to capitalization when only the actual selling price was known, it was necessary to arrive at a predicted sales price which would prevail under certain assumptions if the average amount of tax increase were capitalized in the price of the property in question. If capitalization occurred, the market price would be lower than the predicted price if taxes on a piece of property went up more than the average, and more than the predicted price if taxes increased less than the average. The difference between the predicted and actual price for a unit of property provides a measure of the amount of capitalization, assuming that all assessed valuations were uniform.

Then, a mean 1965 assessment-sales ratio was calculated for the total sample of 23 residences. Each 1965 assessed value was then divided by the mean ratio, resulting in the sales price which would be predicted if tax increased by the average amount and the assessed value was accurate. This predicted sales price ($S_p$) was then subtracted from the actual selling price ($S_i$). The regression equation was then solved for 'a' and 'b', resulting in a portion of the tax increase could, of course, be due to an increase in the mill levy. However, for the area covered by the present study, the 1965 mill levy was nearly 13 mills less than the 1964 levy.
slope of \(-12.2X\) with a positive intercept of \$1,243. This slope of 12.2 is the one best estimate of the capitalization multiple. The regression coefficient amounted \(-.262\), which was not significant at the 95 percent confidence level.\(\text{\textsuperscript{11}}\) Thus, no short run capitalization was demonstrated by the results. Nevertheless, if a larger sample had been available and similar results obtained, the regression coefficient might have been statistically significant.

3. Changes in Market Value

The 326 sales of residential single-family dwellings analyzed took place from June, 1964, through March, 1966. A mean assessment ratio was computed for each of four time periods within the longer 22-month period. A consistent decline in the mean assessment ratio was discovered over the entire period. The difference between the ratio at the beginning of the period (35.5 percent) and that at the end (32.5 percent) was tested and found to be statistically significant at the 95 percent confidence level. Only current 1965 assessment figures were used in these ratios, so this decline was attributed to a steady rise in the price of residential property. Because no capitalization of the general tax increase was discovered, it was assumed that property values changed at the same rate as before the increase. During the period studied,\(\text{\textsuperscript{11}}\) See Appendix C for a mathematical description of the analysis.
real estate prices rose about nine percent, or about five percent per year. Assuming that property values increased more or less consistently throughout the entire geographical area of the sample, the average ratio for each shorter time period was adjusted to put it into constant 1964 dollar terms. This adjustment was accomplished simply by leaving the mean ratio unchanged for period (1), increasing that for period (2) by 2.5 percent, that for period (3) by 5.0 percent, and that for period (4) by 7.5 percent;\(^\text{12}\) using the increase in market value of 5 percent per year as a base.

If an assessment ratio study covers a relatively long period of time during which a general tax increase occurs, then it is necessary to check for both capitalization and price changes. If it is discovered that the increase has been partially or completely capitalized, then the mean assessment ratio for the entire period would be biased by the decline in real estate prices due to the capitalization, unless the amount of capitalization is added to the sales prices of properties transferred since the tax increase.

\(^{12}\)See Table 2, Chapter III of this study for the mean ratio for each time period before and after price change adjustments were made.
CHAPTER III

ANALYSIS

I. ASSESSMENT TO SALES RATIO STUDY

A. Purpose and Scope

Montana law states, "All taxable property must be assessed at its full cash value."¹ A distinction must be made here between "assessed value" and "appraised value." It is the appraised value which in theory represents the "full cash value," or market value. In the past, the general level of assessed valuations as a percentage of market values differed from county to county within the state. In an attempt to equalize intercounty assessments, the State Board of Equalization recently arrived at an assessed value fixed at 40 percent of appraised value for real estate, to be adhered to statewide by each county assessor.

It is the purpose of this study to determine the average level of assessments or appraisals, and the degree of uniformity of assessments or appraisals—primarily within Missoula County. Additional data is later incorporated

¹Revised Codes of Montana 1947, op. cit., Sec. 84-201. Full cash value is defined in Sec. 84-101 as "the amount at which the property would be taken in payment of a just debt due from a solvent debtor."
into the study for Flathead, and Lewis and Clark Counties, primarily for comparing intercounty uniformity among the three counties studied. The method employed to accomplish the stated objectives is to compare the actual market price of various types of recently transferred real estate with the current assessed valuations.

The principal emphasis in this project is upon single-family residential dwellings situated within the greater Missoula area. The reasons for this emphasis are as follows:

1. Available resources were limited and Missoula County data were most readily accessible.

2. The majority of the transfers during the time period considered were single-family residences within the metropolitan Missoula area.

3. This class of property is an important component of total real estate subject to taxation.

Commercial or industrial property, vacant commercial or industrial sites, and rural property are also considered. However, due to the relatively small amount of data available (principally verified selling prices) for these types of property, the analysis is less complete and the results obtained have a lesser degree of reliability.
1. Missoula County
   
a. Collection of data.—The random sample of property transfers considered in this study took place during a 22-month period from June 1964 through March 1966. Several data gathering methods which have been described in Chapter II were employed in an attempt to determine the actual selling price of the properties involved. The reader will remember that these included an examination of real estate contracts at the Missoula Multiple Listing Bureau, questionnaires mailed to grantees and grantors whose names were obtained from deeds on file at the county courthouse, and collection of capital gains information (for 1964 sales only) from Montana state income tax returns. Federal revenue stamps attached to deeds at the Missoula County Courthouse were considered as a data source, but were found to be inaccurate in many cases and hence were not used in this study.

   The legal description of the property and the date of sale were obtained from either the real estate contract or the deed. When the date was taken from the deed, the date of the instrument was used rather than the date the deed was recorded. The assessed valuations were obtained from the 1965 assessment rolls for Missoula County. Other information gathered from one or another of the above sources included the type or use of each property, the age (for single-family residences when available), the type of
transfer, and whether a reasonable market price was paid for the property. Every effort was made to exclude those transactions in which the market value obviously differed from the actual price paid, i.e., transfers between relatives, corporate affiliates, re-organization deeds, and so forth.

b. Analysis.

(1) Residential property.--The sample of residential property consists of 326 useable sales for single-family dwellings, and eight useable sales of multi-family dwellings. The sales represent four different time periods within the longer 22-month period. Table 2 presents the average assessment to sales ratios for residential single-family dwellings. After making the price change adjustments by the method described in Chapter II, the mean weighted adjusted assessment-sales ratio was calculated. The mean ratio of 35.1 percent had a standard deviation (SD) of 6.44. The standard error of the mean (SEM) was 0.36, and the coefficient of variation (V) amounted to 18.3 percent. This amount of variance indicates some non-uniformity among assessments. The actual degree of non-uniformity is brought out in the conclusions of this portion of the study which follow. The range of the assessment-sales ratios in the sample of single-family residences extended

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2See page 42 of this analysis.
from a low of 15.2 percent to a high of 65.7 percent.
 Converted to appraisal-sales ratios, the range is from
38.0 percent to 164.3 percent.

**TABLE 2**

**ASSESSMENT TO SALES RATIOS FOR ONE-FAMILY RESIDENTIAL PROPERTY, GREATER MISSOULA AREA**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Number of Sales</th>
<th>Average Assessment to Sales Ratio</th>
<th>Adjusted Average Assess-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>June-Dec. 1964 (1)</td>
<td>138</td>
<td>35.5%</td>
<td>35.5%</td>
</tr>
<tr>
<td>Jan.-May 1965 (2)</td>
<td>86</td>
<td>33.4%</td>
<td>34.2</td>
</tr>
<tr>
<td>June-Dec. 1965 (3)</td>
<td>67</td>
<td>33.5%</td>
<td>35.2</td>
</tr>
<tr>
<td>Jan.-May 1966 (4)</td>
<td>35</td>
<td>32.5%</td>
<td>34.9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>326</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Weighted Average = 34.2.\(^a\) Weighted Adjusted Average = 35.1
Weighted Adjusted Average Appraisal to Sales Ratio = 87.6\(^b\)

\(^a\)The weighted average reflects the differing number of sales in each time period.

\(^b\)Multiplying the assessment ratio by 2.5 results in the appraisal ratio.

The residential sales were further broken down into various classes by type, age, value, and area to discover if there was a significant difference in the average assessment or appraisal ratios among the different classes. Table 3 presents the data for comparisons of residential single- and
TABLE 3
THE AVERAGE ASSESSMENT AND APPRAISAL RATIOS, MEASURES OF DISPERSION AND RELIABILITY, FOR RESIDENTIAL MULTI- AND SINGLE-FAMILY DWELLINGS

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of Sales</th>
<th>Average Assess. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>Average Apprais. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Family</td>
<td>326</td>
<td>35.1%</td>
<td>6.44</td>
<td>0.36</td>
<td>87.6%</td>
<td>16.10</td>
<td>0.90</td>
<td>18.3%</td>
</tr>
<tr>
<td>Multi-Family</td>
<td>8</td>
<td>37.3</td>
<td>6.85</td>
<td>2.59</td>
<td>93.3</td>
<td>17.13</td>
<td>6.48</td>
<td>18.4</td>
</tr>
</tbody>
</table>

Weighted Average = 35.2. Weighted Average = 88.0.
multi-family dwellings.

The average assessment-sales ratios of 35.1 percent for single-family and 37.3 percent for multi-family dwellings were tested, and it was determined that no statistically significant difference existed between their average assessment levels.

For purposes of determining whether any difference existed between assessed valuations of newer and relatively older residences, properties whose ages were known were separated into two classes, one consisting of homes less than 15 years old (excluding new construction), and the other consisting of those 15 years of age and older as illustrated in Table 4. The actual difference of 2.1 percentage points between the average assessment ratios was tested and found not to be statistically significant.  

Table 5 indicates the mean assessment to sales, and appraisal to sales ratios for the entire sample of single-family dwellings stratified into five classes of property values.

When subjected to a statistical analysis of variance using Tukey's Omega Procedure, no significant differences were found at either the 95 or 99 percent level among

3 Only the average ratio for the entire sample of single-family residences is adjusted for price changes over time. All other ratios are weighted arithmetical averages.
<table>
<thead>
<tr>
<th>Age</th>
<th>No. of Sales</th>
<th>Average Assess. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>Average Apprais. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15 years</td>
<td>56</td>
<td>34.3%</td>
<td>5.54</td>
<td>0.74</td>
<td>85.8%</td>
<td>13.85</td>
<td>1.85</td>
<td>16.2%</td>
</tr>
<tr>
<td>15 years and older</td>
<td>33</td>
<td>32.2</td>
<td>5.49</td>
<td>0.95</td>
<td>80.5</td>
<td>13.73</td>
<td>2.38</td>
<td>17.0</td>
</tr>
</tbody>
</table>
### TABLE 5

**THE AVERAGE ASSESSMENT AND APPRAISAL RATIOS BY VALUE CLASS**

<table>
<thead>
<tr>
<th>Verified Sales Price</th>
<th>No. of Sales</th>
<th>Average Assess. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>Average Apprais. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $10,000</td>
<td>41</td>
<td>35.2%</td>
<td>7.94</td>
<td>1.24</td>
<td>88.0%</td>
<td>19.85</td>
<td>3.10</td>
<td>22.6%</td>
</tr>
<tr>
<td>$10,000-$14,999</td>
<td>80</td>
<td>32.8</td>
<td>6.60</td>
<td>0.73</td>
<td>82.0</td>
<td>16.50</td>
<td>1.83</td>
<td>20.1</td>
</tr>
<tr>
<td>$15,000-$19,999</td>
<td>128</td>
<td>35.3</td>
<td>4.78</td>
<td>0.42</td>
<td>88.3</td>
<td>11.95</td>
<td>1.05</td>
<td>13.5</td>
</tr>
<tr>
<td>$20,000-$24,999</td>
<td>44</td>
<td>34.5</td>
<td>7.59</td>
<td>1.14</td>
<td>86.3</td>
<td>18.98</td>
<td>2.85</td>
<td>22.0</td>
</tr>
<tr>
<td>$25,000 and up</td>
<td>33</td>
<td>32.5</td>
<td>8.77</td>
<td>1.52</td>
<td>81.3</td>
<td>21.93</td>
<td>3.80</td>
<td>27.0</td>
</tr>
</tbody>
</table>
the various assessment ratios in Table 5. The smallest standard deviation of 4.78 for the middle group of from $15,000-$19,999 valued residences was compared to the next smallest of 6.60 for those residences in the $10,000-$14,999 range, and a significant difference was obtained. The above results indicate that even though the average level of assessment is about the same for each value category, there appears to be a somewhat greater degree of uniformity of appraisals in the middle price range than in either the relatively lower or higher value classes.

Finally, single-family residences were classified according to area to determine if any significant difference existed among appraisals in one area as compared to another. Table 6 is a summary of the results obtained. The differences among the mean assessment ratios in Table 6 were determined to be insignificant after application of Tukey's procedure. In order to have been significant even at the 95 percent confidence interval, a difference of 4.0 percentage points was necessary. The greatest difference indicated in Table 6 is 2.6 percentage points. Again, however, a significant difference was found between the standard deviation of 4.54 and the next larger deviation of 7.81 indicating more assessment uniformity in an area consisting

---

# TABLE 6

THE AVERAGE ASSESSMENT AND APPRAISAL RATIOS BY AREA

<table>
<thead>
<tr>
<th>Area</th>
<th>No. of Sales</th>
<th>Average Assess. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>Average Apprais. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older rel. Low Value</td>
<td>25</td>
<td>36.3%</td>
<td>7.94</td>
<td>1.62</td>
<td>90.8%</td>
<td>19.85</td>
<td>4.05</td>
<td>21.9%</td>
</tr>
<tr>
<td>Older, rel. High Value</td>
<td>22</td>
<td>33.7%</td>
<td>7.81</td>
<td>1.70</td>
<td>84.3</td>
<td>19.53</td>
<td>4.25</td>
<td>23.2</td>
</tr>
<tr>
<td>Newer, All Value Class</td>
<td>46</td>
<td>35.8%</td>
<td>4.54</td>
<td>0.66</td>
<td>89.5</td>
<td>11.35</td>
<td>1.65</td>
<td>12.7</td>
</tr>
</tbody>
</table>
of newer homes than in either of the areas comprised mostly of older dwellings.

(2) Commercial and industrial property, vacant commercial and industrial property, and rural property.—As previously stated, there exists a notable shortage of verified sales prices. The final total of useable sales of commercial or industrial property amounted to 23, of which ten were vacant business or industrial sites. For rural property, the final total sample consisted of 20 useable sales, of which ten were vacant acreage.

Presented in Table 7 are the results for all of the above mentioned property plus those for the total sample of residential property. The differing average assessment-sales ratios in Table 7 were subjected to an analysis of variance and it was indicated that some significant variation did exist. Tukey's test showed that a significant difference existed between both of the ratios for rural classes of property when compared with any of the remaining four ratios for residential and commercial or industrial types of property. Some of these differences may be attributed to the fact that in Missoula County, farm homes are assessed at a slightly lower percentage of appraised value than is other real estate considered in the study.

The only other significant difference (barely significant at the 95 percent level) which was discovered among
<table>
<thead>
<tr>
<th>Type</th>
<th>No. of Sales</th>
<th>Average Assess. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>Average Apprais. Ratio</th>
<th>SD</th>
<th>SEM</th>
<th>V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Family Residential</td>
<td>326</td>
<td>35.1%</td>
<td>6.44</td>
<td>0.36</td>
<td>87.6%</td>
<td>16.10</td>
<td>0.90</td>
<td>18.3%</td>
</tr>
<tr>
<td>Multi-Family Residential</td>
<td>8</td>
<td>37.3%</td>
<td>6.87</td>
<td>2.59</td>
<td>93.3%</td>
<td>17.13</td>
<td>6.48</td>
<td>18.4%</td>
</tr>
<tr>
<td>Vacant Comm. or Indust.</td>
<td>10</td>
<td>37.9%</td>
<td>12.69</td>
<td>4.46</td>
<td>94.8%</td>
<td>31.73</td>
<td>11.15</td>
<td>33.5%</td>
</tr>
<tr>
<td>Commercial or Indust.</td>
<td>13</td>
<td>40.3%</td>
<td>31.63</td>
<td>9.12</td>
<td>100.8%</td>
<td>79.08</td>
<td>22.80</td>
<td>78.5%</td>
</tr>
<tr>
<td>Rural Vacant Acreage</td>
<td>10</td>
<td>28.6%</td>
<td>16.21</td>
<td>5.38</td>
<td>71.5%</td>
<td>40.53</td>
<td>13.45</td>
<td>56.6%</td>
</tr>
<tr>
<td>Rural Land / Improv.</td>
<td>10</td>
<td>28.2%</td>
<td>8.28</td>
<td>2.75</td>
<td>70.5%</td>
<td>20.70</td>
<td>6.88</td>
<td>29.4%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>377</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Weighted Average = 35.0
\[SD = 9.19\]
\[SEM = 0.47\]
\[V = 26.3\%\]

Weighted Average Apprais. Ratio = 87.5
\[SD = 22.98\]
\[SEM = 1.18\]
\[V = 26.3\%\]

Weighted Average excluding Rural Land plus Improvements = 35.2

Weighted Average Apprais. Ratio Excluding Rural Land plus Improvements = 88.0
the average ratios was that between the ratio of 35.1 percent for single-family residences and the 40.3 percent average ratio for commercial and industrial property. The difference of 25.19 points between the standard deviations of the above mentioned two classes of property was determined to be very significant. Thus, not only was the commercial property in the sample apparently appraised at a higher average level than was the residential property, but also the degree of nonuniformity of assessments was much greater for the commercial property than for single-family dwellings.

2. Flathead and Lewis and Clark Counties

a. Collection of data.--For Flathead County, all information included in the present study was taken directly from an unpublished report on that county's property tax problems completed by the Research Department of the State Board of Equalization in 1965. The report is comprised of property sales made during the period from January 1964 through February 1965. According to the report, the necessary data--including names of grantors and grantees, legal descriptions of the property, dates of the instruments, and amounts of federal revenue stamps attached to estimate sales prices--were obtained from warranty deeds on file at the County Clerk's office. The appraised and assessed valuations were available from the Classification office.

In Lewis and Clark County the data were also
gathered by State Board of Equalization's Research Department. The methods were essentially the same as for Flathead County, except that questionnaires were sent to the property buyers to verify the selling prices, rather than relying upon estimates from revenue stamps. Only those transactions for which a verified sales price was available were used in the study. The sample consists of sales during 1965.

In all cases for both counties, property transfers which did not appear to constitute bona fide sales were excluded. These excluded sales consisted of transfers between relatives, corporate affiliates, deeds of convenience, and so forth.

b. Analysis.---The Flathead County study was quite comprehensive and included several types of property throughout the county. However, the sample for Lewis and Clark County was comprised entirely of residences within the city of Helena.

As stated earlier, the primary objective of the following analysis is to permit comparisons of assessment levels and uniformity on an intercounty basis. Therefore, because the Helena sample was entirely residential and the Missoula County sample was composed primarily of residential dwellings within metropolitan Missoula, only sales of residences in Kalispell will be utilized from the Flathead County study for purposes of intercounty comparisons. Table 8
TABLE 8
THE AVERAGE ASSESSMENT AND APPRAISAL RATIOS FOR RESIDENTIAL PROPERTIES IN HELENA, KALISPELL, AND MISSOULA

<table>
<thead>
<tr>
<th>Area</th>
<th>Sales</th>
<th>Average Assess. Ratio</th>
<th>Range</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helena</td>
<td>116</td>
<td>34.3%</td>
<td>17.2 - 68.3%</td>
<td>6.82</td>
</tr>
<tr>
<td>Kalispell</td>
<td>213</td>
<td>43.4%</td>
<td>24.9 - 178.1</td>
<td>13.27</td>
</tr>
<tr>
<td>(total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old</td>
<td>166</td>
<td>44.5%</td>
<td>28.2 - 178.1</td>
<td>14.60</td>
</tr>
<tr>
<td>New</td>
<td>47</td>
<td>39.8%</td>
<td>24.9 - 62.3</td>
<td>5.84</td>
</tr>
<tr>
<td>Missoula</td>
<td>326</td>
<td>35.1%</td>
<td>15.2 - 62.7</td>
<td>6.44</td>
</tr>
<tr>
<td>TOTAL</td>
<td>655</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Kalispell ratios from research findings in "Flathead County Tax Problems," Research Department, State Board of Equalization; Helena ratios from research done by Research Department, State Board of Equalization.

bOld = pre 1956.
cNew = post 1956.
dSingle family dwellings only.
<table>
<thead>
<tr>
<th>SEM</th>
<th>Average Appr. Ratio</th>
<th>Range</th>
<th>SD</th>
<th>SEM</th>
<th>V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.63</td>
<td>85.8%</td>
<td>43.0 - 170.8%</td>
<td>17.05</td>
<td>1.58</td>
<td>19.9%</td>
</tr>
<tr>
<td>0.91</td>
<td>108.5</td>
<td>62.2 - 445.3</td>
<td>33.8</td>
<td>2.28</td>
<td>30.6</td>
</tr>
<tr>
<td>1.13</td>
<td>111.3</td>
<td>70.4 - 445.3</td>
<td>36.51</td>
<td>2.83</td>
<td>32.8</td>
</tr>
<tr>
<td>0.88</td>
<td>99.5</td>
<td>62.2 - 155.8</td>
<td>14.60</td>
<td>2.20</td>
<td>14.7</td>
</tr>
<tr>
<td>0.36</td>
<td>87.6</td>
<td>38.0 - 164.3</td>
<td>16.10</td>
<td>0.90</td>
<td>18.3</td>
</tr>
</tbody>
</table>
indicates the mean assessment-sales and appraisal-sales ratios for this class of property in each of the three counties.

Tukey's omega procedure was once again employed to discover whether or not any significant differences existed among the mean ratios for Helena, Kalispell and Missoula.

The difference between the average ratios for Missoula and Helena was not significant. The differences between the mean ratio for Kalispell and each of the other two counties, however, were determined to be significant.

Some qualifications which may affect the above results must be stated, however, before arriving at any conclusions.

1. The sales analyzed in each case took place over different time periods. The Missoula County study showed a definite downward trend of mean assessment ratios over time, therefore different mean ratios may have been discovered had each study covered an identical time period.

2. A relatively small percentage of the Kalispell sales prices were subject to verification. Therefore, most are only as reliable as the amounts of federal revenue stamps affixed to the deeds finally selected. The Missoula County
study showed federal revenue stamps to be an inaccurate source of data.

3. The Helena and Kalispell samples consisted of all types of residential properties; for Missoula only single-family dwellings are considered.

The average ratios for older (prior to 1956) and for newer residences are included in Table 8 in addition to the average ratio for the total sample of transferred properties in Kalispell, primarily because of the difference found between the average ratios when grouped by age. According to the Flathead County report of the State Board of Equalization mentioned previously, the difference between the ratios was statistically significant.

II. THE BURDEN DISTRIBUTION OF MONTANA PROPERTY TAXATION UPON THE INDIVIDUAL PROPERTY OWNER

A. Purpose and Scope

As stated previously, this portion of the analysis concerns the impact of Montana property taxation upon selected groupings of individual taxpayers within Montana. The individuals are grouped according to income level and occupation, and property tax liabilities are compared within and among the selected groups. The analysis attempts to determine whether the property tax burden within and among various income and occupational groups is regressive,
proportional, or progressive in relation to the annual net income received by an individual.\(^5\) In addition to presenting the average amount paid within each group, the degree of variation about the average is analyzed. Although occupation undoubtedly affects the income of an individual, the analysis also endeavors to determine the relationship which exists between income and the amount of property tax paid, independently of any occupational effects.

**B. Collection of Data and Methodology**

The data for the following analysis were obtained from two different sources. The original and primary source consisted of Montana state individual income tax returns for the year 1963.

Out of a total of 227,573 Montana personal income tax returns for the year 1963, an unbiased sample of 5,045 returns was selected. Duplicates of 227,573 IBM cards on file with the Montana State Board of Equalization were sorted into nine brackets of taxpayer income to obtain the desired sample which was stratified by income bracket and constructed to contain an approximately equivalent number of tax returns in all but the two highest income brackets.

\(^5\) Federal adjusted gross income is the measure of net income utilized within the present study.
brackets.6 "To obtain the desired number of returns in each bracket, an I.B.M. 1620 computer was used to list the identification number of every \( n \) th return in each income bracket, where \( n \) was the total number of returns in each bracket divided by the number of returns desired for the sample from that bracket."7 Only those returns which listed itemized deductions, including total property tax paid, could be utilized for this study. These limitations resulted in a total sample of 973, which will be referred to as sample one. Besides the amount of property tax, other information obtained from these returns included federal adjusted gross income (gross income less business expenses), the taxpayer's occupation, and an identification code number.

The second source of data employed was information obtained from a questionnaire sent to a random sample of taxpayers within the larger sample of 5,045. Included in the questionnaire were three items which asked whether an individual had paid any real estate, motor vehicle, or personal property taxes in Montana during 1965, and if so, how much for each.8 Of those responding, 367 indicated

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7Ibid., p. 3.

8The questionnaire specifically directed the respondent to exclude business taxes. A farmer, then, should have included only taxes on property not involved in earning his livelihood.
they had paid taxes in at least one of the above categories. The identification code numbers on those questionnaires were then matched to the numbers for the original sample of 5,045 in order to obtain the respondent's occupation and federal adjusted gross income. For this questionnaire sample, the taxes paid are for 1965, while net income remains the amount earned in 1963. This sample will be referred to as the questionnaire sample.

The data obtained above were transferred to IBM cards and a 1620 computer was programmed to do the necessary calculations required to obtain the mean tax paid as well as measures of variation, both in per-capita dollar terms and as a proportion of income. Additional calculations concerning the effect of income and occupation upon the tax liability were made for sample one (from the 1963 returns), but not for the questionnaire sample.

C. Analysis

1. By Income Bracket

Table 9 indicates the average real, personal (including the personal property tax on motor vehicles), and the total per capita property tax liability calculated from the questionnaire sample and stratified by income

9A license fee of $10 was subtracted from the mean personal property tax on motor vehicles and the percentage figures were adjusted accordingly.
TABLE 9

THE AVERAGE REAL, PERSONAL, AND TOTAL PROPERTY TAX LIABILITIES
BY INCOME BRACKET--QUESTIONNAIRE SAMPLE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-$3000</td>
<td>28</td>
<td>$99</td>
<td>10.3%</td>
<td>27</td>
<td>$82</td>
<td>6.0%</td>
<td>$181</td>
<td>16.3%</td>
</tr>
<tr>
<td>$3000-5000</td>
<td>31</td>
<td>168</td>
<td>4.4</td>
<td>34</td>
<td>69</td>
<td>1.7</td>
<td>237</td>
<td>6.1</td>
</tr>
<tr>
<td>$5000-7500</td>
<td>72</td>
<td>177</td>
<td>2.8</td>
<td>72</td>
<td>76</td>
<td>1.2</td>
<td>253</td>
<td>4.0</td>
</tr>
<tr>
<td>$7500-10,000</td>
<td>50</td>
<td>261</td>
<td>3.1</td>
<td>62</td>
<td>125</td>
<td>1.4</td>
<td>386</td>
<td>4.5</td>
</tr>
<tr>
<td>$10,000-15,000</td>
<td>46</td>
<td>361</td>
<td>3.1</td>
<td>52</td>
<td>188</td>
<td>1.5</td>
<td>549</td>
<td>4.6</td>
</tr>
<tr>
<td>$15,000-25,000</td>
<td>50</td>
<td>653</td>
<td>3.5</td>
<td>56</td>
<td>277</td>
<td>1.4</td>
<td>930</td>
<td>4.9</td>
</tr>
<tr>
<td>$25,000-50,000</td>
<td>57</td>
<td>829</td>
<td>2.6</td>
<td>58</td>
<td>282</td>
<td>0.9</td>
<td>1111</td>
<td>3.5</td>
</tr>
<tr>
<td>$50,000-100,000</td>
<td>6</td>
<td>767</td>
<td>1.3</td>
<td>6</td>
<td>375</td>
<td>0.6</td>
<td>1142</td>
<td>1.9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>340</td>
<td></td>
<td></td>
<td>367</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
bracket. The results are given in absolute dollar amounts and as a proportion of income.

A statistical analysis of variance was conducted both for the dollar amounts and for the tax as a percentage of income in order to determine if the observed variance among the average tax liabilities in all income brackets was actually significant, or was perhaps due to sampling error. In every case, the differences were determined to be significant at the 99 percent confidence level. In other words, if 100 samples of this size were collected in an identical manner from this same population, it could be expected that the results in 99 of the 100 samples would show that the observed tax liabilities do, in fact, differ significantly and are not chance variations due to sampling error.

The mean total property tax payments by income bracket, both as a proportion of income and in dollar terms, was also calculated from the original sample of 1963 state income tax returns. These results are presented in Table 10. The results were once more subjected to an analysis of variance and again the differences in the tax liabilities among all income brackets were discovered to be significant at the 99 percent level.

It may be noted that the mean total tax payments are substantially larger for each income bracket in Table 9 than for the corresponding bracket in Table 10. This apparent discrepancy is explained primarily by the fact that only
<table>
<thead>
<tr>
<th>Income Bracket</th>
<th>Number Itemizing Deductions</th>
<th>Avg. Total Prop. Tax Liability</th>
<th>Coefficient of Variation</th>
<th>Avg. Tax as % of Income</th>
<th>Coefficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-$3000</td>
<td>40</td>
<td>$110</td>
<td>132.7%</td>
<td>5.1%</td>
<td>135.3%</td>
</tr>
<tr>
<td>$3000-5000</td>
<td>110</td>
<td>97</td>
<td>147.4</td>
<td>2.4</td>
<td>150.0</td>
</tr>
<tr>
<td>$5000-7500</td>
<td>139</td>
<td>146</td>
<td>113.0</td>
<td>2.4</td>
<td>116.7</td>
</tr>
<tr>
<td>$7500-10,000</td>
<td>156</td>
<td>182</td>
<td>108.8</td>
<td>2.1</td>
<td>109.5</td>
</tr>
<tr>
<td>$10,000-15,000</td>
<td>124</td>
<td>319</td>
<td>81.8</td>
<td>2.7</td>
<td>81.5</td>
</tr>
<tr>
<td>$15,000-25,000</td>
<td>147</td>
<td>340</td>
<td>83.2</td>
<td>1.8</td>
<td>77.8</td>
</tr>
<tr>
<td>$25,000-50,000</td>
<td>216</td>
<td>458</td>
<td>69.7</td>
<td>1.4</td>
<td>71.4</td>
</tr>
<tr>
<td>$50,000-100,000</td>
<td>37</td>
<td>957</td>
<td>206.6</td>
<td>1.3</td>
<td>153.8</td>
</tr>
<tr>
<td>$100,000</td>
<td>4</td>
<td>4978</td>
<td>142.3</td>
<td>1.2</td>
<td>50.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>973</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
those respondents whose questionnaires indicated the amount of property tax paid were assumed to be property owners and were included in the calculations for the questionnaire sample. The remainder who did not indicate having paid any property tax were assumed not to be property owners. In sample one, however, all those individuals who itemized deductions were included whether or not any property tax payment was itemized as a deduction. Consequently, persons who were not home owners, automobile owners, or for other reasons paid no property tax but still itemized deductions increased the total sample size while leaving the total tax liability substantially unchanged. Another contributing factor, which probably is relatively insignificant, may be the fact that 1963 incomes and 1965 taxes were utilized for the questionnaire sample. Thus, if property taxes have generally risen during the two-year interim period, they would show up as an increase in the per capita tax liability in dollar terms and as a proportion of income. The questionnaire sample is probably the more accurate of the two when used to determine the average amounts of tax liabilities for each income group.

Although the actual tax liabilities were affected by the two different methods of calculation in the manner described above, the burden distribution among the various income brackets remained substantially unchanged, which is demonstrated in Tables 9 and 10 by the columns presenting
the total property tax as a percentage of income. The tax appears to be quite regressive at the lowest income level, roughly proportional throughout the middle income brackets in which the vast majority of household heads are situated, and becomes regressive again at the higher income levels.

The coefficients of variation for the mean total property tax payments are also presented in Table 10 and show a great deal of variance within each income class. (Recall from Part I of this analysis that the coefficient of variation relates the standard deviation to its mean, expressed in percentage form.) A large coefficient of variation indicates that a number of the actual tax liabilities within that bracket vary substantially from the average.

A portion of the observed variation may be due to the fact that although individuals may be in the same income bracket their actual incomes may differ substantially. Thus, insofar as property tax liabilities may be related to incomes some variation within income brackets could occur. Nevertheless, this variation demonstrates that many persons with approximately equivalent incomes were subject to vastly differing amounts of property taxes. The coefficients of variation for Table 9 are similar to those presented in Table 10.

A coefficient of correlation was computed for
sample one to measure the amount of relationship between an individual's income and his property tax liability. A correlation coefficient of 1.0 would mean that the tax is perfectly related to income and all values of each would lie on a straight line. A coefficient amounting to zero would indicate that no relationship exists between income and tax liability. It follows that the higher the value of the coefficient of correlation, the greater the degree of association between the variables involved.\(^\text{10}\)

Because the 973 returns in the sample included many different occupations, any effect that occupation may have upon an individual's income is inherently included in the coefficient of correlation between income and property tax payments. The coefficient of correlation between income and the dollar amount of the average per capita property tax liability, for all occupation and income groups taken together, had a value of .772 and was significant at the 99 percent confidence level.

The correlation coefficient measuring the relationship between income and the average property tax liability as a percentage of income had a value of -.079. This coefficient was also determined to be significant at the 99 percent level. Because of the substantially smaller

\(^{10}\)It is important to note that a coefficient of correlation does not necessarily indicate a causal relationship, i.e., it cannot be inferred that a change in one variable causes a change in the other.
correlation coefficient, however, it may be stated that this relationship is much less pronounced than that between income and the dollar amount of tax liability. Also, a negative coefficient means that a change in one variable is associated with an opposite change in the other. Therefore, the coefficient of \(-0.079\) indicates that as income increases the property tax liability as a percentage of income tends to decrease, illustrating again the apparent regressiveness of the tax.

2. By Occupational Group

The two samples were stratified into seven occupation classes and calculations were made to determine the mean per capita property tax liability in dollar amounts and as a percentage of income in each occupational group. The results, categorized into real, personal, and total tax liabilities, for the questionnaire sample are presented in Table 11. The average total property tax liabilities by occupation group, calculated from the original sample of income tax returns (sample one) are illustrated in Table 12 along with the correlation and variation coefficients. Again the total tax payments are larger for each group from the questionnaire sample than from sample one for reasons explained previously.\(^1\)

It is apparent from the above tables that the dollar

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\(^{1}\)See pages 66-69 of this chapter.
TABLE 11
THE AVERAGE REAL, PERSONAL AND TOTAL PROPERTY TAX LIABILITIES
BY OCCUPATION--QUESTIONNAIRE SAMPLE

<table>
<thead>
<tr>
<th>Occupation Group</th>
<th>Real Estate</th>
<th>Personal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming</td>
<td>37</td>
<td>$538</td>
<td>7.0%</td>
</tr>
<tr>
<td>Professional</td>
<td>77</td>
<td>439</td>
<td>2.5</td>
</tr>
<tr>
<td>Sole Proprietors &amp; Partnerships</td>
<td>38</td>
<td>466</td>
<td>2.6</td>
</tr>
<tr>
<td>Managerial</td>
<td>48</td>
<td>704</td>
<td>3.4</td>
</tr>
<tr>
<td>White Collar, Service, Clerical</td>
<td>27</td>
<td>237</td>
<td>5.2</td>
</tr>
<tr>
<td>Skilled &amp; Unskilled Labor</td>
<td>97</td>
<td>172</td>
<td>3.5</td>
</tr>
<tr>
<td>Salesmen</td>
<td>15</td>
<td>418</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Even though specifically directed otherwise by the questionnaire, it appears likely that in many cases farmers did include business property taxes when answering the questionnaire. Also it is probable that many itemized non-business taxes as a business expense, thus reducing their federal adjusted gross income. Thus the tax liabilities may be exaggerated both in per capita amounts and as a proportion of income.
TABLE 12
THE AVERAGE TOTAL PROPERTY TAX LIABILITY BY OCCUPATION--SAMPLE ONE

<table>
<thead>
<tr>
<th>Occupation Group</th>
<th>No. in Group</th>
<th>Avg. Total Prop. Tax Liab.</th>
<th>Coeff. of Vari.</th>
<th>Coeff. of Correl.</th>
<th>Avg. Tax as % of Income&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Coeff. of Vari.</th>
<th>Coeff. of Correl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming</td>
<td>41</td>
<td>$134</td>
<td>113.4%</td>
<td>.460</td>
<td>1.4%</td>
<td>155.2%</td>
<td>-.211</td>
</tr>
<tr>
<td>Professional</td>
<td>191</td>
<td>$425</td>
<td>75.5</td>
<td>.457</td>
<td>1.9</td>
<td>85.4</td>
<td>-.247</td>
</tr>
<tr>
<td>Sole Proprietors &amp; Partnerships</td>
<td>114</td>
<td>$314</td>
<td>77.7</td>
<td>.260</td>
<td>2.1</td>
<td>110.1</td>
<td>-.385</td>
</tr>
<tr>
<td>Managerial</td>
<td>136</td>
<td>$430</td>
<td>82.6</td>
<td>.534</td>
<td>2.2</td>
<td>96.4</td>
<td>-.300</td>
</tr>
<tr>
<td>White Collar, Service, Clerical</td>
<td>50</td>
<td>$122</td>
<td>122.1</td>
<td>.212</td>
<td>1.7</td>
<td>142.5</td>
<td>-.023</td>
</tr>
<tr>
<td>Skilled &amp; Unskilled Labor</td>
<td>250</td>
<td>$131</td>
<td>119.8</td>
<td>.423</td>
<td>2.0</td>
<td>123.7</td>
<td>-.045</td>
</tr>
<tr>
<td>Salesmen</td>
<td>53</td>
<td>$331</td>
<td>77.6</td>
<td>.287</td>
<td>2.6</td>
<td>97.3</td>
<td>-.211</td>
</tr>
<tr>
<td>TOTAL</td>
<td>835</td>
<td></td>
<td></td>
<td></td>
<td>Avg. r = .407</td>
<td></td>
<td>Avg. r = -.197</td>
</tr>
</tbody>
</table>

<sup>a</sup>Statistical "t" tests at the 99% confidence level determined that each average as a percentage of income was significantly greater than zero.
amounts of property taxes paid vary substantially among and within the seven occupational classes. Since it has previously been shown that a relatively close relationship exists between an individual's income and the dollar amount of his property tax liability, these results may be expected because (1) most or all income groups are represented within each occupation grouping, and (2) different occupations tend to receive different incomes. Note, however, that the average total tax as a percentage of income appears to be roughly equivalent for each occupational grouping (except for group 1 in Table 11), indicating that the tax as a proportion of income varies but slightly among most occupations considered. The above observation was statistically substantiated (at least for one income group) by an analysis of variance. The analysis determined for the $5,000-7,500 income bracket that no significant difference existed in the mean per capita property tax liabilities among all seven occupational groups both as a proportion of income and in absolute dollar terms.

Correlation coefficients measuring the degree of relationship between income and property tax liability were computed for each of the seven occupational groups.

The coefficients between income and the dollar amounts of property tax liabilities were all determined to be significant except the one for the white collar-clerical group. Just three of the correlation coefficients between
income and the tax liability as a proportion of income were found to be significant. The significant coefficients are -.247 for the professional group, -.385 for the sole proprietors, and -.300 for the managerial group. All the coefficients were then averaged (even if not significant) in order to obtain a further measure of the association between income and tax liability, regardless of occupation. An average coefficient of correlation amounting to .407 between income and the dollar amount of property tax liability, and an average coefficient of -.197 between income and the property tax liability as a percentage of income were found. Once again the former coefficient suggests a relatively closer relationship, and the latter coefficient is negative, demonstrating that the tax liability as a percentage of income tends to change in the opposite direction from a corresponding change in income.
CHAPTER IV

CONCLUSIONS

I. ASSESSMENT TO SALES RATIO PORTION

A. Intracounty

The steady decline of the mean assessment ratios for residential properties in Missoula over the nearly two-year period analyzed shows a steady price increase, at least for this class of property. With the exception of properties which have recently been sold and since reappraised, it is apparent that the assessment-sales and appraisal-sales ratios are deteriorating because of rising prices. The same may be true for other classes of property in the Missoula area. This fact points to the need for continuing reappraisal of all real estate as often as possible, especially in an area and during a period of rapidly changing real estate values.

Since no significant difference was discovered between the assessment or appraisal ratios within the various type, age, value, and area categories examined, various categories of residential single-family dwellings in the greater Missoula area are generally appraised at about the same average level. However, appraisals appear to be more uniform in the middle value class of from
$15,000-$19,999 than in the other value strata, and also in the relatively newer areas as opposed to the relatively older areas of Missoula. The variance is quite large for all kinds of residences.

In view of the extremely small standard errors of the mean, it may be stated that single-family residential property is generally appraised somewhat below its true market value within the two sample areas of Helena and Missoula. The standard error of the mean is relatively small for the Kalispell residential sample also, but it appears from Table 8 that dwellings in that city are usually appraised somewhat above market price. Note, however, that newer residences seem to be generally appraised much closer to market value than are older dwellings. Older dwellings were found by the State Board of Equalization to be significantly over-appraised, not only in Kalispell but in several areas in Flathead County.

In evaluating the uniformity of appraisals, it is necessary to know the degree of dispersion about the mean ratios. By examination of Table 8 it may be seen that the degree of dispersion for newer homes in Kalispell is much less than that for older homes, indicating a much greater degree of uniformity of appraisals. These results are similar to those for Missoula where, although no significant difference was found to exist between the average ratios for older (pre 1951) and newer houses, more uniformity of
appraisals was discovered in the newer areas.

Sixty-eight percent of the actual ratios in any sample with a distribution approaching normality will fall within plus or minus one standard deviation of the mean ratio. Therefore, 32 percent of the ratios are more than one standard deviation away from the mean in either direction. For the sample of single-family residences in Missoula, this means that 32 percent of the assessment-sales ratios lie outside the mean ratio of 35.1±6.44 or, in other words, are either less than 28.7 percent or more than 41.5 percent. Converting these figures to appraisal-sales ratios, 32 percent were appraised either below 71.6 percent of the market value or above 103.8 percent of the actual selling price. By further extending the preceding analysis, it may be stated that 58.9 percent of the appraisals varied more than 10 percent from the mean appraisal ratio of 87.6 percent. Relating the average deviation of 12.5 percentage points to the mean appraisal ratio of 87.6 results in an average relative deviation of 14.3 percent.¹ This means that, on the average, each appraisal varied from the mean appraisal by 14.3 percent.

Similarly, for the Helena sample, 32 percent of the residences were appraised either below 68.8 percent or above 102.9 percent of actual market price, and 59.6 percent

¹See footnote 8, Chapter I.
of the sample was outside of the mean appraisal ratio of 85.8 plus or minus 10 percent.

For the total Kalispell residential sample, 75.0 percent of the appraisals varied from the mean ratio more than 10 percent; however, for newer residences alone just 49.6 percent of the cases varied by more than 10 percent. Also, it may be expected that 32 percent of the appraisals for the entire Kalispell sample were either more than 141.7 percent or under 75.3 percent, while for the newer residences only the limits are 114.1 and 84.9 percent respectively.

For the other classes of property in the total Missoula sample, the level of appraisals and assessments can be analyzed, but with much less degree of accuracy. For example, although the sample assessment ratio mean for commercial and industrial property was 40.3 percent, the standard error of the mean (SEM) amounted to 9.12; therefore, at the 95 percent confidence level, the true mean of the population lies somewhere between 22.1 percent and 58.5 percent. Even with the small sample of only 13 sales of commercial and industrial property, the range of the appraisal to sales ratios went from a low of 21.5 percent to a high ratio of 314.0 percent. Obviously, then, some commercial property owners are paying amounts of property taxes based upon appraised valuations which are far below the actual values of their properties, and others are
subject to property tax liabilities based on appraisals which substantially exceed the market value.

The results obtained for the commercial and rural sales are best described as tentative. Although it is apparent that a great degree of nonuniformity of appraisals exists within these types, greater quantities of data are needed before any firm conclusions may be reached concerning the average level of appraisals for these classes of property within Missoula County.

B. Intercounty

On an intercounty basis it may be stated that Helena residences and Missoula single-family dwellings are appraised at about the same general level somewhat below market price. However, both newer and older residential property in Kalispell at the time the sample was obtained appeared to be appraised significantly higher than that within the other two counties sampled.

Although property types other than residential were included in the Flathead County study as well as the one for Missoula County, valid intercounty comparisons are not possible at this time. The principal reasons for this fact are as follows:

1. For each county a few types of property which were analyzed in one county were not considered in the other.
2. The relatively small quantities of data and, more important, the great nonuniformity of appraisals for all except residential property within the Missoula County sample prohibits arriving at any average appraisal or assessment ratio upon which to base comparisons.

The three counties sampled represent only 5.4 percent of the total number of Montana counties. In addition, the comparisons were made among three metropolitan areas which, although each probably contributes substantially to that county's taxable valuation, may not represent the actual existing appraisal ratios for residential property within the entire county. It is apparent that additional research is needed before valid intercounty comparisons may be made on a statewide basis. All that may be said at this time is that the average level of appraisals appears to be uniform between two of the three areas analyzed. However, some degree of inequity exists between those two and the third area on an intercounty level. One significance of differing levels of assessments or appraisals from county to county is that a county whose assessment level is relatively higher is paying more per dollar of taxable valuation for the state mill levy than is a county with a relatively lower level of appraisals. Another involves the apportionment of state aid under the school foundation program.
II. PROPERTY TAX BURDEN DISTRIBUTION PORTION

The evidence presented in the preceding analysis concerning the association between an individual's property tax liability and his occupation has demonstrated that the relationship is not significant for one income bracket. Assuming similar results for other income brackets, it may be stated that an individual's property tax liability is not significantly affected by his occupation, except to the extent that his income is affected by his occupation.

The foregoing analysis has established that the absolute per-capita amount of property tax liability rises with increasing income. In addition, the high correlation coefficient of .772 between income and per-capita tax liability for all income and occupation groups taken together indicates a marked relationship between the two variables. These results are to be expected assuming that real and personal property expenditures rise with increasing income. However, it has been demonstrated that the property tax liability, as a proportion of income, is regressive (i.e., increases less rapidly than does net income) at the lowest and highest income levels. However, at middle income levels, which include most family heads, the tax is approximately proportional. Assuming that individuals are not able to shift the burden of the tax to other portions of society, it appears that those with the lowest incomes pay
proportionately more property tax than do those persons with relatively higher incomes. However, the correlation coefficient of -0.079 between income and property tax liability as a proportion of income, although significant, is so small that the strength of the relationship between the two variables may be said to be almost negligible.

The extremely large coefficients of variation presented in the analysis indicate that the property tax may be considered quite capricious when people within the same income groups are subject to substantially different amounts of property taxes, even though some of the variation is no doubt due to varying amounts of property owned by individuals within the same income bracket.

Thus, it may be stated that the property tax does not generally provide an adequate measure of an individual's ability-to-pay. By its very nature, as an ad valorem tax, the property tax is able to provide a close relationship to income only when the bulk of that income is derived from property sources, and in today's society most income stems from sources other than property. Even if property values did provide a good measure of one's ability-to-pay, the tax would likely remain inequitable because of the problem of assessing all property at its "true" value, which was demonstrated for real property in the assessment-sales ratio part of this analysis.
APPENDIX A

THE MONTANA PROPERTY CLASSIFICATION LAW

For purposes of taxation the Montana property classification law places all taxable property into various classes according to the type of property. Property in each category is taxed at a certain specified percentage of its assessed value. The classes are as follows:

Class 1, taxable at 100 percent =
Net proceeds and royalties of mines and oil wells.

Class 2, taxable at 20 percent =
Household goods and furniture,
vehicles of all kinds, and farm machinery.

Class 3, taxable at 33 1/3 percent =
Livestock and poultry, business inventories, business furniture and fixtures.

Class 4, taxable at 30 percent =
Real estate and improvements, mining and manufacturing machinery, bank capital.

Class 5, taxable at 7 percent =
Money and credits, bank surplus, rural electric and telephone association property, agricultural products other than livestock for sale.

Class 7, taxable at 7 percent =
New industrial property (less than 3 years of operation).

Class 8, taxable at 20 percent =
Dwellings of widows and retired persons (subject to qualifications).
Class 9, taxable at 40 percent = Intercounty utility and railroad property, all property not included in preceding classes.
APPENDIX B

FACSIMILE OF PROPERTY TRANSFER QUESTIONNAIRE

Tax Study Department
University of Montana
Missoula, Montana 59801

As a part of the University's contribution to the current study of Montana taxation under the direction of the Montana Legislative Council and the State Board of Equalization, we are investigating taxation of real estate.

In order to evaluate and improve property taxation, it is important that we have accurate information concerning our present system. The greater the amount of information we receive, the more valid will be any results which we may obtain.

For the purpose of the present study we have obtained information from public records concerning properties that have been recently transferred.

The property which you recently bought/sold was randomly chosen and we would greatly appreciate your promptly completing and returning the attached questionnaire concerning the property. Because of the statistical process involved, your response will add materially to the accuracy of this study.

Thank you.
Location of property transferred: ______________________

Date of instrument: ______________________

PLEASE ANSWER THE FOLLOWING QUESTIONS AS ACCURATELY AS POSSIBLE.

A. Description of the property at the time of transfer:

1. Single-family dwelling: (check one)
   (a) Newly constructed...................................
   (b) Previously occupied..............................

2. Multi-family dwelling (duplexes up to and including apartment houses)..............................

3. Commercial or industrial property..............................

4. Farm or vacant acreage..............................

5. Vacant lot (city or suburban)..............................

6. Other (please describe)___________________

B. Sales price of transferred property: (enter amount)

1. The total price for this property was...$_______

Consisting of:
   (a) Cash payment.................................$
   (b) Balance of assumed mortgage...............$
   (c) Amount of new mortgage....................$
   (d) Other consideration............................$

(Sum of (a - d should equal total sales price.)

2. Did the above sale price include any personal property? (household goods, fixtures, machinery, etc.) Yes______ NO ______

If so, enter value of such property.....$_______

Indicate nature of said personal property ______________________________

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C. Description of Transfer: (check one)

1. Sale or transfer between relatives........

2. Sale or transfer between corporate affiliates, two corporations whose ownership is the same, a corporation and its stockholders, or a corporation and its subsidiary.....................

3. Transfer of convenience (correction deed, deed to reorganize or reconvey property, to create joint tenancy........

4. Sale or transfer in connection with foreclosure or other legal action........

5. Other--that is, none of the above descriptions apply to this property transfer.................................

D. Do you consider that the sale price reported in Item "B" above was a reasonable market price for the property on the date of sale? Yes _____ No _______
APPENDIX C

MATHEMATICAL DESCRIPTION OF
CAPITALIZATION ANALYSIS

A total sample size of 23 was all that was available for the period involved. All the listed variables apply to a single parcel of property. The 1964 and 1965 mill levies were obtained from records at the Missoula County Courthouse, and only the portion applicable to real estate within the city was used in the calculations.

\[ T_0 = 1964 \text{ taxes} \]
\[ T_1 = 1965 \text{ taxes} \]
\[ S_i = \text{actual sales price} \]
\[ S_p = \text{predicted sales price if tax changed by the average proportion for the property.} \]
\[ A_{10} = 1964 \text{ assessed valuation} \]
\[ A_{11} = 1965 \text{ assessed valuation} \]
\[ M_t = \text{mean assessment ratio for total sample (n = 23)} \]
\[ X = \text{independent variable = change in taxes } 1964-65. \]
\[ Y = \text{dependent variable} \]
\[ T_0 = (A_{10})(.30)(1964 \text{ levy}) \]
\[ T_1 = (A_{11})(.30)(1965 \text{ levy}) \]
\[ X = T_1 - T_0 \]
\[ S_p = \frac{A_{11}}{M_t} \]
\[ Y = S_i - S_p \]

The \( X \) and \( Y \) values obtained were substituted into the linear regression equation, \( Y = a - bX \), to obtain values
for 'a' and 'b'. The resulting regression line is illustrated in figure 1. The least squares method was utilized in arriving at a correlation coefficient, which was subsequently tested for significance.
Figure 1.

The Regression Line
plus & minus 1 standard error of estimate.
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