Implication of Replacing Hawaii's Income Tax with an Increase in General Excise Tax

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Executive Summary

Replacing income taxes with a sales tax is often discussed when policy makers consider tax reform. Besides aiming at tax simplification, the idea is rooted in the notion that income taxes discourage saving, capital formation, and economic growth. Another motivation to shift from income to sales taxes is the ability to shift the tax burden from residents to non-residents. This idea is rather well-received at the state level, especially in a tourism-oriented state like Hawaii. A report by the Hawaii Department of Taxation has estimated that in 2005 about 38 percent of the General Excise Tax (GET) was borne by non-residents such as tourists, non-resident military personnel, and the federal government.[1] This suggests that a large portion of the increased tax burden of the GET resulting from such tax reform will be exported to non-residents.

This study examines the macroeconomic and distributional effects of the proposed tax reform using a Computable General Equilibrium (CGE) model. There are a few variations of the proposal that can be considered. This study considers a tax change that abolishes both the individual and corporate income taxes and increases the GET to attain the same total revenue.[2] The economic impacts of the tax reform would depend on how different groups of people react to the tax change. To understand the possible impacts, we considered several scenarios regarding tourist response to the tax change and the amount of new investment that the tax reform will draw.

The following summarizes key results of the study.

- The required increase of the GET rates to attain the same revenue as before the tax reform would depend on responses of economic agents to the tax change. Under a scenario where tourists show sensitive reaction and where the economy can draw only moderate amount of new investment as a result of the tax reform (scenario1), the current retail rate of 4 percent is calculated to increase to 6.78 percent and the wholesale rate of 0.5 percent is calculated to increase to 0.85 percent. We would need less increase in the rates under more optimistic scenarios, for instance 6.52 percent and 0.82 percent

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[1] "*Study on the Progressive or Regressive Nature of Hawaii's Taxes*", Report of the 2005-2007 Tax Review Commission, Hawaii Department of Taxation
[2] The Hawaii GET applies different rates for retail sales and wholesale sales. In the analysis, GET rates are allowed to increases proportionally to attain the same tax revenue as before with new set of prices and consumption.

respectively under scenario 6 (most optimistic scenario considered in the study), because the state economy would have a bigger tax base under those scenarios.[3]

- This study assumes that businesses will pass the full amount of the GET increase onto consumers. As a result, the tax inclusive prices consumers have to pay will increase immediately after the tax reform. However, the extent of the price increase would not be uniform among various spending units as consumption patterns vary among spending units. The simulation results show that as a result of the tax reform, the tax inclusive price index for the typical consumption bundle of residents will increase by 1.6 to 2.8 percent while the tax inclusive price index for the typical consumption bundle of tourists will increase by 2.4 to 3.3 percent. Spending a large proportion of their budgets as labor expense which is not directly affected by the tax reform, governments will face proportionately less cost increase with the GET rate increase. Price increases will be larger for all spending units under the scenario of non-sensitive tourist demand and more aggressive investment increase.

- Abolishing income taxes and increasing the GET would increase the income of residents as a whole by shifting a greater portion of tax burden to non-residents. Resident income as a whole would be 3.4~5.0 percent higher under the new tax system than under the current tax system if visitors cut their consumption in the same proportion as the price change which resulted from the tax reform. Resident income would be 5.3~7.1 percent higher if visitors maintain the same level of consumption even with higher taxes. This increase in resident income is a combination of direct income increase due to removal of the income tax and the subsequent income changes resulting from economic changes.

- Although residents would have higher incomes, the increase in the GET would increase prices for most goods and services they consume. With the higher prices that residents have to pay under the new tax system, the real income increase would be less than the nominal income increase. Real income change is of more interest in the analysis because real income is often used as an indicator of welfare. When measured in terms of real

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[3] The presented results are calculated using tax collections for 2005 calendar year as base information. Different base year information may generate different results.

income, the welfare of residents as a whole will increase under all scenarios considered because resident income would increase more than the price increase.

- Worsening income equality is an inevitable outcome of this kind of tax reform. Moving from a progressive income tax toward a flat GET, the tax reform will bring greater benefit to the higher income group.   Despite the augmented income inequality, residents at most income levels will still be better off under the new tax system by shifting more tax burden to others. However, some residents at the very low end of income spectrum will have a decline in their income in both nominal and real terms calling for some policy devices to compensate them for their monetary loss from the tax reform.

- The increase in saving will be bigger than the increase in consumption. Due to the progressive nature of income tax, a larger portion of newly available resident income without a state income tax will be put in the hands of the high income groups who save a larger portion of their income than lower income groups. As a result, it is estimated that resident saving will increase by 4.4 to 8.8 percent while consumption will increase by 2.9 to 6.4 percent depending on investment and visitor's reaction to the tax increase.

- Replacing income taxes with a sales tax is widely expected to promote economic growth by boosting saving and private investment. For a state economy, however, private investment does not seem to be determined by regional saving. Instead, it appears to be mostly demand-driven, even in the long-term. Abolishing the corporate income tax may attract more business and investment into Hawaii, although we do not know by how much. Our results suggest that unless the tax reform succeeds in drawing a fair amount of new regional investment, either by utilizing newly available regional saving or by attracting new outside businesses and investments, the growth effect of the tax reform is not warranted.

Summary Results of Tax Reform Simulation	
Price (tax inclusive)	• Prices will increase for all spending units
Output	• Output will increase in nominal term, but the real output may increase or decrease depending on the visitor and investment responses
Resident	
Income & Welfare	• Income and welfare of resident as a whole will increase. • Income and welfare of most income groups except the lowest income group will increase.
Income Inequality	• Income inequality will deteriorate
Consumption & Saving	• Consumption and saving of resident as a whole will increase both in nominal and real term. • Saving will increase more than consumption
Visitor	• Welfare will decrease due to the higher prices they have to pay • Unless they increase their budget enough to compensate for the tax increases, the real amount of visitor spending in Hawaii will be less.
Government (State)	• Since we assume an equal-revenue- yield tax reform, the government revenue will remain the same. However, government spending in real term will decrease due to higher prices.

1. Introduction

This study examines the economic impacts of replacing income taxes with an increase in the general excise tax in Hawaii. Replacing income taxes with a sales tax is often discussed when policy makers consider tax reform. Besides aiming at tax simplification, the idea is rooted in the notion that income taxes discourage saving, capital formation, and economic growth.

Some studies have concluded that an economy would achieve higher rates of economic growth by replacing income taxes with a sales tax. However, the idea has been resisted because of the regressive nature of a sales tax. Switching from a progressive income tax to a flat sales tax increases income inequality even with extensive compensation devices for low income groups.

Nevertheless, with the ever growing federal budget deficit and the budget crises among state governments, increasing attention is being paid to the idea by academics and politicians in the U.S. At the state level, tax reform has often been motivated by the desire to stabilize revenues. Compared to other taxes, income taxes are considered to be more sensitive to changes in economic conditions, growing faster during an economic expansion and more slowly during a recession. Empirical studies conducted for several states have indeed found that income taxes were more volatile than other taxes.

Another motivation to shift from income to sales taxes at the state level is the ability to shift the tax burden from residents to non-residents, especially in a tourism-oriented state like Hawaii. There are seven states in the U.S. that have no state income tax. They include Nevada and Florida where tourism plays an important role in the state economy. A state with high dependence on non-resident consumers may find that the welfare gain of residents as a whole from the tax reform could be large enough to compensate for the welfare loss to low income groups.

This study examines quantitative measures of the macroeconomic and distributional effects of the proposed tax reform using a Computable General Equilibrium (CGE) model. New tax policies result in wide-ranging changes in prices and behaviors of individuals and businesses. A CGE model is employed because it is the only modeling tool that can simulate the impacts of a shock on the economy incorporating price changes, feedback of economic agents to price changes, and general equilibrium interactions among sectors. Since study results would depend

on how each economic unit responds to the tax reform, the simulation is conducted under a number of alternative assumptions.

The study is organized as follows: Section 2 reviews Hawaii's current tax system focusing on the two major taxes, the general excise tax and the income tax.   In section 3, the methodology and data used for the analysis are discussed. Section 4 presents simulation results for the macroeconomic and distributional effects of the tax reform and section 5 presents a summary of the results and policy implications.

2. Hawaii's Tax System

The Hawaii tax system is highly concentrated on two major sources of revenue: the GET (general excise tax) and individual income tax, which accounted for 63 percent of the state and local combined tax revenue and 80 percent of the state tax revenue in 2006.

Table 1 compares Hawaii's tax structure to the national average (treating the GET as a form of general sales tax). As the table shows, compared to the national average, Hawaii has a higher reliance on both the GET and income tax.

Table 1. Share of Each Tax of Total State & Local Tax Collection, 2006

	Property	General Sales	Selective Sales	Individual Income	Corporate Income	Others
Hawaii	15.9%	38.0%	13.1%	25.0%	2.4%	5.6%
US average	30.0%	23.6%	10.9%	22.5%	4.4%	8.6%

Source: State & Local Government Finance, U.S. Census Bureau

General Excise Tax

The Hawaii GET applies to virtually all business transactions for goods and services taking place in Hawaii. Levied on business income rather than sales, strictly speaking, the GET is not a sales tax. However, the economic effect of the GET would be similar to a sales tax if businesses explicitly pass the tax on to consumers. In fact, many businesses in Hawaii do pass the tax on to consumers like a sales tax, and for this reason the Hawaii GET is often treated as a broad-based sales tax.

However, the Hawaii GET is different from a sales tax in several aspects. A sales tax is perceived as a consumption tax because a typical sales tax is applied only to final sales for consumption. The Hawaii GET applies not only to final consumption but also to business-to-business transactions. Although Hawaii is not the only state that taxes business-to-business transactions, the GET's incidence on business-to-business transactions is relatively high. One study estimated that about 28 percent of total GET collection in 2005 was from business-input purchases.[4] Since the tax can be imposed at multiple stages of a product and service, concern has been raised on the pyramiding of the tax, i.e., the tax being imposed upon itself. For this reason, compared to a typical consumption tax, the GET would result in more distortions in business decisions and more efficiency loss in the whole economy.

By keeping the tax base broad, however, it has effectively generated large revenues at a low tax rate. The Hawaii GET is lower than any other state's combined state and local sales tax rate in the nation. The Hawaii GET rate is currently 4 percent of business income for most businesses while lower rates apply to wholesale sales (0.5 percent) and commission from insurance sales (0.15 percent). Figure 1 shows the distribution of 50 states' general sales tax rates. Excluding five states without a state sales tax, Hawaii's 4 percent GET rate is the second lowest after Colorado. However, counties and cities in Colorado charge their own sales tax in addition to the state sales tax while Hawaii has no local level sales tax.[5]

Figure 1. Sales Tax Rate of 50 States (as of January 2009)
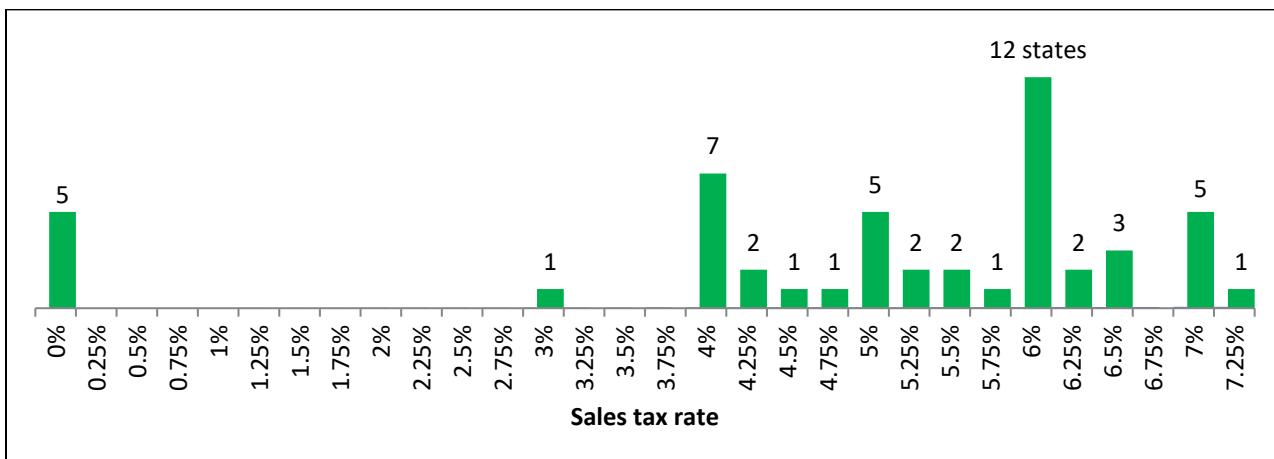
Source: State General Sales and Use Tax Rates, 2009, Tax Foundation

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[4] Cline, et al (2005)
[5] One exception is the temporary 0.5 percent surcharge in Honolulu County to raise fund to build the Honolulu rail.

One of the main concerns about a sales tax is that the tax base may not grow with the economy, especially if the faster growing service sector is not taxed. Being applied to nearly all business activities in Hawaii, however, the GET base has grown with the economy. According to a study that compared the base of each state's sales tax by measuring it against the state's GDP, the Hawaii's GET has the broadest tax base in the U.S. with a base which is equivalent to 90 percent of the state GDP. The state with the second broadest base covered only 51 percent of the state GDP.[6]

Supporters of the GET emphasize the tax exporting role of the GET. Tax exporting takes place when non-residents bear some of the burden of the regional tax. Tax exporting is especially important to Hawaii where tourism plays a significant role in the state economy. In 2008, 6.8 million people visited Hawaii and they spent $11.4 billion, which is about 17.2 percent of Hawaii GDP in the year. Moreover, compared to residents, tourists are a more tax-generating group. A report by the Hawaii Department of Taxation (DOTax) has estimated that in 2005 about 38 percent of the GET was borne by non-residents such as tourists, non-resident military personnel, and the federal government.[7] This suggests that a large portion of the increased tax burden of the GET resulting from such tax reform will be exported to non-residents.

Individual Income Tax

The individual income tax is the second largest revenue source for Hawaii, accounting for about one third of total state tax revenue. Whereas a sales tax is preferred for administrative efficiency and growth reasons, an income tax is preferred for equity reasons. In economic literature on taxes, equity is described as "similarly situated people should be taxed similarly." People with the same ability to pay should be taxed in the same manner (horizontal equity) and people who are able to pay more should be taxed more (vertical equity). While horizontal equity is not often questioned, vertical equity involves significant value judgments. Applying different value systems, states have established income tax systems with a range of progressivity. By

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[6] William F. Fox, "*Hawaii's General Excise: Should the Base Be Changed?*", Report of the 2005-2007 Tax Review Commission, Hawaii Department of Taxation
[7] "*Study on the Progressive or Regressive Nature of Hawaii's Taxes*", Report of the 2005-2007 Tax Review Commission, Hawaii Department of Taxation

adding three additional income tax brackets at top levels in 2009, Hawaii currently has twelve income brackets with the highest rate of 11 percent.

Although it is difficult to compare the progressiveness of income tax systems across states, some basic comparisons among states can be made about top state income tax rates and the tax burden on low-income households. Under both criteria, Hawaii is ranked among the highest in the nation. By raising the top state income tax rate from 8.25% to 11% in 2009, Hawaii is tied with Oregon for the highest, top income tax rate. At the same time, Hawaii income tax is known for heavily taxing poor working families. The Center on Budget and Policy Priorities has released a series of reports on the state income tax burden. According to the reports, Hawaii's income tax burden on low-income families was among the highest in the nation in most measures.[8] For example, the Hawaii's income tax threshold, the income amount at which families start having to pay income tax, was $11,500 for two parent family of four in 2005, which was much lower than the federal poverty line of $19,961 for the same year.[9] Considering that the federal poverty line is determined using the nation's average living cost which is lower than Hawaii's average living cost, it adds more concern. Although there have been a number of attempts to ease income tax burdens on low-income families in Hawaii including SB1882 that expanded refundable low income tax credit in 2006, Hawaii's tax burden on poor families has remained higher than many other states.

Like many other states with a state income tax, Hawaii provides tax benefits to senior residents. Hawaii is one of ten states that excludes all federal, state and local pension income from the state income tax.[10] As for income from private retirement plan, however, Hawaii allows only limited exclusion of retirement income.[11] It allows exclusion of retirement income from contributory plans, but it taxes retirement income from IRAs, 401(k)s, and other elective plans that have become increasingly popular.

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[8] The center defines the poor working families in various ways using the federal poverty line, minimum wage and family size. For example, two parent families of four with income below the federal poverty line, single-parent families of three at minimum wage, etc.

[9] Center on Budget and Policy Priorities (2007)

[10] Alabama, Hawaii, Illinois, Kansas, Louisiana, Massachusetts, Michigan, Mississippi, New York and Pennsylvania allow exclusion of broad retirement income from state income taxes.

[11] Retirement income" means income from federal, state and local governments' retirement plans, Social Security, Railroad Retirement, private pension plans, and deferred compensation plans in the public and private sectors

The favorable treatment of retirement income raises concerns that the base of the Hawaii income tax could erode over time with Hawaii's rapidly aging population. According to the most recent projections of population by DBEDT, the share of the population 65 years of age and over of the total population increased from 8 percent in 1980 to 14 percent in 2007, and this trend is projected to continue in the future, increasing to 24 percent in 2035.[12] Given an accelerating proportion of retirees expected over the next two decades, retirement income will continue to increase as a share of total state income over time. This will tend to erode the base of the income tax over time.[13]

Although it has been less noted, a significant share of the income tax burden is also shifted out of the state. That is, some portion of the state income tax is paid by non-residents, about 10 percent in 2005. Furthermore, Hawaii residents can shift a portion of their state income tax burden to the federal government by deducting their payment for state income tax from taxable income in their federal income tax returns. Those who choose to itemize deductions pay less federal income tax due to their deductions of the state income tax. Adding residents' reduction of federal income taxes paid and income taxes paid by non-residents, the Hawaii tax department estimated that about 23 percent of the state income tax burden was shifted out of the state in 2005.

The American Jobs Creation Act, which was enacted in 2004 for two years and then was extended through 2009, allows federal income tax deduction of state sales tax. The act was designed largely to benefit taxpayers in the seven states without state income taxes. This act, if it is extended again, would allow Hawaii residents to deduct sales taxes in much the same way that they are currently able to deduct income taxes.

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[12] Population and Economic Projections for the State of Hawaii to 2035, July 2009, DBEDT
[13] A study done in 2002 pointed out that erosion will be somewhat mitigated. Pension income excluded from the state income tax will not grow as rapidly as total retirement income due to increasing importance of elective plans relative to traditional pension plans among private sector employees. The study projected that the share of pension income subject to state income tax of total retirement income will increase from 10 percent in 2000 to 36 percent in 2050, which is expected to slow the erosion of income tax base to some degree. (Aging, pension Income, and Taxes in Hawaii", Andrew Mason, *Report of the 2001-2003 Tax Review Commission*)

3. Evaluation of the Proposed Tax Reform

Revenue Neutral Tax Reform

There are a few variations of the proposal that can be considered. This study considers a tax change that abolishes both the individual and corporate income taxes and increases the GET to attain the same total revenue. An equal-revenue-yield tax reform is assumed to avoid mixing the changing tax structure with the effect of changing the level of government spending. With the hypothetical change in the tax system, it is assumed that households and businesses would adjust their consumption and production patterns to achieve maximal utility (households) and profits (businesses) with prices adjusting accordingly to bring about market equilibrium.

The Hawaii GET applies different rates for retail sales and wholesale sales. In the analysis, GET rates are allowed to increase proportionally to attain the same tax revenue as before with new set of prices and consumption.

One of the most important questions about such tax reform is how much GET rates would have to increase to replace current income tax revenues. DOTax has estimated that statutory rate for the GET would have to increase to 6.7 percent from the current level of 4 percent to generate the same amount of revenue as the individual and corporate income taxes. The results of this study could be different from the DOTax estimate for a couple of reasons.

First and most importantly, this study incorporates feedback of macroeconomic variables to the change in tax regime. In other words, changes in the taxes people and businesses face will change their economic behavior, which will feed back into the bottom line of how much taxes are ultimately collected after the change. This study assumes that businesses will pass the full amount of the GET increase onto consumers. The initial impact of the change in tax regime would be an increase in the final prices consumers have to pay, inclusive of the higher tax. The higher prices would, in turn, cause a series of changes in consumption, production patterns, and ultimately additional changes in prices. If the new tax regime results in a decline in the dollar value of taxable goods and services demanded, the new GET will not generate the same revenue lost by eliminating the income tax. A new, higher GET tax rate would be needed to result in the desired amount of revenue.

Another reason this study could find a different result is the use of different baseline information. Table 2 shows GET and income tax collections for the period 1998 to 2007. Tax collections from each tax revenue source change with the economy, but not in the same way. Therefore the relative size of income tax compared to the GET has not been the same over the years. As Table 2 shows, income tax collections in 1998 were 80 percent of GET collection but only 59 percent of GET collection in 2003. A higher tax increase would be needed to equate revenues if tax collection in 1998 were used as the base for calculations compared with 2003.

Table 2. GET and Income Tax Collected for the Period of 1998-2007 ($Million)

	1998	1999	2000	2001	2002	2003	2004	**2005**	2006	2007
GET	1,437	1,455	1,611	1,661	1,680	1,820	1,992	2,263	2,457	2,624
Ind. Inc. Tax	1,093	1,054	1,080	1,100	1,060	1,071	1,236	1,448	1,577	1,579
Corp Inc. Tax	50	48	68	48	55	5	75	133	87	80
Inc. Tax/GET	0.80	0.76	0.71	0.69	0.66	0.59	0.66	**0.70**	0.68	0.63

Source: Department of Taxation, State of Hawaii

This study uses tax collections for 2005 calendar year as base information to be compatible with information in the 2005 Input-Output (I-O) table, which is one tool in the analysis. In 2005, the ratio of income tax collection and GET collection was 0.7, which is about the average of past 10 years. Since the Hawaii Department of Taxation report used tax collection in the 2005 *fiscal* year as the baseline information, which is similar to that of 2005 *calendar* year, the base year issue should not play a significant role in possible differences between two studies.

Methodology

A computable general equilibrium (CGE) model is used to simulate impacts of the tax reform on the economy. A CGE model for the Hawaii economy has been developed through a couple of studies. This study used the CGE model developed in 2004 by University of Hawaii and DBEDT as a base. The model was originally developed for simulating the effects of alternative tourism scenarios on the Hawaii economy.

The model has been modified in several ways to better assess essential issues associated with the tax reform. First, a baseline state which is used as a benchmark is developed integrating

data from numerous sources. Then the impacts of the tax reform are simulated by comparing new equilibrium outcomes under alternative tax regime against those in the benchmark.

Hawaii is modeled as a small open economy. Production sectors produce various goods and services using intermediate inputs, imports, and production factors (labor and capital) under typical assumptions of perfect competition and constant returns to scale.

Imports enter into the production function as a composite commodity. Produced outputs are then consumed either by production sectors as intermediate inputs or for final use by various economic agents such as households, investors, governments, exporters and tourists. Households are key players in the model. They make income by providing labor and capital to the production sectors. They pay taxes to, and receive transfer income from, the government sectors. Government sectors are consolidated into two levels, 1) state and local government and 2) the Federal Government. Both government sectors impose taxes on individuals and businesses as well as providing transfer income to households.

There is a *rest-of-the-world* sector that includes outside demanders of Hawaii products; namely export and tourist demands. While exporters are subject to various taxes in the course of production, current Hawaii tax law allows exemption of exports from GET. Although tourism is a part of exports under a broad definition, it is included in the model as a separate unit to effectively capture its distinctive behavior and roles in the state economy. Visitors' major activity is consumption and they pay taxes to the state and local government by consuming a bundle of goods and services in Hawaii. As in the production function, imports enter into the utility function of various spending units as a composite commodity.

The selection of theories and assumptions that will structure a CGE model is very important because there are many alternative models, each yielding different policy implications (Shoven and Whalley, 1992). The model used in this analysis is a static model focusing on the short-term effects of the tax reform. The main difference between a dynamic model and a static model is the linkage of savings decisions in the current period to capital formation in the future. In a dynamic model, saving is determined within the model as a result of utility maximization over time (inter-temporal).

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Previous studies on tax issues using a dynamic CGE model assumed either overlapping generations or infinitely living households to solve the inter-temporal utility maximization problem.[14] However, it's been reported that regardless of whether the model uses overlapping generations or infinitely living households, it tends to show unrealistically large saving responses to changes in the tax system.[15] Besides, the inter-temporal elasticity of substitution, which is a crucial determinant of household savings, has achieved little consensus on its value. For these reasons, rather than building a dynamic model based on many assumptions of which implications for the results are not immediately clear, we used a static model, in which saving is determined as a constant share of expenditure. Its dynamic implication will be discussed briefly at the end.

__Assumptions__

As recognized in much of the CGE literature, key parameters such as price elasticity of demand, parameters for saving behavior and labor market responses play important roles in determining results of the analysis.

In this study, elasticity of substitution across sectors and elasticity of substitution between local products and imports are assumed to be one in consumption. As for production, elasticity of substitution across sectors and elasticity of substitution between labor and capital are assumed to be one, while a fixed relationship is assumed between a composite of intermediate goods and value added.

Following the breakdown in the 2005 I-O table, three kinds of value added are considered in the model: wage and salary jobs, proprietors' jobs, and capital. Since this model focuses on the short-term effects, wage rigidity of wage and salary jobs is assumed, while proprietors' jobs and capital costs are allowed to change freely to adjust market imbalance.

In most CGE models applied to the study of taxes, even in open economy models, the concept of a closed economy is applied to saving and investment demand. That is, saving determines the investment demand in the period. Using a dynamic CGE model, Tuerck et

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[14] Tuerck, et al (2007)
[15] Joseph J. Cordes, Robert D. Ebel, Jane Gravelle (2000)

al.(2007) showed that, as a result of a stronger incentive to work, save and invest, the U.S. economy would enjoy 7%- 10% higher real GDP over the next 20 years by abolishing most existing federal taxes and introducing a national retail sales tax. Increases in investment and capital stock are especially noteworthy in their results.

Investment would increase right away by 75 percent in the year of the tax reform and more in the following years. This is a result of the assumption that domestic investment is determined by national saving and foreign direct investment would also increase with domestic investment at same rate. This assumption, which is seemingly optimistic even for a national economy, is very unlikely to hold for a state economy.

Although there is no dependable empirical evidence on the saving behavior of Hawaii residents, there seems to be a consensus among economists that, with a highly integrated national financial system, a substantial portion of increased savings resulting from removal of income taxes will go to financial centers out of the state, thus making no direct contribution to capital accumulation and future growth in Hawaii economy. [16] Abolishing the corporate income tax may attract more business and investment into Hawaii, although we do not know by how much.

Thus, this study makes an exogenous assumption regarding local saving and local investment and examines how changing the assumption would affect the results. We considered three scenarios about the investment reaction. First, the full amount of pension and insurance spending will go out of the state and 50 percent of other saving will stay locally to be available to increase local investment. Second, besides the 50 percent of the increased saving, the tax reform will draw an additional $100 million investment inflow into the Hawaii economy. Third, besides the 50 percent of the increased saving, there will be an additional $500 million investment inflow.

Consuming almost one fifth of Hawaii GDP, tourism has received keen attention in a variety of issues in Hawaii. Despite that it is largely an empirical question as to how tourists respond to a tax increase, not many studies have been done to address the question. Fujii et al (1985) used time series data of Hawaii tourism from 1961 to 1980 to estimate the exportability of

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[16] According to the 2005 I-O table, private investment in the year was $7.9 billion. Resident saving, which is calculated using total income reported in the tax returns and consumption and saving patterns in the expenditure survey, explains only 60 percent of this.

the hotel occupancy tax. According to that study, elasticity of tourism demand with respect to price was not significantly different from zero indicating that a hotel room tax was readily shifted and exported to tourists. We first considered borrowing this result for our study. However, the structure of Hawaii tourism market, behaviors of tourists and marketing patterns have changed extensively from the period analyzed in the Fujii study. Besides, an increase in the GET may trigger different tourist responses because the GET applies to a much broader range of tourist expenditure than does a hotel room tax.

For these reasons, we conducted simulations under two extreme scenarios regarding tourist responses and compared results under two scenarios. Two scenarios considered are a very sensitive visitor demand to price change and a completely non-sensitive visitor demand. Under the first scenario, we assumed a unitary elasticity of visitor demand to price implying that visitors would reduce consumption by 1 percent when prices increase by 1 percent. In this case, total tourist expenditures would remain unchanged after the GET increase. Under the second scenario, we assumed a zero elasticity of visitor demand with respect to price, meaning that visitors would consume the same quantities as before the tax reform. Under this scenario, total visitor expenditure would increase by same percentage the price.

Data

This study uses the 2005 Hawaii I-O table as the core data for the analysis. The I-O table provides a good snapshot of an economy including information on inter-industry relationships in production, value added components, spending patterns of households and other primary units of the economy. In spite of this, it lacks information on the receipt side of household income and the transfers among economic units, which is essential in understanding the circular process among production, income, and expenditures.

In order to complete the description of primary economic activities, additional information on household income, tax payment, and expenditure was collected from various sources. Those data were combined with the 2005 Hawaii I-O table and then adjusted in several ways to generate a consistent data set for the CGE modeling.

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The distributional implications of the tax reform are a primary purpose of this study. While income and consumption behavior of households varies by income level, a standard I-O table includes only aggregate information on household units and the Hawaii I-O table is no exception. To assess the distributional implications of tax reform, the Hawaii I-O table was modified to accommodate multiple household units with different levels of income. Then income, consumption and tax information was collected for each income group.

Income and Income Tax Data

Data on income are available from a number of sources. Personal expenditure in the Hawaii I-O table is roughly in line with BEA estimates of personal income. Although BEA estimates provide detailed information on regional income by sources, estimates are available only at the aggregate level. Therefore, data for each income group had to be pulled from other sources, such as tax return reports, consumer expenditure surveys, and American Community Survey.

The most challenging issue in integrating income data from various sources was discrepancies among data. Discrepancies occur either because the definition of income differs across data or because individual providers of the data misreport their income intentionally or mistakenly. Discrepancies between reported income in tax returns and income from other sources attract attention because they hint of tax evasion. In an effort to identify the size of tax evasion, BEA estimates total federal AGI (adjusted gross income) each year. Starting from personal income, BEA makes adjustments for each difference in definition of BEA-generated personal income and federal AGI. The discrepancy between the derived AGI and actually reported AGI is then regarded as an indicator of tax evasion. According to the BEA calculation, the size of total federal AGI should be about 80 percent of BEA personal income. Tax evasion for the U.S. was estimated at 10~15 percent of total federal AGI for the period of 2000 to 2005.[17] Although no study was done to examine tax evasion in Hawaii, the relative size of total federal AGI to BEA personal income for Hawaii is in a range similar to that of the U.S. suggesting similar tax payer behaviors.

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[17] U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts(NIPAs), Table 7.19

Even though tax evasion itself is a very important issue, we could avoid the issue in this study because the benefit of the tax reform to residents is determined by how much tax they are actually paying now, not by how much tax they are supposed to pay assuming some amount of unreported income. Hence, the study handles the discrepancy by allocating the difference to a residual agent who makes income by providing production factors, but pays no tax. Residents are defined as those who have to file a state income tax return regardless of the tax paid. They are then broken down into 6 groups based on their Hawaii AGI (adjusted gross income).

Hawaii AGI is different from federal AGI because state income tax codes are different from federal income tax codes. Starting from federal AGI, Hawaii AGI is calculated by adding components of income taxed by the state government but not by the federal government and subtracting components of income taxed by the federal government but not by the state government. While it varies by individuals, at the aggregate level, federal AGI was about 11 percent more than was Hawaii AGI in 2005, indicating that federal AGI is more inclusive as well as more representative of total income. However, we used Hawaii AGI as thresholds because grouping residents by Hawaii AGI provides the advantage of sorting them by state income tax burden. Total wage and salary income, business income and capital income in the I-O table were allocated to each income group according to the distribution of those income types in Hawaii income tax reports. [18]

Table 3 provides information on state income tax burdens of residents at various income levels. Effective tax rates are calculated by income group using federal AGI and Hawaii AGI. In aggregate, income that is taxed by the federal government but not by the state government is about four times as big as income that is taxed in Hawaii but not by the federal government. As a result, Hawaii AGI is less than federal AGI and effective tax rates based on Hawaii AGI are higher than those based on federal AGI for all income groups. The difference is particularly big for the low-income families with Hawaii AGI less than 10,000 dollars, who heavily rely on the pension and social security income for their living. Pension and social security income of this income class accounted for 67.5 percent of their total income in 2005. Based on the information presented in Table 3, it can be said that the lowest income group, with Hawaii AGI less than 10,000 dollars, is very likely to lose from the tax reform.

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[18] "Hawaii income patterns, individual-2005", Department of Taxation, State of Hawaii

Table 3. Distribution of Income and State Income Tax of Hawaii Residents, 2005

	Total		Under 10K	10K-30K	30K-50K	50K-75K	75K-100K	Over 100K
# of Tax Return	554,563	100%	27.0%	28.8%	17.1%	11.8%	6.6%	8.7%
Federal AGI	$28.0B	100%	5.5%	14.2%	14.5%	15.3%	11.8%	38.8%
Hawaii AGI	$24.9B	100%	1.0%	12.8%	14.8%	16.2%	12.7%	42.5%
Income Tax[1]	$1.2B	100%	-0.2%	8.3%	13.8%	15.7%	13.0%	49.5%
HI AGI/Federal AGI		0.89	0.16	0.80	0.91	0.94	0.96	0.98
Effective Tax Rate[1]								
Based on Federal AGI		4.2%	-0.2%	2.5%	4.0%	4.3%	4.6%	5.3%
Based on Hawaii AGI		4.7%	-1.1%	3.0%	4.4%	4.6%	4.8%	5.5%

[1] Tax liability after tax credit including tax credits for nontaxable resident returns
Source: Hawaii income patterns, individuals-2005, Department of Taxation, State of Hawaii

Consumption Data

Direct benefits from the tax reform to resident households would be determined by how much state income tax they are paying now and how much additional GET they would have to pay under a new tax regime, which is in turn a function of their consumption patterns.

A saving and consumption profile for each income group was constructed based on the Consumer Expenditure Survey, published by the Bureau of Labor Statistics. Although the survey provides information on the expenditure patterns by sub-region, we used national level data and made adjustments for the difference between expenditure patterns of the U.S. and Hawaii. This was because the Hawaii sample survey is not large enough to deliver reliable information for each income group. Moreover, the survey only covers Honolulu, which is a big part of Hawaii but does not necessarily represent the entire population of Hawaii.

Table 4 compares expenditure patterns of Hawaii and nation, and expenditure patterns of different income groups at the U.S. level. Whereas the difference between the overall expenditure patterns of Hawaii and the U.S. is relatively insignificant, variation among different income groups is substantial. Particularly, there is clear distinction among income groups in the expenditure for housing and in the insurance and pension expenditure. Although most households at all income levels commit about 30 to 40 percent of their total expenditure for

housing, it's implication for the GET burden is very different. This is because the cost of owned dwelling (such as mortgage payments and property taxes) is not subject to the GET while cost of rented dwellings is subject to the GET.

Table 4. Consumption Patterns by Income Level

| | Hawaii | US | U.S. | | | | |
			Lowest 20%	Second 20%	Third 20%	Fourth 20%	Top 20%
Consumption/income before tax	0.78	0.79	1.98	1.13	0.92	0.80	0.61
Total expenditure	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
-Food & Beverage	15.6%	14.0%	16.8%	15.0%	14.4%	14.2%	12.0%
-Housing	31.7%	32.4%	39.4%	35.2%	33.8%	31.0%	31.0%
Owned dwelling	(11.9)	(12.7)	(8.5)	(9.0)	(11.7)	(13.3)	(15.2)
Rented dwelling	(7.2)	(5.1)	(14.2)	(10.3)	(7.2)	(3.7)	(1.3)
-Apparel and services	3.9%	4.1%	4.5%	4.1%	3.9%	4.0%	4.1%
-Transportation	18.1%	18.0%	14.3%	18.4%	19.0%	19.3%	17.3%
-Health	4.7%	5.8%	7.6%	8.1%	6.6%	5.5%	4.4%
-Entertainment	5.7%	5.1%	4.7%	4.6%	4.6%	5.3%	5.5%
-Education	2.4%	2.0%	2.8%	1.1%	1.1%	1.7%	2.8%
-Personal insurance & pensions	12.3%	11.2%	2.5%	5.6%	9.1%	11.9%	15.3%
-Other consumption	5.7%	7.3%	7.4%	7.9%	7.5%	7.1%	7.6%

Source: Consumer Expenditure Survey, 2005, Bureau of Labor Statistics

The next step was to combine this expenditure information with income and income tax data in the modified I-O table. Households pay income tax only for income taxable under the tax codes, but spending decision are made based on total income which is often quite different from the taxable income. For example, income groups with Hawaii AGI of $10,000 and under may include a wealthy household with 6 digit income which is mostly non-taxable. In order to cope with this issue, we simulated the true income distribution of each Hawaii AGI group using the Public User Micro-data Samples (PUMS) of the American Community Survey (ACS) collected by the U.S. Census Bureau. The ACS provides detailed information on income by sources and income in the ACS is roughly comparable with income in the consumer expenditure survey. We first grouped households into five quintiles according to their total income. Their Hawaii AGIs are estimated by subtracting 90 percent of retirement incomes from total incomes. Consumption

patterns for each Hawaii AGI group were then developed as a weighted average of quintiles that composed each income group.

4. Simulation results

This section presents the simulated results of macroeconomic and distributional effects of the tax reform. As explained in the previous section, we conducted simulations under 6 different scenarios: 3 different scenarios on investment reaction and 2 different scenarios on visitor reaction.

Table 5. Scenarios on Investment and Tourist Reaction to the Tax Reform

	Tourist Reaction	**Investment Reaction**
Scenario 1	Unitary elasticity to price (Tourists decrease consumption responding to tax & price increase)	Investment increases by 50 % of the increased saving[19]
Scenario 2		Investment increases by 50 % of the increased saving plus additional $100M investment inflow
Scenario 3		Investment increases by 50 % of the increased saving plus additional $500M investment inflow
Scenario 4	Zero elasticity to price (Tourists increase their budget to maintain current consumption level)	Investment increases by 50 % of the increased saving
Scenario 5		Investment increases by 50 % of the increased saving plus additional $100M investment inflow
Scenario 6		Investment increases by 50 % of the increased saving plus additional $500M investment inflow

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[19] Other savings are simulated to increase by $135M to $270M as a result of the tax reform depending on investment and tourist responses.

Effects on Prices and Outputs

This study assumes that businesses will pass the full amount of the GET increase onto consumers. As a result, the tax inclusive prices consumers have to pay will increase immediately after the tax reform. However, the extent of price increase would not be uniform among various spending units as consumption patterns vary among spending units.

Compared to residents, for example, tourists spend in a way that will lead to higher price increases as a result of the tax reform. While residents spend a large portion of their consumption for mortgage and education, which do not apply to the GET, most tourist spending goes for hotel, eating and drinking and shopping that is subject to the GET. Spending a large proportion of their budgets as labor expense which is not directly affected by the tax reform, governments will face proportionately less cost increase with the GET rate increase.

The simulation results show that as a result of the tax reform the tax inclusive price index for the typical consumption bundle of residents will increase by 1.6 percent under scenario1 (sensitive tourist response and moderate investment increase scenario) while the tax inclusive price index for the typical consumption bundle of tourists will increase by 2.4 percent under the same scenario. Price increases will be larger for all agents under scenarios of non-sensitive tourist demand and more aggressive investment increase.

Real output may increase or decrease as a result of the tax reform depending on the feedback of economic agents to the GET increase. Table 6 shows that real output will decrease if tourists respond to the price increase very sensitively. Even when tourists do not reduce their consumption with higher prices, that is, when they are willing to take full amount of tax increase by increasing their budget for Hawaii trip, real output is estimated to increase only moderately. This is because higher prices imply that each spending unit has to consume less in real terms without an increase in income or revenue.

The increase in state output would be less than the increase in total demand because overall demand patterns would move toward more imports for a couple of reasons. First, more income will be earned by residents, whose consumption is more import-dependent than other spending units. According to the 2005 Hawaii I-O table, 21 percent of resident consumption was

met by imports while 14 percent of visitor demand and 5 percent of state and local government demand was met by imports.

Secondly, even though the use tax that applies to imports has the same rates as the GET, the effective tax rate for imports is much lower than the effective tax rate for local products and services because it is easier to avoid the tax with imports. For these reasons, abolishing income taxes and increasing the GET will make Hawaii's economy more dependent on imports.

Table 6. Effects of the Tax Reform on Real Outputs and Prices (in percentage change)

	Unitary elasticity to price change (Tourists decrease consumption responding to tax & price increase)			Zero elasticity to price change (Tourists increase their budget to keep current consumption level)		
	Investment increases by 50% of increased saving	Investment increases by 50% of increased saving plus $100M	Investment increases by 50% of increased saving plus $500M	Investment increases by 50% of increased saving	Investment increases by 50% of increased saving plus $100M	Investment increases by 50% of increased saving plus $500M
	(Scenario1)	(Scenario2)	(Scenario3)	(Scenario4)	(Scenario5)	(Scenario6)
Price (tax inclusive)						
Residents	1.6%	1.7%	2.1%	2.2%	2.3%	2.8%
Visitors	2.4%	2.5%	2.8%	2.9%	3.0%	3.3%
State Gov't	0.5%	0.5%	0.7%	0.8%	0.8%	1.0%
Output (real)	-1.0%	-0.8%	0.1%	0.1%	0.4%	1.4%
Import (real)	-0.2%	0.2%	1.6%	1.4%	1.8%	3.5%
Investment (real)	-1.2%	0.4%	6.6%	0.3%	1.9%	8.5%
Visitor						
Real Spending	-2.3%	-2.4%	-2.7%	0%	0%	0%
Nominal Spending	0%	0%	0%	2.9%	3.0%	3.3%

Effects on Residents

Among spending units, residents are the only consumer group who will have additional income as a result of the tax reform.[20] Therefore, the tax reform would increase welfare of residents but would lower welfare of other spending units who have to pay higher prices without an increase in income or revenue.

Table 7 shows that resident income as a whole would be 3.4~5.0 percent higher under new tax system than under the current tax system if visitors cut their consumption by one to one in response to the tax increase. Resident income would be 5.3~7.1 percent higher if visitors would maintain the same level of consumption with higher taxes.

This increase in resident income is a combination of direct income increase due to removal of the income tax and the subsequent income changes resulting from economic changes.[21] Households are not only major spending unit but also owners of production factors. Income of residents as owners of production factors will increase if the tax reform creates additional demand for local outputs and therefore additional demand for labor and capital, and vice versa. As a result, income increase would be less than the initial income increase if the tax reform leads to a decrease in total demand for local outputs, and larger than the initial income increase if the tax reform leads to an increase in total demand for local outputs.

Distinction between nominal income and real income is important here because price increases are the main outcome of the tax reform. With the higher prices that residents have to pay under new tax system, the real income increase would be less than the nominal income increase. Real income change is of more interest in the analysis because real income is often used as an indicator of welfare. When measured in terms of real income, welfare of residents as a whole will increase under all scenarios as resident income would increase more than the price increase.

It is interesting to note that the increase in saving will be bigger than the increase in consumption. As discussed in section 3, the portion of income to be consumed varies by income

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[20] Corporate income tax is included in the model as a tax on capital income. Abolishing corporate income tax will result in increases in household capital income.

[21] Initial income increase resulting from removal of state income tax would be less than the tax cut because there would no longer be saving in federal income tax for state income tax.

level. The saving increase will be larger than the consumption increase because higher income groups save a larger portion of their income than lower income groups. Graduated structure of current state income tax will augment this tendency. As shown in Table 3, the income group with Hawaii AGI 100,000 dollars and higher, accounting for only 8.7 percent of total tax returns, paid about half of total state income taxes collected in 2005. This means that about half of newly available resident income without a state income tax will be put in the hands of this high income group who has low propensity to consume. As a result, it is estimated that resident saving will increase by 4.4 to 8.8 percent while consumption will increase by 2.9 to 6.4 percent depending on investment and visitor's reaction to the tax increase.

Table 7. Effects of the Proposed Tax Reform on Residents as a Whole (in percentage change)

	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5	Scenario6
Income (real)	1.7%	2.0%	2.8%	3.0%	3.3%	4.2%
Income (nominal)	3.4%	3.7%	5.0%	5.3%	5.6%	7.1%
Consumption	2.9%	3.2%	4.4%	4.7%	5.0%	6.4%
Pension & Other Saving	4.4%	4.8%	6.2%	6.7%	7.1%	8.8%

Distributional Effects

Replacing progressive income taxes with an increase in a flat tax would worsen income distribution of residents. Because of the graduated structure of the state income tax, higher income groups will enjoy more benefit from the tax reform in terms of percentage increase in their disposable income. By shifting a greater portion of the tax burden to non-residents, however, most income groups except residents at very low end of the income spectrum will experience welfare increase even under a very gloomy scenario regarding investment and visitor responses.

Table 8 shows the percentage increases in nominal and real income of residents at various income levels. Residents at most income levels will benefit from the tax reform and the benefit will be greater for higher income groups. With the very low income group as an exception, the

resident income increase will be larger under the scenario of higher demand (less sensitive tourist response and more new investment).

Unlike most other income groups, the very low income group, that is defined as households with Hawaii AGI of $10,000 and lower in this analysis, will experience a decline in their income in both nominal and real terms as a result of the tax reform. A finding worthy of note is that welfare of this very low income group will deteriorate if the economy does not have to go through a demand cut. This happens because a large portion of their income comes from transfer income that is mostly fixed regardless of economic conditions, while prices will be higher with higher demands.

Table 8. Distributional Effects of the Tax Reform (Income Change by Income Group, %)

	Under 10K	10K-30K	30K-50K	50K-75K	75K-100K	Over 100K
Nominal Income Change						
Scenario 1	-0.6%	1.8%	3.4%	3.6%	3.7%	4.7%
Scenario 2	-0.5%	2.0%	3.8%	3.9%	4.1%	5.1%
Scenario 3	-0.2%	3.1%	5.0%	5.2%	5.5%	6.5%
Scenario 4	-0.1%	3.2%	5.2%	5.5%	5.7%	7.1%
Scenario 5	0.0%	3.5%	5.6%	5.8%	6.1%	7.6%
Scenario 6	0.4%	4.7%	7.0%	7.4%	7.8%	9.3%
Real Income Change						
Scenario 1	-2.2%	0.1%	1.8%	1.9%	2.1%	3.0%
Scenario 2	-2.2%	0.3%	2.0%	2.1%	2.3%	3.3%
Scenario 3	-2.2%	1.0%	2.8%	3.1%	3.3%	4.4%
Scenario 4	-2.3%	1.0%	2.9%	3.2%	3.4%	4.8%
Scenario 5	-2.3%	1.2%	3.1%	3.4%	3.7%	5.2%
Scenario 6	-2.3%	1.9%	4.1%	4.5%	4.9%	6.4%

Required GET rates

The required increase of the GET rates to attain the same revenue as before the tax reform would depend on responses of economic agents to the tax change. Under scenario1 (sensitive tourist demand and moderate investment increase) the current retail rate of 4 percent is

calculated to increase to 6.78 percent and the wholesale rate of 0.5 percent is calculated to increase to 0.85 percent. However, we would need less increase in the rates under more optimistic scenarios, for instance 6.52 percent and 0.82 percent respectively under scenario 6, because the state economy would have a bigger tax base under those scenarios.

Table 9. Required GET rates for the Same Revenue as Before the Tax Reform

	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5	Scenario6
Retail rate	6.78%	6.76%	6.66%	6.66%	6.63%	6.52%
Wholesale rate	0.85%	0.84%	0.83%	0.83%	0.83%	0.82%

5. Conclusion

It has been shown that the size and direction of macroeconomic impacts of the proposed tax reform would depend on the feedback of economic agents. We considered six scenarios of different investment and tourist behavior to illustrate how impacts of the tax reform on the economy vary with different investment and tourist responses to the tax change. Many studies that have evaluated a similar tax reform at national level concluded that the increased savings would result in higher capital accumulation in the future increasing household income and the steady state growth path of the economy. However, our simulation results indicate that real output could decrease as a result of the tax reform depending on investment and tourist responses. This result suggests that unless the tax reform succeeds in drawing a fair amount of new regional investment, either by utilizing newly available regional saving or by attracting new outside businesses and investments, the growth effect of the tax reform is not warranted.

As expected, by shifting more of the tax burden to non-residents, the welfare of residents as a whole and welfare of the majority of residents would increase as a result of the tax reform. However, shifting from a progressive income tax to an increase in the flat GET would aggravate income inequality. Especially, the income group at the low end of the Hawaii AGI spectrum will suffer as a consequence of the tax reform. This low income group includes some residents who have abundant income but for whom a large portion of that income is not-taxable under Hawaii tax codes. However, most of this group consists of families who live in relative poverty.

Although augmented income inequality would be an inevitable outcome of this kind of tax reform, some forms of compensation for this very low income group would be necessary to prevent them from suffering the more negative consequences of tax reform.

This study evaluated the proposed tax reform in the short-term emphasizing factors that determine outcomes. The economic effects would be greatly affected by tourist responses and saving-investment decisions. As residents begin to collect returns from the savings and use the saved income for consumption, the positive economic effects in the medium and long-term would be larger than in the short-term although the above discussions still remain valid.

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