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# Issue in Focus





### Carbon Revenue Recycling – Opportunities and Challenges

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September 2009

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#### **Executive Summary**

The federal government is facing increasing criticism from different interest groups suggesting that more decisive measures should be taken to achieve a noticeable reduction in carbon emissions. Under the current circumstances of amplified fiscal pressures, environmental policy instruments that generate budget revenues may become increasingly attractive to the federal government. Although there is little certainty that these prospects will materialize, CGA-Canada considers it timely to examine the benefits of revenue recycling – which is thought to be an essential element of pricing carbon – and to increase public awareness regarding the challenges that decision and policy makers face when considering revenue recycling options. As the following pages reveal, it can reasonably be conceded that:

*In its optimal form, revenue recycling could lead to a "double dividend".* This occurs when the introduction of revenue-generating carbon reduction measures both discourage environmentally damaging activities (the first dividend) and reduce the distortionary effects of the tax system (the second dividend).

*The existing research leaves the open-ended question of which taxes should be used for revenue recycling unanswered;* particularly in the Canadian context. Given this, the economic efficiency of different types of taxes could be used as a source of general guidance for revenue recycling.

*Significant doubt exists that there is sufficient political will to recycle carbon revenue.* Over the past two decades, the tax composition of the federal revenue continued shifting towards a higher reliance on economically distortive taxes instead of increasing use of more efficient taxes.

Taken together, these assertions lead us to assert that revenue recycling may easily be left out of the policy design should a revenue-generating instrument be solely chosen to address increased carbon emissions. In this context, we are compelled to underscore that revenue recycling may present an opportunity for achieving a less distortive tax composition of the federal revenue. We also continue to encourage the federal government to take actions, within or outside of the environmental policy framework, towards evolving our tax system into a more efficient tax regime that accentuates the low behavioural distortions of the economic agents. In the context of environmental public policy, it may be highly beneficial to extend the existing body of research by a Canada-specific analysis of the efficiency of revenue recycling options.

#### Introduction

To date, federal policy on climate change has been primarily focused on non-compulsory policies, such as voluntarism and reporting, and has been interpreted by some observers as public policy inaction.<sup>1</sup> The federal government is facing increasing criticism from different interest groups, which suggest that more decisive regulatory and/or market-based measures should be undertaken to achieve a noticeable reduction in carbon emissions. Changes in U.S. environmental policy have also become anticipated given the more open position of the current U.S. President to take decisive actions in addressing environmental issues and reducing carbon emissions. In this context, the Canadian federal government may find itself under increased pressure to extend its set of public policy instruments intent to effectively address the reduction of carbon emissions.

Concurrently, the current economic downturn amplifies fiscal pressure on the federal government through decreased budget revenues, increased program spending, unwelcomed levels of budgetary deficit, and rapidly ballooning public debt. Under such circumstances, environmental policy instruments that generate budget revenues may become an attractive route for the government to both reduce carbon emissions and to improve the budgetary position through enriched streams of budgetary revenue.

The validity of these assumptions depends greatly on two prospective events taking place. First, it assumes that the federal government will indeed introduce public policies that effectively set a price on carbon emissions, and second, that the choice of policy instruments will create a source of revenue for the federal government. Although there is no certainty that these prospects will materialize, it nonetheless seems important to underline the benefits of revenue recycling – that is thought to be an essential element of carbon pricing. Increasing public awareness regarding the challenges that policymakers may face when deciding on revenue recycling options is deemed equally important. To that end, this paper will first present a brief overview of the variety of public policy instruments available for reducing carbon revenues and the challenges that may be encountered when choosing a specific option for revenue recycling. The paper closes with a brief overview of the changes in the composition of federal tax revenue over the past decades, followed by concluding thoughts intended to highlight the more salient aspects of our contentions, and possible options for future policy development.

<sup>1</sup> See, for instance, Office of the Auditor General of Canada (2006). Report of the Commissioner of the Environment and Sustainable Development to the House of Commons; Jaccard M. et al (2006). Burning Our Money to Warm the Planet: Canada's Ineffective Efforts to Reduce Greenhouse Gas Emissions, C.D. Howe Institute, Commentary No. 234; Drummond, D. et al (2007). Market-based Solutions to Protect the Environment, TD Bank Financial Group, TD Economics Special Report, March 2007.

#### The Variety of Public Policy Instruments

A variety of public policy instruments exist that may be used for reducing and controlling carbon emissions. Among the most often considered are:

- Emission standards. They establish a mandated level of performance and reflect a maximum rate of emissions legally tolerated.
- Taxes on carbon emission imply that polluters may discharge any desired amount of the pollutant, but are required to pay a tax for every unit discharged.
- Subsidies for emission reduction entail a payment made by the regulator to the polluter for every tonne of carbon emission reduction.
- The cap and trade system creates transferable property rights to emit a specified amount of pollution which would then be traded among the market participants.
- Voluntary guidelines and consumer education aim at achieving emission reductions even though no particular regulation is in place.

Similar to the diversity of the policy instruments, there are different ways of categorizing these instruments. For instance, they may be grouped as market-based and non-market based instruments, depending on their ability to place a price on the environmental asset and create incentives for the polluter and consumer to change their behaviour. The primary advantage of market-based instruments is seen as their ability to motivate polluters to seek out the most optimal form of emission reduction. Financial incentives, such as taxes, subsidies, and tradable permits, are usually thought of as market-based instruments, whereas regulations and voluntary agreements are non-market based instruments for controlling carbon emissions.

Another criterion for designing public policies may be the principle of revenue generating, namely, whether the policy instrument is used to generate budget revenue for the respective level of government. From this point of view, the mentioned instruments may be grouped as revenue generating and non-revenue generating. Revenue generating instruments include carbon taxes and cap-and-trade system permits that are sold or auctioned; non-revenue generating instruments are all other instruments. For the purposes of this paper, the discussion will focus primarily on the revenue-generating policy options.

#### Why Recycle Revenue?

Implementing measures to reduce carbon emissions is often associated with trades-off between the economy and the environment. Achieving the improved environmental quality through emission reduction may be accompanied by an economic price tag in the form of higher capital and operating costs for companies, changes in the input and product mix used by firms and consumers, foregone output and a long-run effect on the structure of the industry, enforcement costs sustained by the government and even media switch for pollution emissions. Naturally, the economic costs of reducing carbon emissions may differ substantially under different types of regulatory policies. For instance, cost discrepancies may be caused by differences in economic and competitiveness impact across the industries, the uneven distribution of costs and benefits among households, and/or a high degree of uncertainty in terms of achieving positive results.

Less obvious, but no less important, costs may also be incurred through the design of the tax system. There are two aspects to this consideration. Firstly, any taxation system brings certain elements of distortion to inherent economic agents through reduced economic gains from work, investment and savings. For instance, taxing of personal income discourages work effort through reducing the financial reward for choosing extra time or effort, and encourages greater use of untaxed leisure or home production. Taxing savings increases the investors' price of future consumption and decreases their reward for postponing consumption. And lastly, business taxes (e.g. corporate income tax and sales tax on capital goods) reduce the return on investment diminishing their attractiveness.<sup>2</sup>

The second aspect that should be considered is the extent to which the introduction of an environmental regulation may further exacerbate the already existing tax distortions. This phenomenon, known as the "tax interaction effect", tends to further reduce the level of employment and investment in the economy. For instance, emission reduction measures may increase the marginal cost of a firm's production through the abatement cost and increased costs of other inputs; particularly energy. This may, on the one side, reduce the incentives for capacity-enhancing investments and, on the other, increase the price of goods and services in the economy, thereby diminishing the real wage of workers. The consequences of the latter may be a lower supply of labour as each hour of work buys less than it did before the environmental regulation, while consumption of leisure becomes more attractive, resembling the effect of taxing labour.<sup>3</sup>

<sup>2</sup> Mintz, J.M. (2006). The 2006 Tax Competitiveness Report: Proposals for Pro-Growth Tax Reform, C.D. Howe Institute, Commentary No. 239, p. 3-14.

<sup>3</sup> Murray, B.C. et al (2005). *Tax Interaction Effects, Environmental Regulation, and "Rule of Thumb" Adjustments to Social Cost,* Environmental & Resource Economics, No. 30, p. 76.

The concept of revenue recycling is often seen as an effective way to mitigate these distortions. Revenue recycling implies that budget resources raised through revenue-generating carbon reduction policy instruments are returned to underlying economic agents. The list of revenue recycling options may be relatively extensive. One literature source, for instance, identifies five such options: (i) fiscal recycling to non-climate related programs, (ii) recycling to emission reduction expenditure or incentive programs, (iii) recycling to reduce inefficiencies in the tax system that have been enhanced by the introduction of the carbon tax, (iv) recycling to reduce distributional effects, and (v) recycling to reduce competitiveness impacts.<sup>4</sup>

In its optimal form, revenue recycling may lead to a so-called "double dividend". This occurs when the introduction of revenue generating carbon reduction measures both discourages environmentally damaging activities (the first dividend) *and* reduces the distortionary effects of the tax system (the second dividend). Researchers tend to further distinguish between a weak and a strong form of the double dividend. A strong double dividend occurs when the emission reduction measure and the tax shift result in an overall net gain to the economic welfare, whereas a weak double dividend is present when the emission reduction creates a net loss to the economy, but this loss is partially mitigated by decreasing distortive taxes through revenue recycling.<sup>5</sup>

Striving to achieve at least a weak double dividend may be particularly important if the government aims to select a carbon reduction policy instrument that is both efficient and cost-effective. Efficiency of a policy instrument typically implies that the reduction of emissions is achieved at the minimum cost to the economy, whereas cost-effectiveness seeks to achieve a given amount of environmental improvement at the least possible cost.

Two elements seem to be essential for the government to achieve at least a weak double dividend when introducing revenue generating carbon reduction measures: (i) a solid knowledge base regarding the effectiveness of different revenue recycling options and their impact on economic welfare, and (ii) the political will to shift the composition of government tax revenue towards less distortive taxes. As the following discussion reveals, Canada scores poorly on both of these fronts.

<sup>4</sup> Sustainable Prosperity (2008). Sustainable Prosperity Carbon Pricing Workshop, Meeting Notes, March 10-11, 2008, p. 6.

<sup>5</sup> Rivers, N. and Sawyer, D. (2008). Pricing Carbon: Saving Green. A Carbon Price to Lower Emissions, Taxes and Barriers to Green Technology, David Suzuki Foundation, p. 14.

#### How to Recycle Revenue?

Research in the area of revenue recycling and achieving double dividend may be divided into three broad areas: (i) theoretical discussion regarding the possibility of achieving double dividend, (ii) empirical studies of actual and modeled outcomes achieved in different countries, and (iii) analysis of the Canada-specific situation.

The theoretical discussion suggests that a double dividend may be achieved by using different approaches, including tax credits and income tax cuts. For instance, the overview of the theoretical considerations provided by Babiker<sup>6</sup> shows that Keynesian-type economic models find very large strong double dividends from investment tax credits, while the results from dynamic general equilibrium models suggest that strong double dividends may be generated through corporate income tax cuts. Another body of research<sup>7</sup> also finds that a cut in pre-existing labour taxes may result in significant welfare gains from introducing an environmental tax and, under certain circumstances, may even lead to a strong double dividend.

A group of studies that assume a more applied approach and focus on particular countries do not concur on any one particular option of revenue recycling either. For instance, Babiker<sup>8</sup> carried out a cross-country comparison of a simulated introduction of a carbon tax to achieve Kyoto targets in the EU countries, the United States and Japan. This study considered four different options of revenue recycling: a lump-sum rebate, a reduction in labour tax, a reduction in non-energy consumer tax, and a combination of both a reduction in labour and consumer taxes. The modeling undertaken by the study suggests that carbon reductions to achieve Kyoto targets with lump-sum recycling would always reduce welfare relative to the reference scenario. The reduction in labour taxes could (in most of the cases, but not all) result in a weak double dividend. Interestingly enough though, for some countries revenue recycling through lowering labour taxes worsens welfare outcomes to a greater degree when compared to a lump-sum format of revenue recycling, which does not involve any change to the tax system.

A study undertaken by Parry and Bento<sup>9</sup> arrived to a more positive conclusion when it comes to recycling through lowering labour taxes. Using the U.S. labour market as the basis, this study takes into account tax deductions related to certain types of household spending. It concludes that

<sup>6</sup> Babiker, M.H. et al. (2003). *Tax Distortions and Global Climate Policy*, Journal of Environmental Economics and Management, no. 46, p. 272.

<sup>7</sup> Bento, A.M. and Jacobsen, M. (2007). *Ricardian Rents, Environmental Policy and the "Double Dividend" Hypothesis,* Journal of Environmental Economics and Management, no. 53, p. 30.

<sup>8</sup> Babiker, M.H. et al. (2003). *Tax Distortions and Global Climate Policy*, Journal of Environmental Economics and Management, no. 46, p. 280-283.

<sup>9</sup> Parry, I. and Bento, A. (1999). Tax Deductions, Environmental Policy, and the "Double Dividend" Hypothesis, The World Bank, Policy Research Working Paper 2119.

the presence of tax-favoured consumption can substantially reduce the costs of environmental taxes and lead to a double dividend.

Another country-specific example of testing different instruments for revenue recycling is offered in the study conducted by Edwards and Hutton.<sup>10</sup> They consider and evaluate different methods of allocating carbon trading permits within the United Kingdom. Their results indicate that when revenue from a permit auction is recycled to industry in the form of output subsidies or a tax cut on industrial and commercial output, there may be potential for a double dividend.

As for Canada-specific studies, very little research exists that focuses on modeling the Canadian tax system under the condition of carbon pricing and revenue recycling. One noticeable exception is the research conducted by McKitrick<sup>11</sup> in 1997. The study found that imposing a carbon tax and using budget revenues to finance reductions in payroll taxes may allow for maintaining consumer welfare unchanged while slightly increasing gross national product (GNP) in the short-run. Alternatively, the use of lump-sum transfers to recycle the revenue would decrease both consumer welfare and GNP.

As may be seen from the discussion above, there are a number of revenue recycling options that may be considered when designing policy or protocol aimed at lowering carbon emissions. Although the existing body of research has considered recycling options ranging from labour taxes to investment tax credits, to corporate income taxes, to output subsidies, and finally to consumption taxes, there is no particular agreement on which option is the most appropriate, nor does there seem to be an attempt to rank those options in order to provide a clearer guideline for their selection. This is further aggravated by the fact that research is often focused on a specific country or region and within an evolving or shifting economic environment, while the empirical analysis shows that policy conclusions drawn from one country may not always be transferable to other countries<sup>12</sup> or to alternate periods of time.

As such, the existing theoretical and empirical research leaves the open-ended question of which taxes should be used for revenue recycling when it comes to the particular case of Canada. One of the alternatives that may be worth considering for temporary guidance in this situation is the economic efficiency of the different types of taxes. It may be reasonable to assume that if there is a need to introduce a revenue-generating emission reduction measure, the best way to recycle the revenue would be to reduce the most economically distortive taxes.

<sup>10</sup> Edwards, T.H. and Hutton, J.P. (2001). Allocation of Carbon Permits within a Country: A General Equilibrium Analysis of the United Kingdom, Energy Economics, no. 23, p. 382.

<sup>11</sup> McKitrick, R. (1997). Double Dividend Environmental Taxation and Canadian Carbon Emissions Control, Canadian Public Policy, Vol. 23, No. 4, p. 420.

<sup>12</sup> Babiker, M.H. et al. (2003). *Tax Distortions and Global Climate Policy*, Journal of Environmental Economics and Management, no. 46, p. 283.

In 2004, the Department of Finance Canada undertook a study that compared the impact of seven different tax measures on domestic welfare.<sup>13</sup> The study developed a dynamic general equilibrium tax model of the Canadian economy to look at the degree to which changes in the tax mix affect the decisions of economic agents regarding consumption, investment and participation in the labour market. The measures were ranked based on the magnitude of improvement they bring to GDP and the overall economic well-being which encompasses the value of consumption and leisure.

The measures examined by the study included (i) a cut in personal capital income taxes, (ii) a cut in sales taxes on capital goods, (iii) a cut in corporate income taxes, (iv) a cut in personal income taxes, (v) a cut in payroll taxes, (vi) a cut in consumption taxes, and (vii) an increase in capital cost allowances on new capital. The results of the study suggest that taxes on personal and corporate income impose higher efficiency costs than payroll and consumption taxes. For instance, as seen from Table 1, if personal capital income taxes are reduced by \$1 (but the revenue is compensated from other sources<sup>14</sup>) the economic well-being would improve by \$1.30. Instead, if the revenue from taxing consumption is reduced by \$1, the economic well-being would improve by only \$0.13. Similar differences may also be seen in the magnitude of the impact of different tax measures on GDP.

Tax Reduction Measure	Welfare Gain per \$1 of Lost Present Value of Government Revenue	Percentage Change in GDP due to 1%-of- GDP Reduction in Government Revenue
Personal capital income taxes	\$1.30	3.36%
Sales taxes on capital goods	\$1.29	3.05%
Corporate income taxes	\$0.37	1.94%
Personal income taxes	\$0.32	1.29%
Payroll taxes	\$0.15	0.66%
Consumption taxes	\$0.13	0.19%

Table 1 – Impact of Tax Reduction Initiatives on Welfare and GDP<sup>15</sup>

Source: Baylor M. and Beauséjour L. (2004). *Taxation and Economic Efficiency: Results from a Canadian CGE Model,* Department of Finance Canada, Working Paper 2004-10, Table 4, p. 16.

<sup>13</sup> Baylor M. and Beauséjour L. (2004). *Taxation and Economic Efficiency: Results from a Canadian CGE Model*, Department of Finance Canada, Working Paper 2004-10.

<sup>14</sup> The study assumes that the revenue loss is recovered through lump-sum taxes.

<sup>15</sup> Although an increase in capital cost allowances on new capital was among the measures considered by the study in question, it does not constitute a tax reduction measure and thus is not included among the measures mentioned in Table 1.

The study discussed above confirmed findings of an earlier study conducted in 1997. That study was focused on the marginal economic cost imposed by raising one additional dollar of tax revenue using different types of taxes. The study considered Canada's tax system and, as seen from Table 2, the conclusions were generally the same: corporate and personal income taxes are associated with higher marginal costs to society than consumption or payroll taxes.

#### Table 2 – Estimates of Real Output Loss From Extra Dollar of Tax

Tax Revenue Measure	Marginal Economic Cost of Tax
Corporate income tax	\$1.55
Personal income tax	\$0.56
Payroll tax	\$0.27
Sales tax	\$0.17

Source: Organisation for Economic Co-operation and Development (1997). OECD Economic Surveys - Canada, Table 23, p. 85.

When a tax cut triggers a noticeable change in economic well-being, or is associated with a significant reduction in economic costs, such a tax is believed to have a large distorting effect on the decisions of individuals and businesses and may trigger the diversion of capital and human resources from one type of economic activity to another. Following this logic, recycling budget revenues derived from carbon policies may best be channelled towards reducing the most economically distortive taxes which, in the case of Canada, are personal and corporate income taxes (and their variations, such as personal tax on capital income).

# Can We Count on the Government to Recycle Revenue?

Although the above conclusion may appear fairly logical, a caveat exists in terms of the government's willingness to pursue this route. As seen, knowledge regarding the marginal economic cost created by different tax measures has existed within the government since at least 1997 when the first study was conducted by the Department of Finance. Given that the study in question was done by a government department itself, it would seem logical that the information be given reasonable credence. Nevertheless, the availability of this information did not translate into concrete measures aiming to adjust the composition of the federal budget revenue by shifting towards a larger share of less distortive taxes such as consumer and payroll taxes.

In fact, the situation was quite the opposite. Over the past two decades, the reliance of federal budget tax revenues on personal and corporate income taxes has noticeably increased, while the weight of consumption and payroll taxes has dropped substantially. For instance, as seen in Figure 1, the proportion of consumption taxes (which are the most efficient) in the total federal budget tax revenue went down from 27.9% in 1983-84 fiscal year to a projected 18.4% in 2013-14. The reverse picture can be seen for personal income taxes, which are projected to constitute more than half (56.0%) of the federal tax revenue in 2013-14 fiscal year compared to only 45.7% in 1983-84.

Summing up the discussion, the following points are deemed important. First, reducing carbon emissions and achieving the improved environmental quality may be accompanied by certain economic costs. The opportunity to fully or partially offset these costs through revenue recycling may be seen as one of the advantages of choosing revenue-generating policy instruments for emission reduction. Second, the research conducted to date does not offer clear guidance on what would be the most appropriate form of revenue recycling in the Canadian context. Given this, current knowledge of the magnitude of distortions associated with different taxes used in Canada may serve as a general sense of direction for revenue recycling. Third, changes in the relative importance of different taxes in the total tax revenue of the federal government over the past two decades create certain doubt that there will be sufficient political will to recycle the carbon revenue and to correspondingly mitigate the distortions of the current tax system.

Figure 1 – Structure of the Federal Budget Tax Revenue





Note: Consumption taxes are recognized as the sum of goods and services tax, sales tax, customs import duties, energy taxes and other excise taxes/duties. Payroll taxes are recognized as employment insurance premiums. Total federal tax revenue is recognized as the sum of personal income tax, corporate income tax, other income tax, consumption taxes and payroll taxes.

Source: Department of Finance Canada (2008). *Fiscal Reference Tables*, Table 3; Department of Finance Canada (2009). *The Budget Plan*, Table 4.5. CGA-Canada computation.

#### **Closing Comments**

Canadian policymakers may face a number of challenges when designing legislative oversight and public policy for carbon reduction. The matter of choosing the policy instrument would undoubtedly represent one of them. However, the volume of existing literature and the experiences of other countries may partially ease the task. Should a revenue generating instrument be chosen, the decisions on revenue recycling options may be much more challenging to render. The lack of clear and consistent conclusions from the existing body of theoretical and empirical studies may impede the choice of an optimal revenue recycling option. The lack of political will may also decrease the likelihood of achieving a less distortive composition of the Canadian tax system.

In this respect, it may be highly beneficial to extend the existing body of research by conducting a Canada-specific analysis that looks at different options of revenue recycling and their respective rankings in terms of expected welfare gains. Such research undertaken by an authoritative host organization with strong dissemination ability and influence may empower the public policy community with factual arguments to advocate for the desired outcome(s). The federal government, in turn, is strongly encouraged to stream its fiscal initiatives towards shifting the federal tax revenue composition to rely more extensively on less distortive consumption and payroll taxes and to evolve our tax system into a more efficient tax regime that accentuates the low behavioural distortions of underlying the economic agents.

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