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State Taxation in Hawaii with some notes on Fiscal Policy at the state level

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**Publication Date**

1969-11-01

STATE TAXATION IN HAWAII

With some notes on fiscal policy at the state level.

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WP 111

This paper was supported in part by a grant from the Economic Development Agency.

Preliminary

November 1969

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Prelude

In 1906, the economist Leroy-Beaulier wrote:<sup>1</sup>

"We believe that it is possible to fix an empirical lower and upper limit to taxation. The limits are not inflexible, they are only approximate. We consider that taxation is very moderate when the sum of national, provincial and municipal taxes does not exceed five or six per cent of private incomes. Such a proportion should be the normal rule in countries where the public debt is small and whose politics are not dominated by the spirit of conquest. Taxation is still bearable, though heavy, up to ten or twelve per cent of the citizen's income. Beyond twelve or thirteen per cent the rate of taxation is exorbitant. The country may be able to bear such a rate, but it is beyond doubt that it slows down the growth of public wealth, threatens the liberty of industry and even of the citizens, and hems them in by the vexation and inquisition necessarily entailed by the complexity and height of the taxes."

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<sup>1</sup>As quoted in: L. Johansen, Public Economics.

Times have changed since this dictum was made. Since then, taxes and other government receipts have increased about one hundredfold. In the United States today, receipts of federal, state and local governments amount to more than 25 percent of the total U. S. Gross National Product (GNP), and there are countries in Western Europe in which the share of government receipts exceeds one third of the GNP.<sup>2</sup>

The other side of this picture is of course that the services provided by government agencies have expanded enormously. Economists have grown accustomed to speaking about the "high income elasticity" of government services. Elasticity in this context measures the responsiveness of the demand for services to changes in incomes. Roughly, a measure of elasticity states the percentage change in one variable which results from a one percent change in another variable. To illustrate, as household incomes have risen, the demand for education has increased proportionately more. We describe this relationship by saying that the demand for educational services is elastic with respect to income.

As has often been observed in the literature, the demands upon state and local governments for services have been increasing much faster than the demands for services provided through federal-civilian spending. Zubrow notes that in recent years state and local government expenditures in the United States have grown to approximately 10 percent of the GNP, whereas

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<sup>2</sup>For many interesting comparisons of this kind, see J. A. Pechman, Federal Tax Policy.

the corresponding figure for federal expenditures, exclusive of defense and transfer payments, is less than 2 percent.<sup>3</sup>

Eldridge says that "increases in outlays for education have been conspicuous, but they have been matched in recent years by outlays for general government functions, including health, hospitals, police, fire protection, natural resources, local recreation, water supply, and sanitation".<sup>4</sup>

Mushkin and Adams have focused attention on the rapidly growing demands for public services generated by an increasingly urbanized society. They distinguish between four broad categories of public outlays namely for: (1) Household-supporting services; (2) Supports to disadvantaged families; (3) Supports for industrial development; and (4) Supports for the better life.<sup>5</sup>

During the past twenty years, total U. S. state and local government expenditures have been rising at an annual clip of more than 10 percent. As is well known, state and local governments have been hard pressed to raise the revenues needed to finance the burgeoning expenditures. One authority describes the tax system of state and local governments as having such a structure that "at constant tax rates they (total tax revenues)

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<sup>3</sup>R. Zubrow, Recent Trends Toward Uniformity in State Personal Income Taxation (National Tax Journal, 1966).

<sup>4</sup>D. Eldridge, Equity, Administration and Compliance, and Intergovernmental Fiscal Aspects (In: The Role of Direct and Indirect Taxes in the Federal Revenue System, NBER, 1964).

<sup>5</sup>S. Mushkin & R. Adams, Emerging Patterns of Federalism (National Tax Journal, 1966).

tend to increase, at best, only proportionately or less than in proportion to increases in GNP".<sup>6</sup> Thus, we say that state and local tax revenues have not been very elastic with respect to the GNP. Brazer notes that at the state level "well over 200 rate hikes and 15 new taxes" were imposed between 1959 and 1966.<sup>7</sup>

Were it not for the Vietnam War, the situation on the federal level would offer quite a contrasting picture. The federal tax structure is such that federal tax revenues grow proportionately faster than the GNP. In other words, the past experience has been that federal taxation has been more elastic than state and local taxation with respect to the GNP. The celebrated tax cut in 1964 came about to counteract the resulting "fiscal drag". As noted by Brazer:<sup>8</sup>

"One of the major arguments in favor of the tax cut was that the Federal tax structure tends to exert a "fiscal drag" on the economy, making it increasingly difficult to attain full employment and to sustain it once it has been achieved. This fiscal drag was held to arise from the fact that with the economy growing at the target rate of about 6 per cent per year in current dollar terms Federal revenues would rise at the rate of about 8 per cent per year or more than \$7 billion."

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<sup>6</sup>H. Brazer, The Federal Government and State-Local Finances (National Tax Journal, 1967).

<sup>7</sup>H. Brazer, *Ibid.*, p. 157.

<sup>8</sup>H. Brazer, *Ibid.*, p. 156.

In this light, much interest has arisen during the past few years concerning the features of various tax-sharing systems -- among them the so-called Heller Plan -- whereby the federal government would substantially increase its aid to state and local governments. It seems like a fairly safe prediction of things to come, to say that grants and other transfers from the federal government to the states will increase substantially in future years. Brazer emphasizes in his study the need for streamlining the system and for cutting down the bureaucratic red tape involved for providing the various kinds of grants. He remarks:<sup>9</sup>

"A new profession has developed whose members are finding it highly lucrative to sell their services as experts in the technique of filing successful applications for Federal grants".

Turning now to Hawaii, what is the tax situation and how does taxation in Hawaii compare to the tax systems of other states? These are among the questions to which we shall address ourselves next.

Excellent surveys of Hawaii's system of taxation are published both by the State Department of Taxation and by the private Tax Foundation of Hawaii.<sup>10</sup>

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<sup>9</sup>H. Brazer, *Ibid.*, p. 181.

<sup>10</sup>See for instance, Annual Report 1966-67 of State of Hawaii, Department of Taxation, pp. 8-9 and Government in Hawaii, 1968, pp. 32-33. Incidentally, the statistical eager-beaver will discover a small error in the 1968 Tax Foundation Report recently published. It still says that 0.505% of the retail etc. tax base is distributed to the counties. This proviso was abolished some years ago.

Both surveys give concise descriptions about the nature of the different taxes currently levied in Hawaii, about the different tax bases used, about the rate structures, and about exemptions and deductions. The Tax Foundation's survey also gives a percentage breakdown of the different taxes collected, as pertaining to the most recent fiscal year.

The most penetrating studies of taxation in Hawaii have been made by R. Kamins, (1952, 1957 and 1962), by R. Kamins and Y. S. Leong (1963) and by R. Hoffman (1967). These studies are analytically oriented and consistently of very high quality. In any new comparative study of taxation in Hawaii, it would be an important step to update their data, especially the tabular material organized by Kamins. Well worth mentioning in this context is also the comprehensive review undertaken by the Governor's Advisory Committee on Taxation and Finance a few years ago. It was published in 1965.

This is not the place to make tabular comparisons of taxation between different states and in different years. Let me just make a few broad observations.

Comparing the present distribution of taxes collected in Hawaii with the distribution prevailing around 1960, one finds:

- (1) Between the fiscal year 1960 and 1967, the Grand Total of all state and local taxes collected in Hawaii more than doubled.
- (2) The General Excise Tax -- the State's broadly based sales tax -- continues to be the most important tax revenue source, although its dominance has been somewhat reduced.

- (3) The Personal Income Tax has increased somewhat in importance as a tax revenue source.
- (4) The Real Property Tax (which is collected by the State but distributed to the counties) has increased very significantly in overall importance and it presently brings in almost as much per year as the Personal Income Tax.
- (5) Each one of all the other taxes -- among which the Motor Fuel Tax is the largest -- amounts to a small percentage. But since there are so many of these miscellaneous taxes, they add up to a not insignificant proportion (slightly less than 25 percent or about unchanged from 1960).

Comparing the present distribution of taxes in Hawaii with state taxation in the Nation at large, one finds:<sup>11</sup>

- (1) Sales, gross receipts and similar taxes play a much smaller role in the Nation than in Hawaii.
- (2) Personal Income Taxes play a much smaller -- though increasing -- role in the Nation than in Hawaii. In this context, the paper by Zubrow is of interest. In his study he observes a marked trend toward greater uniformity in State Personal Income Taxation in recent years. Nearly all states are becoming increasingly

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<sup>11</sup>For detailed analyses and tax comparisons between Hawaii and other states, see R. Kamins, Tax Problems and Fiscal Policy in Hawaii, pp. 12-17, in which an interesting comparative indicator of "tax effort" is applied.

dependent upon personal income taxation as a source of revenue. At the same time, he finds, the overall progressivity of this tax has been somewhat reduced.<sup>12</sup>

- (3) Property Taxes play a much larger role as a revenue source in the Nation than in Hawaii.

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<sup>12</sup>R. Zubrow, op.cit.

### Objectives of Taxation

Taxation is said to be "the method by which a Nation implements decisions to transfer resources from the private to the public sector".<sup>13</sup> Taxation is an important means of economic and social policy. On the federal level, it is -- more or less effectively -- integrated with monetary policy.<sup>14</sup> Taxation counteracts the expansionary effects of governmental outlays. Such counteraction through taxation may be needed, if the human as well as the non-human resources are already fully utilized. The case (with monetary policy disregarded) has been neatly and compactly stated by F. Modigliani:<sup>15</sup>

"Given the full-employment output, say  $\bar{X}$ , and given the share of this output which it is appropriate to allocate for government use, say  $G^*$ , there is a maximum amount of output that is left available for the private sector, say  $\bar{P} = \bar{X} - G^*$ . Now the private sector demand for output, say  $P$ , is a function of income and taxes, say  $P = \varphi(X, T)$ , with  $\partial P / \partial T < 0$ . Taxes are then to be set at that level, say  $T$ , which satisfies the equation  $\varphi(\bar{X}, T) = \bar{P}$ . A higher level of

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<sup>13</sup>J. A. Pechman, op.cit., p. 5.

<sup>14</sup>Compare the much quoted statement by P. Samuelson: "With proper fiscal and monetary policies, our economy can have full employment and whatever rate of capital formation and growth it wants".

<sup>15</sup>As quoted in: E. Phelps, Fiscal neutrality toward economic growth, p. 5.

taxes would generate unemployment and a lower level would generate inflation, both evils which it is the task of government to avoid.  $\bar{T}$  may turn out to be larger than  $G^*$ , or even per chance just equal to  $G^*$ ."

A major purpose of federal taxation, then, is to attain and maintain full employment. From this point of view, it is of little consequence whether the result will imply an increasing or decreasing federal debt. Much confusion has surrounded the issue of the burden of the federal debt. Some have argued in the past that an increase in the federal debt means that the present generation will impose added burdens on future generations. If there is unemployment and other unused resources when the debt increase is incurred, the consequence will in all likelihood be a reduced burden on later generations.

On the state level, opinions on the debt issue seem divided. Also, the issue appears to be somewhat clouded by misuse of some of the concepts involved. The difference between total State Revenues and State Current Outlays (including transfer payments) represents State Savings. These savings can be used to finance State Capital Outlays. If these state savings for a particular period exceed the value of state capital investments for the same period, it means that the state makes savings available for private capital investments. Then we say that there is a Surplus on the total state budget (which may be used to reduce state indebtedness). If, on the other hand, the value of state capital expenditures are greater than the state savings, it

means that the private sector of the economy contributes some of the savings needed by the public sector for its investment programs (and the consequence is increased state debt).

If state and county governments continually aim at balancing their budgets, the effect on the national economy is de-stabilizing. In other words, when national economic policies are aimed at stabilization -- that is, putting the brakes on inflationary tendencies, or stimulating economic activity in periods of recession, as the case may be -- the economic consequences of state and local policy rules and actions will run counter to national policies. Considering, as discussed in the introductory section above, that state and local expenditures and revenues are very large in relation to federal-civilian expenditures, it is obvious that if such state and local policies are consistently maintained, the consequences on the national scene can be serious.<sup>16</sup>

On the federal level, the fiscal system provides so-called built-in stabilizers. That is to say, the federal tax structure has such inherent characteristics as to dampen inflationary as well as recessionary tendencies in the economy. On the state level, both writers and policy-makers have expressed opinions which, if set into action, would work in exactly the opposite direction, that is to say de-stabilizing. To illustrate, sales and excise taxes are often supported for their relative stability of yield. The

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<sup>16</sup>See L. Johansen, op.cit., p. 359. See also R. Kamins, Tax Problems and Fiscal Policy in Hawaii, p. 36.

same argument has been used to justify property taxes.<sup>17</sup>

Broadly speaking, policy-makers in matters of taxation at the state level, seem inclined to adopt a passive attitude toward state taxation as a means of economic stabilization. But the cost of such passivity is many foregone opportunities. Take Hawaii's system of taxation as an illustration. It has an unusually rich orchestration of taxation instruments. The economic setting in which it exerts its influence, is presently characterized by strong inflationary pressures. All indications are that these pressures will remain or become even stronger. One source of inflationary pressure in the Hawaiian economy is the exceptionally high demand directed towards the construction sector of the economy. Intense construction activity in the residential area has coincided in time with intense construction in office buildings, hotels and other commercial projects, as well as with high levels of public construction -- ranging from highway projects to new office buildings. This means upward pressure on wages and salaries, and on prices generally, in the construction industries, where Mainland competition can exert only limited influence. In turn, these price and wage increases are likely to spread throughout the economy.

The General Excise Tax on construction could be -- but is not -- viewed as a policy instrument. In times of high

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<sup>17</sup>For one advocate of taxes which provide "revenue stability", see F. Jackson, Tax Burden and the Hawaiian Tax System, p. 1 and pp. 9-10.

and rising levels of construction activity in Honolulu -- and a consequently high and rising demand for construction workers -- the State Legislature could raise the excise tax on construction. At the time of such rate increase, it should be stated for how long a period the higher rate would be effective. In times of slack demand for construction activity, the excise tax rate on contracting could be lowered or abolished altogether -- again with a definite statement about the length or duration of the rate cut.

Seemingly, there exists also a conflict between Federal policy and Hawaiian fiscal policy as far as "exports", including revenues from tourists, are concerned. On the federal level, there is much concern about increasing exports. Various devices have been implemented to attract visitors to the United States. To promote commodity exports, the replacement of some present taxes with a value-added tax has been seriously discussed. Such a tax, it has been claimed, would make it easier to exempt U. S. exports from taxes, so as to improve the competitive ability of the export industry. In Hawaii, general excise taxes on sales to visitors (also a form of export) are not exempted. On the contrary, it is argued that the sales tax is a good form of taxation exactly because of the State's dependence on tourism, which then becomes an

important source of tax revenue. Recently, proposals have been made in the Hawaiian Legislature to impose an additional tax on visitors in the form of a \$2-a-day hotel room tax.<sup>18</sup> However to a considerable degree, this conflict between federal and Hawaiian policy is more apparent than real. The visitors who come to Hawaii, benefit from many public services and they cause public investments in roads, sewers, water lines, etc. So it may be argued, taxation on visitors to Hawaii is somewhat similar to taxation imposed on those who use roads and highways. It is a tax on those who derive benefits from the particular use. There may also be more subtle social costs imposed by the visitors of a nature that the economists refer to as spillover costs and external diseconomies. In such cases, there is no price mechanism at work in the private economy to deter the visitors from imposing the costs concerned. The effect is that the allocation of resources in society will become less efficient. Thus, a justification for excise taxes on tourists is that one desires to counteract the resulting misallocation of resources. Seen in this vein, the taxation of visitors is not entirely unrelated to the rationale given for taxation of such items as liquor and tobacco, the undeterred

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<sup>18</sup>That tax is unusually ill-conceived and obnoxious. It is ill-conceived because it goes counter to a generally accepted principle in Hawaiian taxation which is to levy taxes in the form of percentage rates. In times of increasing price levels, a tax determined as an absolute amount -- like the \$2-a-room tax -- will soon be left by the wayside as a nuisance and as ineffective. It is an obnoxious tax, because it would lead investors to capitalize the unshifted part of the tax. The losses thus capitalized would be incurred, in a rather unequitable pattern, by present hotel owners.

consumption of which is believed to lead to greatly increased medical and other costs for society at large.

The matter of new taxation of tourism is intensely debated in Hawaii. But the arguments raised rest on very shaky foundations, on all sides of the issue. The trouble is that no trustworthy estimates exist about the costs, and the benefits, associated with the visitor industry.

Taxation as a means of improving the existing allocation of resources appears also in other areas at the State level, and we shall conclude this section by two more examples.

A major tool for implementing State planning in Hawaii is its Land Use Law, unique among all the States.<sup>19</sup> The Law's zoning regulations are based on a classification of all land into so-called Land Use Districts, and these are used as a basis for property assessments. In this way, and with some modifications, property taxation in Hawaii is actively used to influence resource allocation, by encouraging "the best use of land".<sup>20</sup>

Another and somewhat more subtle illustration of at least potential influence of taxation with a view of improving the allocation of resources is the following. To a not insignificant degree, Hawaii is a society of transients. There is a considerable mobility in the local labor force caused by the fact that

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<sup>19</sup>See State of Hawaii, General Plan Revision Program, Part 5, Land Use, Transportation and Public Facilities.

<sup>20</sup>For a valuable analysis of related problems, see W. Miklius, Taxation of Urban Land: Nonconforming Use Residential Properties.

many people who come here, especially from the U. S. Mainland, are only temporary residents. While there are undoubtedly great intrinsic values in labor mobility, it is equally true that the high turnover rates of certain kinds of personnel raise training costs and other social costs, and the problem is to strike a happy balance. In a way, one can see the State's Conveyance Tax -- a tax imposed on all documents transferring ownership or interest in real property -- as an instrument of taxation on transients (although presently the tax rate is nominal and therefore brings in only a very small amount, in spite of the large number of real estate transactions).

In our discussion of objectives of taxation thus far, we have considered the goals of attaining and, through stabilization measures, of maintaining full-employment. These objectives, then, are aimed at the level of resource utilization, at reducing fluctuations in the level and at reaching the highest possible level of resource utilization. We have also pointed out, by means of various illustrations, that taxation may be imposed with the aim of improving the allocation of resources. It goes without saying that taxation, in its many forms, also has the opposite effects. Taxes lead to misallocation of resources in society. To put it another way, taxes have the consequence of distorting choices in the economy. This distortion of choice seems germane to practically all taxes in existence.

Let me give some examples of the ways in which taxes interfere with the efficient allocation of resources. I shall use Hawaii as a basis for the illustrations.

In Hawaii -- as elsewhere in this world -- one kind of work, namely the housewife's work in the home, and one kind of current consumption, namely leisure, are favored by taxation. The Hawaii General Excise Tax, and its various supplements, is probably unique in the Nation in terms of its broad coverage. It covers commodities and it covers services, but it does not cover the housewife's work, nor does it cover leisure. Since no other taxation covers these activities, either, the effect is -- whether we like it or not -- a certain misallocation of human resources. This is of some practical significance in Hawaii today. There is widespread concern that the expected continuation of rapid increases in visitor expenditures will generate a large influx of migrants in the coming years. This influx will arise, one believes, because the labor supply in the state is insufficient to cope with the increase in demand. The concern has arisen because of the high social costs that one believes to be associated with the importation of labor (costs of providing new schools, hospitals, etc. for family members of the newcomers). If, through taxation, one were able to make work outside the home somewhat more favorable (and consequently housework and leisure somewhat less favorable), it might be possible to attract into the labor force more housewives and other presently not gainfully employed members of the population.

Thus, a tax incentive for gainfully employed housewives would tend to reduce the present misallocation of resources.<sup>21</sup> It is true that labor participation rates in Hawaii are already high, but they could undoubtedly go still higher. Likewise without any doubts, the social costs in Hawaii of increasing labor participation rates of the existing population, are much lower than the social costs associated with importation of labor.

As illustrated by this example, the existing misallocation of resources due to taxation arises from the probably inevitable lack of generality in taxation. Another illustration of this is the following. Income taxation, generally speaking, is biased against rentals and in favor of homeowners. Even the General Excise Tax in Hawaii appears to exert a bias influencing homeownership. There is an excise tax on rentals, but there is no excise tax on the imputed rentals of homeownership. One may claim, therefore, that the exemption from the General Excise Tax granted to homeownership has helped raise sale prices of homes and thus has added to inflation. My calculations concerning this phenomenon led me to believe that prices of homes in Hawaii are inflated by 4.2 percent to 4.4 percent of their values (interval reflects the somewhat arbitrary choice

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<sup>21</sup>Compare C. H. Kahn, Employee Compensation Under the Income Tax, pp. 56-57: "The main difference between wives working outside the home and all other persons is that the former could otherwise generate considerable income in the home. They have therefore high opportunity costs to consider when seeking employment outside the home. . . Ideally an income tax would include such home-generated income in the tax base."

of an interest rate for discounting). Thus, the inflated prices arise because of the absence of an excise tax on the imputed rentals of homeowners.

An area of possible misallocation on resources due to taxation refers to the banking sector. This is a difficult area, not the least due to the restrictions imposed on state fiscal policy and action because of federal regulations.<sup>22</sup> A recent proposal submitted by Arthur D. Little, Inc., to conduct a study of Hawaii's General Excise Tax points out the possibility that present taxation in Hawaii favors banks and related financial institutions.<sup>23</sup> If this possibility can indeed be demonstrated in fact, it means, then, that the distortion of choice due to taxation has induced too large resources into the banking and financial sector in Hawaii.

A further illustration concerns the exemption from general excise taxes of sales to the Federal Government which may have led to some distortion of the resource allocation in Hawaii.<sup>24</sup>

As was stated initially, taxation is the vehicle for transferring resources from the private to the public sector. In this resource transfer, taxation is very likely, as we have seen, to interfere with and distort the allocation of resources

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<sup>22</sup>For a very interesting survey of these restraints, see S. B. Chase, Jr., State Taxation of Banks, (Law and Contemporary Problems, Winter 1967).

<sup>23</sup>Arthur D. Little, Inc., A Need for Fiscal Reform: The Shortcomings of the General Excise Tax, a proposal to the Department of Taxation, State of Hawaii.

<sup>24</sup>According to its proposal, Arthur D. Little, Inc. will explore the problems of taxation on banks, as well as the problems of exemption of taxes on purchases by the Federal Government.

in society which would otherwise have occurred. The resulting misallocation is a cost to society which is additive to the cost of government generally. Harberger refers to such costs as "the welfare costs of a tax system".<sup>25</sup> His estimates show that these costs are far from negligible in the United States. He finds for instance that the distortion of the work vs. leisure choice, referred to in the discussion above and brought about through personal income taxation, costs the Nation about \$1 billion a year. He finds that the tax-induced misallocation of resources caused by the corporate income tax adds another billion dollars to costs. Although his estimates are tentative, due to data problems, they do seem to indicate the general order of magnitude of the costs involved. He also shows, as have others,<sup>26</sup> that taxation through its effects upon the work-leisure choice, interferes with the temporal allocation of resources. In this way taxation is shown to influence economic growth in society.

Pure examples of taxes which are "neutral" with respect to efficient resource allocation are head taxes and lump-sum taxes. Most of the taxes, as we have indicated above, are likely to be "non-neutral" in this sense. Nevertheless, it is a major principle of tax policy that the effects upon resource allocation should, as far as possible, be neutral.

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<sup>25</sup>See A. C. Harberger, Taxation, Resource Allocation, and Welfare (In: The Role of Direct and Indirect Taxes in the Federal Revenue System).

<sup>26</sup>See for instance, the excellent study by W. H. Oakland, The Theory of the Value-Added Tax: A Comparison of Tax Bases (I) and Incidence Effects (II) (National Tax Journal, 1967).

So whenever a new tax is introduced, the tax experts and policy-makers try to assess the magnitude of the possible misallocation of resources that may result. Other considerations may be overriding, however, and one important such consideration is equity.

In fact, the tax policy principle of equity has often been found to conflict sharply with the tax policy principle of neutrality.

A central concept in discussions of equity is that of incidence. Here we shall adopt the usage of the concept applied by Oakland:

"By the term incidence we mean the changes in the distribution of welfare brought about by the introduction of a particular tax. Because an individual's welfare is not measurable and hence not comparable, economists often assume that real income serves as a satisfactory index of a person's well being as a basis for making interpersonal welfare comparisons.<sup>27</sup>

Thus, tax incidence as we interpret it refers to the influence upon the real net incomes of the various members of society.

In the literature dealing with equity and broadly with the problem of identifying the "ultimate" tax burden, as to distribution, there is perhaps an unfortunately heavy emphasis on the concepts of "forward" and "backward" shifting. Since

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<sup>27</sup>W. H. Oakland, Ibid.

the economic system is most fruitfully viewed as a circular process, there is a logical difficulty of defining, especially in operational terms, what "forward" or "backwards" mean in this context. The important question is how far the shifting of a particular tax goes. This determines what happens to real incomes, and it is their distribution not the distribution of money incomes, which is crucial to an answer of the question, "Who bears the burden?". Considerations of external markets apart, it seems to be of little consequence whether the shifting occurs backwards or forward in the conventional sense.<sup>28</sup>

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<sup>28</sup>For a good statement of the case, see R. F. Hoffman, Hawaii Tax Rate Distribution Estimates:

"The idea of tax shifting may be explained by way of example. A sales tax is levied and therefore has impact on the seller of a product. The structure of relative prices of products (outputs) and factors of production (inputs) will generally undergo adjustment as a result of the imposition of a tax. This adjustment will result in an adjustment of real income flows and wealth stocks of the members of the community. Assume the adjustments proceed with fully employed resources from an initial position of equilibrium to a subsequent equilibrium. If we say the tax is not shifted, what we have in mind is that the adjustment results in a decline, by the amount of tax, in the real income of those who receive income from sources upon which the tax was levied. On the other hand, if we say the tax has been completely shifted forward to the consumer, what we mean is that the adjustment results in a decline, by the amount of the tax, in the real income of those who use their income to purchase the products whose sale is subject to the tax levy.

This simple but only partial formulation leads to a consideration of tax shifting which corresponds to the concept of absolute tax incidence. A more complete and more appropriate pair of alternative formulations may be mentioned. The first considers the adjustment which results from the substitution of one tax for another of equal yield, with no change in the expenditure side of the budget. The second considers the adjustment which results from the imposition of the tax and the expenditure of the tax revenue by the government. These approaches involve the concepts of differential tax incidence and budget incidence respectively." (pp. 4-5).

Most analytically oriented studies of incidence assume perfect competition. Considering that conditions in Hawaii -- in the land and labor markets, in many product markets and to a smaller extent in the capital markets -- deviate, often quite substantially, from the characteristics of perfect competition, it would be of both empirical and theoretical interest to analyze in depth questions of incidence under conditions of imperfect competition. Such work might contribute also to the practice of fiscal policy.

An important step in this direction is R. Hoffman's recent study of "Hawaii Tax Rate Distribution Estimates". His study refers to the year 1960 and is a serious and valuable attempt to measure the incidence of total state and local taxes in Hawaii. In his published report, he has a very fine documentation of the sources and the procedures used. This means that the opportunities are good for updating his material and to improve his estimates whenever and wherever new data become available.

The outstanding result of Hoffman's study is the very heavy burden borne by low-income earners. Quite similar results were found in a recent study by G. Rostvold for the State of California.<sup>29</sup> One may have some reservations about the results of these two studies, especially to the effect

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<sup>29</sup>G. Rostvold, "Distribution of Property, Retail Sales and Personal Income Tax Burdens in California: An Empirical Analysis of Inequity in Taxation" (National Tax Journal, 1966).

that they may both have underestimated the relevant income concept for the low-income wage earners -- and thereby have overestimated the tax burden borne by the low-income earners.<sup>30</sup>

As mentioned, Hoffman's study is an analysis of the situation in the year 1960. It is a feature common to most studies of incidence to analyze the situation at a particular point in time in this way. It would also be of interest, however, to study changes in incidence over time. Especially in Hawaii, where conditions are subject to continuous great change, would a dynamic approach be helpful.

A simple attempt will be made here to analyze the effects of inflation upon tax burdens.

We have discussed above the strong inflationary pressures evident in the Hawaiian economy. From the point of view of economic and social policy-making in the State it is of interest to analyze to what extent state taxation tends to accentuate or dampen these inflationary pressures. From the same point of view, it is also of interest to analyze whether the effects of taxation in an inflationary period differ as between different categories of income earners and families.

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<sup>30</sup>See D. H. Eldridge, op.cit., pp. 157-158:

"In endeavoring to judge the equity of consumption tax distributions with respect to individuals' incomes, annual tax and income figures leave much to be desired. Similar problems are encountered in assessing the fairness of relative burdens under a progressive income tax between persons with varying and stable incomes. Ideally, comparisons might be made between life-time taxes and incomes. . . .

To assist in judging the weight of sales tax burdens in relation to income, further empirical studies of consumption and income patterns over several years would be instructive. Meanwhile, conclusions about the degree and import of regressivity based on one-year comparisons of taxes attributed to groups of consumers and their current incomes should be regarded as tentative." . . .

As we shall see, two significant conclusions will emerge from the following tentative analysis of these questions. First, for poor and rich families in Hawaii alike, the effects of inflationary price level changes appear to be such that percentage increases in the general price level lead to more than proportionate income tax increases for the families. Second, during an inflationary period and speaking broadly, the poorer families seem to be hurt relatively harder by the present structure of income taxation than the richer families in Hawaii.

For purposes of analysis, let us compare two Hawaiian families with the same number of dependents; one family having a very low income and the other family having a relatively high income. We denote the total income of the low-income family by " $py_1$ " and the total income of the high-income family by " $py_2$ ". For simplicity we assume that increases in the general price level are reflected in the incomes of both families. In other words, we assume that whenever there is an increase in the general price level, both families will see their total incomes increase at the same rate as the price increase. We denote the price level by the symbol " $p$ ".

The income tax law in Hawaii is constructed in such a way that we can compute the income tax,  $T(y_{\text{tax}})$ , as a function of the taxable income,  $y_{\text{tax}}$ , in the following manner:<sup>31</sup>

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<sup>31</sup>This is all we need for our purposes. A true reproduction of the total rate structure would require further subdivisions of the interval bounded by  $b_1$  and  $b_2$ .

$$T(y_{\text{tax}}) = \begin{cases} a_1 y_{\text{tax}} & \text{for } y_{\text{tax}} \leq b_1 \\ a_1 b_1 + a_2 (y_{\text{tax}} - b_1) & \text{for } b_2 \geq y_{\text{tax}} \geq b_1 \\ a_3 (y_{\text{tax}} - b_2) + a_2 (b_2 - b_1) + a_1 b_1 & \text{for } y_{\text{tax}} \geq b_2 \end{cases}$$

Assume for purposes of comparison that both the poor and the rich family are entitled to deduct a proportion,  $k$ , of their gross incomes,  $py_1$  and  $py_2$ , and that both families have the same deduction,  $b_0$ , for personal exemptions. Then we can write the income taxes,  $T_1$  and  $T_2$ , for the families, respectively, as follows:

$$T_1 = a_1(py_1 - kpy_1 - b_0)$$

$$T_2 = a_3(py_2 - kpy_2 - b_0 - b_2) + a_2(b_2 - b_1) + a_1 b_1$$

Calculating the income tax elasticity with respect to price level changes we find:

$$\frac{\partial T_1}{\partial p} \cdot \frac{p}{T_1} = 1 + \frac{a_1 b_0}{T_1}$$

$$\frac{\partial T_2}{\partial p} \cdot \frac{p}{T_2} = 1 + \frac{a_3 b_0 + a_3 b_2 - a_2 (b_2 - b_1) - a_1 b_1}{T_2}$$

That is to say, both the poor and the rich family will indeed have their Hawaii State income tax payments increase faster than their gross incomes in times of inflation. This is indicated by the fact that both elasticities, as calculated above, assume values greater than one.

To explore situations in which the poor family's tax payments will grow proportionately more than the rich family's we relate the two elasticity expressions as follows:

$$\frac{\partial T_1}{\partial r} \cdot \frac{r}{T_1} > \frac{\partial T_2}{\partial r} \cdot \frac{r}{T_2} \quad \text{for}$$

$$\frac{a_1 b_0}{T_1} > \frac{a_3 b_0 + a_3 b_2 - a_2(b_2 - b_1) - a_1 b_1}{T_2}$$

It is easily recognized from this expression that for a sufficiently large  $T_2$ , this inequality will indeed be fulfilled. In fact, for families with two or more children, the tax rates in Hawaii are such that in periods of inflation most of the poorer families will have their income tax payments go up at a faster pace -- and thus have relatively larger tax bites taken out of their incomes -- than richer families. In other words, the  $a$  and  $b$  coefficients, in the expressions above, have such values in Hawaii's tax structure that inflation hurts poorer families relatively harder than richer families.<sup>32</sup> Some reflection will reveal to us that the explanation for this phenomenon lies in the rate structure itself. Presumably, this tendency could be effectively counterbalanced by wider use of tax credits for lower income families.

Looked at from the point of view of the State policy-makers, the significance of these findings is as follows: The income tax rate structure in Hawaii will exert a dampening effect upon the economy in times of inflationary pressures, and this dampening effect exerts itself more strongly on poorer families than on richer families.

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<sup>32</sup>For simplicity, we have here assumed that the deductions constitute a fixed proportion of gross incomes. This appears to agree with the facts reasonably well for incomes up to about \$30,000. There-above, deductions increase proportionately more than gross incomes. This should, however, not influence our conclusions.

Even the excise tax on rentals may take an increasing bite out of a family's income in times of inflation. To see this, we write the relationship between the general price level,  $p$ , and the level of rentals,  $r$ , as:

$$r = r(p)$$

where both  $r$  and  $p$  are measured as index numbers.

Denote the actual rental payments that the family considered is presently incurring for its housing unit as  $r_h$ . Then, using the so-called extensive, shifting assumption applied by Ronald Hoffman in his study of tax incidence in Hawaii, and denoting the excise tax rate on rentals as  $t_r$ , we can write the excise payment incurred by the family on its rental unit as:

$$T_r = r_h t_r$$

The elasticity of this excise tax with respect to the general price level is then:

$$\frac{\partial T_r}{\partial p} \cdot \frac{p}{T_r} = \frac{\partial r}{\partial p} \cdot h t_r \cdot \frac{p}{T_r} = \frac{\partial r}{\partial p} \cdot \frac{p}{r}$$

$$\text{Thus, } \frac{\partial T_r}{\partial p} \cdot \frac{p}{T_r} > 1 \text{ for } \frac{\partial r}{\partial p} > \frac{r}{p}$$

In other words, a marginal (percentage) increase in the general price level, will lead to a proportionately larger increase in the excise tax, if the marginal effect on rents of a general-price-level increase is greater than the average relation between rents and the general price level. The last "if" is an empirical proposition that can be tested. But given the peculiar land situation in Hawaii, it is quite a plausible proposition.

Thus, the result -- a poor family will bear an increasing burden of excise taxes in an inflationary period -- will follow, as long as the family's total income does not grow any faster than the rate of inflation.

To alleviate the hardship imposed on low-income families by high taxation, especially indirect taxation, various ideas have been suggested and to some extent implemented. One such idea concerns the "negative income tax". Other, and in their effects quite related, approaches pertain to the idea of tax credits. In this area, the State of Hawaii has been quite innovative, although the initial application of tax credits gave somewhat unexpected results. In a review, the Tax Foundation criticized the law containing the tax credit provisions as being poorly drafted. It said that "the tax credit provisions of Hawaii's income tax law are so confusing that the persons for whom the credits were designed are the least able to take advantage of them".<sup>33</sup> The State Tax Department made a study of the results of the first year's application of the consumer tax credits. The startling result of their study was that relatively speaking many more non-residents than residents claimed the tax credit. The study also found that "the non-resident average amount of consumer credit per claim was \$57.05 comparing with an average of only \$4.87 per resident claim".<sup>34</sup> These results were primarily due

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<sup>33</sup>Tax Foundation of Hawaii, Hawaii's Personal Income Tax Credits, p. 10.

<sup>34</sup>Hawaii State Department of Taxation, Incidence in 1966 of Hawaii's New Tax Credits, p. 5.

In their valuable study of the General Excise Tax, Kamins and Leong pointed to the high regressivity of the tax: "This comparison shows a relative tax burden on the lowest income class of two to almost four times the proportionate size of the burden on families with incomes of \$10,000 or more."<sup>37</sup> Their findings are substantiated in the recent study by Hoffman. The shifting assumption used by them appears to be very reasonable.

The students of public finance will point out to us that the shape of the supply or cost curves and the shape of the demand curves determine together the incidence of taxes under conditions of perfect competition or perfect monopoly. But in the short run, and considering all the intermediate cases between perfect competition and perfect monopoly -- and these contain most of the real-world cases -- we shall probably find that prices are increased by the exact amount of the tax. This conclusion will hold also in the case of a monopolist, provided that before the change in the tax he has not exploited his position fully. There are a good many reasons why a monopolist in Hawaii does not.

The present form of the General Excise Tax in Hawaii is such that prices at the retail level are slightly higher than they would have been if the same tax amount had been collected at the retail level. The reason for this is that the imposition of the excise tax on manufacturing, wholesaling and similar

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<sup>37</sup>R. Kamins and Y. S. Leong, Hawaii's General Excise Tax, p. 23.

intermediary activities, as well, will lead to slightly higher trade margins being imposed by retailers and other intermediate buyers. However, the difference in the consumer price level cannot possibly be greater than a fraction of 1 percent, considering that the excise tax rates on intermediate sales is generally only 1/2 of 1 percent.

In this context it may be of interest to note that a value-added tax results in a somewhat greater rise in the consumer price level than does a single-stage tax at the retail level bringing in the same amount of tax.

Turning, briefly, to another and long-standing objective of state taxation, an important concept is that of liquidity or "financial flexibility".<sup>38</sup> This concerns the timing of the tax revenue flows and involves considerations of essentially a short-term nature. In a later section of this report we shall suggest a procedure for making short-term tax revenue projections.

It should also be clear from what has been said already that whenever a tax is proposed, its revenue elasticity becomes an important consideration. State Legislators and other public decision-makers in the taxation area, often use the word "adequacy" to connote what we have heard referred to as high revenue elasticity of a tax.<sup>39</sup> Sometimes the word "revenue productivity" has been used in the same sense.<sup>40</sup>

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<sup>38</sup>R. Kamins, Tax Problems and Fiscal Policy in Hawaii, pp. 35-36.

<sup>39</sup>See, for instance, Report of the Governor's Advisory Committee on Taxation and Finance, pp. 106-107.

<sup>40</sup>F. Jackson, Tax Burden and the Hawaiian Tax System, pp. 8-9.

The Objectives of the  
Hawaii State Department of Taxation

Collection of taxes in Hawaii is administered by the State Department of Taxation. Since the resources used by the Taxation Department -- as well as the resources spent by tax payers in complying with tax regulations -- have alternative uses, we should take a brief look at this area as well. Over the years, many studies have been made about the administrative and compliance costs of state and local taxes.<sup>41</sup> One recent such study was conducted in the State of Montana.<sup>42</sup> The results show that both administrative and compliance costs can be quite high. The authors found for instance that the compliance costs for the corporation income tax was about 10 percent of the amount of taxes paid, and the administrative costs amounted to .4 percent of the tax revenues. For the individual income tax the corresponding costs were 20.7 percent and 8.3 percent, for a total of 29 percent of total tax revenues.

This is an area in which comparisons between states are hard to make. As Eldridge points out "differences in cost ratios among states often appear to reflect differences in effort rather than efficiency".<sup>43</sup>

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<sup>41</sup>See, for instance, J. Due, State Sales Tax Administration and D. Eldridge, op.cit.

<sup>42</sup>J. Wicks and M. Killworth, Administrative and Compliance Costs of State and Local Taxes (National Tax Journal) (1967).

<sup>43</sup>D. Eldridge, op.cit., p. 162.

One of the stated objectives of the Department of Taxation is to "achieve the highest level of uniformity possible in the administration of the State's tax laws". It also strives for simplicity in taxation, and it is of some interest to note that both the private Tax Foundation and the Director of the State Department of Taxation have recommended a much closer adherence to the federal income tax return in state taxation of personal incomes. The State Tax Director has suggested that a simple, short form be used on which tax payers -- with certain modifications -- would apply a flat percentage of their federal income tax to calculate the tax payment to the State.<sup>44</sup>

Another stated objective of the State Department of Taxation is to develop and furnish essential information of the adequacy of tax revenues and the economic base of the state and to coordinate activities with other governmental and private agencies. To this effect, the Taxation Department carries out studies of various kinds, of which we have referred to a few in our previous discussion. The Department also publishes an annual report which reviews tax administration, tax legislation and the current operations of the Department. It also releases monthly and quarterly statements on tax revenue

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<sup>44</sup>The Tax Foundation has raised the question, however, "whether the state can legally adopt future federal tax legislation". The complete tie-in with federal income taxation would delegate to the U. S. Congress powers to amend the state income tax law "since future amendments to the federal tax law would affect the state tax" -- in possible conflict with the Hawaii State Constitution. See Tax Foundation of Hawaii, Critique of Hawaii's Taxes, p. 16.

collections. It further publishes annual reports on Hawaii income patterns on individuals, corporations, and sole proprietorships. These annual reports appear with a very considerable time delay. For instance, the Hawaii income patterns for the year 1963 were not published until the year 1967.

It would be interesting to know who the users of these annual publications on income patterns are. I am sure that there are users of these reports, but the "opportunity costs" for satisfying their data needs are very high. They may involve a sacrifice of other and in my view more pertinent and also more timely information. As one user of all the major sources of statistics in Hawaii, I would cast my vote for a reallocation of the Tax Department's publication efforts: Away from the mentioned types of annually reported statistics (which still might be made available in the form of photostatic copies of computer printouts) and instead more emphasis on the type of report that the Department published in 1967 under the title "Gross Receipts of Hawaii Employers 1963".

The Tax Department provides monthly releases, among other things, of the General Excise and Use Tax Base and of the General Excise and Use Tax Collections. These releases are very timely, as they appear only a few weeks after the end of the collection period. However, these reports like the quarterly and annual reports, classify the information, by business activity, in a form which disagrees with all standard industrial classifications. Nor do the classifications used agree with those used by other Hawaii state agencies. Since

the excise and use tax applies to nearly all categories of business activity in the state, the information compiled in the process of administering this tax has the potential of serving as an excellent short-term indicator -- "barometer" -- of the state of the Hawaiian economy. In the form in which the information is presently released, it does not serve this purpose very well. So, an important revision would be to reclassify the excise tax information, to render it in one-to-one correspondence with standard one- or two-digit industrial classifications. Indeed, this data source has the potential to go beyond standard classifications in terms of information provided. For instance, the Taxation Department presently uses a category called "Rentals". This is a hodge-podge of items and thus tends to blur the picture concerning the very interesting hotel rental situation. Yet, the forms used by the Department does single out a separate category named "Hotels, etc." which is carefully separated from another category covering other rentals .

An important step towards rectifying this state of affairs is provided by the Tax Department's recent publication "Gross Receipts of Hawaii Employers 1963". This report covers enterprises engaged in business activities subject to the General Excise Tax Law and employing workers covered by unemployment insurance. The study has indeed succeeded in linking up its excise tax statistics with information compiled on a standard industrial classification basis. The tax information in this report is in one-to-one correspondence with employment and

payroll data released by the State Department of Labor and Industrial Relations.

This report holds promise for the future, and it can only be hoped that the study has not been a once-and-for-all effort. It is hoped that in future endeavors information of this nature will be released more timely -- the present report was released in 1967 and contained data for 1963. Also, as mentioned, the value of this information would be considerably enhanced if it were released on a monthly or quarterly basis.

One cannot help but be astounded at the following sentence contained in this report from the State Department of Taxation: "All data in this report, except the employment and payroll data (which came from another department), were compiled manually". As early as in its 1964-65 Annual Report, the Department of Taxation said that modern data processing would be introduced among other areas in "tax research, tax records and statistics and economic planning reports", and its target date for having the required computer routines operational were July 1, 1966. There does not seem to be any reason for complaint about the good intentions of the Hawaii State Department of Taxation.

In the early 1950's, a Joint Committee of the Statistics Committee of the Chamber of Commerce of Honolulu and of the Hawaii Chapter of the American Statistical Association was formed to consider statistics available from the tax administration. This committee had Gordon Frazier of the Bank of Hawaii, and Richard Takasaki of the Bureau of the Budget, as co-chairmen

and with Leonard Withington as secretary. Other members of the committee were John Child and Robert Schmitt.

The committee recognized "that the primary purpose of the Department of the Tax Commissioner is to collect taxes and not to compile statistics. At the same time, it was appreciated that Hawaii's centralized and well administered tax system provides a rich source of economic data which may be drawn off as by-products of the tax administration process".<sup>45</sup> The study suggested that "electrical accounting machines" be installed. This was quite foresighted at the time of writing (about 15 years ago). They also made excellent suggestions for computations and classifications of the tax statistics. In all, they took a very modern approach in these matters, and their report still makes good reading. It can only be regretted that their advice has not been heeded to any appreciable extent.

Each year, in November or December, the Taxation Department releases a short-term projection of general fund tax revenues for the current fiscal year. Thus, by the time of the release, the current fiscal year is almost half way through, so that

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<sup>45</sup>Tax By-Products Statistics: Report of the Joint Committee of the Statistics Committee of Chamber of Commerce of Honolulu, and Hawaii Chapter, American Statistical Association.

the real "projection" part of their estimates covers only the last six or seven months of the current year. In spite of this, their tax revenue projections -- at least for the past few years -- are off the mark by not insignificant amounts. In these reports, the Taxation Department also makes a projection for the ensuing fiscal year. A check of these projections against actual data for the past few years is shown on the table on the next page. It goes without saying that such projections cannot be quite as accurate on the average, as the short-term projections for the current year, but the actual deviations are substantial as revealed by the table.

The table shows that the projections for the ensuing fiscal years are off by the order of magnitude of \$20 million, or about 10 percent. The short-term projections are off by smaller amounts varying between \$6 and \$11 million.

The important thing to observe about these deviations is that they have a systematic bias. Every single projection, as shown by the table, has a downward ("conservative") bias. To the extent that these projections have influenced the Legislators and other decision-makers in the State the effect has been to somewhat dampen economic activity in Hawaii. It is doubtful however that the Taxation Department has been authorized to make its tax projections so as to influence the course of the economy.

In the next section of this report, we shall explore another approach to making short-term general fund tax revenue projections.

PROJECTIONS OF GENERAL FUND TAX REVENUES AS PREPARED BY  
THE TAX RESEARCH AND PLANNING OFFICE -- COMPARED WITH THE  
ACTUAL TAX REVENUES

(Amounts in millions of dollars)

Date of Tax Research and Planning Office Projection	Tax revenue for fiscal year ending June 30, 1966		Percent deviation from actual	Tax revenue for fiscal year ending June 30, 1967		Percent deviation from actual	Tax revenue for fiscal year ending June 30, 1968	
	Amount Projected	Amount Actual		Amount Projected	Amount Actual		Amount Projected	Amount Actual
November 15, 1965	169.86	175.84	3.52	186.00	205.34	10.40	-	-
November 20, 1966	-	-	-	194.01	205.34	5.85	207.40	(most likely to exceed 230.00)
December 22, 1967	-	-	-	-	-	-	225.59	

Sources of figures: Stencilled reports released by the Tax Research and Planning Office

A Meteorological Approach to Short-Term Projections of  
State General Fund Tax Revenues

In his study of fiscal policy, Bent Hansen makes a distinction between three kinds of statements about the future in relation to GNP components of a national budget.<sup>46</sup> The first kind is called a "meteorological" forecast. This is a purely passive forecast, in the sense that it takes all policy variables -- such as tax rates -- as constants, although they are directly subject to control by the decision-makers. The second kind is called an "engineering" forecast. Here it is assumed that the policy-makers actively operate with some decision variables -- such as the outlays on capital and current accounts -- in order to attain stipulated goals or targets for the economy. The third kind of statement about the future is called a "Political Program". Here, the items making up the national budget themselves are viewed as ends or targets.

In this section of our report, which deals with short-term projections, we shall adopt the view of the Department of Taxation in their projections, which generally is to assume present tax rates and the present tax structure as given. This seems like a sensible approach in a short-term projection of tax revenues.

For present purposes we define short-term projections as covering a period less than or equal to two years.

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<sup>46</sup>B. Hansen, The Economic Theory of Fiscal Policy.

We shall confine our interest to the revenues of the State General Fund. That is to say, we shall not concern ourselves with taxes collected for the State Highway Fund, the State Airport Fund, the Unemployment Trust Fund, nor shall we be concerned with the tax revenues distributed to the counties (including the Real Property Tax).

In the introductory part of this paper we discussed the increasing role of tax-sharing in one form or another. To project the future amounts of grants and other transfers from the federal government to the State of Hawaii is outside the scope of this report.

For our purposes, we also need a workable definition of "tax structure". By tax structure we shall mean the whole set of regulations which affect the calculations of taxes, and over which the Legislators and other policy-makers exercise an exclusive control. Thus a tax rate is a component of the tax structure. In order to arrive at the tax liabilities these components of the tax structure operate on the tax bases. Gross proceeds of retail stores and hotel rentals are examples of tax bases.

It seems worthwhile to explore the use of a partial econometric analysis to project tax revenues and to use the computation method known as single-equation least squares.

Roughly, we shall follow a standard technique in forecasting consumer expenditure patterns namely to use fairly broad aggregates as predictor variables. We shall also use lagged variables.

The procedure suggested entails six-month periods. Thus, the approach boils down to predict general fund tax revenues on a semi-annual basis. For evaluations of short-term liquidity problems in the State of Hawaii this seems a worthwhile approach.

To repeat, the interest in this section is on short-term meteorological projections of yield from an unchanged, or approximately unchanged, tax structure. This obviously begs the question of what should be considered "an approximately unchanged tax structure", since every year seems to bring some new changes in the state tax legislation and administration. The rule we shall adopt is that any changes expected to yield less than 1 or 2 percent per year of the total tax collection affected, are part of an approximately unchanged tax structure.

We begin by defining the total State General Fund Tax revenues as consisting of five parts:

$$(1) \text{ SRT} = \text{GEUT} + \text{PIT} + \text{BIT} + \text{LTT} + \text{MT}$$

where

SRT = Total State General Fund Tax revenues collected during one period.

GEUT = General Excise, Use, Consumption and Compensation Taxes collected during one period.

PIT = Personal Income Tax collected during one period.

BIT = Business Income Tax collected during one period.

LTT = Liquor and Tobacco Taxes (including Permits and Licenses) collected during one period.

MT = Miscellaneous taxes (including Inheritance and Estate Tax, Conveyance Tax, etc.) collected during one period.

Our next step is to obtain estimates for the General Excise and Use Tax collections.

$$(2) \text{ GEUT} = r_1 b_1 + r_2 b_2 + r_3 b_3$$

where

$r_1$  = The tax rate which is presently (1968) 4%.

$b_1$  = The total tax base to which  $r_1$  applies.

$r_2$  = The tax rate which is presently (1968)  $\frac{1}{2}$  of 1%.

$b_2$  = The total tax base to which  $r_2$  applies.

$r_3$  = The tax rate which is presently (1968) 2%.

$b_3$  = The tax base to which  $r_3$  applies (presently consisting of commissions received by insurance solicitors).

$$(3) \frac{b_{1,t}}{b_{1,t-2}} = \zeta_0 \cdot \left( \frac{b_{1,t-1}}{b_{1,t-3}} \right)^{\zeta_1} \left( \frac{E_t}{E_{t-2}} \right)^{\zeta_2} \left( \frac{K_t}{K_{t-2}} \right)^{\zeta_3} \left( \frac{U_t}{U_{t-2}} \right)^{\zeta_4} \cdot \zeta_5$$

where

$b_{1,t}$  = The total tax base to which  $r_1$  applies, during period  $t$  (analogously  $b_{1,t-2}$  refers to two periods before the period, that is, to the same period during the previous year).

$E_t$  = Total gainful employment in Hawaii during period  $t$ .

$K_t$  = Total capital stock used in the Hawaiian economy during period  $t$ .

$U_t$  = Unemployment during period  $t$ .

$\zeta_0, \zeta_1$ , etc. are coefficients to be estimated through semi-annual data on the variables concerned.

$$(4) \frac{b_{1,t}}{b_{1,t-2}} = \eta_{10} \left( \frac{b_{1,t-1}}{b_{1,t-3}} \right)^{\eta_{11}} \left( \frac{v_t}{v_{t-2}} \right)^{\eta_{12}} \left( \frac{G_t^d}{G_{t-2}^d} \right)^{\eta_{13}} \left( \frac{G_{t-2}^{nd}}{G_{t-2}^{nd}} \right)^{\eta_{14}} \cdot \eta_{15}$$

where

$v_t$  = Total visitor expenditures in Hawaii during period t.

$G_t^d$  = Total defense expenditures in Hawaii during period t.

$G_t^{nd}$  = Total non-defense (federal, state and local) government expenditures during period t.

$$(5) \frac{b_{2,t}}{b_{2,t-2}} = \eta_{20} \left( \frac{b_{2,t-1}}{b_{2,t-3}} \right)^{\eta_{21}} \left( \frac{x_t}{x_{t-2}} \right)^{\eta_{22}} \left( \frac{p_t}{p_{t-2}} \right)^{\eta_{23}} \left( \frac{y_t}{y_{t-2}} \right)^{\eta_{24}} \cdot \eta_{25}$$

where

$x_t$  = Total value of commodity exports (sugar, pineapple and other manufactured products but exclusive of sales to visitors and other "non-visible" items) from Hawaii during period t.

$p_t$  = Total population in Hawaii (calculated as an average) during period t.

$y_t$  = Per capita personal income (using Department of Commerce definition of personal income) in Hawaii during period t.

$$(6) \frac{b_{3,t}}{b_{3,t-2}} = \eta_{30} \left( \frac{b_{3,t-1}}{b_{3,t-3}} \right)^{\eta_{31}} \left( \frac{p_t}{p_{t-2}} \right)^{\eta_{32}} \left( \frac{y_t}{y_{t-2}} \right)^{\eta_{33}} \cdot \eta_{34}$$

(variables as previously defined)

$$(7) PIT = r_4 b_4 + r_5 b_5 + r_6 b_6 + r_7 b_7 + r_8 b_8$$

where

$b_4$  = total amount of taxable income of all taxpayers whose taxable income to the State of Hawaii is less than \$2,000, during period t.

$r_4$  = composite tax rate applicable to  $b_4$ .

$$(4) \frac{b_{1,t}}{b_{1,t-2}} = \eta_{10} \left( \frac{b_{1,t-1}}{b_{1,t-3}} \right)^{\eta_{11}} \left( \frac{V_t}{V_{t-2}} \right)^{\eta_{12}} \left( \frac{G_t^d}{G_{t-2}^d} \right)^{\eta_{13}} \left( \frac{G_{t-2}^{nd}}{G_{t-2}^{nd}} \right)^{\eta_{14}} \eta_{15}$$

where

$V_t$  = Total visitor expenditures in Hawaii during period t.

$G_t^d$  = Total defense expenditures in Hawaii during period t.

$G_t^{nd}$  = Total non-defense (federal, state and local) government expenditures during period t.

$$(5) \frac{b_{2,t}}{b_{2,t-2}} = \eta_{20} \left( \frac{b_{2,t-1}}{b_{2,t-3}} \right)^{\eta_{21}} \left( \frac{X_t}{X_{t-2}} \right)^{\eta_{22}} \left( \frac{P_t}{P_{t-2}} \right)^{\eta_{23}} \left( \frac{y_t}{y_{t-2}} \right)^{\eta_{24}} \eta_{25}$$

where

$X_t$  = Total value of commodity exports (sugar, pineapple and other manufactured products but exclusive of sales to visitors and other "non-visible" items) from Hawaii during period t.

$P_t$  = Total population in Hawaii (calculated as an average) during period t.

$y_t$  = Per capita personal income (using Department of Commerce definition of personal income) in Hawaii during period t.

$$(6) \frac{b_{3,t}}{b_{3,t-2}} = \eta_{30} \left( \frac{b_{3,t-1}}{b_{3,t-3}} \right)^{\eta_{31}} \left( \frac{P_t}{P_{t-2}} \right)^{\eta_{32}} \left( \frac{y_t}{y_{t-2}} \right)^{\eta_{33}} \eta_{34}$$

(variables as previously defined)

$$(7) PIT = r_4 b_4 + r_5 b_5 + r_6 b_6 + r_7 b_7 + r_8 b_8$$

where

$b_4$  = total amount of taxable income of all taxpayers whose taxable income to the State of Hawaii is less than \$2,000, during period t.

$r_4$  = composite tax rate applicable to  $b_4$ .

$b_5$  = total amount of taxable income of all taxpayers whose taxable income (to the State of Hawaii) is at least \$2,000 and less than \$5,000, during period t.

$r_5$  = composite tax rate applicable to  $b_5$ .

$b_6$  = total amount of taxable income of all taxpayers whose taxable income (to the State of Hawaii) is at least \$5,000 and less than \$10,000, during period t.

$r_6$  = composite tax rate applicable to  $b_6$ .

$b_7$  = total amount of taxable income of all taxpayers whose taxable income (to the State of Hawaii) is at least \$10,000 and less than \$30,000, during period t.

$r_7$  = composite tax rate applicable to  $b_7$ .

$b_8$  = total amount of taxable income of all taxpayers whose taxable income (to the State of Hawaii) is at least \$30,000, during period t.

$r_8$  = composite tax rate applicable to  $b_8$ .

$$(8) \quad \frac{b_{i,t}}{b_{i,t-2}} = \prod_{i0} \left( \frac{b_{i,t-1}}{b_{i,t-3}} \right)^{\pi_{i1}} \left( \frac{v_t}{v_{t-2}} \right)^{\pi_{i2}} \left( \frac{G_t^d}{G_{t-2}^d} \right)^{\pi_{i3}} \left( \frac{G_t^{nd}}{G_{t-2}^{nd}} \right)^{\pi_{i4}} \prod_{i5} \text{ for } i = 4, \dots, 8$$

$$(9) \quad \text{BIT} = \text{PSCT} + \text{CIT} + \text{BFT} + \text{IPT}$$

where

BIT = Total amount of business income taxes payable to the State of Hawaii during period t.

PSCT = Public Service Companies Tax payable to the State of Hawaii during period t.

CIT = Corporate Income Tax payable to the State of Hawaii during period t.

BFT = Banks and Other Financial Institutions Tax payable to the State of Hawaii during period t.

IPT = Insurance Premiums Tax payable to the State of Hawaii during period t.

Equations (1), (2), (7) and (9) are definitional relations. It is seen that no estimating equations are presented here for the following taxes: PSCT, CIT, BFT, IPT, LTT, and MT (for the definitions of these six items, see text above). Each one of these taxes contributes presently only a small proportion of the total General Fund revenues. It is therefore suggested that -- at least provisionally -- a simpler procedure or projection be used for them. The suggested procedure for each one of these six taxes is this:

1. Divide the total observation period into sub-periods during which no change has occurred in the tax rate applicable to the tax in question.
2. For each sub-period, tabulate the tax collections per six-month period.
3. Calculate annual rates of change (percentages) of the six-month tax collections.
4. Calculate the average and the standard deviation of the annual rates of change.
5. Unless the dispersion is large, use the annual average rate of change calculated under 4. in the six-month projection, by applying it to the preceding year's tax collection figure. Example: To estimate the Insurance Premiums Tax (IPT) collectible during the second half of the 1968-69 fiscal year, we start from the IPT collected during the second half of the 1967-68 fiscal year and add to that the average annual rate of change of the starting figure.

As is seen, the specification of form here suggested is the same for equations (3), (4), (5), (6) and (8), namely such that the logarithms of the predicted variables are linear combinations of the logarithms of the predictor variables. Since computer programs are readily available for making ordinary linear estimates, it may be advisable to try both these forms.

One notices further that lagged values of the predicted variables are used as predictor variables throughout. Reasonably accurate values of these predictor variables should be available by the time a particular six-month projection is made. For instance, if a forecast is made for the first half of the 1969-70 fiscal year in June of 1969, good values should be readily available for the first six months of 1969.

By adjoining two consecutive six-month projections, a projection for the full fiscal year is obtained.

By far the most important tax base above is  $b_1$ . That is the tax base to which the present four percent excise tax applies. In view of its importance, it is suggested that attempts to project that tax base be pursued along two different avenues. These are specified in equations (3) and (4). Equation (3) is an estimate from the supply side. Equation (4) is an estimate from the demand side. Apart from the lagged factor -- the most recent rate of change of the predicted variable -- equation (3) is a sort of production function for the relevant tax base. It uses as predictors the annual rates of change in the employment and capital inputs which are absorbed into the enterprises making up the tax base.

Reliable employment information is available, but this is not the case for capital service inputs. My suggestion is that the annual rate of change in hotel capacity in Hawaii -- measured by the number of hotel rooms -- be used as a proxy variable. The last predictor variable in equation (3) is to account for variations in the rate of capacity utilization.

Equation (4) views the same predicted variable from the demand side. It attempts to relate annual changes in the tax base  $b_1$  to annual rates of change in visitor expenditures and total governmental expenditures. These are by far the two most important components of the demand side in Hawaii presently. The government expenditures are specified into defense and non-defense. As in equation (3), lagged values of the predicted variable are also used.

In equation (5), rates of change in commodity exports (sugar and pineapple exports, above all), and rates of change in the population and in the per capita income are suggested as predictor variables for tax base  $b_2$ , to which the  $\frac{1}{2}$  of 1 percent tax rate applies. In equation (6), which estimates the tax base for insurance solicitors, rates of change in total population and in per capita income are again used as predictor variables.

The Personal Income Tax base is difficult to project. The present suggestion -- contained in equations (7) and (8) -- is to divide the tax base into five sub-bases according to size of taxable income using \$2,000, \$5,000, \$10,000, and \$30,000 as dividing lines between the classes. To each one

of the resulting sub-bases a composite tax rate applies. One underlying assumption is that, within each class, demographic patterns and other phenomena affecting the distribution of single vs. joint, resident vs. non-resident etc. returns, remain about the same. This seems to be an entirely acceptable assumption in such short-term forecasts as we are here concerned with. Another underlying assumption is that the average taxable income within each sub-base remains about the same. This is a somewhat more debatable assumption, and its empirical validity should -- and can -- be tested. There may be some drifting of the intra-class averages over the short run. But there does not seem to be any reason to suspect strong systematic movements of any one of the five intra-class averages.

As in equation (4), rates of change in visitor expenditure and in governmental expenditures are suggested as predictor variables, in addition to the lagged variable, in order to predict the sub-bases of taxable personal income.<sup>47</sup>

Thus, tax rates do not appear as predictor variables in a single one of our equations. This is in line with our initial premise of no significant tax rate changes over the projection periods. As we all know, tax rate changes do occur, but -- at least as far as excise and similar tax rates are concerned --

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<sup>47</sup>Needless to say, should the proposed simplification of the personal income taxation be adopted by the Legislature, these regression estimates would have to be revised to fit better into the federal tax schedules.

they occur in very discrete steps, which significantly reduces their usefulness as predictor variables.<sup>48</sup> It is suggested here, as an alternative, that the observation period be broken up into sub-periods, between which significant changes have occurred in individual tax rates of relevance to the tax base concerned. The separate estimates of the exponents for such sub-periods can then be compared and analyzed.

Admittedly, the general approach that we have suggested in this section has its problems. The estimations may be plagued by problems of multicollinearity -- that the predictor variables are inter-correlated. Especially since we are proposing to use lagged values as predictor variables, there may also be problems of serial correlation -- that the residuals, the error terms, are inter-related. All estimating

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<sup>48</sup>A recent study by J. Legler and P. Shapiro, The Responsiveness of State Tax Revenue to Economic Growth, does use tax rates as predictor variables. Changes in income distribution patterns, changes in the tax structure itself, and in other variables unspecified by them, are very likely to cause high inter-correlation among the predictor variables that they do specify. It comes as no surprise that most of their (tax rate) elasticity coefficients are rejected as deviating insignificantly from the zero level, even at the 10 percent level of significance. Also, they were forced to use average income tax rates. Such average coefficients are rather meaningless as policy variables. The legislators change individual tax rates, not crude averages of many tax rates. Such averages, as Legler and Shapiro use, are subject to systematic change by factors outside the control of the policy-makers. In spite of these and other limitations which I shall not take up here, Legler and Shapiro cheerfully hand out all kinds of policy advice. Take this for a sample: "On the basis of the estimated values of the elasticities, California should consider major changes in its tax structure to take full advantage of its population growth. For instance, one alternative is to end the exemption of food purchases from sales taxes."

equations should be carefully tested with respect to the degree of inter-correlation and with respect to the hypothesis of first-order non-autocorrelation.

Another important aspect of a study of this nature is to investigate the extent of the time-lags -- and the occurrence of shifts in the time-lags as between different years -- between the various tax bases and the various tax collections. The amount of refunds vs. the amount of under-payments on the personal income tax base, the timing of collections from corporations, public utilities and banks, illustrate the type of problems implied.

The approach we have here suggested arises from a contention that there is a need in the State Government for reasonably accurate short-term revenue projections -- for periods of six to twelve months -- to assist in the evaluation of up-coming liquidity problems. The approach suggested is only a first step. When one starts to apply the procedure, he will learn from the experience -- and grow with the experience -- and this learning can then be used continually to improve the performance of short-term revenue forecasts.

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