THE EFFECTS OF STATE AND LOCAL GOVERNMENT

EXPENDITURES ON THE DISTRIBUTION OF

INCOME IN OKLAHOMA

By

CHARLES RONALD ROSS

Bachelor of Science
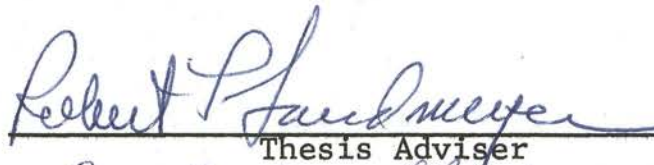University of Tulsa
Tulsa, Oklahoma
1963

Master of Science
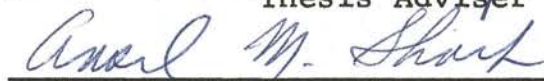Oklahoma State University
Stillwater, Oklahoma
1969

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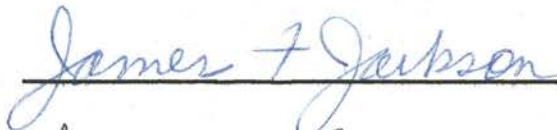the Degree of
DOCTOR OF PHILOSOPHY
May, 1972

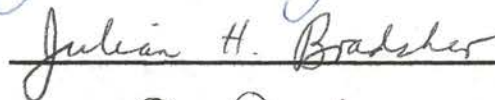# THE EFFECTS OF STATE AND LOCAL GOVERNMENT

EXPENDITURES ON THE DISTRIBUTION OF

INCOME IN OKLAHOMA

Thesis Approved:

_____
Thesis Adviser

_____

_____

_____

_____
Dean of the Graduate College

ACKNOWLEDGMENTS

The writing of a dissertation is a highly educational and exciting experience, at least that is true in the present case. A debt of gratitude is owed to a large number of persons who were responsible for providing me with the opportunity to undertake and complete this study. I am indebted to a large number of truly inspiring teachers who I have been fortunate enough to encounter during my schooling. In particular, the members of the faculty of the Department of Economics at Oklahoma State University have been especially effective in communicating the substance and beauty of the discipline of economics.

My greatest debt is owed to my major advisor, Robert Sandmeyer. Since my entry into graduate school he has been a consistent source of encouragement and guidance. His sincere interest in my progress is deeply appreciated. Ansel Sharp and James Jackson, the other members of my committee, provided valuable comments and suggestions and were very prompt in reading the manuscript.

Robert Clark and Judi Brazil were of great assistance in providing accurate typing of the manuscripts. Gary Morrison assisted with the computational work. Li-Teh Sun helped me formulate several parts of the study as well as

causing me to reconsider others. He also provided access to data that would otherwise have been unavailable.

Finally, a special note of thanks is due to my family. My parents, Mr. and Mrs. Charles E. Ross, have been an invaluable source of motivation, encouragement, and support. My wife, Nancy, gave me the happy environment and understanding that are so helpful during an effort of this type. A particularly appreciated stimulus has been the quiet confidence in my ability that has been reflected by my entire family.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The Purpose of the Study

Among the effects which the existence of a public sec-
tor has on an economy is its influence on the distribution
of income among the population. In the conceptual terms of
Richard Musgrave's multiple theory of the public household,
this influence is the concern of the distribution branch:
The "branch" of the government with the responsibility for
achieving an alteration in the prevailing distribution of
income.[1]

In the context of Musgrave's conceptual framework a
number of issues have arisen, one of which is the measure-
ment of this distributional effect of government activity.[2]
The purpose of the current study is to estimate the effects
which state and local government expenditures have on the
distribution of income within a single state. The state is
Oklahoma and the population is grouped in families according

---

[1]Richard A. Musgrave, The Theory of Public Finance (New
York, 1959), p. 5.

[2]The distributional effect of government activity is
referred to by Musgrave as "incidence." Ibid., p. 211. The
term will be used in that sense here.

to deciles of money income, where "family" also includes un-attached individuals. The time period for the study is fiscal year 1962.

This study is a manifestation of a recent trend in public finance towards the analysis of government expenditures. During most of the years that economists have been interested in government activity they have given a disproportionate amount of attention to the taxation side of the budget. The cause of this asymmetry, according to James Buchanan, stemmed from

> an early misconception by classical economists. Public expenditures were assumed to be wholly un-productive; therefore, the task of public finance theory was that of showing how the necessary tax load could be distributed so as to cause the least possible damage to the economy.[3]

The trend toward expenditure analysis is most notice-ably reflected by the attention that has been given recently to various forms of cost-benefit analysis. Within Musgrave's multiple theory of the public household cost-benefit or systems analysis would likely be within the province of the allocation branch. However, it is not always possible to keep the "branches" of government separate, even at a theo-retical level. Public expenditure analysts have begun to

---

[3]James M. Buchanan, The Public Finances: An Introduc-tory Textbook (3rd ed., Homewood, 1970), pp. 99-100. A very similar observation was made by John H. Adler, "The Fiscal System, the Distribution of Income and Public Welfare," Fis-cal Policies in the American Economy, ed. Kenyon E. Poole (New York, 1951), p. 365: "There has been a traditional em-phasis on the tax side of the budget, arising in part from the belief that government expenditures were non-productive, that they were, in effect, necessary evils."

take cognizance of the fact that it is not only the relationship between the volume of costs and benefits of a government project that has importance, but also the incidence of those costs and benefits.[4] This current study is an attempt to shed some light on the incidence dimension of government expenditures.

Although this study itself will be almost totally devoid of policy recommendations it could very well serve as the basis for them. It is hoped that the study will provide information that has previously been unavailable to policy makers.

Any analysis of government activity in the United States must take cognizance of the multi-level structure of governmental activity in this country. Separate decisions are made at federal, state, and local levels which cause separate and diverse results both horizontally and vertically.

Past studies examining the incidence of government taxes and/or expenditures have dealt with this multi-level dimension in either of two ways: by horizontal aggregation or by vertical separation. The first approach is the procedure used in national studies when the entire United States is

---

[4]James T. Bonnen, "The Absence of Knowledge of Distributional Impacts: An Obstacle to Effective Policy Analysis and Decisions," Public Expenditures and Policy Analysis, ed. Robert H. Haveman and Julius Margolis (Chicago, 1970), pp. 246-270. Burton A. Weisbrod, "Income Redistribution Effects and Benefit-Cost Analysis," Problems in Public Expenditure Analysis, ed. S. B. Chase (Washington, D. C.: 1968), pp. 177-209.

being analyzed.[5] State and local government activities are

aggregated and, in effect, are treated as being centrally

administered. Because these studies are national in scope

and because separate analyses for all states would not be

feasible in any one study, the practice of aggregation would

seem to be necessary and appropriate. The shortcomings of

such an approach are essentially the same as those faced in

any analysis where units of diverse characteristics are

aggregated.

---

[5]Among the incidence studies which have been made at the
national level are Adler, pp. 359-409; Robert J. Allison,
"The Effect of Taxes and Transfer Payments on the Distribu-
tion of Income" (Unpublished Ph.D. dissertation, University
of Colorado, 1966); Tibor Barna, Redistribution of Incomes
Through Public Finance in 1937 (Oxford, 1945); George A.
Bishop, "The Tax Burden by Income Class, 1958," National Tax
Journal, XIV March, 1961), pp. 41-58; Alfred H. Conrad, "Re-
distribution Through Government Budgets in the United States,
1950," Income Redistribution and Social Policy, ed. Alan T.
Peacock (London, 1954), pp. 178-267; W. Irwin Gillespie,
"Effect of Public Expenditures on the Distribution of In-
come," Essays in Fiscal Federalism, ed. Richard A. Musgrave
(Washington, D. C., 1965), pp. 122-186 (hereafter: Gilles-
pie, Brookings); _____, "The Effects of Public Expendi-
tures on the Distribution of Income: An Empirical
Investigation" (unpublished Ph.D. dissertation, Johns Hopkins,
1963), (hereafter: Gillespie, dissertation); _____, The
Incidence of Taxes and Expenditures in the Canadian Economy,
Report No. 6.1, a study prepared for the Royal Commission on
Taxation (Ottawa, 1965), (hereafter: Gillespie, Canadian);
Richard A. Musgrave, and others, "Distribution of Tax Pay-
ments by Income Groups: A Case Study for 1948," National Tax
Journal, IV (March, 1951), pp. 1-53; Peter Newman, "An Em-
pirical Study of the Distribution of the Tax Burden in the
United States, 1955-1959" (unpub. paper dated September,
1961); Tax Foundation, Inc., Tax Burdens and Benefits of
Government Expenditures by Income Class, 1961 and 1965, (New
York, 1967); Rufus S. Tucker, "Distributions of Tax Burdens
in 1948," National Tax Journal, IV (September, 1951), pp.
269-285 (hereafter: Tucker: 1951); and _____, "The
Distribution of Government Burdens and Benefits," American
Economic Review, Papers and Proceedings, XLIII (May, 1953),
pp. 518-543 (hereafter: Tucker, 1953).

When the level of analysis is reduced to the state and/
or local levels the results based on the aggregate approach
may not be satisfactory. Significant differences exist among
states as to types and amounts of government expenditures and
taxes, and of income levels and income distributions. Results
achieved by averaging all governments of a certain level sim-
ply cannot be applied to an individual governmental unit
without a sacrifice of a certain degree of accuracy.

For these reasons a second approach has been used in
other studies. By taking a single state as the unit of anal-
ysis these studies have gained an additional degree of pre-
cision.[6] Even these studies, however, have found it
necessary to use aggregation, primarily in regard to the
local units of government within the state. The practice of
aggregating on this level is necessitated by the same real-
ities that necessitate aggregating at both the state and
local levels in the national studies. The loss of accuracy
associated with aggregation is reduced, not eliminated. In
this study local expenditures will be treated as being
centrally administered.

---

[6]Among the studies which have been made at the state
level are O. H. Brownlee, Estimated Distribution of Minnesota
Taxes and Public Expenditure Benefits, (Minneapolis, 1960);
Governor's Tax Study Group, Financing Government in Colorado
(Denver, 1959); Richard A. Musgrave and Darwin W. Daicoff,
"Who Pays the Michigan Taxes?" Michigan Tax Studies: Staff
Papers, (Ann Arbor, 1958), pp. 131-184; University of Wis-
consin, Tax Study Committee, Wisconsin's State and Local Tax
Burden: Impact, Incidence, and Tax Revision Alternatives,
(Madison, 1959).

The Scope of the Study

Table I exhibits the categories and amounts of state and local government expenditures which this study will attempt to allocate. The categorization used in Table I (based on the Census of Governments' data) is not the categorization used in the body of the study. Some categories will be subdivided and others combined. Expenditures will be grouped according to the method by which they are allocated to income deciles.

Table I does not include all state and local government expenditures listed by the Census of Governments. Excluded are expenditures for sewerage ($5,948 thousand), sanitation other than sewerage ($5,043 thousand), public utilities ($62,400 thousand), and parking facilities ($115 thousand).[7] The rationale for their omission is that the payments made for these items are posited to be a close approximation of the benefits received. If that is true, these activities have little redistributional effect. The characteristics of public utility services are not typical of those usually considered as collective or merit goods.[8] Instead, such services are more characteristic of natural monopolies. In certain instances state and local governments choose public

_____

[7]U. S. Department of Commerce, Bureau of the Census, Census of Governments: 1962, Vol. IV, No. 4 (Washington, D. C.: 1963), Table 46, p. 112.

[8]Musgrave, The Theory of Public Finance, pp. 9-13.

TABLE I

SELECTED EXPENDITURES OF STATE AND LOCAL
GOVERNMENTS IN OKLAHOMA
FISCAL YEAR 1962

(In thousands of dollars)

Item	Total	State	Local
Education	264,274	70,948	193,326
Highways	135,206	83,393	51,813
Public Welfare	142,247	140,434	1,813
Hospitals	33,771	21,118	12,653
Health	5,180	3,106	2,074
Police Protection	16,239	3,017	13,222
Local Fire Protection	8,417		8,417
Local Parks and Recreation	4,243		4,243
Natural Resources	17,586	14,730	2,856
Housing and Urban Renewal	106		106
Airports	11,743		11,743
Correction	4,125	3,633	492
Libraries	2,103	352	1,751
Employment Security Administration	5,478	5,478	
Financial Administration	11,479	5,743	5,736
General Control	12,673	2,574	10,099
General Public Buildings	8,890	6,329	2,561
Insurance Trust Expenditure	26,735	24,828	1,907
Other and Unallocatable	18,393	9,036	9,357
	728,888	394,719	334,169

Source: U. S. Department of Commerce, Bureau of the
Census, Census of Governments: 1962, Vol.
IV, No. 4 (Washington, D. C.: 1963), Table
46, p. 112.

production rather than the alternative of private production with government regulation.

Also excluded are government interest payments ($18,470 thousand). The rationale for this exclusion is considered in detail in Chapter VI.

Ideally a study of this nature would examine the incidence of both sides of the public budget (taxes and expenditures). To do so, however, would be well beyond the practical limits of this study. Although less preferable, isolating one side of the budget would seem to be of significant value: "Except in certain minor cases of clear-cut benefit taxation, the two sides of the budget are the result of separate legislation and involve distinct issues."[9]

The time period which will be examined (fiscal year 1962) offers a number of advantages from the standpoint of data availability. One advantage is that it is a Census of Governments' year. This, in essence, means that an additional source of data is available in a concise form which is readily adaptable to comparisons with other states and with other Census of Governments' years. Census of Governments data are especially adaptable to the purposes of the study as they are more consistently categorized along functional criteria than most other data sources. Also, the year is reasonably close to a decennial Bureau of the Census year (1959), and the Department of Commerce's data on consumer expenditures (1960-1961).

---

[9]Musgrave and others, p. 8.

The decision to concentrate on the expenditure side of the budget resulted, in part, from the following considerations: the major effort to redistribute income through the tax side of the budget is carried out at the federal level, e.g., federal income taxes. But the major effort to redistribute income through the expenditure side of the budget is administered at the state level, e.g., public assistance programs. Another consideration was the fact that previous studies (with the exception of Gillespie's) have given more attention to the tax side of the budget. Hence, the expenditure side would seem to be the part of the problem in greater need of theoretical development and statistical analysis. One advantage of analyzing expenditures at the state and local levels in contrast to the federal level is that a much greater portion of expenditures can be identified with specific beneficiaries; at the federal level a large portion of total expenditures is for national defense, the classic example of a collective good. The benefits accruing from collective goods can be allocated in a variety of ways depending on a variety of assumptions, none of which is clearly preferable to another.

Plan of Presentation

The basic methodology to be used in the study is developed in Chapter II. Theoretical concepts, definitions, and assumptions upon which the body of the study are based are presented there.

The primary objective of Chapter III is to establish the definition of income that will be used. As part of the process of doing so, state governmental transfer payments are analyzed and distributed among income classes.

State and local governmental expenditures other than transfer payments are examined in Chapters IV-VI. Educational expenditures are the subject of Chapter IV, highway expenditures are examined in Chapter V, and miscellaneous and general expenditures are dealt with in Chapter VI. The format of each of these chapters is to examine the nature of the benefits from the respective expenditures and to establish one or more bases for their allocations among income classes.

Results and conclusions of the study are tabulated and presented in Chapter VII. Procedures developed in previous chapters are pulled together and put to use in this final chapter.

CHAPTER II

THEORETICAL AND MEASUREMENT ISSUES

Theoretical Concepts

In the absence of clearly defined objectives an empir-
ical analysis is destined to be vague in its results and to
contain needless peripheral issues. The purpose of this
section will be to specify the ultimate objectives of the
study. The following quotation from Gillespie's Canadian
study provides a useful starting point:

> Let us suppose that in the abstract realm of pure
> theory, a private economy exists in which each in-
> dividual owns a collection of assets (including the
> capitalized value of his labour), the income flows
> from which define his "economic position" relative
> to any other individual. Prior to time "t" the in-
> dividual had no method of satisfying his social
> wants, wants, that is, that can only be satisfied
> by goods consumed (or, at least, which are avail-
> able for consumption) in equal amounts by all. At
> time "t" the individuals of this private economy
> decide to create a government to provide those goods
> necessary to satisfy their social wants. The func-
> tion of this public sector is to divert resources
> from the private sector of the economy to the pro-
> vision of goods which satisfy social wants. Vari-
> ous alternative methods exist with which to effect
> this resource transfer, and each one may have a dif-
> ferent impact on various aspects of an individual's
> "economic position." At time "t+1" the economy has
> made a complete adjustment to the introduction of
> the public sector. Each individual experiences a
> change in his "economic position" due to the taxes
> which he now pays and the benefits from public
> services which he receives. It is this change in

"economic position" which comes close to defining the term "incidence."[1]

Gillespie's explanation of the incidence concept is based on the one established by Musgrave. According to Musgrave the common usage of the term incidence refers to "the ultimate resting place of the tax burden."[2] He argues, however, that such a definition lacks any real explanatory or conceptual value.

A premise underlying this as well as previous studies is that benefits from government expenditures are not bestowed on all members of the economy in proportion to their respective incomes. This is simply to say that incomes are redistributed as a result of government expenditures, that government expenditures are non-neutral in terms of the income distribution.

A second premise is that the benefits can be attributed to individuals in the economy. The basis for this premise was expressed by Tibor Barna:

> The central idea, in the conception of the redistribution of incomes, is that the entire national output is allocatable to the factors of production, the entire national income accrues to individuals, and the entire national expenditure benefits individuals.[3]

A related assumption is that these individuals can be identified as beneficiaries of certain kinds of expenditures, in this case government expenditures. Actually only a

---

[1]Gillespie (Canadian), pp. 1-2.

[2]Musgrave, The Theory of Public Finance, p. 206.

[3]Barna, p. 15.

limited identification is required here, i.e., they must be identified as members of certain income classes.

Previous authors have considered two alternatives for analyzing the redistributive effect of government expenditures: the money-flow concept and the benefits-received concept. The benefits-received concept has been used exclusively and will be used for this study. The differences between the two approaches and the reasons for discarding the money-flow concept were explained by Adler:

> The two concepts may be illustrated by our governmental policy toward war veterans. Under either one of the two concepts subsidy payments to veterans accrue to them. But if the money-flow concept is applied, government payments for the medical payments for medical care and hospitalization of veternas accrue to the medical profession, while under the "service" concept the veterans themselves receive the "income" of free medical care and hospitalization.

> On the basis of the foregoing examples, it should not be too difficult to decide which of the two concepts is, in reality, more plausible and useful. The money-flow concept is, by implication at least, based on the assumption that the imcome of government employees, for instance, would be zero if the government did not employ them.[4]

Although it was not mentioned by any of the authors, the money-flow concept would be inappropriate for another reason. It would be very difficult to determine how much the medical profession employee in Adler's example preferred working and an income to leisure and no income. The income he receives may just barely compensate him for his sacrificed leisure so that he has only a very small net benefit.

---

[4]Adler, pp. 360-361. The two concepts are also examined by Conrad, p. 181.

Procedural Framework

The purpose of this section will be to make operational the theoretical concepts presented in the first part of the chapter. The discussion will be concerned with the methods of measurement to be employed and the general limitations of the study.

The income redistributional effects of government expenditures will be measured in the following ways:

    (1) Lorenz curves of initial and final income distribution will be presented tabularly and graphically. Lorenz curves will be defined in Chapter III.

    (2) Rates of incidence of each type of expenditure will be presented for each income decile.

Rates of incidence are expressed as ratios between the quantity of income within an income class and the quantity of a particular expenditure-benefit within that class. They provide a measuring device for comparing how one income class has benefited from government expenditures in relation to another income class. A tax or expenditure is defined as being regressive, proportional or progressive depending on what happens to the rate of incidence as income increases.

An issue has arisen in regard to the progressive-regressive terminology that has not been clearly resolved. Gillespie argued that any variable that increases more than proportionately with income should be called progressive;[5]

---

[5]Gillespie (Brookings), p. 132.

Conrad argued that any tax or expenditure that leaves the distribution of income less concentrated than it was initially should be called progressive.[6] Thus an expenditure that increased more than proportionally with income would be called progressive by Gillespie and regressive by Conrad. Gillespie's argument is more convincing in this writer's opinion, and in this study a progressive expenditure will be defined as one that increases more than proportionately with income, i.e., one that is "pro-rich." That is, of course, opposite from the meaning of a progressive tax.

The computation of rates of incidence may be approached in two ways: (1) by assuming that government activity is introduced into a situation without it, and (2) where government activity is removed from a situation where it initially existed.[7] If it were possible to conduct an experiment, the nature of that experiment would dictate which approach to use. Such an experiment is not feasible, and so it is necessary to proceed "as if" it had been conducted.

The two approaches can be expressed algebraically as follows:

(1) Introduce government activity

    (a) $\frac{T}{Y}$ (tax incidence)

    (b) $\frac{G}{Y}$ (expenditure incidence)

---

[6]Conrad, pp. 180-181.

[7]These computational techniques were defined by Gillespie in his works cited above.

(c) $\dfrac{G-T}{Y}$ (budget incidence)

(2) Remove government activity

    (a) $\dfrac{T}{Y-T+G}$

    (b) $\dfrac{G}{Y-T+G}$

    (c) $\dfrac{G-T}{Y-T+G}$

where Y = money income before taxes and transfer
        payments

     T = taxes

     G = government expenditures (including transfer
        payments)

Neither method has a clear advantage over the other.
Most of the previous studies have used the first approach,
and that will be the case with this study also.

As is probably evident, the income definition to be
used as the denominator of the incidence rates has a critical
effect on those rates and on the results of the entire study.
The specific definition to be used here will be developed in
Chapter III.

All previous studies of incidence to this writer's
knowledge have measured benefits of government expenditures
in terms of "cost-incurred-on-behalf-of." According to this
procedure the value of a product or service provided by the
government is equal to the total cost of providing that
product or service. As an example the total value of the
national security resulting from expenditures for national
defense would be equal to the cost of the defense activity.

Previous writers have, however, evidenced a certain degree of reluctance to value benefits in this manner. The reluctance results, in part, from the question of whether goods provided through the public budget are provided up to the point where marginal benefit equals marginal cost. Gillespie pointed out that "since goods which satisfy social wants are not paid for through voluntary purchases in the market, there exists no automatic measure of consumer satisfaction in an observed market place."[8] There is a growing body of literature which is concerned with a more precise measure of the value of public expenditures, but no alternative seems to have achieved general acceptability. In this study benefits will be valued in terms of the costs-incurred-on-behalf-of criterion, but in certain instances doubts about the validity of so doing will be expressed and examined.

As defined by the Census of Governments, 22.2% of total state and local government expenditures in Oklahoma for fiscal year 1962 was for capital outlay.[9] This reflects the fact that a significant portion of the benefits of public expenditures during any normal accounting period will not

---

[8]Gillespie (Brookings), pp. 130-131. The cost-valuation approach is also defended by Conrad, pp. 235-236, and Tucker (1953), pp. 525-529.

[9]Capital outlay is defined as "construction, equipment, and purchases of land and existing structures." U. S. Department of Commerce, Bureau of the Census, Census of Governments: 1962, Vol. IV, No. 4 (Washington, D. C., 1963), pp. 5 and 112.

accrue to the recipients during that time period. The portion will certainly be greater than the 22.2% mentioned above, e.g., most of the benefits from current expenditures for education will accrue during future time periods. If such expenditures remain relatively constant over time, the assumption could be made that current expenditures are reasonable estimates for the benefits from previous expenditures that are currently "falling due." Unfortunately there is no way to determine what "reasonably constant" might be, or how capital expenditures would be temporally allocated if they have not been reasonably constant over time.[10] Because of this lack of a better alternative the assumption will be made that the benefits from all expenditures can be allocated currently even though the actual flow of benefits continues beyond the end of the current period. A more complete explanation and defense of this procedure is provided in Chapter IV.

The essential steps in the estimating process to be used in this study are (1) the establishment of theoretical cases to explain which persons can be expected to receive the benefits resulting from state and local government expenditures in Oklahoma, (2) the distribution of those persons according to income groups, and (3) to estimate the income redistributional effect of state and local government

----

[10]Adler, p. 389, raises questions similar to those above. Newman, p. 6, partially resolved the time problem by analyzing a five year period.

expenditures using (1) and (2) along with the initial distribution of income and the magnitudes of the government expenditures. The bulk of the study will be an attempt to distribute, according to income groups, those persons benefiting from respective kinds of government expenditures.

Often during the study national data will be used to estimate allocations for Oklahoma. The implicit assumption is that families within a certain decile in Oklahoma are typical of families within that same decile nationally. This is a commonly employed assumption; in fact, Gillespie used United States data in his Canadian study.

Repeatedly throughout the study choices will have to be made concerning what amount of detail and precision is required to be consistent with the objectives of the study. The reasoning behind such choices will be made explicit in each case.

A premise underlying this and similar studies is that even when a perfectly precise answer is not attainable, it is preferable to have at least the best available approximation. Whether or not the derived approximation is satisfactorily accurate can only be determined by the reader. The duty of the researcher is to make the approximation as close as possible, and, perhaps even more importantly, to make explicit how and under what assumptions it was obtained.

Summary

The purpose of this chapter has been to express as clearly and as rigorously as possible the conceptual and theoretical underpinings of the study. The chapter began with an attempt to provide a rigorous theoretical definition of the incidence concept. Basic premises necessary for the logical development of the entire study were the next matter given attention. Following this was an explanation of how benefits from government expenditures will be measured. The final section of the chapter discussed the general procedure to be employed in the study as well as some of the problems and limitations inherent in a study of this type.

CHAPTER III

THE DISTRIBUTION OF INCOME

Introduction

An element common to all studies of the incidence of government taxes and/or expenditures is the establishment of an appropriate measure of the distribution of income. Obviously, the definition of income and its distribution will have a very significant effect on the final results.

Although some form of income distribution is derived in each of the incidence studies, there is a noticeable lack of any common method. The differences in methodology seem to result from two causes: first, the differences in the objectives of the studies, and secondly, differences in the quality and quantity of income distributional data sources. The format of this chapter will be to explain what income definition and distribution is most appropriate in terms of the objectives of this study, to list the data that are available, and to bring about a reconciliation between the required data and the available data.

Derivation of the Income Distribution

Ideally, the income distributional data that would be of the most appropriate form for this study would

have the following characteristics:

1. It would be computed separately for Oklahoma;
2. It would be classed according to families and income deciles;
3. It would be for fiscal year 1962;
4. It would be exclusive of both positive and negative personal taxes.

Only two income distributional series are computed separately for each of the states: the decinial census conducted by the Department of Commerce and the annual summaries of personal income tax data published by the Internal Revenue Service. The currency of the I.R.S. data would be a definite advantage, but it is presented in such a way as to make it virtually unadaptable for use in this or other incidence studies. The "population" of the data is tax returns and joint tax returns. There is no way to accurately convert this data into a form that is consistent with the population definition (i.e., families and unattached individuals) appropriate for this study, and consistent with the other data sources necessary for the allocation of benefits.[1]

The income distributional data presented by the Department of Commerce's Bureau of the Census possess several characteristics which, in its initial form, make it unsuitable for the study. Fortunately, however, methods exist which allow conversion of the data into an appropriate form.

---

[1]Recently at least one effort has been made to integrate the I.R.S. data with other distributional series. Edward C. Budd and Danial B. Radner, "The OBE Size Distribution Series: Methods and Tentative Results for 1964," American Economic Review, Papers and Proceedings, LIX (May, 1969), pp. 435-449.

For purposes of the study the definition of families and unrelated individuals is different from that used in the Decennial Census of Population. The number of unrelated individuals reported by the Decennial Census is larger than for any other major population survey, including the Bureau's own annual surveys. This results from the fact that certain "special groups" are included in the definition of unrelated individuals. These special groups are three: military personnel living on post, the civilian institutional population, and college and university students living away from home.[2] Not only is such a definition unsuitable in terms of how it relates to other data sources, but it is also unsuitable for conceptual reasons. For instance, the benefits from educational expenditures are considered here to accrue to the family of which the college student is a member.

Also in comparison to other surveys, there is evidence that the Decennial Census of Population understates income. The understatement is thought to result from the questionnaire survey procedure used in the Decennial Census.[3]

The "special groups" and "income understatement" characteristics of the Decennial Census data make it unsuitable not only for this study but for others as well. Because of this the National Planning Association, as a preliminary step

---

[2]National Planning Association, Projections of Income Size Class Distributions of Consumer Units by State for 1964, 1974, 1976, Regional Economic Projection Series, No. 64-III (Washington, D. C., 1964), p. 27.

[3]Ibid., p. 34.

to projecting the income distributions by state, adjusted
the data by absorbing the special groups and by expanding
the income definition to make it consistent with the Office
of Business Economics' family money income definition. The
Decennial Census data, as adjusted by the NPA, will be used
as the starting point for deriving the income distribution
to be used in this study.

The family money income concept is derived from the
OBE's personal income series and family personal income
series. The three income definitions are related as follows:

Personal income[4]

> less "personal" income of institutions, i.e.,
> property income of non-profit institutions,
> transfer payments to such institutions, and
> the undistributed income of private trusts,
> pensions, and welfare funds.

> less personal income of institutional popula-
> tion, i.e., income of military personnel on
> posts and of income of the civilian institu-
> tional population,[5]

Equals: Family (consumer units) personal income

> less non-monetary items, e.g., non-money ci-
> vilian wages and/or salaries, imputed interest
> and accrued interest on U. S. government bonds,
> imputed net rental value of owner-occupied
> homes, food and fuel produced and consumed on
> farms, and farm inventory value adjustments.[6]

Equals: Family (consumer units) money income.

---

[4]The common OBE national accounts definition of person-
al income.

[5]Ibid., p. 29.

[6]Ibid., pp. 128-129.

There usually arises the question at some point in
incidence studies about what kinds of income to include in
the income definition. One could argue that family money
income is not a sufficiently inclusive measure of economic
well-being. Non-money income could be imputed to the distri-
bution in the same manner that was used by the NPA to get
from the Census' estimate of income to the family money in-
come concept, or by others to get from one income definition
to another. The critical question is whether or not the
benefits of expanding the income definition, in terms of
getting nearer to an accurate measure of economic welfare,
are greater than the costs, in terms of the inaccuracies
associated with the imputation of additional income. The
following comment by Edward C. Budd is perhaps appropriate:

> While the inclusion of imputed income obviously
> serves to raise average income its effect on ine-
> quality is far from clear . . . If anything there
> may be a small relative redistribution away from
> middle-income groups towards the rich and the
> poor.[7]

The NPA's income distributional data is classed accord-
ing to income brackets, e.g., less than $1,000 - $1,999, etc.
Although most of the other data which will be used in the
study are classed in income brackets, it was decided that
the computations and results would be presented in terms of
income deciles. The decision resulted from several consid-
erations.

---

[7]Edward C. Budd, "Postwar Changes in the Size-
distribution of Income in the U. S.," American Economic Re-
view, Papers and Proceedings, LX (May, 1970), p. 256.

Of primary importance was the fact that decile distribu-
tions are more adaptable to various computational procedures
necessary as part of the study. Although techniques exist
which allow adjustments of income distributional data when
it is presented in income bracket form, the results are less
precise and defensible than with decile distributions. The
problem referred to by Gillespie as "bracket jumping" illus-
trates the point. Bracket jumping occurs when income is
added or subtracted from an initial distribution. For in-
stance when income is added some units in the $1,000 - $1,999
income bracket will move to the $2,000 - $2,999 income brack-
et, but, as Gillespie states, "it is impossible to determine
either the number of bracket jumpers or the proportion of
income they carry with them."[8] However, because deciles are
relative rather than absolute categories, bracket jumping
will occur in both directions. In fact there will be no
change of populations within the deciles--by definition there
cannot be. Changing the income definition will change only
the total income and mean income (for the total population
and within deciles), and these changes can be estimated.

---

[8]Gillespie, Brookings, p. 126. He raised the problem
of bracket jumpers as part of an effort to impute non-money
income to an income distribution. He stated that bracket
jumpers may be ignored if they "carry with them an equal pro-
portion of income and taxes from the lowest bracket, then
the effective tax rate (as a percentage of income) will not
change after allowance is made for bracket jumpers." (his
emphasis) Although bracket jumping would also have occurred
when Gillespie removed transfer payments from his income
distribution, and the justification for previously having
ignored them would not hold, he failed to discuss the matter.

Throughout the study a criterion for choosing from among alternative methodology is, where possible, to choose the most universally adaptable approach in order to increase the study's clarity and comparability. This criterion was instrumental in the decision to use deciles. The gain in comparability can hardly be exaggerated. To this writer's knowledge, there exists no feasible method that allows a clear comparison of results when data are presented in income brackets if the income definitions differ. Income deciles provide a medium of comparison, a common denominator.

Quantiles emphasize the relative character of income distributions. Insofar as one is of the opinion that economic well-being is partly a function of a person's relative position, quantile distribution would have an advantage over an income bracket distribution.

If one chooses to use an income bracket distribution a choice must be made as to the number and upper and lower limits of brackets to use. Quantiles provide a somewhat more objective basis for choosing, although a degree of subjectivity remains, e.g., should quintiles or deciles be used?

Table II shows the distribution of family money income by income brackets and deciles. Linear interpolation was used to convert the data into deciles.[9] Linear interpolation points were very close to observed values; four of the nine

---

[9]The same linear interpolating technique was used by Robert J. Allison (Ibid., p. 26).

were within one percentage point of an abserved value and
two others were within two percentage points. The Gini coef-
ficient with the initial data was computed to be .440, and
with the converted data to be .427.[10] The decreased Gine co-
efficient (reflecting a reduced degree of inequality) result-
ed, for the most part, from the failure of the decile grouped
data to reflect the income inequality within the tenth
decile.

Thus far the data have been adjusted such that they
possess two of the four "ideal" characteristics which were
listed at the first of this chapter. The third characteris-
tic concerns the time period chosen for the study. The
Census and NPA data are for calendar year 1959; the time
period for the study is fiscal year 1962.

Basically, there are three phenomena which could effect
an income distribution over some time period: the population
could change, the amount of income could change, and the dis-
tribution of the income among the population could change.
The first two phenomena have occurred during the relevant
time period (calendar year 1959 to fiscal year 1962) and pose

---

[10]The Gini coefficient was computed using the method
explained by James N. Morgan, "The Anatomy of Income Distri-
bution," Review of Economics and Statistics, XLIV (August,
1962), p. 281. A Lorenz curve derived from grouped data
results in a segmented line which forms the tops of a series
of trapezoids. The Gini coefficient is derived by dividing
the difference between the sums of the trapezoids and the
triangle of equal income distribution. The greater the dif-
ference, the greater the ratio and the greater the resulting
Gini coefficient.

TABLE II

DISTRIBUTION OF FAMILY MONEY INCOME IN OKLAHOMA BY
INCOME BRACKETS AND DECILES, 1959

Income Class	Families	Cumulative Per Cent	Income (000's)	Cumulative Per Cent	Deciles	Income (000's)	Cumulative Per Cent
Under 1,000	68,605	9.38	$ 43,181	1.08	Lowest	$ 50,036	1.25
1,000- 1,999	83,200	20.76	125,839	4.23	2	110,624	4.02
2,000- 2,999	93,540	33.55	234,448	10.10	3	177,885	8.47
3,000- 3,999	97,548	46.89	341,372	18.64	4	230,119	14.23
4,000- 4,999	92,434	59.53	415,249	29.03	5	278,437	21.20
5,000- 5,999	80,435	70.53	441,014	40.06	6	331,910	29.50
6,000- 6,999	59,343	78.65	383,991	49.67	7	400,690	39.52
7,000- 7,999	38,722	83.95	289,876	56.92	8	479,182	51.52
8,000- 8,999	26,409	87.56	223,772	62.52	9	609,228	66.76
9,000- 9,999	21,816	90.54	206,881	67.70	Highest	1,328,400	100.00
10,000-14,999	42,979	96.42	512,932	80.53			
15,000-24,999	16,696	98.70	312,824	88.36			
Over 25,000	9,340	99.98	465,132	100.00			
Total	731,069		$3,996,511			$3,996,511	

Source: National Planning Association, Projections of Income Size Class Distribu-
tions of Consumer Units by State for 1964, 1969, 1974, 1976, Report No.
64-III (Washington, D. C., 1964), appendix, Tables 3 and 5.

no computational difficulty, provided that the third has not occurred. In fact, evidence strongly supports the assumption that the income distribution did not change significantly. Stated differently, the evidence indicates that the Lorenz curve is a relatively stable economic variable.[11] Conversely, there appears to be a total lack of evidence on which to build a conclusive argument that the distribution has altered in a determinable direction.

Assuming an unchanged distribution, the data are projected by estimating the increases in total income and total population during the relevant time period. The initial income and population within each class are then multiplied by their respective growth factors. Each decile still accounts for the same percentage of the total income and population, but the percentages are of greater totals. The first decile of families and unattached individuals is ten per cent of a larger population and receives the same portion (1.25%) of the total income, that total having also increased.

Computation of the growth factors is accomplished by estimating the increases in total family money income and total families and unattached individuals between calendar year 1959 and fiscal year 1962, a period of two and one-half

[11]Edward C. Budd, "An Introduction to a Current Issue of Public Policy," Inequality and Poverty, ed. Edward C. Budd (New York, 1967), p. xi; _____, "Postwar Changes in the Size Distribution of Income in the U.S.," p. 247-260; and Mary Jean Bowman, "Poverty in an Affluent Society," Contemporary Economic Issues, ed. Neil W. Chamberlain (Homewood, 1969), p. 52.

years. By making the assumption that the average unit size of "families and unattached individuals" has remained constant during the period, the amount of change in the total numbers of these units is approximated to be 5.315 per cent and the number of families and unattached individuals in fiscal year 1962 to be 769,925 (=731,069 x 1.05315).[12]

The growth factor for total family money income was computed using data published by the Office of Business Economics. In this case the essential assumption is that total family money income remained a constant portion of total personal income during the period in question.[13] The income growth factor was thus computed to be 1.0776 and total family money income estimated to be $4,306,640,000 for fiscal year 1962 (rounded to thousands of dollars).[14]

---

[12]During the three year period from July 1, 1959, to July 1, 1962, Oklahoma's population was estimated to have increased from 2,289,000 to 2,435,000. U. S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States: 1965 (Washington, D. C., 1965), p. 11. Using 1959 as the base this was an increase of 6.378%

$$\frac{(2,435,000 - 2,289,000)}{2,289,000}.$$

The increase for the two and one-half year period was approximated by taking 5/6 of the three year increase (=5.315%), and the growth factor is 1.05315.

[13]One reason for using the OBE data for proxy purposes is that the NPA statistically and conceptually integrated their data with the income side of the OBE's personal accounts. National Planning Association, p. 28.

[14]The OBE data are for calendar years. Personal income in Oklahoma for fiscal year 1962 was computed by averaging the incomes for 1961 and 1962

$$\frac{(\$,457 \text{ million} + 4,661 \text{ million})}{2} = \$4,559 \text{ million}.$$

U. S. Department of Commerce, Office of Business Economics, Survey of Current Business, Vol. XLIII, No. 4 (April, 1963),

Transfer Payments

The income distributional data as adjusted to this point
retains a type of income which cannot be satisfactorily in-
cluded in the income base appropriate for this study. In
order to obtain an income base that treats positive and nega-
tive state and local taxes consistently, state and local
government transfer payments (negative taxes) must be deleted
from the family money income data.

The personal income definition of the OBE includes
transfer payments which can be considered conceptually equiv-
alent to negative taxes. However, positive taxes are not
included; their income definition is often labeled before-
tax income. This label is inaccurate because it is before
positive taxes but after negative taxes. Transfer payments
must be deleted in order to arrive at an income distribution
that is net of both positive and negative taxes, i.e., in
order to derive an income distribution that is consistent in
its treatment of positive and negative taxes.

Not only would it be inconsistent not to delete state
and local transfer payments for the above reason, it would
also be inconsistent in terms of the other categories of

---

p. 8. Personal Income for calendar year 1959 was $4,138
million. U. S. Department of Commerce, Office of Business
Economics, Survey of Current Business, Vol. XLI, No. 4
(April, 1961), p. 13. The growth factor is 1.0776
$$\left(= \frac{\$4,459 \text{ million}}{\$4,138 \text{ million}}\right).$$
The NPA data (Table II) was multiplied by this factor to get
family money income for fiscal year 1962.

state and local government expenditures. Failure to do so
would result in an initial income definition that included
some state and local government expenditures (transfer pay-
ments) and excluded others (e.g., highway expenditures).
Federally administered transfer payments, consisting mainly
of Old Age and Survivors Disability Insurance, will not be
deleted from the income definition. In terms of this study,
federal transfer payments are essentially equivalent to
private transfer payments to which the above considerations
do not apply.

The purpose of the remainder of this chapter will be to
explain how state and local transfer payments are distributed
among deciles. Within Oklahoma government transfer payments
result from three kinds of expenditures as categorized by
the Census of Governments: public welfare, unemployment in-
surance payments, and state and local government employee
retirement benefits.

Public welfare transfer payments include old age assist-
ance (OAA), aid to families with dependent children (ADC),
aid to the permanently and totally disabled (APTD), aid to
the blind (AB). Eligibility for these programs is based on
"need," which is defined by income and property of the re-
cipient and by the characteristics alluded to in the titles
of the programs. However, not all income and property is

disallowed in determining need for the recipients of the aid.[15]

During fiscal year 1962, 7.8% of Oklahoma's civilian population received some form of public assistance. Of the population aged sixty-five years and over 34.9% received old-age assistance and 6.6% of the population under eighteen years of age received aid to dependent children.[16] Table III shows average monthly cases, persons, and payments by public assistance categories. The average annual public assistance income per case was $924 (=12 x $77).[17] The total public

---

[15]For OAA recipients the first ten dollars and half of the next forty dollars of earned income per month is disregarded for computation of the grant, for AB all the recipient's earned income of eighty-five dollars or less and one half that in excess of eighty-five dollars is exempt. Oklahoma Department of Public Welfare, Division of Research and Statistics, Income and Special Requirements in Public Assistance Cases: December, 1963 (Oklahoma City, 1963), p. 2. AFDC recipients are allowed to deduct certain amounts of earned income for school-related and work-related expenses. Oklahoma Department of Public Welfare, Division of Research and Statistics, Income and Special Requirements in Public Assistance Cases: May, 1967 (Oklahoma City, 1967), p. 1.

[16]Oklahoma Department of Public Welfare, Division of Research and Statistics, Annual Report, Fiscal Year Ending June 30, 1962 (Oklahoma City, 1962), Appendix, Charts 10, 12, and 15.

[17]The following definition of the term "case" is from a letter dated February 18, 1971, from Dale L. Mitchell, Supervisor of the Division of Research and Statistics of the Oklahoma Department of Public Welfare: "A case may be defined as a person or family unit approved for financial assistance or services rendered by this Department. In the category of Old Age Assistance, a case represents a person over 65 years of age, and dependents, receiving a money payment. If husband and wife are both over 65 years of age, they each have a case. The difference between the number of cases and the number of persons then would be number of dependent spouses under 65 years of age. In the category of

assistance payments for the year were $109,621,000 (=$924 x
118,637). This quantity does not agree with the $109,832,000
figure listed by the Census of Governments;[18] the discrepancy
is partly attributable to the miscellaneous categories of
cash payments not included in the four major categories of
public assistance. In terms of overall effects, the differ-
ence is slight; the Census of Governments' figure will be
used for allocation purposes.

The assumption will be made here that the benefits from
transfer payments accrue to the recipients of the payments.
This is an assumption partially equivalent to the common pro-
cedure of assigning the burden of a positive personal income
tax to the point of initial liability, i.e., that personal
income taxes are not shifted. This is the assumption made
in all but one of the earlier incidence studies. Brownlee
argued that the reduction of poverty benefitted all, not just
those whose individual poverty was reduced.[19] Based on this

---

Aid to Families with Dependent Children, the case represents
a family and the number of persons include both children and
the needy caretaker whose needs are included in the assist-
ance grant. However, a case may contain only one or more
children if the caretaker is not needy or whose needs are in-
cluded in another category. In the category of Aid to the
Blind, the case represents the blind person, who may or may
not have dependents. Again, as in the case of Old Age As-
sistance, the difference between the case count and the per-
son count is the number of dependents of blind persons. The
same thing is true of Aid to the Disabled. The case would
represent the number of disabled persons who have been certi-
fied eligible for assistance."

[18]Census of Governments, 1962, Vol. IV, No. 4, p. 112.

[19]Brownlee, p. 33.

rationale he allocated benefits from public welfare expenditures equally per capita.[20]

A variety of methods and data sources has been used in previous studies to allocate public assistance payments. The early studies were faced with a rather stark lack of data with which to approximate the allocation of public assistance payments. Musgrave and Daicoff arbitrarily allocated ninety-five percent of the payments to the income bracket of less than $2,000 and the other five per cent to the $2,000-$2,999 bracket.[21] Adler allocated the payments inversely to income below $4,000.[22] More recent studies have relied on survey data to approximate the distribution of public assistance benefits.

There are only two published surveys that separate public assistance payments from other kinds of transfer income: the Survey of Consumer Expenditures by the Bureau of Labor Statistics[23] and Families in Low-Rent Projects, 1960 by the Housing and Home Finance Agency.[24] The latter is the

[20]Based on an assumption of interdependence among individual utility functions, Harold M. Hochman and James D. Rodgers have extended and refined the kind of approach used by Brownlee. "Pareto Optimal Redistribution," American Economic Review, LIX (September, 1969), pp. 542-557.

[21]Musgrave and Daicoff, p. 182.

[22]Adler, p. 385.

[23]U. S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditures and Income, Survey of Consumer Expenditures 1960-61, Report No. 237-38 and various supplements (Washington, D. C., 1965 and 1966).

[24]U. S. Housing and Home Finance Agency, Families in Low-Rent Projects, 1960, Item 225.1 (Washington, D. C., 1961).

distribution that was used by Gillespie. The sample was small and non-random, but the BLS survey was not available to Gillespie. The two estimates of the distribution of payments are quite different; concentration in the lower brackets is less pronounced in the BLS data, where there is reflected a surprising portion of the total payments going to the highest three deciles (22.3%). The BLS provides no explanation as to why there is such a significant quantity of payments going to the highest deciles. Although the occurrence of such payments in these deciles might seem unlikely, the unliklihood is founded on a priori grounds. Any attempt to adjust the distribution would be arbitrary.

The BLS data is based on a much more broad and inclusive survey than the survey by the Housing and Home Finance Agency. The BLS data will be used here to allocate public assistance payments. The only adjustment will be the conversion of data into deciles.

Unemployment compensation transfer payments are administered by the Oklahoma Employment Security Commission. Payments are made from a trust fund that arises from a payroll tax levied on employers. The program is similar in nature to the federal social security program. Eligibility for unemployment insurance benefits is defined by the recipients' current unemployment and past earnings.[25] For calendar year

---

[25]Oklahoma Employment Security Commission, 1962 Annual Report to the Governor (Oklahoma City, 1963), p. 23: "To be eligible for benefits a claimant must have earned a certain amount of wages during a stated period of time with one

1961 the average weekly benefit was $25.84 for an average duration of 16.2 weeks; for calendar year 1962, the restrictive amounts were $25.62 and 14.9 weeks.[26]

The total amount of payments for fiscal year 1962, as computed from the Employment Security Commission data, was $18,941,287.[27] According to the Census of Governments, the figure was $17,998,000.[28] Again, in terms of overall effects, the difference is small and the Census of Governments' data will be used for allocation purposes.

In the published form the BLS data combined "public unemployment and social security benefits." Because most of this combined amount consists of social security benefits, this grouping would provide an unsatisfactory source of data with which to estimate the distribution of unemployment insurance benefits. Fortunately, however, the data are presented separately by the BLS in unpublished computer printouts.[29] This distribution will be used to allocate unemployment insurance transfer payments and the benefits accruing therefrom.

---

or more firms covered by the law. He must have registered for work with the employment service, able and available for work and must, when directed by the Commission, make a reasonable effort to obtain work in his own behalf."

[26]Ibid., p. 25.

[27]Oklahoma Employment Security Commission, 1961 Annual Report to the Governor, p. 31, Table II, and 1962 Annual Report to the Governor, p. 26, Table II.

[28]Census of Governments: 1962, Vol. IV, No. 4, p. 112.

[29]U. S. Department of Commerce, Bureau of Labor Statistics, Survey of Consumer Expenditures (unpub. computer data, 1960-1961), Table I, p. 2065.

One additional kind of state and local transfer payment remains to be allocated: pension payments for retired state and local government employees (mainly teachers, police, and firemen).[30] During fiscal year 1962, $4,852,000 of such payments were made at the state level and $1,907,000 at the local level.[31] The distribution of such payments will be estimated using data for social security payments from the BLS computer print-out series.

The distribution of income which will be used in this study as the basis to estimate expenditures incidence is derived in Table III. Computation of the actual rates of incidence will be deferred until Chapter VII. It can be seen from Table III that transfer payments by themselves have a significant effect on the distribution of income in Oklahoma. The Gini coefficient computed from the family money income decile distribution is .427. Computed from the adjusted decile distribution it is .447.

The difference between the two income definitions can also be seen in Figure 1. Adjusted family money income is represented by the Lorenz curve further from the 45° line of equal distribution.

---

[30]U. S. Department of Commerce, Bureau of the Census, Census of Governments: 1962, Vol. VI, No. 1, Employment Retirement Systems of State and Local Governments (Washington, D. C., 1963), Table 5, p. 21.

[31]Census of Governments: 1962, Vol. IV, No. 4, p. 112.

TABLE III

DISTRIBUTION OF FAMILY MONEY INCOME, TRANSFER PAYMENTS, AND ADJUSTED FAMILY MONEY INCOME IN OKLAHOMA, FISCAL YEAR 1962

Dollar Amounts are in Thousands

Deciles	Lowest	2	3	4	5	6	7	8	9	Highest	Total
ITEM:											
Family Money Income	53,919	119,208	191,689	247,976	300,044	357,666	431,784	516,366	656,504	1,431,484	4,306,640
Per cent	1.25	2.78	4.45	5.76	6.97	8.30	10.03	11.99	15.24	33.24	100.00
LESS:											
Public Assistance Payments	12,038	33,859	12,532	7,750	7,365	6,343	5,530	6,816	7,519	10,180	109,932
Per cent	10.95	30.80	11.40	7.05	6.70	5.77	5.03	6.20	6.84	9.26	100.00
Unemployment Insurance Payments	466	2,020	3,081	2,848	2,173	1,817	1,842	1,468	1,365	908	17,988
Per cent	2.59	11.23	17.13	15.83	12.08	10.10	10.24	8.16	7.59	5.05	100.00
Pension Payments	1,224	1,482	1,181	744	512	408	326	324	290	268	6,759
Per cent	18.10	21.92	17.47	11.01	7.58	6.04	4.83	4.80	4.29	3.96	100.00
EQUALS:											
Adjusted Family Money Income	40,191	81,847	174,895	236,634	289,994	349,098	424,086	507,758	647,330	1,420,128	4,171,961
Per cent	.96	1.96	4.19	5.67	6.95	8.37	10.17	12.17	15.52	34.04	100.00

Source: Family money income is derived from Table II using the growth factor computed on page 31. Transfer payment totals are from Census of Governments: 1962, Vol. IV, No. 4, Table 46, p. 112. The transfer payments were distributed according to series from Appendix A.
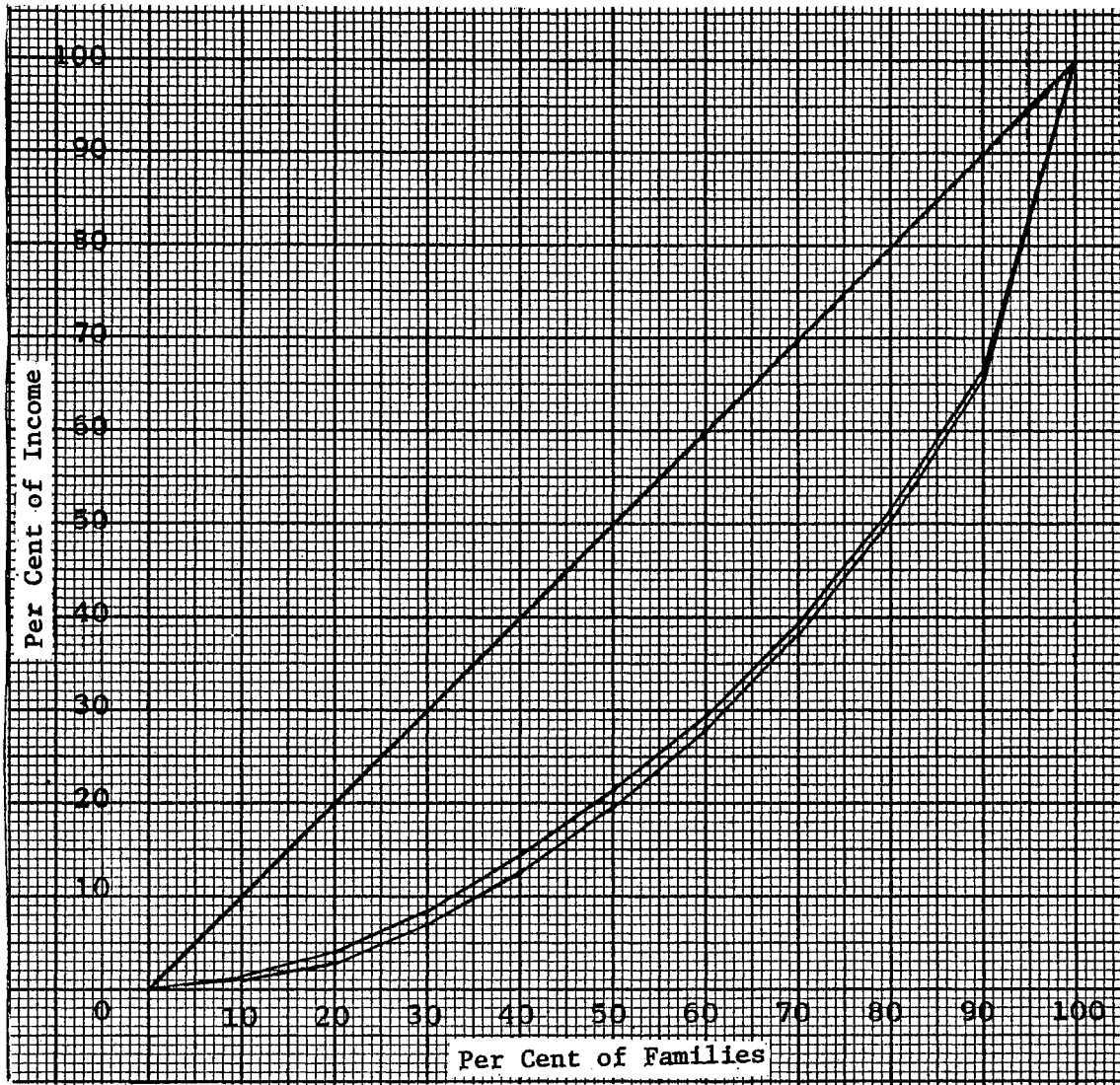
Figure 1. Lorenz Curves of Family Money Income
and Adjusted Family Money Income

Summary

With this chapter began the development and computation of data to be used in deriving the results of the study. The major portion of the chapter was concerned with the following objective: to adjust the available data on the distribution of income to reconcile it with the distribution of income appropriate to the objectives of the study. This was accomplished by listing the characteristics of the appropriate distribution of income, by reviewing the sources and characteristics of the available data, and then to derive, analyze, and apply methods of adjustment and reconciliation.

An important characteristic of the appropriate income distribution is that it be free of all positive and negative income taxes. The final section of the chapter examined state and local negative income taxes (transfer payments) and deleted them from the distribution of income as reflected by the published data.

CHAPTER IV

EDUCATIONAL EXPENDITURES

Introduction

For transfer payments the theory of incidence is rela-
tively straightforward, and for this reason was given little
attention as the benefits from transfer payments were being
allocated in Chapter III. It is generally assumed that the
benefits from transfer payments are not shifted and that the
benefits accrue currently.

The incidence of educational benefits, however, is not
so straightforward. In fact, the question of who benefits
from educational expenditures is among the more challenging
topics in the fields of public finance and manpower econom-
ics. The bulk of this chapter will be concerned with the
establishment of theories which attempt to explain who are
the beneficiaries of education expenditures. The review and
analysis of the benefits and beneficiaries will not be re-
stricted to monetary benefits. The fact that benefits will
be measured in dollars does not preclude consideration of
non-monetary benefits, particularly in light of the objec-
tive, i.e., the determination of portions or shares of total
benefits being received by various groups.

Education as Capital Formation

Before attempting to allocate the benefits of education-
al expenditures, the legitimacy of a critical procedural as-
sumption must be scrutinized, i.e., the assumption that the
benefits from education accrue to the recipients currently.
At first glance this assumption appears to be illegitimate
since a large portion of the benefits accrue to the student
and society in the future. However, by altering the direc-
tion of analysis the first glance conclusions require re-
examination.

One of the economic definitions of education is that it
is an investment: the creation of human capital. Those per-
sons who receive the education are the recipients of a capi-
tal allocation. To allocate the benefits of the distribution
of that capital it is not necessary to wait until the capital
provides earnings to its owner. Conceptually we are saying
that the benefits of the capital distribution can be allo-
cated at the time it is created and distributed, that it is
not necessary to wait until the capital actually produces a
flow of benefits.

That flow of benefits, or at least an estimate of it,
is required to estimate the value of the capital. Initially,
however, we will continue to assume that the value of the
capital is approximated by its cost of production. Later the
legitimacy of that assumption will be examined.

Types of Education Benefits

An important classificatory concept of this chapter
will be division between internal and external benefits[1] of
education, or as they are sometimes referred to, between
private and spillover benefits. The "rim" over which the
benefits "spill" will be defined as that which surrounds the
student's family, not that which surrounds just the individu-
al student himself. In other words, students will be placed
in income deciles according to the incomes of their parents.
Part of the reason for doing so is because the unit of analy-
sis for this study is the family, but there is also a con-
ceptual argument for doing so. The student's economic well
being is determined by the income of his parents,[2] although
to a decreasing extent as the student gets older.

---

[1]A lucid definition of an education benefit is provided
by Burton A. Weisbrod, "Education and Investment in Human
Capital," Journal of Political Economy, Supplement, LXX
(October, 1962), p. 107: "A benefit of education will refer
to anything that pushes outward the utility possibility func-
tion for the society. Included would be (1) anything which
increases production possibilities, such as increased labor
productivity; (2) anything which reduces costs and thereby
makes resources available for more productive uses, such as
increased employment opportunities, which may release re-
sources from law enforcement by cutting crime rates; and (3)
anything that increases welfare possibilities directly, such
as development of public-spiritedness or social consciousness
of one's neighbor. Anything which merely alters relative
prices without affecting total utility opportunities for the
group under consideration will not be deemed a social bene-
fit (or loss)."

[2]One potential advantage of allocating the benefits of
educational expenditures to the families of which the stu-
dents are a part is related to a possible use to which the
results of this study might be put. One might wish to ex-
amine how the benefits of public education are allocated in

Burton Weisbrod's analysis of education and investment in human capital provides a useful framework with which to review the benefits of education. Probably the most widely recognized benefit from education is what Weisbrod calls the direct financial return,[3] or simply the increased lifetime earnings one can expect as a result of education. This particular benefit is perhaps the least difficult to measure, but is somewhat difficult to isolate because the typical person who obtains more education also possesses marketable assets, e.g., ambition, intelligence, and good health. He likely would earn a higher income even without the additional education than would a person who typically receives less education.

Other educational benefits which Weisbrod discusses are less widely recognized. The "financial option return" is the value of the opportunity to "obtain still further education and the rewards accompanying it" that one receives through additional education.[4] He estimates that "the

terms of ability to pay. For education, at least through high school, the relevant bearer of the costs of education is the parent of the student, not the student himself.

It was this kind of reasoning that led Weisbrod and W. Lee Hansen to conclude that the financing of higher education in California is an income transfer from the relatively poor to the relatively well-to-do. Benefits, Costs, and Finance of Public Higher Education (Chicago, 1969), Chapter IV (hereafter: Hansen and Weisbrod). Their conclusions have been disputed in the 1970 spring and summer issue of The Journal of Human Resources.

[3]Weisbrod, p. 108.

[4]Ibid., p. 109.

option turns out to be quite valuable indeed, increasing the
return from elementary education from 35 to 54 per cent."[5]
Several other options are listed by Weisbrod, options which
increase a person's available alternatives between income
and leisure, between different occupations, and between
different ways-of-life. One, the "hedging option," increases
a person's ability to adjust to changing job opportunities;[6]
the value of which would become greater the more rapid the
rate of technological change that is taking place.

The present family of the student benefits from a by-
product of education, i.e. child care services. Weisbrod
estimated that the value of such services for working mothers
alone provides an annual return of twenty-five per cent on
the cost of elementary education.[7]

The future children of the student benefit from his
education in that it makes possible education in the home.
The result is a kind of intergenerational transfer of bene-
fits of educational expenditures.[8]

The following comments by Weisbrod implies who are some
of the recipients of the externalities created by education:

> (Schooling) benefits neighbors, who may be affected
> favorably by the social values developed in children

---

[5]Ibid., p. 112. The 35 per cent figure referred to an
estimate derived by T. W. Schultz, "Education and Economic
Growth," Social Forces Influencing American Education
(Chicago, 1961), p. 81.

[6]Weisbrod, p. 113.

[7]Ibid., p. 117.

[8]Ibid., p. 107.

by the schools and even by the quietness of the neigh-
borhood while the schools are in session. Schooling
benefits employers seeking a trained labor force; and
it benefits the society at large by developing the
basis for an informed electorate.[9]

Part of the external benefits resulting from education
are employment related. Insofar as there is imperfect com-
petition in the labor market, employers may benefit from the
education of the employees if they are paid less than the
value of their marginal product. No conclusive evidence
exitsts on which to base such an assumption; so it will be
assumed here that no particular benefits accrue to employers.

Another employment related benefit results from the co-
operative nature of production processes. Productivity of
one worker complements the productivity of his fellows. It
would seem reasonable to assume that such benefits are
received in proportion to income.

A portion of the external benefits deriving from edu-
cational expenditures are widely distributed, e.g. the de-
velopment of an informed electorate, and it could be assumed
that they accrue to families either equally per capita or
proportionately to income.

Allocation of Educational Benefits

The distribution of students will be estimated on the
basis of the distribution of children aged five through
seventeen years among income deciles. Several of the

---

[9]Ibid., p. 107.

previous studies have relied on distributions of the popu-

lation under eighteen years of age,[10] but such distributions

contain sizeable numbers of pre-school aged children[11] who

are not distributed among income deciles in the same manner

as school aged children.[12] The inclusion of pre-school aged

children would, therefore, have a distorting effect on the

results of such studies.

The Bureau of the Census in its "5 per cent sample"

cross-classified income with age of child of head. The

"special groups" referred to in Chapter III comprised 2.8

per cent of that sample.[13] The income understatement associ-

ated with census data could also be exptected in the 5-per

cent sample data. The distorting effects caused by the

presence of the special groups would likely be much less

than that caused by the inclusion of pre-school aged children,

if, for instance, BLS data were used for estimating purposes.

The effects of the income understatement are reduced by con-

verting the distribution into deciles. The census 5-per

---

[10]See below, p.

[11]According to Bureau of Census estimates there were 606,000 children aged 5-17 years in Oklahoma as of July 1, 1962. As of the same date there were 253,000 children under five years of age in Oklahoma. U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, No. 280, p. 5.

[12]U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population: 1960, Final Report, PC(2)-4B, Subject Reports, Persons by Family Characteristics (Washington, D.C., 1964), Table 10a, p. 92.

[13]Ibid., p.

cent sample data will be used here as the basis for estimating the distribution of the elementary and secondary school age population among deciles.

It would be worthwhile, perhaps, if educational expenditures could be separated between the elementary and secondary levels. Data limitations on two counts prohibit this. All expenditure data from standard sources do not separate elementary and secondary expenditures. There is also a lack of data of the distribution of children according to elementary and secondary ages, i.e. the distribution of children aged 5-17 is available by income classes, but not of children aged 5-13 and 14-17.

Allocation of the benefits from higher education expenditures could not be accomplished using the distribution of college aged persons among deciles. There are simply too many college aged persons who do not attend college and they are not distributed among deciles similarly to all college aged persons. Some other distribution series must be derived. The distributive series to be used here is derived from a study of the family incomes of junior college, state college, and state university students in California.[14] The average income in California is, of course, higher than it is in Oklahoma, but some of the significance of that fact is reduced when deciles are used. The BLS computer print-out data lists educational expenditures for college and

---

[14]Hansen and Weisbrod, p. 69.

professional levels, but this would overstate the progressiv-
ity of the incidence as more higher income families would
send their children to private institutions of higher edu-
cation.

During the 1961-1962 academic year approximately 11.9
per cent of the students in Oklahoma colleges and univer-
sities were from out of state.[15] The families to which
these students belonged were not within the population which
is being considered in this study. The benefits of the edu-
cation being received by these students are, in effect,
being shifted out of state. Musgrave and Daicoff dropped
from their analysis that portion of benefits going to non-
resident students. Brownlee did not mention the non-resident
phenomenon. If this current study were considering revenues
as well as expenditures the problem of non-resident students
would be less bothersome as the out-of-state fees come closer
to paying the full cost of the credit hours received.[16] The
problem is somewhat altered when it is taken into account
that some Oklahoma residents are receiving the benefits of
other states' higher education facilities when they attend
state colleges and universities located outside Oklahoma.
Although not a totally satisfactory approach, no allowance

---

[15]Oklahoma State Regents for Higher Education, Eleventh
Biennial Report: Period Ending June 30, 1962 (Oklahoma City,
1962), pp. 126-133.

[16]Oklahoma State Regents for Higher Education, An
Analysis of Faculty Teaching Loads and Student-Credit-Hour
Costs in Twenty-Four Oklahoma Colleges and Universities for
the 1961-62 Academic Year (Oklahoma City, 1962), pp. 138-141.

will be made in this study for the existence of non-resident
students in Oklahoma higher education facilities.

So far in this chapter, bases have been established
with which to allocate various kinds of benefits (internal
and external) resulting from educational expenditures, but
there has been no specific discussion of what relative
weights these benefits should be given. Unfortunately,
there is no clear solution to the question of what relative
weights should be given. The final part of this chapter
will attempt to establish a basis on which to form a judg-
ment as to how various kinds of educational benefits should
be allocated. Methodology used in previous incidence
studies will be presented as well as pertinent methodology
used in related studies.

Two previous incidence studies treated educational
benefits as general benefits. Adler argued that "the
publicly financed educational system offers the benefits of
free (government financed) education to all consumer units
alike," and allocated the benefits on a per capita basis.[17]
He stated that a better alternative would be to allocate the
benefits on the number of children of school age; he did not
do so, however, because of a lack of appropriate data.
Conrad stated that "since (educational) facilities are
available for the entire population and there is no evidence

[17]Adler, p. 386.

of concentrations in low income areas, a per spending unit distribution has been used."[18]

Gillespie, Tucker, and the Tax Foundation study attributed the benefits to the students and their families. Gillespie reasoned that "the government incurs these costs (including current and capital) on behalf of one beneficiary group--the students who receive the education."[19] He allocated educational benefits on the basis of estimates of the number of students who complete various grade levels. In his Canadian study, however, the distribution of elementary and secondary benefits was made on the basis of the number of children sixteen years and younger. Higher education benefits were distributed on the basis of a survey of family incomes of university students.[20] Tucker stated that "although education is generally available to promote the general welfare, the primary beneficiaries are the students themselves, whose earning power and enjoyment of life are increased, and their parents, who are exempt from the necessity of providing education at their own expense."[21] He distributed the benefits on the basis of the number of children under eighteen in each income bracket. The Tax Foundation allocated elementary and secondary benefits

---

[18]Conrad, pp. 218-219.

[19]Gillespie (Brookings), p. 146.

[20]Gillespie (Canadian), pp. 108-109.

[21]Tucker (1953), p. 532.

according to the number of children under eighteen and higher

education benefits on the basis of expenditures on higher

education among income brackets.[22]

A comparatively complex allocating procedure was em-

ployed by Brownlee:

> Some of the expenditures for education benefit persons
> who do not receive them directly, e.g., it is of some
> benefit to Minnesota citizens generally to have a
> literate population...In this analysis, one half of the
> estimated expenditure for primary education was allo-
> cated on a per capita basis and thus assumed to benefit
> all persons equally; the other half of estimated pri-
> mary school costs was allocated among income groups
> proportionately to the number of children under 18 years
> of age; one quarter of estimated school expenditures was
> allocated on a per capita basis, the other three quar-
> ters being allocated proportionately to the number of
> children under 18 years of age. All the benefits of
> higher education were allocated to those attending
> those institutions of higher learning, and expenditures
> for this purpose were thus allocated proportionately to
> crude estimates of the distribution of college students
> according to the income of the income receiving units
> of which they were members.[23]

Although Brownlee did not specify the reasons for de-

creasing the amount of benefits to be allocated on a per

capita basis as the grade level increased, it might stem

from an opinion similar to one expressed by Milton Friedman:

"The social gain presumably is greatest for the lowest

levels of schooling, where there is the nearest approach to

unanamity about content, and declines continuously as the

level of schooling rises."[24] Friedman argued that the

---

[22]Tax Foundation, p. 63.

[23]Brownlee, pp. 31-32.

[24]Milton Friedman, _Capitalism and Freedom_ (Chicago, 1962), p. 88.

student "captures" most of the benefits of vocational type education himself.

In this writer's opinion the procedure of allocating internal benefits on the basis of the number of students per family is not totally satisfactory. The case will be made below that such a procedure leads to an understatement of the degree of progressiveness of the educational benefits.

Implicit in the use of the distribution of school age children as the estimating device is the assumption that children of parents in all income deciles receive educations of like quality and quantity. There are several reasons to doubt the accuracy of such an assumption.

Most (74%) of the revenue available for elementary and secondary education in Oklahoma is generated locally or is rebated by the state government on the basis of local collections.[25] School districts with low average incomes would tend to have a smaller amount of funds available to spend for elementary and secondary education. This tendency is partly offset by the fact that low income counties in Oklahoma tend to make a greater tax effort.[26]

Not only the quality but the quantity of education is likely to vary among income groups. Children from low

---

[25]H. E. Ward, "Financing Public Expenditures and Services in Oklahoma," unpub. Ph.D. dissertation, Oklahoma State University, 1968, p. 44.

[26]Ibid., Chapter V.

income families are more likely to receive no formal education, i.e. to have dropped out.[27]

The general procedure of this study is to measure the benefits of a government activity in terms of the costs-incurred-on-behalf-of criteria. The use of such a measure for education expenditures has certain limitations. The question relevant to this study is whether or not benefits from educational expenditures of a given amount vary among income deciles.[28]

One of the kinds of educational benefits listed by Weisbrod was the one he called the financial return option. Its value depends, in large measure, on a person's opportunity to exercise the option. That opportunity would tend to increase with family income.

---

[27]Stanley H. Masters, "The Effects of Family Income on Children's Education: Some Findings on Inequality of Opportunity," Journal of Human Resources, IV (Spring, 1969), p. 162: "For example, consider a youth whose family has less than $3,000 annual income, whose father has completed less than five grades of school, and whose mother has completed less than eight. If this youth is in school at age 14 or 15, he has a 0.47 chance of his progress in school being retarded. If he is 16 or 17 then he has a 0.33 chance of being a drop-out...For a youth whose family has an income of over $10,000 and whose parents have both graduated from high school, the probabilities are 0.02 and 0.01 (respectively)."

[28]Although the analysis was conducted in a race dimension rather than an income dimension, a study by Randall D. Weiss is not totally irrelevant to this study because of the relationship between income and race in our economy. Weiss found that the annual earnings of a white person increases by $523.17 for each additional year in school while the annual earnings for a black person increases by only $160.47 for each additional year of schooling. "The Effects of Education on the Earnings of Blacks and Whites," Review of Economics and Statistics, LII (May, 1970), p. 155.

A child whose parents are in the upper income deciles is likely to receive a greater flow of earnings from the human capital that he receives than is a child whose parents are in the lower deciles. This results in part from the fact that the more well-to-do child possesses more complementary capital which will increase the productivity of the capital he receives as a result of formal education. Examples of the complementary capital would be access to monetary capital, informal education, and positively reinforced expectation.

One cause of progressiveness in the receipt of benefits from educational expenditures that is not adequately reflected in the data, results from the following tendencies: the higher the grade level in school, the greater is the cost of instruction; the higher the grade level of the student, the greater the age of his parents; the greater the age of the parent (to a point) the greater will be the family income. The result will be that the more costly instruction will tend to accrue to higher decile families. There is a legitimate doubt about the significance of this tendency since there will tend to be a balancing effect when the entire educational life span of each family is considered. It is true, however, that the children from low income families are less likely to reach the higher grade levels than are those students whose parents are more wealthy.

As is likely evident from the preceding discussion, there is no one set of assumptions which is clearly preferable in regard to allocating educational benefits. The evidence is simply not complete enough at this point to make precise hypotheses about the incidence of educational benefits, and one is forced to make an arbitrary, but hopefully informed, decision.

In this study the incidence of benefits from higher education will be allocated to the students and their families. The benefits from elementary and secondary education will be allocated on the basis of two sets of assumptions:

> Alternative A: that all benefits accrue to the students and their families.

> Alternative B: that one half of all benefits accrue to the students and their families and one half accrue to families in proportion to adjusted family money income.

It is this writer's considered judgment that Alternative B is the more accurate. The reason for this judgment is that, based on what has been said previously, it appears that the receipt of both internal and external benefits of education is directly related to income. The incidence of educational expenditures using both assumptions will be presented in Chapter VII.

Summary

When considering educational expenditures problems arise not only in terms of allocating benefits among income deciles but along a time dimension as well. This time

dimension aspect was the first question dealt with in this chapter. The concept of human capital was employed in an attempt to derive a workable procedure with which to deal with the time question. The remainder of the chapter examined two other questions: (1) What are the kinds of benefits derived from expenditures on education?, and (2) How are those benefits distributed among deciles? Unfortunately, clear answers were not determinable for either question and it will be necessary to allocate educational benefits on the basis of two alternative sets of assumptions, both of which were defined in the final section of the chapter.

CHAPTER V

HIGHWAY BENEFITS

Introduction

When seeking to determine the appropriate allocation of
highway expenditure benefits one might tentatively conclude
that the benefits could be allocated to the owners of the
vehicles traveling on the highways.[1] But, like many first
conclusions this one must be qualified in various ways.
Does the highway benefit the owner of a commercial vehicle
in the form of increased profits, or does it cause a
decrease in the price of a transported good and hence bene-
fit the direct purchaser of the good? Does the paving of a
street benefit only direct users of the street or does it
increase adjacent property values and hence benefit those
who own such property? The increased property value will
benefit the property owner whether or not he himself drives
a vehicle on the street and the benefit will not be in any
close proportion to how much he drives a vehicle.

----

[1]In common useage the term highway usually connotes a
certain kind of road, one that is used primarily for high
speed through traffic. It is common in highway studies to
employ a more inclusive meaning of the term. In this study
the word highway will be defined as follows: "any road fre-
ely open to everyone, 'a public road'." Webster's New World
Dictionary of the American Language, (New York, 1957), p. 686.

Most current expenditures for highways are capital expenditures in a manner similar to current expenditures for education. Highways currently being constructed will not, in most instances, be available for use during the current period. Highways currently being used were financed and built during previous periods. The time dimension associated with highway benefits does not seem as troublesome as that associated with educational benefits, however. The typical recipient of the highway capital grant would undergo less change[2] from the time of the grant to the time of the actual benefits than would be the case with an educational capital grant. This study is not concerned with fiscal year 1962 as a specific or unique period of time; instead it is concerned with fiscal year 1962 as a typical, representative period of time. If the current beneficiaries of previously constructed highways can be identified, the results can be used to represent future beneficiaries of current expenditures.

Some portion of the benefits from highways accrues to non-residents. This phenomenon will be ignored for the following reasons: it would lose practically all significance if the current analysis were not restricted to one side of

---

[2]For the purposes of this study the salient characteristic of a benefit recipient is his family money income. It would not seem to be unrealistic to assume that the recipient of a highway benefit would have approximately the same relative income as he had when the expenditure was financed. As pointed out in the previous chapter, this assumption is not evident when dealing with educational expenditures.

the budget in one state. Out of state residents help finance Oklahoma highways through their in-state gasoline purchases and Oklahomans receive benefits from non-Oklahoman highways. Furthermore, very little appropriate data exists with which to make estimates of highway use by non-residents.

<div align="center">User Versus Non-User Benefits</div>

One method of analyzing highway benefits is to divide the analysis into two steps: divide benefits between users and non-users, and then divide user benefits between those that are and those that are not shifted.[3]

The user - non-user dimension of highway benefits relate to the impact of the benefits, not the final beneficiary. An almost equivalent terminology would be vehicle-real property benefits. User benefits accrue in proportion to some measure of useage such as ton-miles. According to the Department of Commerce[4] they are of four major catergories:

1. Savings in operating costs;
2. Savings in time costs;
3. Savings in accident costs; and
4. Reductions in strain and annoyance of driving under congested or other unfavorable conditions.

---

[3]Part of the reason for the attention that has been given to the division of benefits between users and non-users results from attempts to determine cost responsibility for highway financing. For instance, if a certain portion of highway benefits accrues to property owners, then that portion of the costs might be financed through property taxes.

[4]U. S. Congress, House, First Progress Report of the Highway Cost Allocation Study, H. Doc. 106, 85th. Cong., 1st. sess., 1957, p. 90.

The principal type non-user benefit is the access provided to real property. The access increases real property values resulting in benefits to the owners. "The limit is the dead-end section where all traffic is access traffic."[5] Not all of the benefits from a dead-end road, however, accrue to the adjacent property owners any more than all benefits from a through street accrue to users, e.g. residential and commercial property values have been shown to increase in areas served by expressways.[6]

It should be pointed out that the division between users and non-users is not analogous to the division between internal and external benefits. The recipient of an internal educational benefit is the student and his family. An initial, direct recipient of a highway might be a real property owner, and this would be defined as a non-user benefit. Truckers are classified as users, but they are not usually considered as final recipients of the benefits after adjustments of the market have taken place. In relation to highway benefits, the internal-external benefit dimension appears to be of limited applicability.

Among previous expenditure incidence studies Gillespie was the only one to specifically make allowance for non-user benefits.[7] Others seemed to have implicitly concurred with

---

[5] Ibid., p. 113.

[6] Ibid.

[7] Gillespie (dissertation), Chapter II; Gillespie (Brookings), pp. 140-145; Gillespie (Canadian), pp. 97-105.

an opinion expressed by Brownlee:

> A clear cut case can be made for allocating most of highway expenditures to those who use the highways. Exceptions to this include the value of access provided by some city streets and rural roads. However, this portion of the total is small and is neglected here.[8]

Gillespie employed the results obtained in a study of Louisiana's highway system by William D. Ross.[9] Using two separate approaches which he called the "relative use" and the "earnings-credit" solutions, Ross obtained practically identical results. Both solutions indicated that 25 per cent of the benefits from highways accrue to non-users.

The details of Ross' methodology will not be presented here. A summary is provided in Gillespie's Canadian study. The purpose of the following discussion will be to examine briefly Ross' conclusions.

Ross' methodology and conclusions are not implausible, but he is quick to admit that they are based on assumptions that cannot be rigorously defended. The major difficulty seems to arise from the fact that no way has yet been developed to establish even conceptually the process by which any given highway benefits members of the economy (in terms of the division between users and non-users). As stated previously, a dead-end street would provide benefits mainly in the form of access provision, but certainly part of the

---

[8]Brownlee, p. 35.

[9]William D. Ross, Financing Highway Improvements in Louisiana (Baton Rouge, 1955), pp. 212-218.

benefit would be in proportion to the travel over the dead-end street.

The conceptual dilemma is aggravated when one attempts to give the question empirical content. Ross was forced to estimate the benefits accruing to users and assumed the remainder accrued to non-users. This method is rather un-satisfoctory for this study, however, as he included in non-users "the general public" as well as property owners. Furthermore, his determination of total benefits is not en-tirely clear, a shortcoming that is critical when using a residual solution.

One is left with somewhat of a dilemma. There exists a rather strong a priori case that access does make a sig-nificant contribution to the value of real estate, but with no feasible means of weighing that contribution in relation to other highway benefits.

Two different allocations of highway benefits will be computed here. One will proceed as all previous studies have, with the exception of Gillespie's, and ignore non-user benefits. The second allocation will assume that one fourth of the benefits of highway expenditures accrues to non-users. That portion accruing to non-users will be al-located somewhat differently from Gillespie's method. The difference arises from the recognition that non-user bene-fits affect commercial as well as non-commercial property. The assumption will be made that benefits affecting com-mercial property are shifted forward and will be distributed

according to consumption expenditures, the same base which
is to be used for the allocation of user benefits accruing
initially by commercial vehicles.

The division of total real property value between com-
mercial and residential users is made on the basis of as-
sessments for property tax purposes. The data is presented
for individual states by the Census of Governments.[10] Farm
property is considered here to be part of commercial property.
For Oklahoma for 1961 real property was comprised of 41.5
per cent commercial property and 56.5 per cent residential
property. Prorating the two per cent of taxable property
that consisted of vacant lots, the division was 42.3 per
cent commercial and 57.7 per cent residential. Non-user
benefits accruing to residential property will be allocated
on the basis of BLS distribution of expenditures on homes.
The BLS data will also be used as the basis for deriving a
distribution of consumption expenditures. The derived dis-
tribution is a variation of a common consumption function;
i.e. the amount of consumption expenditures per income
decile.

User Benefits

Highway user benefits that initially accrue to business
firms are assumed in this study, as well as previous studies,

---

[10]U. S. Department of Commerce, Bureau of the Census,
Census of Governments: 1962, Vol. II, Taxable Property
Values (Washington, D. C., 1963), p. 35.

to be shifted forward. As Gillespie explained, "the pro-
vision of an improved road which leads to a per unit re-
duction in transportation costs may be considered to act as
a negative sales tax which is passed on to the consumer of
transported products."[11] The underlying assumption is that
there exists a sufficiency of competition in the trucking
industry which would tend to assure this forward shifting of
benefits. The fact that trucking companies are furnished
with roads whose costs are shared with private users would
seem to provide them with an advantage relative to railroads,
but trucking companies are in competition with one another
as well as with the railroads and there is no evidence to
this writer's knowledge of any unusual barriers to entry
into the trucking industry.

Although the three studies used diverse estimating pro-
cedures, the estimates of relative shares of commercial and
private user benefits were very similar in the studies by
Musgrave and Daicoff, Brownlee, and Gillespie. Using the
ratio of business to total highway user taxes Musgrave and
Daicoff allocated 45.06 per cent of highway benefits on the
basis of total consumption expenditures and 54.94 per cent
according to expenditures on gasoline and motor oil.[12]
Brownlee employed data that estimated that "on a weight-
distance basis about 57 per cent of highway service is

_____

[11]Gillespie (Brookings), p. 140.

[12]Musgrave and Daicoff, p. 280.

rendered to passenger cars and 43 per cent to trucks and buses."[13]

Gillespie averaged the results from seven separate studies,[14] each of which had employed the incremental-cost method of dividing benefits between commercial and private users.[15]

This method is derived from cognizance of the fact that roads and roadbeds must be made stronger and wider to accommodate heavy commercial vehicles. Costs are allocated to each class of vehicles by attempting to answer the question: how much of the total highway costs was necessitated in order to make the highway suitable for commercial vehicles? On the basis of these studies Gillespie allocated 56.4 per cent of user benefits to automobiles and 43.6 per cent to trucks, and made the assumption that all automobiles were private vehicles and all trucks are commercial vehicles. He argued that buses were too small a part of the total to be allocated separately and so were included with automobiles.[16]

---

[13]Brownlee, p. 35.

[14]Gillespie (Brookings), p. 184.

[15]Conceptually it might seem that the incremental cost method would be the appropriate one for this study in light of the fact that benefits are being measured in terms of "costs-incurred-on-behalf-of." How benefits are measured, however, is a separate matter from how they are allocated. Because of the distinct similarity between empirical results derived from the relative-use and the incremental-cost methods, there appears to be little to be gained from pursuing the matter at a conceptual level.

[16]Gillespie (Brookings), p. 140.

If the noted similarity of the above mentioned data is typical, the results for Oklahoma would not be significantly different from other similar studies. The significance of any variation is further diminished by recognizing the similarity of the allocation bases which will be applied to the two kinds of benefits. Non-user benefits will be allocated on the basis of consumption expenditures per income decile. User-benefits will be allocated on the basis of automobile expenditures per income decile. Although there are differences in the distributions of the two series (see Appendix A), the difference is not so great that a few percentage points difference in their relative weights would make a noticeable impact on the results.

User benefits will be distributed 55 per cent to private users and 45 per cent to commercial users. This division relies on earlier incidence studies cited above. Private user benefits will be allocated on the basis of BLS data of automobile expenditures. Table IV reflects the allocation of highway expenditure benefits on the basis of the two alternative assumptions.

The difference between the two assumptions is as follows:

Assumption A: No non-user benefits; benefits are allocated as follows:

.45 on basis of consumption expenditures

.55 on basis of automotive expenditures

Assumption B: One fourth of benefits accrue to non-users; benefits are allocated as follows:

TABLE IV

INCIDENCE OF BENEFITS FROM
HIGHWAY EXPENDITURES

| Decile | Benefits as Percent of Adjusted FMI | |
	Assumption A	Assumption B
Lowest	9.32	7.16
Second	6.39	6.33
Third	4.22	3.58
Fourth	3.93	3.98
Fifth	3.65	3.68
Sixth	3.61	3.56
Seventh	3.16	3.10
Eighth	2.84	2.79
Ninth	2.67	2.66
Highest	2.92	2.91

(.45 x .75) + (.423 x .25) on basis of consumption expenditures

(.55 x .75) on basis of automotive expenditures

(.577 x .25) on basis of expenditues on homes

In Chapter VII where the incidence of benefits of all expenditures will be considered, highway benefits will be allocated on the basis of assumption A. When not considering highway benefits in isolation, the resulting difference between the two assumptions is not great enough to present them both.

Summary

Ideally, the allocation of benefits arising from expenditures on highways would take the form of a three step process: first, the total benefits would be divided between users and non-users (real property owners); second, the user benefits would be divided between commercial and private users; and finally, the total benefits would be allocated to income deciles. In this chapter the details of this "ideal" process have been examined, an attempt has been made to achieve it, and the limitations of the attempt have been considered. Two alternative sets of assumptions upon which to allocate highway expenditures were defined as well as a presentation of benefits distributed according to the two sets of assumptions.

CHAPTER VI

MISCELLANEOUS AND GENERAL EXPENDITURES

Introduction

Transfer payments and associated expenditures, education
expenditures, and highway expenditures comprise $568,462
thousand of the $747,358 thousand total expenditures which
are the subject of this study. Of the remaining $178,896
thousand, no single category of expenditure appears to be
sufficiently possessive of unique characteristics or large
enough to warrant a separate chapter. The format of this
chapter will be to give a description of each remaining
category of public expenditure and the basis for allocation
of each category among deciles.

Hospital Expenditures

Expenditures for hospitals comprise the largest category
of expenditures not already examined. Hospital expenditures,
however, are only about a fourth as much as the next larger
category, highway expenditures. As is the case in most other
states, most of the governmental expenditures for hospitals
in Oklahoma are for mental hospitals.

Two problems present themselves in connection with the
allocation of benefits from governmental expenditures for

hospitals. The first is that the population previously de-
fined for this study does not include institutionalized
persons. The author knows of no way to completely resolve
this problem short of redefining the population. In its
actual effects, the problem is rather minor: the average
daily population of the state hospitals for fiscal year 1962
was about 6,500 or about .3% of the total population.[1] Fur-
thermore, only those patients who are defined as unattached
individuals would be completely out of the population being
considered in this study. All other patients would be con-
nected to the general population because the other members
of their families would still be included.

A second difficulty arises from a lack of data relating
to the income status of patients in public hospitals. How-
ever, because of fee policies by these hospitals it is pos-
sible to make certain deductions about the incidence of
benefits resulting from expenditures for public hospitals.
Fees are charged in proportion to the income of the patient,
or more precisely, the standard fee is reduced in accordance
to the "need" of the patient where need is defined in terms
of income. Combining this fact with data on the income dis-
tribution of public hospital patients in Illinois, Gillespie
estimated a distribution of benefits from expenditures for
public hospitals.[2] He did not rely exclusively on the

_____

[1]U. S. Department of Health, Education, and Welfare, Public
Health Service, Patients in Mental Institutions: 1962, Part II,
State and County Mental Hospitals (Washington, D. C., 1964),
Table II, p. II-65.

[2]Gillespie (dissertation), pp. 140-152.

Illinois data because it was argued that a person who pays more for a given service receives less of a net benefit from that service; the Illinois data were for all patients regardless of the user-fee that they were charged.

This writer knows of no additional distributional series relating to benefits from public hospital expenditures and can detect no discrepancies in Gillespie's methodology. His estimates of the distribution of benefits from such expenditures will be relied upon for this study. It is this writer's opinion that the series is reasonably accurate if one accepts the assumption that the benefits accrue to the patients and their families. Such an assumption would seem plausible, although a case could be made for assuming that there are some benefits that accrue to the community at large, e.g., there are spillover costs when no accommodation is made for mentally disturbed persons. Such a possibility will be disregarded here and the benefits will be assumed to accrue to the patients and their families and will be allocated on the basis of Gillespie's data.

Agricultural Expenditures

The $17,586 thousand listed by the Census of Governments as expenditures for natural resources consists mostly of expenditures directly pertaining to agriculture. It is the opinion of this writer that the expenditures titled natural resources contain two significantly different kinds of expenditures: agricultural and non-agricultural. The two

types will be separated here and allocated on the basis of two different distributional series. The non-agricultural expenditures will be allocated below along with general expenditures and designated as natural resources expenditures.

Benefits from agricultural expenditures accrue, initially at least, to farmers. Two opposing arguments have been presented as to the incidence of these expenditures. Gillespie reasoned that because of the government price support and soil bank programs, cost reductions do not take the form of decreased farm product prices. He concluded that such expenditures benefit farmers and in his U. S. studies are allocated on the basis of farm income.[3] Other evidence points to the conclusion that agricultural research and extension programs benefit consumers of food.[4] The choice of the appropriate series is quite marked in this particular instance. Allocating the benefits according to the series of farm income would result in a progressive incidence, allocating the benefits on the basis of food expenditures would result in a regressive incidence. The assumption will be made here that the benefits accrue to farmers. The distribution of food expenditures series will

---

[3]Gillespie (Brookings), p. 152.

[4]Z. Griliches, "Research Costs and Social Returns," Journal of Political Economy, LXVI (October, 1958), p. 430: "Almost none of the calculated returns from hybrid corn were appropriated by the hybrid corn seed industry or by corn producers. They were passed on to consumers in the form of lower prices and higher output. Entry into the hybrid seed industry was easy, and in the long run no 'abnormal' profits were made there."

be presented in the distributive series table in Appendix A

for comparison purposes.

Natural resource expenditure for purposes other than

those relating to agriculture will be allocated with other

general expenditures. The series to be used is explained

later in this chapter. Without having access to the raw

data used in the Census of Governments it is not possible to

know precisely the division of natural resource expenditures

between agricultural and non-agricultural categories. Recon-

ciling from the figures in The State of Oklahoma Budget it

appears to be about $11,757 thousand agricultural and $5,829

non-agricultural.[5]

---

[5]Expenditures catagorized by the State of Oklahoma
under the heading "conservation" included the following
amounts which will be designated here as agricultural expen-
ditures: Department of Agriculture, $2,048,888; Soil Con-
servation Board, $827,252. The expenditures under the con-
servation heading which will be designated here as non-
agricultural totaled $5,829,039 which included the following
amounts: Wildlife Conservation Department, $2,076,398:
Petroleum Experiment Station, $73,890; Planning and Re-
sources Board, $3,512,670; and Water Resources Board,
$166,081. State of Oklahoma Budget for the Fiscal Year
Ending June 30, 1965, pp. 99-107. (Actual figures are for
fiscal year 1962, of course.) Agricultural expenditures
listed under the heading natural resources by the Census of
Governments includes more than the amounts listed above:
"expenditures of higher educational institutions for hospi-
tals, and for agricultural experiment stations and agri-
cultural extension services, is reported under other
functional catagories....For state and local governments,
this heading (natural resources) covers activities pertaining
to agriculture (including experiment stations and extension
services, soil conservation, flood control, irrigation,
drainage, and state parks)." Census of Governments: 1962,
Vol. IV, No. 4, p. 7. Total agricultural expenditures are
estimated here by subtracting total non-agricultural con-
servation expenditures ($5,829,039 rounded to $5,829
thousands) from the Census of Governments total figures for
natural resources expenditures ($17,586 thousands.).

Airports

Expenditures for airports will be distributed on the basis of BLS data on expenditures for air travel. There are, no doubt, others who benefit from airport expenditures such as consumers of mail service. There is also the possibility that the price of certain products may be lower because of the cost of business trips is in effect subsidized when the government helps finance airport facilities. No attempt will be made, however, to determine the magnitude or distribution of such possibilities; the entire expense will be assumed to benefit persons in proportion to their air travel.

General Expenditures

The remaining expenditures to be allocated are listed in Table V. Most of what remains might be termed "general cost of administering and executing government activity." Most administrative costs associated with specific expenditures have been allocated previously, but such things as the cost of supporting the state legislature, the governor, and local officials can not properly be traced to any particular category of government activity. What might be a more scientific approach would be to allocate these general administrative costs on the basis of a weighted average of the incidence of all other benefits allocated in the study. However, governments do more to benefit people than to just expend money on their behalf, especially in regard to their law-making authority. Again because there is no clearly

preferred alternative, the general administrative expenditures will be allocated both on per capita basis and in proportion to adjusted family money income.

TABLE V

SELECTED GENERAL EXPENDITURES FOR STATE AND LOCAL
GOVERNMENTS IN OKLAHOMA
FISCAL YEAR 1962

(In thousands of dollars)

Item	Total	State	Local
Health	5,180	3,106	2,074
Police Protection	16,239	3,017	13,222
Correction	4,125	3,633	492
Local Fire Portection	8,417		8,417
Local Parks and Recreation	4,243		4,243
Natural Resources	5,829	5,829	
Housing and Urban Renewal	106		106
Libraries	2,103	352	1,751
Financial Administration	11,479	5,743	5,736
General Control	12,673	2,574	10,099
General Public Buildings	8,890	6,329	2,561
Insurance Trust Expenditure*	1,988	1,988	
Other and Unallocatable	18,393	9,036	9,357
	99,665	41,607	58,058

*Other than for unemployment compensation and employee
retirement.

Source: See text.

Police Protection

Although expenditures for police will be allocated with
general expenditues it is perhaps worthwhile to examine sepa-
rately the question of the appropriate allocation of the
benefits from such expenditures. State and local expendi-
tures for police are typical of what is perhaps the most
widely accepted function of government: the maintenance of
collective security, in this case internal collective securi-
ty or what is popularly termed "law and order." There is
wide agreement about the appropriateness of the government's
role in providing a police force, however, there is less a-
greement about the portion of the total benefits received by
each beneficiary or group of beneficiaries.

One of the reasons for the agreement about government's
need to provide police protection is that security is a
classic example of a collective good whose benefits are in-
divisable; a good that is not subject to the exclusion prin-
ciple, i.e. all members of the community receive equal doses
of the good regardless of their contribution to its cost.[6]
That does not necessarily mean, however, that every member
of the community places an equal value on the doses. The
nature of the benefits and the variables to which they are
proportional has been a subject of discussion among eco-
nomists and political scientists at least since the time
of Adam Smith. As summarized by Musgrave, the debate was

---

[6]Musgrave, The Theory of Public Finance, p. 9.

initiated partly in an attempt to allocate just tax distributions.[7] Smith stated that:

> the subjects of every state ought to contribute toward
> the support of the government, as nearly as possible,
> in proportion to their respective abilities; that is
> in proportion to the revenue which they respectively
> enjoy under the protection of the state.[8]

According to Musgrave, J. S. Mill "interpreted the concept of protection more broadly and took the opposite view--that protection is needed more urgently by the poor."[9] The question has still not been resolved, and the answer may hinge primarily on one's political philosophy.

If police protection expenditures were to be allocated separately it would perhaps be appropriate to include expenditures for correctional institutions. One could make the assumption that such expenditures benefit the inmates of such institution, but it is questionable that our prison system has progressed to the point that such an assumption would be justified.

Interest Payments

As stated in Chapter I, interest payments will not be included among the governmental expenditures to be allocated as part of this study. Such a decision is unusual: all previous incidence studies have included interest payments

---

[7]Ibid., pp. 63-68.

[8]Adam Smith, The Wealth of Nations, ed. E. Canon (New York: Random House, 1935), p. 777.

[9]Quoted by Musgrave, Theory of Public Finance, p. 65.

as an item to be allocated. Previous writers' reasons for
including interest payments and the present writer's reasons
for not doing so are explained below.

In Chapter II the "money-flow" method of attributing
benefits was examined and rejected. As part of the rationale
for rejecting the method, a statement by Adler was presented;
his argument against it was strong and unequivocal. He
appears, however, to have reverted to its use in the case of
interest payments. Although he argues that repayment of the
principal should not be treated as income, he states that
"interest payments, on the other hand, must be treated as
additions to the income of security owners--just as interest
income from other forms of capital is considered part of
aggregate income."[10] That statement is true, but it is not
justified to reach then the conclusion that such income
results in benefits analogous to other governmental expendi-
tures. Adler had previously rejected the notion that income
received by a veterans' hospital employee should be consid-
ered a benefit. To do so, he argued, would be to imply that
the employee's income would be zero in the absence of the
government job. Adler's action is even more puzzling in
light of a comment he made regarding the initial creation of
the government debt:

> But this burden of spending is the "sacrifice" of
> foregoing current, in favor of future, consumption,

10Adler, p. 374.

inherent in all decisions; it is, at least in part, "rewarded" by the receipt of interest.[11]

Is it valid to consider that a person has received a benefit of $\underline{x}$ amount when he receives a payment of $\underline{x}$ amount even though he had to make a sacrifice of $\underline{y}$ amount in order to receive that payment? It appears to have been Adler's opinion that it is. He imputed benefits in the full amount of the interest payments and allocated the benefits on the basis of holdings of liquid assets.[12]

Conrad reflected the most theoretically consistent analysis of interest payments. He stated that "if government interest is to be included in direct redistributive finance, it is necessary to establish that the payments are not directly analogous to private debt service."[13] Because most of the interest payments relevant to Conrad's analysis

---

[11]Ibid., p. 373.

[12]Ibid., p. 385.

[13]Conrad, p. 234: "Classify loans as productive (or self-liquidating) and consumption debts, the former representing capital formation and the latter deficit financed relief payments, for example, or purchase of military equipment. Without extreme assumptions about the 'output' arising from the state of peace or the alleviation of economic insecurity, the second class is not self-liquidating and the debt service must be paid out of taxes--a transfer payment." One of the parts of Conrad's explanation of why public debt is dissimilar from private debt is that "the contrast to the private market is significant at least for the war bond program in which the appeals to patriotism and the payroll withdrawal system were strong elements in the sale." This may certainly be a valid point in regard to the original financing of the national debt, however it becomes less valid as the debt is continuously refinanced. An increasing fraction of the debt is purchased voluntarily on the basis of comparisons made to alternative rates of return and risk.

resulted from the financing of World War II, he concluded
that they were not directly analogous to private debt serv-
ice. Treating them as a transfer payment, he allocated the
benefits from interest payments on the basis of holdings of
liquid assets.[14]

For state and local government debt the converse of one
of Conrad's statements holds, i.e., that "the bulk of govern-
ment debt has actually been incurred not for capital forma-
tion but for consumption purposes."[15] Practically all state
level debts at the close of fiscal year 1962 were for build-
ings and municipal projects.[16] Regardless of that fact the
distinction between the purposes of the debt likely serves
no useful function. As Barna has argued, "from the point of
view of government accounting or national accounting, there
is no difference between interest on productive and interest
on consumptive loans."[17]

It is this writer's considered opinion that the payment
of interest by the government is fundamentally different from
other kinds of government expenditures. Whenever a public
debt is created (assuming rationality in the decision-making
process) both the taxpayer and purchaser of the bond benefit.
The taxpayer exchanges current taxes for future taxes. The

---

[14]Ibid., p. 217.

[15]Ibid., p. 235.

[16]Budget, State of Oklahoma, pp. 64-65.

[17]Barna, pp. 32-33.

bond purchaser foregoes liquidity for earnings. Both bene-
fit, but there is little to be gained by attempting to
measure the net benefit of each.

The interest payment recipient's uniqueness may be
somewhat clarified by contrasting the interest recipient to
a recipient of another kind of government expenditure, e.g.,
educational expenditures. In order to be eligible for the
interest payment the bond holder must make a certain specific
sacrifice, i.e., liquidity. Such is not the case with the
recipient of an expenditure for education. The educational
benefit recipient becomes eligible not because of any sacri-
fice but because of some characteristic such as age, previ-
ous education, or just willingness. The only sacrifice is
the time that must be spent to receive the benefit, a sacri-
fice necessary for a benefit of any kind.

Summary

The analysis of the nature of benefits examined in the
study has been completed in this chapter. Expenditures for
hospitals, agriculture, and airports were analyzed individ-
ually as well as their respective bases to be used for allo-
cation of their benefits. A residual group of expenditures
was listed and two alternative bases for allocating the bene-
fits from these "general" expenditures were developed. Ex-
penditures for police protection, although part of this
general group for allocation purposes, were given individual
attention in terms of the nature of benefits arising from

such expenditures. The chapter concluded with an explanation and defense of a procedure unique among studies of this type, i.e., the deletion of interest payments from the government expenditures to be allocated. The argument was made that such payments are fundamentally dissimilar from other types of government expenditures.

CHAPTER VII

INCIDENCE OF EXPENDITURES

Introduction

The main purpose of all of the preceding chapters was
to establish the basis for what will be presented in this
chapter. The purpose of the present chapter is to apply and
analyze what was developed earlier. The distribution of in-
come and the allocation of expenditures will be brought to-
gether to derive measures of incidence.

The Results

There does not appear to exist a unique, concise measure
of the income redistributional impact of some economic ac-
tivity. The Gini coefficient is one method of measuring the
degree of inequality of how a variable is distributed among
a population. The coefficient itself reflects the difference
between the prevailing, actual distribution of some variable
and complete equality of that variable. It can be applied
to both tax and expenditure analysis: a regressive tax
would increase the Gini coefficient, i.e., the degree of in-
equality, and a regressive expenditure (as defined here)
would decrease the Gini coefficient. However, it is a rather
gross index of inequality as two very different distributions

could have identical Gini coefficients. This would occur if
the Lorenz curves intersect, indicating that one part of the
population has experienced greater equality at the expense
of another part of the population that has experienced great-
er inequality. In such a case one part of the population
will have moved closer to equality and the 45° line while
another part has moved away from equality and the 45° line.
To appreciate the difference in such a case it is necessary
to examine what has occurred among quantiles within the
distribution.

For the above reasons, the distributional impact of a
governmental expenditure cannot be adequately summarized in
a single statistic. Probably the most revealing series of
statistics are the rates of incidence described in Chapter
II. In this case the benefits are expressed as a percent of
adjusted family money income for each decile. Rates of
incidence reflect both the magnitude of each benefit rela-
tive to income within deciles and the differential effects
among deciles.

Besides percentage rates of incidence, results will be
presented here in two additional ways. One method will be
to present absolute dollar amounts of benefits of various
expenditures accruing to deciles. This is an important com-
plement to incidence rates because incidence rates may often-
times be misleading because of the small income base in the
lower deciles.

A third measure of the distributional impact will be
what is called here the Gini coefficient reduction index.
It is computed by comparing the Gini coefficient of the dis-
tribution of adjusted family money income with the Gini co-
efficient of the distribution after the benefits of the
particular expenditure are allocated. It is of course sub-
ject to the shortcomings of Gini coefficients listed above,
but it nevertheless retains a good deal of value in reflect-
ing what has happened to the overall distribution.

Tables VI and VII reflect the incidence of all expendi-
tures dealt with in the study[1] on the basis of relatively
regressive (pro-poor) assumptions. Tables VIII and IX are
based on relatively progressive assumptions. The difference
between the two sets of assumptions is in the treatment of
elementary and secondary educational expenditures and general
expenditures. Under the relatively regressive set of assump-
tions, educational benefits are allocated in proportion to
the estimated number of school-aged children in each decile.
Educational benefits under the progressive set of assumptions
are allocated according to educational benefits' "Assumption
B," i.e., one-half on the basis of school-aged children per
decile and one-half on the basis of adjusted family money
income. General expenditure benefits are allocated under

---

[1]The amounts shown for public assistance expenditures
and unemployment expenditures differ from those presented in
Chapter III where transfer payments were distributed. The
difference results from the inclusion here of administrative
costs and non-transfer payment assistance.

TABLE VI

PERCENTAGE INCIDENCE RATES ACCORDING TO REGRESSIVE ASSUMPTIONS

Deciles	Lowest	2	3	4	5	6	7	8	9	Highest	Totals
Public Assistance	38.75	53.55	9.27	4.23	3.28	2.35	1.68	1.73	1.50	.92	3.41
Unemployment	1.51	3.21	2.29	1.56	.98	.67	.56	.37	.27	.08	.56
Retirement	3.04	1.81	.68	.31	.17	.11	.07	.06	.04	.02	.16
Higher Education	6.53	4.68	3.19	2.49	2.06	1.66	1.48	1.60	1.17	.86	1.53
Elementary & Secondary Education	35.38	17.21	11.00	6.91	6.78	5.95	5.14	4.61	3.85	1.80	4.80
Highways	9.32	6.39	4.22	3.93	3.65	3.61	3.16	2.84	2.67	2.92	3.24
Hospitals	27.55	13.50	6.45	.79	.50	.33	.27	.14	.10	.05	.81
Agriculture	.82	.40	.26	.27	.28	.27	.27	.29	.29	.26	.28
Airports	.59	.24	.29	.30	.28	.23	.17	.20	.26	.34	.28
General	14.28	8.93	4.87	3.92	3.41	3.19	2.70	2.29	1.87	.89	2.39
Total	137.79	109.58	38.34	24.76	21.44	18.41	15.55	14.17	12.08	8.14	17.47

TABLE VII

DISTRIBUTION OF STATE AND LOCAL EXPENDITURES
ACCORDING TO REGRESSIVE ASSUMPTIONS
Dollar Amounts are in Thousands

Deciles	Lowest	2	3	4	5	6	7	8	9	Highest	Total
Adjusted FMI	40,191	81,847	174,895	236,634	289,994	349,098	424,086	507,758	647,330	1,420,128	4,171,961
Public Assistance	15,576	43,812	16,216	10,028	9,530	8,207	7,155	8,819	9,729	13,172	142,247
Unemployment	608	2,635	4,020	3,715	2,835	2,370	2,403	1,915	1,781	1,185	23,466
Retirement	1,223	1,482	1,181	744	512	408	326	324	290	268	6,759
Higher Education	2,624	3,827	5,581	5,900	5,990	5,798	6,297	8,153	7,622	12,204	63,994
Elementary & Secondary Education	14,220	14,099	19,247	16,363	19,708	20,789	21,831	23,473	25,015	25,536	200,280
Highways	3,747	4,947	7,394	9,300	10,589	12,618	13,412	14,445	17,304	41,451	135,206
Hospitals	11,074	11,046	3,914	1,891	1,456	1,158	1,158	722	675	675	33,771
Agriculture	330	330	469	643	818	957	1,176	1,479	1,892	3,662	11,757
Airports	238	196	510	719	823	835	755	1,033	1,739	4,894	11,743
General	5,741	7,315	8,521	9,289	9,907	11,143	11,432	11,621	12,119	12,578	99,665
Total Expenditures	55,381	89,689	67,053	58,592	62,168	64,283	65,945	71,984	78,166	115,625	728,888
Adjusted FMI plus total expenditures	95,572	171,536	241,948	295,226	352,162	413,381	490,031	579,742	725,496	1,535,753	4,900,849

TABLE VIII

PERCENTAGE INCIDENCE RATES ACCORDING TO PROGRESSIVE ASSUMPTIONS

Deciles	Lowest	2	3	4	5	6	7	8	9	Highest	Total
Public Assistance	38.75	53.55	9.27	4.23	3.28	2.35	1.68	1.73	1.50	.92	3.41
Unemployment	1.51	3.21	2.29	1.56	.98	.67	.56	.37	.27	.08	.56
Retirement	3.04	1.81	.68	.31	.17	.11	.07	.06	.04	.02	.16
Higher Education	6.53	4.68	3.19	2.49	2.06	1.66	1.48	1.60	1.17	.86	1.53
Elementary & Secondary Education	17.46	12.38	7.43	6.37	5.83	5.58	5.07	4.65	5.40	3.23	4.80
Highways	9.32	6.39	4.22	3.93	3.65	3.61	3.16	2.84	2.67	2.92	3.24
Hospitals	27.55	13.50	6.45	.79	.50	.33	.27	.14	.10	.05	.81
Agriculture	.82	.40	.26	.27	.28	.27	.27	.29	.29	.26	.28
Airports	.59	.24	.29	.30	.28	.23	.17	.20	.26	.34	.28
General	3.03	3.31	2.48	2.37	2.34	2.32	2.31	2.30	2.29	2.29	2.39
Total	108.60	99.47	36.56	22.62	19.37	17.13	15.04	14.18	13.99	10.97	17.47

TABLE IX

DISTRIBUTION OF STATE AND LOCAL EXPENDITURES
ACCORDING TO PROGRESSIVE ASSUMPTIONS

Dollar Amounts are in Thousands

Deciles	Lowest	2	3	4	5	6	7	8	9	Highest	Total
Adjusted FMI	40,191	81,847	174,895	236,634	289,994	349,098	424,086	507,758	647,330	1,420,128	4,171,961
Public Assistance	15,576	43,812	16,216	10,028	9,530	8,207	7,155	8,819	9,729	13,172	142,247
Unemployment	608	2,635	4,020	3,715	2,835	2,370	2,403	1,915	1,781	1,185	23,466
Retirement	1,223	1,482	1,181	744	512	408	326	324	290	268	6,759
Higher Education	2,624	3,827	5,581	5,900	5,990	5,798	6,297	8,153	7,622	12,204	63,994
Elementary & Secondary Education	7,019	10,134	13,017	15,100	16,932	19,506	21,528	23,682	27,437	45,921	200,280
Highways	3,747	4,947	7,394	9,300	10,589	12,618	13,412	14,445	17,304	41,451	135,206
Hospitals	11,074	11,046	3,914	1,891	1,456	1,158	1,158	722	675	675	33,771
Agriculture	330	330	469	643	818	957	1,176	1,479	1,892	3,662	11,757
Airports	238	196	510	719	823	835	755	1,033	1,739	4,894	11,743
General	1,246	2,771	4,435	5,741	6,947	8,272	9,996	11,950	15,189	33,129	99,665
Total Expenditures	43,685	81,180	56,737	53,781	56,432	60,129	64,206	72,522	83,658	156,561	728,888
Adjusted FMI plus total expenditures	83,876	163,027	231,632	290,415	346,426	409,164	488,292	580,280	730,988	1,576,689	4,900,849

regressive assumptions on a per capita basis and under progressive assumptions according to adjusted family money income.

The rates of incidence as computed above strongly suggest that state and local government expenditures in Oklahoma have a significant impact on the distribution of income within the state. Even according to the regressive, pro-rich set of assumptions expenditure benefits more than double the incomes of families and unattached individuals within the lowest decile.

There is, however, a disturbing aspect of incidence rates per se. It might appear on the basis of the rates themselves that the lower deciles were receiving much greater benefit from government expenditures than higher deciles. The decreasing rates, however, stem not from decreasing government expenditures but rather from increasing incomes, i.e., from an increasing denominator (Y) rather than from a decreasing numerator (G).

The incomes of the lowest quintile of income recipients is more than doubled because of state and local government expenditures, while the incomes of those in the highest quintile are increased by little more than ten percent. This is true even though the highest quintile receives more benefits in absolute terms than the lowest quintile.

Even if it is granted that incidence rates overstate the relative benefits being received by the lower income deciles, it is nevertheless evident that state and local

government expenditures significantly increase the incomes of these lower income deciles. Their incomes remain relatively low after the expenditures are imputed to all deciles, but their relative and especially absolute positions are improved.

The change in the Lorenz curve can be seen graphically in Figure II. The line further from the 45° diagonal is the distribution of adjusted family money income. The line closer to the diagonal is the distribution after state and local government expenditures have been added to the distribution based on the relatively regressive set of assumptions. The distribution according to the relatively progressive set of assumptions is not shown because the difference in results between it and the relatively regressive set of assumptions is not great enough to be delineatable on the graph.

The Gini coefficient reduction indexes are presented in Table X. They reflect that all of the expenditures having significant effects are regressive (pro-poor), even when the relatively progressive assumptions are employed. When total state and local government expenditures are imputed to before tax income, the degree of inequality in terms of the change in the Gini coefficient is reduced by 12.53 percent and 9.62 percent for regressive and progressive assumptions, respectively.
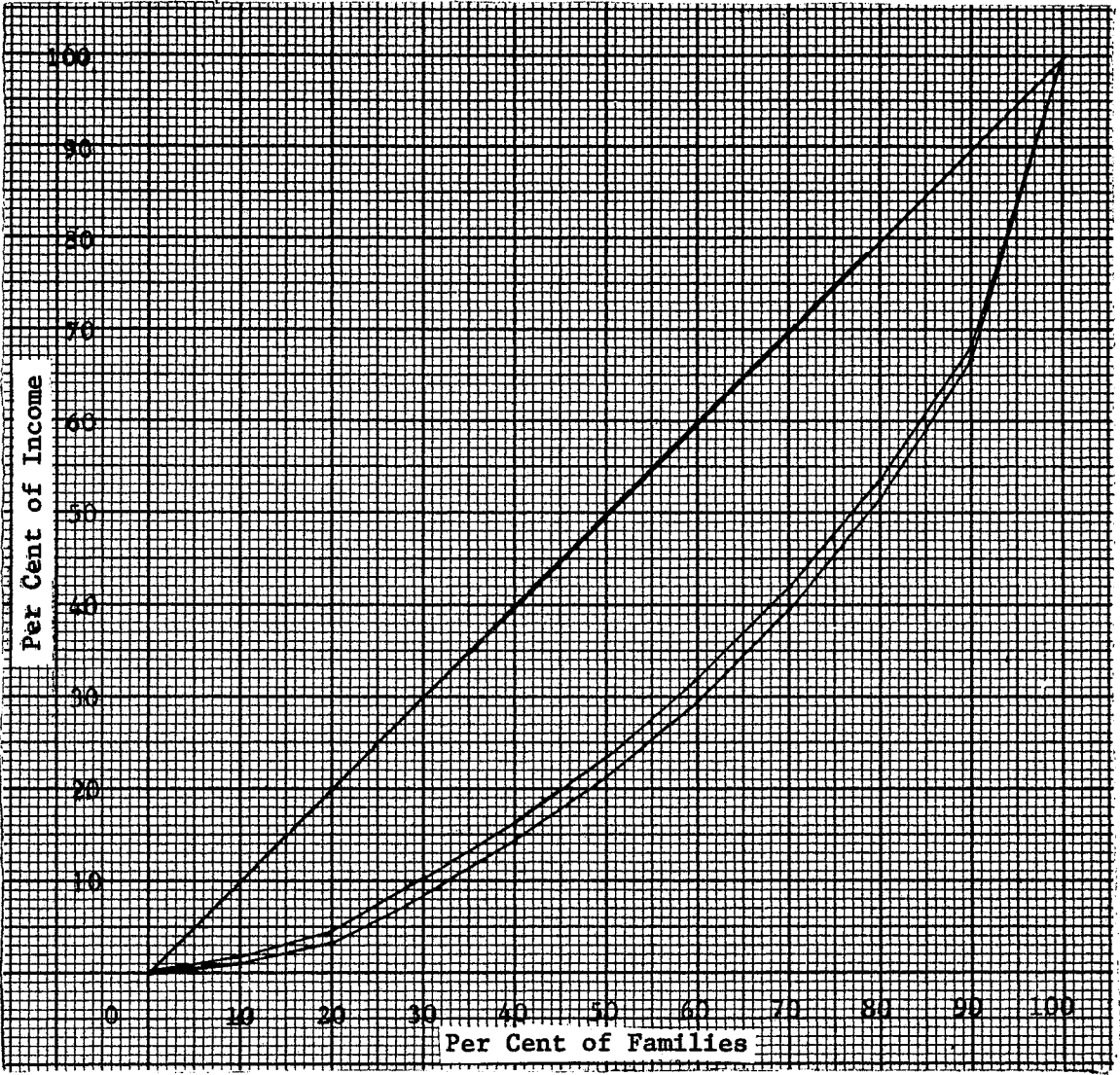
Figure 2. Lorenz Curves of Adjusted FMI and
Adjusted FMI plus Total Expenditures

TABLE X

GINI COEFFICIENT REDUCTION INDEXES

	Regressive Assumptions		Progressive Assumptions	
	Gini Coefficient	Gini Coefficient Reduction Index (per cent)	Gini Coefficient	Gini Coefficient Reduction Index (per cent)
Adjusted FMI	.447		.447	
Adjusted FMI plus:				
Public Assistance	.426	4.69	.426	4.69
Unemployment	.445	.45	.445	.45
Retirement	.446	.22	.446	.22
Higher Education	.444	.67	.444	.67
Elementary & Secondary Education	.432	3.36	.439	1.79
Highways	.444	.67	.444	.67
Hospitals	.439	1.79	.439	1.79
Agriculture	.447	--	.447	--
Airports	.447	--	.447	--
General	.439	1.57	.446	--
Total	.391	12.53	.404	9.62

Comparison of Results to Fiscal Year 1967

Assuming that the principal assumptions used in the study hold true, there are two changes that could alter the results over time. The first is that the overall level of state and local government activity could change in relation to adjusted family money income. The second possible change is that composition of state and local government activity could change.

The magnitude of the first type of change was estimated by comparing the total of the selected expenditures dealt with in this study to the OBE's estimates for personal income within Oklahoma. The selected government expenditures as a percent of personal income increased from 15.8 percent during fiscal year 1962 to 17.5 percent during fiscal year 1967.[2] Since adjusted family money income is less than personal income, both rates would be larger if adjusted family money income had been used as the base. If the assumption is made, as it was in Chapter III, that adjusted family money income remains a constant percentage of personal income, the above rates provide reasonably close indications of what transpired in terms of adjusted family money income.

------

[2]U. S. Department of Commerce, Office of Business Economics, Survey of Current Business, Vol. XLVIII, No. 4 (April, 1968), p. 13, and Vol. XLIX, No. 4 (April, 1969), p. 20. _____, Bureau of the Census, Census of Governments: 1962, Vol. IV, No. 4 (Washington, D. C.: 1963), Table 46, p. 112, and Census of Governments: 1967, Vol. IV, No. 4 (Washington, D. C.: 1968), Table 46, p. 112. Estimates for personal income for fiscal years were computed by averaging the personal incomes for two calendar years, e.g., 1966 and 1967.

Table XI reflects changes that have occurred of the second type. Only two expenditure categories have changed by as much as two percent of the total: higher education expenditures, which increased by 4.66 percent, and highway expenditures, which decreased by 2.25 percent of the total. By far the largest change of all was the increase in expenditures for higher education, an expenditure that is relatively progressive. Two of the most regressive types of expenditures, public assistance and unemployment payments, decreased in relative importance.

Overall, it does not appear that there was a very significant difference in the situation between fiscal year 1962 and fiscal year 1967. On the basis of the very brief evidence above it is possible to say that the rates of incidence would be higher in general and slightly more progressive.

Limitations of the Study

Two general areas upon which one could question the validity of the study are the theoretical assumptions used to identify beneficiaries of government expenditures and the statistical series which were used to estimate the distribution of the beneficiaries among income deciles. The attempt was made throughout the study to provide the reader with sufficient information to form his own judgment about the accuracy of these two areas.[3]

---

[3]The following comments by Gillespie summarize some of the general limitations of a study of this type (Brookings,

TABLE XI

SELECTED STATE AND LOCAL GOVERNMENT EXPENDITURES
IN OKLAHOMA FOR FISCAL YEARS
1962 and 1967

Expenditure	1962	Per Cent	1967	Per Cent
Public Assistance	142,247	19.52	208,262	18.72
Unemployment	23,466	3.22	16,993	1.53
Retirement	6,759	.93	14,480	1.30
Higher Education	63,994	8.78	149,739	13.46
Elementary & Secondary Education	200,280	27.48	295,779	26.58
Highways	135,206	18.55	181,349	16.30
Hospitals	33,771	4.63	50,853	4.57
Natural Resources	17,586	2.41	24,616	2.21
Airports	11,743	1.61	7,805	.70
General	93,836	12.87	162,708	14.62
Total	728,888	100.00	1,112,584	100.00

Source: U. S. Department of Commerce, Bureau of the
Census, Census of Governments: 1962, Vol.
IV, No. 4 (Washington, D. C.: 1963), Table
46, p. 112, and Census of Governments: 1967,
Vol. IV, No. 4 (Washington, D. C.: 1968),
Table 46, p. 112.

A conceptual issue which appears to warrant further examination concerns the procedure of measuring benefits from government expenditures in terms of costs-incurred-on-behalf-of criteria. As was stated in Chapter II, a question has been raised in the literature about whether or not collective decisions are as likely to extend an activity to the point where marginal costs equals marginal benefits as market decisions are. Even if the assumption is made that the collective activity is as close to the optimum quantity as is a market determined activity, is it valid to assume that the same comparative relationship exists between total costs and total benefits? That is to say, does consumer surplus exist in about the same relative magnitudes in both private and collective activities? These questions perhaps are of little use other than to provide another reason to devote effort towards the estimation of demand curves for both goods provided by the market and by the government. In the absence of

---

p. 67): "In conclusion, some of the major limitations inherent in this analysis should be recalled. Among these, perhaps the most basic is the assumption that the distribution of earnings before tax is unaffected by the fiscal process. The second is the necessity to hypothesize about the shifting of various tax burdens and expenditure benefits. The third is the fact that in some cases the distribution of particular tax or expenditure items has to be based on data which are not altogether satisfactory. Since it is impossible to determine actual benefits derived from public expenditures, 'expenditures undertaken on behalf of' various income groups had to be adopted as a less satisfactory, but workable, alternative. Finally, there was the difficulty of dealing with 'general' expenditures; these cannot be imputed readily to any particular group, but their exclusion would make it impossible to obtain a net benefit series."

such information, the alternative with which one is left, in effect, is an allocation of the budget.

A measure with useful policy implications would result if benefits could be given differential weights according to the incomes of the beneficiaries. One evaluation that could be given to the results of a study of this type is that benefits from government expenditures going to lower income groups are more "worthy" (of greater benefit) than expenditures going to higher income groups. It would be helpful if such subjective valuations could at least be made explicit and quantified. This is not a completely unexplored question; Weisbrod has made an interesting attempt in this direction.[4]

Studies of any kind, and certainly dissertations, never include all of what the researcher would judge to be relevant to the topic and purpose of study, simply because time and data are limited. There are two particular omissions which the author of this study judges to be especially unfortunate. One results from the omission of the revenue side of the budget, without which it is not possible to determine budget incidence. The other major omission, in the author's opinion, is the failure to consider the non-expenditure government activities that affect the income distribution, e.g., the government's law-making powers concerning contracts and property rights.

---

[4]"Income Redistribution Effects and Benefit-Cost Analysis."

No attempt has been made in this study to determine if
the distributional effect of state and local government ex-
penditures in Oklahoma have met the objectives of the citi-
zenry and their representatives. In fact, no attempt has
been made to determine what the redistributional objectives
are, or to determine if they exist at all. If the study is
useful, it will likely be in providing the citizenry and
their representatives with information which could be used
to help determine if their self-defined objectives are being
met.

Summary

The main purpose of this final chapter has been to pre-
sent the results of the study. The chapter commenced with a
discussion of possible measures of the distributional effects
of government, including the advantages and disadvantages of
such measures. Because no one measure appears to be suffi-
cient, the results were presented in terms of incidence
rates, absolute amounts, Gini coefficient reduction indexes,
and by Lorenz curves. The first three measures were computed
according to two alternative sets of assumptions: relatively
regressive assumptions and relatively progressive assumptions.
Results derived by either set of assumptions reflected a re-
gressive (pro-poor) distribution of benefits from government
expenditures by all measures other than that reflected by the
absolute amounts measure. This final chapter concluded with
a brief review of some of the principal limitations of a
study of this nature.

BIBLIOGRAPHY

Adler, John H. "The Fiscal System, the Distribution of Income, and Public Welfare." Fiscal Policies in the American Economy. Ed. Kenyon E. Poole. New York: Prentice-Hall, 1951. 359-409.

Allison, Robert J. "The Effect of Taxes and Transfer Payments on the Distribution of Income." Unpublished Ph.D. dissertation, University of Colorado, 1966.

Barna, Tibor. Redistribution of Incomes Through Public Finance in 1937. Oxford: Clarendon Press, 1945.

Bishop, George A. "The Tax Burden by Income Class, 1958." National Tax Journal, XIV (March, 1961), 41-58.

Bonnen, James T. "The Absence of Knowledge of Distribution Impacts: An Obstacle to Effective Policy Analysis and Decisions." Public Expenditures and Policy Analysis. Ed. Robert Haveman and Julius Margolis. Chicago: Markham, 1970. 246-270.

Bowman, Mary Jean. "Poverty in an Affluent Society." Contemporary Economic Issues. Ed. Neil W. Chamberlain. Homewood: Irwin, 1969. 49-107.

Brownlee, O. H. Estimated Distribution of Minnesota Taxes and Public Expenditure Benefits. Minneapolis: University of Minnesota Press, 1960.

Buchanan, James M. The Public Finances: An Introductory Approach. 3rd ed., Homewood: Irwin, 1970.

Budd, Edward C. "An Introduction to a Current Issue of Public Policy." Inequality and Poverty. Ed. Edward C. Budd. New York: Norton, 1967.

_____. "Postwar Changes in the Size Distribution of Income." American Economic Review, Papers and Proceedings, LX (May, 1970), 247-260.

Budd, Edward C., and Danial B. Radner. "The OBE Size Distribution Series: Methods and Tentative Results for 1964." American Economic Review, Papers and Proceedings, LIX (May, 1969), 435=449.

Conrad, Alfred H. "Redistribution Through Government Budgets in the United States, 1950." Income Redistribution and Social Policy. Ed. Alan T. Peacock. London: Johnathan Cape, 1954. 178-267.

Friedman, Milton. Capitalism and Freedom. Chicago: University of Chicago, 1962.

Gillespie, W. Irwin. "The Effects of Public Expenditures on the Distribution of Income: An Empirical Investigation." Unpublished Ph.D. dissertation, Johns Hopkins, 1963.

_____. "Effect of Public Expenditures on the Distribution of Income." Essays in Fiscal Federalism. Ed. Richard A. Musgrave. Washington, D. C.: Brookings, 1965. 122-186.

_____. The Incidence of Taxes and Public Expenditures in the Canadian Economy, Report No. 6.1, A Study Prepared for the Royal Commission on Taxation. Ottawa: Queen's Printer, 1965.

Governor's Tax Study Group. Financing Government in Colorado. Denver, 1959.

Griliches, Z. "Research Costs and Social Returns." Journal of Political Economy, LXVI (October, 1958), 419-431.

Hochman, Harold M., and James D. Rodgers. "Pareto Optimal Redistribution." American Economic Review, LIX (September, 1969), 542-557.

Katona, George, Charles A. Lininger, James N. Morgan, and Eva Mueller. 1961 Survey of Consumer Finances. Survey Research Center, Monograph No. 24. Ann Arbor: University of Michigan, 1962.

Morgan, James N. "The Anatomy of Income Distribution." Review of Economics and Statistics, XLIV (August, 1962), 270-283.

Musgrave, Richard A. The Theory of Public Finance. New York: McGraw-Hill, 1959.

Musgrave, Richard A., J. J. Carroll, L. D. Cook, and L. Frane. "Distribution of Tax Payments by Income Groups: A Case Study for 1948." National Tax Journal, IV (March, 1961), 1-53.

Musgrave, Richard A., and Darwin W. Daicoff. "Who Pays the Michigan Taxes?" Michigan Tax Studies: Staff Papers. Ann Arbor: University of Michigan, 1958.

National Bureau of Economic Research. Studies in Income and Wealth, Vol. 33, Six Papers on the Size Distribution of Wealth and Income. Ed. Lee Soltow. New York: Columbia University Press, 1969.

National Planning Association. Projections of Income Size Class Distributions of Consumer Units by State for 1964, 1974, 1976, Regional Economic Projection Series, No. 64-III. Washington, D. C.: National Planning Association, 1964.

Newman, Peter. "An Empirical Study of the Distribution of the Tax Burden in the United States, 1955-1959." Unpublished paper, University of Michigan, September, 1961.

Oklahoma Department of Public Welfare, Division of Research and Statistics. Annual Report, Fiscal Year Ending June 30, 1962. Oklahoma City: Oklahoma Welfare Commission, 1962.

_____. Income and Special Requirements in Public Assistance Cases: December, 1963. Oklahoma City: Oklahoma Welfare Commission, 1963.

_____. Income and Special Requirements in Public Assistance Cases: May, 1967. Oklahoma City: Oklahoma Welfare Commission, 1967.

Oklahoma Employment Security Commission. 1961 Annual Report to the Governor. Oklahoma City: Oklahoma Employment Security Commission, 1962.

_____. 1962 Annual Report to the Governor. Oklahoma City: Oklahoma Employment Security Commission, 1963.

Oklahoma, Office of the Governor. State of Oklahoma Budget for the Fiscal Year Ending June 30, 1965. Oklahoma City: Division of the Budget, 1964.

Oklahoma State Regents for Higher Education. Eleventh Biennial Report: Period Ending June 30, 1962. Oklahoma City, 1962.

_____. An Analysis of Faculty Teaching Loads and Student-Credit-Hour Costs in Twenty-Four Oklahoma Colleges and Universities for the 1961-62 Academic Year. Oklahoma City, 1962.

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

Ross, William D. Financing Highway Improvements in Louisiana. Baton Rouge: Louisiana State University, 1955.

Schultz, T. W. The Economic Value of Education. New York: Columbia University Press, 1963.

Tax Foundation, Inc. Tax Burdens and Benefits of Government Expenditures by Income Class, 1961 and 1965. New York: Tax Foundation, Inc., 1967.

Tax Study Committee, University of Wisconsin. Wisconsin's State and Local Tax Burden: Impact, Incidence, and Tax Revision Alternatives. Madison: University of Wisconsin, 1959.

Tucker, Rufus S. "Distributions of Tax Burdens in 1948." National Tax Journal, IV (September, 1951), 269-285.

_____. "The Distribution of Government Burdens and Benefits." American Economic Review, Papers and Proceedings, XLIII (May, 1953), 518-543.

U. S. Congress, House. First Progress Report of the Highway Cost Allocation Study. H. Doc. 106, 85th Cong., 1st sess., 1957.

_____. Committee on Ways and Means. Federal Aid Highway Financing. Hearings on the President's Proposal for Financing the Federal-Aid Highway Program, 87th Cong., 1st sess., 1961.

U. S. Department of Commerce, Bureau of the Census. Census of Governments: 1962, Vol. II, Taxable Property Values. Washington, D. C.: U. S. Government Printing Office, 1963.

_____. Census of Governments: 1962, Vol. IV, No. 4. Washington, D. C.: U. S. Government Printing Office, 1963.

_____. Census of Governments: 1967, Vol. IV, No. 4. Washington, D. C.: U. S. Government Printing Office, 1968.

_____. Census of Governments: 1962, Vol. VI, No. 1, Employee Retirement Systems of State and Local Governments. Washington, D. C.: U. S. Government Printing Office, 1963.

_____. Current Population Reports, Series P-25, No. 280, Washington, D. C.: U. S. Government Printing Office, March 2, 1964.

_____. *Statistical Abstract of the United States: 1965*. Washington, D. C.: U. S. Government Printing Office, 1965.

_____. *U. S. Census of Population: 1960*, Final Report, PC(2)-4B, *Subject Reports, Persons by Family Characteristics*. Washington, D. C.: U. S. Government Printing Office, 1964.

U. S. Department of Commerce, Office of Business Economics. *Survey of Current Business*, Monthly Issues.

U. S. Department of Labor, Bureau of Labor Statistics. *Consumer Expenditures and Income, Survey of Consumer Expenditures 1960-61*, Report No. 237-238 and various supplements. Washington, D. C.: U. S. Government Printing Office, 1965 and 1966.

_____. *Survey of Consumer Expenditures, 1960-1961*. (undated computer print-out data).

U. S. Housing and Home Finance Agency. *Families in Low Rent Projects, 1960*, Item 225.1. Washington, D. C.: U. S. Government Printing Office, 1961.

Weisbrod, Burton A. "Income Redistribution Effects and Benefit-Cost Analysis." *Problems in Public Expenditure Analysis*. Ed. Samuel Chase. Washington, D. C.: Brookings, 1968, 177-209.

_____. *External Benefits of Public Education: An Economic Analysis*. Princeton: Industrial Relations Section of the Princeton University Press, 1964.

Weisbrod, Burton A., and W. Lee Hansen. *Benefits, Costs, and Finance of Public Higher Education*. Chicago: Markham, 1969.

Weiss, Randall D. "The Effects of Education on the Earnings of Blacks and Whites." *Review of Economics and Statistics*, LII (May, 1970), 150-159.

A P P E N D I X   A

PERCENTAGE DISTRIBUTIVE SERIES

PERCENTAGE DISTRIBUTIVE SERIES

	Lowest	2	3	4	5	6	7	8	9	Highest
				D e c i l e s						
1. Family Money Income	1.25	2.78	4.45	5.76	6.97	8.30	10.03	11.99	15.24	33.24
2. Adjusted Family Money Income	.96	1.96	4.19	5.67	6.95	8.37	10.17	12.17	15.52	34.04
3. Private & Public Relief	10.95	30.80	11.40	7.05	6.70	5.77	5.03	6.20	6.84	9.26
4. Unemployment Insurance Payments	2.59	11.23	17.13	15.83	12.08	10.10	10.24	8.16	7.59	5.05
5. Social Security Payments	18.10	21.92	17.47	11.01	7.58	6.04	4.83	4.80	4.29	3.96
6. Farm Operator Families	2.81	2.81	3.99	5.47	6.96	8.14	10.00	12.58	16.09	31.15
7. Population	5.76	7.34	8.55	9.32	9.94	11.18	11.47	11.66	12.16	12.62
8. Children Aged 6-17	7.10	7.04	9.61	8.17	9.84	10.38	10.90	11.72	12.49	12.75
9. College Students	4.10	5.98	8.72	9.22	9.36	9.06	9.84	12.74	11.91	19.07
10. Consumption Expenditures	3.25	4.50	6.25	7.61	8.86	10.24	11.63	12.68	14.69	20.29
11. Automotive Expenditures	2.38	2.97	4.83	6.28	6.99	8.59	8.52	9.05	11.25	39.14
12. Food Expenditures	5.34	4.66	5.64	6.27	6.47	7.76	7.58	8.04	10.08	38.16
13. Mental Hospital Benefits	32.79	32.71	11.59	5.60	4.31	3.43	3.43	2.14	2.00	2.00
14. Air Travel Expenditures	2.03	1.67	4.34	6.12	7.01	7.11	6.43	8.80	14.81	41.68
15. Expenditures for Shelter	4.03	4.22	6.01	7.02	7.59	7.61	7.34	7.75	10.84	37.59

A P P E N D I X   B

SOURCES OF THE PERCENTAGE DISTRIBUTIVE SERIES

SOURCES OF THE PERCENTAGE DISTRIBUTIVE SERIES

Line 1: National Planning Association, Projections of Income Size Class Distributions of Consumer Units by State for 1964, 1974, 1976, Regional Economic Projection Series, No. 64-III (Washington, D. C., 1964) Appendix, Tables 3 and 5. For an explanation of how the data were con- verted into deciles from income size brackets, see Chapter III.

Line 2: This distribution results from the deletion of state and local government transfer payments from the distri- bution presented in Line 1. See Chapter III for a more complete explanation.

Lines 3-5: U. S. Department of Labor, Bureau of Labor Sta- tistics, Survey of Consumer Expenditures, 1960-61 (un- dated computer print-out data), Table I, p. 2065.

Line 6: U. S. Department of Commerce, Office of Business Economics, Survey of Current Business, XLII, No. 4 (April, 1962), p. 13.

Line 7: U. S. Department of Labor, Bureau of Labor Statis- tics, Consumer Expenditures and Income: Detail of Expenditures and Income, Supplement 3--Part A to BLS Report No. 237-93 (Washington, D. C., May, 1966), pp. 2-3.

Line 8: U. S. Department of Commerce, Bureau of the Census, U. S. Census of Population: 1960, Final Report, PC(2)- 4B, Subject Reports, Persons by Family Characteristics (Washington, D. C., 1964), Table 10a, p. 92.

Line 9: Burton A. Weisbrod and W. Lee Hansen, Benefits, Costs, and Finance of Public Higher Education (Chicago, 1969), p. 69.

Lines 10-12: Same as Line 7.

Line 13: W. Irwin Gillespie, "Effects of Public Expenditures on the Distribution of Income," Essays in Fiscal Fed- eralism, ed. Richard A. Musgrave (Washington, D. C., 1965), Table 12, pp. 170-171.

Line 14: Same as Lines 3-5.

Line 15: Same as Line 7.

VITA

Charles Ronald Ross

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECTS OF STATE AND LOCAL GOVERNMENT EXPENDI-
TURES ON THE DISTRIBUTION OF INCOME IN OKLAHOMA

Major Field: Economics

Biographical:

Personal Data: Born in Tulsa, Oklahoma, August 6, 1941,
the son of Mr. and Mrs. Charles E. Ross.

Education: Graduated from Edison High School, Tulsa,
Oklahoma, in May, 1960; received the Bachelor of
Science degree from the University of Tulsa in
1963, with a major in Economics; received the
Master of Science degree from Oklahoma State Uni-
versity in 1969, with a major in Economics; com-
pleted requirements for the Doctor of Philosophy
degree at Oklahoma State University in May, 1972.

Professional Experience: Graduate teaching assistant,
Department of Economics, Oklahoma State University,
1966-1969; Assistant Professor of Economics,
Humboldt State College, 1969-1971.