Restructuring the Canadian Tax System by Changing the Direct/Indirect Tax Mix

Bev Dahlby
Professor
Department of Economics
University of Alberta
Edmonton, Alberta
T6G 2H4

bev.dahlby@ualberta.ca

(September 2001)

I would like to thank the Donner-Canadian Foundation for their on-going support for my research on the restructuring of the Canadian tax system.

1. Introduction

John Stuart Mill defined a direct tax as one that is levied on the individual or firm that is "intended" to pay it. Indirect taxes are, by default, those taxes where the individual or firm, from whom the taxes are collected, is not intended to bear the burden of the tax. This distinction between direct and indirect taxes is necessarily highly imprecise because it is frequently difficult, if not impossible, to discern the legislators' intentions with regard to who should bear the burden of a tax or their understanding of how the tax burden is likely to be shifted through the adjustment of market prices. Overtime, however, indirect taxes have come to mean sales and excise taxes on goods and services, while direct taxes usually refer to personal and corporate income taxes. Canada, as well as most OECD countries, relies on a mix of direct and indirect taxes. As Figure 1 indicates, Canada, the United States, Australia, New Zealand and Japan place a greater reliance on taxes on income and profits and a lessor reliance on taxes on goods and services than the European countries of France, Germany, Italy and the United Kingdom.[1]

Determining the mix of direct and indirect taxes is a fundamental tax policy choice. On what basis should this choice be made? I will approach this issue by first noting that the taxation of goods and services is a form on consumption taxation. Therefore the decision to rely to a greater or lessor degree on indirect taxes is ultimately a decision to concerning the level of consumption taxation. This is the main issue that is addressed in this paper. I review the theoretical models and some of the empirical

evidence regarding the efficiency consequences of consumption taxes. My reading of the evidence suggests that while the level effects (static efficiency gains) from adopting a consumption tax are ambiguous, there is mounting evidence from simulation models and econometric studies that switching to consumption taxation has very significant growth, or dynamic efficiency, effects. In Section 3, I argue that consumption taxation is a fair or equitable form of taxation if we adopt the intuitively appealing notion that those with a higher standard of living should pay higher taxes.

Increasing reliance on consumption taxation does not necessarily imply an increased reliance on indirect taxes because consumption taxes can be imposed through an expenditure tax, which is a form of direct taxation. In the final section of the paper, I briefly consider the direct vs. indirect tax mix under a consumption tax system. I argue that one would want to impose both direct and indirect taxes under a consumption tax system because both types of taxes are subject to different forms of tax evasion and avoidance. Therefore a combination of direct and indirect consumption taxes would produce a more efficient and equitable tax system than simple reliance on one from of consumption taxation.

2. Efficiency Arguments for Consumption Taxation

The output of the economic system can be thought of as an "economic pie", where the size of the pie is the total value of the goods and services produced in the economy, including non-market activities such as leisure and the quality of the environment. The tax system can affect the size and distribution of the economic pie

[1] This pattern is not significantly altered if employee payroll taxes are classified as direct taxes and employer payroll taxes are classified

because taxes affect the labour supply and savings decisions of households, and the output, employment, and investment decisions of firms. Taxes alter economic incentives by changing the net returns that households and firms receive from the inputs that they provide or from the products that they sell. If, in the absence of taxation, markets allocate resources to maximize the size of the economic pie, then the tax system, by changing the allocation of resources, will shrink the size of the economic pie. The shrinkage of the economic pie is what economists mean by the efficiency cost of the tax system.[2]

In discussing how the tax system affects economic performance, it is important to distinguish between level effects and growth effects.[3] In its purest form, a level effect has a once-and-for-all impact on the size of the economic pie, but it does not affect the long-term growth rate of the economy. However, the economic adjustments to a tax reform usually do not occur instantaneously. It takes time for households and firms to adjust their behaviour to a change in the tax regime and for changes in their decisions to have an impact on the economy.[4] If there is a gradual adjustment to a change in tax policy, then the growth rate of the economy will be temporarily higher along the transition path to the new equilibrium, but once all of the economic adjustments have occurred, the growth rate of the economy will return to its previous rate. Thus, the

---

as indirect taxes.

[2] The administration of the tax system and the compliance activities of taxpayers also use up resources, and this contributes to the shrinkage of the economic pie. In this paper, we focus on the efficiency cost of the tax system caused by the reallocation of resources rather than on the administration and compliance costs.

[3] See Myles (2000, pp.146-147) on the distinction between level and growth effects.

[4] For example, Loayza, Schmidt-Hebbel, and Servén (2000, p. 180) in a study of the determinants of savings across countries found that changes in savings behaviour in response to changes in economic conditions "are fully realized only after a number of years, with long-run responses

defining characteristic of a level effect is that it has, at most, a temporary impact on the growth rate of the economy. By contrast, the growth effect from a tax reform alters the long-term growth rate of the economy.

It is useful to distinguish between level effects and growth effects because some tax reforms will only have level effects, while other tax reforms may have a growth effect or both a level and a growth effect. An important point to bear in mind is that even seemingly small growth effects can have a major impact on living standards over a 20 to 30 year period.

A. The Level Effects of Switching to Consumption Taxation

A tax on investment income distorts an individual's savings decision because it is equivalent to imposing a tax on future consumption. (The "price" of future consumption. increases because the individual has to give up more current consumption to obtain a dollar of future consumption when the net rate of return on savings is reduced.) In contrast, a consumption tax, imposed at a constant rate over time, does not affect the rate of return on savings and does not distort savings decisions.

The gain from replacing a tax on the return on savings with a consumption tax is illustrated in Figure 2 using the standard two-period model of consumption and savings decisions. C_1 is consumption in the first period, which we will consider the individual's working life. C_2 is the individual's second period consumption, which we can think of as his retirement years. In this model, it will be assumed that the individual's earnings, E, are fixed and equal to E and that there is no precautionary or bequest motive for savings.

---

estimated to be more than two times larger than short-run (within a year) ones."

It is also assumed that savings are completely unresponsive to the rate of return on savings in order to show that there is a gain from switching to a consumption tax even if savings elasticity is zero, a point was first emphasized by Feldstein (1978).

In the absence of taxation, the individual's intertemporal budget constraint would be EE′. With a tax on the return to savings, the individual's intertemporal budget constraint is BE. The slope of the budget constraint reflects the reduced rate of return on savings, or equivalently, the increase in the price of future consumption. The individual's optimal consumption bundle is at b on the indifference curve U^1 where the individual consumes C_{10} in the first period and saves $E - C_{10}$. The present value of the tax revenues collected from the individual is equal to the distance bd.

A consumption tax that collected the same tax revenues would have the same slope as EE' and would pass through point b. The budget line HH' is the individual's intertemporal budget constraint with revenue neutral switch to a consumption tax. Given this budget constraint, the individual maximizes the utility by consuming at c on the indifference curve U^2. The gain, G, from switching to the consumption tax is the "distance" between the indifference curves U^1 and U^2. This gain is given by the distance EM.

As this figure illustrates, there is a gain from switching to a consumption tax even though the savings rate is completely unresponsive to the rate of return on savings. What is crucial for determining the magnitude of the gain is elasticity of substitution between consumption in the two periods, σ, not the savings elasticity. Only if the indifference curves are "elbow shaped", indicating no substitution effect from a change in the price of

future consumption, would there be no gain from eliminating the intertemporal price distortion by substituting a consumption tax.

Intuitively, the efficiency gain is achieved by replacing a highly distortive, or high "cost", tax with a less distortive, less costly, source of tax revenues. Consequently, the gain from switching to a consumption tax per dollar of tax revenue, G/R, can be approximated by the following:

$$\frac{G}{R} \approx \frac{1}{2}\left[MCF_{\tau_r} - MCF_{\tau_c}\right] \tag{1}$$

where $MCF_{\tau r}$ is the marginal cost of public funds obtained from taxing the return on savings and $MCF_{\tau c}$ is the marginal cost of public funds from a consumption tax. (See Dahlby (2001) for a survey of the concept and applications of the marginal cost of public funds.) Within the context of this model, the MCFs for the two taxes can be shown to equal the following:[5]

$$MCF_{\tau_r} = \frac{q_2}{p_2 \cdot \left[1 + \tau_r\, r\, q_2 \left(1 + \varepsilon_{22}\right)\right]} = \frac{q_2}{p_2 \cdot \left[1 - \tau_r\, \varepsilon_S\right]} \tag{2}$$

$$MCF_{\tau c} = \frac{1}{1 - p_2\, \tau_r\, r\, b_2\, \theta_2} \tag{3}$$

where:

q_2 is the distorted price of second period consumption, $(1 + (1 - \tau_r)r)^{-1}$;

r is the pre-tax rate of return on savings;

τ_r is the tax rate on the return to savings;

ε_{22} is the elasticity of demand for second period consumption with respect to the price of second price consumption;

p_2 is the undistorted price of second period consumption, $(1 + r)^{-1}$.

ε_S is the elasticity of savings with respect to the net rate of return on savings;

b_2 is the share of the individual's earnings that are devoted to second period consumption;

θ_2 is the elasticity of second period consumption with respect to the individual's earnings.

The two equivalent expressions for $MCF_{\tau r}$ arise because savings, S, are related to second period consumption by $S = q_2C_2$. Consequently, $\varepsilon_S = -rq_2(1 + \varepsilon_2)$. Note that if the savings elasticity is zero, the $MCF_{\tau r} = q_2/p_2 = (1 + r)/(1 + (1 - \tau)r) > 1$. Note also that since the income elasticity of C_2 is positive, $MCF_{\tau c} > 1$ for $\tau_r > 0$ because, although the consumption tax is equivalent to a lump-sum tax in this model (given the fixed earnings assumption), a consumption tax increase causes a reduction in second period consumption and therefore a decline in revenue from the interest tax. This revenue slippage implies that the $MCF_{\tau c}$ to be greater than one.

Equation (1) is used to calculate the G/R for the parameter values shown in Table 1. These parameter values have been chosen so that the first period can be interpreted as a working life of 40 years and the second period is a retirement period of 15 years. It is assumed that the marginal tax rate on savings is 0.4, p_2 is 0.286, and q_2 is 0.40. In other words, the individual has to $400 during their working life to have $1000 of consumption in retirement, which is what would be implied by if savings accumulated over a 25 year period at a real after-tax rate of return of 3.0 percent. The table shows how the gain per dollar of tax revenue varies with the assumed value of the elasticity of substitution between first and second period consumption, σ, and the elasticity of future consumption

[5] Detailed derivations of these expressions are available from the

with respect to earnings, θ_2. One would expect the latter parameter to be positive and close to one, given that most people probably want to increase their retirement consumption in proportion to any increase in earnings. The table also shows the implied values of the savings elasticity given the values of σ and θ_2. Most studies of savings behaviour indicate that savings elasticity is close to zero.[6] In our base case calculation, with $\sigma = 1$ and $\theta_2 = 1$, the individual has a Cobb-Douglas utility function with a zero savings elasticity, and the gain from replacing a tax on interest income with a consumption tax is 18.3 cents per dollar of tax revenue. In other words, the gain is almost one fifth of the revenue of collected from the tax on the return to savings. Most would consider this a relatively large social gain from restructuring the tax system. If the earnings elasticity of future consumption is 1.5, then the gain increases to 19 cents per dollar of tax revenue and implied savings elasticity is 0.059. If the earnings elasticity is 0.5, then the gain is only slightly lower, at 17.5 cents per dollar of tax revenue.

As noted above, the elasticity of substitution is a critical parameter in determining the gain from replacing the distortionary tax on future consumption, and some empirical studies suggest that σ is substantially less than one. See Bernheim (1999). The table shows that the gain from restructuring the tax system is substantially reduced (to about 3.5 cents per dollar of tax revenue is $\sigma = 0.25$), but the implied savings elasticities are negative and relatively large in absolute value. While these values are not implausible, they imply that individuals significantly reduce their lifetime savings in response to higher real after-tax rates of return. Such responses do not seem consistent with our casual observations about how individuals respond to rates of return on savings and at

---

author upon request.

least some of the econometric evidence on savings behaviour. However, as Bernheim has admitted, our empirical knowledge about the savings behavioural is very limited. That said, the conventional wisdom that savings elasticities are low or close to zero, and the intuitively appealing idea that the earnings elasticities of retirement consumption is close to one suggest that the relatively large G/R values in the last column of Table 1 may be the empirically relevant ones.

There are two serious deficiencies with this analysis of the gain from substituting a consumption tax for a tax on interest income. First, it treats the consumption tax as a lump-sum tax. In reality, a consumption tax distorts an individual's work-leisure decision because they reduce the individual's real wage rate.[7] A consumption tax is in many respects similar to a wage tax because the lifetime consumption tax base for an individual is equal to the present value of the individual's labour income plus the value of any inheritances less bequests. Therefore, the disincentives to work need to be taken in computing the cost of raising revenue through a consumption tax.

A second neglected issue is the interaction of the two tax bases. Taxpayers generally change their behaviour in ways that reduce the base on which a tax is levied. However, in changing their behaviour, the taxpayer may also affect the sizes of the other tax bases. If the change in their behaviour causes other tax bases to expand, some of the other tax-induced distortions in the economy are reduced, and the total distortions caused by the tax system might be relatively small. Indeed, there might even be an improvement in resource allocation. Alternatively, an increase in a tax on one tax base might lead to

---

[6] See Bernheim (1999) for a survey of the research on the determinants of savings.

[7] Sales taxes may also induce cross-border shopping, thereby distorting the location of an individual's consumption decision.

adjustments in behaviour which reduce other tax bases, thereby exacerbating the tax distortions caused by other taxes. In such cases, the total efficiency losses induced by a particular tax may be much greater than one it induces with respect to its own tax base. Consequently, we need to assess the interactions between the interest income base and the consumption base in assessing the costs of raising tax revenues from either of these two tax sources.

If one introduces leisure time as a third "good" in the two period intertemporal choice model, then the following expressions can be used derived form the marginal cost of raising revenue from either a consumption tax or an interest income tax.[8]

$$MCF_{\tau_r} = \frac{q_2}{[p_2(1-\tau_r\varepsilon_S)] + \tau_c\left[\frac{-b_0}{b_2}\varepsilon_{02}^c + b_0\theta_0 - (1+\tau_r r\varepsilon_{22})\right]} \tag{4}$$

$$MCF_{\tau_c} = \frac{1}{\left[\left(\frac{C_1 + p_2C_2}{C_1 + q_2C_2}\right)(1+\tau_c) - \tau_c(1+\varepsilon_H)\right] + \tau_r\left[p_2r(1-\tau_c)(-b_0\varepsilon_{02}^c - b_2\theta_2)\right]} \tag{5}$$

Even in this simple framework, the expressions for the MCFs for the two taxes are relatively complex. In both expressions, the denominators indicate how total tax revenues respond changes in τ_r and τ_c respectively. The first set of terms in square brackets indicates how revenues from the own-tax base respond to changes in the tax rate. (The more tax-sensitive the tax base, the lower the "own" revenue response, and the higher the MCF.) The second set terms in square brackets shows how the revenues from

[8] Detailed derivations are available from the author upon request.

the other tax base respond to changes in the given tax rate. Each tax's MCF is higher the greater the reduction in revenues from the other tax base.

The three key parameters determining the costs of raising revenues from these two tax sources are:[9]

ε_S the elasticity of demand for savings which determines the cost of the savings distortion caused by taxing interest income;

ε_H the elasticity of labour supply which determines the cost of the labour supply distortion caused by taxing consumption; and

ε_{02}^c the compensated elasticity of demand for leisure with respect to the price of second period consumption which determines the interactions between the tax bases.

The ε_S and ε_H parameters determine the "own" revenue effects of the interest and consumption taxes. In theory, these parameters can be either positive or negative, because of offsetting substitution and income effects. Most empirical studies indicate that the savings elasticities and labour supply elasticities are relatively small. The third parameter, ε_{02}^c, is positive if an individual views leisure and future consumption as "net" substitutes, or negative if they are viewed as "net" complements. To my knowledge, no empirical studies have yielded estimates of this parameter, i.e. how labour supply is affected by the net real rate of return on savings. My economic intuition suggests that if the price of future consumption increases, but I am compensated through a lump-sum transfer so that I am no worse off than before, working to save for the future is less attractive, making leisure and future consumption net substitutes—but this is not a deeply

[9] The only other new parameter is b_0, the share of the individual's resources that 'spent" on leisure.

held belief and other people may have different tastes. In other words, we do not have econometric estimates, or strong intuition, which help us in placing numerical values on this key parameter value.

Table 2 shows how the calculated values of the MCFs for these two taxes vary with different values for the three key parameters.[10] The first line of the table, which I will refer to as the base case, shows the MCFs when all three key parameters are zero. The difference between the MCFs for the two taxes is much smaller than in the corresponding case in Table 1 with $\varepsilon_S = 0$. However, the $MCF_{\tau r}$ continues to be greater than the $MCF_{\tau c}$, so there would still be a gain from a revenue neutral switch from a tax on interest income to consumption taxation. The second row of the table shows the impact of increasing the elasticity of savings. Contrary to expectations, a higher savings elasticity *reduces* the marginal cost of public funds from taxing interest incomes because while own-revenues are less responsive to an increase in τ_r, thereby increasing the $MCF_{\tau r}$, there is an increase in consumption tax revenues which more than offsets this effect. (When ε_S increases, ε_{22} is larger in absolute value, which makes the reduction in future consumption larger for a given increase in τ_r.) The shift in consumption from the future to the present increases the present value of the government's consumption tax revenues.) With these parameter values, the MCFs for the two taxes are virtually identical, indicating that there would be no gain from small changes in tax mix. The third row shows if the labour supply elasticity is 0.10, while the other two key parameters are zero, then the $MCF_{\tau c}$ increases somewhat, but it is still below the $MCF_{\tau r}$.

---

[10] The values of the other parameters are given at the bottom of the table.

The last two rows show the sensitivity of the MCFs to the assumed value of the ε_{02}^{c}. If leisure and second period consumption are net substitutes (as my intuition weakly suggests), an increase in τ_r reduces hours of work, thereby reducing consumption tax revenues. The $MCF_{\tau r}$ is much higher than in the base case while the $MCF_{\tau c}$ is only slightly higher, and there would be a large gain in substituting a consumption tax for an interest income tax.

However, as the last row in the table indicates, if leisure and retirement consumption are net complements, taxing interest income will induce people to work harder, which greater lowers the distortionary cost raising revenues through taxing interest incomes, and these calculations would justify higher taxes on interest incomes.

To summarize, this analysis has indicated that the efficiency gain from replacing an income tax with a consumption tax depends critically upon the substitutability or complementarity of future consumption and leisure. Since we do not have direct estimates of this parameter, and economic intuition does not provide much guidance, we have to conclude that the static efficiency gains from replacing an income tax with a consumption tax are ambiguous or at least highly uncertain.

Two further points regarding the substitution of a consumption tax for an income tax should be considered. First, as previously noted, our current system is a hybrid income-consumption tax which does not tax the returns on certain types of investment income, such the return on consumer durables such as owner-occupied housing, or the return on investment income held in registered retirement savings and investment plans. Indeed, it has been estimated that our current income tax system only taxes about one-quarter of the total return to savings. See Poddar and English (1999). For many

individuals the current personal tax system is effectively an expenditure tax. Moving completely to a consumption tax system would have little or no impact on them.

However, there could still be gains in moving completely to an expenditure tax. First, some savers are taxed under the current system. Removing the limits on contributions to RRSPs and RPPs would eliminate the marginal taxation of their savings. Since the average rate of tax is less than the marginal rate of tax on savings, because of the features of the tax system referred to above, eliminating the residual taxation of savings would tend to have a relatively strong pro-savings effect because the "income" effect of the change (which tends to reduce the incentive to save) would be relatively weak compared to the substitution effect which is determined by the marginal tax rate on the return on the last dollar saved. Thus the stimulative effect of eliminating the taxation of savings under the current system for those who are currently taxed on their savings is likely to be much larger than the conventional low savings elasticity would suggest. Furthermore, the distortion in the choice of investments, particularly the bias in favour of investment in owner-occupied housing, under the current tax regime would be eliminated if a comprehensive consumption tax regime were adopted, leading to a further improvement in resource allocation.

Finally, the calculated MCF for the consumption tax did not include the efficiency gain that arises from the fact that a consumption tax serves as a lump-sum tax on the initial stock of wealth. The lump-sum aspect of consumption taxation is one of the ways in which it differs from a proportional wage tax and would lower its MCF. It also has implications for the distributional impact of the tax. The consumption tax can be viewed as enhancing equity, because the lump-sum aspect falls disproportionately on the

wealthy, or as inequitable because it falls disproportionately on accumulated wealth of the elder. These equity aspects of switching to a consumption tax are addressed in Section 3 of the paper.

B. The Growth Effects of Switching to Consumption Taxation

In analyzing the growth effects of restructuring the personal tax system, I will use as a framework a class of endogenous growth models that have been developed by economists over the last 15 years. This model stresses the importance of investment in human capital—the skill and knowledge embodied in the workforce—in explaining an economy's rate of economic growth. Thus it focuses on a central feature of the knowledge-based economy—that success depends on having a highly skilled and educated workforce that can take advantage of the technological innovations, the scientific breakthroughs, and the communication revolution that are occurring throughout the world.

The endogenous growth model will only be described here in broad-brush strokes.[11] A key feature of this model is that it describes the growth effects of tax reforms for a small open economy where the prices of exported and imported goods and the after-tax rate of return on investment is determined by world markets. In particular, it is assumed that investment funds will flow into the economy from the rest of the world if the expected rate of return on investments in Canada is above the rate of return that

[11] See Dahby (2000) for a more detailed description of the model.

investors can get elsewhere in the world. Similarly, capital can readily flow out of Canada if the expected after-tax rate of return is below the rate that investors can earn in other parts of the world. This high degree of capital mobility means that the rate of return on capital invested in domestic economy will adjust in the long-run so that that investors can earn the same net rate of return that can be earned on investments elsewhere in the world.

At the heart of any model of economic growth is the aggregate relationship between the growth rate of per capita output, the growth rates of inputs, the population growth rate, and the rate of the technological change. This basic *growth accounting* relationship is presented below:

$$\dot{y} = (1 - \alpha)\,\dot{A} + \alpha\,\dot{K} + (1 - \alpha)\,\dot{H} - \dot{N} \qquad (6)$$

where

$\dot{y}$ is the growth rate of per capita output.

$\dot{A}$ is the productivity growth rate.

α is a parameter equal to physical capital's share of the cost of production, which in most economies is around one third.

$\dot{K}$ is the growth rate of the physical capital stock.

$\dot{H}$ is the growth rate of the stock of human capital population.

$\dot{N}$ is the growth rate of the population.

Per capita output will grow at a faster rate the higher the productivity growth rate and the more rapid the growth rate of physical and human capital. It will grow more slowly when the population growth rate is higher, assuming that the other variables that affect

the rate of economic growth are unchanged, because a given level of output is spread over a larger population when the population growth rate is higher.

This growth accounting relationship is useful for *describing* the sources of economic growth, but not for *explaining* the economic growth rate because it does not explain why each component of the accounting relationship grows at any particular rate. In order to explain how changes in public policy affect the growth rate of the economy, we need a model of the behavioural relationships between the variables in the growth accounting relationship.

The human capital variant of the endogenous growth model focuses on the behavioural relationships that determine the growth rates of human and physical capital. Investment in human capital is determined by the savings decisions of the residents of the economy. They will invest in human capital (by, for example, undertaking education and training course) up to the point where the after-tax return that they can earn from acquiring more human capital is equal to the after-tax return which they can earn from investing in financial assets. Investment in physical capital is determined by "foreign" investors who require a net rate of return, adjusted for risk, that is equal to what they can earn on investments in other countries. The physical capital stock will grow faster when the productivity growth rate is higher, when the growth rate of human capital is higher, or when output prices are growing at a faster rate, and it will grow more slowly when the required gross rate of return on investment is increasing.

From the relationships determining $\dot{H}$ and $\dot{K}$, the growth accounting relationship can be transformed into the following predictive model of the growth rate of per capita output:

$$\dot{y} = \dot{A} + s(1-\tau_r)\, r + \frac{\alpha}{1-\alpha}\dot{P} - \frac{\alpha}{1-\alpha}\dot{r}_g \qquad (7)$$

where s is the savings rate, $\dot{P}$ is the rate of increase in the price of the economy's output, and $\dot{r}_g$ is the rate of increase in the required gross rate of return that on investment,.

The model predicts that the growth rate of per capita output will be higher in an economy with a higher savings rate because individuals will invest in human capital at a faster rate. A higher savings rate means that individuals will invest in human capital at a faster rate. A more rapid growth rate for human capital means that investment in physical capital will be more profitable and the stock of physical capital will also grow at this more rapid rate. With constant returns to scale in production, per capita output will also grow at this faster rate. Thus the key mechanism linking a higher savings rate with faster economic growth is that individuals will invest in human capital at a faster rate.

That a higher savings rate is predicted to lead to a higher growth rate may seem obvious to the "man in the street." However, this is one of the features that distinguishes endogenous growth models from because the neo-classical growth model, which was developed in the mid 1950s by Robert Solow, a Nobel prize-winning economist. The neo-classical model predicts that an increase in the savings rate may temporarily boost the growth rate as the capital-labour ratio in the economy increased, but once the new equilibrium capital-labour ratio is achieved, the growth rate will return to its previous rate.[12] In other words, the neo-classical model predicts that an increase in the savings rate would have a level effect, but not a growth effect.[13]

[12] This is the neo-classical model's prediction for a closed economy. For a small open economy, the neo-classical model predicts that a higher savings rate will not affect per capita output or the long-term growth

The model predicts that a reduction in the tax rate on the return to savings will increase the growth rate as follows:

$$\frac{d\dot{y}}{d\tau_r} = -s(1 + \varepsilon_S)r < 0 \qquad (8)$$

Even if the savings elasticity is zero, a reduction in the tax rate on return to savings would still increase the long-term growth rate.

This simple model can be used to calculate the growth effect from eliminating the tax on the return to savings. Assuming that the real pre-tax rate of return on savings is 5 percent and that the savings rate is 10 percent, eliminating a 40 percent marginal tax rate on savings would increase the long-run economic growth rate by two tenths of a percentage point if elasticity of the savings rate is zero. If the savings rate elasticity were 0.15, the growth rate would increase 0.23 of percentage point. If the savings elasticity were –0.15, the growth rate would increase by 0.17 of a percentage point. Thus the size of the growth effect is not greatly affected by the assumed elasticity of savings.

While the endogenous growth model outlined above is very simple and our back-of-the-envelope calculations of the growth effects of restructuring the tax system are admittedly crude, they are consistent with the predictions of much more sophisticated

---

rate. It would only affect the degree to which the residents of the economy are net debtors (or net creditors) vis a vis the rest of the world.

[13] The domestic savings rates are highly correlated with domestic investment rates. This empirical regularity has been interpreted as indicating that capital is not highly mobile across countries. However, the observed positive correlation would arise, even with perfect capital mobility, if the governments' run zero deficits and exports equal imports. Furthermore, the open-economy endogenous growth model described above also predicts that domestic savings rates will be highly correlated with investment rates in physical capital. Consequently, the observed correlation of savings rates and investment rates is not a powerful test of capital mobility.

endogenous growth models.[14] One of the interesting results from these simulations models is the growth effects of tax reforms are much larger (on the order of 10 times larger) in a small open economy version of these models than in a closed economy version. The reason for the difference is that in a small open economy, the gross rate of return on savings is determined on international markets. Therefore, eliminating the tax on the return to savings increases the return to savings by the full amount of the tax. In a closed economy, an increase in return to savings causes a one-for-one increase in investment, which leads to a lower rate of return on capital, thereby partially offsetting the initial increase in the return on savings. Since the Canadian economy represents less than three percent of the world economy and Canadian capital markets are highly integrated with world capital markets, it is unlikely that the return to capital would decline if the tax on the return on savings were eliminated. Therefore, one would expect that switching to consumption tax would have a powerful growth effect in Canada.

As Myles (2000, p.164) has noted, simulation models "introduce a range of issues that must be considered, but that they do not provide any convincing or definitive answers." We therefore turn to the statistical studies of the growth effects of taxes, which try to determine whether international variations in growth rates can be explained by the level or the composition of countries' taxes.[15] Some early econometric studies found significant negative growth effect from taxation, but subsequent studies have concluded

[14] See Milesi-Ferretti and Roubini (1998) on the growth effects of income and consumption taxes in endogenous growth models. King and Rebelo (1990), Rebelo and Stokey (1995), Pecorino (1994), and Coleman (2000), have simulated the endogenous growth models which replicate the basic characteristics of the US economy. Endogenous growth models that mimic the characteristics of Canadian economy have been developed by Mérette (1997) and Xu (1997, 1999). All of these models have indicated that there are positive growth rate effects from replacing a tax on investment income with a consumption tax.

[15] For a review of these studies, see Ahn and Hemmings (2000).

that these results are not robust because they are affected by the sample of countries, the time periods, or the conditioning variables (such as initial per capita income level or level of education) which are included the regression equation to reflect the other variables that affect the rate of economic growth.[16] Three recent studies—Mendoza et al. (1997), Kneller et al. (1999), and Widmalm (2001)—have overcome many of the problems that plagued the earlier studies, and their results are briefly discussed in detail below. Mendoza et al. (1997) studied the growth effects of taxes using data based on 5 year averages for 18 OECD countries (including Canada) for the period 1965-1991. They found strong negative relationships between the investment rate and the rate of wage and capital taxation and a positive relationship between the investment rate and the rate of consumption taxation. Mendoza et al. concluded that shifting the tax burden from capital and wages to consumption would increase a country's investment rate. They interpreted this effect as a level effect—which alters the transition growth rate of the economy—not a growth effect.

Kneller et al. (1999) argued that Mendoza et al. (1997) and other studies have produced biased and unstable estimates of the growth effects of taxes because they failed to incorporate the government's budget constraint in their estimate equations. They noted that if one fiscal variable changes, such as the tax consumption tax rate, then there must be a change in another fiscal variable, such as the level of expenditures, or in the government's budget surplus. They argued that Mendoza et al. (1997) found insignificant growth effects from taxes because their model implicitly assumed that an increase in taxes is offset by an increase in productive government expenditures, such as

[16] See, for example, Koester and Kormendi (1989) and Garrison and Lee (1992).

expenditures on infrastructure. Therefore, the coefficient estimates in Mendoza et al.'s growth rate regressions actually reflect the difference between the effect of a tax increase and the effect of a productive expenditure increase, which may be small and not statistically significant.

Kneller et al. estimated a model that incorporated the governments' budget constraints using five year average data for 22 OECD countries for the period 1970-1995. The authors classified taxes on income, profit, payrolls, and property as "distortionary" taxes and taxes on domestic goods and services as "non-distortionary" taxes. They classified expenditures on defence, education, health, housing, and transportation and communication as "productive" expenditures and expenditures on social security, welfare, recreation, and economic services as "non-productive". Their maintained hypothesis was that non-distortionary taxes (i.e. consumption taxes) and non-productive expenditures would have negligible growth effects, and therefore these fiscal variables were excluded from their main regression equations. Their results indicated that the distortionary taxes have significant negative growth effects, reducing the rate of growth rate by 0.41 percentage points for a 1.0 percent of GDP increase in the distortionary taxes. Overall, Kneller et al. (1999, p.188) concluded that even their lowest coefficient estimates indicate that "increasing productive expenditure or reducing distortionary taxes by 1% of GDP can modestly increase the growth rate (by between 0.1 and 0.2% per year.)"

Finally, a recent study by Widmalm (2001) has examined the effects of the tax structures on economic growth based on data for 23 OECD countries between 1965 and 1990. She found a robust negative correlation between economic growth rates and the

share of tax revenue from personal income taxes and a measure of the progressivity of the tax system. She also found that reliance on consumption taxes tend to be growth-enhancing. Widmalm (2001, p.211) concluded that "personal income taxes affect growth, not so much via physical capital accumulation, as through resource allocation efficiency or the accumulation of human capital", a result that is consistent with the endogenous growth model outlined above.

To conclude, endogenous growth models and recent econometric studies indicate that switching the tax mix toward consumption taxes can significantly increase the growth rate of the economy. An increase in the annual economic growth rate on the order of a two-tenths of a percentage point—as predicted by the simple open-economy endogenous growth model—would have a dramatic impact on Canadian living standards over time. The present value of the additional per capita output from increasing the annual growth rate by two-tenths of a percentage point is 238 percent of current output, which represents an enormous gain. The endogenous growth model is admittedly highly simplistic and might exaggerate the increase in the growth rate that would occur from switching to a consumption tax. However, the cumulative impact of very small increases in the growth rate are so large that even if we have overstated the growth effect of switching to a consumption tax by a factor of 10, and the growth rate only increase by two-one hundreds of a percentage point, the present value of the increase in per capita output would still be 22.3 percent of current output—a very significant gain.

In setting our tax policies, we need to pay particular attention to their growth effects. Theoretical models and empirical evidence predict a significant boost to the growth rate from switching to consumption taxation. Although, in setting economic

policies, there is never enough evidence to be 100 percent sure that the predicted outcome will occur, the potential payoffs for our society from switching to a consumption tax base are so significant that switching to consumption taxation has to be high on our policy agenda.

3. Equity Arguments for Consumption Taxation

Consumption taxes, such as the GST, are probably the most unpopular taxes in Canada because they are said to be "regressive". If we are going to reap the efficiency gains from switching to consumption taxation, we are going to have to overcome this fundamental misconception.

To some degree, economists have been responsible for the mislabeling of consumption taxes as regressive taxes because in discussing what constitutes a fair tax system, we inevitably trot out the "ability-to-pay" principle. The very use of the words "ability-to-pay" makes it almost inevitable that annual income will be adopted as the standard for measuring "ability-to-pay". If instead we adopted the more neutral terminology—that the tax burden should be distributed according to an individual's "standard-of-living"—than the basis on which to measure of the fairness in taxation could be approached in a more neutral basis.

This is not just a matter of semantics. I believe that in discussing equity issues, the public is essentially concerned about "standards-of-living" not "ability-to-pay". Indeed, "ability-to-pay" is not so much an equity concept as an efficiency concept. When a bank robber was asked why he robbed banks, he replied "because that's where the money is". In much the same way, governments have come to rely on the income tax base because 'that's where the money is'.

Most people—and almost all economists—are closet utilitarians. It is time to come out of the closet and openly declare that a person's standard of living is best measured by their consumption of goods and services. Ideally, a broad measure of

consumption should be adopted which would include private good and services obtained through market transactions, publicly-provided goods and services, environmental quality, and leisure activity which also includes home production of goods and services. However, it is very difficult to include the last three categories in any index of consumption used for tax purposes, and the consumption of marketed goods and services is, for practical purposes, the index of consumption that we have to adopt. Still, consumption of marketed goods and services is the primary determinant of standards of living in our society.

Since consumption is a flow—something that is measured per unit of time—an essential question that has to be addressed is—Over what time period do we measure consumption? Any short period of time, such as an hour, a day, or a month, leads to an unreliable index given the normal temporal fluctuations in measured consumption activity. Generally speaking, the longer the time period, the more reliable measured consumption becomes as an index of well-being. What timeframe should we adopt—a year, a decade, a generation, a lifetime? As a practical matter, taxes probably have to assessed at least once a year, but a basic principle of horizontal equity dictates that two people with the same lifetime consumption (in present value terms) should pay the same amount in taxes (again in present value terms). This implies that, at least in principle, progressivity of the tax system should be measured by the individual's tax burden paid as a percentage of lifetime consumption.

If we continue to use taxes paid as a percentage of annual income as the standard by which to measure the progressivity of the tax system, it is inevitable that other taxes will look regressive, or at least less progressive, than a personal income tax system. It is

a mug's game to compare the progressivity of a consumption tax with the progressivity of an income tax if progressivity is measured by taxes as a percentage of annual income. A consumption tax is bound to lose by comparison. Using annual income, which is a flawed index of "standard-of-living", only perpetuate misconceptions about the fairness of the tax system and horizontal inequities that a personal income tax system inevitably produces.

Using lifetime consumption as measure of an individual's standard of living, a broad sales tax, such as the GST or a single rate expenditure tax, is a proportional or slightly progressive. How progressive should the tax system be? Inevitably, there is an efficiency-equity trade-off. A highly progressive expenditure tax would distort an individual's labour supply and as well as savings decisions just as an interest income tax does. Whether the gain in fairness is worth the shrinkage of the pie depends on the strength of one's preferences for egalitarian outcomes. However, it should be remembered that the current personal tax system is not highly progressive, even when progressivity is measured using taxes as a percentage of annual income. Most economists who have studied the redistributive role of government have concluded that most of the net redistribution through the public fisc occurs through the expenditure side of the budget, not the tax side. Basically, it is much more costly to achieve significant increases in redistribution through the tax side than it is through the expenditure side of government. Those who favour a greater degree of redistribution by Canadian governments should focus their efforts and policy proposals on the expenditure side of the budget, rather than the tax side. This is not to say that redistribution through the expenditure side is costless, in terms of administrative costs or disincentive effects, only

that the expenditure side of the budget is a better means—has a higher benefit-cost ratio—than the tax side of the budget. Furthermore, "a rising tide floats all ships". A higher rate of economic growth will, over time, improve everyone's standard of living, rich as well as poor.

There are distributional implications of switching to consumption taxation that have to be addressed. These arise from the intergenerational impacts. Since, on average, the elderly have accumulated more wealth than younger generations, an increase in consumption taxation imposes a higher burden on older age groups. Many simulation models, such as Akerloff and Kotlikoff (1987) and Altig et al. (1997), have shown that the elder are adversely affected if a consumption tax is adopted, while the young and future generations are made better off. These models are neo-classical growth models that do not incorporate the growth effects of switching to consumption taxes. Since the elderly have typically retired, they do not benefit from the higher growth rate that is predicted to occur under a consumption tax.

How to solve this? Given the substantial efficiency gains to be derived from switching to a consumption tax, our society could afford to generous to those who will not benefit from the faster rate of economic growth, such as the elderly who are no longer part of the workforce. Growing a bigger economic pie means that we can provide higher transfer payments, such as social assistance payments and seniors' benefits, so that virtually everyone benefits from the tax reform. That said, it might be advisable, as part of a tax reform package to at least temporarily increase reliance on payroll or wage taxes, which would shift the burden to the younger generations who will benefit from the higher future rate of economic growth. Finally, a non-revenue neutral tax reform would also

help to assuage the intergenerational consequences of switching to a consumption tax. Substituting a low rate of consumption taxation at for investment income taxes and running a deficit during a transition period would transfer the tax burden to future generations who are the main the beneficiaries of the higher rates of economic growth. However, given that Canada's public sector debt to GDP ratio is still relatively high, a non-revenue neutral tax reform is a relatively risky policy measure given the volatility of the world economy. Therefore, the other two options—higher transfer payments to the elderly and the disabled and higher payroll taxes during a transition period—are better ways of redistributing the tax burden to the younger generations who are likely to be the primary beneficiaries of the tax reforms.

4. Direct versus Indirect Consumption Taxes

Given the strong equity and efficiency arguments for consumption taxation, the question arises—Should we impose a direct consumption tax in the form of an expenditure tax, or should we impose an indirect consumption tax in the form of a sales tax such as the GST. In my view, the answer is simple. We need both. Both forms of consumption taxation are needed because both types of taxes are subject to somewhat different forms of tax avoidance and tax evasion behaviour and therefore it is preferable to have two systems of consumption taxation, each levied at a moderate rate, rather than have one consumption tax system levied at the full rate.

Under an expenditure tax, consumption is directly taxed either by allowing individuals to deduct savings invested in a *designated asset* account, which are taxed when the assets are withdrawn, or by exempting the return on assets purchased out of after-tax dollars. RRSPs are an example of the designated asset approach. Our current

tax treatment of housing, where savings in the form of increases of the homeowner's equity are not deductible, but the return on owner-occupied housing—implicit rental income plus capital gains—is not taxed is an example of the so-called *tax-prepaid* approach. Both approaches should be utilized, with the designated asset approach used for investments in closely-held unincorporated businesses and human capital formation and the tax-prepaid method used for purchases of consumer durables.

Our current personal tax system is a hybrid system combining elements of consumption taxation and comprehensive income taxation, with consumption tax treatment of consumer durables, the return to human capital, and retirement savings. The system could be fully converted to an expenditure tax by removing the limits on RRSP and RPP contributions, but Kesselman and Poshmann (2001) have proposed an attractive alternative, a tax pre-paid savings plan. One feature that makes this alternative attractive is that it avoids a problem that is inherent in designated asset plans when the marginal tax rate on contributions is different from the marginal tax rate when assets are withdrawn. As a numerical example in Kesselman and Poshmann (2001, Table 3) indicates, when the marginal tax rate at the time of contribution is higher than the marginal tax rate on withdrawal, the tax system effectively subsidies the return to savings. Conversely, it imposes a tax on the return to savings if the marginal tax rate on withdrawals exceeds the marginal tax rate at the time of contribution. Thus designated asset treatment can either tax or subsidize the return to savings even though it is nominally a component of the expenditure tax. Since no one can confidently predict tax rates twenty to thirty years in the future, the designated asset approach also introduces a great deal of uncertainty into the concerning the net rate of return on savings. Furthermore, as Kesselman and

Poshmann (2001) point out, consumption out of a tax-prepaid savings plan could be exempt from the GIS tax-back, thereby eliminating this potential disincentive to save for retirement. For these reasons, the use of tax-prepaid savings plans might be the preferred way of converting our current hybrid personal tax system to a full expenditure tax system.

If we had a personal expenditure tax system, would we need to levy a broad sales tax such as the GST or the provincial sales tax. Kesselman (1993) has shown that if there is a sector—call it the underground economy—where sales taxes cannot be levied and where individuals' earnings are not taxed, then changing the direct-indirect tax mix will not change the size of the underground economy. Kesselman's analysis suggests that we could levy either an expenditure tax or a sales tax and that by levying both forms of taxation, we would incur excessive administration and compliance costs. However, in my view, we should levy both direct and indirect consumption taxes because they are subject to different forms of tax evasion and avoidance.[17] Direct taxes, levied on a residence basis lead to evasion or under-reporting of income from, for example, off-shore sources. Sales taxes levied on a destination basis lead to incentives to consume outside Canada and to engage in cross-border shopping. The optimal tax mix under a consumption tax regime would involve levying both direct and indirect taxes.

[17] See Boadway, Marchand, and Pestieau (1994) and Richter and Boadway (2001) on the direct/indirect tax mix when the two tax bases are subject to different degrees of evasion.

References

Ahn, S., and P. Hemmings. (2000). "Policy Influences on Economic Growth in OECD Countries: An Evaluation of the Evidence," OECD Economics Department Working Papers (June).

Altig, David, Alan J. Auerbach, Laurence Kotlikoff, Kent A. Smetters, and Jan Walliser (1997) "Simulating U.S. Tax Reform" NBER Working Paper 6248, National Bureau of Economic Research, Cambridge, Mass.

Auerbach, Alan J. and Laurence Kotlikoff (1987) *Dynamic Fiscal Policy*, Cambridge University Press, Cambridge.

Bernheim, Douglas (1999). "Taxation and Saving" Department of Economics, Stanford University, Stanford.

Boadway, Robin W., Maurice Marchand, and Pierre Pestieau (1994). "Towards a Theory of Tax Structure: Direct versus Indirect Taxation" *Journal of Public Economics* 55, 71-88.

Coleman II, W.J. (2000). "Welfare and Optimum Dynamic Taxation of Consumption and Income," *Journal of Public Economics* 76(1) (April): 1-39.

Dahlby, Bev (2000) *Tax Reform and Economic Growth in Alberta,* Canada West Foundation, Calgary.

Dahlby, Bev (2001). ""Using the Marginal Cost of Public Funds to Evaluate Public Expenditure Programs", Department of Economics, University of Alberta, Edmonton.

Feldstein, Martin (1978). "The Welfare Cost of Capital Income Taxation" *Journal of Political Economy* Vol. 86 No.2 pt. 2, S29-S51.

Garrison, C.B., and F.Y. Lee. (1992). "Taxation, Aggregate Activity and Economic Growth: Further Cross-Country Evidence on Some Supply-Side Hypotheses," *Economic Inquiry* 30(1) (January): 172-176.

Kesselman, Jonathan (1993) "Evasion Effects of Changing the Tax Mix" *Economic Record* 69(205): 131-148.

Kesselman, Jonathan and Finn Poshmann (2001) "A New Option for Retirement Savings: Tax-Prepaid Savings Plans" Commentary No. 149, C.D. Howe Institute, Toronto.

King, R.G., and S. Rebelo. (1990). "Public Policy and Economic Growth: Developing Neoclassical Implications," *Journal of Political Economy* 98(5): 126-150.

Kneller, R., M.F.Bleaney, and N. Gemmell (1999). "Fiscal Policy and Growth: Evidence from OECD Countries," *Journal of Public Economics* 74: 171-190.

Loayza, N., K. Schmidt-Hebbel, and L. Servén. 2000. "What Drives Private Saving Across the World?" *The Review of Economics and Statistics* 82(2) (May): 165-181.

Mendoza, E.G., G.M. Milesi-Ferretti, and P. Asea (1997). "On the Ineffectiveness of Tax Policy in Altering Long-Run Growth: Harberger's Superneutrality Conjecture," *Journal of Public Economics* 66: 99-126.

Mérette, M. (1997). "Income Taxes, Life-Cycles and Growth," Working Paper 97-06, Dept. of Finance, Ottawa.

Milesi-Ferretti, G.M., and N. Roubini. (1998). "Growth Effects of Income and Consumption Taxes," *Journal of Money, Credit, and Banking* 30(4) (November): 721-744

Myles, G. (2000). "Taxation and Economic Growth," *Fiscal Studies* 21(1): 141-168.

Pecorino, P. (1994). "The Growth Rate Effects of Tax Reform," *Oxford Economic Papers* 46(3) (July): 492-501.

Poddar, Satya and Morley English (1999). "Canadian Taxation of Personal Investment Income" *Canadian Tax Journal* Vol. 47 No. 5, 1270-1304.

Rebelo, S, and N.L. Stokey. (1995). "Growth Effects of Flat-Rate Taxes," *Journal of Political Economy* 103(3) (June): 519-550.

Richter, Wolfram and Robin W. Boadway (2001) "Trading Off Tax Distortion and Tax Evasion" CESifo Working Paper No. 505, Center for Economic Studies and Ifo Institute for Economic Research, Munich.

Widmalm, Frida (2001) "Tax Structure and Growth: Are Some Taxes Better Than Others" *Public Choice* Vol. 107, No. 3-4, (June): 199-219.

Xu, J. (1997). "The Dynamic Effects of Taxes and Government Spending in a Calibrated Canadian Endogenous Growth Model," Working Paper 97-02, Dept. of Finance, Ottawa.

Xu, J. (1999). "Taxation and Economic Performance: A Cross-Country Comparison and Model Sensitivity Analysis," Working Paper 99-01 Dept. of Finance, Ottawa.

Table 1

Measuring the Gain from Replacing an Interest Income Tax with a Consumption Tax When Earnings Are Fixed

The Income Elasticity of Future Consumption θ_2		**The Elasticity of Substitution Between Current and Future Consumption σ**		
		0.25	0.50	1.00
0.50	G/R	0.035	0.075	0.175
	ε_s	-0.721	-0.500	-0.059
1.00	G/R	0.036	0.078	0.183
	ε_s	-0.662	-0.441	0.00
1.50	G/R	0.037	0.081	0.190
	ε_s	-0.603	-0.382	0.059

Notes: Computations based on $p_2 = 0.286$, $q_2 = 0.40$, $r = 2.5$, $b_2 = 0.118$, $\tau_r = 0.40$.

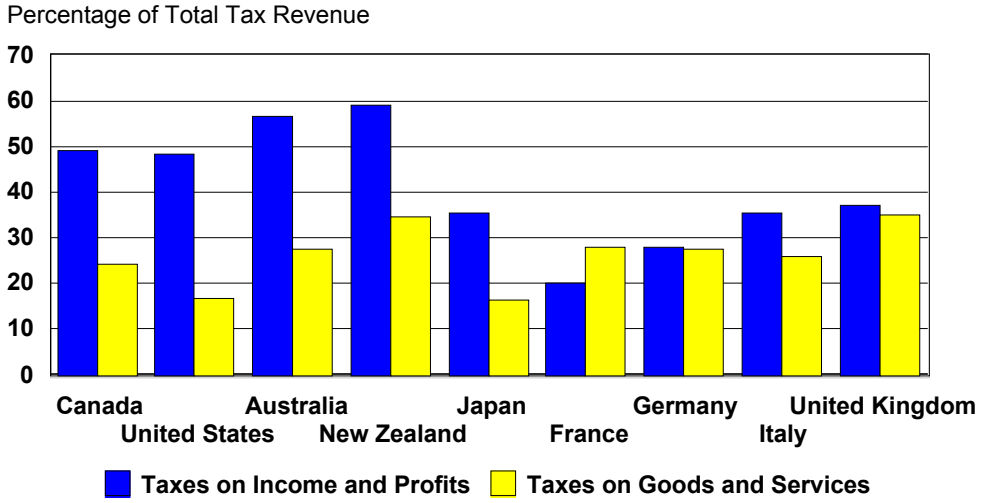
Table 2

The Marginal Cost of Public Funds from Taxing Interest and Consumption

Key Parameters:			*Marginal Cost of Public Funds*	
Savings Elasticity ε_s	Labour Supply Elasticity ε_H	Compensated Elasticity of Demand for Leisure with respect to the Price of Second Period Consumption ε^c_{02}.	Tax on Interest Income, $MCF_{\tau r}$	Tax on Consumption, $MCF_{\tau c}$
0.00	0.00	0.00	1.135	1.067
0.10	0.00	0.00	1.069	1.067
0.00	0.10	0.00	1.135	1.106
0.00	0.00	0.10	1.898	1.078
0.00	0.00	-0.10	0.810	1.056

Note: Calculations based on $\tau_c = 0.333$, $\tau_r = 0.40$, $b_2 = 0.11765$. The marginal propensity to "spend" on leisure is 0.20. Taxes represent 36.8 percent of lifetime consumption.

Figure 1
International Comparison of Tax Mixes in 1997



Source: OECD (1999).

Figure 2

The Gain from Substituting a Consumption Tax for an Interest Income Tax When Earnings Are Fixed