

Assessing Ontario's Fiscal Competitiveness

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A central issue facing any Minister of Finance is how to create a fiscally competitive economy. Expenditures on public services are critical to building a sound economy while taxes, used to fund such activities, discourage work, investment and entrepreneurship. Economic studies on economic growth suggest that productive public expenditures can raise the standard of living while taxes have the contrary effect.¹

Fiscal policies that affect businesses have a strong influence on the economy. While legally, businesses pay taxes or receive subsidies, economically, they do not since businesses are simply constructs for whom people work for, invest in or buy from goods and services. Businesses pass on taxes and subsidies through prices they charge to consumers, compensation they pay employees or profits they pay owners of capital invested in the business.

In an open economy like Ontario, the impact of business taxes and subsidies is to fall most heavily on consumers or salaries paid to workers. Business owners can invest their funds internationally so Ontario businesses pay an after-tax rate of return on capital sufficient to attract investors to fund business investment projects. If a business tries to lower profits in face of higher taxes, for example, investors will choose investments outside of Ontario where the rate of return on capital is higher. Businesses cut back investments, thereby lowering salaries paid to workers and increasing prices of goods and services sold to consumers. Ultimately, business output is cut back and real incomes of Canadians are reduced.

In this paper, we assess Ontario's fiscal climate in terms of how it impacts on the cost of doing business for multinational and entrepreneurial businesses.² Public subsidies provided through programs such as infrastructure, research and development, health, education and social security reduce the cost of doing business as governments take on responsibilities that businesses would otherwise need to provide to produce goods and services. Taxes on income, capital expenditures, assets, salaries, wages and consumption increase the cost of doing business by discouraging owners to provide labour and capital inputs needed to produce goods and services.

For multinational businesses, only Ontario's corporate income taxes impact on business costs since large companies raise funds from international markets. Ontario personal income taxes on dividends, capital gains and interest income affect savings provided by Ontario residents to Ontario and international capital markets. However, since Ontario savings have a small impact on internationally determined interest rates, Ontario personal income taxes on investment income are assumed not to impact on the investment decisions of large Ontario corporations. Instead, they only determine the degree to which large Ontario corporations are owned by Ontario residents.

¹ See for example, Kneller, Bleaney and Gemmel [1999]). They found that one point increase in productive expenditures as a proportion of GDP raised growth rates by 0.26 percentage points. An increase in the distortionary taxes as a proportion of GDP ratio by one point reduces economic growth by 0.4 percentage points.

² The analysis follows the original methodology provided in the book *Most Favored Nation* (Mintz [2001]).

On the other hand, both corporate income and personal income taxes on investment income affect the cost of doing business for entrepreneurial firms. In this case, entrepreneurs, as major owners of a business, will be affected by corporate and personal income taxes that reduce the return they receive from their personal investment in the firm. Entrepreneurs can only avoid personal taxes on investment income by moving elsewhere.

All else equal, the cost of production for both multinational and entrepreneurial businesses in a jurisdiction will be higher if the taxes paid on use of labour and capital inputs more than offset the value of expenditure subsidies provided through public programs that relieve costs of business.

This study calculates the “marginal fiscal burden” (alternatively “the marginal effective tax rate”) on the cost of doing business by calculating all the taxes paid, net of public subsidies, on the use of factors in producing goods and services by various industries in Ontario and for similar competing industries in closely-related jurisdictions in the United States: California, Georgia, Illinois, Massachusetts and Michigan.

Our conclusion is that fiscal policies create a disadvantage for Ontario relative to other jurisdictions in the United States. The disadvantage is quite significant. For large corporations, Ontario’s fiscal system results in a higher cost of doing business by almost 25%, the smallest disadvantage at about 7 percentage points more than in California and the most by 11 percentage points more than Michigan. For entrepreneurial corporations – medium-sized businesses – Ontario’s public policies increase the cost of doing business by 30%, the least by 7 percentage points more than for California and the most by almost 11 percentage points more than in Illinois.

The primary reason that Ontario’s fiscal system is not competitive is that it has relatively high taxes on investments and labour, which more than offset the effect of public subsidies associated with services, including education, health and infrastructure. Given that budgets balance (or close to balancing relative to the size of the budget), how can there be such significant differences in marginal fiscal burdens between Ontario and the five US states?

Tax revenues raised by a jurisdiction are not necessarily spent on goods and services that help improve the competitiveness of the economy. While education and infrastructure expenditures, for example, are of benefit to private production, expenditures on certain public programs like subsidies for ailing businesses and support paid to that discourages work effort undermine productivity in the economy. For example, taxes paid to cover public debt charges make a jurisdiction less competitive in the long run. This is an important consideration for Canada since taxes were substantially increased during the past two decades to fund programs in the presence the accumulation of public debt to very high levels by the mid 1990s. The impact of taxes and subsidies on the cost of doing business also depends on the mix of taxes – taxes primarily levied on the workers and business capital inputs will erode the competitive position of the business sector

compared to those taxes that more generally fall on the broad population which benefit from many public programs.

The lack of fiscal competitiveness should be a concern to policy makers since Ontario would be a less attractive environment for business investment in North America. In fact, Canada's expenditure on machinery and structures – critical if new technologies are to be adopted – is one of the lowest of other industrialized countries. In 2001, Canada's capital as a ratio of output is 1.5, less than Australia (1.6), Belgium (3.2), Germany (2.9), Ireland (1.9), Japan (3.0), Switzerland (3.7) and the United Kingdom (2.9).³ Also, high taxes on labour discourage work effort, especially with respect to participation by secondary workers in the labour force, retirement and, to some extent, migration of high-skilled workers.

To demonstrate how tax policies can improve competitiveness, we simulate several possible changes: a reduction in Ontario's corporate income tax rates to 8% applied to all businesses, the elimination of capital taxes, the elimination of sales taxes on business inputs, a cut in personal income taxes on labour income, a cut in dividend taxes (affecting entrepreneurial investments especially) and a cut in the Education and Health payroll tax. We also consider the case in which Ontario replaces its corporate income tax with a cash flow tax in which capital is expensed for tax purposes and interest expense is no longer deductible. While each policy has revenue consequences, the biggest "bang for the buck" in reducing the cost of doing business comes with the reduction of corporate income tax rates, followed by capital taxes.

I. The Cost of Doing Business and Fiscal Effects

In our analysis below, we provide a summary measure of the effect of fiscal policies on the cost of doing business. A technical appendix provides a mathematical presentation of the underlying model used to measure the impact of fiscal policies on the cost of doing business (see also McKenzie, Mintz and Scharf [1997]).

Conceptually, the model is based on the following economic principles. Suppose a business is planning to produce a product or service for sale to the international market. It has several plants operating in various jurisdictions that could be used to produce the product or service. In principle, a business will decide to produce at a location where the cost of production is lowest since it would be able to maximize its profits for the overall operation. However, if it chooses to produce too much product or service from any one location, it might drive up costs in that location making another more competitive to use from its perspective. At the end of the process, production will take place in all locations until the incremental or marginal cost of adding more production at each location is the same across all locations. Thus, a business will equalize the marginal cost of production (including taxes and subsidies) to be the same across locations to be the same.

³ See *OECD in Figures*, 2002.

How do fiscal policies impact on the cost of production? In principle, the cost of production is the payment made by businesses to factors of production (land, labour, and capital) as income (rents, employee compensation and profits and interest required to attract capital from owners). Included in these payments are the taxes paid explicitly by the business (corporate income, employer payroll, property, capital and sales taxes on business inputs) as well taxes paid by factors that compensated for working or investing in the business (personal income, consumption and employee payroll taxes). When an employee or investor pays taxes, they either withdraw their labour or capital from markets or they will negotiate for higher compensation. Ultimately, business input costs rise to some degree depending on how much capital or labour are withdrawn from the market or on the bargaining strength of workers and other owners of business inputs.

Similarly, government expenditures reduce the cost of doing business. Explicit payments to businesses, including research and development grants and tax credits and business grants reduce the cost of the input used in production. This allows businesses to expand production although the subsidies encourage owners of inputs to negotiate higher salaries and capital good prices. Further, programs that enhance the productivity of labour and capital save workers and investors from paying for benefits and thereby reduce the compensation needed to pay to them. This is particular true for health and education costs that would otherwise be borne by employees (or employers). But it also applies to public infrastructure expenditures such as transportation and communication networks that support business directly that use these services as part of their production.

Clearly, the effect of taxes and subsidies on business costs depends on their economic incidence. For example, employer-paid payroll taxes tend to fall most on workers through lower incomes, although, as Dahlby [1992], up to 30 percent of payroll taxes result in higher employee compensation costs for businesses. Personal income taxes tend to fall on labour but could result in higher wage costs for businesses as workers negotiate higher salaries to make up differences. In our work below, we treat all taxes and subsidies for labour as affecting business costs, due to the withdrawal of work effort from the market in the face of taxes on labour compensation. However, as Mintz [2001] discusses, one could assume that all taxes and subsidies fall on labour incomes without affecting labour compensation faced by employers, which would only arise if the supply of labour is fully unresponsive to changes in after-tax labour compensation. In this case, the only the marginal fiscal burden on capital is most relevant to determine the production decisions by businesses at a specific location.

In our summary measure of the *marginal fiscal burden* on costs, we estimate the total impact of relevant taxes and expenditures on cost of doing business by calculating the net taxes (taxes net of subsidies) divided by marginal costs, inclusive of net taxes:

$$(1) \quad T = [MC(t) - MC(0)]/MC(t)$$

Whereby T is the marginal fiscal burden, MC(t) is the marginal cost of producing more output in the jurisdiction, inclusive of net taxes, and MC(0) is the marginal cost exclusive of any net taxes.

The marginal fiscal burden is therefore expressed as net taxes as a proportion of costs inclusive of taxes and subsidies. For example, suppose it costs \$10 per unit to produce a product in the absence of fiscal policies. With fiscal policies, the cost is \$12 per unit. The marginal fiscal burden is 16%, which is calculated as \$2 per unit (\$12 minus \$10) divided by \$12.⁴

More specifically, McKenzie, Mintz and Scharf [1997] show that expression (1) can be estimated as follows when production is characterized by fixed proportional use of labour and capital (letting $t(l)$ be the net tax on labour and $t(k)$ the net tax on capital and α is the share of costs attributed to labour):⁵

$$(2) \quad T = \alpha t(l) + (1-\alpha)t(k)$$

Our analysis incorporates the following taxes: corporate income taxes (rates and bases), capital taxes, sales and excise taxes (on consumers and business inputs including capital inputs), payroll taxes, personal income taxes (rates, brackets and treatment of taxable benefits) and business user fees. From taxes we subtract subsidies including infrastructure subsidies accruing to business, grants, health, education and program benefits associated with unemployment insurance, social security and workers' compensation.

One tax not included in our analysis, due to data limitations, are property taxes (which would be reduced by the value of municipal services). Although this limitation is of some concern, real estate is generally a fixed factor so that for a jurisdiction as a whole, the property tax would tend to fall on land values. However, when looking at specific municipalities and uses of property, differential property taxes would impact on the cost of doing business, especially since business property taxes tend to be greater than the cost of providing municipal services (while home owners tend to pay less tax than municipal service costs as discussed by Slack [2003]). Further, Slack [2003] suggests that effective property tax rates on non-residential property in selected cities in the United States are lower than Toronto. Thus, if anything, we have underestimated the fiscal burden on capital given the relatively high non-residential property taxes in Ontario compared to benefits received from municipal services and with those in the United States.

In our calculations, we provide two specific cases. The first considers a large multinational that invests in North American jurisdictions. As discussed above, given that multinationals raise funds from international markets for investments, personal income taxes in Ontario are irrelevant to the cost of doing business since international markets, of which Canadian savings are small in comparison, determine the

⁴ Mintz [2001] calculates the effective tax rate (which is the same as the marginal fiscal burden here) as a percentage of costs, net of taxes and subsidies. It really does not matter which calculation is used in terms of assessing competitiveness. However, by taking costs, inclusive of net taxes, the reported marginal fiscal burdens or effective tax rates are generally smaller in value.

⁵ With the Cobb-Douglas production function, the marginal fiscal burden is measured by the geometric, rather than arithmetic average: $T = \{ (1+t(k))^\alpha + (1+t(l))^{(1-\alpha)} \} - 1$.

multinational's cost of funds. Personal taxes on dividends, capital gains and interest income paid by Ontario investors will certainly impact on Ontario savings, and the extent to which Ontario large businesses are owned by Ontarians, but have little impact on the international cost of raising capital for Ontario businesses. Probably, US personal tax rates on capital income affect to some degree the cost of funds faced by international markets because of the size of the US capital markets.

The second case, however, is based on entrepreneurial businesses needing to raise equity funds from domestic markets, such as medium sized companies. In this case, personal income taxes on capital income can affect the cost of funds raised by businesses since they will have to pay out more income to investors to cover personal tax payments on dividends, capital gains and interest income. We call this case the "entrepreneurial" firm since the medium-sized business will operate according to the preferences of its majority-owners. In this case, we include taxes on dividends, capital gains and interest in the determining the overall effective tax rate. This case assumes that the type of worker remains the same as in the large corporation case so that the effective tax rate on labour does not change compared to the other case.

2. Is Ontario Fiscally Competitive?

Ontario's fiscal position relative to similar US jurisdictions competing for jobs and capital is not at all competitive. As shown in Table 1, the marginal fiscal burden on cost in Ontario for large corporations is 25.4%, well above the marginal fiscal burdens in California, Georgia, Illinois, Massachusetts and Michigan. Recall that these estimates include the impact of education, health, infrastructure and business grants in our analysis.

The case of the entrepreneurial (medium-sized company) corporation is no different – marginal fiscal burdens in Ontario are substantially higher than those in the five US states (Table 2). The Ontario marginal fiscal burden on the cost of doing business is 30.1%, generally 10 percentage points higher than in the United States.

Why is Ontario's Marginal Fiscal Burden on Labour so High?

Marginal fiscal burdens on labour, computed by taking into account the distribution of workers' income within each industry, explain a significant part of the differences in fiscal burdens on the cost of doing business for Ontario and the five US jurisdictions. The US rates are about two-thirds of the Ontario's rate except in California, which is the most highly taxed state that we considered. Since labour accounts for almost eighty per cent of the costs, so differences in marginal fiscal burdens matter most in determining differences in costs of production. To the extent that these effective tax rates are shifted back in lower wage costs, then they become less relevant in determining competitiveness across jurisdictions.

Given the number of components involved in estimating the effective tax rate on labour, it would be useful to provide a breakdown to show how Ontario and the US states differ. Table 3 provides a decomposition of various parts to estimating the marginal fiscal burden on labour. Several reasons explain why Ontario's marginal fiscal burden on labour is so high.

- Marginal personal income tax rates are on average higher in Ontario than in the selected US states. The average personal income tax rate in Ontario (across the distribution of workers, aggregated across industries) is close to 30%, about 5 percentage points higher than in California (the smallest difference) and 9 percentage points higher than in Illinois. The higher marginal tax rate in Ontario reflects not just higher personal rates, but also that the rates apply at lower levels of income compared to the US states. For example, the top rate in Massachusetts is 38.3% (taking into account deductibility of state taxes against federal taxes) but on income above US \$312,000. Ontario's top tax rate is close to 47% applied to income above CAN\$100,000.
- Taking into account both federal and provincial sales and excise taxes, Ontario's average tax rate, as a percentage of total consumption⁶, is about 13.0%, more than twice the level of sales tax rates in the US states. Given that sales taxes apply to current and future consumption derived from earnings, net of personal and payroll taxes, the taxes have a similar impact on labour supply decisions.
- Employer payroll taxes net of program benefits are higher than that in the United States since the benefits from the Canadian-based programs are less than the contributions made by employers. Ontario's Health and Education payroll tax is not related to actual expenditures on health and education so it is treated fully as a tax (we calculate the education and health subsidies elsewhere). Also, the federal Employment Insurance system imposes contributions in excess of unemployment and other program benefits for employers and employees. In the United States, unemployment insurance is nearly balanced. Further, there is considerable variation in employer payroll taxes, as low as -5.4% in forestry and as high as 6.3% in communications and electrical power, gas and water in Canada. In the United States, the net employer payroll taxes vary from -0.6% in construction to 0.5% in retail trade. The variation is much less since the United States relies on partial experience-rate for unemployment insurance.

Offsetting the above effects are larger health and education subsidies provided to workers in Ontario. The US states provide somewhat larger education subsidies than that provided in Ontario primarily because the US governments spend more money per dollar of salary paid compared to Canadian governments. However, federal and Ontario governments pay much more significant health subsidies that benefit the working population. For example,

⁶ Estimates of the sales tax rate are based on calculating sales and excise taxes as a percentage of total consumption, including housing services. We assume that savings defers consumption to a later period that will be subject to the same rate of tax as the current period.

the health subsidy for a manufacturing worker earning \$60,000 is close to \$3,000 per year.

However, despite the somewhat higher health and education subsidies in Ontario, they are insufficient in offsetting the tax disadvantage in Ontario compared to the selected US states.

Why is the Marginal Fiscal Burden on Capital so High?

Although of a smaller weight, the marginal fiscal burdens on capital are particularly important to productivity since technology is imbedded in new capital investments and add most significantly to productivity and the ability of businesses to pay high wages to workers. As shown in Table 1, the marginal fiscal burden on capital in Ontario is particularly high relative to the US states in this study. The marginal fiscal burden on capital is 29% in Ontario, generally double the level in the United States. Ontario is a distinctly poor environment in North America for capital investments. In other work that we have done, we have also found that Ontario has one of the highest fiscal burdens on capital in Canada and double the rate in the United States as a whole (Chen and Mintz [2003]).

Why is the marginal fiscal burden on capital so high in Ontario compared to the United States? As often pointed out, the statutory corporate income tax rate for large corporations in Ontario, now 36.62% is actually below the average corporate income tax rate in the United States which is roughly 39.5%. So why is Ontario so much offside?

Concentrating on only the statutory tax rates masks the overall impact of business taxes on capital investment that depends on more than just rates. Ontario has a high fiscal burden compared to the US for five reasons:

- The United States provides a more generous deduction for capital cost allowances (depreciation) that lowers sharply the fiscal burden on machinery investments.
- The United States provides bonus depreciation for investments in capital (50% expensing in the first year) that sharply reduces the marginal fiscal burden on capital by almost 4 percentage points.
- The United States permits businesses to write off inventory costs according to the last-in-first-out (LIFO) method, which is much faster than Canada where only first-in-first-out (FIFO) method is used. Even with inflation at a relatively low level of 2 percent, the ability to use a higher price for inventory cost deductions under LIFO provides a significant benefit to capital expenditures in the United States.

- Capital taxes are much higher in Ontario compared to the United States (only Massachusetts has a capital tax among these five states).
- Sales taxes on capital goods in the US states tend to be somewhat lower than those in Canada for most industries. The US rates are 4.2% for machinery and 1.6% for buildings while in Ontario's retail sales taxes on capital inputs are over 5% except for mining and manufacturing (1.2%).

Other factors play a surprisingly minor role in explaining differences in marginal fiscal burdens. Although Ontario has more generous tax treatment of research and development expenses (due to federal and provincial tax credits), much of the advantage is offset by US research grants to businesses through defence, environment and energy programs, although the US programs tend to be targeted to transportation and communication industries. Infrastructure spending by governments on transportation, and communication networks that improves the productivity of businesses (and excludes government buildings) is actually higher in the United States than in Canada. Business subsidies and user fees also do not impact significantly on differences between fiscal burdens in Ontario and the United States.

Property taxes, which are ignored in these calculations, might also lead to major differences in fiscal burdens as discussed above. It is well known that many US municipalities provide significant property tax breaks to attract new industries. However, existing businesses can pay quite substantial property taxes, with property taxes applying to not just real estate but also machinery and even inventories in some states. Ontario's non-residential property tax, at about a 3% effective rate on commercial property and over 5% on industrial property (Kitchen [2002], applies to real estate only. Slack [2003] suggests that property taxes on non-residential property is higher in Toronto compared to selected US cities. Without data that provides property tax payments by industry, it is virtually impossible to compare results. However, inclusion of property taxes in our estimates would increase the marginal fiscal burden in Ontario relative to the five US states.

Industry Differences

Although Ontario is not fiscally competitive in an aggregate sense, are there some industries that are better off than for similar activities found in the United States? Tables 4 and 5 provide comparisons of marginal fiscal burdens on the cost of doing business for ten industries in the six jurisdictions of this study.

In general, fiscal burdens on costs are higher in Ontario than those in the five US states. However, some interesting differences can be noted.

First, forestry in Ontario is not as disadvantaged as in the United States. Although taxes on capital investment is much higher in Ontario (28.6% for large corporations) than in the five US states (14.5% for large corporations in Georgia for example), the marginal fiscal

burden on labour is lower in Ontario (15.4%) compared to the US (15.8% in Georgia). The Employment Insurance program in Canada, whereby benefits to the forest companies are substantially higher than contribution paid to the plan, provides a significant advantage to the industry. In the United States, with partial experience-rating for unemployment insurance, the benefits derived by the industry from the program are much smaller. Construction also derives a similar benefit in Ontario in that it is subsidized under the Employment Insurance program.

Second, mining is a significant industry in Ontario, but not in the five US states considered in the study. The marginal fiscal burden on capital in mining (8.6% for large corporations) is much lower than for other industries (29.0% on average for large corporations) but the marginal fiscal burden on labour costs is much higher (32.7% compared to an average of 24.7%). The high fiscal burden on mining labour is associated with the relative high incomes earned by miners due to skill demands and the need to compensate workers in outlying regions, who as a result must pay higher personal income taxes on their income derived from their work effort.

Third, transportation, communications and electrical power are much more highly taxed on Ontario compared to similar investments in the 5 US states. Communications and electrical power alone are subject to effective tax rates on costs that are at least three times higher than those in the 5 US states. The substantial difference is related to two factors. The first is that US governments provide substantial greater infrastructure subsidies to these industries compared to Ontario. The second is that much faster deductions are provided for capital expenditures in the United States compared to Ontario for these businesses, including bonus depreciation.

Fourth, some industries, particularly retail trade, have relatively low annual labour compensation. The fiscal burdens on costs are much lower as a result.

Whether considering large corporations or entrepreneurial businesses, Ontario has substantially higher fiscal burdens than those found in the five US states, except those in forestry and construction.

What has Changed from 2002?

Earlier work reported by the Institute for Competitiveness and Prosperity (2002) also came to the conclusion that marginal fiscal burdens on costs in Ontario were higher than those in the United States. Since 2002 there have been several changes that have had some impact on differences in Ontario-US fiscal burdens.⁷

⁷ We have also improved some of the data, particularly with respect to measuring the average effective marginal personal income tax rate that did result in a reduction of the overall fiscal burdens in both countries. Our results are also quite consistent with Mintz [2001] in that use of tax parameters in 2000 would provide similar results as derived at that time.

In Ontario, the federal government continued to cut corporate income tax rates by a further 2 points in 2003 (a further cut will be made in 2004) to benefit non-manufacturing income. Ontario, however, suspended its tax cuts in 2003. In the United States, personal income tax cuts were accelerated in 2003, whereby the rates were reduced (the top rate, for example, was reduced from 38.6% to 35%). Also, the United States cut by half the dividend tax rate in 2003 that especially benefits entrepreneurial businesses. Further, the US extended bonus depreciation from 30% to 50% of qualifying investment expenditures (the bonus depreciation will be phased out by 2006).

Table 6 provides a comparison of marginal fiscal burdens on costs for 2002 and 2003. Ontario's fiscal burden on costs for both large and entrepreneurial businesses have declined by a small degree during this past year, primarily due to federal reductions in corporate tax rates and some federal personal tax reduction with respect to widening income tax brackets. The US marginal fiscal burdens fell much more dramatically especially for entrepreneurial businesses since bonus depreciation, personal income tax cuts and the dividend tax cut had quite dramatic effects on these companies that rely on capital drawn from domestic owners.

Thus, the differences in marginal fiscal burdens on costs between Ontario and five US states have dramatically increased in 2003 compared to 2002. Despite some tax cuts in Ontario for 2003, Ontario is more fiscally uncompetitive today than it was last year.

The future outlook is not clear but it appears that the lack of fiscal competitiveness for Ontario will last for some time. Besides next year's rate cut, the Canadian federal government will be phasing out its large corporations tax (a capital tax) by 2008. Ontario, which had scheduled further reductions in corporate income tax rates to 8% and a 10% capital tax cuts, is set to not only repeal the scheduled cuts but increase the general corporate income tax rate from 12.5% to 14% and the manufacturing tax rate from 11% to 12.0%. The US is facing a sharper increase in deficits at federal and state levels, thereby making tax cuts less likely in the future. However, the corporate income tax system could be subject to considerable change since current proposals are being considered to replace an export incentive regime by new investment incentives that will significantly increase competitiveness of the US corporate tax system.

3. Can Ontario become Fiscally Competitive: Some Potential Reforms

High marginal fiscal burdens on capital and labour inputs used for producing goods and services in Ontario undermine competitiveness in three ways.

- First, high marginal tax rates on income and consumption deter people from working. Economic studies have tended to show that labour supply of primary workers is not affected much by taxation. However, labour supply offered by secondary workers in a family and retirement decisions have been found to have been significantly affected by taxation. Estimates suggest that an increase in the after-tax wage rate of male workers will have small impacts on their labour

supply but female worker supply is more sensitive to changes in after-tax wage rates. Estimates suggests that a 10% rise in the after-tax wage rate could cause secondary worker labour supply to increase as much as 10%. (Blundell [1996]).

- Second, high effective tax rates on capital deter investments in new equipment and structures and undermine the adoption of innovative techniques that are imbedded in new capital purchases. Recent economic studies have tended to show that a 10% increase in the cost of capital, due to higher taxes, will cause a long-run decline in capital stock in a range of 5% to 20% (Mintz [1996]).
- Third, taxes impacting on multinational companies not only deter large corporations from investing at a specific location (Hines [1999] for a survey of results), but also encourage them to shift the tax base out of the high-taxed to low-taxed jurisdictions. Income-shifting is a concern to governments since reported profits are much more sensitive to changes in tax rates than real inputs – labour and capital – as companies do not need to move machines or people, only profits or assets, out of a high-taxed jurisdiction to reduce tax payments. For example, financial transactions and leasing arrangements can easily result in a shift of profits and assets from jurisdictions with high nominal rates. Jog and Tang [1997] estimate that as much as 20% of corporate profits will shift due to greater leverage of companies when the corporate tax rate is increased by one point. Mintz and Smart [2003] suggest that almost 10% of the tax base could shift out of Ontario in the shorter term when a province raises its corporate tax rate by a point.

Fiscal competitiveness could be pursued by either reducing tax rates or providing greater public support for infrastructure and other programs. Below, we consider some tax measures that are easily implemented without significant revenue costs. Increased expenditure on education, health and infrastructure subsidies could also be considered to improve competitiveness but they would need to be targeted to the working population to be most effective. Further, their impacts take a longer time in raising productivity than immediate tax cuts.

The above comment raises a further question as to what is more effective – tax cuts or business grants. Tax cuts have the virtue of reducing obstacles to growth for the most profitable and productive enterprises. If high marginal tax rates are reduced, the economy is especially made better off.

Economic studies have estimated the impact of an increase in one dollar of tax revenues on the value of lost output to the economy due to distortions imposed by taxation on the allocation of resources in the economy. Jorgenson and Yun [2001] suggest the US marginal efficiency cost of all taxes in terms of lost economic output for each dollar raised is 27% with labour income taxes at 40% and corporate income taxes at 28%. Ballard, Shoven and Whalley [1985] estimate that the marginal efficiency cost of all taxes in the US is 33% with 46% for capital income taxes and 23% for labour taxes. Dahlby [1994] suggests that high income surtaxes can cause the loss in economic output to be over ten times the cost of raising a dollar of tax revenue. Taxes on corporate

income in Canada also have a high marginal efficiency cost, almost doubling the cost of raising corporate taxes (Technical Committee on Business Taxation [1998]).

Subsidies could reduce business costs as well, but are often used by governments to prop up companies having difficulty raising capital, either because they are in financial difficulty, or are unable to attract financing from private lenders. One can argue that some targeted subsidies can create a new cluster of firms and, as a result of agglomeration, create strong conditions for new growth. However, as one recent study has shown in Sweden (Bergstrom [2000]), subsidized firms had lower productivity than non-subsidized businesses. In part, this might reflect the old adage that “governments are poor at picking winners from losers, but losers are good at picking governments”.

Some Potential Tax Reforms

Below, we consider the impact of some potential tax reforms that would improve the cost of doing business in Ontario. Some reforms would not be too costly such as corporate income tax rate cuts, since the cut would counter the impact of income-shifting as well as increase investment so that the dynamic revenue costs of cutting corporate income tax rates is not large. However, given the tight fiscal budgets of the Ontario government, large tax cuts are difficult unless certain spending and targeted tax programs are eliminated. To help pay for tax cuts, it is possible to eliminate some expenditure programs, like business subsidies, or ineffective targeted tax credits, following the recent June 2003 approach of the Quebec government.

For example, the Ontario government has introduced in the past years a number of programs including tax-free municipal bonds, flow-through shares for tax credit, tax holidays for businesses in Northern Ontario, the innovation tax credit, Ontario investment and employee ownership (labour-sponsored venture capital) tax credit, the co-operative education tax credit, the graduate transitions tax credit, the workplace accessibility tax credit, the education technology tax credit, the school bus safety tax credit and the research and development super-allowance. Some studies on flow-through shares, incremental research and development tax credits, and labour-sponsored venture capital credits, for example, have suggested that the beneficiaries of such credits have been investments with low economic rates of return on capital (see Mintz [2001] and Mintz and Smart [2003] for some review). While some of these credits may be effective, certainly a review would be worthwhile to cancel or cut back many programs. This would do much to help pay for some of the reforms discussed below, minimizing the revenue cost of cutting corporate taxes for the government.

Tables 7 and 8 provide estimates of the impact of the following reform proposals for Ontario on the cost of doing business for large corporations and entrepreneurial businesses:

- Reducing the general and manufacturing corporate income tax rates from 12.5% and 11% respectively to 8% for all forms of income, thereby reducing the

complexity arising from differential corporate income tax rates. The estimated revenue cost of cutting rates, net of income shifting impacts, is \$840 million.⁸

- Eliminating the Ontario capital tax of 0.3% of taxable capital. The estimated revenue cost would be \$1.1 billion.
- Eliminating sales taxes on capital inputs, which could be accomplished if Ontario converted its retail sales tax into a value-added tax, similar to Quebec. The estimated revenue cost would be \$900 million.
- Eliminating the employer-paid education and health tax. The estimated cost would be \$3.8 billion.
- Reduce personal income taxes by 5% for all income levels. The estimated costs would be \$950 million.
- Convert the Ontario corporate income tax into a cash flow tax – capital would be expensed instead of depreciated although interest expense incurred to finance capital acquisitions would not be deductible. The estimate cost would be small if the corporate tax rate were adjusted upwards for any loss in revenue, although we estimate a loss of about \$1 billion assuming no adjustment in tax rates.⁹ A number of technical problems arise if a cash flow tax were implemented without accompanying changes to the personal income tax, which we will discuss further below.

As shown in Tables 7 and 8 all policies would result in reducing the marginal fiscal burdens on costs. Cuts to corporate income taxes, capital taxes and sales taxes on capital inputs would affect primarily capital investments. Cuts to the employer education and health tax and personal income taxes primarily operate through labour markets (and to some extent with regard to personal income taxes on entrepreneurial income derived from dividends and capital gains). None of the policies would result in marginal fiscal burdens on costs falling to levels found in the United States, although cuts to corporate income, capital and sales taxes on capital inputs would result in a marginal fiscal burden on capital approaching levels found in the United States, especially if bonus depreciation expires in the United States by 2006. Certainly, Ontario would not be able to tilt the playing field to itself without lowering fiscal burden significantly below levels in the United States.

Some policies are more effective for each dollar of revenue loss compared to the others. Table 7 provides some guidance by assuming that revenue impacts fully fall on the large

⁸ The estimate is based on Finance Canada's revenue estimates. It is assumed that income shifting would reduce the cost of corporate income tax rate cuts by 20 percent.

⁹ The Technical Committee on Business Taxation [1998] estimated the cash flow tax base would be about 83% of the corporate income tax base. Current corporate income tax collections in Ontario are about \$6.3 billion.

corporate sector (ignoring personal income taxes on dividend, interest and capital gain income earned by the entrepreneur).

The tax cut with the least revenue cost for each point reduction in the marginal fiscal burden on the cost of doing business would be reductions in the corporate income tax rate (\$1.32 billion per percentage point cut), primarily as a result of reducing the incentive to shift profits out of Ontario to low-tax jurisdictions. This is followed by cuts to capital taxes, sales taxes on business inputs and personal income taxes. The most expensive policies in terms of revenue losses are the employer education and health tax and converting the corporate income tax into a cash flow tax.

For several reasons, other than revenue reasons, cutting corporate income tax rates would be a higher priority than cuts to capital taxes or sales taxes on capital inputs. The corporate income tax rate has a more significant impact on investments that earn high rates of return on capital, which could go elsewhere to other jurisdictions. Further, cuts to corporate income tax rates apply evenly to all business activities and is therefore a more neutral tax cut.

This is not to say that capital tax cuts would not be important as well. These taxes tend to be paid by growing businesses or those facing high risk since the tax must be paid even if little profit is being earned at the time. However, relative to corporate income tax rate cuts, the capital tax is a lower priority since it is somewhat less distortionary (see the Technical Committee on Business Taxation [1998]). The federal government gave first priority to corporate income tax cuts over capital tax cuts for this reason.

Sales tax on capital inputs reflect a general problem in that the Ontario retail sales tax falls on business inputs, thereby making Ontario businesses less competitive. Quebec, Newfoundland, Nova Scotia and New Brunswick have converted their sales taxes to value-added tax that results in a substantial reduction in taxes on business inputs. Certainly, the replacement of the retail sales tax by a value-added tax in Ontario would be a significant step towards making Ontario more fiscally competitive without resulting in a large reduction in tax revenues. It would, however, result in higher taxes on services paid by consumers, thereby increasing the fiscal burden on labour.

The elimination of the employer education and health tax is quite costly as policy. Further, to the extent that such taxes are shifted back on labour through lower wage costs, the impact of the tax is muted to some degree in terms of its impact on business costs (see Mintz [2001] for further discussion).

The most interesting reform would be to convert the Ontario corporate income tax into a cash flow tax. Not only would this reform result in a neutral treatment of different activities but it would also eliminate taxes paid on marginal investments since expensing of capital is equivalent to providing a deduction for the economic costs of capital depreciation and financing over time (see the Technical Committee on Business Taxation, [1998], Annex). However, without making similar changes to the personal income tax system, it would be difficult to convert the corporate income tax into a cash

flow tax. For instance, even though the business is taxed on its cash flow, investors still would still pay tax on dividends, capital gains and interest received from their investments in the businesses. In principle, dividends and capital gains would be fully taxed since corporate income accruing to shareholders is no longer taxed once the corporate income tax is replaced by a cash flow tax. Given that capital gains are only taxed when assets are disposed, a cash flow tax in the presence of a personal income tax would encourage businesses to shift interest expense to investors who could borrow funds to invest in business equity (without any income inclusion for capital gains) and deduct interest from taxable personal income. A cash flow tax would be much easier to implement if the personal tax were applied to expenditure, not income. With a personal expenditure tax, tax is applied to income net of contributions to savings accounts, interest is neither taxable nor deductible and withdrawals from assets would be fully taxed. This approach to personal taxation is used for retirement income in Canada.

Further, if Ontario moved to a cash flow tax without the federal government doing so as well, economic gains achieved from the reform are sharply compromised. Federal and provincial co-operation would be necessary to reform both the corporate and personal tax base to remove taxes on investment and savings. Given the impressive economic gains from moving to a cash flow tax at both personal and business levels (see Jorgenson and Yun [2001] US estimates for example), both levels of government might be wise to consider a fundamental tax reform to spur on economic growth and a higher standard of living.

On its own, Ontario could, however, consider the cash flow tax for mining profit taxes and forest stumpage fees (Ontario Fair Tax Commission [1993]). These taxes are independent of the personal tax system in that they are royalties assessed on rents derived from resources owned by the Ontario government. British Columbia has a mining tax in the form of a cash flow tax. One could apply the cash flow tax to forestry as well. Both the mining profit tax and stumpage fee system could be suitable candidates for cash flow taxation.

4. Conclusions

The current fiscal environment for the business sector in Ontario is not competitive compared to that found in five US states. Although it is commonly believed that public services in Canada offset any tax disadvantages compared to the United States, we find the opposite – businesses would find it disadvantageous, for fiscal reasons, to operate in Ontario. Even after accounting for health, education, infrastructure and business subsidies, we find that Ontario businesses have a fiscal disadvantage of about 50 % compared with their counterparts in the United States.

Although further subsidies could be provided to attract businesses, we suggest that the most effective means of improving competitiveness, especially with respect to capital investments, is to cut business taxes. Some tax cuts, such as reduced corporate income tax rates, have low revenue costs because businesses shift income from high to low tax

jurisdictions quite easily through financial transactions without moving people or machines. We suggest that the “biggest bang for the buck” comes from corporate income tax rate cuts, followed by capital tax cuts.

We suggest that Ontario, feeling a lack of fiscal room, could improve fiscal competitiveness through tax reform, rather than just tax cuts. Like Quebec’s recent reform, Ontario should contemplate eliminating ineffective business subsidies and targeted tax incentives in favour of general business tax cuts that would provide greatest relief to the most productive and profitable business sectors.

A significant reform that would improve Ontario’s fiscal competitiveness would be to replace the retail sales tax with a provincial value-added tax, similar to Quebec.

Finally, Ontario should consider replacing the mining profit tax and forestry stumpage fee system with a cash flow tax applied to revenues net of current and capital costs.

**Table 1: Marginal Fiscal Burdens on Costs for Ontario and 5 US Jurisdictions:
Large Companies for 2003 (in percentages)**

	Ontario	California	Georgia	Illinois	Massachusetts	Michigan
Labour	24.7	19.6	16.0	15.4	16.7	15.0
Capital	29.0	13.2	12.4	12.7	16.3	11.4
Aggregate	25.4	17.9	15.0	14.6	16.4	14.0

**Table 2: Marginal Fiscal Burdens on Costs for Ontario and 5 US Jurisdictions:
Entrepreneurial Companies for 2003 (in percentages)**

	Ontario	California	Georgia	Illinois	Massachusetts	Michigan
Labour	24.7	19.6	16.0	15.4	16.7	15.0
Capital	43.9	33.8	30.9	29.5	33.3	32.3
Aggregate	30.1	23.4	20.0	19.1	21.3	19.8

Table 3: Decomposition of the Marginal Fiscal Burden on Labour for Ontario and Selected US Jurisdictions for 2003 (in percentages)

	Employer Payroll Tax Net of Benefits	Education Subsidy	Health Care Subsidy¹	Personal Income Tax Rate (average)²	Sales Tax Rate	Personal Income Tax plus Employee Payroll and Sales Tax³
Ontario	2.5	9.3	4.9	29.4	13.0	36.8
California	-0.1	10.6	0.0	24.5	7.2	29.9
Georgia	-0.1	10.6	0.0	22.4	5.3	26.4
Illinois	-0.1	10.6	0.0	20.4	7.0	25.9
Massachusetts	-0.1	10.2	0.0	23.1	4.8	26.7
Michigan	-0.1	10.7	0.0	21.0	5.7	25.5

1. Includes only government-provided health care for workers. Non-taxability of employer-provided health care premiums is incorporated by reducing the marginal personal tax rate according to the share of health care benefits to total income in each jurisdiction.
2. Average marginal tax rate calculated as a weighted sum of marginal tax rates on employment income with the weights based on the distribution of workers in each industry paid according to annual employment compensation.
3. Numbers cannot be added to arrive at the total since they take into account interaction effects among taxes to calculate total as a proportion of gross income received. All calculations aggregated across industries.

Table 4: Marginal Fiscal Burdens on Costs for Ontario and Selected US Jurisdictions by Industry for 2003 for Large Corporations (in percentages)

	Ontario	California	Georgia	Illinois	Massachusetts	Michigan
Forestry	17.7	20.4	15.7	16.3	17.2	15.0
Mining	25.5	n/a	n/a	n/a	n/a	n/a
Manufacturing	25.5	18.0	15.1	14.6	17.0	13.9
Construction	21.8	22.4	17.4	18.1	18.8	17.6
Transportation	28.8	16.1	12.8	12.0	13.1	11.8
Communications	29.4	9.8	5.0	6.3	8.4	6.3
Electrical Power	30.8	6.6	4.3	3.8	6.7	3.8
Wholesale Trade	28.3	18.7	15.8	15.2	17.5	14.7
Retail Trade	17.9	12.5	11.9	11.1	11.9	10.6
Other Services	25.4	20.2	17.5	16.9	18.1	16.2

Table 5: Marginal Fiscal Burdens on Costs for Ontario and Selected US Jurisdictions by Industry for 2003 for Entrepreneurial Businesses (in percentages)

	Ontario	California	Georgia	Illinois	Massachusetts	Michigan
Forestry	21.4	21.6	18.8	19.1	20.2	18.6
Mining	31.9	n/a	n/a	n/a	n/a	n/a
Manufacturing	30.5	23.8	20.5	19.5	22.2	20.3
Construction	24.8	25.4	20.2	20.6	21.6	20.8
Transportation	31.8	19.7	16.2	15.1	16.4	15.5
Communications	36.2	18.7	13.7	13.9	16.4	15.5
Electrical Power	41.1	21.6	18.1	16.5	19.7	18.7
Wholesale Trade	31.6	22.8	19.6	18.7	21.2	19.0
Retail Trade	20.8	15.7	14.6	13.5	14.6	13.7
Other Services	30.1	25.4	22.3	21.3	22.8	21.8

Table 6: Marginal Fiscal Burdens on Costs for Ontario and Selected US Jurisdictions for 2002 and 2003 (in percentages)

Large Corporations		Ontario	California	Georgia	Illinois	Massachusetts	Michigan
2003	Labour	24.7	19.6	16.0	15.4	16.7	15.0
	Capital	29.0	13.2	12.4	12.7	16.3	11.4
	Aggregate	25.4	17.9	15.0	14.6	16.4	14.0
2002	Labour	25.0	20.6	17.2	16.6	18.0	16.1
	Capital	29.8	15.0	14.1	14.5	18.0	12.9
	Aggregate	25.9	19.1	20.0	15.9	18.0	15.2

Entrepreneurial		Ontario	California	Georgia	Illinois	Massachusetts	Michigan
2003	Labour	24.7	19.6	16.0	15.4	16.7	15.0
	Capital	43.9	33.8	30.9	29.5	33.3	32.3
	Aggregate	30.1	23.4	20.0	19.1	21.3	19.8
2002	Labour	25.0	20.6	17.2	16.6	18.0	16.1
	Capital	44.6	45.5	42.2	40.6	44.1	40.7
	Aggregate	30.6	28.3	24.9	23.9	26.2	23.6

**Table 7: Estimated Impact of Various Tax Reform Measures on the Cost of
Doing Business in Ontario for Large Corporations in 2003
(in percentages)**

	Fiscal Burden on Labour	Fiscal Burden on Capital	Fiscal Burden on Costs	Revenue Cost per Point Reduction in Fiscal Burden on Costs (million)
Current	24.7	29.0	25.4	
1. Reducing Corporate Rate to 8%	24.7	26.6	24.8	\$1320
2. Eliminating Capital Tax	24.7	25.4	24.5	\$1333
3. Eliminating Sales Tax on Capital Inputs	24.7	25.8	24.8	\$1500
4. Combining 1, 2 and 3	24.7	18.9	23.0	\$1666
5. Eliminating Employer Education and Health Tax	23.2	29.0	24.3	\$3455
6. Reducing Personal Income Taxes by 5%	24.0	29.0	24.8	\$1583
7. Replacing Ontario Corporate Income Tax with Cash Flow Tax	24.7	27.7	25.1	\$3333

**Table 8: Estimated Impact of Various Tax Reform Measures on the Cost of
Doing Business in Ontario for Entrepreneurial Businesses in 2003
(in percentages)**

	Fiscal Burden on Labour	Fiscal Burden on Capital	Fiscal Burden on Costs
Current	24.7	43.9	30.1
1. Reducing Corporate Rate to 8%	24.7	41.8	29.3
2. Eliminating Capital Tax	24.7	41.9	29.4
3. Eliminating Sales Tax on Capital Inputs	24.7	42.0	29.4
4. Combining 1, 2 and 3	24.7	37.3	27.9
5. Eliminating Employer Education and Health Tax	23.2	43.9	29.2
6. Reducing Personal Income Taxes by 5%	24.0	43.4	29.5
7. Replacing Ontario Corporate Income Tax with Cash Flow Tax	24.7	42.7	29.6

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APPENDIX A

METHODOLOGY FOR CALCULATING MARGINAL FISCAL BURDENS

The method used for estimating marginal fiscal burden (effective tax rate) in this report closely follows the one used in Mintz (2001)¹⁰. A list of reference is provided at the end of this appendix. Our estimate is made for Ontario and the five US jurisdictions including California, Georgia, Illinois, Massachusetts, and Michigan. The estimates of the marginal fiscal burden include those on cost of doing business, on cost of capital and on cost of labor.

I. Marginal fiscal burden on cost of business

Capital and labor are two major inputs for doing business. That is, the cost of doing business consists of both capital and labour costs. Therefore, the marginal fiscal burden on cost of doing business, T , is a combination of marginal fiscal burdens on capital, T_k , and on labor, T_l . By using the augmented production function characterized by a fixed proportion of capital to labour, the marginal fiscal burden on cost of doing business can be estimated as

$$T = (1 + T_k) * W_k + (1 + T_l) * W_l - 1 = T_k * W_k + T_l * W_l$$

Where W_k = share of capital in total business output, W_l = share of labour in total business output, and $W_k + W_l = 1$.

II. Marginal fiscal burden on capital (T_k)

As well known, the effective tax rate (marginal fiscal burden) is the difference between the gross of tax rate of return on capital (R_g) and the net of tax rate of return on capital expressed as a proportion of the gross rate of return to capital. Depending on how the net of tax rate of return on capital is defined, marginal fiscal burden on capital may be simply the effective corporate tax rate (t_c), and the integrated effective tax rate (t) from an entrepreneur perspective. In other words, if the net of tax rate return on capital is estimated as net of (only) corporate tax rate return to capital (R_{nc}), then the result is an effective corporate tax rate (t_c). If the net of tax rate of return to capital is the net of (both) corporate tax and personal income taxes on capital (R_n), then the result is the integrated effective tax rate (t). The difference between these two effective tax rates is the effective personal tax rate on capital (t_p). These effective tax rates may be expressed in the following formulas.

$$\text{In general, } T_k = (R_g - R_n)/R_g \quad (1)$$

$$\text{And specifically } t_c = (R_g - R_{nc})/R_g \text{ and } t_p = t - t_c \text{ or } t_p = (R_n - R_{nc})/R_g$$

¹⁰ Mintz [2001].

The gross of tax rate of return on capital, R_g , is equivalent to the tax-inclusive cost of capital since a firm will invest in capital until the risk-adjusted rate of return on capital, net of economic depreciation, is equal to the cost of capital. The cost of capital is equal to the inflation-adjusted cost of financing. The rest of this section provides a description of methods used to estimate financing costs, gross of tax rates of return on capital, and net of tax rates of return on capital.

The real cost of financing (r^f)

The real cost of financing is defined by

$$r^f = \beta i(1 - U) + (1 - \beta)\rho - \pi \quad (2)$$

with β = debt to assets ratio, i = cost of debt, U = the combined statutory corporate income tax rate¹¹, ρ = cost of equity, and π = inflation rate. That is, the cost of financing for a real capital investor is the weighted-average cost of financing net of the inflation rate.

It should be noticed that the cost of equity, ρ , is the weighted average of cost of retained earnings and that of dividends. At the market equilibrium condition, ρ may be estimated as $\rho = i(1 - m)/(1 - e)$ with m = effective personal income tax rate on interest, and e = effective personal income tax rate on equity income. The effective personal income tax rate on equity may be estimated as $e = \theta d + c(1 - d)$, with c as the accrual-equivalent capital gains tax rate, θ the dividends tax rate, and d the propensity of profit distribution.

The gross-of-tax rate of return on capital

For depreciable assets including buildings and machineries, the gross-of-tax rate of return on capital (R_g) may be estimated as the following

$$R_g = (1 + tm)(r^f + \delta)(1 - k)[1 - A + \tau(1 - U)/(\alpha + r^f + \pi)]/(1 - U) - \delta \quad (5)$$

with tm = sales tax rate on the capital input, δ = economic depreciation rate, k = investment tax credit rate, A = present tax value of the accumulated capital cost allowance, τ = capital tax rate, and α = depreciation rate used for capital tax purposes.

¹¹ The formula for estimating combined statutory CIT rate varies with different tax-payer conditions. For example, in the Canadian case, when the federal surtax payable is not enough to offset the federal large corporate tax (LCT) such that firms have to pay LCT at margin, the combined statutory CIT rate is smaller by the portion of surtax than the case when firms do not have to pay LCT. A more complicated example is for the mining sector where statutory CIT rate needs to be reduced by the corresponding resource allowance. A further complication comes from the provincial mining tax, which includes a mining allowance.

For inventory,

$$R_g = (r^f + U\pi\zeta)/(1-U) + \tau \quad (6)$$

with $\zeta = 1$ for FIFO accounting method and 0 for LIFO.

For land

$$R_g = r^f [1 + \tau(1-U)/(r^f + \pi)]/(1-U) \quad (7)$$

For research and development (R&D) expenditure

Assuming that the R&D is expensed for the accounting purpose and hence, the cost of capital, without tax, is 1, then the gross-of-tax rate of return to R&D expenditure, R_g , can be estimated as

$$R_g = (1 - PV)/(1-U)$$

Where PV = the present value of total tax credits and tax allowances at both federal and provincial levels. (Refer to the Appendix B for detailed items contributing to the estimation of this present value.)

For exploration and development (E&D) assets used by the mining industry,

$$R_g = (R - \pi + h) [1 - (B1 + B2 - up=B3)/(1-B3)]/(1-U + Us) - h$$

Where B and $B2$ are the respective present tax values of exploration and development (E&D) deductions and credits under the federal income tax and the provincial income tax respectively; and $B3$ is the present value of E&D deductible under the provincial mining tax. They can be defined as the following¹²:

$B1 = uf$ for the Canadian exploration expenses (CEE), and

$B1 = uf A ZCDE$ for the Canadian development expenses (CDE), with $ZCDE =$ the present value of CDE allowance.

$B2 = up$ for the CEE, and

$B2 = up$ for the CDE with

¹² The parameters defined here are applicable to the Ontario case only.

$B3 = um A Zm A (1 - MPA) A (1 - \sigma m)$, with um = Ontario mining tax rate, Zm = present value of depreciation allowance under the mining tax, MPA = processing allowance under the mining tax, and σm = resource allowance under the mining tax.

The net-of-tax rate of return on capital

The net of corporate tax rate of return on capital is defined by the formula

$$R_{nc} = \beta i + (1 - \beta)\rho - \pi \quad (3)$$

And the net of both corporate and personal tax rate of return on capital is defined as

$$R_n = \beta i(1 - m) + (1 - \beta)\rho(1 - e) - \pi$$

Aggregation of marginal fiscal burden on capital

The marginal fiscal burden on capital for a given industry is the proportional difference between the weighted average of before-tax rate of return by asset type and the after-tax rate of return on capital, which is the same across asset type within the industry. That is, the marginal effective tax rate for industry i (t_i) is calculated as following:

$$t_i = (\sum_j r_{g\ ij} w_{ij} - r^N_i) / \sum_j r_{g\ ij} w_{ij} \quad (8)$$

where j denotes asset type (i.e., capital investment in buildings, machinery, inventories, and land), w_{ij} denotes the weight of asset type j in industry i .

VI. The marginal fiscal burden on labour

The marginal fiscal burden on labour is measured as the gap between the gross of tax and subsidy wages (W_g) and the net of tax and subsidy wages (W_n) taken as a proportion of gross wage.

Taxes and subsidies considered in this calculation include the effective marginal personal income tax on wages (t_{wi}), the net of benefits payroll tax (t_{pr} denoting the net employer payroll tax and t_{pe} denoting the net employee payroll tax), the sales tax (t_s), the health subsidy (S_h) and education subsidy (S_e) measured as government expenditure on per employee basis as a percentage of labor cost.

We include the benefit of non-taxability of employer-provided health care for employees by reducing the effective personal income tax rate based on the ratio of health care compensation to total employee compensation. The marginal effective PIT rate is therefore measured as the marginal statutory PIT rate to observed wages grossed up by

the employer-paid private health care benefits. Furthermore, in Canada, the employee-paid payroll tax results in a credit based on the personal income tax rate of the lowest PIT bracket. This statutory provision results in an identical credit rate (k) for the employee-paid payroll taxes.

The gross wage paid by employers is:

$$W_g = w (1 + t_{pr}).$$

Net wage earned by workers net of income, payroll, sales taxes and grossed up by education and health subsidies:

$$W_n = w \{ (1 - t_{wi}) - (1 - t_{wi}) [t_s / (1 + t_s)] - t_{pe} (1 - k) + S_h + S_e \}.$$

The marginal fiscal burden is the following:

$$T = (W_g - W_n) / W_g = A/B, \text{ with}$$

$$A = t_{pr} + t_{wi} + (1 - t_{wi}) [t_s / (1 + t_s)] + t_{pe} (1 - k) - S_h - S_e$$

$$B = (1 + t_{pr}).$$

APPENDIX B

DATA SOURCE AND PROCESSING PROCEDURES

This appendix consists of two parts: a description of the procedures used to process the raw data to arrive at the estimates required for our calculation of marginal fiscal burdens, and a list of major data sources. The former forms the main text and the latter is provided at the end of this appendix. Data sources mentioned in the main text are referred by their orders as listed at the end of this appendix.

1. The government infrastructure expenditure as a subsidy to private capital investment by industry

This estimate is made at the national level due to the lack of sub-national data. The 1997 national input-output tables (Sources 1 and 2), the latest one available for Canada, and the government capital expenditure for the same year (Sources 3 and 4) are used to estimate the government infrastructure expenditure as a subsidy to private capital investment by industry. The following steps are taken to arrive at this estimate.

- 1) Estimate the utilization ratio of government infrastructure expenditure by industry, based on the total input in transportation, storage, communication and public utility by industry (i.e., sum of dollar amount of these input items on the IO table).
- 2) Allocate the total government infrastructure expenditure on structure and machinery, respectively, to each industry based on the utilization ratio (estimated in Step 1).
- 3) Estimate the total private capital investment by industry based on the IO table.
- 4) Estimate the total private capital investment in structure and machinery by industry by applying the capital weights (Source 5) to the total private capital investment (resulting from Step 3).
- 5) Estimate the total capital investment in structure and machinery, respectively, by industry by summing up the corresponding government expenditure (resulting from Step 2) and private investment (resulting from Step 4) on structures and machinery.
- 6) Estimate the government subsidy ratio *gross-of-user-fee charges* by dividing the government expenditure (resulting from step 2) by the total capital investment (resulting from Step 5) for structure and machinery and for each industry.
- 7) Estimate the capital recovery ratio (Sources 6 and 7) as a ratio of user fees to government-funded capital. This is estimated by dividing the user fee collection rate by the sum of government capital investment growth rate and the economic depreciation rate. The government capital investment growth rate is estimated based on the historical data and the economic depreciation rate by industry and assets type is provided by the Finance Canada.

- 8) Estimate the government subsidy ratio net-of-user-fee charges by multiplying the result from Step 6 by the result derived from subtracting the capital recovery ratio (resulted from Step 7) from 1.

2. The marginal fiscal burden on R&D investment

The marginal fiscal burden on R&D investment is estimated by including all the government tax and non-tax expenditures benefiting the private R&D capital investment. These tax and non-tax expenditures include tax credit and allowance for R&D investment (e.g. Ontario super allowance) and the government grants.

Data on the government grants in relation to the “business enterprise intramural expenditure on R&D” are obtained from the OECD publication, Basic Science and Technology Statistics (Source 8). Unfortunately, there is no consistency in the dates when the data are available. For example, data for Canada are available only for 1991 while those for U.S. are available for later years varied by industry.

Taking the Ontario case, procedures for estimating the marginal fiscal burden on R&D investment are described below.

- 1) Estimate the effective tax credit at provincial level, EC_p , using the formula

$$EC_p = T_p * STA * (1 - G - C_f)$$

with T_p = the provincial CIT rate, STA = the Ontario super tax allowance for R&D expenditure in excess of 100 percent, G = ratio of the total government grant to the R&D expenditure by the private sector, and C_f = statutory tax credit at federal level.

- 2) Estimate the effective tax credit at federal level, EC_f , using the formula

$$EC_f = C_f (1 - G - EC_p),$$

- 3) Estimate the present value of total tax credits and tax allowances at both federal and provincial levels, PV , using the formula

$$PV = EC_f + EC_p + T_f * (1 - G - EC_f - EC_p) + T_p * (1 - G - C_f)$$

- 4) Estimate the gross-of-tax rate of return to R&D expenditure

Assuming that the R&D is expensed for the accounting purpose and hence the financing cost is 0 and the cost of capital, without tax, is 1, then the gross-of-tax rate of return to R&D expenditure, R_g , can be estimated as

$$R_g = (1 - PV)/(1 - U)$$

5) Marginal fiscal burden on R&D expenditure

Assuming that the R&D is expensed for the tax purpose, the net-of-tax rate of return is 1, then the conventional formula for estimating the marginal fiscal burden is the following:

$$MFB = (Rg - Rn)/Rg.$$

That is

$$MFB = (U - PV)/(1-U)$$

3. Average earnings by wage rate group and by industry

For Ontario, this estimate is an update of the 1996 Ontario average earnings by wage rate group and by industry published in MMB paper (McKenzie, Mansour and Brûlé, 1997), Table B3. Two steps are taken to arrive at this estimate. First, estimating the average annual growth rate in the industry aggregated “fixed-weighted indexes (1986=100) of average hourly earnings for all employees” for Ontario based on the Statistics Canada data (Source 9). And second, applying this annual growth rate (six times) to the 1996 average earnings by wage rate group and by industry (Source 10) to arrive at the 2002 average earnings by wage rate group and by industry. Same results are obtained for 2003 by applying the annual growth rate to the estimated 2002 earnings.

For the five US states, we first obtained the following three groups of data from the Bureau of Labor Statistics website (Source 11): i) 2002 average earnings for private sector by industry for non-supervisory employees, ii) 2002 occupational earnings of all occupations for the whole nation and the five US states, and iii) monthly change in average hourly rate for production workers. Based on these data, we then take following six steps to arrive at the average earnings by wage rate group and by industry for each of five US states.

- 1) Estimate the ratio of national overall occupational earnings to nationwide average earnings for private sector’s non-supervisory employees.
- 2) Applying this ratio to nationwide average earnings by industry for non-supervisory employees to arrive at the nationwide average earnings by industry for all the employees.
- 3) Estimate the state to national ratio in overall occupational earnings for each of five US states.

- 4) Applying the ratio resulted from Step 3 to the national average earnings by industry for all employees resulted from Step 2 to arrive at the average earnings by industry for all employees for each of five US states.
- 5) Applying our estimate of Ontario's average earnings (2002) and wage distribution by wage rate group and by industry (Source 10) to the average earnings by industry for each of five US states to arrive at average earnings by wage rate group and by industry for each of five US jurisdictions.
- 6) Applying the monthly change in average earnings for production workers for the period of August 2002 – July 2003 (the latest month available) to update the numbers resulted from Step 5 to 2003 estimates.

4. The government expenditure on health care as a subsidy ratio to labor cost

The government expenditure on health care is estimated at the national level. This is mainly because of the lack of sub-national data. It is also justifiable on the base that federal government in both countries is a significant funding source for the public health expenditure. The basic idea is to use the public health expenditure per capita for the age group that matches the age range of the labor force as a proxy to the public health expenditure per employee.

For the Ontario case, public health expenditure per capita for the five age groups (i.e., 15-24, 25-34, 35-44, 45-54, and 55-64) and the population distribution of these five age groups are used to arrive at the weighted average public health expenditure per capita for the age group of 15-64. (Source 12) This weighted average for 2001 is \$1,430. Using our previous estimate of \$1,201 (Source 13), we estimated the average annual change for the period of 1996-2001 is about 3.6%. Applying this annual growth rate to the 2001 public health expenditure per employee, we estimated the public health expenditure per employee in Ontario for 2002 and 2003 are \$1,481 and \$1,533 respectively.

In the case of US jurisdictions, we follow the assumption of “zero health subsidy” implied in the MMB paper. That is, “a value of 0 percent was used for OASDI, health insurance and federal UI tax rates, on the assumption that directly related benefits are approximately equal to contributions.” (MMB Paper, page 100)

5. The government expenditure on education as a subsidy ratio to labor cost

Following the method used in Mintz [2001], we estimate the education subsidy for each of the five earning groups by industry. Dividing this amount by the corresponding earnings arrives at the education subsidy ratio by industry and by earning level.

The data on government education expenditure by education level are obtained by ICP from Cansim database (Source 14). These total expenditures are then divided by corresponding enrollment (Source 15) to arrive at the government expenditure per student per academic year. (Note that the year 1998-99 is the latest one available for Ontario school enrollment data.) Therefore, we first estimate government expenditure per student for year 1999, and then estimate the annual incremental ratio based on this estimate and its 1996 counterpart we estimate previously. By applying this annual incremental ratio to the per-student expenditure for year 1998-99, we estimate the per-student expenditure for 2002 and 2003 respectively.

There is no educational profile by industry that matches precisely the earnings profile. However, by assuming that earning power is positively related to the number of schooling years, we match (in the ascending order) each two of ten education levels with one of five earning levels by industry. As a result, we estimate the education subsidy ratio for each of five earning groups by industry. In this way, the education subsidy ranges from 3% for the lowest earning group across industries to around 10% depending on the earning level. The outliers appear to be in the retail sector where earnings for all the five earning groups are the lowest compared to other sectors and the education subsidy ratios are the highest (well above 10 % for the four “upper” earning groups).

The same method is used to estimate education subsidy ratio for the five U.S. jurisdictions and based on the U.S. data (Source 16).

DATA SOURCE:

1. Statistics Canada, Input-output account, 1997.
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3. Statistics Canada, Cansim database.
4. U.S. Department of Commerce, Bureau of Economic Analysis, Assets Tables, Table 7.5. Historical-Cost Investment in Government Fixed Assets.
5. Finance Canada, capital weights by industry and by type of assets.
6. Canadian Tax Foundation, Finance of the Nation 2002, Table 7.1, revenues from “sales of goods and services.”
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8. OECD, Basic Science and Technology Statistics, 199? and 2001
9. Statistics Canada, Employment, Earnings and Hours, Cat. No. 72-002-XPB, 2000, Table 3.
10. MMB Paper, Tables B.1 and B.3.
11. U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov.
12. Table 5C of Health Expenditure in Canada by Age and Sex, 1980-81 to 2000-01, Report.
13. International Tax Program, data work for Mintz’s book, The Most Favored Nation.
14. Statistics Canada, Cansim database, Tables 478-0004, 478-0005, 478-0007, and 478-0015.
15. Education in Canada, 2000. (publisher?) Some of the data on enrolment can be found through <http://www.statcan.ca/english/Pgdb/educ02a.htm>.
16. National Center for Education Statistics, Education Finance Statistics Center, <http://nces.ed.gov/ccd/bat/selectcolumn.asp?columngroup=30&view=State&id=465852280&nc=74043+PM>.