
The Calculation of Marginal Effective Tax Rates

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Secretariat of the Technical Committee on Business Taxation

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Abstract

The objective of this working paper is to describe the methodology used to undertake the marginal effective tax rate (METR) calculations contained in the final report issued by the Technical Committee on Business Taxation. The data underlying the computations are also described and presented, as are various illustrative calculations that supplement the cases covered by the effective tax rates presented in the Technical Committee's report.

The model used to calculate the METRs updates, and expands on, earlier Canadian work. The main extensions to the model are: for METRs on tangible capital, incorporation of federal and provincial capital taxes, and provincial sales taxes on capital inputs, in addition to federal and provincial corporate income taxes; METRs on research and development (R&D), labour, and total production cost; METRs for non-tax-paying firms; and finally, METRs on tangible and intangible capital using industry-specific debt-asset ratios. These additions allow for an analysis of METRs on a broader range of production inputs and accounting for a larger variety of federal and provincial taxes. This has become more relevant for the study of the impact of taxation, given the increase in the relative importance of taxes that are not sensitive to profits (i.e. payroll and capital taxes).

The METRs for the current Canadian corporate tax system vary across firm size, asset type and industries. Generally, small firms face lower METRs than large firms, regardless of the type of investment they make. Investments in machinery, R&D, and exploration and development (E&D) are subject to lower METRs than investment in structures, land and inventories, and METRs on labour are appreciably lower than METRs on capital (except R&D). Finally, a comparison of METRs across industries shows that, in general, service industries are treated less favourably than manufacturing and resource industries.

Also provided, to allow international comparisons, is a calculation of METRs on tangible capital in the G-7 countries and Mexico. Canadian METRs on tangible capital are generally lower than those in Germany, Italy and Japan, but higher than those in the rest of the G-7 countries and Mexico. However, investment in manufacturing equipment is treated more favourably in Canada than in most of the other G-7 countries, including the United States, and investment in R&D is treated more favourably in Canada than in the United States.

Finally, a simulation of the Technical Committee's policy package shows that the Committee's recommendations would result in little change in the overall level of METRs, but that the variation in METRs would be reduced substantially, especially those across industries.

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1. Introduction

The purpose of this working paper is to describe the methodology used to undertake the marginal effective tax rate (METR) calculations contained in the report issued by the Technical Committee on Business Taxation. The data underlying the computations will also be described and presented, as will various illustrative calculations, extending somewhat the effective tax rates presented in the Technical Committee's main report.

As a part of the documents laying the groundwork for the 1987 tax reform, various calculations of the marginal effective tax rate on capital for different types of assets employed in various sectors were presented.¹ A technical paper explaining the methodology used to compute those effective tax rates, as well as an extensive description of the underlying data, was released by the Department of Finance shortly thereafter.² The current exercise represents a substantial update and revision of the Department's effective tax rate model.

The model has been revised along several dimensions. First, various tax changes that have occurred over the past 10 years have been incorporated into the model. This has involved not only updating tax parameters such as statutory corporate tax rates, capital cost allowance (CCA) rates, investment tax credits rates (ITCs), etc., but also incorporating new taxes into the model, such as the large corporations tax (LCT) at the federal level and various capital taxes at the provincial level. Second, the 1987 tax reform documents reported METRs on capital for fully tax-paying corporations only; the current version allows for the incorporation of non-tax-paying firms. Third, much of the underlying data have been revised and updated. Economic parameters such as interest and inflation rates have changed, but so too has the structure of the Canadian economy. For example, the service sector has grown, and small (for tax purposes) corporations have increased in prominence. As such, the capital and industry weights used to aggregate the METRs on capital have been substantially updated. Fourth, several methodological innovations have been incorporated into the model. In 1987 the analysis was devoted exclusively to METRs on various types of tangible capital – structures, machinery, land and inventories – as well as exploration and development (E&D) in the resource sector. The current version also calculates METRs associated with other inputs in the production process, such as research and development (R&D) and labour. The effective tax rates on the different inputs used in production are then aggregated together into a METR on production costs, following a methodology developed by McKenzie, Mintz and Scharf (1997). As described in more detail in Section 2, the METR on costs measures the contribution of various taxes levied on inputs to the marginal cost of production. As such, it provides a convenient measure of the extent to which the tax system impinges upon the cost of doing business. Finally, the model has been expanded to allow for the calculation of METRs for purposes of international comparisons. Marginal effective tax rates on tangible capital for the manufacturing and services sector in the G-7 countries, as well as Mexico, are computed. For the United States, METRs on the other inputs as well as production costs are calculated for numerous industrial sectors.

¹ Canada, Department of Finance (1987).

² Jung (1989).

Finally, while the METR calculations contained in this document are “state of the art,” the methodology does have its limitations. Many aspects of the tax system do not lend themselves to the approach, as they cannot be modelled analytically. Moreover, the estimates can be sensitive to the data and assumptions regarding key parameters. While we do perform some sensitivity analysis, there is clearly scope for more. Thus, one additional purpose of this document is to give the interested technical reader some feel for the limitations of the estimates.

The remainder of the document is organized as follows. The following section provides an overview of the methodology. Section 3 presents and discusses various METR calculations, under different assumptions regarding the tax system and the economic environment. Section 4 presents METRs for the G-7 countries plus Mexico. Section 5 presents the METRs for the Technical Committee’s policy package. Finally, section 6 concludes. Three data and technical appendixes are also included. Appendix A outlines the data and structure of the METR model. Appendix B provides the data and methodology used to calculate marginal effective payroll tax rates in Canada, while Appendix C does the same thing for the United States.

2. Methodology

In this section, an overview of the basic methodology underlying the calculation of METRs is presented. The section begins with a brief discussion of the motivation behind the approach to the calculation of METRs taken in this study. We then move on to the methodological overview. For the most part, the basic concepts underlying the methodology are quite simple and have been documented elsewhere³; the discussion is therefore largely intuitive.

2.1 Motivation

While businesses are subject to various types of taxes, analysts have traditionally focussed on the corporate income tax (CIT). Since the CIT can be thought of as a tax on the return to capital, the tendency to focus on it is perhaps understandable in light of prevailing concerns regarding the impact of taxes on capital accumulation and investment.⁴ However, other business inputs, most notably labour, are subject to various taxes as well, such as federal payroll taxes to fund Employment Insurance (EI) and the Canada Pension Plan and Quebec Pension Plan (CPP/QPP), and provincial payroll taxes to finance health and education. Moreover, while the implementation of the Goods and Services Tax (GST) largely eliminated the taxation of business inputs that occurred under the federal manufacturing sales tax, provincial retail sales taxes still result in the taxation of some business inputs.

³ See McKenzie, Mintz and Scharf (1997) and references therein.

⁴ Bird (1996) discusses various ways of viewing the CIT, and provides some justification for its existence. See also Mintz (1995). It is also important to note that while the CIT can be thought of as a tax on the return to capital, the ultimate burden, or economic incidence, of the tax need not fall on the owners of capital (shareholders). Depending upon the economic environment, and on the technological characteristics of the corporate sector, the burden of the CIT may be borne by (some combination of) the owners of capital, consumers of goods produced by corporations, other factors of production (e.g. labour, land), or even foreign treasuries in the case of non-resident multinational firms subject to the CIT. For a discussion of some of the issues in this regard, see Whalley (1997).

When analysing the incentive effects of taxation, it is important to consider the impact of taxes on *marginal*, or *incremental*, economic decisions (i.e. the decision to employ one more unit of capital, hire one more worker, or produce one more unit of output). In this spirit, we thus focus on the calculation of *marginal effective tax rates*. The METR is defined as the amount of tax arising from the decision of a firm to undertake one more unit of an economic activity. In the case of capital, the activity is the employment of an incremental unit of capital, in the case of labour, it is an incremental worker; and in the case of production, it is an incremental unit of output. Because we measure the taxes arising from an incremental unit of economic activity, a positive METR associated with that activity indicates that it is *discouraged* by the tax system, a negative METR indicates that the activity is *encouraged* by the tax system, while a *zero* METR indicates that the tax system is *neutral* with respect to the activity. In the case of a neutral tax system, the activity generates no tax revenue at the margin, but *inframarginal* units of the activity may generate tax revenue.

Taxes imposed on capital (like the CIT) can affect both the level and composition of investment in an economy by distorting the return to an incremental unit of capital. The METR on capital is a summary measure of the size of this distortion. There is a growing body of empirical research that suggests that corporate taxes levied on capital can dampen investment, although there is some disagreement over the magnitude of the impact.⁵ Moreover, taxes on capital may affect not only the level of investment, but its composition as well: differences in METRs across types of capital can give rise to inter-asset distortions; differences in METRs on capital employed in different sectors can give rise to inter-industry distortions; and differences in METRs on capital employed in different jurisdictions can give rise to inter-jurisdictional distortions. Thus, taxes can lead to distortions in the allocation of capital over time, across assets, among sectors, and among jurisdictions.

The distortions in the allocation of capital caused by the tax system are important for two reasons. First, the distortions can lead to a reduction in the *level* of goods and services produced in the economy. This gives rise to what are referred to as the *efficiency costs* of capital taxation. Second, although both the theoretical and empirical literature is somewhat less developed on this issue, there is some evidence that there exists a positive correlation between investment and economic *growth* in cross-country comparisons.⁶ Thus, taxes on capital may also affect the rate of growth in the economy through their impact on investment.⁷ These linkages between taxes on

⁵ Auerbach and Hassett (1992), Cummins and Hasset (1992, 1994), Cummins, Hasset and Hubbard (1996), and Chirinko, Fazzari and Meyer (1996) find significant CIT effects on investment, with the elasticity of investment with respect to the tax adjusted cost of capital (discussed below) between .25 and 1. McKenzie and Thompson (1997) also find that differences in the tax-adjusted cost of capital between Canada and the United States help to explain differences in investment rates between the two countries in a statistically significant way.

⁶ See Levine and Renelt (1992).

⁷ There is some question in the literature as to whether or not changes in investment caused by the tax system are permanent or transitory. In either event, a temporary change in growth may still last for a substantial period of time. As discussed above, even if changes in growth are transitory, they still lead to a permanent changes in the *level* of economic output (GDP). Also, De Long and Summers (1991) argue that it is not so much the level of savings and investment that matters for economic growth, but rather whether that investment is allocated "appropriately." Thus, inter-asset, inter-industry and inter-jurisdictional distortions may also be important for economic growth.

capital and both the level and growth of economic activity provide much of the motivation for the traditional focus on measuring METRs on capital.

Yet taxes on other business inputs, such as payroll taxes levied on labour, can also have important economic effects. The effect of such taxes on wages and employment are theoretically ambiguous, and the empirical evidence is somewhat mixed.⁸ Nonetheless, there is some evidence that taxes imposed on labour, such as payroll taxes, dampen employment, at least in the short run. Moreover, some representations of endogenous growth theory, which focus on the role that technology and human capital play in contributing to economic growth, suggest that taxes on labour can stifle growth by lowering the incentives of individuals to invest in human capital.

Aside from the traditional supply and demand responses to taxes levied on factor inputs such as capital and labour, if input METRs differ across factors, firms will, to the extent that it is technologically possible, alter the mix of inputs used in production. Moreover, taxes levied on business inputs, such as labour and capital, can affect the cost of providing the goods and services that help to produce. Policy analysts often voice concern with the implications of taxation for competitiveness;⁹ yet the meaning of the term is not always well defined. A natural way to think about competitiveness is as the cost of doing business. Taking this view, the extent to which the tax system affects a firm's, or an industry's, or a country's cost of doing business, is a key determinant of competitiveness. More precisely, we are interested in measuring the extent to which the business tax regime might impinge upon the marginal cost of producing an incremental unit of output. The METR on costs does just this – it measures the extent to which taxes levied on firm inputs, such as capital and labour, contribute to the cost of producing one more unit of output. It thus aggregates the various METRs on firm inputs into a summary measure of the extent to which the business tax regime adds to the cost of doing business.

Measuring the extent to which the business tax regime impinges upon marginal costs is a natural way to think about the implications of taxation for competitiveness. For example, in their examination of border-tax adjustments on imported goods, Poterba and Rotemberg (1995) specifically identify the preservation of the competitive position of domestic producers vis-à-vis foreign producers, which they define as the relative marginal costs of domestic and foreign producers, as the objective pursued by governments.

The marginal cost of production is a key determinant of the level and composition of goods and services produced in an economy. Businesses maximize profits by producing output up to the point that marginal revenues (the revenue accruing to the firm due to the production of one more unit of output) are just equal to marginal costs. An increase in marginal costs will cause production to decrease, a decrease will cause output to expand. To the extent that government policies affect the marginal cost of production, through the tax system or otherwise, they can therefore affect the level of goods and services produced in an economy. Of particular concern is

⁸ See Dahlby (1992), Di Matteo and Shannon (1995), and Wilton and Prescott (1993).

⁹ See, for example, Porter (1993).

the extent to which the business tax regime may result in an uneven playing field by generating tax-induced differences in marginal costs across producers within a market, across producers from different jurisdictions, and across industries.

To close this subsection, it is important to reiterate the distinction between the two basic types of METRs that will be employed in the subsequent analysis. The first is the METR on inputs, which includes tangible capital such as buildings, equipment, land and inventories, intangible capital such as E&D and R&D, and labour. These METRs measure the taxes collected on an incremental unit of the input employed by a firm. The second is the METR on costs, which measures the contribution of the taxes levied on the various inputs to the cost of producing an incremental unit of output. As discussed above, both sets of effective tax rate measures are motivated by different, though not necessarily mutually exclusive, considerations: the input METRs provide an indication of the extent to which the tax system impinges upon the incentive to employ these inputs, while the cost METRs, which are a function of the input METRs, measure the impact of the tax system on competitiveness, or the cost of doing business.

2.2 Methodology

With the above motivation in hand, we now proceed by presenting an explanation of the basic idea behind the methodology. We begin with a discussion of the METR on costs, which is grounded in the fundamentals of elementary price theory. We then move on to a discussion of the METRs on the individual inputs – labour, tangible capital and then intangible capital.¹⁰

2.2.1 METR on Costs

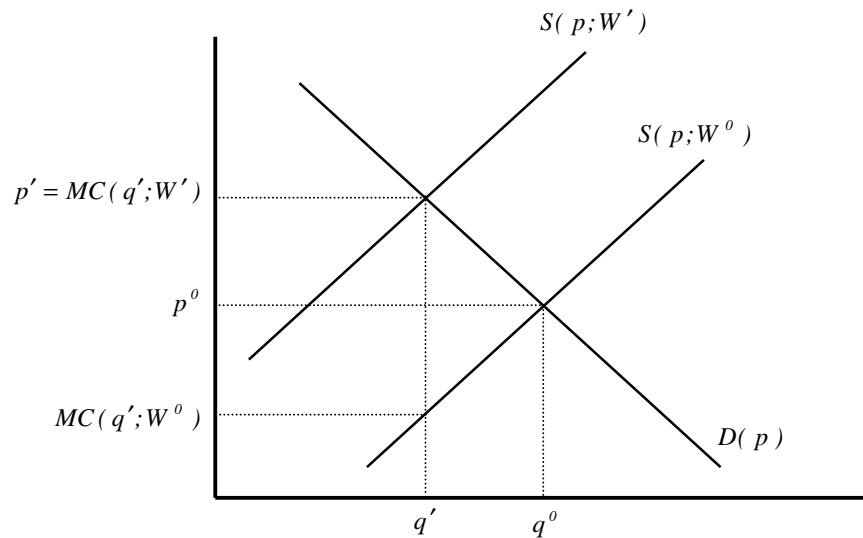
To begin, presume that both input and output markets are perfectly competitive. The assumption of perfect competition is for expositional purposes only, as the analysis also applies to non-competitive markets (with minor modifications). Consider the output market for some good or service. Figure 1 illustrates the equilibrium in the absence of any taxes. The equilibrium occurs at the intersection of the market supply and demand curves, denoted $S(p; W^0)$ and $D(p)$ respectively, where p is the output price, and W^0 is a vector of input prices, or user costs. The equilibrium price in this case is p^0 and the quantity is q^0 . Ignore, for the moment, the rest of the diagram.

The approach incorporates the vertical linkages between input and output markets. The output market is connected to the input markets by the fact that the aggregate supply curve is the (horizontal) sum of the marginal cost curves for the individual suppliers. The marginal cost of providing an additional unit of output thus reflects the user cost of the various inputs, which in turn reflects the supply and demand conditions in the input markets. This is emphasized by writing aggregate supply as a function of the vector of input prices W^0 . The connection between the input and output markets provides the key to the measure of the METR on production costs.

¹⁰ We do not provide a formal derivation here, as it has been done elsewhere. In particular, the discussion related to the METR on costs closely follows McKenzie, Mintz and Scharf (1997), while the discussion related to the METR on capital follows Chen and McKenzie (1997) and McKenzie and Mintz (1992).

The various taxes applied to firm inputs affect the marginal cost of providing the product by changing the user costs. For example, if the tax system causes the user cost of, say, labour to rise, the marginal cost of providing an additional unit of output will rise as well, and the industry supply curve will shift up. Referring again to Figure 1, the after-tax aggregate supply curve is designated $S(p; W')$, where W' denotes the vector of gross-of-tax user costs. The after-tax equilibrium price and quantity are p' and q' respectively.

Figure 1



The gross-of-tax marginal cost of production at the after-tax equilibrium is $MC(q'; W')$, which is expressed as a function of the gross-of-tax user costs, W' . Associated with this gross-of-tax marginal cost is a net-of-tax marginal cost, defined as $MC(q'; W^0)$. The METR on costs is then the tax rate T , which, if hypothetically applied to production costs directly, would yield the same gross-of-tax marginal cost that results under the existing tax regime. Thus, T solves the equation $(1+T)MC(q'; W^0) = MC(q'; W')$, which gives:

$$T = \frac{MC(q'; W')}{MC(q'; W^0)} - 1 \quad (1)$$

As defined in equation (1), the METR on the cost of production gives the rate of tax on marginal costs implied by the various taxes levied on business inputs. It can be viewed as aggregating these various taxes together into a simple effective excise tax rate. In terms of Figure 1, the tax wedge, $MC(q'; W') - MC(q'; W^0)$, is expressed as a percentage of the net-of-tax marginal cost, $MC(q'; W^0)$.

An important issue concerns the *incidence* of the taxes levied on firm inputs, or the extent to which those taxes are reflected in higher user costs, and therefore in marginal production costs. This is important because, under some conditions, taxes levied on inputs may not affect user costs at all, and will therefore not feed through to marginal costs.

In general, the extent to which taxes will be reflected in the user cost of the inputs depends upon the supply and demand conditions in the input markets. Consider the introduction of a tax at the METR of t_i on input i , where $w'_i = w_i(1 + t_i)$ is the user cost of input i (the i th element of the vector W'), and w_i is the equilibrium supply price. Assuming that the input market is competitive, equilibrium is determined by:

$$D_i(w_i(1 + t_i)) = S_i(w_i) \quad (2)$$

where $D_i(\cdot)$ is the demand function for input i and $S_i(\cdot)$ is the supply function. The demand function for input i is expressed with respect to the gross-of-tax price of the input, and the supply function is expressed with respect to the net-of-tax price. For simplicity, prices of other inputs are suppressed.

Differentiating both sides of (2) with respect to the tax rate t_i , and evaluating the derivative at zero, gives, after some algebraic manipulation:

$$\frac{\partial w'_i}{\partial t_i} = w_i \left[\frac{\eta_i^S}{\eta_i^S + \eta_i^D} \right] \quad (3)$$

where η_i^D is the elasticity of demand for input i and η_i^S is the elasticity of supply. Equation (2) implicitly determines the equilibrium user cost of input i as a function of the tax rate t_i , $w'_i = w_i(t_i)$. A first-order Taylor series approximation of this implicit function yields:

$$w'_i = w_i^0 + t_i \frac{\partial w'_i}{\partial t_i} \quad (4)$$

Using equations (3) and (4) gives:

$$w'_i = w_i^0(1 + t_i \beta_i), \quad \text{where } \beta_i = \left[\frac{\eta_i^S}{\eta_i^S + \eta_i^D} \right] \quad (5)$$

and w_i^0 is the i th element in the vector W^0 .

The parameter $0 < \beta_i < 1$ is a tax-shifting factor. When $\beta_i = 1$ the tax is fully shifted forward to the demander of the input, and the user cost changes by the full amount of the tax, as would be the case when the input supply function is perfectly elastic, or demand is perfectly inelastic.

When $\beta_i = 0$, none of the tax is shifted forward to the user, and the user cost is unaffected by the tax or subsidy, as would be the case when supply is perfectly inelastic, or demand is perfectly elastic. In the intermediate case, the user cost increases by some fraction of the tax.

2.2.2 Functional Form for Cost Function

To calculate the effective tax rate on marginal cost, as in equation (1) above, the marginal cost function must be parameterized. In general, marginal costs will depend upon the level of output, productivity parameters, input shares, factor prices, and the degree of substitutability between factors. In this section, we illustrate the methodology by employing the commonly used linearly homogeneous Constant Elasticity of Substitution (CES) production function, which has the form:

$$q = H \left[\sum_i \frac{a_i}{f_i} x_i^\rho \right]^{\frac{1}{\rho}}, \quad \sum_i a_i = 1 \quad (6)$$

where q is output, x_i is the quantity of input i employed, H , a_i , f_i and ρ are production parameters, and the elasticity of substitution is $\sigma = \rho / (\rho - 1)$.

The gross-of-tax marginal cost function that arises from the CES production function is:

$$MC(q'; W') = H^{-1} \left[\sum_i a_i^{\frac{-b}{\rho}} (f_i W'_i)^b \right]^{\frac{1}{b}} \quad (7)$$

where $b = \rho / (\rho - 1)$.

$MC(q'; W^0)$ is determined by evaluating (7) at W^0 rather than W' . Recalling from our earlier discussion that $w'_i = w_i^0 (1 + t_i \beta_i)$, equations (7) and (1) give an effective tax rate on marginal cost for a CES production function of:

$$T = \left[\sum_i A_i (1 + t_i \beta_i)^b \right]^{\frac{1}{b}} - 1, \quad \text{where } A_i = \frac{a_i^{\frac{-b}{\rho}} (w_i^0 f_i)^b}{\sum_i a_i^{\frac{-b}{\rho}} (w_i^0 f_i)^b}, \quad \sum_i A_i = 1 \quad (8)$$

and A_i is the factor share for input i .

It is possible to show from equation (8) that as the elasticity of substitution increases, the effective tax rate on marginal costs decreases. This is because as the degree of substitutability between inputs rises, the firm is better able to respond to changes in relative factor prices by changing the input mix. As such, a tax-induced increase in the relative price of an input has a lower impact on marginal costs, the higher the elasticity of substitution.

Two commonly used special cases of the CES production function are the Cobb-Douglas (CD) and the Leontief, or fixed proportions (FP), production functions. The elasticity of substitution for the CD case is unity, in which case equation (8) reduces (in the limit) to:

$$T = \prod_i (1 + t_i \beta_i)^{A_i} - 1 \quad (9)$$

For the FP case, the elasticity of scale is zero, and the effective tax rate on marginal costs becomes:

$$T = \sum_{i=1}^n A_i (1 + t_i \beta_i) - 1 \quad (10)$$

It is interesting to note that the effective tax rate on marginal costs for the FP case reflects a simple arithmetic-weighted average of the user costs of the inputs (with net of tax prices normalized to unity), while the rate for the CD case reflects the geometric-weighted average. The arithmetic average for the FP production function reflects the fact that under this technology, firms are not able to respond to tax-induced changes in user costs by substituting away from (relatively) highly taxed factors. Factors are employed in fixed proportions, and the effective excise tax rate on marginal costs is simply the arithmetic-weighted average of the METRs on the inputs. In the case of a CD production function, with the elasticity of substitution equal to unity, there is some scope for substituting between factors, and the effective tax rate on marginal costs reflects the geometric-weighted average of the tax rates on the inputs, which is lower than the arithmetic average.

The empirical calculations of the METR on cost reported later in the paper are based on the CD parameterization of the cost function. Although they are not reported here, calculations based on the FP parameterization yield similar results; the effective tax rates are slightly higher because no input substitution is possible.

2.2.3 METRs on Inputs

In order to calculate the METR on costs, we must determine the METRs on the various inputs (the t_i 's). Moreover, as discussed in Section 2.1, the marginal effective tax rates on firm inputs are of independent interest. To make the measurement task manageable, a certain amount of aggregation is required. In the empirical analysis which follows in Section 3, we include four types of tangible capital (structures, machinery, land and inventories), two types of intangible capital (E&D and R&D), and labour.

2.2.3.1 Labour

To calculate the METR on labour, we incorporate the various payroll taxes or other levies for social security, employment insurance, etc. Since taxes on labour are often applied at variable rates, depending upon income, and may also vary by individual characteristics, the difference between average and marginal rates can be quite important. A key consideration is the meaning of the marginal unit of labour. The approach we use here is to presume that the employment of a

marginal unit of labour involves hiring an additional worker with *typical* characteristics. We use employment data to construct a profile of a hybrid marginal worker in each sector being studied, and then calculate the effective tax rate on labour for this hybrid worker. The data used to do this, and the computations themselves, are discussed in detail in Appendix B.

The incidence of payroll taxes levied on labour is an important consideration. As discussed above, this depends upon the demand and supply elasticities for labour. There is not a broad consensus among economists regarding the incidence of payroll taxes. The literature does seem to suggest that in the long run, the supply of labour is relatively inelastic, which suggests that in the long term, labour bears the bulk (though not all) of the burden of payroll taxes.¹¹ However, labour demand is relatively elastic in the short run, which suggests that in the short term, the burden of payroll taxes may well fall on producers, at least to some extent. Moreover, payroll taxes may not be shifted at all onto workers at the minimum wage. The approach that we take here is to assume for the base case calculations that the economic incidence of payroll taxes coincides with the statutory incidence. Thus, both employers and employees are assumed to bear the share of payroll taxes that they are legally required to pay. This coincides roughly to an assumption that the tax incidence of payroll taxes is split equally between employers and employees; we also consider the implications of alternative shifting assumptions.

Another issue that arises in the case of payroll taxes is the question of the extent to which they should be viewed as taxes at all. In many cases, payroll taxes finance certain programs from which employers and employees directly benefit. The most obvious example is workers' compensation, which can be thought of as insurance for on-the-job accidents paid for workers by their employers. Although in some provinces workers' compensation payments are not actuarially fair, for the most part they are a reasonably good approximation. Thus, in our base case we do not include workers' compensation payments made by employers with other payroll taxes. At the other end of the spectrum, since provincial payroll taxes go into general revenues, we treat them as taxes. CPP/QPP taxes and EI premiums are more problematic. This is particularly true for EI premiums, as there are substantial variations in the net EI contributions (contributions less benefits) arising from EI across sectors. Sectors that are systematically net beneficiaries of EI (with benefits exceeding contributions) can be thought of as receiving a labour subsidy, as they are able to pay lower wages because of the income support offered to their employees by the EI system. Our approach is to consider various scenarios regarding the effective CPP/QPP and EI rates. In the base case, payroll taxes are expressed on a net-of-benefits basis, as the rates are adjusted to reflect their direct benefit component. In the case of EI, the adjustments are based upon the net inflows or outflows of EI contributions and benefits. We also make adjustments to reflect the recent changes to the CPP/QPP system, which will increase payroll tax rates over the next five years in order to achieve a sustainable system by 2003. These adjustments are described in detail in Appendix B.

¹¹ See Dahlby (1992).

2.2.3.2 Tangible Capital

Tangible capital inputs such as structures, machinery, land and inventories present other problems. The difficulty here is that these inputs give rise to a flow of output over time, which requires that we impute a per-period cost of holding capital, and calculate the METR applied to this imputed cost. As is the case with the other inputs, some aggregation is required. For physical assets, the approach adopted here is similar to that taken in the user cost of capital literature, which examines the impact of corporate income taxes on physical investment.¹²

To begin, it is again useful to consider an economy without any taxes at all. Firms invest in projects that generate a rate of return in excess of a “hurdle” rate required by financial markets. This hurdle rate reflects the real (inflation adjusted), net-of-depreciation rate of return that investors (debt and equity holders) could earn in the next-best alternative investment opportunity with similar characteristics. If we presume that the proportion of investment financed by debt is β , the expected rate of inflation is π , the nominal interest rate on debt is i , and the nominal required rate of return on equity is ρ , then the real hurdle rate of return is a weighted average of the required rate of return on debt and equity, or $R = \beta i + (1 - \beta)\rho - \pi$.¹³

If we assume that investment is continuously divisible, and that the marginal revenue product of capital (the increment to revenue arising from investing in one more unit of capital) eventually declines as the amount of capital employed increases, value-maximizing firms will invest in capital up to the point where the rate of return on the last unit of capital employed is equal to the real opportunity cost of the funds tied up in that capital, R , plus the loss in the value of the capital due to economic depreciation, δ . If we denote the relative price of a unit of capital with respect to output by q_K , the expression $q_K(R + \delta)$ is referred to as the cost of capital. Denoting the marginal revenue product of capital by MRP_K , the equilibrium condition is $MRP_K = q_K(R + \delta)$, where capital is accumulated up to the point that the marginal unit breaks even in the sense that it earns just enough to cover the cost of capital.¹⁴ This condition implicitly determines the demand for capital by firms as a function of the rate of return on capital net-of-depreciation, R .

We are now in a position to see how taxes on capital can affect capital accumulation. Investors are concerned with the rate of return on their capital, net of both corporate and personal taxes. Consider first the imposition of personal taxes on interest income and on the return to equity. Denoting by m the personal tax rate imposed on nominal interest income, and by c the effective tax rate on equity, the weighted average net-of-personal tax real hurdle rate of return becomes $R^n = \beta i(1 - m) + (1 - \beta)\rho(1 - c) - \pi$. In capital market equilibrium, in the absence of risk and capital market imperfections other than taxes, the after-tax rate of return on equity must equal

¹² See King and Fullerton (1984), and Boadway, Bruce and Mintz (1984).

¹³ In the absence of taxation, or other capital market imperfections, and risk, $i = \rho$. For expositional ease, we abstract from risk in the discussion. However, the analysis and calculations are consistent with the presence of what is commonly referred to as *income risk*. Income risk involves uncertainty regarding future revenues or operating costs. If we express rates of return net of risk, the METR calculations are identical to those presented here. For a discussion of the implications of other types of risk see McKenzie (1994).

¹⁴ We are implicitly treating capital as the numeraire.

the after-tax rate of return on debt; thus $i(1-m) = \rho(1-c)$, which implies that $\rho = i(1-m)/(1-c)$, in which case $R^n = i(1-m) - \pi$.

The imposition of corporate taxes affects investment by altering the cost of capital. There are several ways in which this can occur, depending upon the details of the tax system. Here we present a somewhat simplified representation, which ignores some of the details of the CIT in Canada. Modifications required to take some of these considerations into account are discussed below. As discussed above, firms will accumulate capital up to the point where the rate of return generated by the last unit of capital is just equal to the cost of capital. To yield R^n after personal taxes, the marginal investment must earn $R = \beta i + (1-\beta)\rho - \pi$ after corporate taxes (and net of depreciation). Denote by R_K^g the gross-of-corporate tax, net-of-depreciation rate of return on a marginal unit of capital required to yield R after corporate taxes – thus $R_K^g = MRP_K / q_K - \delta$.

R_K^g will reflect various provisions of the corporate tax system. For example, the deductibility of nominal debt interest expenses for corporate income tax purposes lowers the nominal cost of debt finance to $i(1-u)$, where u is the combined federal-provincial statutory corporate income tax rate, including the federal surtax.¹⁵ Nominal interest deductibility thus lowers the cost of capital to the firm by reducing the average opportunity cost of finance to $R^f = \beta i(1-u) + (1-\beta)\rho$.¹⁶ The cost of capital is also lowered by the reduction in the effective purchase price of capital, due to the presence of tax depreciation allowances and investment tax credits (ITCs). A company that is provided with an ITC at the rate ϕ and annual depreciation allowances that generate a reduction in taxes of uA in present value terms, A being the present value of the tax depreciation allowances on one dollar of capital,¹⁷ faces an effective purchase price of capital that is lowered by the amount $\phi + uA$ per dollar. Taking all of this into account, the after-tax cost of capital for a firm is $q_K(R^f + \delta - \pi)(1 - \phi - uA)$. Recognizing that the incremental revenue generated by an additional unit of capital is taxed at the statutory tax rate, leaving $MRP_K(1-u)$ after tax, the firm's value maximization condition becomes $MRP_K(1-u) = q_K(R^f + \delta - \pi)(1 - \phi - uA)$, or $MRP_K = q_K(R^f + \delta - \pi)(1 - \phi - uA)/(1-u)$, whereby the marginal revenue product of capital is equal to the gross-of-depreciation, tax-adjusted user cost of capital. Using this equilibrium condition, and recalling the definition of R^g above, the gross-of-corporate-tax, net-of-depreciation rate of return on a marginal unit of capital is:

$$R_K^g = (R^f + \delta - \pi) \left[\frac{1 - \phi - uA}{1 - u} \right] - \delta \quad (11)$$

¹⁵ Thus, $u = u_f(1 + s_f) + u_p$ where u_f is the federal CIT rate, s_f is the federal surtax rate and u_p is the provincial CIT rate.

¹⁶ Note that the required rate of return to equity, ρ , is not deductible for tax purposes.

¹⁷ In the absence of various provisions such as the half-year rule (which is included in subsequent calculations but ignored here for simplicity), A is the infinite sum $A = (1-\phi) \sum_{t=0}^{\infty} [\alpha(1-\alpha)^t / (1+R^f)^t] = (1-\phi)\alpha / (R^f + \alpha)$,

where α is the declining balance Capital Cost Allowance (CCA) rate. This reflects the reduction in the tax depreciation base by the ITC.

As indicated above, some aspects of the business tax system in Canada that are relevant to physical capital are omitted from the formulation of R_K^g given in equation (11). Three of these will be discussed here. Provisions that relate specifically to the resource sector are discussed in Subsection 2.2.3.3 below. First, as discussed above, although the GST largely eliminated the taxation of business inputs, including capital, at the federal level, various provincial retail sales taxes still result in some sales taxes being levied on some types of capital. This is particularly relevant for machinery and equipment; the problem is less acute for structures and land. Second, the federal government levies a tax on the capital of large corporations with assets in excess of \$10 million (the Large Corporations Tax). The federal surtax is creditable against the LCT. This means that the LCT impacts only on large corporations with an LCT liability in excess of the surtax – this is why the LCT is sometimes referred to as a minimum tax on large corporations. Third, some provinces impose capital taxes on the capital of large corporations as well.

Taking these factors into account, the gross rate of return on a marginal unit of capital becomes:

$$R_K^g = (I + t_s)(R^f + \delta - \pi) \left[\frac{I - \phi - uA + (t_L + t_P(I - u))/(R^f + \alpha)}{I - u} \right] - \delta \quad (12)$$

The term t_s is the effective sales tax rate on machinery and equipment; it serves to increase the cost of a unit of capital by $(I + t_s)$. This term is relevant for machinery and equipment only, as it is presumed that buildings bear no sales taxes. The term t_L is the LCT rate,¹⁸ and t_P is the provincial capital tax rate. Thus, $(t_L + t_P)/(R^f + \alpha)$ is the present value of the federal and provincial capital taxes that arise due to the purchase of an incremental unit of capital; t_P is multiplied by $(I - u)$ to reflect the fact that provincial capital taxes are deductible for CIT purposes.

The expressions to this point have focussed on investments in machinery and equipment and buildings. The equations may be modified to develop similar expressions for investments in land and inventories. Land is similar to investments in machinery or buildings, except that we presume that there is no physical depreciation, so δ is set to zero. Moreover, there are no capital cost allowance deductions, no sales taxes and no investment tax credits, therefore $A = \phi = t_s = 0$, leaving,

$$R_L^g = (R^f - \pi) \left[\frac{I + (t_L + t_P(I - u))/R^f}{I - u} \right] \quad (13)$$

For investment in inventories, the relevant feature of the tax system is the fact that inventory purchases are fully deducted for tax purposes when used, sold or otherwise disposed of. However, the deduction is based on the first-in, first-out (FIFO) method of inventory accounting. This means that a deduction for the original cost of the inventory item is made at the time of disposition, and there is no accounting for any increase in that cost due to inflation. As such,

¹⁸ It is presumed in equation (12) that the firm pays the LCT [i.e. the surtax is zero]. The METRs calculations reflect a weighted average of firms that pay the LCT and those that do not; see Appendix A for more detail.

an inflation tax is imposed on inventory holdings.¹⁹ If we presume that inventories somehow increase the productivity of the firm, then we can use an approach similar to that used for physical capital. The after-tax marginal revenue product from investing an incremental unit in inventories is, as above, $MRP_I(1-u)$. The opportunity cost of inventories consists of the forgone return on the capital invested in the inventories and the various tax costs. The after-tax cost of a marginal unit of inventory capital is thus $q_I(R^f - \pi + u\pi + (t_L + t_p(1-u)))$. As above, profit maximization requires $MRP_I(1-u) = q_I(R^f - \pi + u\pi + (t_L + t_p(1-u)))$, or, in rate of return form:

$$R_I^s = \frac{R^f - \pi + u\pi + (t_L + t_p(1-u))}{1-u} \quad (14)$$

2.2.3.3 The Non-Renewable Resource Sector

The discussion above focusses exclusively on tangible capital employed in the non-resource sector. The non-renewable resource sector – mining and oil and gas – deserves separate treatment, because of its special characteristics and the special features of the tax system applied to it. Most important in this regard are the tax treatment of E&D and the incorporation of special resource levies imposed on the resource sector by the provinces.

With respect to the latter, the treatment of provincial resource levies, specifically mining taxes imposed upon businesses involved in mining and royalties imposed upon oil and gas companies, is an important consideration. A somewhat contentious issue concerns whether these levies should be treated as a tax or a cost in the calculation of METRs. While from the perspective of the firms employed in the extraction of non-renewable resources this distinction is largely meaningless – at a simple level they are concerned with the cost of employing inputs and producing output, not with how or why a cost arises – the matter can be important to policy makers. The approach taken in this study is to treat provincial resource levies as a cost; however, we also present calculations where they are treated as a tax for comparative purposes. Even in the case where resource levies are treated as a cost, mining tax and royalty rates still affect the METRs because of the way that such levies interact with the corporate income tax system. Particularly important in this regard is the fact that such levies are not deductible for federal corporate income tax purposes, rather, a federal resource allowance is granted instead (more on this below).

The Oil and Gas Sector

Oil and gas royalty systems are quite complex. For our purposes, it is convenient to simplify the regime by assuming that a simple average royalty rate applies. In fact, royalty rates vary by production, year of discovery, and the price of oil or gas. As indicated above, royalties are not deductible for federal CIT purposes, but are for provincial purposes.²⁰ In lieu of the deduction of

¹⁹ For more on taxation and the cost of holding inventories, see Boadway, Bruce and Mintz (1982).

²⁰ With over 90% of oil and gas production occurring in Alberta, we model the Alberta system only.

royalties, at the federal level, a resource allowance equal to 25 percent of revenues net of operating costs and CCA deductions is granted. Notably, the resource allowance base is not reduced by interest expenses or Canadian Exploration Expenses (CEE). The implications of this will be discussed below. For the oil and gas sector, the after-CIT and after-royalty marginal revenue product for input i is $MRP_i(1-g-u_f(1+s_f)(1-\sigma)-u_p(1-g))$, where σ is the federal resource allowance rate and g is the effective royalty rate; this can be written as $MRP_i(1-g)(1-u_f(1-\sigma)(1+s_f)(1-g)-u_p)$. The after-tax marginal revenue product reflects the fact that royalties are deductible for provincial CIT purposes, but not for federal CIT purposes, where a resource allowance is granted instead.

For physical assets in the oil and gas sector (structures and machinery), the after-tax cost of capital is $q_K(1+t_s)(R^f+\delta-\pi)(1-\phi-(u_f(1-\sigma)+u_p)A+(t_L+t_p(1-u))/(R^f+\alpha))$, which incorporates the LCT and provincial capital taxes and any sales taxes levied on physical capital, and reflects the deductibility of CCA deductions from the resource allowance base. As above, the optimality condition involves the employment of capital up to the point where the after-tax marginal revenue product of capital is equal to its after-tax marginal cost, or $MRP_K(1-g)(1-u_f(1-\sigma)(1+s_f))/(1-g)-u_p = q_K(1+t_s)(R^f+\delta-\pi)(1-\phi-(u_f(1-\sigma)+u_p)A+(t_L+t_p(1-u))/(R^f+\alpha))$. As before, this condition can be expressed in rate of return terms by defining the gross-of-tax and royalty rate of return on a marginal unit of capital as $R_K^g = MRP_K / q_K - \delta$. Expressed in this way, oil and gas royalties are treated as a tax, and we have:

$$R_K^g = \frac{(1+t_s)(R^f+\delta-\pi)(1-\phi-(u_f(1-\sigma)+u_p)A+(t_L+t_p(1-u))/(R^f+\alpha))}{(1-g)(1-u_f(1-\sigma)(1+s_f))/(1-g)-u_p} - \delta \quad (15)$$

If royalties are treated as a cost rather than a tax, we define the gross-of-tax, net-of-royalty rate of return as $R_K^g = MRP_K(1-g) - \delta$, giving:

$$R_K^g = \frac{(1+t_s)(R^f+\delta-\pi)(1-\phi-(u_f(1-\sigma)+u_p)A+(t_L+t_p(1-u))/(R^f+\alpha))}{(1-u_f(1-\sigma)(1+s_f))/(1-g)-u_p} - \delta \quad (16)$$

Equations (15) and (16) differ from one another in that the former (where royalties are treated as a tax for measurement purposes) multiplies the denominator by $(1-g)$, while the latter (where royalties are treated as a cost) does not. However, in the latter case, royalties still affect the gross-of-tax, net-of-royalty rate of return, so long as the resource allowance rate (σ) does not equal the royalty rate (g).

The formulas for the gross-of-tax marginal rates of return on investments in inventories and land in the oil and gas sector are straightforward to adjust in a similar way, so they are not reported here.

As discussed above, not only do non-renewable resource firms face a different tax regime than other sectors, they also invest in different types of capital. Of particular interest in this regard is E&D. The formulas for E&D follow the basic methodology presented above, with the exception that E&D is portrayed as a point-input, point-output process (see Boadway, Bruce, McKenzie and Mintz (1987)). This means that E&D expenditures produce output in the year they are incurred. While a flow-input, flow-output type process might be more realistic – whereby E&D expenditures take place over time and generate a flow of output into the future – this modelling approach has not been attempted before, and poses various technical problems.

Canadian Exploration Expenses in the oil and gas sector are expensed for CIT purposes. Moreover, unlike CCA deductions, they do not reduce the resource allowance base. This means that CEE are deducted at a higher rate than the resulting revenues are taxed, which tends to lower the METR. Provincial capital taxes and the LCT also do not apply to CEE. The marginal cost of a unit of exploration is $1 - u_f - u_p$, which reflects the fact that CEE are written off immediately for tax purposes and do not reduce the resource allowance base. Treating royalties as a tax, the after-tax marginal revenues are $MRP_{CEE}(1 - g)(1 - u_f(1 - \sigma)(1 + s_f))/(1 - g) - u_p$, which reflects the fact that exploration expenditures are deductible for provincial income tax purposes (in Alberta), but not for federal tax purposes. When royalties are treated as a tax, the gross-of-tax rate of return on CEE is simply:

$$R_{CEE}^g = \frac{1 - u_f - u_p}{(1 - g)(1 - u_f(1 - \sigma)(1 + s_f))/(1 - g) - u_p} \quad (17)$$

When royalties are treated as a cost, the expression becomes:

$$R_{CEE}^g = \frac{1 - u_f - u_p}{1 - u_f(1 - \sigma)(1 + s_f)/(1 - g) - u_p} \quad (18)$$

A similar expression exists for Canadian Development Expenses (CDE), except that it is adjusted to take account of the fact that these expenditures are written off over time rather than deducted immediately.

The Mining Sector

The mining sector faces the same issues discussed with respect to oil and gas. However, there are some important differences that make the treatment of mining more difficult. These differences involve the treatment of provincial mining taxes, which are more complicated to incorporate into the modelling framework than oil and gas royalties. While royalties are represented as a simple levy on gross oil and gas revenues, most provincial mining tax systems grant various deductions and allowances for capital expenses and E&D. Moreover, these regimes vary substantially across the provinces. To simplify matters, the METR model incorporates the provincial mining tax regimes of B.C., Ontario and Quebec only; these provinces account for over 70 percent of mining investment in Canada. The mining tax regimes in these provinces are quite complicated,

therefore, we limit our discussion here to a simplified system. For a more extensive discussion, see Boadway and McKenzie (1989), and Boadway, McKenzie and Mintz (1990).

The simplified mining tax system presented here allows physical capital to be written off over time, generating a deduction of A_m in present value terms. The mining tax rate is denoted u_m . For simplicity, we ignore various processing and other allowances offered under provincial mining tax regimes, although they are incorporated into the calculations presented later.²¹ For physical assets in the mining sector (structures and machinery), the after-tax cost of capital is $q_K(1+t_s)(R^f + \delta - \pi)(1 - \phi - (u_f(1 - \sigma) + u_p)A - u_m A_m + (t_L + t_p(1 - u))/(R^f + \alpha))$, which incorporates the LCT at the federal level, provincial capital taxes and sales taxes on machinery, and which reflects the deductibility of CCA from the resource allowance base. Following the by now familiar approach, the optimality condition involves the employment of capital up to the point where the after-tax marginal revenue product of capital is equal to its after-tax marginal cost, that is $MRP_K(1 - u_f(1 - \sigma)(1 + s_f) - u_p - u_m(1 - u_p)) = q_K(1 + t_s)(R^f + \delta - \pi)(1 - \phi - (u_f(1 - \sigma) + u_p)A - u_m A_m + (t_L + t_p(1 - u))/(R^f + \alpha))$. As before, this condition can be expressed in rate of return terms by defining the gross-of-tax and gross-of-royalty rate of return on a marginal unit of capital as $R_K^g = MRP_K / q_K - \delta$. Expressed in this way, mining taxes are treated as a tax, and we have:

$$R_K^g = \frac{(R^f + \delta - \pi)(1 - \phi - (u_f(1 - \sigma_f) + u_p)A - u_m A_m + (t_L + t_p(1 - u))/(R^f + \alpha))}{1 - u_f(1 - \sigma)(1 + s_f) - u_p - u_m(1 - u_p)} - \delta \quad (19)$$

If mining taxes are treated as a cost rather than a tax, we define the gross-of-tax, net-of-mining-taxes rate of return as $R_K^g = MRP_K(1 - u_m)/(1 - u_m A_m) - \delta$. After rearranging, this yields:

$$R_K^g = \frac{(R^f + \delta - \pi)(1 - \phi - (u_f(1 - \sigma_f)A + u_p(A - u_m A_m))/(1 - u_m A_m) + (t_L + t_p(1 - u))/(R^f + \alpha))}{1 - u_f(1 - \sigma)(1 + s_f)/(1 - u_m) - u_p} - \delta \quad (20)$$

Exploration and development expenditures are typically written off immediately for mining tax purposes. Following the same approach as for oil and gas, when mining taxes are treated as a tax, the gross-of-tax rate of return on E&D is simply:

$$R_{ED}^g = \frac{1 - u_f - u_p - u_m}{1 - u_f(1 - \sigma)(1 + s_f) - u_p - u_m(1 - u_p)} \quad (21)$$

²¹ Most provincial mining tax systems grant processing allowances, which provide additional write-offs for processing assets up to a maximum expressed as a share of taxable income. For our purposes, we assume that the maximum restrictions of the processing allowances are binding.

When mining taxes are treated as a cost, the expression becomes:

$$R_{ED}^g = \frac{1 - u_f - u_p}{1 - u_f(1 - \sigma)(1 + s_f)/(1 - g) - u_p} \quad (22)$$

Non-Renewable Resources in the United States

For the U.S. non-renewable resource sector, the tax regimes in Nevada and Texas were used for the mining and oil and gas respectively. As in Canada, the taxation of the resource sector in the U.S. is quite complicated and contains numerous special provisions. Here we briefly discuss some of these provisions and their treatment within the METR model.

The federal government in the United States imposes a 2 percent production royalty on the net value of minerals extracted from federal lands; this royalty is deductible for the federal corporate income tax. The treatment of exploration expenses in the U.S. is quite complicated. Firms have two choices with respect to the recovery of the costs associated with exploration expenses:

1. 70 percent of exploration costs may be expensed in the year incurred, with the remainder recovered in a straight-line fashion over 60 months; if this treatment is chosen, the expenses must be subsequently recaptured after achieving production; or
2. exploration costs may be capitalized and recovered through a depletion allowance.

For purposes of calculating METRs for the U.S. non-renewable resource sector, we presumed that the second method is used. This was done primarily for simplicity, as there are substantial analytical difficulties in modelling the U.S. recapture provisions. There are two methods for determining the depletion allowance in the United States. The first, cost depletion, involves dividing the depletable cost of the property by the estimated recoverable reserve to arrive at a unit cost. The unit cost is then multiplied by current unit sales, to arrive at cost depletion for the taxable year. The second, percentage depletion, involves multiplying gross income from the property by a specified depletion allowance rate, which varies depending upon the mineral product. The percentage depletion deduction is limited to 50 percent of the net income of the property. Taxpayers may continue to claim percentage depletion even after the full depletable capital investment in the property has been recovered by prior depletion claims. For our calculations, we presume the use of percentage depletion. Moreover, we assume that the 50 percent limit on the depletion allowance is binding. For modelling purposes, this amounts to reducing the corporate income tax rate by 50 percent.

With regard to development expenditures, firms also have two options. They may capitalize 100 percent of the expenses and amortize them on a unit of sales basis; or, they may deduct up to 70 percent of the expenses immediately, and amortize the remaining 30 percent over a 60-month period. If the latter option is chosen, there is no recapture required for the development expenditures. We presumed that development expenditures were recovered using the second approach. Post-development costs in the United States can be fully expensed, and no recapture is required.

Tax provisions specific to the mining sector in Nevada include the following. Nevada imposes no corporate income tax at the state level. However, a progressive minerals extraction tax is imposed on net proceeds. The rate ranges from 2 percent to 5 percent, depending on the ratio of net proceeds to gross proceeds. A sales tax of 6.5 percent is applied to the purchase of machinery and equipment, and a tax on the transfer of property is levied at a rate of 0.13 percent.

With regard to the treatment of oil and gas in Texas, there is also no corporate income tax at the state level. A severance tax is imposed on gross production at a rate of 4.6 percent, which is deductible for federal corporate income tax purposes. The aggregate royalty is 16.67 percent, which consists of both federal and state royalties on gross revenue. A sales tax of 6.25 percent is applied to the purchase of machinery and equipment. There is no tax on the transfer of property in Texas.

With these assumptions in hand, it is straightforward to modify the METR formulas described above to undertake similar calculations for the mining and oil and gas sectors in the United States.

2.2.3.4 Research and Development

Expenditures on R&D receive special treatment under the corporate income tax. Expenditures on both labour and machinery and equipment related to scientific research are written off immediately. Moreover, the federal government grants these expenditures a tax credit (the scientific research and experimental development tax credit). The treatment of R&D varies substantially across the provinces. To simplify matters, only the R&D regime in Ontario was incorporated into the analysis.

To calculate METRs for R&D, we distinguish between labour inputs into the R&D process and capital inputs. Labour inputs are treated much like E&D in the resource sector, except, of course, that the tax treatment is different. The after-tax cost of a unit of labour employed in R&D is $(1-\phi)(1-u_f-u_p(1+\omega))$, where ϕ is the SR&ED tax credit rate and ω is the Ontario superallowance rate. The after-tax marginal revenue from labour R&D is $MRP_{RDL}(1-u_f-u_p)$. R&D labour will be employed up to the point where the after-tax marginal cost is equal to the after-tax marginal revenue. Defining $R_L^g = MRP_{RDL}$:

$$R_L^g = \frac{(1-\phi)(1-u_f-u_p(1+\omega))}{1-u_f(1+s_f)-u_p} \quad (23)$$

For capital equipment expenditures on R&D, we follow the same procedure as above to obtain:

$$R_K^g = \frac{(R^f + \delta - \pi)(1-\phi)(1-u_f-u_p(1+\omega))}{1-u_f(1+s_f)-u_p} \quad (24)$$

Note that expenditures on equipment used in R&D are deducted immediately, which means that the present value of the deductions on a one dollar expenditure is one dollar (thus, $A=1$).

2.2.3.5 Input METRs

We are now in a position to determine the marginal effective tax rates on the capital inputs used in the METR on cost expressions (the t_i 's). As discussed above, for capital inputs to yield R^n after personal taxes, a marginal investment must earn $R = \beta i + (1 - \beta)\rho - \pi$ after corporate taxes (and net-of-depreciation). The METR on input i is defined as the tax rate which, if applied to the net-of-corporate-tax rate of return R , yields the gross-of-tax rate of return R_i^g , or $(1 + t_i)R = R_i^g$, or

$$t_i = \frac{R_i^g - R}{R} \quad (25)$$

Using this expression, and the various formulas for R^g discussed above, METRs may be calculated on each of the capital inputs.²² For labour, E&D and labour type R&D, which are modelled on a point-input, point-output basis, the R in the expression may be viewed as being normalized to unity.

2.2.4 METRs for the G-7 Countries and Mexico

With regard to the calculation of METRs for the G-7 countries plus Mexico, the formulas for Canada were modified to account for specific features of the tax systems in each of the countries.²³ Some of the key tax parameters incorporated into the model are shown in Table A.13 (Appendix A). It should be noted that for all of the countries, except the United States, a great deal of aggregation was required, as we lacked disaggregated data for these countries. For the United States, more disaggregated information was available, and thus a disaggregated METR model much like that developed for Canada was used.²⁴

3. Results

Before we present the results, it is important to briefly discuss the features of the federal and provincial tax systems that are included in the METR model. The interested reader should refer to Appendixes A, B and C for more detail.

At the federal level, the present value of depreciation deductions arising from the declining-balance depreciation of physical assets under the capital cost allowance (CCA) system reflects differences in CCA rates across asset types, straight-line treatment for some assets, and the half-year rule. The statutory tax rates reflect differences in the proportion of income subject to the lower manufacturing and processing rate across sectors, as well as the lower rate faced by

²² This differs slightly with some of the METR literature, which expresses METRs relative to the gross-of-tax rate of return rather than the net-of-tax rate of return. The approach adopted here is consistent with the METR on cost orientation of the study. See McKenzie, Mintz and Scharf (1997).

²³ Refer to McKenzie and Chen (1997) for detailed modifications to the METR formulas that take into account some of the special features of the country tax systems.

²⁴ For more on the calculation of METRs for the U.S., see McKenzie and Mintz (1992) and references therein.

small Canadian-controlled private corporations (CCPCs). The model also incorporates special tax credits for investments in qualifying regions and activities, the deductibility of interest expenses for tax purposes, and the FIFO treatment of inventories. Similar provisions at the provincial level are also reflected in the model, although we do not incorporate some of the special investment allowances and tax holidays that are available in some provinces. For the non-renewable resource sectors of oil and gas and mining, most of the features of provincial mining tax and royalty regimes are incorporated in the model, although some simplifying assumptions had to be made for analytical tractability. The LCT at the federal level, as well as taxes levied on capital by some provinces, are incorporated into the model. We do not include local property taxes in the model because of the very wide variation in both the effective property tax rate across localities and the lack of a consistent data set. For taxes on labour, as discussed above and in Appendix B, payroll taxes associated with the CPP and EI programs at the federal level, as well as provincial payroll taxes are incorporated into the analysis.

In this section, we report the Canadian METRs on production inputs and METRs on cost, for the base case and for selected alternative scenarios. The results are presented for 12 industries, three firm groups (large, small, and combined large and small), and the seven production inputs discussed in Section 2: four tangible inputs (structures, machinery, land and inventories), two intangible inputs (E&D and R&D), and labour.²⁵ The tables in this section show the METRs for each of the seven production inputs individually (expressed with respect to net-of-tax returns), as well as several aggregations. For example, the METRs on tangible capital are aggregated together, as are the METRs on tangible and intangible capital. The overall METR on costs, including tangible and intangible capital as well as labour, is reported in the final column of each table.

In order to keep the discussion simple, the emphasis will be on two types of comparisons. First, for a given scenario, the METRs show three types of distortions caused by the tax system:

- distortions across firm sizes, which come mainly from a preferential treatment of small companies relative to large companies;
- distortions across production inputs, which come mainly from differing CCA rates relative to economic depreciation rates, investment tax credit rates, and statutory tax rates on tangible and intangible inputs versus labour; and
- distortions across industries, which come from a combination of all these tax factors, coupled with differences in input shares and firm sizes.

The second type of comparisons is between scenarios. These comparisons show the direction and magnitude of change in the METRs as well as the change in the distortions mentioned above.

²⁵ We do not report METR results separately for the capital and current components of R&D because more than 90% of scientific research and experimental development (SR&ED) expenditures are current in nature (e.g. salaries and benefits for research staff). It is assumed here that all SR&ED expenditures constitute an intangible input, although the METR on R&D is calculated as a weighted average of METRs on capital and current SR&ED expenditures.

3.1 The Base Case

Table 3.1-A shows the METRs for the base case, which are reported in the Technical Committee's main report.²⁶ The base case assumptions are consistent with the Canadian corporate tax system in 1997 (see Appendixes A and B). As discussed above, payroll tax rates are reported on a net-of-benefit basis, under the assumption that the economic incidence of payroll taxes is congruent with the statutory incidence; the rates also incorporate CPP and EI rates that are consistent with the sustainable system envisioned in 2003 (see Appendix B).

Although the calculations speak largely for themselves, and are discussed in the Technical Committee's report, we note the following:

- small firms are treated more favourably than large firms;
- METRs on tangible capital are appreciably higher than those on intangible capital and labour; and
- service industries are treated less favourably than non-service industries such as agriculture and forestry, non-renewable resources and construction.

The METRs on large firms are appreciably higher than those on small firms for all of the inputs individually and for marginal cost. For example, the METR on investments in structures and inventories by large firms is three times as high as that on investments by small firms. This is due to the much lower tax rates faced by small CCPCs. This also helps explain why the gap between total METRs on investment in machinery for large and small firms is less important – CCA deductions are more valuable for large firms because they are subject to higher tax rates. Note also that the METR on labour for large firms is slightly higher than that for small firms, due to exemptions from payroll taxes granted to small firms in some provinces (see Appendix B).

The second type of distortion caused by the tax system is across the various production inputs. In Table 3.1-A (Large and Small Firms), note that tangible capital is taxed much more heavily than intangible capital and labour. In the case of R&D, the system provides a subsidy through the SR&ED tax credit and generous write-offs for current and some capital expenditures. E&D in the resource sector also faces very low METRs because of fast write-offs for these expenditures. Also of note is the low METR on machinery in the manufacturing industry (for both the large and small-firms groups). This arises because of the relatively fast write-off rate for equipment used in manufacturing. Finally, note that the distortions across the various inputs vary between large and small firms. For example, the METR on investment in inventories by large firms is appreciably higher than the METR on machinery (60.2 percent versus 24.4 percent); for small firms, inventories and machinery face similar METRs (19.8 percent versus 21.8 percent). The differential METRs on individual inputs across large and small firms largely reflects the differences in statutory tax rates.

²⁶ The figures in this table are based on input cost excluding taxes. Table 3.1-B shows METRs on capital, expressed with respect to gross-of-tax returns. The comparative analysis that follows is not affected by how METRs are expressed (see methodology in Section 2 for more detail).

The third type of distortion caused by the tax system is across industries. The Large and Small Firms section of Table 3.1-A shows that overall, METRs for agriculture, forestry, non-renewable resources, construction and retail trade are lower than those for the other industries. Looking at METRs on cost by industry for large and small firms separately, the picture is about the same, which suggests that size is not an important factor, except perhaps for manufacturing and services in the small-firms group.

Table 3.1-C considers further the variation in METRs on capital by reporting three weighted dispersion measures: inter-asset, inter-industry and overall dispersion, by firm size.²⁷ As expected, the overall dispersion is the highest, since it reflects inter-industry, inter-asset and inter-size variations in METRs.²⁸ The asset dispersion is higher than the industry dispersion for both the large- and small-firms groups, which suggests that inter-asset distortions caused by the tax system are larger than inter-industry distortions. Further analysis showed that on average, R&D METRs account for about 40 percent of the inter-asset dispersion, and 30 percent of the overall dispersion; from Table 3.1-A, recall that the METRs on R&D are negative and high.

3.2 Alternative Scenarios

In this subsection, various alternative scenarios are considered. The purpose of these scenarios is to examine the sensitivity of the METRs to various economic and tax parameters. In each scenario, only one factor is modified, the others remain equal to the base case. The remainder of this subsection outlines these scenarios and reports the METR results.

3.2.1 Industry-Specific Debt-Asset Ratios

In the base case, the capital structure of all firms was fixed at 40 percent debt-financing and 60 percent equity-financing. Given that interest is deductible for tax purposes while dividends are paid out of after-tax income, we would expect the METRs to decrease as the debt-asset ratio

²⁷ The dispersion measures are based on Jog and Mintz (1989). The overall dispersion is calculated as

$[\sum_i \sum_j w_{ij} (t_{ij} - \bar{t})^2]^{1/2}$, the industry dispersion is $[\sum_j w_j [\sum_i w_{ij} (t_{ij} - \bar{t}_j)^2]]^{1/2}$, and the asset dispersion is

$[\sum_i w_i [\sum_j w_{ij} (t_{ij} - \bar{t}_i)^2]]^{1/2}$, where i is the industry index, j is the asset index, t is the METR, \bar{t} is the average METR,

and the w 's are the normalized weights. In this table, the dispersion measures are based on METRs expressed with respect to gross-of-tax returns; in Section 5 (Table 5.2-B and 5.2-C), we report dispersion in METRs on capital and labour, based on METRs expressed with respect to input costs after taxes. The aggregation level used in the calculation of the dispersions is the same one used to report METR results in this section, that is 12 industries and seven inputs (structures, machinery, land, inventories, E&D, R&D and labour). Note that labour was excluded from the results in Table 3.1-C and 5.2-A, but it was included in Table 5.2-B and 5.2-C. The dispersion measures reported in Table 3.1-A and 5.2-A were also calculated using the lowest aggregation level available (i.e. 35 industries, seven structure types, 20 machinery types, two E&D types and R&D); the results are similar for the overall and asset dispersion, but tend to be lower for the industry dispersion.

²⁸ Note that the dispersion measures in the column "Large and Small Firms" are based on METRs for large and small firms taken separately, rather than on average METRs. The number of observations used in calculating these measures is therefore twice that used in the calculation of the dispersion measures reported in the "Large Firms" and "Small Firms" columns.

increases. Table 3.2-A reports METRs with industry-specific debt-asset ratios, and Table 3.2-B reports the change in METRs (in percentage points) between this scenario and the base case.²⁹

Table 3.2-B shows that, compared to the base case, METRs increase for industries with debt-asset ratios lower than 0.4, and decrease for those whose debt-asset ratios are higher. Note also that the change in METRs is more important for large firms than for small firms; this is due to the fact that large firms are subject to higher statutory tax rates, which yield higher tax values for interest deductions.

3.2.2 Non-Tax-Paying Firms

The base case, as well as all other scenarios considered in this section, assume that firms are in a tax-paying position. In this scenario, we calculate METRs for non-tax-paying firms. The methodology used is based upon Mintz (1988). Non-capital losses in a given year can be carried forward seven years or back three years, to reduce taxable income in those years. Such losses are therefore valuable to the company, only if it can use them against future (seven years) or past (three years) profits; otherwise they are “expired losses.” Non-capital losses impact the METRs through the statutory corporate income tax rate; \$1 of loss in a given year can be seen as reducing the statutory income tax rate by a loss utilization factor equal to $1/(1+\rho)^T$, where ρ is the cost of equity financing and T is the number of years that elapse before the \$1 loss expires. The methodology used to calculate the loss utilization factor for each sector is discussed in Appendix A.

Tables 3.3-A and 3.4-A report the METRs for non-tax-paying firms and combined tax-paying and non-tax-paying firms respectively; Tables 3.3-B and 3.4-B report the difference (in percentage points) between Table 3.3-A and the base case and Table 3.4-A and the base case respectively.

Note that METRs for non-tax-paying firms are lower than those for tax-paying firms. From the formula for the loss utilization rate in Appendix A, it is easy to see that the higher this rate, the lower the METR.

3.2.3 Resource Levies Treated as a Tax

Tables 3.5-A and 3.5-B report METRs for the resource sector treating resource levies as a tax, and the difference between this scenario and the base case respectively.³⁰ Not surprisingly, the METRs increase when resource levies are treated as a tax. Note in particular the substantial

²⁹ The industry-specific debt-asset ratios are derived from Jog (1997); see Appendix A for more detail. For the purpose of this simulation, it is assumed that small firms have the same debt-asset ratio as large firms in a given industry. This assumption would tend to underestimate the METRs for small firms, since we would expect them to have lower debt-asset ratios.

³⁰ The most important levies are mining taxes and oil and gas royalties. Recall that the mining sector is represented by British Columbia, Ontario and Quebec, and the oil and gas sector is represented by Alberta.

increase in METRs, especially for structures and machinery in the mining industry; the input structures in this industry includes investments in new mines and major expansion of existing mines, which are fully expensed for federal income tax purposes.

3.2.4 Alternative Assumptions Regarding Payroll Taxes

In this last subsection, we analyse the impact of alternative assumptions regarding the burden of payroll taxes on METRs. Three scenarios were considered: (a) METRs on labour reflect 1997 CPP/QPP and EI rates, gross-of-benefits;³¹ (b) METRs on labour are those in scenario (a), but they include workers' compensation, (i.e. workers' compensation is treated as a tax on labour rather than a form of insurance provided by employers); (c) firms bear only two thirds of their statutory share of payroll taxes, one third is shifted to the employee.³² The METRs for these three scenarios are reported in Tables 3.6-A, 3.6-B and 3.6-C respectively.

Note the difference between the METRs on labour expressed gross-of-benefits of funded programs versus those expressed net-of-benefits, 8.0 percent versus 2.7 percent on average. The METRs on labour in scenario (b), which treats workers' compensation payments as a tax, yields the highest METRs; compared to the base case, the increase is especially important for agriculture, forestry and construction. In scenario (c), there is a reduction in METRs on labour, and consequently METRs on cost, as one third of the burden of labour taxes is assumed to be shifted to the employee through lower wages and benefits.

³¹ Recall that in the base case, labour METRs are expressed net of estimated benefits of funded programs. CPP/QPP and EI rates are those expected to be effective when current changes are completely phased in shortly after 2000.

³² Labour METRs in this scenario are those of the base case.

TABLE 3.1-A
METRs on Inputs: The Base Case

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	43.5	15.0	32.7	63.0	48.7		-24.1	45.4	-5.2	0.9
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.3	2.7	5.7
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	1.4	4.5
Manufacturing	30.2	9.4	28.8	54.7	31.6		-21.5	27.0	3.2	8.8
Construction	57.2	45.0	35.0	67.7	60.3		-20.0	59.9	-0.6	5.5
Transportation	34.7	36.8	35.4	68.5	39.8		-25.3	39.5	3.2	8.3
Communications	35.7	54.5	35.4	68.5	40.3		-21.7	35.2	4.4	15.4
Public Utilities	38.6	42.2	35.5	68.7	44.5		-23.7	44.4	4.5	26.9
Wholesale Trade	30.7	36.0	33.8	65.3	54.9		-23.0	51.7	3.6	10.4
Retail Trade	15.2	53.1	35.1	67.8	53.2		-23.1	53.0	3.0	7.5
Other Services	33.4	55.6	34.9	67.1	40.1		-23.1	39.5	2.7	9.7
All Industries	31.9	24.4	33.9	60.2	38.4	0.2	-21.9	33.3	2.8	9.4
Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	-5.4	1.6
Forestry	13.3	14.5	10.2	20.4	14.7		-33.2	14.5	-5.4	-2.9
Mining										
Oil and Gas										
Manufacturing	7.6	5.5	10.2	20.4	12.0		-28.1	9.8	3.0	4.6
Construction	16.7	31.3	10.2	20.4	21.6		-29.5	21.5	-0.9	1.7
Transportation	8.5	21.8	10.2	20.4	19.2		-29.2	19.0	2.9	5.3
Communications	8.4	33.5	10.2	20.4	28.7		-30.8	27.3	4.0	10.8
Public Utilities	9.7	18.4	10.2	20.4	17.7		-20.7	17.4	4.2	12.0
Wholesale Trade	6.0	29.9	10.2	20.4	20.4		-28.9	19.4	3.3	5.7
Retail Trade	4.0	35.0	10.2	20.4	20.3		-29.7	20.3	2.6	4.3
Other Services	9.4	29.4	10.2	20.4	13.2		-28.5	12.2	2.3	4.3
All Industries	9.0	21.8	10.2	19.8	15.6		-28.4	14.6	2.4	5.1
Large and Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	-5.3	1.6
Forestry	29.2	14.6	12.4	44.2	21.7		-25.9	20.9	-5.3	-2.1
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.4	2.7	5.8
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	1.4	4.5
Manufacturing	27.1	8.8	23.8	48.0	28.1		-22.5	24.0	3.2	8.1
Construction	38.1	32.9	19.0	35.2	34.3		-27.9	34.2	-0.8	3.0
Transportation	26.5	31.9	20.1	61.1	33.2		-26.4	32.9	3.1	7.4
Communications	35.7	53.7	34.6	65.0	40.2		-21.7	34.9	4.4	15.1
Public Utilities	38.4	36.1	32.2	67.8	42.6		-23.2	42.5	4.5	25.8
Wholesale Trade	20.3	32.9	22.9	39.6	35.8		-24.9	33.9	3.5	7.9
Retail Trade	8.8	43.9	17.2	33.2	31.4		-28.1	31.3	2.7	5.5
Other Services	20.0	39.5	19.0	42.6	24.4		-27.0	23.5	2.4	6.6
All Industries	23.4	23.5	18.4	40.8	28.3	0.2	-23.6	25.3	2.7	7.6

Note: In all the tables reported in Section 3, except Table 3.1-B, METRs are expressed with respect to input costs excluding taxes. Columns labelled "Total" reflect from left to right: total METRs on tangible inputs, total METRs on tangible and intangible inputs and METRs on costs.

TABLE 3.1-B
METRs on Capital: The Base Case

	Tangible Inputs				Total	Intangible Inputs		Total
	Structures	Machinery	Land	Inventories		E&D	R&D	
				(percent)				
Large Firms								
Agriculture, Fishing and Trapping								
Forestry	30.3	13.1	24.7	38.7	31.7		-31.8	28.8
Mining	0.1	15.5	20.7	35.0	17.8	0.1	-29.7	8.7
Oil and Gas	10.9	20.3	23.9	38.6	24.7	0.3	-35.3	5.5
Manufacturing	23.2	8.6	22.4	35.3	22.3		-27.4	17.9
Construction	36.4	31.0	25.9	40.4	37.4		-24.9	37.0
Transportation	25.8	26.9	26.2	40.7	28.2		-33.8	27.9
Communications	26.3	35.3	26.2	40.6	28.5		-27.7	23.9
Public Utilities	27.9	29.7	26.2	40.7	30.4		-31.1	30.3
Wholesale Trade	23.5	26.5	25.3	39.5	34.8		-29.9	32.1
Retail Trade	13.2	34.7	26.0	40.4	33.5		-30.0	33.3
Other Services	25.0	35.7	25.9	40.2	28.2		-30.1	27.6
All Industries	24.2	19.6	25.3	37.6	27.0	0.2	-28.0	22.8
Small Firms								
Agriculture, Fishing and Trapping	5.8	7.6	9.2	9.3	8.5		-42.7	7.9
Forestry	11.8	12.7	9.2	16.9	12.8		-49.7	12.6
Mining								
Oil and Gas								
Manufacturing	7.1	5.2	9.2	16.9	10.4		-39.0	7.6
Construction	14.3	23.8	9.2	16.9	17.6		-41.8	17.5
Transportation	7.9	17.9	9.2	16.9	15.9		-41.3	15.7
Communications	7.7	25.1	9.2	16.9	21.8		-44.4	20.2
Public Utilities	8.9	15.5	9.2	16.9	15.0		-26.0	14.7
Wholesale Trade	5.6	23.0	9.2	16.9	16.7		-40.5	15.5
Retail Trade	3.9	26.0	9.2	16.9	16.4		-42.3	16.4
Other Services	8.6	22.7	9.2	16.9	11.4		-39.8	10.1
All Industries	8.3	17.9	9.2	16.5	13.3		-39.8	12.1
Large and Small Firms								
Agriculture, Fishing and Trapping	5.8	7.6	9.2	9.3	8.5		-42.7	7.9
Forestry	22.6	12.7	11.0	30.6	17.2		-35.0	16.3
Mining	0.1	15.5	20.7	35.0	17.8	0.1	-29.7	8.8
Oil and Gas	10.9	20.3	23.9	38.6	24.7	0.3	-35.3	5.5
Manufacturing	21.3	8.1	19.2	32.5	20.5		-29.1	16.5
Construction	27.6	24.7	16.0	26.0	25.5		-38.6	25.3
Transportation	21.0	24.2	16.7	37.9	24.6		-35.8	24.4
Communications	26.3	34.9	25.7	39.4	28.5		-27.7	23.6
Public Utilities	27.8	26.5	24.4	40.4	29.5		-30.3	29.4
Wholesale Trade	16.8	24.8	18.6	28.4	26.2		-33.1	24.3
Retail Trade	8.1	30.5	14.7	24.9	23.3		-39.0	23.2
Other Services	16.6	28.3	15.9	29.9	19.3		-36.9	18.2
All Industries	18.9	19.0	15.6	29.0	21.8	0.2	-30.9	19.0

Note: METRs are expressed with respect to gross-of-tax return on investments.

TABLE 3.1-C
Dispersion in METRs on Capital

	Large Firms	Small Firms	All Firms
		(percent)	
Overall Dispersion	16.6	9.6	15.7
Industry Dispersion	6.7	3.9	9.4
Asset Dispersion	14.3	8.7	12.5

Note: The dispersion measures are based on METRs on tangible and intangible capital expressed with respect to gross-of-tax returns (see Table 3.1-B). The aggregation level used is 12 industries and six assets (structures, machinery, land, inventories, E&D and R&D). See Appendix A for more detail on the aggregation structure of the METR model.

TABLE 3.2-A
METRs on Inputs: Industry-Specific Debt-Asset Ratios

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	57.5	26.5	46.8	78.1	62.9		-24.0	58.9	-5.2	2.2
Mining	10.8	30.4	40.3	69.0	39.0	0.4	-22.6	20.2	2.7	7.8
Oil and Gas	24.4	38.5	46.8	79.2	50.1	0.5	-25.6	11.2	1.4	5.9
Manufacturing	33.0	12.6	33.1	59.4	35.3		-21.5	30.3	3.2	9.5
Construction	58.2	46.0	36.1	68.8	61.4		-20.0	60.9	-0.6	5.6
Transportation	26.8	29.2	27.0	59.6	32.0		-25.5	31.7	3.2	7.3
Communications	25.9	44.3	25.0	57.4	30.4		-21.8	26.1	4.4	12.3
Public Utilities	22.8	26.9	19.0	51.1	28.4		-24.0	28.3	4.5	18.1
Wholesale Trade	35.5	40.7	39.0	70.7	60.2		-22.9	56.8	3.6	11.0
Retail Trade	22.5	61.4	43.7	77.0	61.8		-23.0	61.6	3.0	8.1
Other Services	34.4	56.6	36.0	68.2	41.1		-23.1	40.5	2.7	9.9
All Industries	31.1	25.8	35.7	65.2	40.0	0.4	-21.9	34.7	2.8	9.7
Small Firms										
Agriculture, Fishing and Trapping										
Forestry	18.7	19.9	15.5	26.1	20.2		-33.3	19.9	-5.4	-2.3
Mining										
Oil and Gas										
Manufacturing	9.8	7.5	12.6	22.3	14.0		-28.1	11.7	3.0	5.1
Construction	17.1	31.7	10.6	20.8	22.0		-29.5	21.9	-0.9	1.7
Transportation	5.7	18.8	7.3	17.3	16.1		-29.2	16.0	2.9	4.9
Communications	4.9	29.3	6.6	16.6	24.6		-30.7	23.4	4.0	9.7
Public Utilities	4.2	12.5	4.6	14.4	11.9		-20.7	11.6	4.2	8.6
Wholesale Trade	7.8	32.0	12.0	22.4	22.4		-28.9	21.3	3.3	6.0
Retail Trade	6.8	38.5	13.2	23.6	23.5		-29.8	23.5	2.6	4.6
Other Services	9.8	29.8	10.6	20.8	13.6		-28.5	12.5	2.3	4.3
All Industries	9.7	22.9	10.9	21.6	16.8		-28.5	15.8	2.4	5.4
Large and Small Firms										
Agriculture, Fishing and Trapping										
Forestry	38.7	20.3	18.5	54.5	28.8		-25.9	27.8	-5.3	-1.4
Mining	10.8	30.4	40.3	69.0	39.0	0.4	-22.6	20.2	2.7	7.8
Oil and Gas	24.4	38.5	46.8	79.2	50.1	0.5	-25.6	11.3	1.4	5.9
Manufacturing	29.8	11.8	27.6	52.2	31.5		-22.5	27.1	3.2	8.8
Construction	38.8	33.3	19.6	35.8	34.9		-27.9	34.8	-0.8	3.1
Transportation	20.4	25.8	15.2	53.3	27.0		-26.5	26.8	3.1	6.6
Communications	25.8	43.8	24.4	54.5	30.3		-21.9	25.9	4.4	12.1
Public Utilities	22.7	23.4	17.2	50.5	27.3		-23.5	27.2	4.5	17.5
Wholesale Trade	23.6	36.2	26.4	42.9	39.1		-24.8	37.1	3.5	8.3
Retail Trade	13.4	49.7	21.5	37.8	36.2		-28.1	36.1	2.7	5.9
Other Services	20.6	40.1	19.5	43.3	25.1		-27.0	24.1	2.4	6.7
All Industries	23.1	24.8	19.5	44.1	29.7	0.4	-23.6	26.6	2.7	7.9

Note: Industry-specific debt-asset ratios are shown in Table A.12 (Appendix A).

TABLE 3.2-B
Change in METRs on Inputs: Industry-Specific Debt-Asset Ratios
vs. The Base Case (in percentage points)

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	14.0	11.5	14.1	15.0	14.2		0.1	13.5	0.0	1.3
Mining	10.7	12.1	14.2	15.1	12.8	0.2	0.3	6.9	0.0	2.0
Oil and Gas	12.3	13.1	15.4	16.4	14.1	0.2	0.5	3.3	0.0	1.4
Manufacturing	2.8	3.1	4.3	4.8	3.7		0.0	3.4	0.0	0.8
Construction	1.1	1.0	1.1	1.1	1.1		0.0	1.1	0.0	0.1
Transportation	-7.9	-7.6	-8.4	-8.9	-7.8		-0.3	-7.8	0.0	-1.0
Communications	-9.8	-10.1	-10.4	-11.1	-9.9		-0.1	-9.1	0.0	-3.1
Public Utilities	-15.9	-15.3	-16.5	-17.6	-16.1		-0.3	-16.0	0.0	-8.7
Wholesale Trade	4.8	4.7	5.1	5.5	5.2		0.1	5.0	0.0	0.6
Retail Trade	7.3	8.3	8.6	9.2	8.6		0.1	8.6	0.0	0.6
Other Services	1.0	1.0	1.1	1.1	1.0		0.0	1.0	0.0	0.2
All Industries	-0.9	1.4	1.8	5.0	1.6		0.0	1.5	0.0	0.3
Small Firms										
Agriculture, Fishing and Trapping	1.3	1.4	1.2	1.2	1.3		0.0	1.3	0.0	0.6
Forestry	5.4	5.4	5.3	5.7	5.4		-0.1	5.4	0.0	0.6
Mining										
Oil and Gas										
Manufacturing	2.2	2.0	2.4	2.0	2.0		0.0	1.9	0.0	0.5
Construction	0.4	0.4	0.4	0.4	0.4		0.0	0.4	0.0	0.0
Transportation	-2.8	-3.1	-2.9	-3.1	-3.0		0.0	-3.0	0.0	-0.4
Communications	-3.5	-4.1	-3.6	-3.8	-4.0		0.0	-3.9	0.0	-1.1
Public Utilities	-5.6	-5.9	-5.6	-6.0	-5.9		0.0	-5.8	0.0	-3.4
Wholesale Trade	1.8	2.1	1.9	2.0	2.0		0.0	1.9	0.0	0.3
Retail Trade	2.8	3.5	3.0	3.2	3.2		0.0	3.2	0.0	0.3
Other Services	0.4	0.4	0.4	0.4	0.4		0.0	0.4	0.0	0.1
All Industries	0.7	1.1	0.7	1.9	1.2		0.0	1.1	0.0	0.2
Large and Small Firms										
Agriculture, Fishing and Trapping	1.3	1.4	1.2	1.2	1.3		0.0	1.3	0.0	0.6
Forestry	9.5	5.7	6.0	10.4	7.1		0.1	6.9	0.0	0.7
Mining	10.7	12.1	14.2	15.1	12.8	0.2	0.3	6.9	0.0	2.0
Oil and Gas	12.3	13.1	15.4	16.4	14.1	0.2	0.5	3.3	0.0	1.4
Manufacturing	2.7	3.0	3.8	4.1	3.4		0.0	3.1	0.0	0.7
Construction	0.7	0.5	0.6	0.6	0.6		0.0	0.6	0.0	0.1
Transportation	-6.1	-6.0	-4.9	-7.9	-6.2		-0.2	-6.2	0.0	-0.8
Communications	-9.8	-9.9	-10.2	-10.5	-9.8		-0.1	-9.0	0.0	-3.1
Public Utilities	-15.8	-12.7	-15.0	-17.3	-15.3		-0.2	-15.3	0.0	-8.4
Wholesale Trade	3.4	3.3	3.5	3.3	3.3		0.1	3.2	0.0	0.4
Retail Trade	4.6	5.7	4.4	4.5	4.8		0.0	4.8	0.0	0.4
Other Services	0.6	0.6	0.6	0.7	0.6		0.0	0.6	0.0	0.1
All Industries	-0.2	1.3	1.1	3.3	1.4	0.2	0.0	1.3	0.0	0.2

TABLE 3.3-A
METRs on Inputs: Non-Tax-Paying Firms

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	12.4	15.0	10.0	15.8	14.5		-22.6	12.8	-5.2	-2.8
Mining	-0.8	6.6	8.6	13.3	6.5	0.1	-20.8	3.0	2.7	2.7
Oil and Gas	3.2	9.3	11.1	18.4	11.2	0.2	-24.3	2.5	1.4	1.9
Manufacturing	11.9	10.4	14.1	22.5	15.4		-20.1	12.3	3.2	5.5
Construction	26.9	33.9	17.3	30.9	28.6		-18.4	28.3	-0.6	2.7
Transportation	13.3	21.1	14.4	24.4	20.0		-24.2	19.8	3.2	5.7
Communications	14.3	36.2	14.3	24.6	19.5		-20.1	16.2	4.4	8.7
Public Utilities	11.1	26.1	10.4	16.5	15.0		-22.2	15.0	4.5	10.6
Wholesale Trade	15.1	28.0	16.5	29.4	26.7		-21.8	24.8	3.6	6.9
Retail Trade	7.3	36.5	14.4	24.8	25.0		-21.8	24.9	3.0	5.2
Other Services	14.3	38.7	14.9	25.9	18.6		-21.9	18.2	2.7	5.8
All Industries	13.3	18.9	14.8	24.3	18.2	0.1	-20.5	15.3	2.8	5.7
Small Firms										
Agriculture, Fishing and Trapping	0.0	4.9	2.6	2.6	2.9		-29.1	2.6	-5.4	-1.5
Forestry	7.1	12.8	5.5	10.9	11.9		-32.8	11.7	-5.4	-3.2
Mining										
Oil and Gas										
Manufacturing	2.5	4.2	4.3	8.4	5.6		-27.3	3.8	3.0	3.1
Construction	9.3	28.1	5.7	11.4	14.6		-29.0	14.5	-0.9	0.9
Transportation	4.1	17.1	5.0	10.0	14.3		-28.7	14.1	2.9	4.6
Communications	1.5	25.4	1.9	3.7	20.5		-30.0	19.3	4.0	8.5
Public Utilities	6.9	17.3	7.3	14.7	16.4		-20.2	16.0	4.2	11.2
Wholesale Trade	3.1	25.9	5.5	11.0	12.6		-28.3	11.8	3.3	4.6
Retail Trade	1.6	28.6	4.3	8.6	11.1		-29.1	11.1	2.6	3.4
Other Services	3.2	24.1	3.5	7.8	6.5		-27.6	5.6	2.3	2.9
All Industries	3.3	18.0	3.6	9.2	8.5		-27.7	7.7	2.4	3.6
Large and Small Firms										
Agriculture, Fishing and Trapping	0.0	4.9	2.6	2.6	2.9		-29.1	2.6	-5.3	-1.4
Forestry	10.2	13.0	6.0	14.0	12.5		-24.6	11.8	-5.3	-3.1
Mining	-0.8	6.6	8.6	13.3	6.5	0.1	-20.8	3.0	2.7	2.7
Oil and Gas	3.2	9.3	11.1	18.4	11.2	0.2	-24.3	2.5	1.4	1.9
Manufacturing	10.8	9.4	11.6	20.1	13.8		-21.2	11.0	3.2	5.1
Construction	19.3	28.8	10.1	18.2	19.6		-27.2	19.5	-0.8	1.5
Transportation	10.7	19.9	9.0	22.6	18.3		-25.5	18.1	3.1	5.4
Communications	14.2	35.9	13.9	23.3	19.5		-20.2	16.1	4.4	8.6
Public Utilities	11.1	24.0	10.0	16.5	15.1		-21.9	15.0	4.5	10.6
Wholesale Trade	10.3	26.9	11.7	19.6	19.5		-23.9	18.1	3.5	5.7
Retail Trade	4.1	32.6	7.4	13.7	16.3		-27.3	16.3	2.7	4.1
Other Services	8.3	30.0	7.8	17.2	11.8		-26.1	11.1	2.4	4.2
All Industries	9.8	18.6	7.7	17.7	14.3	0.1	-22.4	12.4	2.7	4.9

Note: See Appendix A for a discussion on the calculation of METRs on non-tax-paying firms, and in particular Table A.11, which reports loss utilization rates and proportions of tax-paying firms, by industry.

TABLE 3.3-B
Change in METRs on Inputs: Non-Tax-Paying Firms vs. The Base Case
(in percentage points)

	Tangible Inputs				Total	Intangible Inputs		Total Labour	Total	
	Structures	Machinery	Land	Inventories		E&D	R&D			
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	-31.0	0.0	-22.7	-47.2	-34.3		1.6	-32.6	0.0	-3.6
Mining	-1.0	-11.8	-17.4	-40.6	-19.7	-0.1	2.0	-10.3	0.0	-3.0
Oil and Gas	-9.0	-16.1	-20.3	-44.4	-24.7	-0.1	1.8	-5.5	0.0	-2.5
Manufacturing	-18.3	1.0	-14.7	-32.1	-16.2		1.4	-14.7	0.0	-3.3
Construction	-30.2	-11.1	-17.8	-36.8	-31.7		1.6	-31.5	0.0	-2.9
Transportation	-21.4	-15.7	-21.0	-44.1	-19.8		1.0	-19.7	0.0	-2.6
Communications	-21.4	-18.2	-21.2	-43.9	-20.8		1.5	-19.0	0.0	-6.7
Public Utilities	-27.5	-16.1	-25.2	-52.2	-29.4		1.5	-29.4	0.0	-16.2
Wholesale Trade	-15.6	-8.0	-17.3	-35.9	-28.2		1.1	-27.0	0.0	-3.5
Retail Trade	-7.8	-16.5	-20.7	-43.0	-28.2		1.3	-28.2	0.0	-2.3
Other Services	-19.1	-16.9	-20.1	-41.2	-21.5		1.2	-21.3	0.0	-3.9
All Industries	-18.6	-5.4	-19.1	-35.9	-20.2	-0.1	1.4	-17.9	0.0	-3.7
Small Firms										
Agriculture, Fishing and Trapping	-6.2	-3.3	-7.6	-7.7	-6.4		0.8	-6.3	0.0	-3.0
Forestry	-6.2	-1.7	-4.7	-9.4	-2.8		0.4	-2.8	0.0	-0.3
Mining										
Oil and Gas										
Manufacturing	-5.1	-1.3	-5.9	-12.0	-6.4		0.8	-6.0	0.0	-1.5
Construction	-7.4	-3.2	-4.5	-9.0	-7.0		0.5	-7.0	0.0	-0.8
Transportation	-4.4	-4.8	-5.1	-10.3	-4.9		0.6	-4.9	0.0	-0.7
Communications	-6.9	-8.1	-8.3	-16.7	-8.2		0.8	-8.0	0.0	-2.3
Public Utilities	-2.8	-1.1	-2.9	-5.7	-1.4		0.5	-1.4	0.0	-0.8
Wholesale Trade	-2.9	-4.0	-4.7	-9.4	-7.8		0.5	-7.6	0.0	-1.1
Retail Trade	-2.5	-6.5	-5.9	-11.7	-9.2		0.6	-9.2	0.0	-0.9
Other Services	-6.2	-5.3	-6.7	-12.6	-6.7		0.8	-6.5	0.0	-1.4
All Industries	-5.8	-3.8	-6.6	-10.6	-7.1		0.8	-6.9	0.0	-1.5
Large and Small Firms										
Agriculture, Fishing and Trapping	-6.2	-3.3	-7.6	-7.7	-6.4		0.8	-6.3	0.0	-3.0
Forestry	-19.0	-1.6	-6.4	-30.2	-9.3		1.3	-9.1	0.0	-1.0
Mining	-1.0	-11.8	-17.4	-40.6	-19.7	-0.1	2.0	-10.3	0.0	-3.0
Oil and Gas	-9.0	-16.1	-20.3	-44.4	-24.7	-0.1	1.8	-5.5	0.0	-2.5
Manufacturing	-16.4	0.6	-12.2	-28.0	-14.3		1.3	-13.0	0.0	-3.0
Construction	-18.8	-4.0	-9.0	-17.0	-14.7		0.6	-14.7	0.0	-1.5
Transportation	-15.8	-12.0	-11.1	-38.6	-14.9		0.9	-14.8	0.0	-2.0
Communications	-21.4	-17.9	-20.7	-41.7	-20.7		1.5	-18.7	0.0	-6.5
Public Utilities	-27.3	-12.1	-22.2	-51.4	-27.5		1.3	-27.5	0.0	-15.2
Wholesale Trade	-9.9	-6.0	-11.2	-20.0	-16.3		0.9	-15.8	0.0	-2.2
Retail Trade	-4.7	-11.3	-9.8	-19.6	-15.0		0.8	-15.0	0.0	-1.4
Other Services	-11.6	-9.5	-11.2	-25.4	-12.6		0.9	-12.3	0.0	-2.4
All Industries	-13.6	-4.9	-10.7	-23.2	-14.1	-0.1	1.2	-13.0	0.0	-2.8

Note: See Table A.11 (Appendix A) for the proportions of tax-paying firms, by industry.

TABLE 3.4-A
METRs on Inputs: Combined Tax-Paying and Non-Tax-Paying Firms

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	17.7	14.9	13.9	23.7	20.2		-22.8	18.2	-5.2	-2.1
Mining	-1.1	7.7	10.6	17.7	8.5	0.2	-21.1	4.1	2.7	3.1
Oil and Gas	6.1	14.6	18.0	33.1	19.4	0.3	-24.9	4.4	1.4	2.9
Manufacturing	16.5	11.0	19.2	33.4	20.8		-20.7	17.2	3.2	6.7
Construction	34.7	37.2	21.8	40.1	36.6		-18.8	36.3	-0.6	3.5
Transportation	18.4	25.1	20.1	35.5	25.0		-24.5	24.8	3.2	6.4
Communications	27.5	49.3	27.1	50.6	32.8		-21.0	28.3	4.4	13.0
Public Utilities	30.7	40.6	28.2	52.5	36.4		-23.1	36.3	4.5	22.6
Wholesale Trade	22.4	32.7	24.5	45.5	39.6		-22.3	37.1	3.6	8.5
Retail Trade	9.3	41.5	19.5	35.3	32.2		-22.1	32.0	3.0	5.8
Other Services	20.8	45.1	21.6	39.3	25.9		-22.3	25.4	2.7	7.2
All Industries	20.6	21.9	21.2	36.0	25.6	0.3	-21.1	21.9	2.8	7.1
Small Firms										
Agriculture, Fishing and Trapping	3.2	6.5	6.6	6.7	6.2		-29.6	5.8	-5.4	0.1
Forestry	11.2	13.9	8.6	17.2	13.7		-33.1	13.5	-5.4	-3.0
Mining										
Oil and Gas										
Manufacturing	5.4	4.8	7.7	15.2	9.2		-27.7	7.2	3.0	4.0
Construction	12.8	29.6	7.9	15.7	18.0		-29.2	17.9	-0.9	1.3
Transportation	6.3	19.7	7.6	15.7	16.9		-29.0	16.8	2.9	5.0
Communications	4.3	28.6	5.3	10.5	23.7		-30.3	22.5	4.0	9.4
Public Utilities	8.7	18.0	9.2	18.4	17.3		-20.5	16.9	4.2	11.7
Wholesale Trade	4.8	28.2	8.3	16.6	17.2		-28.6	16.3	3.3	5.2
Retail Trade	2.9	32.1	7.6	15.1	16.2		-29.5	16.1	2.6	4.0
Other Services	6.3	26.6	6.9	14.0	9.9		-28.1	8.9	2.3	3.6
All Industries	6.2	20.0	7.0	15.0	12.3		-28.1	11.4	2.4	4.4
Large and Small Firms										
Agriculture, Fishing and Trapping	3.2	6.5	6.6	6.7	6.2		-29.6	5.8	-5.3	0.1
Forestry	14.9	14.0	9.2	21.2	15.2		-24.9	14.5	-5.3	-2.8
Mining	-1.1	7.7	10.6	17.7	8.5	0.2	-21.1	4.1	2.7	3.1
Oil and Gas	6.1	14.6	18.0	33.1	19.4	0.3	-24.9	4.4	1.4	2.9
Manufacturing	15.1	10.0	16.3	30.2	18.9		-21.8	15.6	3.2	6.2
Construction	25.1	30.5	13.1	24.1	24.6		-27.5	24.4	-0.8	2.1
Transportation	14.9	23.4	12.8	32.9	22.5		-25.8	22.3	3.1	6.0
Communications	27.4	48.6	26.4	47.8	32.6		-21.0	28.0	4.4	12.8
Public Utilities	30.6	34.8	25.8	52.0	35.0		-22.7	34.9	4.5	21.9
Wholesale Trade	15.2	30.4	17.2	29.7	27.7		-24.3	26.0	3.5	6.9
Retail Trade	5.7	36.9	11.2	21.3	22.1		-27.6	22.0	2.7	4.6
Other Services	12.9	34.0	12.4	26.8	16.8		-26.5	16.0	2.4	5.2
All Industries	15.4	21.2	12.2	26.6	20.0	0.3	-22.9	17.7	2.7	6.1

TABLE 3.4-B
Change in METRs on Inputs: Combined Tax Paying and Non-Tax-Paying Firms
vs. The Base Case (in percentage points)

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	-25.8	-0.1	-18.8	-39.4	-28.5	0.0	1.3	-27.1	0.0	-3.0
Mining	-1.2	-10.7	-15.4	-36.2	-17.7	0.0	1.8	-9.2	0.0	-2.7
Oil and Gas	-6.0	-10.8	-13.4	-29.7	-16.6	0.0	1.2	-3.6	0.0	-1.6
Manufacturing	-13.7	1.6	-9.6	-21.3	-10.8	0.0	0.8	-9.8	0.0	-2.1
Construction	-22.5	-7.8	-13.2	-27.6	-23.7	0.0	1.2	-23.5	0.0	-2.1
Transportation	-16.3	-11.8	-15.3	-33.0	-14.8	0.0	0.8	-14.8	0.0	-1.9
Communications	-8.3	-5.1	-8.3	-17.9	-7.6	0.0	0.7	-6.9	0.0	-2.4
Public Utilities	-7.9	-1.6	-7.3	-16.2	-8.1	0.0	0.6	-8.0	0.0	-4.3
Wholesale Trade	-8.3	-3.4	-9.4	-19.8	-15.3	0.0	0.7	-14.7	0.0	-1.8
Retail Trade	-5.9	-11.6	-15.6	-32.5	-21.1	0.0	1.0	-21.0	0.0	-1.7
Other Services	-12.6	-10.4	-13.3	-27.8	-14.2	0.0	0.9	-14.1	0.0	-2.5
All Industries	-11.3	-2.5	-12.6	-24.2	-12.8	0.0	0.8	-11.4	0.0	-2.3
Small Firms										
Agriculture, Fishing and Trapping	-3.0	-1.7	-3.6	-3.6	-3.0	0.0	0.4	-3.0	0.0	-1.4
Forestry	-2.1	-0.6	-1.6	-3.2	-1.0	0.0	0.1	-1.0	0.0	-0.1
Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil and Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manufacturing	-2.2	-0.6	-2.5	-5.2	-2.8	0.0	0.4	-2.6	0.0	-0.6
Construction	-3.8	-1.7	-2.3	-4.7	-3.7	0.0	0.2	-3.6	0.0	-0.4
Transportation	-2.2	-2.1	-2.6	-4.7	-2.2	0.0	0.2	-2.2	0.0	-0.3
Communications	-4.1	-4.9	-4.9	-9.8	-4.9	0.0	0.5	-4.8	0.0	-1.4
Public Utilities	-1.0	-0.4	-1.0	-2.0	-0.5	0.0	0.2	-0.5	0.0	-0.3
Wholesale Trade	-1.2	-1.7	-1.9	-3.8	-3.2	0.0	0.2	-3.1	0.0	-0.4
Retail Trade	-1.1	-2.9	-2.6	-5.3	-4.1	0.0	0.3	-4.1	0.0	-0.4
Other Services	-3.1	-2.8	-3.3	-6.4	-3.4	0.0	0.4	-3.3	0.0	-0.7
All Industries	-2.9	-1.8	-3.2	-4.8	-3.3	0.0	0.4	-3.2	0.0	-0.7
Large and Small Firms										
Agriculture, Fishing and Trapping	-3.0	-1.7	-3.6	-3.6	-3.0	0.0	0.4	-3.0	0.0	-1.4
Forestry	-14.2	-0.6	-3.2	-23.0	-6.5	0.0	1.1	-6.4	0.0	-0.7
Mining	-1.2	-10.7	-15.4	-36.2	-17.7	0.0	1.8	-9.2	0.0	-2.7
Oil and Gas	-6.0	-10.8	-13.4	-29.7	-16.6	0.0	1.2	-3.6	0.0	-1.6
Manufacturing	-12.1	1.2	-7.6	-17.9	-9.2	0.0	0.7	-8.4	0.0	-1.8
Construction	-13.0	-2.4	-5.9	-11.1	-9.8	0.0	0.4	-9.7	0.0	-1.0
Transportation	-11.6	-8.5	-7.3	-28.2	-10.7	0.0	0.6	-10.6	0.0	-1.4
Communications	-8.3	-5.1	-8.2	-17.3	-7.6	0.0	0.7	-6.8	0.0	-2.3
Public Utilities	-7.8	-1.2	-6.4	-15.9	-7.5	0.0	0.6	-7.5	0.0	-4.0
Wholesale Trade	-5.1	-2.5	-5.7	-10.0	-8.1	0.0	0.5	-7.8	0.0	-1.1
Retail Trade	-3.1	-7.1	-6.0	-12.0	-9.2	0.0	0.4	-9.2	0.0	-0.8
Other Services	-7.0	-5.5	-6.6	-15.8	-7.6	0.0	0.5	-7.4	0.0	-1.4
All Industries	-7.9	-2.3	-6.3	-14.2	-8.3	0.0	0.7	-7.6	0.0	-1.6

TABLE 3.5-A
METRs on Inputs: Resource Levies Treated as a Tax

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Mining	143.9	174.5	33.8	65.7	112.9	5.1	-22.9	61.0	2.7	17.7
Oil and Gas	64.6	88.8	56.5	101.3	87.1	20.4	-26.1	34.9	1.4	18.2

TABLE 3.5-B
Change in METRs on Inputs: Resource Levies Treated as a Tax
vs. The Base Case (in percentage points)

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percentage points)									
Mining	143.8	156.2	7.7	11.8	86.7	5.0	0.0	47.7	0.0	11.9
Oil and Gas	52.4	63.3	25.1	38.5	51.1	20.2	0.0	26.9	0.0	13.8

TABLE 3.6-A
METRs on Inputs: Labour METRs are Gross-of-Benefits, 1997

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	43.5	15.0	32.7	63.0	48.7		-24.1	45.4	7.6	12.4
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.3	7.6	8.9
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	4.9	6.0
Manufacturing	30.2	9.4	28.8	54.7	31.6		-21.5	27.0	8.3	12.6
Construction	57.2	45.0	35.0	67.7	60.3		-20.0	59.9	7.9	13.3
Transportation	34.7	36.8	35.4	68.5	39.8		-25.3	39.5	7.9	12.5
Communications	35.7	54.5	35.4	68.5	40.3		-21.7	35.2	8.0	17.7
Public Utilities	38.6	42.2	35.5	68.7	44.5		-23.7	44.4	7.6	28.3
Wholesale Trade	30.7	36.0	33.8	65.3	54.9		-23.0	51.7	8.1	14.3
Retail Trade	15.2	53.1	35.1	67.8	53.2		-23.1	53.0	8.2	12.3
Other Services	33.4	55.6	34.9	67.1	40.1		-23.1	39.5	8.1	14.3
All Industries	31.9	24.4	33.9	60.2	38.4	0.2	-21.9	33.3	8.1	13.6
Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	7.5	8.1
Forestry	13.3	14.5	10.2	20.4	14.7		-33.2	14.5	7.5	8.4
Mining										
Oil and Gas										
Manufacturing	7.6	5.5	10.2	20.4	12.0		-28.1	9.8	8.1	8.4
Construction	16.7	31.3	10.2	20.4	21.6		-29.5	21.5	7.5	9.2
Transportation	8.5	21.8	10.2	20.4	19.2		-29.2	19.0	7.7	9.4
Communications	8.4	33.5	10.2	20.4	28.7		-30.8	27.3	7.5	13.3
Public Utilities	9.7	18.4	10.2	20.4	17.7		-20.7	17.4	7.3	13.3
Wholesale Trade	6.0	29.9	10.2	20.4	20.4		-28.9	19.4	7.7	9.5
Retail Trade	4.0	35.0	10.2	20.4	20.3		-29.7	20.3	7.8	9.0
Other Services	9.4	29.4	10.2	20.4	13.2		-28.5	12.2	7.7	8.6
All Industries	9.0	21.8	10.2	19.8	15.6		-28.4	14.6	7.8	9.3
Large and Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	7.5	8.1
Forestry	29.2	14.6	12.4	44.2	21.7		-25.9	20.9	7.5	9.2
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.4	7.6	9.0
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	4.9	6.0
Manufacturing	27.1	8.8	23.8	48.0	28.1		-22.5	24.0	8.3	11.9
Construction	38.1	32.9	19.0	35.2	34.3		-27.9	34.2	7.6	10.6
Transportation	26.5	31.9	20.1	61.1	33.2		-26.4	32.9	7.9	11.5
Communications	35.7	53.7	34.6	65.0	40.2		-21.7	34.9	7.9	17.4
Public Utilities	38.4	36.1	32.2	67.8	42.6		-23.2	42.5	7.6	27.3
Wholesale Trade	20.3	32.9	22.9	39.6	35.8		-24.9	33.9	7.9	11.8
Retail Trade	8.8	43.9	17.2	33.2	31.4		-28.1	31.3	7.9	10.2
Other Services	20.0	39.5	19.0	42.6	24.4		-27.0	23.5	7.8	11.0
All Industries	23.4	23.5	18.4	40.8	28.3	0.2	-23.6	25.3	8.0	11.8

TABLE 3.6-B
METRs on Inputs: Labour METRs are Gross-of-Benefits and Workers' Compensation Contributions are Treated as a Tax

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories	(percent)	E&D	R&D			
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	43.5	15.0	32.7	63.0	48.7		-24.1	45.4	15.3	19.1
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.3	11.6	11.5
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	10.8	8.5
Manufacturing	30.2	9.4	28.8	54.7	31.6		-21.5	27.0	10.7	14.4
Construction	57.2	45.0	35.0	67.7	60.3		-20.0	59.9	13.6	18.5
Transportation	34.7	36.8	35.4	68.5	39.8		-25.3	39.5	11.1	15.3
Communications	35.7	54.5	35.4	68.5	40.3		-21.7	35.2	11.3	19.8
Public Utilities	38.6	42.2	35.5	68.7	44.5		-23.7	44.4	9.3	29.1
Wholesale Trade	30.7	36.0	33.8	65.3	54.9		-23.0	51.7	9.3	15.4
Retail Trade	15.2	53.1	35.1	67.8	53.2		-23.1	53.0	9.4	13.4
Other Services	33.4	55.6	34.9	67.1	40.1		-23.1	39.5	9.6	15.5
All Industries	31.9	24.4	33.9	60.2	38.4	0.2	-21.9	33.3	10.3	15.3
Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	15.2	11.9
Forestry	13.3	14.5	10.2	20.4	14.7		-33.2	14.5	15.2	15.1
Mining										
Oil and Gas										
Manufacturing	7.6	5.5	10.2	20.4	12.0		-28.1	9.8	10.5	10.1
Construction	16.7	31.3	10.2	20.4	21.6		-29.5	21.5	13.2	14.2
Transportation	8.5	21.8	10.2	20.4	19.2		-29.2	19.0	10.9	12.2
Communications	8.4	33.5	10.2	20.4	28.7		-30.8	27.3	10.8	15.7
Public Utilities	9.7	18.4	10.2	20.4	17.7		-20.7	17.4	9.0	14.0
Wholesale Trade	6.0	29.9	10.2	20.4	20.4		-28.9	19.4	9.0	10.5
Retail Trade	4.0	35.0	10.2	20.4	20.3		-29.7	20.3	9.0	10.1
Other Services	9.4	29.4	10.2	20.4	13.2		-28.5	12.2	9.2	9.8
All Industries	9.0	21.8	10.2	19.8	15.6		-28.4	14.6	9.9	11.0
Large and Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	15.2	11.9
Forestry	29.2	14.6	12.4	44.2	21.7		-25.9	20.9	15.2	15.9
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.4	11.6	11.5
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	10.8	8.5
Manufacturing	27.1	8.8	23.8	48.0	28.1		-22.5	24.0	10.7	13.7
Construction	38.1	32.9	19.0	35.2	34.3		-27.9	34.2	13.3	15.7
Transportation	26.5	31.9	20.1	61.1	33.2		-26.4	32.9	11.1	14.3
Communications	35.7	53.7	34.6	65.0	40.2		-21.7	34.9	11.2	19.6
Public Utilities	38.4	36.1	32.2	67.8	42.6		-23.2	42.5	9.3	28.1
Wholesale Trade	20.3	32.9	22.9	39.6	35.8		-24.9	33.9	9.2	12.9
Retail Trade	8.8	43.9	17.2	33.2	31.4		-28.1	31.3	9.1	11.3
Other Services	20.0	39.5	19.0	42.6	24.4		-27.0	23.5	9.3	12.2
All Industries	23.4	23.5	18.4	40.8	28.3	0.2	-23.6	25.3	10.2	13.5

TABLE 3.6-C
METRs on Inputs: Labour METRs are Net of Benefits and
Firms Bear Two Thirds of Payroll Taxes

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories	(percent)	E&D	R&D			
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	43.5	15.0	32.7	63.0	48.7		-24.1	45.4	-3.5	2.5
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.3	1.8	5.2
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	0.9	4.3
Manufacturing	30.2	9.4	28.8	54.7	31.6		-21.5	27.0	2.2	7.9
Construction	57.2	45.0	35.0	67.7	60.3		-20.0	59.9	-0.4	5.7
Transportation	34.7	36.8	35.4	68.5	39.8		-25.3	39.5	2.1	7.4
Communications	35.7	54.5	35.4	68.5	40.3		-21.7	35.2	3.0	14.4
Public Utilities	38.6	42.2	35.5	68.7	44.5		-23.7	44.4	3.0	26.1
Wholesale Trade	30.7	36.0	33.8	65.3	54.9		-23.0	51.7	2.4	9.3
Retail Trade	15.2	53.1	35.1	67.8	53.2		-23.1	53.0	2.0	6.5
Other Services	33.4	55.6	34.9	67.1	40.1		-23.1	39.5	1.8	9.0
All Industries	31.9	24.4	33.9	60.2	38.4	0.2	-21.9	33.3	1.9	8.6
Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	-3.6	2.5
Forestry	13.3	14.5	10.2	20.4	14.7		-33.2	14.5	-3.6	-1.3
Mining										
Oil and Gas										
Manufacturing	7.6	5.5	10.2	20.4	12.0		-28.1	9.8	2.0	3.9
Construction	16.7	31.3	10.2	20.4	21.6		-29.5	21.5	-0.6	1.9
Transportation	8.5	21.8	10.2	20.4	19.2		-29.2	19.0	1.9	4.5
Communications	8.4	33.5	10.2	20.4	28.7		-30.8	27.3	2.7	9.9
Public Utilities	9.7	18.4	10.2	20.4	17.7		-20.7	17.4	2.8	11.4
Wholesale Trade	6.0	29.9	10.2	20.4	20.4		-28.9	19.4	2.2	4.7
Retail Trade	4.0	35.0	10.2	20.4	20.3		-29.7	20.3	1.7	3.6
Other Services	9.4	29.4	10.2	20.4	13.2		-28.5	12.2	1.5	3.7
All Industries	9.0	21.8	10.2	19.8	15.6		-28.4	14.6	1.6	4.5
Large and Small Firms										
Agriculture, Fishing and Trapping	6.2	8.2	10.2	10.3	9.2		-29.9	8.9	-3.6	2.5
Forestry	29.2	14.6	12.4	44.2	21.7		-25.9	20.9	-3.6	-0.5
Mining	0.1	18.4	26.0	53.9	26.2	0.1	-22.9	13.4	1.8	5.2
Oil and Gas	12.2	25.4	31.4	62.8	35.9	0.3	-26.1	8.0	0.9	4.3
Manufacturing	27.1	8.8	23.8	48.0	28.1		-22.5	24.0	2.1	7.3
Construction	38.1	32.9	19.0	35.2	34.3		-27.9	34.2	-0.5	3.3
Transportation	26.5	31.9	20.1	61.1	33.2		-26.4	32.9	2.1	6.5
Communications	35.7	53.7	34.6	65.0	40.2		-21.7	34.9	2.9	14.2
Public Utilities	38.4	36.1	32.2	67.8	42.6		-23.2	42.5	3.0	25.1
Wholesale Trade	20.3	32.9	22.9	39.6	35.8		-24.9	33.9	2.3	6.9
Retail Trade	8.8	43.9	17.2	33.2	31.4		-28.1	31.3	1.8	4.6
Other Services	20.0	39.5	19.0	42.6	24.4		-27.0	23.5	1.6	5.9
All Industries	23.4	23.5	18.4	40.8	28.3	0.2	-23.6	25.3	1.8	6.9

4. International Comparisons

In order to provide a point of reference, METRs were also calculated for the G-7 countries and Mexico. While the METR model for Canada is very detailed, the level of detail is much lower for the other countries due to lack of data. In particular, the level of aggregation across industries and asset types is much higher in the METR calculations for the other countries. An exception to this is the United States, for which METRs for a broad range of assets and industries were calculated.³³ Nonetheless, the international comparisons provide a useful benchmark.

The underlying methodology for the international comparisons is identical to that discussed above. An important point to emphasize is that the same input shares used to compute Canadian METRs were employed in the calculation of international METRs, because of the difficulty of obtaining input shares data on a disaggregated basis for the other countries. However, it serves a useful purpose since METRs may be considered more directly comparable to the Canadian METRs in the sense that the differences arise solely due to variations in the tax system, and not to variations in the industrial structure across economies. The approach adopted closely follows a recent paper by Chen and McKenzie (1997).

The first set of comparisons is between Canadian and U.S. METRs. Table 4.1 and Table 4.2 show U.S. METRs for a level of details equal to the Canadian one (see tables in Section 3). Table 4.1 is comparable to Table 3.1-A; this is the base case in both countries.³⁴ Table 4.2 is comparable to Table 3.6-A; this is the scenario where labour METRs in both countries are calculated gross-of-benefits and the 1997 statutory rates apply.

A comparison of the Canadian and U.S. base cases reveals the following patterns:

- As with the Canadian system, the U.S. tax system treats intangible inputs and labour more favourably than tangible inputs.
- METRs on costs in Canada are higher than those in the United States, except for forestry; this exception is mainly due to a lower Canadian METR on labour and, to a lesser extent, a higher tax subsidy for R&D.
- On average, the Canadian system imposes higher METRs on tangible inputs and labour than the U.S. system (except for labour in the forestry industry).
- The Canadian system provides a higher tax subsidy for R&D than the U.S. system.

³³ The structure of the U.S. calculations is as follows: one firm size (large); 12 industries and seven production inputs (the same as those listed in the tables in Section 3); structures were further disaggregated into 14 categories and machinery into 20 categories.

³⁴ Recall that the Canadian base case applies CPP/QPP and EI rates that will prevail after 2000 when current proposed changes are fully phased in.

- The Canadian METR on machinery employed in the manufacturing industry is lower than that in the United States (9.4 percent versus 13.8 percent); this is mainly due to a lower statutory tax rates on M&P income and higher tax depreciation rates on M&P machinery in Canada.
- In the United States, METRs on cost for the transportation and communications industries are appreciably lower than average METRs on cost; in Canada, the METR on cost for transportation is close to the average, and that for communications is appreciably higher than the average.
- Finally, note that the distortion between U.S. service and non-service industries is less important than that in Canada.

Looking at Tables 3.6-A and 4.2, note that only the METRs on labour change (they are gross-of-benefits). Note that Canadian METRs on labour are lower than the U.S. METRs, although marginally so for most industries. However, U.S. METRs on cost remain lower than those in Canada, because METRs on tangible inputs in the United States are lower.

The METR calculations on tangible capital for the G-7 countries and Mexico are presented in Table 4.3. Note that only two industries were considered here: manufacturing and services. The following patterns are worth noting:

- The average Canadian METRs on tangible inputs are lower than those of Germany, Italy and Japan, but higher than those of the United States, the United Kingdom and Mexico, especially in service industries.
- With respect to inter-asset distortions, the Canadian system imposes higher METRs on inventories than all G-7 countries and Mexico. However, METRs on machinery in manufacturing industries are below most G-7 countries and Mexico; this reflects the combined effect of lower statutory tax rates on M&P income and higher tax depreciation rates for M&P machinery and equipment in Canada relative to the other countries.
- The inter-industry variations in Canadian METRs are relatively more important than those in the United States, the United Kingdom, Japan and Mexico, and similar to those in Germany, France and Italy.

TABLE 4.1
U.S. METRs on Inputs: The Base Case

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	25.6	9.1	25.1	34.5	27.6		-18.5	25.4	0.1	3.5
Mining	12.2	19.6	14.1	0.7	8.7	-4.9	-18.9	1.9	-0.3	0.4
Oil and Gas	17.3	26.6	20.1	5.9	16.7	0.3	-18.9	3.9	-0.3	1.9
Manufacturing	34.0	13.8	25.1	34.5	26.5		-18.5	22.5	-0.5	5.2
Construction	28.6	8.6	25.1	34.5	30.3		-18.9	30.1	-0.6	2.8
Transportation	18.2	10.2	25.1	34.5	14.4		-20.3	14.3	0.4	2.5
Communications	9.9	12.4	25.1	34.5	10.8		-18.9	8.3	0.4	3.4
Public Utilities	14.9	11.7	25.1	34.5	17.9		-18.9	17.8	0.4	10.5
Wholesale Trade	26.4	18.9	25.1	34.5	30.7		-19.6	28.6	0.3	4.5
Retail Trade	26.4	17.6	25.1	34.5	27.7		-19.3	27.6	0.5	3.1
Other Services	26.8	19.7	25.1	34.5	26.6		-19.3	26.1	0.4	5.5
All Industries	26.7	13.8	31.6	36.8	26.5	-1.5	-18.9	22.7	0.2	5.2

Note: The columns labelled “Total” reflect from left to right: total METRs on tangible inputs, total METRs on tangible and intangible inputs, and METRs on costs. METRs are expressed with respect to input costs after taxes.

TABLE 4.2
U.S. METRs on Inputs: Labour METRs Are Gross-of-Benefits

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	25.6	9.1	25.1	34.5	27.6		-18.5	25.4	9.3	11.5
Mining	12.2	19.6	14.1	0.7	8.7	-4.9	-18.9	1.9	8.5	5.9
Oil and Gas	17.3	26.6	20.1	5.9	16.7	0.3	-18.9	3.9	8.3	5.6
Manufacturing	34.0	13.8	25.1	34.5	26.5		-18.5	22.5	8.9	12.2
Construction	28.6	8.6	25.1	34.5	30.3		-18.9	30.1	8.9	11.3
Transportation	18.2	10.2	25.1	34.5	14.4		-20.3	14.3	8.7	9.5
Communications	9.9	12.4	25.1	34.5	10.8		-18.9	8.3	8.6	8.3
Public Utilities	14.9	11.7	25.1	34.5	17.9		-18.9	17.8	8.6	13.9
Wholesale Trade	26.4	18.9	25.1	34.5	30.7		-19.6	28.6	8.7	11.7
Retail Trade	26.4	17.6	25.1	34.5	27.7		-19.3	27.6	9.1	11.0
Other Services	26.8	19.7	25.1	34.5	26.6		-19.3	26.1	8.7	12.3
All Industries	26.7	13.8	31.6	36.8	26.5	-1.5	-18.9	22.7	8.8	11.9

Note: The columns labelled “Total” reflect from left to right: total METRs on tangible inputs, total METRs on tangible and intangible inputs, and METRs on costs. METRs are expressed with respect to input costs after taxes.

TABLE 4.3
International Comparisons of METRs on Tangible Inputs:
The G-7 Countries and Mexico – Large Firms

	Tangible Inputs				
	Structures	Machinery	Land	Inventories	Total
	(percent)				
Manufacturing					
Canada	23.2	8.6	22.4	35.3	22.3
United States	25.3	12.2	20.1	25.7	20.5
United Kingdom	17.5	11.9	15.1	28.9	20.1
Germany	34.3	22.8	27.1	27.1	27.5
France	26.0	9.5	24.9	29.4	21.9
Italy	39.6	9.7	22.6	18.3	22.1
Japan	31.3	29.7	35.6	34.6	32.0
Mexico	15.4	10.5	23.8	22.3	16.5
Services					
Canada	25.0	35.7	25.9	40.2	28.2
United States	21.1	16.5	20.1	25.7	20.9
United Kingdom	17.8	22.0	15.1	28.9	19.1
Germany	34.7	37.5	27.1	27.1	33.1
France	26.3	18.6	24.9	29.4	25.5
Italy	40.0	25.6	22.6	18.3	34.1
Japan	31.6	41.4	35.6	34.6	33.9
Mexico	15.6	13.9	23.8	22.3	17.7
Manufacturing and Services					
Canada	24.6	23.2	25.2	38.3	26.2
United States	22.0	14.5	20.1	25.7	20.8
United Kingdom	17.7	17.3	15.1	28.9	19.4
Germany	34.6	30.7	27.1	27.1	31.2
France	26.2	14.4	24.9	29.4	24.3
Italy	39.9	18.2	22.6	18.3	30.1
Japan	31.5	36.0	35.6	34.6	33.3
Mexico	15.6	12.3	23.8	22.3	17.3

Notes:

- METRs are expressed with respect to gross-of-tax returns.
- Services are narrowly defined; they correspond to “Other Services” in the tables reported in Section 3. The METR results for Canada are similar when services are broadly defined (i.e. when they include construction, transportation, communications, public utilities, wholesale trade, retail trade, and other services); the exception is the Canadian METR on machinery, which equals 32% instead of the 35.7% reported in this table. This is mainly due to lower METRs on machinery in the wholesale and retail trade industries.

5. Simulating the Technical Committee's Policy Package

In this last section, we present METR results for the current system adjusted to reflect most of the Committee's recommendations. The purpose of this exercise is to compare the METRs of the Committee's policy package with the base case METRs in Table 3.1-A, and see what changes would occur in the variations in marginal effective tax rates if the government were to implement the Committee's recommendations.

Before we present the results, it is useful to briefly list the Committee's recommendations that were reflected in the simulation; for a full summary of the recommendations, the reader should refer to Chapter 1 of the Committee's main report, and to Chapters 4 to 11 for detailed discussions.

The Committee's proposed changes to statutory corporate tax rates were all reflected in the simulation: the top federal income tax rate of 29.12 percent and the manufacturing and processing rate of 22.12 percent (both including the 4 percent surtax) would be lowered to 20 percent; the small business rate would be increased from 13.12 percent to 14 percent, but there would be an employment tax credit that would reduce that rate by up to 3 percentage points, resulting in an average small business rate of about 12.5 percent. Offsetting the rate reduction, the Committee's proposed base-broadening measures, which were reflected in the simulation, are: changes to CCA rates; changes to the SR&ED tax credit; changes to the taxation of mining and oil and gas industries; elimination of the Atlantic Canada Investment Tax Credit; and elimination of the deductibility of provincial capital taxes.

In addition, two adjustments were made to reflect the Committee's suggestion to the provinces that they reduce their corporate income and capital tax rates by an average amount that would roughly offset the provincial revenue gain from the above base-broadening measures. First, average provincial statutory income tax rates were assumed to be reduced by one percentage point. Second, average provincial capital tax rates were assumed to be reduced from 0.345 percent to 0.276 percent.³⁵

Although most of the Committee's recommendations were reflected in the simulation, some were not taken into account, for two main reasons: (1) the recommendation would have no impact on the Canadian METRs on domestic investment (e.g. changes to the taxation of inbound and outbound investment); or, (2) the recommendation could not be handled within the theoretical framework that we have considered (e.g. efficiency gains in compliance with and enforcement of the corporate tax system).

³⁵ Recall that in the METR model, the tax systems of the provinces and territories are represented by average statutory income and capital tax rates for three types of income (income taxed at the small business rate of 12%, income taxed at the M&P rate of 21%, and income taxed at the 28% federal tax rate) and two firm sizes (large and small. See Appendix A for more detail.

Table 5.1-A reports the METRs of the Committee's policy package, and Table 5.1-B reports the difference (in percentage points) between these METRs and those of the base case (Table 3.1-A).³⁶ In order to evaluate the overall impact of the Committee's package on the distortions caused by the tax system, we report dispersion measures in Tables 5.2-A, 5.2-B and 5.2-C. The numbers in Table 5.2-A measure the dispersion in METRs on capital (structures, machinery, land, inventories, E&D and R&D), expressed with respect to gross-of-tax returns. The numbers in Table 5.2-B measure the dispersion in METRs on capital and labour, expressed with respect to input costs after taxes. Finally, the numbers in Table 5.2-C measure the industry dispersion in METRs on capital and labour separately.³⁷

Compared to the base case, Tables 5.2-A, 5.2-B and 5.2-C all show a decrease in the dispersion in METRs under the Committee's policy package. The main patterns that these tables show are as follows:

- The decrease in the industry dispersion in METRs is much more important than the decrease in the asset/input dispersions. For example, Table 5.2-A shows that the industry dispersion in METRs for large firms decreases from 6.7 percent to 3.9 percent (a 42 percent reduction), while the asset dispersion decreases from 14.3 percent to 11.7 percent (an 18 percent reduction).
- The decrease in the dispersion measures for large firms is generally more appreciable than that for small firms. For example, Table 5.2-A shows that the overall dispersion for large firms decreases by 25 percent (from 16.6 percent to 12.5 percent), while the overall dispersion for small firms decreases by 6 percent (from 9.6 percent to 9.0 percent). Similar comparative results can be obtained from Tables 5.2-B and 5.2-C.

Finally, from Table 5.1-B, we note the following patterns in the METRs of the Technical Committee's policy package compared with those of the current system:

- Overall, the impact of the Committee's policy package on the METRs on cost is almost neutral: METRs on cost would increase by 0.2 percentage points for large firms and 0.1 for small firms.
- The average METR on capital would decrease by 0.2 percentage points for large firms and 0.4 points for small firms; the average METR on labour would increase, however, by 0.2 percentage points for large and small firms. (This reflects the proposed introduction of partial experience rating of employer EI premium, which is designed to be revenue neutral relative to the base case for the EI system as a whole, but which results in a marginal increase in average premiums for the industries covered in the METR analysis.)

³⁶ Table 5.1-C reports METRs on capital (tangible and intangible), expressed with respect to gross-of-tax returns.

³⁷ Recall that in Tables 5.2-B and 5.2-C, the METRs on capital were obtained by aggregating the METRs on structures, machinery, land, inventories, E&D and R&D.

- The reduction in the METRs would be appreciable for certain types of capital assets. For large firms, note a reduction of 8.6 percentage points on inventories, 5.2 on land and 2.5 on structures; for small firms, the reductions would be less important: 1.8 points on inventories, 0.9 on land and 0.7 on structures. These reductions are mainly due to recommended changes to statutory income tax rates and CCA rates.
- There would be an increase in the METRs on machinery for both large and small firms (10.1 and 2.3 percentage points respectively), and an increase in METRs on R&D (5.1 points for large firms and 1.8 points for small firms). The first is mainly due to recommended changes to CCA rates for M&P equipment (from 30 percent to 25 percent). The latter is mainly due to recommended changes to CCA and ITC rates for R&D capital expenditures. (The Committee recommends that full expensing for such expenditures be replaced by a 35 percent declining balance rate, and that the ITC rate be lowered from 35 percent to 27 percent for small firms and from 20 percent to 15 percent for large firms.)
- There would be a decrease in the METRs on cost for service industries and construction, especially in the large-firms group. However, the METRs for mining, oil and gas, manufacturing, agriculture and forestry would increase. For mining and oil and gas, the increase is mainly due to recommended changes to CCA rates for Canadian Development Expenses (from 30 percent to 25 percent) and for major expansions of existing mines (from full expensing to 35 percent declining balance), as well as to changes to the base for the calculation of the federal resource allowance. For manufacturing, agriculture and forestry, the slight increase is mainly due to the recommended change to the CCA rate for M&P equipment (from 30 percent to 25 percent).

In summary, a comparison of the METRs under the Committee's recommended policy changes with the METRs of the current corporate tax system shows that there is almost no change in the overall METR on cost for both large and small firms. However, there is an appreciable decrease in the dispersion in METRs, especially inter-industry dispersions.

TABLE 5.1-A
METRs on Inputs: The Technical Committee's Policy Package

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
	(percent)									
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	37.9	22.9	28.4	51.9	42.4		-16.4	39.7	-4.7	0.9
Mining	23.7	28.7	29.5	51.3	36.1	9.2	-17.7	22.7	3.1	9.5
Oil and Gas	28.0	31.3	33.0	57.0	39.9	8.7	-20.0	15.4	1.3	8.8
Manufacturing	31.4	24.1	27.9	50.8	35.9		-16.7	31.3	3.5	10.2
Construction	46.2	48.3	28.7	52.4	48.2		-15.8	47.9	-0.1	4.9
Transportation	28.9	36.4	28.8	52.5	36.7		-19.3	36.4	3.2	7.9
Communications	29.6	56.0	28.8	52.5	36.0		-16.7	31.6	3.9	13.9
Public Utilities	31.5	44.0	28.8	52.5	37.5		-17.5	37.5	3.9	23.0
Wholesale Trade	27.0	41.3	28.6	52.1	46.2		-17.3	43.6	3.5	9.3
Retail Trade	14.4	56.4	28.7	52.4	46.3		-17.2	46.1	3.1	7.0
Other Services	28.2	57.7	28.7	52.4	34.5		-17.1	34.0	3.1	9.1
All Industries	29.4	34.4	28.6	51.6	37.3	8.8	-16.8	33.1	3.0	9.6
Small Firms										
Agriculture, Fishing and Trapping										
Forestry	7.4	10.3	9.3	9.4	9.3		-26.3	9.0	-4.8	1.9
Mining	12.1	15.7	9.3	18.5	15.4		-28.1	15.2	-4.8	-2.3
Oil and Gas										
Manufacturing	8.1	12.2	9.3	18.5	13.9		-25.9	11.7	3.2	5.3
Construction	15.2	31.7	9.3	18.5	20.5		-26.7	20.3	-0.4	1.9
Transportation	7.7	21.3	9.3	18.5	18.5		-25.8	18.3	2.9	5.2
Communications	7.6	33.4	9.3	18.5	28.4		-26.5	27.1	3.4	10.4
Public Utilities	9.0	18.0	9.3	18.5	17.3		-23.1	17.0	3.6	11.4
Wholesale Trade	5.4	30.5	9.3	18.5	19.1		-26.2	18.2	3.2	5.4
Retail Trade	3.6	34.5	9.3	18.5	19.0		-26.4	18.9	2.7	4.3
Other Services	8.5	31.5	9.3	18.5	12.7		-27.1	11.7	2.7	4.5
All Industries	8.3	24.1	9.3	18.0	15.2		-26.6	14.2	2.6	5.2
Large and Small Firms										
Agriculture, Fishing and Trapping										
Forestry	7.4	10.3	9.3	9.4	9.3		-26.3	9.0	-4.8	1.9
Mining	25.8	16.1	11.2	37.6	21.0		-18.8	20.3	-4.8	-1.6
Oil and Gas	23.7	28.7	29.5	51.3	36.1	9.2	-17.7	22.8	3.1	9.5
Manufacturing	28.0	31.3	33.0	57.0	39.9	8.7	-20.0	15.4	1.3	8.8
Construction	28.3	22.1	22.9	44.6	32.0		-18.2	27.9	3.4	9.4
Transportation	32.1	33.6	16.4	29.7	29.9		-24.9	29.8	-0.4	3.0
Communications	22.4	31.4	17.1	47.7	30.9		-21.2	30.7	3.1	7.1
Public Utilities	29.6	55.2	28.2	50.3	35.9		-16.7	31.3	3.8	13.6
Wholesale Trade	31.4	37.2	26.3	52.0	36.1		-18.4	36.0	3.9	22.2
Retail Trade	18.0	35.7	19.8	33.5	31.7		-20.2	30.0	3.4	7.4
Other Services	8.3	45.1	14.9	28.3	28.6		-24.1	28.5	2.8	5.3
All Industries	17.4	41.6	16.3	35.3	22.0		-24.4	21.1	2.8	6.5
All Industries	21.6	30.8	16.1	35.8	27.8	8.8	-19.5	25.3	2.8	7.8

TABLE 5.1-B
Change in METRs on Inputs: The Technical Committee's Policy Package
versus The Base Case (in percentage points)

	Tangible Inputs				Total	Intangible Inputs		Total	Labour	Total
	Structures	Machinery	Land	Inventories		E&D	R&D			
Large Firms										
Agriculture, Fishing and Trapping										
Forestry	-5.6	7.9	-4.3	-11.1	-6.3		7.8	-5.6	0.6	0.0
Mining	23.6	10.3	3.4	-2.7	9.9	9.0	5.2	9.4	0.4	3.7
Oil and Gas	15.8	5.8	1.6	-5.8	3.9	8.4	6.1	7.4	-0.1	4.3
Manufacturing	1.2	14.6	-0.9	-3.9	4.3		4.8	4.3	0.2	1.4
Construction	-10.9	3.3	-6.3	-15.3	-12.1		4.1	-12.0	0.5	-0.6
Transportation	-5.9	-0.4	-6.7	-16.0	-3.1		6.0	-3.1	0.0	-0.4
Communications	-6.1	1.5	-6.6	-16.0	-4.4		5.0	-3.6	-0.6	-1.5
Public Utilities	-7.1	1.7	-6.7	-16.1	-6.9		6.2	-6.9	-0.6	-3.9
Wholesale Trade	-3.7	5.2	-5.3	-13.1	-8.7		5.7	-8.2	-0.1	-1.0
Retail Trade	-0.8	3.3	-6.4	-15.4	-6.9		5.9	-6.9	0.1	-0.4
Other Services	-5.1	2.1	-6.2	-14.8	-5.6		6.0	-5.5	0.4	-0.6
All Industries	-2.5	10.1	-5.2	-8.6	-1.1	8.6	5.1	-0.2	0.2	0.2
Small Firms										
Agriculture, Fishing and Trapping	1.2	2.0	-0.9	-0.9	0.1		3.6	0.1	0.6	0.4
Forestry	-1.2	1.2	-0.9	-1.8	0.6		5.2	0.6	0.6	0.6
Mining										
Oil and Gas										
Manufacturing	0.5	6.8	-0.9	-1.8	1.9		2.2	2.0	0.2	0.7
Construction	-1.5	0.4	-0.9	-1.8	-1.2		2.8	-1.2	0.5	0.3
Transportation	-0.8	-0.6	-0.9	-1.8	-0.7		3.4	-0.6	0.0	-0.1
Communications	-0.8	-0.1	-0.9	-1.8	-0.3		4.3	-0.1	-0.6	-0.4
Public Utilities	-0.7	-0.3	-0.9	-1.8	-0.4		-2.4	-0.4	-0.6	-0.5
Wholesale Trade	-0.5	0.6	-0.9	-1.8	-1.3		2.7	-1.2	-0.1	-0.2
Retail Trade	-0.4	-0.6	-0.9	-1.8	-1.4		3.3	-1.4	0.1	-0.1
Other Services	-0.9	2.1	-0.9	-1.8	-0.5		1.3	-0.5	0.4	0.2
All Industries	-0.7	2.3	-0.9	-1.8	-0.4		1.8	-0.4	0.2	0.1
Large and Small Firms										
Agriculture, Fishing and Trapping	1.2	2.0	-0.9	-0.9	0.1		3.6	0.1	0.6	0.4
Forestry	-3.3	1.5	-1.2	-6.6	-0.7		7.2	-0.6	0.6	0.5
Mining	23.6	10.3	3.4	-2.7	9.9	9.0	5.2	9.4	0.4	3.7
Oil and Gas	15.8	5.8	1.6	-5.8	3.9	8.4	6.1	7.4	-0.1	4.3
Manufacturing	1.1	13.3	-0.9	-3.4	3.9		4.4	3.9	0.2	1.3
Construction	-6.0	0.7	-2.7	-5.4	-4.4		3.0	-4.4	0.5	0.0
Transportation	-4.1	-0.5	-3.0	-13.5	-2.3		5.2	-2.2	0.0	-0.3
Communications	-6.1	1.5	-6.4	-14.8	-4.3		5.0	-3.5	-0.6	-1.5
Public Utilities	-7.1	1.1	-5.9	-15.8	-6.5		4.8	-6.5	-0.6	-3.7
Wholesale Trade	-2.2	2.8	-3.1	-6.1	-4.2		4.7	-3.9	-0.1	-0.6
Retail Trade	-0.6	1.2	-2.3	-5.0	-2.8		4.0	-2.8	0.1	-0.2
Other Services	-2.6	2.1	-2.6	-7.3	-2.5		2.5	-2.4	0.4	-0.1
All Industries	-1.8	7.3	-2.3	-5.0	-0.5	8.6	4.2	0.0	0.2	0.2

TABLE 5.1-C
METRs on Capital: The Technical Committee's Policy Package

	Tangible Capital				Total	Intangible Capital		Total
	Structures	Machinery	Land	Inventories		E&D	R&D	
	(percent)							
Large Firms								
Agriculture, Fishing and Trapping								
Forestry	27.5	18.6	22.1	34.2	29.4		-19.6	27.1
Mining	19.2	22.3	22.8	33.9	25.9	8.4	-21.5	16.9
Oil and Gas	21.8	23.8	24.8	36.3	27.9	8.0	-24.9	12.2
Manufacturing	23.9	19.4	21.8	33.7	25.9		-20.0	21.8
Construction	31.6	32.6	22.3	34.4	32.4		-18.8	32.1
Transportation	22.4	26.7	22.3	34.4	26.7		-24.0	26.5
Communications	22.8	35.9	22.3	34.4	26.0		-20.0	22.2
Public Utilities	24.0	30.5	22.3	34.4	27.0		-21.2	27.0
Wholesale Trade	21.3	29.2	22.2	34.3	31.3		-20.9	29.1
Retail Trade	12.6	36.1	22.3	34.4	30.8		-20.8	30.6
Other Services	22.0	36.6	22.3	34.4	25.2		-20.6	24.7
All Industries	22.7	25.6	22.3	34.1	26.8	8.1	-20.2	23.6
Small Firms								
Agriculture, Fishing and Trapping	6.9	9.3	8.5	8.6	8.5		-35.7	8.1
Forestry	10.8	13.6	8.5	15.6	13.3		-39.0	13.1
Mining								
Oil and Gas								
Manufacturing	7.5	10.9	8.5	15.6	12.1		-34.9	9.5
Construction	13.2	24.1	8.5	15.6	16.7		-36.4	16.6
Transportation	7.2	17.5	8.5	15.6	15.4		-34.8	15.2
Communications	7.1	25.0	8.5	15.6	21.6		-36.0	20.3
Public Utilities	8.2	15.3	8.5	15.6	14.7		-30.0	14.3
Wholesale Trade	5.2	23.4	8.5	15.6	15.8		-35.4	14.7
Retail Trade	3.5	25.6	8.5	15.6	15.5		-35.9	15.4
Other Services	7.9	24.0	8.5	15.6	10.9		-37.2	9.6
All Industries	7.7	19.4	8.5	15.3	12.9		-36.2	11.8
Large and Small Firms								
Agriculture, Fishing and Trapping	6.9	9.3	8.5	8.6	8.5		-35.7	8.1
Forestry	20.5	13.8	10.1	27.3	17.0		-23.1	16.3
Mining	19.2	22.3	22.8	33.9	25.9	8.4	-21.5	17.0
Oil and Gas	21.8	23.8	24.8	36.3	27.9	8.0	-24.9	12.2
Manufacturing	22.0	18.1	18.7	30.9	23.8		-22.2	20.1
Construction	24.3	25.1	14.1	22.9	23.0		-33.1	22.8
Transportation	18.3	23.9	14.6	32.3	23.4		-26.8	23.2
Communications	22.8	35.6	22.0	33.4	26.0		-20.1	22.0
Public Utilities	23.9	27.1	20.8	34.2	26.3		-22.6	26.2
Wholesale Trade	15.3	26.3	16.5	25.1	23.9		-25.3	22.3
Retail Trade	7.6	31.1	13.0	22.0	21.6		-31.8	21.5
Other Services	14.8	29.4	14.0	26.1	17.6		-32.4	16.7
All Industries	17.7	23.5	13.9	26.4	21.5	8.1	-24.2	19.3

Note: METRs are expressed with respect to gross-of-tax returns.

TABLE 5.2-A
Dispersion in METRs on Capital: The Base Case
versus the Technical Committee's Policy Package

	Large Firms	Small Firms	Large and Small Firms
	(percent)		
The Base Case			
Overall Dispersion	16.6	9.6	15.7
Industry Dispersion	6.7	3.9	9.4
Asset Dispersion	14.3	8.7	12.5
The Technical Committee's Package			
Overall Dispersion	12.5	9.0	12.6
Industry Dispersion	3.9	3.2	7.8
Asset Dispersion	11.7	8.4	10.6

Note: The dispersion measures are based on METRs on tangible and intangible capital expressed with respect to gross-of-tax returns; labour METRs are not taken into account in this table. The aggregation level used is 12 industries and six assets (structures, machinery, land, inventories, E&D and R&D).

TABLE 5.2-B
Dispersion in METRs on Capital and Labour: The Base Case
versus the Technical Committee's Policy Package

	Large Firms	Small Firms	Large and Small Firms
	(percent)		
The Base Case			
Overall Dispersion	15.3	6.2	12.8
Industry Dispersion	6.6	2.8	7.0
Input Dispersion	14.7	13.1	22.6
The Technical Committee's Package			
Overall Dispersion	13.9	5.8	11.7
Industry Dispersion	3.8	2.5	5.6
Input Dispersion	13.7	12.3	21.0

Note: The dispersion measures are based on aggregate capital and labour METRs calculated with respect to input costs after taxes. The aggregation level is 12 industries and two inputs (capital and labour); capital METRs by industry were obtained by aggregating the METRs on structures, machinery, land, inventories, E&D and R&D.

TABLE 5.2-C
Industry Dispersion in METRs on Capital and Labour: The Base Case
versus the Technical Committee's Policy Package

	Large Firms	Small Firms	Large and Small Firms
	(percent)		
The Base Case			
Capital Dispersion	12.4	4.5	13.7
Labour Dispersion	1.1	2.1	1.8
Capital and Labour Dispersion	6.6	2.8	7.0
The Technical Committee's Package			
Capital Dispersion	7.1	3.9	10.9
Labour Dispersion	1.0	2.0	1.6
Capital and Labour Dispersion	3.8	2.5	5.6

Note: The dispersion measures are based on aggregate capital and labour METRs calculated with respect to input costs after taxes. The aggregation level is 12 industries and two inputs (capital and labour); capital METRs by industry were obtained by aggregating the METRs on structures, machinery, land, inventories, E&D and R&D.

6. Concluding Thoughts

The purpose of this document is to describe the methodology and present the data underlying the calculation of marginal effective tax rates (METRs) contained in the report issued by the Technical Committee on Business Taxation on April 6, 1998. The document serves three purposes. First, it documents the methodological innovations that distinguish the calculations from previous METR calculations released as a part of the 1987 White Paper on corporate tax reform, and described in the subsequent Department of Finance working paper. Second, it reports various alternative METR scenarios that were not contained in the Committee's report. Third, it presents in detail the data underlying the METR model. These data are important not only for an understanding of the calculations contained in the report, but also should prove very useful in their own right.

Appendix A

Structure of the METR Model

This appendix describes the basic structure of the METR model and the data used to undertake the main calculations.

Aggregation Structure and Calculation of Input Shares

At the most disaggregated level, METRs are calculated for 35 industries, two firm sizes: large and small,¹ and seven production inputs: structures, machinery, land, inventories, exploration and development (E&D),² research and development (R&D), and labour. In addition, E&D is divided into Canadian Exploration Expenses (CEE) and Canadian Development Expenses (CDE); and, structures and machinery are divided into 27 Capital Cost Allowance (CCA) classes (seven structure classes and 20 machinery classes – see Table A.1).

The 35 industries are shown in Table A.2, along with the corresponding 1980 Standard Industrial Classification (SIC) code and division names. The definitions of large and small firms approximate the tax definition. A small firm is a Canadian-controlled private corporation (CCPC) with total assets less than \$15 million; all other firms are large.³ For example, a foreign-controlled corporation with assets less than \$15 million is counted in the large firms group because it is not eligible for the small business deduction (i.e. it faces either the 28 percent federal corporate income tax rate or the 21 percent manufacturing and processing rate).

The input share matrix was constructed using four data sources: Statistics Canada input-output (I-O) tables and corporate statistics, and Revenue Canada T2 and T661 databases.⁴ The construction of this matrix involved three steps:

1. calculation of the labour weights;
2. calculation of R&D weights; and
3. calculation of structures, machinery, land, inventories and E&D weights.

¹ Small firms in the mining and oil and gas sectors and large firms in the agriculture, fishing and trapping sector are ignored because they account for a very small proportion of production inputs.

² Only firms in the mining and oil and gas sectors undertake E&D activities.

³ Although the weights are based on this assumption, the METR calculation assumes that all small firms face the “small business tax rate” at the margin.

⁴ Statistics Canada, *The Input-Output Structure of the Canadian Economy*, Catalogue 15-201, 1988 to 1992. Statistics Canada, *Financial and Taxation Statistics for Enterprises*; Catalogue 61-219, 1995. The T2 database contains tax and accounting information on a sample of about 15,000 corporations; a weighted version representing the entire Canadian corporate sector is also available (about 975,000 corporations for 1994, the last year available). The T661 database contains tax data relating to the calculation of the SR&ED tax credit. Unlike the T2, the T661 is not a sample database; it is the population of corporations that claim the SR&ED tax credit.

The labour weights were derived as follows:

$$w_i^L = \frac{SW_i + SLI_i}{SW_i + SLI_i + OS_i(1 - d_i)}$$

where i is the industry index ($i=1, 2, \dots, 35$), SW is salaries and wages of incorporated businesses,⁵ SLI is supplementary labour income, OS is operating surplus, and d is the depreciation charge portion of the operating surplus.

The operating surplus variable from Statistics Canada I-O tables is reported gross of depreciation, interest and income taxes. The depreciation expense is not reported separately in these tables; d was calculated using data from Statistics Canada's corporate statistics publication:

$$d_i = \frac{D_i}{\Pi_i + D_i + IN_i}$$

where D is the depreciation expense, Π is profit before income tax, and IN is the interest expense. The expression $\Pi+D+IN$ approximates the operating surplus variable in the I-O tables, that is the term OS in the formula for w^L .⁶

The second step in the construction of the input share matrix is the calculation of the R&D shares, which was derived as follows:

$$w_i^R = \frac{R_i}{Y_i(1 - p_i)(1 - d_i)}$$

where R is SR&ED current and capital expenditures,⁷ Y is gross revenues, p is the primary input portion of all production inputs, and d is the depreciation portion of the operating surplus (defined above).⁸

⁵ Excludes salaries and wages eligible for the SR&ED tax credit, since this is accounted for in the calculation of the R&D share.

⁶ For SW , SLI , OS and p (in the formula for w^R), we used average 1988-92 figures; d was derived using average figures for 1990-95. The I-O tables do not report values for SW , SLI , OS and p for large and small firms separately; we used the distribution of average 1989-94 gross revenues by industry and firm size from the T2 database to split these values between large and small firms for each industry (see Table A.3); however, it was assumed that the same d vector applies to large and small firms.

⁷ Current expenditures represent more than 90% of total SR&ED expenditures; it is mainly because of this that the model treats R&D expenditures as an intangible.

⁸ The R&D shares obtained using this method were slightly higher than what is observed at the firm level in some industries, especially agriculture and forestry, as well as compared to the ratio of R&D to GDP. An adjustment was made to these shares, so that for each industry, the ratio of the R&D share to the total share of tangible capital is equal to the ratio of SR&ED expenditures to tangible capital expenditures.

The expression $Y_i(1-p_i)$ approximates the gross operating surplus variable in the I-O tables. It was used because the R&D shares were derived from Revenue Canada's T661 database on SR&ED, which does not report operating surplus figures that are consistent with those in the I-O tables. For the variables R and Y , the 1993 T661 database was used; the parameter p was derived from the I-O tables using average figures for 1988-92.

The labour and R&D shares were calculated as percentages of the total input share for each of the 35 industries, which is equal to one. The shares of the other production inputs were calculated residually as:

$$w_i^j = \frac{k_i^j}{\sum_j k_i^j} (1 - w_i^L - w_i^R)$$

Where j represents the inputs: structures, machinery, land, inventories and E&D, and K is the weight of input j in industry i . The k 's were derived from the T2 database as follows:

$$k_i^j = \frac{BV_i^j}{\sum_{j,i} BV_i^j}$$

where BV is the net book value of the stock of input j . The weights for structures and machinery were further disaggregated by CCA class using the distribution of CCA additions. Since the use of CCA additions may bias the weight for some CCA classes, a three-year average of CCA additions was used in order to minimize the impact of the bias.⁹

Table A.4 shows the capital stock weight matrix for structures, machinery, land, inventories and E&D, and Table A.5 shows normalized production input shares for these production inputs plus R&D and labour. The weights in Table A.4 are used to aggregate METRs on capital within broad types of capital (i.e. expressed with respect to gross-of-tax return on capital); the shares in Table A.5 are used to aggregate METRs on inputs (i.e. expressed with respect to net-of-tax returns on production inputs); the aggregation of METRs on inputs yields METRs on cost, as discussed in Section 2.

⁹ The book values of the different inputs are from the 1993 T2 database; average additions to CCA pools are from T2 1991-93. The distribution of CCA additions was used because stock values for CCA classes are not available; however, note that the bias caused by using the flows of CCA additions would occur only when we aggregate METRs for different CCA subgroups within structures or machinery.

Income Tax Rates

Combined federal-provincial statutory income tax rates were calculated for 35 industries and two firm sizes. The large and small average statutory federal tax rates are as follows:

$$\bar{u}_L^f = qu_L^f + (1 - q)u_M^f$$

$$\bar{u}_S^f = u_S^f$$

where q is the proportion of taxable income eligible for the M&P deduction, and u_L^f , u_M^f and u_S^f are the federal corporate tax rate on regular income (28 percent), the tax rate on M&P income (21 percent) and the tax rate on small business income (12 percent) respectively. For large firms, differences in the average tax rates across industries are attributable to q ; for small firms, there are no differences in the tax rates across industries since, at the margin, small firms are subject to the small business rate. Table A.6.1 shows values for q and combined federal-provincial average statutory tax rates by industry for large and small firms.

The provincial average statutory tax rates were calculated in a similar fashion, with the exception that one provincial three-rate structure (i.e. regular income, M&P and small business rates) was used rather than 12 different rate structures (i.e. 10 provinces and two territories). The average provincial rate structure was generated by weighting the individual provincial rates by the distribution of taxable income across provinces.¹⁰ For example, the small business rate was calculated as:

$$\bar{u}_S^p = \sum_v cu_s^v$$

Where v represents the province; c is the share of province v of taxable income, and u is province v 's statutory corporate income tax rate on small business (see Table A.6.2).

Combined federal-provincial rates were obtained by adding the federal and provincial rates. The federal surtax of 4 percent, as well as various provincial surtaxes, are also included.

Capital Tax Rates

At the federal level, the LCT is imposed at a rate of 0.225 percent on corporations with taxable capital in excess of \$10 million. In the METR model, this tax applies to the large corporations group; at the margin, small corporations are not affected by the LCT. The METR calculations reflect a weighted average of firms that pay LCT and those that do not. The latter proportion was estimated at 20 percent.¹¹

¹⁰ The provincial allocation of corporate taxable income is from the 1994 T2 database. Note that the same distribution was used for all industries to avoid the impact of provincial specific rates on industry comparisons.

¹¹ This estimate was calculated using the 1994 T2 database; the 80% was assumed to apply across all industries.

Seven provinces impose general capital taxes similar to the federal LCT at different rates, varying from 0.25 percent in Nova Scotia to 0.64 percent in Quebec. One average provincial capital tax rate was used in the model. It was calculated by weighting the provincial rates by the provincial distribution of taxable income (See Table A.7).

Investment Tax Credit Rates

Most investment tax credits (ITCs) were phased out in the 1987 tax reform. In the current corporate tax system, there is only one ITC remaining (other than the SR&ED ITC): the Atlantic Canada Investment Tax Credit, which applies at a rate of 10 percent on eligible capital expenditures made in specified regions of the Atlantic provinces, including offshore oil and gas activities.

Since ITC rates apply to specified capital expenditures rather than to all additions to CCA pools, statutory ITC rates could not be used. Effective ITC rates were calculated for each industry and CCA class by dividing the ITC claim by the cost of additions to CCA pools. Table A.8 reports average effective ITC rates for structures and machinery.

Economic Depreciation Rates

The economic depreciation rates are the same as those used in Jung (1987), with the following exceptions: most of the differences in the rates between industries at the 35 level were ignored, that is one rate was used in most cases for all industries that belong to the same division as indicated in Table A.1; and the differences between large and small firms were ignored. Table A.9 reports the economic depreciation rates by CCA class as well as weighted averages across CCA classes and across industries.

Provincial Sales Taxes on Capital Input

Effective provincial sales taxes on capital inputs apply to machinery only. They were calculated as the ratios of provincial sales taxes paid to capital expenditures. Given that the data were not available for large and small firms, only one rate was calculated and used for both groups of firm (see Table A.10).

Non-Tax-Paying Firms and Loss Utilization Rates

Non-capital losses in a given year can be carried forward seven years, or back three years, to reduce taxable income in those years. Such losses are therefore valuable to the company only if it can use them against future (seven years) or past (three years) profits; otherwise they are “expired losses.” Non-capital losses impact the METRs through the statutory corporate income tax rate; \$1 of loss in a given year can be seen as reducing the statutory income tax rate by a factor equal to:

$$\frac{1}{(1 + \rho)^T}$$

where ρ is the cost of equity financing and T is the number of years that elapse before the \$1 loss expires. The parameter T was approximated by $2/U$, where U is the loss utilization rate, estimated as $L/(OL+UCCA+UDEP)$; L is the amount of non-capital-losses claimed, OL is the opening balance of non-capital-losses in a given period, $UCCA$ is the pool of unused CCA deductions and $UDEP$ is the pool of unused depletion deductions. Both $UCCA$ and $UDEP$ were estimated as the difference between what a firm could claim in depreciation and depletion in a given year and what it actually claimed.¹²

The combined METRs for tax-paying and non-tax-paying firms were then calculated as $\theta METR_{tax-paying} + (1-\theta) METR_{non-tax-paying}$, where θ is the proportion of tax-paying firms.

Table A.11 shows estimated values for θ and T for large and small firms.¹³

Capital Structure, Cost of Finance, and Inflation

Two assumptions on the capital structure of firms were considered. In the first, firms finance 40 percent of their assets by debt and 60 percent by equity; this assumption was used in the base case. In the second, debt-asset ratios vary by sector, as reported in Table A.12.

The industry-specific debt-asset ratios were derived from Jog (1997).¹⁴ For each of the 35 industries in the METR model, we calculated the average debt-asset ratios of similar industries considered in Jog (1997); for those industries that were not represented in Jog (1997), we assumed that the overall average applies.

Finally, it was assumed that return on debt financing is 8 percent, return on equity financing is 6.7 percent,¹⁵ the risk-free return on capital is 8 percent, and inflation is 2 percent.

¹² The calculation was based on average figures from the T2 weighted sample file, 1991-93. The methodology for calculating T follows Mintz (1988).

¹³ The proportion of non-tax-paying firms was calculated based on federal income tax only; the LCT was excluded from the calculation, as well as the tax on the capital of large financial institutions, which are not accounted for in the model. It is important to differentiate between “non-tax-paying firms” and “profitable but non-tax-paying firms”; it is the former that are reported here. There are many reasons why a firm may not pay taxes in a given year, including inter-corporate dividends, losses, and tax credits such as the SR&ED tax credit.

¹⁴ The author uses two approaches to calculate debt-asset ratios: the market value approach and the book value approach; the ratios that we consider here are based on the former approach.

¹⁵ This rate is equal to $i(1-m)/(1-c)$, where i is the interest rate, m is the personal tax rate on interest income and c is the personal tax rate on capital gains (see Section 2 for more detail).

TABLE A.1
Capital Cost Allowance (CCA): Classes and Rates

CCA Class	CCA Rate (%)	Principal Assets
<u>Structures</u>		
1 (2,5,20,31,32)	4	Buildings, bridges, canals, dams, roads, railway tracks, electrical generating equipment
3	5	Breakwaters (other than wooden), trestles, docks, windmills, wharves
6	10	Wooden breakwaters, greenhouses, fences, railway locomotives and tanks
13	20	Leaseholds
26	5	Catalysts, deuterium-enriched water
33	15	Timber resources
41a	100	Mining assets for new mines or major expansion of existing mines
<u>Machinery</u>		
4	6	Tramway or trolley buses
7	25	Vessels, canoes, rowboats, scows
8 (11,19)	20	A broad range of assets (mainly machinery) not included in other classes
9	25	Aircraft
10 (30)	30	Automotive equipment
12 (18)	100	Dies, jigs, kitchen utensils and other tools that cost less than \$200
14	11	Patents, franchises, licences
15	100	Assets for cutting and removing timber
16	40	Trucks, taxis, leased automobiles
17	48	Telephone and telegraph systems
24	46	Water pollution control equipment (ends in 1998)
27	46	Air pollution control equipment (ends in 1998)
34	48	Energy-efficient equipment
35	7	Railway cars
36	7	Deemed depreciable property – Income Tax Act 13(5.2)(c)
37	15	Amusement parks
38 (22)	30	Earth moving equipment acquired after 1988
41b	25	Mining assets acquired after 1987 for new mines or major expansions of existing mines
42	12	Fibre optic cables
43 (21,29,39,40)	30	Manufacturing and processing equipment

Note: Classes in parentheses refer to old classes that no longer exist or that are being phased out; the new CCA rates apply to such classes for purposes of the METR calculation. The Principal Assets column is not meant to be exhaustive; the interested reader should refer to the Income Tax Act for more details.

TABLE A.2
Industrial Structure

Industry Name	SIC Code (1980)	Division Name
Agriculture	0100-0299	Agriculture, Forestry and Fishing
Fishing and Trapping	0300-0399	Agriculture, Forestry and Fishing
Forestry	0400-0599	Agriculture, Forestry and Fishing
Mining	0600-0629, 0800-0899, 0920-0999	Mining
Oil and Gas	0630-0799, 0910-0919	Oil and Gas
Food	1000-1099	Manufacturing
Beverages	1100-1199	Manufacturing
Tobacco	1200-1299	Manufacturing
Rubber	1500-1599	Manufacturing
Plastic	1600-1699	Manufacturing
Leather	1700-1799	Manufacturing
Textile	1800-1999	Manufacturing
Clothing	2400-2499	Manufacturing
Wood	2500-2599	Manufacturing
Furniture	2600-2699	Manufacturing
Paper	2700-2799	Manufacturing
Print and Publishing	2800-2899	Manufacturing
Primary Metal	2900-2999	Manufacturing
Metal Fabrication	3000-3099	Manufacturing
Machinery	3100-3199	Manufacturing
Transportation Equipment	3200-3299	Manufacturing
Electrical	3300-3399	Manufacturing
Mineral	3500-3599	Manufacturing
Petroleum	3600-3699	Manufacturing
Chemical	3700-3799	Manufacturing
Miscellaneous Manufacturing	3900-3999	Manufacturing
Construction	4000-4499	Construction
Transportation	4500-4699	Transportation and Storage
Storage	4700-4799	Transportation and Storage
Communications	4800-4899	Communication
Electrical Power, Gas and Water	4900-4999	Public Utilities
Wholesale Trade	5000-5999	Wholesale Trade
Retail Trade	6000-6999	Retail Trade
Services to Business Management	7700-7799	Other Services
Government, Personal and Misc. Services	9100-9999	Other Services

TABLE A.3
Distribution of Gross Revenues

	Large Firms	Small Firms
	(percent)	
Agriculture	0.0	100.0
Fishing and Trapping	0.0	100.0
Average – Agriculture, Fishing and Trapping	0.0	100.0
Forestry	21.7	78.3
Mining	100.0	0.0
Oil and Gas	100.0	0.0
Food	76.3	23.7
Beverages	91.8	8.2
Tobacco	96.4	3.6
Rubber	93.1	6.9
Plastic	61.9	38.1
Leather	70.6	29.4
Textile	74.5	25.5
Clothing	30.0	70.0
Wood	64.4	35.6
Furniture	36.0	64.0
Paper	94.8	5.2
Print and Publishing	69.8	30.2
Primary Metal	93.2	6.8
Metal Fabrication	46.8	53.2
Machinery	71.3	28.7
Transportation Equipment	97.0	3.0
Electrical	87.2	12.8
Mineral	72.6	27.4
Petroleum	99.2	0.8
Chemical	94.2	5.8
Miscellaneous Manufacturing	59.0	41.0
Average – Manufacturing	82.1	17.9
Construction	23.9	76.1
Transportation	64.8	35.2
Storage	87.6	12.4
Average – Transportation and Storage	67.2	32.8
Communications	93.8	6.2
Electrical Power, Gas and Water	89.9	10.1
Wholesale Trade	57.9	42.1
Retail Trade	33.2	66.8
Services to Business Management	34.8	65.2
Government, Personal and Misc. Services	26.1	73.9
Average – Other Services	29.8	70.2
All Industries	59.6	40.4

TABLE A.4.1
Capital Stock Weights – Large Firms

	Total	Structures	Machinery	Land	Inventories	E&D	Structures CCA Classes						
							CL1	CL3	CL6	CL13	CL26	CL33	CL41a
Agriculture	1.9E-03	3.3E-04	2.7E-04	4.0E-04	9.2E-04		1.9E-04	4.0E-05	8.9E-05	7.8E-06	0.0E+00	0.0E+00	0.0E+00
Fishing and Trapping	1.5E-04	5.4E-06	1.1E-04	3.0E-06	3.1E-05		4.9E-07	1.9E-08	4.7E-06	1.2E-07	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.1E-03	3.4E-04	3.8E-04	4.0E-04	9.5E-04		2.0E-04	4.0E-05	9.4E-05	8.0E-06	0.0E+00	0.0E+00	0.0E+00
Forestry	8.7E-04	2.8E-04	1.3E-04	2.0E-05	4.4E-04		2.6E-04	1.1E-05	5.1E-07	5.4E-06	0.0E+00	2.6E-07	0.0E+00
Mining	3.2E-02	6.6E-03	2.8E-03	5.8E-04	7.0E-03	1.5E-02	7.1E-04	8.6E-05	3.2E-07	1.4E-04	0.0E+00	0.0E+00	5.6E-03
Oil and Gas	3.7E-02	1.9E-03	3.1E-03	1.0E-04	2.9E-03	2.9E-02	6.1E-04	4.0E-05	3.4E-05	1.2E-04	1.9E-05	1.3E-07	1.1E-03
Food	1.8E-02	3.8E-03	7.1E-03	5.2E-04	7.0E-03		3.0E-03	4.3E-04	3.6E-05	4.1E-04	0.0E+00	0.0E+00	0.0E+00
Beverages	5.2E-03	9.8E-04	2.0E-03	1.7E-04	2.0E-03		6.5E-04	1.4E-04	1.7E-06	1.9E-04	0.0E+00	0.0E+00	0.0E+00
Tobacco	2.5E-03	1.6E-04	7.0E-04	9.3E-06	1.6E-03		4.3E-05	8.7E-05	5.4E-08	2.7E-05	0.0E+00	0.0E+00	0.0E+00
Rubber	2.6E-03	2.8E-04	7.6E-04	9.3E-05	1.5E-03		2.5E-04	1.3E-05	5.4E-06	8.3E-06	0.0E+00	0.0E+00	0.0E+00
Plastic	6.2E-03	1.0E-03	3.6E-03	2.4E-04	1.4E-03		6.4E-04	3.1E-04	8.1E-06	4.3E-05	0.0E+00	0.0E+00	0.0E+00
Leather	8.7E-04	1.0E-04	1.8E-04	1.0E-05	5.7E-04		9.4E-07	2.7E-05	0.0E+00	7.6E-05	0.0E+00	0.0E+00	0.0E+00
Textile	3.7E-03	4.7E-04	1.4E-03	4.9E-05	1.8E-03		3.8E-04	4.5E-05	1.1E-05	2.9E-05	2.9E-06	0.0E+00	0.0E+00
Clothing	2.3E-03	2.7E-04	4.9E-04	4.8E-05	1.5E-03		1.2E-04	3.5E-05	0.0E+00	1.1E-04	0.0E+00	0.0E+00	0.0E+00
Wood	1.0E-02	2.0E-03	4.1E-03	2.0E-04	3.8E-03		1.7E-03	1.5E-04	1.4E-05	3.3E-05	0.0E+00	1.0E-04	0.0E+00
Furniture	1.2E-03	2.9E-04	3.6E-04	4.5E-05	5.0E-04		1.5E-04	2.7E-05	2.0E-07	1.2E-04	0.0E+00	0.0E+00	0.0E+00
Paper	3.3E-02	1.5E-02	1.1E-02	3.6E-04	6.9E-03		1.3E-02	1.8E-03	9.9E-06	1.5E-04	0.0E+00	5.2E-05	0.0E+00
Print and Publishing	6.0E-03	1.0E-03	3.2E-03	4.4E-04	1.3E-03		8.0E-04	7.5E-05	1.5E-06	1.3E-04	0.0E+00	0.0E+00	0.0E+00
Primary Metal	1.5E-02	6.2E-03	2.5E-03	2.2E-04	6.0E-03		5.9E-03	2.5E-04	1.7E-05	6.4E-05	0.0E+00	0.0E+00	0.0E+00
Metal Fabrication	8.7E-03	1.2E-03	3.4E-03	2.7E-04	3.9E-03		9.3E-04	9.7E-05	5.9E-06	1.3E-04	0.0E+00	0.0E+00	0.0E+00
Machinery	1.1E-02	1.4E-03	2.6E-03	4.9E-04	6.6E-03		1.1E-03	1.9E-04	8.7E-06	9.1E-05	0.0E+00	0.0E+00	0.0E+00
Transportation Equipment	3.8E-02	4.2E-03	2.0E-02	4.1E-04	1.4E-02		3.3E-03	6.1E-04	2.2E-05	2.8E-04	0.0E+00	0.0E+00	0.0E+00
Electrical	1.3E-02	1.8E-03	4.3E-03	2.5E-04	6.3E-03		1.3E-03	1.6E-04	1.5E-05	2.9E-04	0.0E+00	0.0E+00	0.0E+00
Mineral	7.6E-03	1.5E-03	3.6E-03	5.6E-05	2.4E-03		1.0E-03	3.1E-04	5.7E-05	1.6E-04	0.0E+00	0.0E+00	0.0E+00
Petroleum	4.6E-03	5.5E-04	3.7E-04	1.0E-04	3.6E-03		3.7E-04	1.1E-04	1.5E-05	3.4E-05	2.2E-05	0.0E+00	0.0E+00
Chemical	2.4E-02	7.5E-03	8.7E-03	6.8E-04	7.6E-03		6.1E-03	6.9E-04	1.5E-05	6.1E-04	6.1E-05	4.9E-06	0.0E+00
Miscellaneous Manufacturing	4.6E-03	8.9E-04	1.6E-03	1.4E-04	2.0E-03		2.9E-04	2.8E-04	2.9E-06	3.1E-04	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.2E-01	5.1E-02	8.1E-02	4.8E-03	8.2E-02		4.1E-02	5.8E-03	2.5E-04	3.3E-03	8.6E-05	1.6E-04	0.0E+00
Construction	2.5E-02	9.0E-03	1.3E-03	1.8E-03	1.3E-02		8.4E-03	4.4E-04	6.8E-06	1.6E-04	0.0E+00	0.0E+00	0.0E+00
Transportation	2.7E-02	4.4E-03	1.9E-02	3.3E-04	2.4E-03		3.5E-03	5.5E-05	8.6E-04	6.3E-05	5.7E-06	3.7E-06	0.0E+00
Storage	1.2E-03	3.5E-04	2.4E-04	9.7E-05	5.5E-04		2.9E-04	3.7E-05	6.7E-06	1.2E-05	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.8E-02	4.8E-03	2.0E-02	4.3E-04	3.0E-03		3.8E-03	9.2E-05	8.6E-04	7.4E-05	5.7E-06	3.7E-06	0.0E+00
Communications	7.1E-02	5.3E-02	1.7E-02	7.4E-04	4.0E-04		7.1E-03	4.2E-02	2.1E-05	3.5E-03	0.0E+00	0.0E+00	0.0E+00
Electrical Power, Gas and Water	7.5E-03	4.6E-03	1.5E-03	1.4E-04	1.3E-03		4.6E-03	5.7E-06	5.6E-06	1.7E-05	0.0E+00	0.0E+00	0.0E+00
Wholesale Trade	4.7E-02	6.4E-03	7.2E-03	1.7E-03	3.2E-02		4.9E-03	5.7E-04	4.8E-05	9.5E-04	0.0E+00	0.0E+00	0.0E+00
Retail Trade	3.8E-02	6.4E-03	1.1E-02	1.4E-03	1.9E-02		2.4E-03	5.0E-04	2.0E-04	3.4E-03	0.0E+00	0.0E+00	0.0E+00
Services to Business Management	1.1E-01	6.8E-02	8.4E-03	2.2E-02	1.2E-02		4.7E-02	1.5E-02	1.2E-04	6.2E-03	2.0E-06	2.2E-07	0.0E+00
Government, Personal and Misc. Services	2.0E-02	8.3E-03	6.8E-03	2.3E-03	3.0E-03		5.6E-03	4.9E-04	4.8E-06	2.2E-03	0.0E+00	0.0E+00	0.0E+00
Subtotal	1.3E-01	7.6E-02	1.5E-02	2.4E-02	1.5E-02		5.2E-02	1.5E-02	1.2E-04	8.4E-03	2.0E-06	2.2E-07	0.0E+00
Total	6.4E-01	2.2E-01	1.6E-01	3.6E-02	1.8E-01	4.3E-02	1.3E-01	6.5E-02	1.6E-03	2.0E-02	1.1E-04	1.7E-04	6.8E-03

TABLE A.4.1
Capital Stock Weights – Large Firms (*continued*)

	Machinery CCA Classes												
	CL4	CL7	CL8	CL9	CL10	CL12	CL14	CL15	CL16	CL17	CL24	CL27	CL34
Agriculture	9.7E-09	0.0E+00	1.1E-04	2.7E-07	9.6E-05	4.8E-06	5.7E-07	0.0E+00	0.0E+00	3.5E-06	7.1E-07	0.0E+00	0.0E+00
Fishing and Trapping	0.0E+00	7.7E-05	2.8E-05	5.0E-08	9.7E-07	3.1E-07	0.0E+00	0.0E+00	0.0E+00	5.6E-08	0.0E+00	0.0E+00	0.0E+00
Subtotal	9.7E-09	7.7E-05	1.4E-04	3.2E-07	9.7E-05	5.1E-06	5.7E-07	0.0E+00	0.0E+00	3.5E-06	7.1E-07	0.0E+00	0.0E+00
Forestry	0.0E+00	5.3E-07	2.0E-06	2.2E-06	1.9E-05	5.2E-08	0.0E+00	1.2E-07	0.0E+00	5.6E-07	1.9E-05	7.5E-06	0.0E+00
Mining	1.1E-08	5.0E-08	7.0E-05	9.8E-07	2.3E-04	4.5E-05	2.5E-06	0.0E+00	2.1E-07	1.4E-05	2.2E-05	5.8E-04	0.0E+00
Oil and Gas	0.0E+00	4.4E-07	1.4E-04	1.7E-05	4.1E-04	5.2E-05	1.7E-06	0.0E+00	0.0E+00	1.0E-05	2.1E-06	1.7E-07	1.6E-05
Food	2.7E-08	4.2E-04	7.1E-04	2.8E-07	1.0E-03	2.9E-04	1.1E-04	0.0E+00	1.5E-05	2.9E-05	1.2E-05	2.6E-06	3.6E-05
Beverages	1.1E-08	4.3E-08	3.6E-04	7.9E-07	3.7E-04	1.4E-04	4.6E-05	0.0E+00	5.3E-06	6.9E-06	0.0E+00	0.0E+00	8.4E-08
Tobacco	0.0E+00	0.0E+00	6.1E-05	0.0E+00	6.2E-05	9.0E-05	2.4E-06	0.0E+00	0.0E+00	1.3E-06	0.0E+00	6.5E-06	0.0E+00
Rubber	0.0E+00	0.0E+00	4.9E-05	0.0E+00	6.2E-05	7.4E-05	0.0E+00	0.0E+00	0.0E+00	7.7E-06	2.0E-06	4.0E-06	0.0E+00
Plastic	0.0E+00	0.0E+00	2.1E-04	1.8E-08	2.5E-04	7.4E-04	1.1E-05	0.0E+00	0.0E+00	1.3E-05	0.0E+00	0.0E+00	0.0E+00
Leather	0.0E+00	0.0E+00	4.6E-05	0.0E+00	1.3E-05	5.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Textile	0.0E+00	0.0E+00	4.6E-05	3.4E-08	8.8E-05	1.6E-05	2.1E-05	0.0E+00	0.0E+00	1.2E-05	3.1E-06	0.0E+00	5.8E-05
Clothing	0.0E+00	0.0E+00	8.0E-05	0.0E+00	9.0E-05	7.3E-05	9.2E-08	0.0E+00	0.0E+00	3.6E-06	0.0E+00	0.0E+00	0.0E+00
Wood	0.0E+00	4.6E-06	6.1E-05	1.6E-06	7.0E-04	1.3E-05	2.0E-08	2.3E-05	1.6E-07	5.6E-05	3.5E-04	3.2E-04	1.1E-05
Furniture	0.0E+00	0.0E+00	2.4E-05	0.0E+00	4.2E-05	4.7E-05	1.6E-08	0.0E+00	0.0E+00	2.8E-06	0.0E+00	0.0E+00	0.0E+00
Paper	0.0E+00	4.2E-06	1.9E-04	3.9E-06	6.9E-04	4.2E-05	2.4E-06	1.9E-07	3.9E-08	6.7E-05	6.9E-04	9.8E-05	2.1E-04
Print and Publishing	0.0E+00	0.0E+00	3.1E-04	3.8E-07	4.5E-04	9.0E-05	3.1E-07	0.0E+00	0.0E+00	5.5E-06	6.3E-08	3.9E-06	0.0E+00
Primary Metal	0.0E+00	3.8E-07	4.9E-05	6.6E-07	3.4E-04	3.9E-04	7.4E-06	0.0E+00	0.0E+00	3.4E-05	9.5E-05	1.1E-04	8.7E-07
Metal Fabrication	0.0E+00	0.0E+00	2.0E-04	5.5E-06	3.5E-04	4.5E-04	2.1E-06	0.0E+00	0.0E+00	1.0E-05	1.4E-05	4.3E-06	1.4E-06
Machinery	0.0E+00	0.0E+00	2.4E-04	4.1E-06	4.4E-04	2.6E-04	1.5E-06	0.0E+00	0.0E+00	9.5E-06	3.1E-06	3.8E-08	0.0E+00
Transportation Equipment	0.0E+00	1.0E-05	7.0E-04	1.3E-04	1.3E-03	5.9E-03	1.3E-05	0.0E+00	0.0E+00	6.6E-05	7.5E-06	6.3E-05	0.0E+00
Electrical	0.0E+00	8.9E-07	5.2E-04	9.5E-06	1.0E-03	5.3E-04	5.2E-05	0.0E+00	1.6E-09	1.2E-05	0.0E+00	5.3E-07	1.7E-08
Mineral	0.0E+00	1.7E-05	1.6E-04	0.0E+00	2.7E-04	3.1E-04	1.5E-05	0.0E+00	0.0E+00	2.1E-05	3.5E-07	8.4E-05	0.0E+00
Petroleum	0.0E+00	1.5E-06	7.4E-05	3.0E-11	3.7E-05	6.2E-06	7.0E-07	0.0E+00	0.0E+00	7.0E-06	4.5E-06	1.9E-06	0.0E+00
Chemical	4.2E-06	2.2E-06	6.4E-04	2.2E-06	7.9E-04	1.5E-04	5.2E-05	0.0E+00	9.3E-06	4.0E-05	2.6E-04	3.9E-05	3.1E-07
Miscellaneous Manufacturing	0.0E+00	0.0E+00	3.4E-04	6.3E-07	2.2E-04	1.0E-04	7.8E-06	0.0E+00	0.0E+00	9.6E-06	1.1E-05	1.5E-05	0.0E+00
Subtotal	4.2E-06	4.6E-04	5.1E-03	1.6E-04	8.7E-03	9.8E-03	3.4E-04	2.3E-05	2.9E-05	4.2E-04	1.5E-03	7.5E-04	3.2E-04
Construction	8.9E-10	7.5E-06	4.6E-04	1.9E-07	3.1E-04	9.2E-06	5.4E-07	0.0E+00	1.6E-06	3.0E-05	0.0E+00	6.0E-08	2.3E-05
Transportation	0.0E+00	9.3E-04	4.6E-03	9.6E-03	2.4E-03	2.2E-04	9.1E-06	0.0E+00	1.1E-04	1.1E-04	1.9E-05	1.6E-05	2.6E-05
Storage	0.0E+00	4.9E-08	1.1E-04	0.0E+00	3.8E-05	2.1E-05	4.1E-06	0.0E+00	0.0E+00	2.7E-06	0.0E+00	3.6E-07	0.0E+00
Subtotal	0.0E+00	9.3E-04	4.7E-03	9.6E-03	2.4E-03	2.4E-04	1.3E-05	0.0E+00	1.1E-04	1.2E-04	1.9E-05	1.6E-05	2.6E-05
Communications	2.0E-06	0.0E+00	1.3E-02	1.6E-05	2.3E-03	1.5E-03	3.3E-06	0.0E+00	5.8E-06	1.0E-04	0.0E+00	0.0E+00	0.0E+00
Electrical Power, Gas and Water	2.8E-07	0.0E+00	5.9E-04	3.4E-08	6.5E-04	1.0E-04	3.7E-07	0.0E+00	1.1E-06	7.1E-06	0.0E+00	0.0E+00	4.7E-05
Wholesale Trade	1.3E-06	4.9E-06	2.5E-03	1.3E-05	1.9E-03	4.9E-04	1.1E-08	0.0E+00	3.4E-06	7.2E-05	2.1E-05	4.0E-06	1.5E-07
Retail Trade	6.1E-08	4.1E-05	5.3E-03	3.4E-07	4.3E-03	9.9E-04	0.0E+00	0.0E+00	4.6E-04	6.0E-05	0.0E+00	0.0E+00	3.6E-06
Services to Business Management	9.1E-08	2.0E-05	1.7E-03	2.5E-04	4.9E-03	4.0E-04	5.5E-05	8.6E-07	8.3E-07	1.1E-04	2.9E-06	9.2E-07	9.8E-05
Government, Personal and Misc. Services	1.9E-07	4.7E-06	1.0E-03	6.6E-07	3.7E-03	1.6E-04	8.2E-05	0.0E+00	1.5E-03	2.3E-05	1.0E-05	0.0E+00	0.0E+00
Subtotal	2.8E-07	2.5E-05	2.7E-03	2.5E-04	8.6E-03	5.6E-04	1.4E-04	8.6E-07	1.5E-03	1.3E-04	1.3E-05	9.2E-07	9.8E-05
Total	8.1E-06	1.5E-03	3.4E-02	1.0E-02	3.0E-02	1.4E-02	5.0E-04	2.4E-05	2.1E-03	9.7E-04	1.6E-03	1.4E-03	5.3E-04

TABLE A.4.1
Capital Stock Weights – Large Firms (*continued*)

	E&D								
	CL35	CL36	CL37	CL38	CL41b	CL42	CL43	CEE	CDE
Agriculture	0.0E+00	0.0E+00	0.0E+00	7.9E-08	0.0E+00	0.0E+00	5.0E-05		
Fishing and Trapping	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.2E-06		
Subtotal	0.0E+00	0.0E+00	0.0E+00	7.9E-08	0.0E+00	0.0E+00	5.3E-05		
Forestry	0.0E+00	0.0E+00	0.0E+00	1.4E-06	0.0E+00	0.0E+00	8.1E-05		
Mining	2.3E-07	0.0E+00	0.0E+00	5.9E-06	1.6E-03	0.0E+00	2.0E-04	1.1E-02	3.7E-03
Oil and Gas	2.9E-08	0.0E+00	1.4E-07	8.0E-06	1.7E-03	0.0E+00	7.2E-04	2.9E-02	0.0E+00
Food	0.0E+00	0.0E+00	0.0E+00	8.2E-10	0.0E+00	0.0E+00	4.4E-03		
Beverages	0.0E+00	0.0E+00	2.5E-08	0.0E+00	0.0E+00	0.0E+00	1.1E-03		
Tobacco	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-04		
Rubber	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-06	5.6E-04		
Plastic	0.0E+00	0.0E+00	2.2E-07	0.0E+00	0.0E+00	0.0E+00	2.3E-03		
Leather	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.1E-05		
Textile	2.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-03		
Clothing	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.4E-04		
Wood	1.4E-08	0.0E+00	0.0E+00	5.9E-06	0.0E+00	0.0E+00	2.6E-03		
Furniture	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.5E-04		
Paper	5.9E-07	0.0E+00	0.0E+00	3.1E-06	0.0E+00	0.0E+00	8.7E-03		
Print and Publishing	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E-07	2.3E-03		
Primary Metal	1.0E-06	0.0E+00	0.0E+00	6.0E-06	0.0E+00	0.0E+00	1.4E-03		
Metal Fabrication	3.2E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.9E-08	2.3E-03		
Machinery	0.0E+00	0.0E+00	0.0E+00	5.6E-05	0.0E+00	0.0E+00	1.6E-03		
Transportation Equipment	1.3E-04	0.0E+00	0.0E+00	2.5E-07	0.0E+00	0.0E+00	1.2E-02		
Electrical	3.7E-08	0.0E+00	4.0E-06	0.0E+00	0.0E+00	0.0E+00	2.2E-03		
Mineral	0.0E+00	2.2E-05	0.0E+00	4.2E-04	0.0E+00	0.0E+00	2.3E-03		
Petroleum	0.0E+00	0.0E+00	3.9E-07	1.6E-07	0.0E+00	0.0E+00	2.4E-04		
Chemical	5.0E-06	0.0E+00	7.9E-08	0.0E+00	0.0E+00	0.0E+00	6.7E-03		
Miscellaneous Manufacturing	1.9E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.9E-06	8.8E-04		
Subtotal	1.5E-04	2.2E-05	4.7E-06	5.0E-04	0.0E+00	4.7E-06	5.3E-02		
Construction	0.0E+00	2.2E-07	1.2E-06	3.2E-04	0.0E+00	0.0E+00	1.1E-04		
Transportation	6.9E-04	0.0E+00	0.0E+00	3.7E-05	0.0E+00	0.0E+00	6.6E-04		
Storage	6.8E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.4E-05		
Subtotal	6.9E-04	0.0E+00	0.0E+00	3.7E-05	0.0E+00	0.0E+00	7.3E-04		
Communications	0.0E+00	0.0E+00	0.0E+00	1.3E-05	0.0E+00	3.6E-04	3.9E-05		
Electrical Power, Gas and Water	0.0E+00	0.0E+00	0.0E+00	4.1E-05	0.0E+00	0.0E+00	5.1E-05		
Wholesale Trade	0.0E+00	0.0E+00	0.0E+00	3.9E-04	0.0E+00	0.0E+00	1.7E-03		
Retail Trade	0.0E+00	0.0E+00	3.4E-07	1.2E-07	0.0E+00	0.0E+00	3.3E-04		
Services to Business Management	5.1E-04	0.0E+00	2.2E-07	7.0E-05	0.0E+00	0.0E+00	3.7E-04		
Government, Personal and Misc. Services	3.0E-05	0.0E+00	1.9E-05	1.6E-05	0.0E+00	0.0E+00	2.2E-04		
Subtotal	5.4E-04	0.0E+00	1.9E-05	8.6E-05	0.0E+00	0.0E+00	5.8E-04		
Total	1.4E-03	2.2E-05	2.6E-05	1.4E-03	3.3E-03	3.6E-04	5.8E-02	4.0E-02	3.7E-03

TABLE A.4.2
Capital Stock Weights – Small Firms

	Total	Structures	Machinery	Land	Inventories	E&D	Structures CCA Classes						
							CL1	CL3	CL6	CL13	CL26	CL33	CL41a
Agriculture	2.5E-02	2.7E-03	6.2E-03	1.0E-02	5.5E-03		1.1E-03	3.9E-04	1.1E-03	2.4E-04	0.0E+00	0.0E+00	0.0E+00
Fishing and Trapping	6.2E-04	1.6E-04	3.3E-04	6.9E-05	5.2E-05		1.1E-04	1.3E-06	3.6E-05	1.5E-05	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.5E-02	2.9E-03	6.5E-03	1.0E-02	5.6E-03		1.2E-03	3.9E-04	1.1E-03	2.5E-04	0.0E+00	0.0E+00	0.0E+00
Forestry	2.9E-03	2.0E-04	2.3E-03	1.5E-04	2.6E-04		1.7E-04	1.2E-05	7.3E-06	4.6E-06	0.0E+00	3.2E-07	0.0E+00
Mining													
Oil and Gas													
Food	4.1E-03	1.1E-03	1.5E-03	2.1E-04	1.4E-03		6.4E-04	1.9E-04	1.8E-05	2.2E-04	0.0E+00	0.0E+00	0.0E+00
Beverages	1.9E-04	5.4E-05	6.8E-05	1.3E-05	5.9E-05		2.2E-05	0.0E+00	0.0E+00	3.2E-05	0.0E+00	0.0E+00	0.0E+00
Tobacco	2.5E-05	0.0E+00	2.3E-06	0.0E+00	2.2E-05		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Rubber	9.4E-05	0.0E+00	2.1E-05	5.7E-07	7.3E-05		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Plastic	2.1E-03	1.4E-04	1.2E-03	7.0E-05	6.6E-04		4.7E-05	6.9E-05	0.0E+00	2.4E-05	0.0E+00	0.0E+00	0.0E+00
Leather	1.8E-04	2.7E-06	3.5E-05	0.0E+00	1.4E-04		5.1E-07	1.0E-06	1.4E-07	9.8E-07	0.0E+00	0.0E+00	0.0E+00
Textile	9.3E-04	5.0E-05	4.0E-04	1.9E-06	4.8E-04		2.3E-05	7.7E-07	3.5E-09	2.6E-05	0.0E+00	0.0E+00	0.0E+00
Clothing	2.2E-03	2.1E-04	5.5E-04	6.0E-06	1.5E-03		1.1E-05	4.7E-06	0.0E+00	1.9E-04	0.0E+00	0.0E+00	0.0E+00
Wood	3.8E-03	8.1E-04	1.1E-03	1.6E-04	1.7E-03		7.1E-04	5.2E-05	8.3E-06	3.9E-05	0.0E+00	1.8E-06	0.0E+00
Furniture	1.2E-03	1.8E-04	4.1E-04	5.2E-05	5.6E-04		9.3E-05	2.3E-05	3.0E-07	6.0E-05	0.0E+00	0.0E+00	0.0E+00
Paper	6.8E-04	7.1E-05	3.1E-04	9.1E-06	2.9E-04		4.4E-05	2.5E-06	1.3E-07	2.5E-05	0.0E+00	0.0E+00	0.0E+00
Print and Publishing	2.1E-03	3.0E-04	1.5E-03	1.8E-05	3.6E-04		1.0E-04	9.7E-06	1.2E-07	1.8E-04	0.0E+00	0.0E+00	0.0E+00
Primary Metal	6.5E-04	5.6E-05	5.1E-04	1.6E-05	7.1E-05		4.4E-05	5.3E-07	1.1E-06	1.0E-05	0.0E+00	0.0E+00	0.0E+00
Metal Fabrication	8.3E-03	1.7E-03	3.7E-03	4.4E-04	2.5E-03		1.3E-03	1.9E-04	9.0E-06	2.4E-04	0.0E+00	0.0E+00	0.0E+00
Machinery	2.5E-03	2.5E-04	7.0E-04	6.4E-05	1.5E-03		2.1E-04	1.2E-05	5.5E-06	2.3E-05	0.0E+00	0.0E+00	0.0E+00
Transportation Equipment	1.9E-03	3.0E-04	6.0E-04	1.7E-04	8.1E-04		1.9E-04	6.4E-05	2.3E-07	4.4E-05	0.0E+00	0.0E+00	0.0E+00
Electrical	1.6E-03	3.3E-04	4.1E-04	1.5E-05	8.6E-04		1.7E-04	1.1E-04	2.6E-07	5.1E-05	0.0E+00	0.0E+00	0.0E+00
Mineral	1.9E-03	2.9E-04	7.9E-04	1.2E-04	6.9E-04		1.4E-04	1.2E-04	1.1E-06	3.1E-05	0.0E+00	0.0E+00	0.0E+00
Petroleum	1.1E-04	8.4E-06	7.8E-05	6.2E-06	2.1E-05		8.8E-07	5.0E-08	1.1E-06	6.4E-06	0.0E+00	0.0E+00	0.0E+00
Chemical	1.7E-03	2.9E-04	7.6E-04	1.1E-04	5.8E-04		1.6E-04	8.0E-05	1.1E-06	4.9E-05	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Manufacturing	1.9E-03	4.4E-04	3.2E-04	2.6E-05	1.1E-03		1.6E-04	3.2E-05	3.7E-07	2.5E-04	0.0E+00	0.0E+00	0.0E+00
Subtotal	3.8E-02	6.6E-03	1.5E-02	1.5E-03	1.5E-02		4.1E-03	9.5E-04	4.7E-05	1.5E-03	0.0E+00	1.8E-06	0.0E+00
Construction	3.7E-02	6.0E-03	8.9E-03	2.7E-03	2.0E-02		5.2E-03	5.4E-04	6.8E-05	1.2E-04	0.0E+00	0.0E+00	0.0E+00
Transportation	1.0E-02	1.0E-03	8.5E-03	3.1E-04	3.3E-04		6.4E-04	1.4E-04	3.5E-05	1.8E-04	0.0E+00	0.0E+00	0.0E+00
Storage	1.2E-03	7.7E-04	1.9E-04	2.3E-04	5.4E-05		6.2E-04	2.9E-05	6.8E-06	1.1E-04	0.0E+00	0.0E+00	0.0E+00
Subtotal	1.1E-02	1.8E-03	8.7E-03	5.4E-04	3.8E-04		1.3E-03	1.6E-04	4.2E-05	2.9E-04	0.0E+00	0.0E+00	0.0E+00
Communications	6.7E-04	9.9E-05	5.3E-04	1.9E-05	2.2E-05		5.2E-05	1.8E-05	5.7E-07	2.8E-05	0.0E+00	0.0E+00	0.0E+00
Electrical Power, Gas and Water	4.8E-04	2.2E-05	4.3E-04	1.7E-05	1.6E-05		2.0E-05	1.9E-07	1.6E-06	3.9E-07	0.0E+00	0.0E+00	0.0E+00
Wholesale Trade	4.3E-02	3.8E-03	7.2E-03	1.2E-03	3.1E-02		2.2E-03	1.9E-04	8.8E-05	1.4E-03	0.0E+00	0.0E+00	0.0E+00
Retail Trade	5.7E-02	7.7E-03	1.0E-02	2.9E-03	3.6E-02		2.9E-03	7.2E-04	3.7E-04	3.6E-03	0.0E+00	0.0E+00	0.0E+00
Services to Business Management	1.1E-01	6.2E-02	8.1E-03	3.1E-02	6.2E-03		4.6E-02	1.2E-02	2.7E-04	3.8E-03	0.0E+00	0.0E+00	0.0E+00
Government, Personal and Misc. Services	4.0E-02	1.8E-02	1.2E-02	4.7E-03	5.7E-03		8.3E-03	3.9E-03	1.3E-04	5.3E-03	0.0E+00	0.0E+00	0.0E+00
Subtotal	1.5E-01	8.0E-02	2.0E-02	3.5E-02	1.2E-02		5.4E-02	1.6E-02	4.0E-04	9.1E-03	0.0E+00	0.0E+00	0.0E+00
Total	3.6E-01	1.1E-01	8.0E-02	5.5E-02	1.2E-01	0.0E+00	7.2E-02	1.9E-02	2.1E-03	1.6E-02	0.0E+00	2.2E-06	0.0E+00

TABLE A.4.2
Capital Stock Weights – Small Firms (*continued*)

	Machinery CCA Classes												
	CL4	CL7	CL8	CL9	CL10	CL12	CL14	CL15	CL16	CL17	CL24	CL27	CL34
Agriculture	1.6E-09	0.0E+00	2.5E-03	2.0E-05	3.1E-03	8.4E-05	1.9E-06	5.5E-07	1.3E-07	1.5E-05	2.4E-05	6.3E-07	2.5E-06
Fishing and Trapping	0.0E+00	1.2E-04	1.4E-04	3.9E-09	6.8E-05	1.3E-07	5.6E-07	0.0E+00	0.0E+00	1.1E-07	0.0E+00	0.0E+00	0.0E+00
Subtotal	1.6E-09	1.2E-04	2.6E-03	2.0E-05	3.2E-03	8.4E-05	2.4E-06	5.5E-07	1.3E-07	1.5E-05	2.4E-05	6.3E-07	2.5E-06
Forestry	0.0E+00	1.9E-05	1.1E-04	1.3E-05	2.1E-03	4.2E-06	3.3E-07	7.5E-06	8.0E-07	5.1E-06	0.0E+00	0.0E+00	4.5E-08
Mining													
Oil and Gas													
Food	0.0E+00	2.0E-05	3.2E-04	3.2E-06	3.7E-04	2.5E-05	1.2E-06	0.0E+00	0.0E+00	6.7E-06	8.5E-07	6.9E-07	0.0E+00
Beverages	0.0E+00	0.0E+00	5.8E-06	0.0E+00	7.4E-06	2.6E-06	0.0E+00	0.0E+00	0.0E+00	8.8E-08	0.0E+00	0.0E+00	0.0E+00
Tobacco	0.0E+00	0.0E+00	6.2E-07	0.0E+00	2.3E-07	1.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Rubber	0.0E+00	0.0E+00	6.2E-06	0.0E+00	9.3E-06	3.9E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Plastic	0.0E+00	0.0E+00	1.0E-04	8.6E-08	6.7E-05	1.2E-04	1.4E-06	0.0E+00	0.0E+00	7.5E-06	0.0E+00	0.0E+00	0.0E+00
Leather	0.0E+00	0.0E+00	2.8E-06	0.0E+00	3.0E-06	6.7E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Textile	0.0E+00	0.0E+00	3.7E-05	0.0E+00	4.0E-05	1.7E-05	3.4E-07	0.0E+00	0.0E+00	9.4E-08	7.7E-08	0.0E+00	0.0E+00
Clothing	0.0E+00	0.0E+00	7.2E-05	0.0E+00	6.8E-05	1.6E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.2E-08	0.0E+00	0.0E+00
Wood	0.0E+00	0.0E+00	8.9E-05	1.2E-06	2.2E-04	1.1E-05	0.0E+00	0.0E+00	7.4E-06	2.2E-05	0.0E+00	3.7E-07	0.0E+00
Furniture	2.6E-07	0.0E+00	5.1E-05	0.0E+00	9.0E-05	3.8E-05	7.8E-07	0.0E+00	0.0E+00	6.6E-07	0.0E+00	0.0E+00	0.0E+00
Paper	0.0E+00	0.0E+00	1.9E-05	9.5E-06	3.1E-05	5.6E-05	1.2E-06	0.0E+00	0.0E+00	1.7E-07	0.0E+00	0.0E+00	0.0E+00
Print and Publishing	0.0E+00	0.0E+00	2.1E-04	4.6E-06	1.2E-04	3.8E-05	3.0E-08	0.0E+00	0.0E+00	9.1E-07	0.0E+00	0.0E+00	0.0E+00
Primary Metal	0.0E+00	0.0E+00	1.1E-04	0.0E+00	1.8E-04	8.7E-06	0.0E+00	0.0E+00	0.0E+00	4.0E-06	0.0E+00	2.8E-07	0.0E+00
Metal Fabrication	0.0E+00	3.9E-05	3.8E-04	0.0E+00	6.4E-04	3.2E-04	1.3E-05	0.0E+00	0.0E+00	1.1E-05	0.0E+00	0.0E+00	0.0E+00
Machinery	0.0E+00	1.0E-06	5.1E-05	0.0E+00	1.8E-04	1.4E-05	2.2E-06	0.0E+00	0.0E+00	6.6E-07	0.0E+00	0.0E+00	0.0E+00
Transportation Equipment	0.0E+00	0.0E+00	4.1E-05	1.1E-06	1.0E-04	7.2E-05	0.0E+00	0.0E+00	0.0E+00	2.0E-06	0.0E+00	0.0E+00	0.0E+00
Electrical	0.0E+00	0.0E+00	4.0E-05	0.0E+00	1.1E-04	3.4E-05	2.4E-07	0.0E+00	0.0E+00	3.7E-07	0.0E+00	0.0E+00	0.0E+00
Mineral	0.0E+00	0.0E+00	6.3E-05	2.7E-07	2.5E-04	2.1E-05	1.7E-07	1.9E-07	0.0E+00	8.7E-06	0.0E+00	0.0E+00	0.0E+00
Petroleum	0.0E+00	9.9E-09	1.0E-05	0.0E+00	1.1E-05	3.6E-07	0.0E+00	0.0E+00	0.0E+00	6.1E-08	0.0E+00	0.0E+00	0.0E+00
Chemical	5.4E-08	0.0E+00	4.6E-05	0.0E+00	8.3E-05	3.3E-05	5.8E-07	0.0E+00	0.0E+00	7.7E-06	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Manufacturing	0.0E+00	0.0E+00	9.2E-05	0.0E+00	5.0E-05	4.2E-05	1.8E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Subtotal	3.2E-07	6.0E-05	1.8E-03	2.0E-05	2.6E-03	8.7E-04	2.2E-05	1.9E-07	7.4E-06	7.3E-05	1.0E-06	1.3E-06	0.0E+00
Construction	0.0E+00	5.9E-06	1.4E-03	3.3E-05	4.9E-03	1.1E-04	4.5E-08	0.0E+00	6.1E-06	1.2E-04	0.0E+00	6.1E-06	0.0E+00
Transportation	2.8E-06	4.6E-04	3.9E-04	1.3E-03	5.9E-03	4.0E-05	0.0E+00	2.8E-07	1.2E-04	1.7E-05	0.0E+00	0.0E+00	0.0E+00
Storage	0.0E+00	0.0E+00	1.0E-04	0.0E+00	6.1E-05	3.6E-06	0.0E+00	0.0E+00	6.0E-08	1.0E-05	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.8E-06	4.6E-04	5.0E-04	1.3E-03	6.0E-03	4.4E-05	0.0E+00	2.8E-07	1.2E-04	2.7E-05	0.0E+00	0.0E+00	0.0E+00
Communications	0.0E+00	0.0E+00	3.0E-04	2.8E-05	1.4E-04	3.9E-05	1.7E-06	0.0E+00	0.0E+00	9.4E-06	0.0E+00	0.0E+00	0.0E+00
Electrical Power, Gas and Water	0.0E+00	0.0E+00	9.3E-05	2.7E-09	1.5E-04	1.3E-06	0.0E+00	0.0E+00	1.8E-08	8.6E-06	0.0E+00	0.0E+00	1.7E-04
Wholesale Trade	3.9E-06	1.2E-05	1.8E-03	4.3E-06	3.4E-03	1.9E-04	2.7E-05	0.0E+00	1.4E-05	6.3E-05	2.5E-07	0.0E+00	0.0E+00
Retail Trade	1.1E-04	1.1E-05	3.4E-03	1.3E-06	5.4E-03	3.1E-04	1.0E-04	0.0E+00	9.0E-04	5.2E-05	0.0E+00	0.0E+00	0.0E+00
Services to Business Management	5.0E-06	2.3E-05	3.0E-03	4.0E-05	3.4E-03	6.3E-04	3.5E-05	0.0E+00	1.1E-05	2.7E-04	0.0E+00	0.0E+00	1.4E-06
Government, Personal and Misc. Services	2.2E-05	2.5E-04	3.5E-03	9.0E-06	4.5E-03	5.8E-04	8.0E-05	0.0E+00	2.1E-03	7.1E-05	1.2E-09	0.0E+00	0.0E+00
Subtotal	2.7E-05	2.7E-04	6.6E-03	4.9E-05	7.8E-03	1.2E-03	1.2E-04	0.0E+00	2.1E-03	3.4E-04	1.2E-09	0.0E+00	1.4E-06
Total	1.4E-04	9.5E-04	1.8E-02	1.5E-03	3.6E-02	2.9E-03	2.7E-04	8.5E-06	3.1E-03	7.1E-04	2.5E-05	8.0E-06	1.8E-04

TABLE A.4.2
Capital Stock Weights – Small Firms (*continued*)

								E&D	
	CL35	CL36	CL37	CL38	CL41b	CL42	CL43	CEE	CDE
Agriculture	0.0E+00	5.2E-06	4.1E-04	1.6E-06	0.0E+00	0.0E+00	2.3E-05		
Fishing and Trapping	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.0E-05		
Subtotal	0.0E+00	5.2E-06	4.1E-04	1.6E-06	0.0E+00	0.0E+00	3.3E-05		
Forestry	1.3E-06	0.0E+00	0.0E+00	6.7E-05	0.0E+00	0.0E+00	2.8E-05		
Mining									
Oil and Gas									
Food	0.0E+00	0.0E+00	0.0E+00	5.5E-07	0.0E+00	0.0E+00	7.0E-04		
Beverages	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.2E-05		
Tobacco	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00		
Rubber	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E-06		
Plastic	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.5E-04		
Leather	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.3E-05		
Textile	0.0E+00	0.0E+00	0.0E+00	2.1E-07	0.0E+00	0.0E+00	3.0E-04		
Clothing	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.9E-04		
Wood	0.0E+00	0.0E+00	0.0E+00	3.0E-07	0.0E+00	0.0E+00	7.2E-04		
Furniture	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.3E-04		
Paper	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.9E-04		
Print and Publishing	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-03		
Primary Metal	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E-04		
Metal Fabrication	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.3E-03		
Machinery	0.0E+00	0.0E+00	0.0E+00	2.8E-04	0.0E+00	0.0E+00	1.6E-04		
Transportation Equipment	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.8E-04		
Electrical	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.3E-04		
Mineral	0.0E+00	0.0E+00	0.0E+00	1.1E-04	0.0E+00	0.0E+00	3.3E-04		
Petroleum	0.0E+00	0.0E+00	0.0E+00	2.8E-05	0.0E+00	0.0E+00	2.9E-05		
Chemical	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.9E-04		
Miscellaneous Manufacturing	0.0E+00	0.0E+00	0.0E+00	6.7E-06	0.0E+00	0.0E+00	1.3E-04		
Subtotal	0.0E+00	0.0E+00	0.0E+00	4.3E-04	0.0E+00	0.0E+00	9.0E-03		
Construction	0.0E+00	2.8E-05	0.0E+00	2.1E-03	0.0E+00	0.0E+00	1.9E-04		
Transportation	0.0E+00	0.0E+00	0.0E+00	1.8E-04	0.0E+00	0.0E+00	1.2E-06		
Storage	0.0E+00	0.0E+00	0.0E+00	5.8E-06	0.0E+00	0.0E+00	4.2E-06		
Subtotal	0.0E+00	0.0E+00	0.0E+00	1.9E-04	0.0E+00	0.0E+00	5.4E-06		
Communications	0.0E+00	0.0E+00	0.0E+00	1.3E-07	0.0E+00	7.3E-08	7.5E-06		
Electrical Power, Gas and Water	0.0E+00	0.0E+00	0.0E+00	1.0E-07	0.0E+00	0.0E+00	5.2E-08		
Wholesale Trade	0.0E+00	2.6E-07	0.0E+00	2.9E-04	0.0E+00	0.0E+00	1.3E-03		
Retail Trade	0.0E+00	0.0E+00	0.0E+00	4.4E-05	0.0E+00	0.0E+00	1.1E-04		
Services to Business Management	0.0E+00	5.6E-06	4.3E-06	3.8E-05	0.0E+00	0.0E+00	7.0E-04		
Government, Personal and Misc. Services	0.0E+00	0.0E+00	2.0E-05	3.0E-04	0.0E+00	0.0E+00	6.6E-04		
Subtotal	0.0E+00	5.6E-06	2.4E-05	3.4E-04	0.0E+00	0.0E+00	1.4E-03		
Total	1.3E-06	3.9E-05	4.3E-04	3.5E-03	0.0E+00	7.3E-08	1.2E-02	0.0E+00	0.0E+00

TABLE A.4.3
Capital Stock Weights – Large and Small Firms

	Total	Structures	Machinery	Land	Inventories	E&D	Structures CCA Classes						
							CL1	CL3	CL6	CL13	CL26	CL33	CL41a
Agriculture	2.6E-02	3.1E-03	6.5E-03	1.0E-02	6.5E-03		1.3E-03	4.3E-04	1.2E-03	2.5E-04	0.0E+00	0.0E+00	0.0E+00
Fishing and Trapping	7.6E-04	1.7E-04	4.4E-04	7.2E-05	8.3E-05		1.1E-04	1.3E-06	4.0E-05	1.5E-05	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.7E-02	3.2E-03	6.9E-03	1.1E-02	6.5E-03		1.4E-03	4.3E-04	1.2E-03	2.6E-04	0.0E+00	0.0E+00	0.0E+00
Forestry	3.8E-03	4.7E-04	2.5E-03	1.7E-04	7.0E-04		4.3E-04	2.3E-05	7.8E-06	1.0E-05	0.0E+00	5.8E-07	0.0E+00
Mining	3.2E-02	6.6E-03	2.8E-03	5.8E-04	7.0E-03	1.5E-02	7.1E-04	8.6E-05	3.2E-07	1.4E-04	0.0E+00	0.0E+00	5.6E-03
Oil and Gas	3.7E-02	1.9E-03	3.1E-03	1.0E-04	2.9E-03	2.9E-02	6.1E-04	4.0E-05	3.4E-05	1.2E-04	1.9E-05	1.3E-07	1.1E-03
Food	2.3E-02	4.9E-03	8.6E-03	7.3E-04	8.3E-03		3.6E-03	6.2E-04	5.4E-05	6.3E-04	0.0E+00	0.0E+00	0.0E+00
Beverages	5.4E-03	1.0E-03	2.1E-03	1.9E-04	2.1E-03		6.7E-04	1.4E-04	1.7E-06	2.3E-04	0.0E+00	0.0E+00	0.0E+00
Tobacco	2.5E-03	1.6E-04	7.0E-04	9.3E-06	1.6E-03		4.3E-05	8.7E-05	5.4E-08	2.7E-05	0.0E+00	0.0E+00	0.0E+00
Rubber	2.7E-03	2.8E-04	7.8E-04	9.4E-05	1.6E-03		2.5E-04	1.3E-05	5.4E-06	8.3E-06	0.0E+00	0.0E+00	0.0E+00
Plastic	8.3E-03	1.1E-03	4.8E-03	3.1E-04	2.0E-03		6.9E-04	3.8E-04	8.1E-06	6.7E-05	0.0E+00	0.0E+00	0.0E+00
Leather	1.0E-03	1.1E-04	2.1E-04	1.0E-05	7.1E-04		1.5E-06	2.8E-05	1.4E-07	7.7E-05	0.0E+00	0.0E+00	0.0E+00
Textile	4.6E-03	5.1E-04	1.8E-03	5.1E-05	2.3E-03		4.0E-04	4.6E-05	1.1E-05	5.5E-05	2.9E-06	0.0E+00	0.0E+00
Clothing	4.6E-03	4.7E-04	1.0E-03	5.4E-05	3.0E-03		1.3E-04	4.0E-05	0.0E+00	3.1E-04	0.0E+00	0.0E+00	0.0E+00
Wood	1.4E-02	2.8E-03	5.2E-03	3.6E-04	5.5E-03		2.4E-03	2.1E-04	2.3E-05	7.2E-05	0.0E+00	1.1E-04	0.0E+00
Furniture	2.4E-03	4.7E-04	7.8E-04	9.7E-05	1.1E-03		2.4E-04	5.0E-05	4.9E-07	1.8E-04	0.0E+00	0.0E+00	0.0E+00
Paper	3.4E-02	1.5E-02	1.1E-02	3.7E-04	7.1E-03		1.3E-02	1.8E-03	1.0E-05	1.7E-04	0.0E+00	5.2E-05	0.0E+00
Print and Publishing	8.1E-03	1.3E-03	4.6E-03	4.6E-04	1.7E-03		9.1E-04	8.5E-05	1.6E-06	3.1E-04	0.0E+00	0.0E+00	0.0E+00
Primary Metal	1.6E-02	6.3E-03	3.0E-03	2.3E-04	6.1E-03		6.0E-03	2.5E-04	1.8E-05	7.4E-05	0.0E+00	0.0E+00	0.0E+00
Metal Fabrication	1.7E-02	2.9E-03	7.0E-03	7.2E-04	6.4E-03		2.2E-03	2.8E-04	1.5E-05	3.7E-04	0.0E+00	0.0E+00	0.0E+00
Machinery	1.4E-02	1.7E-03	3.3E-03	5.6E-04	8.1E-03		1.3E-03	2.1E-04	1.4E-05	1.1E-04	0.0E+00	0.0E+00	0.0E+00
Transportation Equipment	4.0E-02	4.5E-03	2.0E-02	5.8E-04	1.5E-02		3.5E-03	6.7E-04	2.2E-05	3.2E-04	0.0E+00	0.0E+00	0.0E+00
Electrical	1.4E-02	2.1E-03	4.7E-03	2.7E-04	7.1E-03		1.5E-03	2.7E-04	1.5E-05	3.4E-04	0.0E+00	0.0E+00	0.0E+00
Mineral	9.5E-03	1.8E-03	4.4E-03	1.8E-04	3.1E-03		1.2E-03	4.2E-04	5.8E-05	1.9E-04	0.0E+00	0.0E+00	0.0E+00
Petroleum	4.7E-03	5.6E-04	4.5E-04	1.1E-04	3.6E-03		3.7E-04	1.1E-04	1.7E-05	4.1E-05	2.2E-05	0.0E+00	0.0E+00
Chemical	2.6E-02	7.7E-03	9.4E-03	7.8E-04	8.2E-03		6.2E-03	7.7E-04	1.6E-05	6.6E-04	6.1E-05	4.9E-06	0.0E+00
Miscellaneous Manufacturing	6.5E-03	1.3E-03	1.9E-03	1.7E-04	3.1E-03		4.5E-04	3.1E-04	3.3E-06	5.6E-04	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.6E-01	5.7E-02	9.6E-02	6.3E-03	9.8E-02		4.5E-02	6.8E-03	2.9E-04	4.8E-03	8.6E-05	1.6E-04	0.0E+00
Construction	6.2E-02	1.5E-02	1.0E-02	4.5E-03	3.2E-02		1.4E-02	9.8E-04	7.5E-05	2.8E-04	0.0E+00	0.0E+00	0.0E+00
Transportation	3.7E-02	5.4E-03	2.8E-02	6.4E-04	2.7E-03		4.1E-03	1.9E-04	8.9E-04	2.4E-04	5.7E-06	3.7E-06	0.0E+00
Storage	2.5E-03	1.1E-03	4.3E-04	3.3E-04	6.0E-04		9.1E-04	6.6E-05	1.4E-05	1.2E-04	0.0E+00	0.0E+00	0.0E+00
Subtotal	3.9E-02	6.6E-03	2.8E-02	9.7E-04	3.3E-03		5.0E-03	2.6E-04	9.1E-04	3.7E-04	5.7E-06	3.7E-06	0.0E+00
Communications	7.2E-02	5.3E-02	1.7E-02	7.6E-04	4.2E-04		7.2E-03	4.2E-02	2.2E-05	3.5E-03	0.0E+00	0.0E+00	0.0E+00
Electrical Power, Gas and Water	8.0E-03	4.6E-03	1.9E-03	1.6E-04	1.3E-03		4.6E-03	5.8E-06	7.1E-06	1.8E-05	0.0E+00	0.0E+00	0.0E+00
Wholesale Trade	9.0E-02	1.0E-02	1.4E-02	2.9E-03	6.3E-02		7.0E-03	7.7E-04	1.4E-04	2.3E-03	0.0E+00	0.0E+00	0.0E+00
Retail Trade	9.5E-02	1.4E-02	2.2E-02	4.2E-03	5.5E-02		5.3E-03	1.2E-03	5.7E-04	7.0E-03	0.0E+00	0.0E+00	0.0E+00
Services to Business Management	2.2E-01	1.3E-01	1.7E-02	5.2E-02	1.8E-02		9.3E-02	2.7E-02	3.9E-04	1.0E-02	2.0E-06	2.2E-07	0.0E+00
Government, Personal and Misc. Services	6.0E-02	2.6E-02	1.9E-02	6.9E-03	8.6E-03		1.4E-02	4.4E-03	1.3E-04	7.5E-03	0.0E+00	0.0E+00	0.0E+00
Subtotal	2.8E-01	1.6E-01	3.5E-02	5.9E-02	2.7E-02		1.1E-01	3.1E-02	5.2E-04	1.7E-02	2.0E-06	2.2E-07	0.0E+00
Total	1.0E+00	3.3E-01	2.4E-01	9.0E-02	3.0E-01	4.3E-02	2.0E-01	8.4E-02	3.8E-03	3.6E-02	1.1E-04	1.7E-04	6.8E-03

TABLE A.4.3
Capital Stock Weights – Large and Small Firms (continued)

	Machinery CCA Classes												
	CL4	CL7	CL8	CL9	CL10	CL12	CL14	CL15	CL16	CL17	CL24	CL27	CL34
Agriculture	1.1E-08	0.0E+00	2.6E-03	2.1E-05	3.2E-03	8.9E-05	2.4E-06	5.5E-07	1.3E-07	1.8E-05	2.4E-05	6.3E-07	2.5E-06
Fishing and Trapping	0.0E+00	1.9E-04	1.7E-04	5.4E-08	6.9E-05	4.4E-07	5.6E-07	0.0E+00	0.0E+00	1.6E-07	0.0E+00	0.0E+00	0.0E+00
Subtotal	1.1E-08	1.9E-04	2.8E-03	2.1E-05	3.3E-03	8.9E-05	3.0E-06	5.5E-07	1.3E-07	1.8E-05	2.4E-05	6.3E-07	2.5E-06
Forestry	0.0E+00	2.0E-05	1.2E-04	1.5E-05	2.1E-03	4.3E-06	3.3E-07	7.6E-06	8.0E-07	5.6E-06	1.9E-05	7.5E-06	4.5E-08
Mining	1.1E-08	5.0E-08	7.0E-05	9.8E-07	2.3E-04	4.5E-05	2.5E-06	0.0E+00	2.1E-07	1.4E-05	2.2E-05	5.8E-04	0.0E+00
Oil and Gas	0.0E+00	4.4E-07	1.4E-04	1.7E-05	4.1E-04	5.2E-05	1.7E-06	0.0E+00	0.0E+00	1.0E-05	2.1E-06	1.7E-07	1.6E-05
Food	2.7E-08	4.4E-04	1.0E-03	3.5E-06	1.4E-03	3.1E-04	1.1E-04	0.0E+00	1.5E-05	3.5E-05	1.3E-05	3.3E-06	3.6E-05
Beverages	1.1E-08	4.3E-08	3.7E-04	7.9E-07	3.7E-04	1.5E-04	4.6E-05	0.0E+00	5.3E-06	7.0E-06	0.0E+00	0.0E+00	8.4E-08
Tobacco	0.0E+00	0.0E+00	6.2E-05	0.0E+00	6.2E-05	9.2E-05	2.4E-06	0.0E+00	0.0E+00	1.3E-06	0.0E+00	6.5E-06	0.0E+00
Rubber	0.0E+00	0.0E+00	5.5E-05	0.0E+00	7.2E-05	7.7E-05	0.0E+00	0.0E+00	0.0E+00	7.7E-06	2.0E-06	4.0E-06	0.0E+00
Plastic	0.0E+00	0.0E+00	3.1E-04	1.0E-07	3.2E-04	8.6E-04	1.2E-05	0.0E+00	0.0E+00	2.1E-05	0.0E+00	0.0E+00	0.0E+00
Leather	0.0E+00	0.0E+00	4.8E-05	0.0E+00	1.6E-05	6.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Textile	0.0E+00	0.0E+00	8.4E-05	3.4E-08	1.3E-04	3.3E-05	2.1E-05	0.0E+00	0.0E+00	1.2E-05	3.1E-06	0.0E+00	5.8E-05
Clothing	0.0E+00	0.0E+00	1.5E-04	0.0E+00	1.6E-04	8.9E-05	9.2E-08	0.0E+00	0.0E+00	3.6E-06	9.2E-08	0.0E+00	0.0E+00
Wood	0.0E+00	4.6E-06	1.5E-04	2.9E-06	9.2E-04	2.4E-05	2.0E-08	2.3E-05	7.6E-06	7.9E-05	3.5E-04	3.2E-04	1.1E-05
Furniture	2.6E-07	0.0E+00	7.5E-05	0.0E+00	1.3E-04	8.4E-05	8.0E-07	0.0E+00	0.0E+00	3.4E-06	0.0E+00	0.0E+00	0.0E+00
Paper	0.0E+00	4.2E-06	2.1E-04	1.3E-05	7.2E-04	9.9E-05	3.5E-06	1.9E-07	3.9E-08	6.7E-05	6.9E-04	9.8E-05	2.1E-04
Print and Publishing	0.0E+00	0.0E+00	5.2E-04	5.0E-06	5.6E-04	1.3E-04	3.4E-07	0.0E+00	0.0E+00	6.4E-06	6.3E-08	3.9E-06	0.0E+00
Primary Metal	0.0E+00	3.8E-07	1.6E-04	6.6E-07	5.2E-04	4.0E-04	7.4E-06	0.0E+00	0.0E+00	3.8E-05	9.5E-05	1.1E-04	8.7E-07
Metal Fabrication	0.0E+00	3.9E-05	5.8E-04	5.5E-06	9.9E-04	7.6E-04	1.5E-05	0.0E+00	0.0E+00	2.1E-05	1.4E-05	4.3E-06	1.4E-06
Machinery	0.0E+00	1.0E-06	2.9E-04	4.1E-06	6.3E-04	2.8E-04	3.7E-06	0.0E+00	0.0E+00	1.0E-05	3.1E-06	3.8E-08	0.0E+00
Transportation Equipment	0.0E+00	1.0E-05	7.4E-04	1.4E-04	1.4E-03	6.0E-03	1.3E-05	0.0E+00	0.0E+00	6.8E-05	7.5E-06	6.3E-05	0.0E+00
Electrical	0.0E+00	8.9E-07	5.6E-04	9.5E-06	1.1E-03	5.6E-04	5.2E-05	0.0E+00	1.6E-09	1.3E-05	0.0E+00	5.3E-07	1.7E-08
Mineral	0.0E+00	1.7E-05	2.3E-04	2.7E-07	5.2E-04	3.4E-04	1.6E-05	1.9E-07	0.0E+00	3.0E-05	3.5E-07	8.4E-05	0.0E+00
Petroleum	0.0E+00	1.5E-06	8.4E-05	3.0E-11	4.8E-05	6.5E-06	7.0E-07	0.0E+00	0.0E+00	7.1E-06	4.5E-06	1.9E-06	0.0E+00
Chemical	4.2E-06	2.2E-06	6.8E-04	2.2E-06	8.7E-04	1.8E-04	5.3E-05	0.0E+00	9.3E-06	4.7E-05	2.6E-04	3.9E-05	3.1E-07
Miscellaneous Manufacturing	0.0E+00	0.0E+00	4.4E-04	6.3E-07	2.7E-04	1.4E-04	9.6E-06	0.0E+00	0.0E+00	9.6E-06	1.1E-05	1.5E-05	0.0E+00
Subtotal	4.5E-06	5.2E-04	6.8E-03	1.8E-04	1.1E-02	1.1E-02	3.7E-04	2.4E-05	3.7E-05	4.9E-04	1.5E-03	7.5E-04	3.2E-04
Construction	8.9E-10	1.3E-05	1.8E-03	3.3E-05	5.2E-03	1.2E-04	5.9E-07	0.0E+00	7.7E-06	1.5E-04	0.0E+00	6.1E-06	2.3E-05
Transportation	2.8E-06	1.4E-03	5.0E-03	1.1E-02	8.3E-03	2.6E-04	9.1E-06	2.8E-07	2.3E-04	1.3E-04	1.9E-05	1.6E-05	2.6E-05
Storage	0.0E+00	4.9E-08	2.1E-04	0.0E+00	9.9E-05	2.4E-05	4.1E-06	0.0E+00	6.0E-08	1.3E-05	0.0E+00	3.6E-07	0.0E+00
Subtotal	2.8E-06	1.4E-03	5.2E-03	1.1E-02	8.4E-03	2.9E-04	1.3E-05	2.8E-07	2.3E-04	1.4E-04	1.9E-05	1.6E-05	2.6E-05
Communications	2.0E-06	0.0E+00	1.3E-02	4.4E-05	2.4E-03	1.5E-03	5.0E-06	0.0E+00	5.8E-06	1.1E-04	0.0E+00	0.0E+00	0.0E+00
Electrical Power, Gas and Water	2.8E-07	0.0E+00	6.9E-04	3.7E-08	8.0E-04	1.0E-04	3.7E-07	0.0E+00	1.1E-06	1.6E-05	0.0E+00	0.0E+00	2.2E-04
Wholesale Trade	5.2E-06	1.7E-05	4.3E-03	1.7E-05	5.4E-03	6.8E-04	2.7E-05	0.0E+00	1.8E-05	1.3E-04	2.1E-05	4.0E-06	1.5E-07
Retail Trade	1.1E-04	5.3E-05	8.6E-03	1.7E-06	9.6E-03	1.3E-03	1.0E-04	0.0E+00	1.4E-03	1.1E-04	0.0E+00	0.0E+00	3.6E-06
Services to Business Management	5.1E-06	4.3E-05	4.7E-03	2.9E-04	8.2E-03	1.0E-03	9.0E-05	8.6E-07	1.2E-05	3.8E-04	2.9E-06	9.2E-07	9.9E-05
Government, Personal and Misc. Services	2.2E-05	2.5E-04	4.5E-03	9.7E-06	8.2E-03	7.4E-04	1.6E-04	0.0E+00	3.5E-03	9.4E-05	1.0E-05	0.0E+00	0.0E+00
Subtotal	2.7E-05	3.0E-04	9.3E-03	3.0E-04	1.6E-02	1.8E-03	2.5E-04	8.6E-07	3.6E-03	4.7E-04	1.3E-05	9.2E-07	9.9E-05
Total	1.5E-04	2.5E-03	5.3E-02	1.2E-02	6.6E-02	1.7E-02	7.8E-04	3.3E-05	5.2E-03	1.7E-03	1.6E-03	1.4E-03	7.1E-04

TABLE A.4.3
Capital Stock Weights – Large and Small Firms (*continued*)

								E&D	
	CL35	CL36	CL37	CL38	CL41b	CL42	CL43	CEE	CDE
Agriculture	0.0E+00	5.2E-06	4.1E-04	1.7E-06	0.0E+00	0.0E+00	7.3E-05		
Fishing and Trapping	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-05		
Subtotal	0.0E+00	5.2E-06	4.1E-04	1.7E-06	0.0E+00	0.0E+00	8.6E-05		
Forestry	1.3E-06	0.0E+00	0.0E+00	6.8E-05	0.0E+00	0.0E+00	1.1E-04		
Mining	2.3E-07	0.0E+00	0.0E+00	5.9E-06	1.6E-03	0.0E+00	2.0E-04	1.1E-02	3.7E-03
Oil and Gas	2.9E-08	0.0E+00	1.4E-07	8.0E-06	1.7E-03	0.0E+00	7.2E-04	2.9E-02	0.0E+00
Food	0.0E+00	0.0E+00	0.0E+00	5.5E-07	0.0E+00	0.0E+00	5.1E-03		
Beverages	0.0E+00	0.0E+00	2.5E-08	0.0E+00	0.0E+00	0.0E+00	1.2E-03		
Tobacco	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-04		
Rubber	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-06	5.6E-04		
Plastic	0.0E+00	0.0E+00	2.2E-07	0.0E+00	0.0E+00	0.0E+00	3.3E-03		
Leather	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.4E-05		
Textile	2.5E-06	0.0E+00	0.0E+00	2.1E-07	0.0E+00	0.0E+00	1.4E-03		
Clothing	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.3E-04		
Wood	1.4E-08	0.0E+00	0.0E+00	6.2E-06	0.0E+00	0.0E+00	3.3E-03		
Furniture	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-04		
Paper	5.9E-07	0.0E+00	0.0E+00	3.1E-06	0.0E+00	0.0E+00	8.9E-03		
Print and Publishing	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E-07	3.4E-03		
Primary Metal	1.0E-06	0.0E+00	0.0E+00	6.0E-06	0.0E+00	0.0E+00	1.6E-03		
Metal Fabrication	3.2E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.9E-08	4.6E-03		
Machinery	0.0E+00	0.0E+00	0.0E+00	3.3E-04	0.0E+00	0.0E+00	1.8E-03		
Transportation Equipment	1.3E-04	0.0E+00	0.0E+00	2.5E-07	0.0E+00	0.0E+00	1.2E-02		
Electrical	3.7E-08	0.0E+00	4.0E-06	0.0E+00	0.0E+00	0.0E+00	2.4E-03		
Mineral	0.0E+00	2.2E-05	0.0E+00	5.4E-04	0.0E+00	0.0E+00	2.6E-03		
Petroleum	0.0E+00	0.0E+00	3.9E-07	2.8E-05	0.0E+00	0.0E+00	2.6E-04		
Chemical	5.0E-06	0.0E+00	7.9E-08	0.0E+00	0.0E+00	0.0E+00	7.3E-03		
Miscellaneous Manufacturing	1.9E-06	0.0E+00	0.0E+00	6.7E-06	0.0E+00	1.9E-06	1.0E-03		
Subtotal	1.5E-04	2.2E-05	4.7E-06	9.2E-04	0.0E+00	4.7E-06	6.2E-02		
Construction	0.0E+00	2.8E-05	1.2E-06	2.4E-03	0.0E+00	0.0E+00	3.0E-04		
Transportation	6.9E-04	0.0E+00	0.0E+00	2.2E-04	0.0E+00	0.0E+00	6.7E-04		
Storage	6.8E-08	0.0E+00	0.0E+00	5.8E-06	0.0E+00	0.0E+00	6.8E-05		
Subtotal	6.9E-04	0.0E+00	0.0E+00	2.3E-04	0.0E+00	0.0E+00	7.3E-04		
Communications	0.0E+00	0.0E+00	0.0E+00	1.3E-05	0.0E+00	3.6E-04	4.7E-05		
Electrical Power, Gas and Water	0.0E+00	0.0E+00	0.0E+00	4.1E-05	0.0E+00	0.0E+00	5.1E-05		
Wholesale Trade	0.0E+00	2.6E-07	0.0E+00	6.8E-04	0.0E+00	0.0E+00	3.0E-03		
Retail Trade	0.0E+00	0.0E+00	3.4E-07	4.4E-05	0.0E+00	0.0E+00	4.4E-04		
Services to Business Management	5.1E-04	5.6E-06	4.5E-06	1.1E-04	0.0E+00	0.0E+00	1.1E-03		
Government, Personal and Misc. Services	3.0E-05	0.0E+00	3.9E-05	3.2E-04	0.0E+00	0.0E+00	8.8E-04		
Subtotal	5.4E-04	5.6E-06	4.4E-05	4.2E-04	0.0E+00	0.0E+00	1.9E-03		
Total	1.4E-03	6.1E-05	4.6E-04	4.9E-03	3.3E-03	3.6E-04	7.0E-02	4.0E-02	3.7E-03

TABLE A.5.1
Production Input Shares – Large Firms

	Total	Structures	Machinery	Land	Inventories	E&D	R&D	Labour
	(percent)							
Agriculture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fishing and Trapping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forestry	100.0	4.6	2.2	0.3	7.3	0.0	0.7	84.8
Mining	100.0	7.4	3.2	0.7	7.9	16.6	0.8	63.5
Oil and Gas	100.0	3.1	4.8	0.2	4.6	44.9	0.2	42.2
Food	100.0	7.1	13.1	1.0	12.8	0.0	1.6	64.5
Beverages	100.0	10.1	20.9	1.8	20.5	0.0	0.6	46.2
Tobacco	100.0	4.2	18.7	0.2	42.5	0.0	2.4	31.9
Rubber	100.0	1.1	3.0	0.4	5.9	0.0	0.4	89.1
Plastic	100.0	3.7	13.2	0.9	5.0	0.0	1.9	75.3
Leather	100.0	1.6	2.8	0.2	8.9	0.0	0.2	86.4
Textile	100.0	2.9	8.5	0.3	11.1	0.0	4.4	72.7
Clothing	100.0	2.0	3.6	0.4	11.3	0.0	0.8	81.9
Wood	100.0	2.5	5.0	0.2	4.6	0.0	0.2	87.5
Furniture	100.0	3.4	4.2	0.5	5.8	0.0	0.7	85.4
Paper	100.0	9.7	6.8	0.2	4.4	0.0	0.3	78.6
Print and Publishing	100.0	4.1	12.8	1.8	5.5	0.0	0.5	75.3
Primary Metal	100.0	5.8	2.3	0.2	5.6	0.0	0.2	85.9
Metal Fabrication	100.0	2.2	6.4	0.5	7.4	0.0	1.8	81.5
Machinery	100.0	2.6	4.9	0.9	12.3	0.0	1.3	78.0
Transportation Equipment	100.0	2.4	11.5	0.2	8.1	0.0	2.6	75.1
Electrical	100.0	3.4	8.2	0.5	11.9	0.0	14.6	61.3
Mineral	100.0	4.5	10.5	0.2	7.1	0.0	0.4	77.3
Petroleum	100.0	3.2	2.1	0.6	20.9	0.0	0.3	72.9
Chemical	100.0	13.4	15.6	1.2	13.6	0.0	8.2	48.0
Miscellaneous Manufacturing	100.0	2.8	4.9	0.4	6.2	0.0	2.3	83.4
Subtotal	100.0	5.9	9.4	0.6	9.5	0.0	2.4	72.2
Construction	100.0	4.6	0.6	0.9	6.4	0.0	0.1	87.4
Transportation	100.0	2.7	11.8	0.2	1.5	0.0	0.1	83.8
Storage	100.0	4.7	3.2	1.3	7.4	0.0	0.7	82.5
Subtotal	100.0	2.8	11.4	0.2	1.7	0.0	0.1	83.8
Communications	100.0	27.9	8.9	0.4	0.2	0.0	3.4	59.3
Electrical Power, Gas and Water	100.0	37.0	12.0	1.1	10.4	0.0	0.1	39.4
Wholesale Trade	100.0	2.2	2.5	0.6	11.0	0.0	0.7	82.9
Retail Trade	100.0	1.8	3.3	0.4	5.3	0.0	0.0	89.2
Services to Business Management	100.0	9.0	1.1	2.9	1.6	0.0	0.1	85.2
Government, Personal and Misc. Services	100.0	11.0	8.9	3.0	3.9	0.0	0.0	73.2
Subtotal	100.0	12.8	2.5	4.0	2.5	0.0	0.2	78.0
Total	100.0	8.5	6.2	1.4	6.7	1.7	1.1	74.5

TABLE A.5.2
Production Input Shares – Small Firms

	Total	Structures	Machinery	Land	Inventories	E&D	R&D	Labour
	(percent)							
Agriculture	100.0	6.1	12.8	20.6	12.7	0.0	0.5	47.4
Fishing and Trapping	100.0	6.1	16.2	2.7	3.1	0.0	1.9	70.1
Subtotal	100.0	6.0	12.7	19.4	12.1	0.0	0.5	49.3
Forestry	100.0	0.9	10.8	0.7	1.2	0.0	0.1	86.4
Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil and Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food	100.0	9.1	12.4	1.8	11.5	0.0	0.4	64.7
Beverages	100.0	14.8	18.7	3.5	16.3	0.0	0.7	46.0
Tobacco	100.0	0.0	6.3	0.0	61.1	0.0	0.0	32.6
Rubber	100.0	0.0	2.0	0.1	7.2	0.0	0.6	90.2
Plastic	100.0	1.6	14.5	0.8	7.6	0.0	1.6	73.8
Leather	100.0	0.2	2.8	0.0	11.1	0.0	0.1	85.7
Textile	100.0	1.3	10.0	0.0	12.1	0.0	0.4	76.2
Clothing	100.0	1.6	4.3	0.0	11.7	0.0	0.3	81.9
Wood	100.0	2.7	3.7	0.5	5.8	0.0	0.2	87.0
Furniture	100.0	2.1	4.9	0.6	6.8	0.0	0.5	85.1
Paper	100.0	2.3	9.8	0.3	9.4	0.0	0.2	78.1
Print and Publishing	100.0	3.3	16.5	0.2	4.1	0.0	0.5	75.4
Primary Metal	100.0	1.1	10.5	0.3	1.5	0.0	0.2	86.4
Metal Fabrication	100.0	3.7	7.8	0.9	5.3	0.0	0.7	81.6
Machinery	100.0	2.3	6.3	0.6	13.5	0.0	3.5	73.7
Transportation Equipment	100.0	3.4	6.8	1.9	9.1	0.0	0.7	78.1
Electrical	100.0	4.5	5.6	0.2	11.6	0.0	15.1	63.0
Mineral	100.0	3.5	9.6	1.5	8.4	0.0	0.5	76.5
Petroleum	100.0	2.7	25.2	2.0	6.6	0.0	4.8	58.6
Chemical	100.0	7.5	20.0	2.7	15.2	0.0	10.9	43.7
Miscellaneous Manufacturing	100.0	3.9	2.8	0.2	9.8	0.0	4.9	78.3
Subtotal	100.0	4.4	9.9	1.0	10.2	0.0	1.5	73.0
Construction	100.0	2.0	3.0	0.9	6.7	0.0	0.0	87.4
Transportation	100.0	1.6	13.5	0.5	0.5	0.0	0.1	83.8
Storage	100.0	10.3	2.6	3.1	0.7	0.0	0.0	83.2
Subtotal	100.0	2.5	12.3	0.8	0.5	0.0	0.1	83.8
Communications	100.0	4.7	25.1	0.9	1.0	0.0	0.8	67.5
Electrical Power, Gas and Water	100.0	2.7	53.2	2.1	2.0	0.0	0.5	39.4
Wholesale Trade	100.0	1.4	2.7	0.5	11.4	0.0	0.3	83.7
Retail Trade	100.0	1.5	2.0	0.5	6.9	0.0	0.0	89.1
Services to Business Management	100.0	8.9	1.2	4.4	0.9	0.0	0.4	84.2
Government, Personal and Misc. Services	100.0	11.8	8.0	3.1	3.8	0.0	0.1	73.1
Subtotal	100.0	11.7	3.0	5.2	1.7	0.0	0.6	77.9
Total	100.0	7.0	5.2	3.6	7.8	0.0	0.5	75.9

TABLE A.5.3
Production Input Shares – Large and Small Firms

	Total	Structures	Machinery	Land	Inventories	E&D	R&D	Labour
	(percent)							
Agriculture	100.0	6.1	12.8	20.6	12.7	0.0	0.4	47.4
Fishing and Trapping	100.0	6.1	16.2	2.6	3.0	0.0	1.9	70.1
Subtotal	100.0	6.0	12.8	19.4	12.1	0.0	0.5	49.3
Forestry	100.0	1.7	8.9	0.6	2.5	0.0	0.2	86.0
Mining	100.0	7.5	3.2	0.7	7.9	16.6	0.7	63.5
Oil and Gas	100.0	3.1	4.8	0.2	4.6	44.9	0.2	42.2
Food	100.0	7.5	13.1	1.1	12.7	0.0	1.1	64.5
Beverages	100.0	10.2	20.8	1.8	20.4	0.0	0.6	46.2
Tobacco	100.0	4.2	18.6	0.2	42.7	0.0	2.3	32.0
Rubber	100.0	1.1	3.0	0.4	6.0	0.0	0.5	89.2
Plastic	100.0	3.2	13.6	0.9	5.7	0.0	1.8	74.7
Leather	100.0	1.4	2.8	0.1	9.3	0.0	0.2	86.2
Textile	100.0	2.6	9.1	0.3	11.7	0.0	2.7	73.6
Clothing	100.0	1.8	4.0	0.2	11.6	0.0	0.4	81.9
Wood	100.0	2.5	4.6	0.3	5.0	0.0	0.2	87.3
Furniture	100.0	2.8	4.6	0.6	6.3	0.0	0.6	85.2
Paper	100.0	9.6	6.9	0.2	4.5	0.0	0.3	78.6
Print and Publishing	100.0	3.9	13.8	1.4	5.1	0.0	0.5	75.4
Primary Metal	100.0	5.6	2.7	0.2	5.4	0.0	0.2	85.9
Metal Fabrication	100.0	3.0	7.3	0.7	6.6	0.0	0.9	81.6
Machinery	100.0	2.6	5.2	0.9	12.6	0.0	2.0	76.8
Transportation Equipment	100.0	2.5	11.2	0.3	8.1	0.0	2.7	75.1
Electrical	100.0	3.5	7.8	0.4	11.7	0.0	15.0	61.5
Mineral	100.0	4.3	10.3	0.4	7.4	0.0	0.5	77.1
Petroleum	100.0	3.2	2.5	0.6	20.5	0.0	0.4	72.8
Chemical	100.0	13.0	15.8	1.3	13.7	0.0	8.4	47.8
Miscellaneous Manufacturing	100.0	3.1	4.4	0.4	7.2	0.0	3.7	81.3
Subtotal	100.0	5.7	9.5	0.6	9.6	0.0	2.3	72.3
Construction	100.0	3.0	2.1	0.9	6.6	0.0	0.0	87.4
Transportation	100.0	2.4	12.3	0.3	1.2	0.0	0.1	83.8
Storage	100.0	7.7	3.0	2.3	4.1	0.0	0.3	82.6
Subtotal	100.0	2.7	11.7	0.4	1.4	0.0	0.1	83.8
Communications	100.0	27.2	8.9	0.4	0.2	0.0	3.5	59.8
Electrical Power, Gas and Water	100.0	34.9	14.5	1.2	9.9	0.0	0.1	39.4
Wholesale Trade	100.0	1.8	2.6	0.5	11.2	0.0	0.5	83.3
Retail Trade	100.0	1.6	2.5	0.5	6.2	0.0	0.0	89.1
Services to Business Management	100.0	9.1	1.2	3.7	1.3	0.0	0.3	84.5
Government, Personal and Misc. Services	100.0	11.5	8.3	3.1	3.8	0.0	0.1	73.1
Subtotal	100.0	12.2	2.8	4.6	2.1	0.0	0.4	77.9
Total	100.0	7.9	5.8	2.2	7.1	1.0	0.9	75.0

TABLE A.6.1
Average Statutory Tax Rates by Industry, 1997

	Large Firms				Small Firms			
	M&P Share	Federal Tax Rate	Provincial Tax Rate	Combined Rate	M&P Share	Federal Tax Rate	Provincial Tax Rate	Combined Rate
	(percent)							
Agriculture	23.7	27.46	13.88	41.34	0.3	13.12	7.83	20.95
Fishing and Trapping	0.0	29.12	14.15	43.27	0.0	13.12	7.83	20.95
Forestry	30.3	27.00	13.80	40.80	0.6	13.12	7.83	20.95
Mining	8.8	28.50	14.22	42.73	3.1	13.12	7.83	20.95
Oil and Gas	8.9	28.50	15.50	44.00	0.7	13.12	7.83	20.95
Food	79.1	23.59	13.24	36.83	47.0	13.12	7.83	20.95
Beverages	81.9	23.39	13.21	36.60	74.0	13.12	7.83	20.95
Tobacco	97.5	22.29	13.03	35.33	100.0	13.12	7.82	20.94
Rubber	69.9	24.22	13.35	37.57	83.5	13.12	7.83	20.95
Plastic	100.0	22.12	13.00	35.12	64.4	13.12	7.83	20.95
Leather	88.4	22.93	13.14	36.06	84.9	13.12	7.83	20.95
Textile	90.4	22.79	13.11	35.91	51.7	13.12	7.83	20.95
Clothing	86.5	23.07	13.16	36.23	50.2	13.12	7.83	20.95
Wood	100.0	22.12	13.00	35.12	51.7	13.12	7.83	20.95
Furniture	85.8	23.11	13.17	36.28	30.8	13.12	7.83	20.95
Paper	100.0	22.12	13.00	35.12	42.6	13.12	7.83	20.95
Print and Publishing	62.8	24.72	13.43	38.15	5.1	13.12	7.83	20.95
Primary Metal	44.3	26.02	13.64	39.66	40.2	13.12	7.83	20.95
Metal Fabrication	86.7	23.05	13.16	36.20	48.3	13.12	7.83	20.95
Machinery	70.6	24.18	13.34	37.52	34.4	13.12	7.83	20.95
Transportation Equipment	96.4	22.37	13.04	35.42	42.3	13.12	7.83	20.95
Electrical	81.0	23.45	13.22	36.67	34.3	13.12	7.83	20.95
Mineral	69.7	24.24	13.35	37.59	38.7	13.12	7.83	20.95
Petroleum	56.0	25.20	13.51	38.70	33.0	13.12	7.83	20.95
Chemical	65.6	24.53	13.40	37.93	54.8	13.12	7.83	20.95
Miscellaneous Manufacturing	54.5	25.31	13.52	38.83	36.3	13.12	7.83	20.95
Construction	5.2	28.76	14.09	42.85	0.9	13.12	7.83	20.95
Transportation	0.8	29.06	14.14	43.20	0.1	13.12	7.83	20.95
Storage	2.5	28.95	14.12	43.06	1.4	13.12	7.83	20.95
Communications	1.2	29.03	14.13	43.17	0.0	13.12	7.83	20.95
Electrical Power, Gas and Water	0.2	29.11	14.15	43.25	0.0	13.12	7.83	20.95
Wholesale Trade	18.1	27.85	13.94	41.79	5.0	13.12	7.83	20.95
Retail Trade	4.7	28.79	14.09	42.89	0.4	13.12	7.83	20.95
Services to Business Management	5.1	28.76	14.09	42.85	1.7	13.12	7.83	20.95
Government, Personal and Misc.	21.0	27.65	13.91	41.56	1.9	13.12	7.83	20.95

TABLE A.6.2
Statutory Federal and Provincial Income Tax Rates, 1997

	Taxable Income Share (1)	Large Firms		Small Firms	
		Regular	M&P	Regular	M&P
		(percent)			
Federal		29.12	22.12	13.12	13.12
British Columbia	13.79	16.50	16.50	9.00	9.00
Alberta	15.05	15.50	14.50	6.00	6.00
Saskatchewan	2.02	17.00	10.00	8.00	8.00
Manitoba	2.25	17.00	17.00	9.00	9.00
Ontario	38.05	15.50	13.50	9.50	9.50
Quebec	24.71	9.15	9.15	5.91	5.91
New Brunswick	1.53	17.00	17.00	7.00	7.00
Nova Scotia	1.27	16.00	16.00	5.00	5.00
Prince Edward Island	0.24	16.00	7.50	7.50	7.50
Newfoundland	0.72	14.00	5.00	5.00	5.00
Yukon	0.05	15.00	2.50	6.00	2.50
Northwest Territories	0.33	14.00	14.00	5.00	5.00
Provincial Average		14.15	13.00	7.83	7.82
Combined Federal-Provincial		43.3	35.1	20.9	20.9

(1) *Revenue Canada*; T2 Database, 1994.

TABLE A.7
Statutory Federal and Provincial Capital Tax Rates, 1997

	(percent)
Federal	0.225
British Columbia	0.300
Alberta	n/a
Saskatchewan	0.600
Manitoba	0.500
Ontario	0.300
Quebec	0.640
New Brunswick	0.300
Nova Scotia	0.250
Prince Edward Island	n/a
Newfoundland	n/a
Yukon	n/a
Northwest Territories	n/a
Provincial Average	0.345

TABLE A.8
Effective Investment Tax Credit Rates

	Large Firms			Small Firms			Large and Small Firms		
	Structures	Machinery	Total	Structures	Machinery	Total	Structures	Machinery	Total
	(percent)								
Agriculture	0.17	0.26	0.21	1.00	0.44	0.61	0.88	0.43	0.58
Fishing and Trapping	0.28	0.73	0.71	2.36	3.73	3.28	2.22	2.10	2.13
Forestry	0.06	0.13	0.08	0.00	0.33	0.30	0.02	0.34	0.28
Mining	0.87	0.79	0.85	0.00	0.00	0.00	0.87	0.72	0.82
Oil and Gas	0.44	0.41	0.42	0.00	0.00	0.00	0.43	0.40	0.41
Food	0.81	1.16	1.04	1.68	0.66	1.09	1.03	1.08	1.06
Beverages	0.20	0.23	0.22	0.00	0.00	0.00	0.19	0.23	0.21
Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber	0.72	0.02	0.21	0.00	0.00	0.00	0.72	0.02	0.20
Plastic	0.00	0.00	0.00	0.41	0.00	0.04	0.20	0.00	0.04
Leather	0.00	0.00	0.00	2.19	0.00	0.15	0.14	0.00	0.05
Textile	0.87	0.13	0.32	0.00	14.37	12.77	0.73	1.63	1.42
Clothing	0.00	0.00	0.00	0.08	1.41	1.05	0.13	0.60	0.46
Wood	5.84	0.38	2.19	1.33	0.03	0.58	3.20	0.34	1.35
Furniture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paper	0.70	0.52	0.62	1.03	0.01	0.20	0.71	0.51	0.63
Print and Publishing	0.01	0.05	0.04	2.52	0.00	0.43	0.50	0.05	0.15
Primary Metal	0.08	0.23	0.12	0.00	0.00	0.00	0.08	0.21	0.12
Metal Fabrication	0.01	0.01	0.01	0.22	0.72	0.56	0.16	0.42	0.35
Machinery	0.05	0.00	0.02	0.02	0.02	0.02	0.05	0.01	0.02
Transportation Equipment	0.48	0.12	0.18	0.01	0.01	0.01	0.45	0.11	0.17
Electrical	0.17	1.22	0.91	0.00	0.00	0.00	0.13	1.23	0.89
Mineral	1.22	0.62	0.80	1.94	2.30	2.20	1.34	1.04	1.12
Petroleum	0.01	0.01	0.01	0.00	0.35	0.32	0.01	0.06	0.03
Chemical	0.24	2.69	1.56	0.02	0.41	0.30	0.23	2.66	1.57
Miscellaneous Manufacturing	0.07	0.01	0.03	0.00	0.00	0.00	0.04	0.01	0.02
Construction	0.00	0.05	0.01	0.00	0.03	0.02	0.00	0.03	0.01
Transportation	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.01	0.01
Storage	0.28	0.06	0.19	0.00	0.00	0.00	0.12	0.04	0.09
Communications	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Electrical Power, Gas and Water	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Wholesale Trade	0.08	0.17	0.13	0.01	0.11	0.08	0.06	0.16	0.12
Retail Trade	0.00	0.01	0.01	0.00	0.02	0.01	0.00	0.01	0.01
Services to Business Management	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02	0.00
Government, Personal and Misc. Services	0.07	0.00	0.04	0.01	0.51	0.21	0.03	0.20	0.11
All Industries	0.19	0.34	0.25	0.07	0.31	0.18	0.14	0.32	0.22

TABLE A.9
Economic Depreciation Rates

	Weighted Average			Structures CCA Classes							Machinery CCA Classes				
	All Assets	Structures	Machinery	CDE	CL1	CL3	CL6	CL13	CL26	CL33	CL41a	CL4	CL7	CL8	CL9
	(percent)														
Agriculture	10.9	4.1	14.2		4.2	4.3	3.7	5.0	2.9	15.0	10.0	6.6	7.5	11.5	18.3
Fishing and Trapping	8.8	4.5	10.5		4.2	5.8	5.2	5.0	2.9	15.0	10.0	6.6	7.5	11.5	18.3
Forestry	13.5	4.3	15.3		4.2	5.3	4.6	5.0	2.9	15.0	10.0	6.6	7.5	11.5	18.3
Mining	9.8	9.1	10.5	10.0	3.4	3.6	8.0	4.6	2.9	15.0	10.0	6.6	10.0	13.3	18.3
Oil and Gas	9.9	7.3	10.3	10.0	3.4	3.6	8.0	4.6	2.9	15.0	10.0	6.6	10.0	13.3	18.3
Food	10.9	3.7	15.0		3.7	3.4	3.7	4.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Beverages	12.4	3.7	16.6		3.7	3.4	3.7	4.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Tobacco	14.1	3.6	16.5		3.7	3.4	3.7	4.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Rubber	12.4	3.7	15.5		3.7	3.4	3.7	4.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Plastic	14.7	3.6	17.4		3.7	3.4	3.7	4.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Leather	16.1	4.2	22.1		3.7	3.6	4.0	4.4	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Textile	10.8	4.2	12.7		3.7	4.7	5.1	6.7	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Clothing	13.1	5.7	16.5		3.7	4.7	5.1	6.7	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Wood	10.4	3.7	14.1		3.7	4.6	5.0	6.5	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Furniture	12.6	5.0	17.2		3.7	4.7	5.1	6.7	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Paper	7.3	3.7	12.3		3.7	3.3	3.7	3.9	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Print and Publishing	11.9	3.8	14.1		3.7	3.4	3.7	4.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Primary Metal	8.3	3.8	17.8		3.7	3.8	4.2	4.9	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Metal Fabrication	12.9	3.8	16.6		3.7	3.6	3.9	4.4	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Machinery	12.9	3.8	17.4		3.7	3.6	4.0	4.4	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Transportation Equipment	17.6	3.8	20.6		3.7	3.8	4.2	4.9	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Electrical	14.2	4.0	18.8		3.7	3.9	4.2	5.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Mineral	12.5	4.1	15.9		3.7	4.2	4.6	5.7	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Petroleum	8.4	3.8	14.2		3.7	3.9	4.2	5.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Chemical	8.9	3.7	13.2		3.7	3.3	3.6	3.8	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Miscellaneous Manufacturing	11.8	5.2	16.4		3.7	4.7	5.0	6.6	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Construction	10.7	5.4	18.7		5.4	3.5	5.4	8.0	2.9	15.0	10.0	6.6	7.5	15.6	18.3
Transportation	16.1	3.5	18.6		3.4	3.2	3.8	3.9	2.9	15.0	10.0	6.6	7.5	13.6	18.3
Storage	6.7	3.3	15.6		3.4	2.8	3.4	3.2	2.9	15.0	10.0	6.6	7.5	13.6	18.3
Communications	7.8	3.9	19.9		4.0	3.7	4.0	5.0	2.9	15.0	10.0	6.6	7.5	15.5	18.3
Electrical Power, Gas and Water	7.9	3.1	19.5		3.1	2.9	3.5	3.4	2.9	15.0	10.0	6.6	7.5	15.8	18.3
Wholesale Trade	13.3	3.5	20.3		3.4	3.2	3.8	4.0	2.9	15.0	10.0	6.6	7.5	16.1	18.3
Retail Trade	15.5	3.7	23.1		3.4	3.2	3.8	4.0	2.9	15.0	10.0	6.6	7.5	16.1	18.3
Services to Business Management	5.6	3.4	22.4		3.5	3.2	3.5	4.0	2.9	15.0	10.0	6.6	7.5	15.1	18.3
Government, Personal and Misc. Services	12.5	3.6	24.8		3.5	3.2	3.5	4.0	2.9	15.0	10.0	6.6	7.5	15.1	18.3
All Industries	10.1	3.8	18.7		3.7	3.6	3.9	4.3	2.9	15.0	10.0	6.6	7.5	15.3	18.3

Note: For E&D, economic depreciation applies to CDE only; CEE is fully expensed.

TABLE A.9
Economic Depreciation Rates (*continued*)

	CL10	CL12	CL14	CL15	CL16	CL17	CL24	CL27	CL34	CL35	CL36	CL37	CL38	CL41b	CL42	CL43
	(percent)															
Agriculture	15.7	35.3	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	16.3	10.0	12.0	12.3
Fishing and Trapping	15.7	35.3	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	16.3	10.0	12.0	12.3
Forestry	15.7	35.3	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	16.3	10.0	12.0	12.3
Mining	10.0	10.0	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	12.1	10.0	12.0	10.6
Oil and Gas	10.0	10.0	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	12.2	10.0	12.0	10.7
Food	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Beverages	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Tobacco	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Rubber	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Plastic	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Leather	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Textile	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Clothing	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Wood	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Furniture	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Paper	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Print and Publishing	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Primary Metal	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Metal Fabrication	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Machinery	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Transportation Equipment	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Electrical	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Mineral	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Petroleum	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Chemical	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Miscellaneous Manufacturing	27.3	40.1	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	10.8
Construction	21.5	31.3	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	16.3	10.0	12.0	12.3
Transportation	25.6	8.8	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	12.3
Storage	25.6	8.8	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	12.3
Communications	29.1	46.8	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	16.9	10.0	12.0	12.3
Electrical Power, Gas and Water	27.5	6.0	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	12.3
Wholesale Trade	27.5	0.0	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	12.3
Retail Trade	27.5	35.3	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	16.9	10.0	12.0	12.3
Services to Business Management	27.5	44.2	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	12.3
Government, Personal and Misc. Services	27.5	44.2	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.2	10.0	12.0	12.3
All Industries	27.0	38.2	11.1	20.0	33.3	2.9	12.3	11.8	11.8	6.6	7.0	15.0	17.0	10.0	12.0	10.9

TABLE A.10
Effective Provincial Sales Tax Rates on Machinery

	(percent)
Agriculture	1.6
Fishing and Trapping	3.3
Forestry	3.3
Mining	1.3
Oil and Gas	1.3
Food	2.3
Beverages	2.3
Tobacco	0.0
Rubber	1.1
Plastic	1.1
Leather	2.0
Textile	0.7
Clothing	2.2
Wood	3.3
Furniture	1.8
Paper	2.6
Print and Publishing	2.3
Primary Metal	1.7
Metal Fabrication	1.9
Machinery	2.1
Transportation Equipment	1.8
Electrical	2.4
Mineral	2.5
Petroleum	1.8
Chemical	2.0
Miscellaneous Manufacturing	1.8
Construction	5.4
Transportation	2.5
Storage	2.5
Communications	4.8
Electrical Power, Gas and Water	3.4
Wholesale Trade	4.4
Retail Trade	4.4
Services to Business Management	4.3
Government, Personal and Misc. Services	4.3

TABLE A.11
Loss Utilization Rates and Proportion of Tax-Paying Firms

	Loss Utilization Rates		Proportion of Tax-Paying Firms	
	Large Firms	Small Firms	Large Firms	Small Firms
	(percent)			
Agriculture	18	11	49	57
Fishing and Trapping	10	12	9	43
Forestry	7	25	23	69
Mining	6	9	15	38
Oil and Gas	9	23	42	55
Food	29	12	60	69
Beverages	24	13	46	73
Tobacco	0	0	100	44
Rubber	3	0	29	81
Plastic	11	19	33	58
Leather	0	11	70	67
Textile	10	10	59	63
Clothing	16	13	42	60
Wood	9	33	28	54
Furniture	13	15	63	71
Paper	7	7	12	69
Print and Publishing	28	24	26	65
Primary Metal	7	11	12	61
Metal Fabrication	14	21	41	64
Machinery	15	30	38	57
Transportation Equipment	10	16	53	57
Electrical	16	11	69	49
Mineral	5	33	44	61
Petroleum	28	11	20	49
Chemical	16	2	52	54
Miscellaneous Manufacturing	18	14	9	56
Construction	18	27	30	51
Transportation	11	22	29	60
Storage	22	22	54	42
Communications	13	9	66	46
Electrical Power, Gas and Water	7	48	76	67
Wholesale Trade	17	25	51	62
Retail Trade	13	18	31	58
Services to Business Management	14	13	41	55
Government, Personal and Misc. Services	15	19	35	50
All Industries	12	20	51	51

TABLE A.12
Industry Specific Debt-Asset Ratios

	(percent)
Agriculture	36.8
Fishing and Trapping	28.0
Forestry	26.0
Mining	26.0
Oil and Gas	26.0
Food	28.0
Beverages	35.0
Tobacco	35.0
Rubber	35.0
Plastic	35.0
Leather	35.0
Textile	35.0
Clothing	35.0
Wood	44.0
Furniture	44.0
Paper	44.0
Print and Publishing	39.0
Primary Metal	30.0
Metal Fabrication	30.0
Machinery	35.0
Transportation Equipment	34.0
Electrical	35.0
Mineral	35.0
Petroleum	33.0
Chemical	33.0
Miscellaneous Manufacturing	35.0
Construction	39.0
Transportation	48.0
Storage	48.0
Communications	50.0
Electrical Power, Gas and Water	56.0
Wholesale Trade	35.0
Retail Trade	32.0
Services to Business Management	39.0
Government, Personal and Misc. Services	39.0

TABLE A.13
Main Features of the Corporate Tax Systems in the G-7 Countries and Mexico, 1995

	Canada	United States	United Kingdom	Germany	France	Italy	Japan	Mexico
	(percent)							
Income Tax Rate								
<i>National</i>	29.12	35	33	48.38	33 ^{1/3}	37	37.5	35
<i>Local</i>	8.9-17	to 12	No	5-25	No	16.20	(a)	No
Tax Depreciation Rate								
<i>Manufacturing</i>								
Structures	5 DB	6 DB	4 SL	4 SL	5 SL	3 SL	4 SL	5 SL
Machinery	39 DB	32 DB	25 DB	15 SL	15 SL	13 SL	10 SL	10 SL
<i>Services</i>								
Structures	5 DB	7 DB	4 SL	4 SL	5 SL	3 SL	4 SL	5 SL
Machinery	29 DB	34 DB	25 DB	15 SL	15 SL	13 SL	10 SL	10 SL
Business Tax	No	No	No	No	3.5-4	No	No	No
Capital Tax	0-0.64 (average: 0.57)	No	No	No	No	No	No	1.8 as minimum tax
Property Transfer Tax	No	No	1	No	6.4	3.8	1.5	2
Inventory Accounting	FIFO	FIFO/LIFO	FIFO	LIFO	LIFO	LIFO	FIFO/LIFO	LIFO
Tax Indexation	No	No	No	No	No	No	No	Yes

Sources: Department of Finance METR Model, and Chen and McKenzie (1997).

Notes:

- There are different types of income taxes that apply at the local level in Japan; see Chen and McKenzie (1997) for a brief description.
- The average capital tax for Canada is composed of the LCT (0.225%) and the weighted average provincial capital tax (0.345%).

Appendix B

Estimated Effective Payroll Tax Rates for Canada

This appendix describes the data and the methodology used to compute the effective payroll tax rates for Canada used in the METR model.

As discussed in the text, in the base case, it is assumed that the economic incidence of payroll taxes coincides with the legal incidence, although other incidence assumptions were also considered.

The METR methodology requires the calculation of the marginal tax rate on labour inputs, which we interpret as the tax associated with expansion of employment of a firm or industry. In principle, there are several ways in which this might be done. One approach would be to simply take total payroll taxes by sector and divide them by total wages and salaries paid in the sector, to obtain an average payroll tax rate; but fully comparable data on payroll taxes and payroll are not readily available. Another approach would be to calculate the (wage and salary) income for an “average” worker in each industry, and apply the statutory payroll tax provisions to the average worker. But this approach would not take into account differences in the distribution of wages and salaries among industries. These differences, when coupled with the income ceilings and floors associated with most payroll taxes, can affect the tax rate.¹ Thus, a third approach was followed, which allowed for more variability in effective payroll tax rates across sectors. This approach involved the calculation of average earnings for income groups within each sector. The statutory provisions of the various payroll taxes were then applied to each of these groups, and a weighted average taken to determine the overall effective payroll tax rate for a “typical” hybrid employee in each industry.

To compute effective payroll tax rates for Canada, information is required for each of the 10 provinces, as there are substantial differences in payroll tax regimes across the provinces.

Data on the distribution of hourly wages² by industry for 1989-90 (Table B.1) provided a starting point. Unfortunately, these wage distribution data were for Canada as a whole rather than for individual provinces. While we combined these Canada-wide wage distribution data with provincial data on average weekly hours by industry, the resulting calculations of “annual wages by industry for each province” obviously only allow in part for province-specific factors.

The hourly wage distribution consists of five wage groups (the wage brackets were converted to 1996 dollars using a fixed-weight index of average hourly earnings). Since the fifth group includes hourly wages over \$22.06 with no upper limit, an average wage had to be computed for

¹ For example, the \$39,000 ceiling on wages subject to contribution for purposes of Employment Insurance, together with the statutory employer contribution rate in 1997, mean that an employer contributes at an effective rate of 4.06% of wages for an employee earning \$30,000 per year but at a rate of 3.17% of wages for an employee earning \$50,000 a year.

² Statistics Canada (1996b), Table 11.

this class. This hourly wage was calculated as a residual using information on the distribution of employees among the five wage categories and on the overall average hourly wage.³

Column (1) of Table B.2 shows the values calculated for the 1996 overall average hourly wage by industry, and column (2), the average hourly wage in the fifth wage group (>\$22.06).

Data by province on average weekly hours worked for employees paid by the hour and for salaried employees, for 33 industries,⁴ were converted to average annual hours worked by typical employees using the assumption that typical employees are paid for 52 weeks per year. Using the hourly wage distribution and assuming the same average annual hours for each wage group within an industry, average annual wages were then determined for the purpose of computing the taxes paid by an employer for a typical employee by industry.

For each province, this gives average annual wages for five wage groups, for 33 industries. The calculated average annual wages for employees in each of the five wage groups by industry for Ontario are shown in Table B.3 as an example.

The 1997 statutory tax rates (see Table B.4) were then used to calculate the effective payroll tax rates for each of the five wage groups of the 33 industries, in each province. (The table also shows certain tax rates for 2000-2003 to be discussed below.) Basically, to compute effective payroll tax rates, we applied the statutory rates to the average salary level in each group, and then calculated the weighted average tax rate.

Taxes Paid

1. Canada Pension Plan:

$$CPP_{j,k} = (MIN(AAW_{j,k}, \$35,800) - \$3,500) \times 2.925\%$$

where $CPP_{j,k}$ represents CPP taxes of wage group j in industry k , $AAW_{j,k}$ is the average annual wage, \$3,500 is the minimum earning subject to contribution, \$35,800 is the maximum earning subject to contribution, and 2.925 percent is the tax rate in 1997.

2. Employment Insurance:

$$EI_{j,k} = MIN(AAW_{j,k}, \$39,000) \times 4.06\%$$

where $EI_{j,k}$ represents the Employment Insurance taxes in wage group j in industry k , and 4.06 percent is the tax rate in 1997.

³ Statistics Canada (1996b), Table 10.

⁴ These observations are from Statistics Canada (1996a) "Employment, Earnings and Hours, 1995."

3. Provincial Payroll Taxes:

Four provinces impose a tax for health and education: Newfoundland, Quebec, Ontario and Manitoba. The thresholds under which the small firms are exempt from paying this tax are \$100,000 in Newfoundland; \$400,000 in Ontario; and \$750,000 in Manitoba. There are no exemptions in Quebec.

To determine the proportion of small firm payrolls under and over the thresholds by industry, we used Canada-wide data from the T2 database for small firms, as indicated below.⁵

Percentage of Small Firms

	Payroll – Canada		
	< \$100,000	< \$400,000 (percent)	< \$750,000
Forestry	8	36	55
Mining	4	41	59
Oil and Gas	10	22	27
Manufacturing	4	24	38
Construction	20	46	59
Transportation and Storage	13	31	49
Communications	4	48	76
Public Utilities	12	36	45
Wholesale Trade	9	36	55
Retail Trade	18	53	67
Other Services	16	45	63

4. Total Taxes and Effective Payroll Tax Rates:

Total payroll taxes for each annual wage group within an industry and province were determined by summing up the different taxes paid: CPP/QPP, EI and, where relevant, provincial payroll taxes.

The effective tax rates for each industry subsector were then calculated as weighted averages (using shares of employees). This approach generates effective payroll tax rates for 11 industries (forestry; mining; oil and gas; manufacturing;⁶ construction; transportation and storage;⁷ communications; public utilities; wholesale trade; retail trade; and other services⁸) for each province, for small and large firms separately. Since no data were available for agriculture, fishing and trapping, we used the calculated values for forestry as an approximation. The industry-specific effective payroll tax rates for each of the 10 provinces were then combined,

⁵ See Appendix A for a description of small versus large firms.

⁶ Manufacturing subsectors were combined using a weight matrix based on the number of employees. The observations on the number of employees are from Statistics Canada, Catalogue No. 72-002.

⁷ A weight of 50% for each subsector was used.

⁸ Includes services to business management and government, personal and miscellaneous services. Other services subsectors were combined using a weight matrix based on the number of employees (Statistics Canada, 72-002).

using the industrial distribution among provinces shown in Table B.5, to obtain effective payroll tax rates for Canada by industry, for small and large firms.

All of these calculations were completed for small and large firms separately, since, as mentioned above, small firms that are under a provincial-specific threshold are exempt from paying payroll taxes except in Quebec, where all firms must pay these taxes. The effective payroll tax rates by industry for small firms were combined with the effective payroll tax rates by industry for large firms, to generate effective payroll tax rates by industry for Canada.⁹

The resulting 1997 effective payroll tax rates by industry for Canada are shown in Table B.6. These rates can be thought of as “gross” rates, given the 1997 payroll tax regime in Canada. Two further adjustments were made to these rates to produce the base case payroll tax estimates used in the METR calculations in the Technical Committee's report. The first involves an adjustment for changes to payroll tax rates associated with expected changes in CPP/QPP and EI contribution rates; the second involves an adjustment for benefits.

As well, alternative estimates of effective payroll tax rates were prepared, which include estimates of employer contributions for workers' compensation.

Adjustment for Anticipated Changes in CPP/QPP and EI Contribution Rates

The CPP/QPP and EI contribution rates for 1997 might be regarded as not representative of the contribution rates for these programs that will prevail in the medium term. In the case of the CPP, legislation was passed in 1997 that provides for a sequence of rate increases from 1998 to 2003, with the rate structure reached by 2003 intended to be one that can be maintained while leaving the CPP on a sustainable financial basis. In the case of EI, while there is no announced schedule of future rate changes, the fact that the EI account is running a surplus on an annual basis at current contribution rates leads to a presumption that the sustainable average rate is appreciably lower than the current rate, and there is a general expectation that EI contribution rates will be reduced over the next several years.

In order that the base case will be representative of the rate structure expected to prevail over the next few years, we have used CPP and EI contribution rate structures that are estimated to prevail when currently anticipated adjustments to rate structures for these programs have been completed (and have labelled these the “2000-2003 rates”). As shown in Table B.4, for the CPP/QPP, we used the rate structure that is scheduled to apply in 2003 (employer contribution rate of 4.95 percent, compared with the 1997 rate of 2.925 percent). For EI, we used an employer contribution rate of \$3.08 per \$100 of contributory earnings – an estimate of the rate structure that would yield balance in EI annual contributions and benefits on an average basis. This corresponds to an employee contribution rate of \$2.20, and compares with employer contribution rates of \$4.06 for 1997 and \$3.78 for 1998. (On the basis of most recent information, the estimate that we have used for the rate structure that would yield balance in the EI account may be on the high side. See Canada, Human Resources Development (1997).)

⁹ Using the distribution of gross revenues (see Table A.3 of Appendix A).

The approach used to calculate the corresponding “2000-2003 Effective Payroll Tax Rates” shown in Table B.6 parallels the approach described above for the calculation of the effective rates for 1997, except that we have used CPP/QPP and EI statutory contribution rates assumed for 2000-2003.

Adjustment for Benefits

As noted in Section 2.2.3.1 of this paper, in the base case, we use estimates of effective payroll tax rates net of directly associated benefits (where workers’ compensation, CPP/QPP and EI are viewed as having directly associated benefits, while general provincial payroll taxes are viewed as “pure taxes” for which no associated benefit needs to be netted against the contribution rate).

For workers’ compensation, we assume that benefits match contribution rates by industry, resulting in a zero net contribution rate.

For CPP/QPP, our estimate of the net contribution rate reflects the view that, by 2003, the rate will somewhat exceed the expected value of benefits for the average employee (due to the need to cover the actuarial deficiency of the plan accumulated by lack of full funding to date). We assumed an effective contribution rate, net of benefits, of 1.5 percent for 2003 and following years. This would correspond to the employer share (50 percent) of an excess of the 2003 combined employer-employee actual contribution rate over the “full cost rate” of 3 percentage points. The Chief Actuary’s Report of September 1997¹⁰ estimated the combined full cost rate to be 6.1 percent, compared with the combined employer-employee actual rate schedule for 2003 of 9.9 percent. This implies that our assumed rate might be viewed as modestly underestimating the “net of benefits” rate (the employers’ share of the difference between the 2003 rate and this latest official estimate of the full cost rate would be 1.8 percent, rather than our assumed 1.5 percent).

We further assume that, in the case of the CPP/QPP, the relationship between benefits and contributions does not vary systematically for employees in different industries. Thus we apply a common 1.5 percent net rate, subject to the floor and ceiling on insurable earnings discussed above, to all industries.

For EI, we wish to allow in an approximate way for the systematic difference by industry in the relationship between contribution rates and benefits (see discussion in Chapter 8 of the Report of the Technical Committee on Business Taxation). Our estimates are based on detailed EI benefit and contribution data by industry developed for 1989-1990 by Corak and Pyper (1995).

Table B.7 shows the Corak-Pyper data for total EI benefits by industry expressed as ratios to approximately matched data on labour income by industry (column (a)). Data from the same source on total (employer and employee) contributions by industry are also expressed as ratios to labour income, and then adjusted by a common proportionality factor so that total contributions (from all industries including the public sector, not just those industries shown in the table) equal total benefits (column (b)). (Adjusted) contribution rates net of benefits (column (c)) are then

¹⁰ Canada, Office of the Superintendent of Financial Institutions (1997), page 13.

multiplied by 1.4/2.4 to give an estimate (column (d)) of effective employer contribution rates, net of benefits, in a balanced system corresponding approximately to the current EI structure.

These EI employer contribution rates net of benefits by industry are shown in the last column of Table B.7, and in the 2000-2003 EI net of benefits line of Table B.8. They are used in calculating the overall 2000-2003 effective payroll tax rates, net of benefits, shown in Table B.9.

Finally, we provide estimates of effective EI employer contribution rates, net of benefits, by industry under the partial experience rating employer contribution rate structure put forward as an illustration by the Technical Committee (see Report, Table 8.3). These effective EI employer rates are shown in the “Technical Committee Illustrative Proposal” EI net of benefits line of Table B.8. They in turn are used in calculating the overall “Effective Payroll Tax Rates, Net of Benefits, Including Technical Committee EI Employer Rate Illustrative Proposal” section of Table B.9.

Workers’ Compensation

All of the calculations to this point have, in effect, ignored workers’ compensation, following the premise that workers’ compensation is, to a first approximation, an actuarially fair benefit tax.

Contribution rate data on workers’ compensation are inherently complex, since each province has its own rate system, different rates are generally set for each of a multitude of narrow industry categories (which themselves are not common across provinces), and there can be further rate variations for firms within an industry category. Calculating weighted average effective rates is further complicated by difficulties in obtaining payroll data consistent with the narrow industry categories used in setting workers’ compensation contribution rates.

To provide an approximate indicator of variation in effective workers’ compensation contribution rates across the set of broad industry categories used in the METR analysis, we attempted to compute rates for various industries in Ontario. Table B.10 shows the weighted average workers’ compensation rates for 34 industries based on the rates for 3-digit industries in Ontario.¹¹

Information is also available on average effective workers’ compensation rates by province for 1995 (DiMatteo and Shannon (1995)). If it is assumed that industry contribution rates relative to the provincial average in other provinces are similar to the Ontario pattern, rates by industry for Canada as a whole can then be calculated. Table B.11 shows the resulting calculated average tax rates for 1997 workers’ compensation.

¹¹Association of Workers’ Compensation Boards of Canada (1996).

The total effective payroll tax rates for the case where workers' compensation is included, and no allowance is made for benefits associated with any of the payroll taxes, are shown in Table B.12.

These overall effective payroll tax rate estimates may be compared with the 1997 rates in Table B.6. Both are notional for 1997, and neither are net of directly associated benefits. The B.12 estimates include workers' compensation rates, whereas the B.6 estimates do not.

TABLE B.1
Wage Distribution, 1989-90 (Hourly Wages in 1996 dollars)

	$W \leq \$9.56$	$\$9.56 < W \leq$ $\$13.04$	$\$13.04 < W \leq$ $\$16.81$	$\$16.81 < W \leq$ $\$22.06$	$W > \$22.06$	Total
	(percent)					
Forestry	13.40	22.92	20.59	25.18	17.91	100.00
Mining	5.21	8.30	18.35	33.26	34.89	100.01
Oil and Gas	6.65	11.49	15.49	16.18	50.19	100.00
Manufacturing						
Food	20.10	24.16	20.88	21.60	13.27	100.01
Beverages	20.10	24.16	20.88	21.60	13.27	100.01
Tobacco	13.40	22.92	20.59	25.18	17.91	100.00
Rubber	16.63	13.63	24.92	26.42	18.40	100.00
Plastic	16.63	13.63	24.92	26.42	18.40	100.00
Leather	46.24	26.61	12.37	0.00	3.00	88.22
Textile	23.47	33.64	23.58	11.71	7.60	100.00
Clothing	47.46	30.09	9.38	3.60	1.00	91.53
Wood	10.34	21.27	25.00	27.31	16.09	100.01
Furniture	20.33	34.96	24.96	11.21	8.54	100.00
Paper	5.93	5.24	10.46	34.02	44.35	100.00
Print and Publishing	17.94	21.09	22.13	17.98	20.86	100.00
Primary Metal	2.25	7.20	25.27	32.21	33.06	99.99
Metal Fabrication	9.53	13.93	27.19	27.50	21.85	100.00
Machinery	8.33	13.31	23.21	25.21	29.93	99.99
Transportation Equipment	5.53	14.07	19.23	38.30	22.88	100.01
Electrical	5.54	19.41	30.18	31.97	12.91	100.01
Mineral	9.35	14.38	20.84	31.67	23.76	100.00
Petroleum	0.00	0.00	15.39	37.62	39.79	92.80
Chemical	7.52	15.35	19.40	28.65	29.08	100.00
Miscellaneous Manufacturing	27.90	24.36	17.69	11.86	18.20	100.01
Construction	11.82	21.66	20.39	22.13	23.99	99.99
Transportation and Storage						
Transportation	12.60	17.65	19.89	28.80	21.06	100.00
Storage	15.96	26.60	0.00	26.58	20.35	89.49
Communications	7.92	10.08	21.13	32.85	28.01	99.99
Public Utilities	4.45	8.69	16.36	23.38	47.11	99.99
Wholesale Trade	17.52	22.29	23.73	17.16	19.30	100.00
Retail Trade	43.75	23.95	13.82	11.83	1.00	94.35
Other Services						
Services to Business Management	20.44	24.06	15.69	17.08	22.73	100.00
Government, Personal and Misc. Services	34.59	17.77	16.32	14.02	17.30	100.00

Note: Some totals do not add up to 100% since these numbers are estimates.

Source: Statistics Canada (1996b).

TABLE B.2
Average Hourly Wage Rates of Full Time Equivalent Jobs
by Industry Group, 1996
(1996 dollars)

	Average Hourly Wage (1)	Average Hourly Wage in Fifth Wage Group (2)
Forestry	16.38	25.36
Oil and Gas	20.36	27.85
Mining	27.55	40.17
Food and Beverages	15.47	26.36
Tobacco	15.47	26.36
Rubber and Plastics	16.83	26.33
Leather	16.83	26.33
Textile	11.47	28.08
Knitting Mills	13.57	22.66
Clothing	11.18	19.74
Wood	16.61	25.94
Furniture and Fixtures	13.70	22.26
Paper and Allied Products	21.14	26.62
Print and Publishing	16.42	26.47
Primary Metal	20.55	28.70
Metal Fabricating	17.39	25.16
Machinery	20.75	33.69
Transportation Equipment	18.72	27.46
Electrical	17.33	30.09
Non-metallic	17.98	26.09
Petroleum	22.27	27.78
Chemical	18.78	27.03
Miscellaneous Manufacturing	14.76	24.13
Construction	17.24	26.32
Transportation	17.64	27.87
Storage	17.20	27.99
Communications	19.31	28.11
Public Utilities	22.01	28.89
Wholesale Trade	16.83	29.83
Retail Trade	12.14	20.07
Services to Business Management	17.14	29.94
Government, Personal and Misc. Services	14.70	24.43
	Wage Group	Average Hourly Wage
	Hourly Wage \leq 9.56	9.56
	9.56 < Hourly Wage \leq 13.04	11.31
	13.04 < Hourly Wage \leq 16.81	14.93
	16.81 < Hourly Wage \leq 22.06	19.44
	Hourly Wage > 22.06	22.06

Notes:

- The numbers in columns (1) and (2) are calculated by the authors; for column (1), the wages were adjusted using a fixed-weighted index from average hourly earnings, Statistics Canada 72-002.
- The high wage in the clothing industry is less than \$22.06 since the average hourly wage in that industry is low.

TABLE B.3
Calculated Average Annual Wage of Employee by Wage Rate Group
and Industry, Ontario, 1996
(1996 dollars)

	Average Hourly Wage Rate				
	= \$9.56	= \$11.31	= \$14.93	= \$19.44	> \$22.06
Forestry	20,097.27	23,776.16	31,386.22	40,867.25	53,321.95
Mining	20,853.33	24,670.63	32,566.97	42,404.68	60,746.84
Oil and Gas	19,258.05	22,783.32	30,075.59	39,160.71	80,922.28
Food	18,691.71	22,113.31	29,191.14	38,009.09	51,537.38
Beverages	-	-	-	-	-
Tobacco	-	-	-	-	-
Rubber	-	-	-	-	-
Plastic	19,673.52	23,274.85	30,724.45	40,005.58	54,174.31
Leather	-	-	-	-	-
Textile	-	-	-	-	-
Clothing	18,666.86	22,083.91	29,152.32	37,958.54	38,548.98
Wood	18,741.42	22,172.12	29,268.77	38,110.18	50,860.65
Furniture	20,046.36	23,715.94	31,306.72	40,763.74	46,675.88
Paper and Allied Products	20,274.21	23,985.49	31,662.55	41,227.06	56,444.12
Print and Publishing	17,336.26	20,509.74	27,074.31	35,252.82	48,009.22
Primary Metal	21,094.46	24,955.89	32,943.54	42,895.01	63,332.97
Metal Fabrication	19,835.09	23,465.99	30,976.76	40,334.11	52,208.20
Machinery	20,601.48	24,372.67	32,173.65	41,892.55	72,603.89
Transportation Equipment	20,420.78	24,158.90	31,891.46	41,525.11	58,665.87
Electrical	19,196.42	22,710.41	29,979.35	39,035.40	60,413.92
Mineral	-	-	-	-	-
Petroleum	-	-	-	-	-
Chemical	18,763.40	22,198.12	29,303.09	38,154.86	53,045.69
Miscellaneous Manufacturing	19,433.25	22,990.59	30,349.21	39,516.98	49,051.31
Construction	18,853.57	22,304.80	29,443.91	38,338.23	51,902.25
Transportation	19,030.07	22,513.60	29,719.55	38,697.12	55,479.87
Storage	19,016.86	22,497.98	29,698.92	38,670.27	55,673.09
Communications	18,588.99	21,991.79	29,030.71	37,800.21	54,662.71
Public Utilities	19,077.22	22,569.39	29,793.19	38,793.00	57,646.32
Wholesale Trade	18,568.29	21,967.30	28,998.39	37,758.12	57,937.58
Retail Trade	13,522.33	15,997.65	21,118.03	27,497.29	28,390.42
Services to Business Management	17,034.03	20,152.18	26,602.30	34,638.23	53,338.30
Government, Personal and Misc. Services	13,240.81	15,664.60	20,678.37	26,924.82	33,837.70

Note: Authors' calculations as described in text.

TABLE B.4
1997 and 2000-2003 Statutory Payroll Tax Rates,
Excluding Workers' Compensation – Large and Small Firms

	Rate (%)	Earnings Subject to Contribution		Maximum Contribution (\$)						
		Min (\$)	Max (\$)							
<u>CPP</u>										
1997 Rates	2.925	3,500	35,800	944.78						
2000-2003 Rates	4.950	3,500	35,400	1,579.05						
<u>EI</u>										
1997 Rates	4.060	-	39,000	1,583.40						
2000-2003 Rates	3.080	-	39,000	1,201.20						
<u>Workers' Compensation</u>										
1997 Rates	0.000	-	-	-						
2000-2003 Rates	0.000	-	-	-						
	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC
<u>Payroll Tax</u>										
Provincial Threshold (\$)	100,000	n/a	n/a	n/a	0	400,000	750,000	n/a	n/a	n/a
Rate on Payroll Above Threshold (%)	2.00	n/a	n/a	n/a	4.26	1.95	2.25	n/a	n/a	n/a

TABLE B.5
Industrial Distribution Among Provinces, 1995

	FOR	MIN	OG	MAN	CON	TS	COM	PU	WT	RT	OS
	(percent)										
Newfoundland	0.00	0.00	0.00	0.69	2.00	1.36	1.74	2.27	0.96	1.74	0.95
Prince Edward Island	0.00	0.00	0.00	0.24	0.76	0.40	0.30	0.00	0.00	0.42	0.00
Nova Scotia	0.00	0.00	0.00	2.18	2.85	2.36	3.10	2.40	2.34	3.22	2.41
New Brunswick	7.04	0.00	0.00	1.88	2.67	2.79	2.23	2.79	1.97	2.53	1.88
Quebec	22.95	25.00	0.00	27.58	22.59	24.41	24.86	26.82	24.74	23.41	22.52
Ontario	14.31	44.00	0.00	47.95	33.90	31.28	38.76	39.22	40.14	38.22	40.13
Manitoba	0.00	0.00	0.00	3.15	3.05	5.72	4.09	4.77	3.75	3.63	3.51
Saskatchewan	0.00	0.00	0.00	1.47	2.89	3.49	3.28	3.58	3.27	3.22	2.64
Alberta	3.68	0.00	100.00	5.49	13.86	11.13	8.86	9.65	10.14	10.06	10.86
British Columbia	43.30	31.00	0.00	9.39	15.42	17.05	12.77	8.50	12.40	13.54	15.11
Total	91.27	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.70	100.00	100.00

Notes:

- FOR = Forestry, MIN = Mining, OG = Oil and Gas, MAN = Manufacturing, CON = Construction, TS = Transportation and Storage, COM = Communications, PU = Public Utilities, WT = Wholesale Trade, RT = Retail Trade, OS = Other Services.
- Calculated using the number of employees from Statistics Canada's catalogue No. 72-002.
- Some of the totals do not add up to 100% since observations were not available for some industries in some provinces.

TABLE B.6
1997 and 2000-2003 Effective Payroll Tax Rates, Excluding Workers' Compensation

	Large Firms	Small Firms (percent)	Large and Small Firms
1997 Effective Payroll Tax Rates			
Agriculture, Fishing and Trapping	7.6	7.5	7.5
Forestry	7.6	7.5	7.5
Mining	7.6	7.2	7.6
Oil and Gas	4.9	4.9	4.9
Manufacturing	8.3	8.1	8.3
Construction	7.9	7.5	7.6
Transportation and Storage	7.9	7.7	7.9
Communications	8.0	7.5	7.9
Public Utilities	7.6	7.3	7.6
Wholesale Trade	8.1	7.7	7.9
Retail Trade	8.2	7.8	7.9
Other Services	8.1	7.7	7.8
All Industries	8.1	7.8	8.0
2000-2003 Effective Payroll Tax Rates			
Agriculture, Fishing and Trapping	8.3	8.2	8.2
Forestry	8.3	8.2	8.2
Mining	8.2	7.8	8.2
Oil and Gas	5.4	5.4	5.4
Manufacturing	9.0	8.7	8.9
Construction	8.6	8.2	8.3
Transportation and Storage	8.6	8.4	8.5
Communications	8.6	8.2	8.6
Public Utilities	8.2	7.9	8.2
Wholesale Trade	8.7	8.4	8.6
Retail Trade	8.9	8.4	8.6
Other Services	8.8	8.4	8.5
All Industries	8.8	8.4	8.6

Source: Authors' calculations.

TABLE B.7
Effective EI Tax Rates, Net of Benefits – Based on 1989 Data
with Contributions Adjusted to Balance Benefits

	Total Benefits / Labour Income	Total Adjusted Contributions / Labour Income	Adjusted Contributions Net of Benefits / Labour Income	Employer's Share: Contributions Net of Benefits (1.4/2.4)*(c)
	(a)	(b)	(c)	(d)
(percent)				
Forestry	16.8	3.4	-13.4	-7.8
Mining	3.7	3.1	-0.6	-0.3
Oil and Gas	2.1	2.8	0.7	0.4
Manufacturing	3.8	3.6	-0.2	-0.1
Construction	9.0	3.0	-6.0	-3.5
Transportation	3.4	3.7	0.3	0.2
Communications	1.3	3.6	2.3	1.3
Public Utilities	1.3	3.7	2.4	1.4
Wholesale Trade	2.8	3.7	0.8	0.5
Retail Trade	3.7	3.7	0.0	0.0
Commercial	4.4	3.7	-0.6	-0.4
All Industries	4.2	3.3	-0.9	-0.4

Note: Data on benefits, premiums and payrolls are from Corak and Pyper (1995).

TABLE B.8
2000-2003 Payroll Tax Rates, Net of Benefits and with Technical Committee
Alternative EI Proposal Net of Benefits

	Rate (%)	Earnings Subject to Contribution		Maximum Contribution (\$)							
		Min (\$)	Max (\$)								
CPP	1.500	3,500	35,400	478.50							
Workers' Compensation	0.000										
<hr/>											
	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	
<u>Payroll Tax</u>											
Provincial Threshold (\$)	100,000	n/a	n/a	n/a	0	400,000	750,000	n/a	n/a	n/a	
Rate on Payroll Above Threshold (%)	2.00	n/a	n/a	n/a	4.26	1.95	2.25	n/a	n/a	n/a	
<u>EI Experience-rated</u>											
Maximum Insurable Earnings	\$39,000										
<hr/>											
	FOR	MIN	OG	MAN	CON	TS	COM	PU	WT	RT	OS
	(percent)										
2000-2003 EI Effective Employer Contribution Rate, Net of Benefits	-7.8	-0.3	0.4	-0.1	-3.5	0.2	1.3	1.4	0.5	0.0	-0.4
Partial Experience Rating (Technical Committee Illustrative Proposal)	-7.3	0.1	0.3	0.1	-3.0	0.2	0.8	0.8	0.4	0.1	0.1

Note: FOR = Forestry, MIN = Mining, OG = Oil and Gas, MAN = Manufacturing, CON = Construction, TS = Transportation and Storage, COM = Communications, PU = Public Utilities, WT = Wholesale Trade, RT = Retail Trade, OS = Other Services.

TABLE B.9
2000-2003 Effective Payroll Tax Rates

	Large Firms	Small Firms	Large and Small Firms
		(percent)	
Net of Benefits			
Agriculture, Fishing and Trapping	-5.2	-5.4	-5.3
Forestry	-5.2	-5.4	-5.3
Mining	2.7	2.3	2.7
Oil and Gas	1.4	0.6	1.4
Manufacturing	3.2	3.0	3.2
Construction	-0.6	-0.9	-0.8
Transportation and Storage	3.2	2.9	3.1
Communications	4.4	4.0	4.4
Public Utilities	4.5	4.2	4.5
Wholesale Trade	3.6	3.3	3.5
Retail Trade	3.0	2.6	2.7
Other Services	2.7	2.3	2.4
All Industries	2.8	2.4	2.7
 Net of Benefits, Including Technical Committee EI Employer Rate Illustrative Proposal			
Agriculture, Fishing and Trapping	-4.7	-4.8	-4.8
Forestry	-4.7	-4.8	-4.8
Mining	3.1	2.7	3.1
Oil and Gas	1.3	1.0	1.3
Manufacturing	3.5	3.2	3.4
Construction	-0.1	-0.4	-0.4
Transportation and Storage	3.2	2.9	3.1
Communications	3.9	3.4	3.8
Public Utilities	3.9	3.6	3.9
Wholesale Trade	3.5	3.2	3.4
Retail Trade	3.1	2.7	2.8
Other Services	3.1	2.7	2.8
All Industries	3.0	2.6	2.8

Source: Authors' calculations.

TABLE B.10
Calculation of Workers' Compensation Rates for Ontario, 1997

SIC	Industry	Rate	Weight of Sub-industries (%)	Weight of Aggregate Industries (%)	SIC	Industry	Rate	Weight of Sub-industries (%)	Weight of Aggregate Industries (%)
11	Livestock farms	4.2	47.1		291	Primary steel	6.3	48.8	
13	Field crop farms	4.2	18.9		292	Steel pipe and tubes	3.5	5.4	
15	Fruit, other vegetable farms	3.5	14.2		294	Iron foundries	5.5	4.4	
21	Services incidental to farming	2.4	19.8		295	Non-ferrous metal smelters/refineries	3.3	38.2	
	Total Agriculture	3.761	100.0	0.11	296	Aluminium roll cast and extrude	3.2	3.2	
31	Total Fishing and Trapping	4.200	100.0	0.13		Total Primary Metal	4.849	100.0	2.84
41	Total Forestry	12.720	100.0	0.95	301	Power boiler	2.6	3.8	
61	Metal mines	7.5	62.0		302	Fabric	5.9	15.6	
81	Stone quarries	5.6	4.5		303	Ornamental	5.9	11.5	
82	Sand and gravel pits	5.2	7.8		304	Stamp press coat metal products	4.5	21.7	
92	Services incidental to mining	4.2	25.7		305	Wire and wire products	4.2	7.6	
	Total Mining	6.357	100.0	2.21	306	Hardware tool and cutlery	2.9	13.9	
91	Oil and Gas	15.200	100.0	0.66	307	Heating equipment	4.5	3.1	
					308	Machine shop	3.5	13.0	
					309	Other metal fabrication	4.0	9.9	
						Total Metal Fabrication	4.375	100.0	3.93
101	Meat and poultry products	6.0	28.8		311	Agricultural equipment	4.9	7.8	
103	Fruit and vegetable	3.8	9.6		319	Other machinery and equipment	3.1	92.2	
104	Dairy products	2.8	20.9			Total Machinery	3.258	100.0	2.03
107	Bakery products	4.1	17.7		321	Aircraft and aircraft parts	3.8	21.8	
108	Sugar and sugar confectionery	2.4	8.8		323	Motor vehicles	5.1	19.9	
109	Other food products	3.2	14.3		324	Truck and bus body and trailers	6.2	4.3	
	Total Food	4.061	100.0	3.34	325	Motor vehicle parts and accessories	5.0	47.0	
110	Beverages	2.825	100.0	0.64	326	Railroad rolling stock	4.7	1.5	
150	Rubber Products	4.440	100.0	0.65	327	Shipbuilding and repairs	12.3	4.0	
160	Plastic Products	4.200	100.0	1.04	328	Boat building and repairs	5.7	1.5	
171	Leather and Allied Products	5.030	100.0	0.23		Total Transportation Equipment	5.106	100.0	6.33
180	Primary textile	4.1	42.3		330	Appliances, lighting, etc.	3.8	12.1	
190	Textile products	3.9	57.7		332	Major appliances	3.6	5.3	
	Total Textile	3.969	100.0	1.00	335	Electronic equipment	2.3	49.3	
240	Total Clothing	3.790	100.0	0.53	336	Office stores and business machines	0.5	19.3	
250	Wooden box, pallet, coffin	5.7	27.9		337	Electric industrial equipment	3.5	14.0	
254	Sash door and other millwork	5.6	72.1			Total Electrical	2.352	100.0	0.09
	Total Wood	5.603	100.0	1.04	354	Concrete products	6.1	28.7	
261	Household furniture	6.4	44.7		355	Ready-mix concrete	4.5	35.0	
264	Office furniture	4.2	22.4		356	Glass and glass products	4.8	36.3	
269	Other furniture and fixture	5.4	32.9			Total Mineral	5.077	100.0	0.86
	Total Furniture	5.575	100.0	1.07		Petroleum	0.740	100.0	0.36
273	Paper box and bags	3.0	51.0		371	Industrial chemicals	1.6	24.9	
279	Other converted paper products	2.6	49.0		373	Plastic and synthetic resin	1.9	6.1	
	Total Paper	2.790	100.0	0.75	374	Pharmaceutical and medicine	0.9	23.8	
281	Commercial printing	2.0	59.5		375	Paint and varnish	2.0	7.5	
282	Platemaking and bindery	1.6	16.3		376	Soap and cleaning compounds	1.4	10.6	
283	Publishing industries	0.7	24.2		377	Toilet preparations	1.6	9.2	
	Total Printing and Publishing	1.653	100.0	2.34	379	Other chemical products	1.9	17.9	
						Total Chemical	1.496	100.0	2.20
					390	Other Manufacturing Industries	2.040	100.0	1.48
					401	Residential buildings and development	9.6	17.2	
					402	Non-residential buildings	7.7	10.0	
					412	Highway and heavy construction	9.0	11.1	
					420	Trade contracting	9.3	61.8	
						Total Construction	9.166	100.0	12.97

TABLE B.10
Calculation of Workers' Compensation Rates for Ontario, 1997 (continued)

SIC	Industry	Rate	Weight of Sub- industries	Weight of Aggregate Industries
		(\$)	(%)	(%)
451	Air transport	2.1	13.6	
452	Services incidental to air trans.	3.5	1.1	
453	Railway transport	5.6	12.2	
454	Water transport	5.6	5.3	
455	Services incidental to wat. trans.	13.6	3.6	
456	Truck transport	7.2	47.6	
457	Public passenger transit system	4.6	16.5	
	Total Transportation	5.970	100.0	7.49
471	Grain elevator	4.9	53.3	
479	Other storage and warehousing	4.0	46.7	
	Total Storage	4.509	100.0	0.39
483	Other telecommunications	0.5	12.3	
484	Postal and courier service	5.9	87.7	
	Total Communications	5.270	100.0	0.47
491	Electric power systems	5.0	51.3	
492	Gas-distribution systems	0.5	48.7	
	Total Public Utilities	2.810	100.0	0.87
501	Farm products	1.9	6.1	
511	Petroleum products	1.8	5.6	
521	Food wholesale	3.4	14.8	
542	Household furniture	1.8	0.3	
561	Metal and metal products	3.2	3.6	
562	Hardware, air conditioning, etc.	1.5	6.4	
563	Lumber and building materials	3.0	12.5	
571	Farm equipment and supplies	2.0	3.1	
572	Construction machines	2.8	4.1	
573	Industrial machines	1.7	9.2	
574	Electronics	0.8	17.0	
590	Other products	1.3	17.2	
	Total Wholesale Trade	1.999	100.0	10.70
601	Food	3.0	28.9	
602	Liquor, wine and beer	3.7	0.2	
603	Prescription drugs	0.7	9.5	
614	Clothing	1.4	4.4	
631	Automobile dealers	1.3	22.5	
634	Auto parts and accessories	1.9	5.3	
641	General merchandising	1.6	29.1	
	Total Retail Trade	1.875	100.0	11.33
774	Advertising services	0.8	9.8	
775	Architecture and engineering	0.4	51.3	
779	Other business services	2.2	38.9	
	Total Business Services	1.117	100.0	6.12
863	Non-institutional health services	4.4	3.7	
911	Hotels, motels and tourism	3.6	18.0	
921	Food services	2.7	42.6	
965	Sports and recreation clubs	2.5	5.3	
972	Laundries and cleaners	4.6	4.5	
980	Membership organizations	0.8	16.9	
995	Services to buildings/dwellings	5.3	8.9	
	Total Government and Personal Services	2.900	100.0	9.19
	All Industries	4.210		100.00

Sources:

- Data for control rates are from Association of Workers' Compensation Boards of Canada (1996).
- Weights of subsectors are based on average payrolls, Corak and Pyper (1995).

TABLE B.11
1997 and 2000-2003 Statutory Payroll Tax Rates,
Excluding Workers' Compensation – Large and Small Firms

	Rate (%)	Earnings Subject to Contribution		Maximum Contribution (\$)
		Min (\$)	Max (\$)	
CPP	2.925	3,500	35,800	944.78
EI	4.060	–	39,000	1,583.40

	FOR	MIN	OG	MAN	CON	TS	COM	PU	WT	RT	OS
Workers' Compensation Rates (%)	7.74	4.17	7.69	2.47	5.73	3.66	3.35	1.79	1.27	1.19	1.39

	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	
Maximum Taxable Earnings (\$)	45,500	35,100	38,600	42,600	48,500	55,600	48,610	48,000	44,000	54,200	
Rates – All Industries (%)	3.18	2.07	2.50	2.15	2.75	3.01	2.12	1.67	2.13	2.42	
Payroll Tax											
Provincial Threshold (\$)	100,000	n/a	n/a	n/a	0	400,000	750,000	n/a	n/a	n/a	
Rate on Payroll Above Threshold (%)	2.00	n/a	n/a	n/a	4.26	1.95	2.25	n/a	n/a	n/a	

Note: FOR = Forestry, MIN = Mining, OG = Oil and Gas, MAN = Manufacturing, CON = Construction, TS = Transportation and Storage, COM = Communications, PU = Public Utilities, WT = Wholesale Trade, RT = Retail Trade, OS = Other Services.

TABLE B.12
1997 Effective Payroll Tax Rates, Including
Workers' Compensation Employer Contributions

	Large Firms	Small Firms	Large and Small Firms
	(percent)		
Agriculture, Fishing and Trapping	15.3	15.2	15.2
Forestry	15.3	15.2	15.2
Mining	11.6	11.3	11.6
Oil and Gas	10.8	10.8	10.8
Manufacturing	10.7	10.5	10.7
Construction	13.6	13.2	13.3
Transportation and Storage	11.1	10.9	11.0
Communications	11.3	10.8	11.2
Public Utilities	9.3	9.0	9.3
Wholesale Trade	9.3	9.0	9.2
Retail Trade	9.4	9.0	9.1
Other Services	9.6	9.2	9.3
All Industries	10.3	9.9	10.1

Source: Authors' calculations.

Appendix C

Estimated Effective Payroll Tax Rates for the United States

Our objective was to calculate effective payroll tax rates for the United States that were reasonably comparable with those calculated for Canada. The basic approach paralleled the approach for Canada outlined in Appendix B. The focus of Appendix C is thus on aspects where, because of differences in tax systems or problems with availability of data, some differences were required in the approach followed. In general, we were attempting to calculate the effective payroll tax rates that would be faced if the U.S. payroll tax regime were to be applied to Canadian industries, rather than to calculate the best estimates of the effective tax rates actually applicable in the United States given the somewhat different mix of workers by wage levels that may prevail in U.S. industries. As will be noted below, however, we did make use of U.S. data for some aspects of industry mix.

To calculate the average annual wage in order to compute the taxes paid by an employer for a typical employee, we used the same hourly wage distribution as for the Canadian calculations of effective payroll tax rates (Table B.1), converted to U.S. dollars at the 1996 average annual exchange rate, US\$1=C\$1.364. We did, however, combine these hourly wage rates with U.S. data on average weekly hours worked by industry for nine states, accounting for more than 50 percent of GDP: California, New York, Texas, Illinois, Florida, Pennsylvania, Ohio, New Jersey and Michigan. Multiplying weekly hours by 52 gives the annual results shown in Table C.1.¹

Using these observations, we then computed average annual wages of production workers for each industry, one for each wage group. We then calculated gross effective payroll tax rates for each of the five wage groups in each industry using the 1996 U.S. federal statutory tax rates² and ceilings for Old Age, Survivors and Disability Insurance (OASDI), health insurance (HI) and federal unemployment insurance shown in Table C.2.

For the purpose of calculating effective payroll tax rates, we combined the narrow industry classes as follows to obtain estimates for the broader classes based in the METR analysis:

- *Manufacturing*: Includes food, beverages, tobacco products, rubber, plastics, leather industries, textile industries, wood industries, furniture and fixtures, paper and allied products, print and publishing, primary metal, metal fabricating, machinery, transportation equipment, electrical products, chemical products, and miscellaneous manufacturing. To combine the different manufacturing categories, we used the weight matrix shown in Table C.3.

¹ Data on weekly hours were not available for the following industries used in the Canadian calculations: forestry, clothing, mineral products, petroleum, storage, government, personal and miscellaneous services.

² CCH Incorporated. *1996 U.S. Master Tax Guide*, paragraph 45.

- *Transportation and Storage*: Includes only observations on transportation, since no observations are available for storage.
- *Services*: Includes only services to business management, since no observations are available on government, personal and miscellaneous services.

These calculations resulted in estimates of effective federal payroll tax rates for 10 industries (mining; oil and gas; manufacturing; construction; transportation and storage; communications; public utilities; wholesale trade; retail trade; and services), for nine states. Estimates of industry-specific national average effective federal payroll tax rates were then calculated using the industrial distribution among states shown in Table C.4.

To determine the values of effective total (federal and state) payroll tax rates, we also needed estimates of the effective state unemployment insurance tax rates, which vary substantially by industry due to the use of experience rating at the state level. (State-level UI employer contributions are generally substantially larger than the federal UI employer contributions.)

We were unable to locate comprehensive data that would allow direct estimation of such rates. We thus made use of a fairly recent study by Anderson and Meyer (1993), which provided estimates of relative average state UI contribution rates on covered wages by industry, and relative covered wage levels by industry, to obtain values for relative UI contributions paid per employee. (The Anderson-Meyer estimates use a somewhat different industry classification structure than we have used for estimating the remaining components of effective tax rates; their analysis is based on data for eight states.) These estimates of relative UI contributions per employee were applied to an estimate of average employer UI contributions across all industries (for 1994), and then coupled with data on employees, and on total wages and salaries, by industry to obtain estimates of the effective tax rate by industry.

Table C.5 shows the key steps in these calculations. The resulting estimated effective state UI employer contribution rates by industry (final column) are repeated in the lower panel of Table C.2 (with the estimate for agriculture in Table C.5 used as the estimated rate for forestry).

Estimated federal, state and total effective payroll tax rates by industry are shown in Table C.6.

In addition to calculating gross effective payroll tax rates, we calculated employer payroll tax rates net of benefits, for comparison with the Canadian base case.

- *Net of benefits*: The rates used in making the calculations for this case are shown in Table C.7. 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.³

Effective state unemployment insurance tax rates net of benefits were calculated as shown in Table C.8. As with state UI employer contribution rates discussed above, in the absence of more comprehensive and current data, rough estimates were developed based on estimates of UI benefits relative to employer contribution by industry in Anderson and Meyer (1993). These were combined with more current data on wages and employment by industry to obtain the rough estimates of effective state UI contribution rates net of benefits as shown in Table C.8.

Estimated total effective payroll tax rates net of benefits by industry for the United States, together with effective tax rates net of benefits for the major individual payroll taxes, are shown in Table C.9.

³ While we lumped all U.S. federal social insurance payroll taxes together and assumed fully offsetting benefits (directly related to contributions), arguably, it would have been more comparable with the approach followed in calculating the Canadian net-of-benefit payroll tax rates to have separated out the U.S. federal health insurance component and treated it as having no directly associated offsetting benefit. This component funds the U.S. medicare programs, where benefit eligibility, and the expected value of benefits at the individual employee, employer or industry levels, have no direct relation to the level of contributions. If the health insurance component had been viewed as having no directly associated offsetting benefit, the overall estimated U.S. payroll tax rates net of benefit would have been approximately 1.5 percentage points higher for all industries.

TABLE C.1
U.S. Average Annual Hours Worked by Industry, 1996

	Average Annual Hours Worked
Forestry	n/a
Mining	2322.67
Oil and Gas	2322.67
Food	2137.63
Beverages	2137.63
Tobacco	2057.03
Rubber	2160.17
Plastic	2160.17
Leather	1974.27
Textile	2120.73
Clothing	n/a
Wood	2111.20
Furniture	2059.20
Paper	2242.93
Print and Publishing	1986.40
Primary Metal	2287.57
Metal Fabrication	2200.90
Machinery	2253.33
Transportation Equipment	2273.27
Electrical	2163.20
Mineral	n/a
Petroleum	n/a
Chemical	2247.27
Miscellaneous Manufacturing	2070.90
Construction	2011.53
Transportation	2056.17
Storage	n/a
Communications	2056.17
Electrical Power, Gas and Water	2056.17
Wholesale Trade	1988.13
Retail Trade	1497.60
Services to Business Management	1699.10
Government, Personal and Misc. Services	n/a

Note: Data on average annual hours worked are from "National Employment, Hours, and Earnings," Bureau of Labor Statistics, 1995.

TABLE C.2
U.S. Payroll Tax Rates, 1996

	Rate (%)	Wage Base Ceiling in U.S. \$
Federal		
OASDI	6.20	65,400
HI	1.45	0
UIC	0.80	7,000
Effective State UI Tax Rates^(a) (%)		
States		
Forestry	0.95	
Mining	0.68	
Oil and Gas	0.68	
Manufacturing	0.97	
Construction	0.96	
Transportation and Storage	0.77	
Communications	0.77	
Public Utilities	0.77	
Wholesale Trade	0.75	
Retail Trade	1.05	
Other Services	0.78	

Note: Federal rates and wage base ceiling are from "1997 Social Security Benefits"

(a) Authors' calculations (see Table C.5 and text).

TABLE C.3
Distribution of U.S. Manufacturing Subsectors, 1995

	(percent)
Food	9.39
Beverages	1.09
Tobacco Products	0.26
Rubber	3.05
Plastics	3.05
Leather	0.66
Textile	4.16
Clothing	0.00
Wood	4.77
Furniture and Fixtures	3.18
Paper and Allied Products	4.32
Printing and Publishing	9.63
Primary Metal	4.43
Metal Fabricating	8.98
Machinery	12.85
Transportation Equipment	11.14
Electrical Products	10.14
Non-metallic Products	0.00
Petroleum and Coal	0.00
Chemical and Chemical Products	6.46
Miscellaneous Manufacturing	2.43
All Manufacturing Industries	100.00

Notes:

- A weight of 0 can imply that there are no observations.
- Data on the number of employees used to calculate this distribution are from "116th Edition Statistical Abstract of the United States 1996," The National Data Book, Table 654.

TABLE C.4
Industrial Distribution Among States, 1995

	FOR	MIN	OG	CON	MAN	TS	COM	PU	WT	RT	OS
	(percent)										
California	40.068	0.347	12.195	20.682	20.421	22.195	21.725	10.073	22.211	21.263	22.380
New York	3.326	0.061	1.140	10.663	10.772	13.722	15.678	5.518	12.828	11.418	14.948
Texas	10.543	0.987	71.000	17.438	11.836	14.126	15.248	26.172	14.055	14.290	11.966
Illinois	4.717	29.391	2.629	9.245	11.032	11.138	8.405	8.666	10.608	9.306	9.194
Florida	16.783	0.000	1.426	12.954	5.522	9.364	10.893	12.443	9.581	11.864	11.765
Pennsylvania	9.754	46.466	4.194	8.516	10.803	8.770	7.419	12.262	8.016	9.000	9.019
Ohio	2.349	14.098	4.508	8.758	12.643	7.235	6.295	11.373	8.356	9.626	7.969
New Jersey	0.620	0.000	0.796	5.233	5.717	8.169	9.913	4.966	7.936	5.625	6.185
Michigan	11.840	8.650	2.113	6.511	11.253	5.281	4.424	8.528	6.409	7.608	6.574
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Notes:

- FOR = Forestry, MIN = Mining, OG = Oil and Gas, MAN = Manufacturing, CON = Construction, TS = Transportation and Storage, COM = Communications, PU = Public Utilities, WT = Wholesale Trade, RT = Retail Trade, OS = Other Services.
- State shares by industry are based on data for annual average employment from United States Department of Labour (1996).

TABLE C.5
Effective State UI Employer Tax Rates by Industry

	Based on Anderson and Meyer (1993) ^(a)		
	Relative Tax Rate (t_i / t)	Relative Taxable Wages (w_i / w)	Relative Total UI Taxes Paid (t_i / t) (w_i / w)
	(1)	(2)	(3)
Agriculture	1.11	0.61	0.67
Construction	1.27	0.87	1.10
FIRE	0.85	1.23	1.06
Manufacturing	1.01	1.30	1.31
Mining	0.92	1.27	1.16
Retail Trade	0.93	0.79	0.74
Services	0.95	0.88	0.84
Transportation and Communications	0.88	1.23	1.09
Wholesale Trade	0.92	1.16	1.07

1994 Data from the Survey of Current Business			
	Total Employer Contributions to State UI, Excluding Railroad and Federal Employees (U.S. \$) (4)	Full-time Equivalent Employees in Private Industries (5)	Average Employer Contributions by Employee (U.S. \$) (4)/(5) (6)
All United States	23,300,000,000	90,441,000	257.63

	Employer Contribution per Employee (3)×(6) (7)	Wages and Salaries (U.S.\$ millions) (8)	Number of Full-time Employees (9)	Average Wage per Employee (8)/(9) (10)	Effective UI Tax Rates for Employers (7)/(10) (11) (%)
Agriculture	173	29,819	1,631,000	18,283	0.95
Construction	284	147,483	4,988,000	29,568	0.96
FIRE	272	n/a	n/a	n/a	n/a
Manufacturing	338	625,219	18,014,000	34,707	0.97
Mining	299	26,367	597,000	44,166	0.68
Retail Trade	190	312,334	17,307,000	18,047	1.05
Services	217	820,838	29,520,000	27,806	0.78
Transportation and Communications	281	211,291	5,782,000	36,543	0.77
Wholesale Trade	275	217,985	5,972,000	36,501	0.75

Notes:

- t_i is the tax rate of industry i , and t is the average tax rate for all industries.
- w_i is total taxable wages in industry i , and w is the average total taxable wages for all industries.
- (a) Anderson and Meyer (1993). In their final data set, the years 1978-83 are available for Georgia, 1978-82 for Missouri, 1980-83 for Washington, 1979-81 for Idaho, and 1981-83 for Louisiana, New Mexico, Pennsylvania, and South Carolina.

TABLE C.6
Estimated U.S. Effective Payroll Tax Rates by Industry

	FOR	MIN	OG	CON	MAN	TS	COM	PU	WT	RT	OS	ALL
	(percent)											
Effective OASDI Rate	6.64	6.20	6.06	6.19	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20
Effective Health Insurance Rate	1.55	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
Effective Federal UI Rate	0.19	0.18	0.16	0.23	0.25	0.24	0.22	0.19	0.27	0.43	0.31	0.31
Effective Federal Payroll Tax Rate	8.39	7.83	7.67	7.87	7.90	7.89	7.87	7.84	7.92	8.08	7.96	7.96
Effective State UI Rate	0.95	0.68	0.68	0.97	0.96	0.77	0.77	0.77	0.75	1.05	0.78	0.89
Combined Effective Federal/State Payroll Tax Rate	9.34	8.51	8.35	8.84	8.86	8.66	8.64	8.61	8.67	9.13	8.74	8.85

Notes:

- FOR = Forestry, MIN = Mining, OG = Oil and Gas, MAN = Manufacturing, CON = Construction, TS = Transportation and Storage, COM = Communications, PU = Public Utilities, WT = Wholesale Trade, RT = Retail Trade, OS = Other Services, ALL = All Industries
- For forestry, we generated effective OASDI, HI and federal UI tax rates using an index comparing this industry with mining. We also used the same effective adjusted UI tax rate calculated for agriculture.

TABLE C.7
U.S. Payroll Tax Rates Net of UI Benefits, by Industry

	Rate (%)	Wage Base in U.S. \$
Federal		
OASDI	0.00	65,400
HI	0.00	0
UIC	0.00	7,000
	Effective State UI Tax Rates^(a) (%)	
Forestry	0.12	
Mining	-0.27	
Oil and Gas	-0.27	
Manufacturing	-0.49	
Construction	-0.56	
Transportation and Storage	0.39	
Communications	0.39	
Public Utilities	0.39	
Wholesale Trade	0.28	
Retail Trade	0.54	
Other Services	0.39	

(a) Authors' calculations (see Table C.8 and text).

TABLE C.8
State Effective UI Tax Rates Net of Benefits, by Industry

	Data from Anderson and Meyer ^(a)		1994 Data from Survey of Current Business ^(b)		
	Total Relative UI Taxes Paid (t_i / t) (w_i / w)	Benefit / Tax Ratio	Wages and Salaries (millions of U.S. \$)	Number of FT Employees	Average Employer's Contribution per Employee (All Industries)
	(1)	(2)	(3)	(4)	(5)
Agriculture	0.673	0.87	29,819	1,631,000	257.63
Construction	1.101	1.58	147,483	4,988,000	257.63
FIRE	1.055	0.27	n/a	n/a	257.63
Manufacturing	1.312	1.50	625,219	18,014,000	257.63
Mining	1.161	1.40	26,367	597,000	257.63
Retail Trade	0.736	0.49	312,334	17,307,000	257.63
Services	0.843	0.50	820,838	29,520,000	257.63
Transportation and Communications	1.093	0.49	211,291	5,782,000	257.63
Wholesale Trade	1.067	0.63	217,985	5,972,000	257.63

	Calculation Results ^(c)					
	Average Wage per Employee	Employer's Contribution per Employee	Benefits per Employee	State UI Effective Premium Rates	State UI Effective Benefit Rates	Effective State UI Tax Rates Net of Benefits
	(3)/(4)	(1)×(5)	(2)×(7)	(7)/(6)	(8)/(6)	(9)-(10)
	(6)	(7)	(8)	(9)	(10)	(11)
				(%)	(%)	(%)
Agriculture	18,283	173	151	0.95	0.83	0.12
Construction	29,568	284	448	0.96	1.52	-0.56
FIRE	n/a	272	73	n/a	n/a	n/a
Manufacturing	34,707	338	507	0.97	1.46	-0.49
Mining	44,166	299	419	0.68	0.95	-0.27
Retail Trade	18,047	190	93	1.05	0.51	0.54
Services	27,806	217	109	0.78	0.39	0.39
Transportation and Communications	36,543	281	138	0.77	0.38	0.39
Wholesale Trade	36,501	275	173	0.75	0.47	0.28

Note: Average Employer's Contribution per Employee are from Table C.5.

Sources:

- (a) Anderson and Meyer (1993).
- (b) United States Department of Commerce (1996).
- (c) Authors' calculations.

TABLE C.9
Estimated U.S. Effective Payroll Tax Rates Net of UI Benefits, by Industry

	FOR	MIN	OG	CON	MAN	TS	COM	PU	WT	RT	OS	ALL
	(percent)											
Effective OASDI Rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Effective Health Insurance Rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Effective Federal UI Rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Effective Federal Payroll Tax Rates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Effective State UI Tax Rate, Net of Benefits	0.12	-0.27	-0.27	-0.49	-0.56	0.39	0.39	0.39	0.28	0.54	0.39	0.18
Combined Effective Federal/State Payroll Tax Rate	0.12	-0.27	-0.27	-0.49	-0.56	0.39	0.39	0.39	0.28	0.54	0.39	0.18

Notes:

- FOR = Forestry, MIN = Mining, OG = Oil and Gas, MAN = Manufacturing, CON = Construction, TS = Transportation and Storage, COM = Communications, PU = Public Utilities, WT = Wholesale Trade, RT = Retail Trade, OS = Other Services, ALL = All Industries.
- For forestry, we used the effective adjusted UI tax rate estimated for agriculture.

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Technical Committee on Business Taxation

The Technical Committee was established by the Minister of Finance, at the time of the March 1996 federal budget, to consider ways of:

- improving the business tax system to promote job creation and economic growth,
- simplifying the taxation of businesses to facilitate compliance and administration, and
- enhancing fairness to ensure that all businesses share the cost of providing government services.

The report of the Technical Committee was released in April 1998, with public consultations to follow the release of the report.

The Technical Committee was composed of a panel with legal, accounting and economic expertise in the tax field. The members are:

Mr. Robert Brown
Price Waterhouse
Toronto, Ontario

Professor Bev Dahlby
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University of Alberta
Edmonton, Alberta

Mr. James Cowan
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The Technical Committee commissioned a number of studies from outside experts to provide analysis of many of the issues being considered as part of its mandate. These studies were released as working papers to make the analysis available for information and comment. The papers received only limited evaluation; views expressed are those of the authors and do not necessarily reflect the views of the Technical Committee.

A list of research studies follows. They may be requested from:

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Technical Committee on Business Taxation Research Studies

- WORKING PAPER 96-1**
Comparison and Assessment of the Tax Treatment of Foreign-Source Income in Canada, Australia, France, Germany and the United States
Brian Arnold (Goodman Phillips & Vineberg)
Jinyan Li and *Daniel Sandler* (University of Western Ontario)
- WORKING PAPER 96-2**
Why Tax Corporations?
Richard M. Bird (University of Toronto)
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The Effects of Taxation on U.S. Multinationals and Their Canadian Affiliates
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