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Carbon Pricing in Alberta

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Executive Summary

One of the most important tax policy debates in Canada and Alberta specifically concerns “carbon pricing”, that is, the government’s imposition of an extra cost on activities that release carbon dioxide. Two common mechanisms of carbon pricing are a cap-and-trade program (in which the government issues tradeable permits that allow for the emission of a certain amount of CO₂) or a straightforward carbon tax.

Alberta has had carbon pricing in some form since 2007, when the Specified Gas Emitters Regulation (SGER) framework required reductions in emissions intensity for all large emitters. In November 2015, the government of Alberta introduced the Climate Leadership Plan (CLP), which broadened the scope of the provincial carbon tax, and contained specific objectives on emissions and electricity generation. In fiscal year 2018/19, Alberta’s carbon levy is expected (at a price of \$30 per tonne) to raise \$1.4 billion. A further scheduled increase to \$50 per tonne in 2022 will substantially increase the burden of the carbon tax on businesses and households in the province, as would any additional changes beyond that.

Although there is justifiable concern over the potential harms from climate change, policy makers and the public should also be aware of the economic consequences of carbon pricing. The potential environmental benefits of reduced carbon-dioxide emissions should be considered in the context of their economic cost. Unfortunately, carbon pricing implemented in less-than-global jurisdictions—such as individual countries or, even more so, individual provinces—suffers from the problem of “leakage”, in which some of the avoided emissions are merely displaced to other, less regulated jurisdictions. Thus, the jurisdiction with the carbon price suffers from reduced economic activity, while global emissions do not drop by the corresponding amount.

This study provides a review of the theoretical and empirical evidence on the impact of carbon taxes on economic performance with the object of helping to inform policy development in Alberta on this critical issue. Besides the limitations of carbon pricing at the provincial level, the specific details of the CLP ignore some of the basic lessons in the economics literature. For example, the CLP combines a carbon tax with specific objectives, such as an annual cap (100 megatonnes) on oil-sands emissions, and the goal of phasing out coal-fired electrical generation by 2030. Such supplemental goals undercut the logic of carbon pricing, in which policy makers use a carbon tax to correct incentives and then allow the market to find the least-cost methods of reducing emissions.

Another problem with the design of the CLP is that it uses the receipts of its carbon tax to fund “green” projects, rather than using the funds to minimize the impact of higher prices on consumers. Furthermore, even to the extent that the CLP *does* include rebates to help poorer households and other vulnerable groups cope with the impact of a carbon tax, these reimbursements come in the form of lump-sum payments. This approach may be laudable for equitably distributing the economic burden of a carbon

tax, but lump-sum rebates make carbon taxes more economically inefficient. The standard findings in the economic literature are that only devoting carbon-tax receipts to reductions in capital taxes can offset the economic drag of a carbon tax; other revenue-neutral designs, including lump-sum rebates, reduce conventional GDP below what it would otherwise be in the absence of a carbon tax.

In its current form, Alberta's Climate Leadership Plan will reduce the province's economic growth at a far higher cost than necessary to achieve a very modest impact on global climate change. As such, the best option is arguably to eliminate carbon pricing at the provincial level altogether. However, especially in the context of a federal "back-stop" carbon price, at the very least the Alberta government should revise its approach to carbon pricing to eliminate the most economically destructive elements of the CLP. Specifically, any carbon tax should be truly revenue-neutral (that is, with no additional spending on programs, even if designated as "green"), with the receipts ideally used to reduce the marginal rates on other taxes. Furthermore, a carbon price ostensibly corrects for any "market failure" in business and household decisions, and therefore it should *not* be supplemented with additional targets for emissions or renewable energy.

1 Introduction

Amongst the most important ongoing tax policy debates currently taking place in Alberta is the one surrounding carbon taxes. Alberta has had carbon pricing in some form since 2007, when the Specified Gas Emitters Regulation (SGER) framework required reductions in emissions intensity for all large emitters. In November 2015, the government of Alberta introduced the Climate Leadership Plan (CLP), which broadened the scope of the provincial carbon tax, and contained specific objectives on emissions and electricity generation. The transition from the SGER to the provisions of the CLP and the rising price on carbon emissions has led to a significant increase in government revenue from this source.

Debates about the economic implications of the carbon tax have been intense across the country but particularly so in Alberta. There is good reason for the issue to attract so much public attention in this province. Specifically, given the importance of the energy industry to the provincial economy, Alberta's carbon tax already imposes a substantial tax burden on the provincial economy, a burden that will grow quickly over time under the policy status quo. In fiscal year 2018/19, for example, Alberta's carbon levy is expected (at a price of \$30 per tonne) to raise \$1.4 billion. A further scheduled increase to \$50 per tonne in 2022 will substantially increase the carbon tax burden on businesses and households in the province, as would any additional changes beyond that. Because Alberta's economy is relatively energy intensive, each additional dollar added to the carbon tax in this province will wind up creating a larger tax increase (in terms of dollars collected) than an additional dollar added to the price of carbon emissions in most other provinces.

This publication provides a review of the theoretical and empirical evidence on the impact of carbon taxes on economic performance with the objective of helping to inform policy development in Alberta on this critical issue. Because of Alberta's energy-intensive economy, understanding the economic implications of an escalating tax on carbon emissions is critical if policy makers are to make informed choices in their efforts to balance the objectives of economic growth and contributing to global emissions mitigation efforts. The paper concludes that the CLP is a counterproductive policy package, even accepting the desirability of government action on climate change. This is particularly apparent once we take into account the federal and provincial institutional framework of carbon taxation in Canada.

The publication proceeds as follows. The second section reviews the economic literature on the effects of carbon pricing on conventional economic growth, and summarizes three standard principles for minimizing the cost of desired environmental objectives. The third section shows that the CLP violates each of these principles for efficient carbon taxation. The fourth section discusses the nuances of carbon-tax policy in Canadian provinces, given the "backstop" federal policy. Section five gives a brief conclusion.

2 Theory—Economic Impacts of a Carbon Tax

According to textbook theory, the laissez-faire market economy can handle the provision of typical goods and services much more efficiently than government planners. However, there is the possibility of “market failure” in some situations, because the parties to a market transaction do not fully incorporate the consequences (bad or good) on third parties from their exchanges, and thereby engage in too much (or too little) of the activity. In the context of the CLP, the allegation is that human emissions of greenhouse gases (such as carbon dioxide) exacerbate the future harms of climate change. In principle, a properly designed carbon tax could correct the “negative externality” involved in carbon dioxide emissions, by making emitters take into account the full “social costs” of their actions, rather than merely the “private costs” being charged by the conventional market. When a tax is imposed on emissions, market participants will automatically look for ways to reduce their tax burden by adopting emission-reduction options that cost less per tonne to implement than the tax rate. The result is that buyers and sellers will seek out and implement the least-cost ways of reducing emissions without the government needing to direct the process.

Even if one accepts the basic rationale of a carbon tax, it will still carry with it costs in the form of reduced economic output, at least as conventionally measured. After all, the reason society currently relies on carbon-intensive technologies in energy and transportation is that these approaches are more cost effective and/or practical for many businesses and households. Another way to express this insight is to observe: If the government needs to levy a tax to induce people to move away from carbon-intensive processes, this is a sign that these processes are more advantageous if we disregard climate change issues. *Given* that policy makers are going to levy a carbon tax in order to reduce carbon dioxide emissions, the economic literature contains several principles to help cushion the blow to (conventional) economic growth. In other words, economists have offered several principles to help minimize the economic cost of reducing carbon dioxide and other greenhouse gas emissions.

Universal coverage

First, in order to minimize the economic cost of achieving a given environmental objective (such as a target on emissions or a ceiling on global warming), the carbon tax ideally should be applied to as wide a base as possible. If only *some* sectors of the economy are covered by the tax (or if the tax is only levied in certain jurisdictions), then “leakage” occurs, in which emissions migrate from the areas affected by the carbon tax to those that are not covered. As a report from the Canadian Ecofiscal Commission explains:

Provinces with higher carbon prices might see some current or future production and investment move toward jurisdictions with weaker policies. The result is lost economic activity in the home jurisdiction. *Leakage* is the environmental side of the same coin: **if economic activity simply relocates to other jurisdictions and produces carbon emissions identical to what existed in the home jurisdiction, Canadian provinces risk bearing the economic costs of lost production or investment with no net change in global GHG emissions.** (Beale et al., 2015: 2–3; bold added)

Recent Nobel laureate William Nordhaus explained the magnitude of this factor in his 2008 book on climate-change policy:

Our modeling results point to the importance of near-universal participation in programs to reduce greenhouse gases. Because of the structure of the costs of abatement, with marginal costs being very low for the initial reductions but rising sharply for higher reductions, there are substantial excess costs if the preponderance of sectors and countries are not fully included. We preliminarily estimate that **a participation rate of 50 percent, as compared to 100 percent, will impose an abatement-cost penalty of 250 percent. Even with the participation of the top 15 countries and regions, consisting of three-quarters of world emissions, we estimate that the cost penalty is about 70 percent.** (Nordhaus, 2008: 19; bold added)

No policy layering

Second, many economists have recommended that *if* an economy-wide carbon tax is going to be imposed, then policy makers should remove other “command-and-control” mandates or regulations instead of simply layering the tax on top of them. If the carbon tax is designed to correct the “negative externality” of human-caused climate change, then other measures from policy makers are redundant and indeed may undermine the economic efficiency of the tax instrument. When political officials pick winners and losers and/or mandate particular efficiency standards, this forces market participants to pursue emission cuts in other ways than the ones they would have chosen in response to the tax. This means they are being forced to adopt relatively inefficient abatement options. There is no reason to suppose policy makers know better how to identify cost-minimizing responses to a carbon tax than the households and firms who make up the market.

This is the final (out of four) “pillar” of the carbon-tax plan from the US-based Climate Leadership Council (CLC):

The final pillar is the elimination of regulations that are no longer necessary upon the enactment of a rising carbon fee whose longevity is secured by the popularity of dividends. Many, though not all, of the Obama-era carbon dioxide regulations could be safely phased out, including an outright repeal of the Clean Power Plan. (Climate Leadership Council, n.d.)

Revenue neutrality

Finally, a third principle to minimize the economic harm of a new carbon tax is that it should be “revenue neutral”, meaning that its receipts should be returned to taxpayers rather than used to fund additional government expenditures. This principle says that a carbon tax should merely alter *what* is taxed rather than *how much* is taxed. Even here, policy makers and the public should be careful not to misunderstand what the literature says. Some advocates of a carbon tax claim that so long as it is revenue neutral, it will boost conventional economic growth because it “taxes bads, not goods”. However, generally speaking computer modeling shows that even among genuinely revenue-neutral options, lump-sum rebates lead to the biggest hit to economic growth, reductions in sales taxes are the next worse, reductions in taxes on labour are better yet but still hurt the economy, and finally that only reductions in corporate income tax rates might actually lead to *greater* conventional economic growth (plus whatever environmental benefits accrue from lower emissions).

For example, a Resources for the Future (RFF) study (Carbone, Morgenstern, Williams III, and Burtraw, 2013) on the budgetary and economic impacts of various implementations of a \$30/tonne carbon tax found that, *even if all carbon tax receipts were returned to taxpayers*, there would be a reduction in conventional economic output *except* if the revenues were used to reduce corporate income tax rates. In particular, the RFF study found that merely returning carbon tax receipts in a lump-sum fashion would yield a level of GDP that would be permanently about 3.5% lower than it would otherwise be (Carbone, Morgenstern, Williams III, and Burtraw, 2013: 8, fg 1). In a follow-up report for RFF, the authors explain:

Among the revenue-neutral tax reform options ... we find that using the carbon tax revenues to cut noncarbon taxes has a range of effects.

Cutting capital taxes—corporate taxes or personal income rates on interest, dividends, or capital gains—**produces the largest economic efficiency benefits, roughly offsetting the economic cost of the carbon tax.** Without considering the environmental benefits from CO₂ emissions reductions, the net social costs are close to zero ...

Another approach is to recycle the revenues by reducing labor taxes—in the form of payroll or personal income tax reductions. This option is less economically efficient than recycling via capital tax cuts, though the differences are relatively modest.

Recycling the revenues via lump-sum rebates to lower-income households (which are likely to be the most disadvantaged by a carbon tax) **is worse for economic efficiency than any of the options that involve tax rate cuts.** At the same time, as we discuss later, such rebates are most progressive in terms of their income distribution impacts. (Carbone, Morgenstern, Williams III, and Burtraw: 2014: 35; bold added)

Although the authors do not stress this point—after all, they are in favour of a carbon tax—the above quotation confirms that *only* a revenue-neutral program involving

corresponding cuts to capital taxes can offset the economic drag from a new carbon tax. Other possibilities, namely using carbon-tax receipts to reduce payroll taxes or simply to provide lump-sum rebates to households, are less economically efficient, meaning that conventional GDP growth would be reduced by a new carbon tax in such scenarios.

To reiterate, this is a standard finding in the literature. For another example—again coming from an institution that favours a carbon tax—a Brookings Institution study (McKibbin, Warren, and Wilcoxon, 2012) also finds that only a carbon tax involving corresponding capital tax cuts can boost GDP, whereas other revenue-neutral options lower GDP relative to the no-carbon-tax baseline.

The reason for these results is called the “tax interaction effect” in the literature. (see, e.g., Bovenberg and Goulder, 1996; Goulder, 2000). Specifically, the harm of pre-existing distortionary taxes is exacerbated when a carbon tax is implemented, even if it is the “optimal” tax in terms of environmental externalities. Intuitively, a carbon tax concentrates its effects on a small portion of the economy, while generally speaking the tax literature suggests that the way to minimize distortions is to spread a tax uniformly over a wide base. (For example, it would cause more economic harm to raise \$1 billion through a tax on *red* cars rather than to raise \$1 billion through a tax on *all* cars, because the per-vehicle tax would have to be higher in the former case and would therefore distort behaviour more.) The upshot is that even if one believes a carbon tax makes economic sense (all things, including climate change, considered) by itself, in conjunction with pre-existing distortionary taxes the carbon tax can cause additional economic fallout. This is why many economists suggest using the receipts from a carbon tax to reduce the most distortionary taxes as a way to soften the blow to conventional economic growth if a new carbon tax is to be introduced.

Table 1 (adapted from Bovenberg and Goulder’s pioneering article (1994) on the tax interaction effect) gives a sense of just how significant the tax interaction effect is. The specific numbers in Table 1 are calibrated for the U.S. federal tax code as it stood in the early 1990s, but for our purposes the qualitative pattern is what’s important. If, for example, the “negative externalities” from an additional tonne of carbon [1] emissions cause \$100 in marginal climate-change damage (in present-discounted value terms), then the standard Pigovian approach, [2] without considering other taxes, would be to levy a \$100/tonne tax on carbon (with the receipts distributed as a lump-sum back to citizens so as not to distort their behaviour by affecting relative prices, except for the penalty on carbon).

[1] Note that Bovenberg and Goulder’s (1994) results, summarized in table 1, quote the environmental externality and carbon tax in tonnes of carbon, not tonnes of carbon dioxide (which has become more standard in the policy literature).

[2] In economics, a “Pigovian” tax—named after the economist A.C. Pigou—seeks to correct a so-called negative externality by giving an additional disincentive, beyond the normal costs of the market. In the case of climate change, if emitting carbon dioxide causes damages that the market is not capturing with its prices, then in principle a tax of the correct size could lead firms and households to reduce their emissions to the “optimal” amount.

Table 1: "Textbook" carbon tax compared to optimal carbon tax, in presence of pre-existing tax code distortions

Assumed marginal environmental damages from carbon emissions (\$/tonne)	Optimal textbook carbon tax, ignoring pre-existing taxes (\$/tonne)	Optimal carbon tax from Bovenberg and Goulder's model, taking into account interactions with US tax code in early 1990s	
		Carbon tax receipts returned as lump sum to households	Carbon tax receipts used to reduce personal income tax rates
\$25	\$25	\$0	\$7
\$50	\$50	\$0	\$27
\$75	\$75	\$13	\$48
\$100	\$100	\$31	\$68

Note: Figures in the table refer to tonnes of carbon, not of carbon dioxide.

Source: adapted from table 2 (appendix) in Bovenberg and Goulder, 1994.

However, in an economy with pre-existing, distortionary taxes such as a personal income tax, the implementation of a new carbon tax *exacerbates* the harm of the personal income tax. Taking this effect into account, Bovenberg and Goulder estimated that the "optimal" carbon tax would only be \$31 per tonne of carbon (**table 1**). It was more conducive to economic growth to use the carbon-tax receipts to reduce personal income-tax rates (in a revenue neutral fashion) but, even there, the "optimal" carbon tax would still only be \$68 per tonne—still 32% lower than the stipulated environmental damage.

To repeat, the specific numbers in table 1 refer to an estimate made of the US economy and tax code from the early 1990s, and so do not directly apply to Canada today. But the general principle remains, that carbon taxes have a surprisingly strong negative impact on economic growth. Even if the receipts are entirely dedicated to lowering pre-existing distortionary taxes, the net result is a reduction in conventionally measured GDP, unless (as we discussed earlier) the tax relief is concentrated on the most economically harmful of taxes, taxes on capital.

The upshot of the "tax interaction effect" is that pre-existing distortionary taxes can hamper the ability of the government to use fiscal policy to address environmental problems; this is why the "optimal" carbon tax shown in table 1 (under various scenarios) is lower than the stipulated environmental damages. It is worth stressing that this result was (initially) quite counterintuitive to energy and environmental economists. Indeed, many analysts still take it for granted that pre-existing distortionary taxes can only *strengthen* the case for imposing a revenue-neutral carbon tax where the receipts are used to offset taxes on labour and capital. Yet, as table 1 makes clear, this is not necessarily correct: An inefficient tax code can make it costlier to impose a carbon tax (even a revenue-neutral one), and therefore the initial presence of tax distortions can *weaken* the case for imposing a new carbon tax.

Although this result was initially surprising, the economics literature eventually placed it in the context of a more familiar framework. It is well known in the field of public finance that, if the government is going to spend money on a project (even one with net social benefits that cannot be provided by the private sector), the government must still take into account the efficiency loss emanating from a distortionary tax code, which is necessary to raise the funds for the project. For example, if the Marginal Cost of Public Funds (MCPF) is 1.5, that means the government lowers private-sector output by \$1.50 for every additional dollar of revenue it collects in taxes. So, even if policy makers thought a certain project—such as building a park—would confer \$1.30 in total social benefits for every \$1 actually spent, the wasteful tax code would actually offset the net value of the project.

In an analogous manner, McKittrick (2016) shows that the gross benefits (from the avoided “social cost of carbon”) of levying a carbon tax must be deflated by the MCPF, in order to calculate a more accurate measure of the *net* social benefits from such a policy. This is why the optimal carbon tax—taking all factors into account—will tend to be lower, the more inefficient the tax code’s status quo design. We have emphasized these results because so often analysts assume that the *opposite* holds and that, so long as the government “taxes bads, not goods”, the policy will enhance welfare. Yet, as our discussion indicates, the actual situation is much more nuanced and policy makers should be wary of casual promises of “win-win” outcomes from a revenue-neutral carbon tax.

3 Practice—Economic Flaws in Alberta’s Climate Leadership Plan

In Section 2, we highlighted some of the key results from the literature on the economic impacts of a carbon tax. Specifically, we showed that *if* government(s) are going to levy carbon taxes to address the “negative externality” of greenhouse-gas emissions, then some important steps to increase the benefits (in terms of mitigated climate change) and to minimize the economic harm are: (1) ensure a wide base for the carbon tax’s application to minimize “leakage” of emissions into neighbouring carbon-tax-free jurisdictions; (2) let the “price on carbon” do the work of incentivizing households and individuals to cut back on emissions in an efficient manner, rather than having policy makers issue top-down edicts either for specific technologies or emission targets; and (3) don’t *spend* the incoming carbon-tax receipts but instead use them to cut marginal rates in taxes on labour and, especially, on capital.

This section will now show that judged by these three criteria, Alberta’s Climate Leadership Plan (CLP) is deficient, even stipulating the basic rationale for a carbon tax. Specifically, a carbon tax levied at the provincial level is largely symbolic, in an effort to mitigate *global* emissions. To the extent that Alberta households and businesses reduce their consumption of fossil fuels, for example, they thereby lower the world price of oil, natural gas, and coal, which spurs greater usage of fossil fuels by those living outside of Alberta than would otherwise have been the case.

Another major flaw in the CLP approach is that it includes specific climate-change objectives, such as the annual cap (100 megatonnes) on oil-sands emissions, or the goal of phasing out coal-fired electrical generation by 2030 (Alberta Government, 2017b: 55). To reiterate, even if one accepts the textbook logic of a carbon tax to rectify a negative externality from greenhouse gas emissions, one still would want to rely on the market process to determine the *amount* of emission reductions and more crucially *where* to cut back. In general, we would not want political officials determining the optimal amount of emissions from particular sectors of the economy, just as we would not want them determining how many television sets should be produced annually.

To get a sense of just how inefficient these external limits may be, consider: Green and Jackson (2016) estimated that the CLP’s cap of 100 megatonnes (Mt) on emissions from oil sands could reduce oil production from that sector by 3.34 billion barrels between 2025 and 2040, relying on current emissions intensity levels. Although Green and Jackson also estimate that the CLP’s cap would reduce greenhouse gas emissions by 236 Mt (relative to the baseline in which there was no CLP cap on oil sands emissions), the implied economic cost of these reductions would be CA\$1,035 (in 2015 dollars) per

metric tonne. This implied “price” on carbon-dioxide emissions is some *twenty times* standard estimates of the “social cost of carbon” over the next few decades. This estimate is just a particular example of the more general principle that specific top-down government edicts on *where* emissions cutbacks should take place will achieve the reductions at a higher economic cost than is necessary.

Finally, the CLP approach makes the economic harm of its carbon tax larger than it needs to be. Rather than using the carbon-tax receipts to reduce other (distortionary) taxes, the CLP has diverted the monies elsewhere. It provides some rebates for low-income households (which is a laudable goal but conflicts with the principle of revenue-neutrality through reductions in other tax rates), [3] and it funds “green investment” projects to promote “clean energy” and other goals. This latter category is particularly problematic because the projects that will get funded are typically ones that the market declined to pursue in response to the carbon tax because they are the relatively expensive and inefficient ones. By subsidizing these measures, the government coerces people into pursuing them anyway, thus destroying the efficiency of the tax instrument.

To reiterate, even if one believes that market prices do not provide adequate information regarding climate-change externalities, a properly calibrated carbon tax is all that is necessary to rectify the “market failure”. For example, a carbon tax makes gasoline more expensive and thereby could give the proper incentive for motorists to consider switching to electric vehicles. However, if they prefer to stick with gasoline cars and pay the carbon tax, then that is the market’s verdict. For the government then to use carbon tax revenues to explicitly subsidize households in buying electric cars will be a waste of resources and will undermine the efficiency of the market.

Proponents of CLP misuse the term “revenue neutral”

On this point, it is worth clarifying that the CLP proponents are misusing the term “revenue neutral”. For example, one of the “press release” website pages that explain the CLP plan to the public contains the following section:

[3] A more comprehensive analysis lies outside the scope of the present paper, but it should be noted that the ostensible “full rebates” from the CLP could also be misleading. According to a report from the Alberta government, “The Alberta Climate Leadership Adjustment Rebate will provide \$1.5 billion over three years to low and middle income households to offset typical carbon levy costs. The rebate is granted based on household income, not fuel consumption, so all households still have an incentive to reduce fuel use ... An estimated 60% of Alberta households will get a full rebate, while additional households will receive a partial rebate” (Alberta Government, 2017b: 56). These types of claims are misleading to the extent that households significantly reduce their carbon emissions, which will be more relevant over time (as they adjust their behaviour and as the carbon tax rate increases). In the extreme limit—just to illustrate the problem—at a carbon tax of (say) \$10,000 per tonne, poorer households would switch to zero-emission lifestyles, which would drastically lower their standard of living. Yet they would not pay any explicit carbon tax, because (in this extreme example) they would have reduced their emissions to zero. But clearly we would not want to say that therefore such households were not bearing any of the burden of a carbon tax.

Revenue neutral

- One-hundred per cent of proceeds from carbon pricing will be reinvested in Alberta.
- A portion of collected revenues will be invested directly into measures to reduce pollution, including clean energy research and technology; green infrastructure, such as public transit; and, programs to help Albertans reduce their energy use.
- Other revenues will be invested in an adjustment fund that will help individuals and families make ends meet; provide transition support to small businesses, First Nations, and people working in affected coal facilities.

“We are going to do our part to address one of the world’s greatest problems. We are going to put capital to work, investing in new technologies, better efficiency, and job-creating investments in green infrastructure. We are going to write a made-in-Alberta policy that works for our province and our industries, and keeps our capital here in Alberta.” — Rachel Notley, Premier (Alberta Government, 2015)

In the economics literature—and indeed using plain English—to say that a new tax is “revenue neutral” means that *the new tax will not bring in net revenue to the government*. In other words, the way the term is used in the literature, a new carbon tax will be completely offset dollar-for-dollar with other *tax cuts* and/or lump-sum cash rebates to citizens. It is a misleading abuse of language to say that the CLP carbon tax is “revenue neutral” merely because its revenues will ultimately be spent on projects located in Alberta. If the Canadian government increased federal income taxes by \$10 billion and used the money to build more infrastructure (in Canada), that would clearly not be “revenue neutral”—even though federal receipts and expenditures had both risen by \$10 billion. No, in the context of tax reform, “revenue neutral” means that a new tax does not increase the total tax receipts extracted from the economy—but this is what the CLP’s carbon tax in fact does.

In contrast, British Columbia’s provincial carbon tax truly *was* supposed to be revenue neutral, though Lammam and Jackson (2017) argue that this is based on an accounting sleight-of-hand. But the CLP’s own statements quoted above show that it is clearly not revenue neutral on the face of it, except in the tautologous sense in which *all* taxes are revenue neutral.

Proponents of CLP misunderstand job growth statistics

Part of the difficulty in properly assessing the economic impact of the CLP and other carbon tax plans is that proponents often misunderstand the proper way to assess costs and benefits. For example, the Alberta government’s December 2017 interim report on the CLP proudly declares in a section on “Strategic Developments” that \$18.3 million of investment of the carbon-tax receipts fostered “supports the delivery of carbon pricing, methane reduction, carbon competitiveness incentives, and the oil sands emissions

cap” and the report went on to say that this investment “supported approximately 310 jobs and will result in a range of 41 to 67 Mt of cumulative emission reductions by 2020” (Alberta Government, 2017a: 5).

As this quotation makes clear, supporters of Alberta’s CLP seem to believe that “creating jobs” is a fortunate offshoot of government spending. However, strictly speaking, the number of labour-hours needed to achieve a given objective is a measure of its *costs*, not its *benefits*. This principle is easy enough to understand in our personal lives: a household hiring a contractor to renovate its kitchen would not view a decision by the contractor to hire more workers and increase the overall cost of the project as a “benefit”. The benefit is the new kitchen; the additional workers represent cost.

When it comes to government spending programs, it sheds little light on the social utility of the projects to measure how many workers were hired. The classic example here is a government paying 1,000 people to dig ditches and another 1,000 to fill them back up. This would employ 2,000 people but would achieve nothing useful for society, and in fact would make society as a whole poorer by the forfeited leisure of the 2,000 workers involved in the self-defeating enterprise. To the extent that the workers themselves were willing to perform the labour in exchange for paychecks, this is only reflecting the fact that the government effectively transferred some of the total output of the economy from the taxpayers into the hands of the 2,000 workers. If their labour were voluntary, then the workers benefited from the deal, but the taxpayers at large are obviously made worse off—since no taxpayer actually benefits from seeing ditches dug and then filled back up. The same principle applies, though not as starkly, to “green” investment projects supported by CLP carbon tax receipts. If the private sector would not voluntarily support the 310 jobs in question, this is a sign that the value to society from their output is not worth using the potential labour-hours of the 310 workers in question.

In conclusion, it is acceptable to use “employment growth” as a proxy for the economic health of a region (perhaps in response to a policy change), *assuming the employment is driven by voluntary market transactions*. But “employment growth” *fails* as a proxy for genuine economic health when it is driven by government spending (or mandates) that involve involuntary transfers or edicts placed on the taxpaying public. In assessing the economic impact of the CLP (or other government policies for that matter), therefore, we should carefully distinguish between general private-sector employment and jobs that only exist because the provincial government spent funds raised through a carbon tax. The mere fact that government officials spent money to hire workers for a project is not *itself* evidence that the project makes economic sense or that the labour-hours involved were wisely used.

4 The Institutional Context of Federal and Provincial Carbon Taxation in Canada

It only makes sense to discuss carbon-tax policy options for provincial lawmakers in the context of the “federal backstop” now in place. Although the implementation is in flux as of this writing, the federal backstop states that provinces are required to have a carbon tax of at least \$20 per tonne in 2019 rising to \$50 over the next few years, and that the federal government will impose such a tax if the provinces do not comply. [4] The federal program would return the receipts from a carbon tax to the province from which they were collected, to be distributed in lump-sum fashion to households, schools, hospitals, and other organizations that could claim hardship from higher gasoline and electricity prices. (Because businesses do not receive rebates, this makes the overall package a net transfer from businesses to households.)

However, it is important to note that the political fortunes of carbon taxation are quite volatile (Austin, 2018). For example, the carbon tax in Australia has been a source of bitter political feuds, [5] while the “yellow vest” protests in France are a reminder of how onerous energy taxes can become. Even in Canada, cap and trade has been repealed in Ontario, [6] while at the federal level, the leader of the official opposition has vowed that any future Progressive Conservative government would repeal the federal backstop. With an election in 2019, the fate of a federal carbon tax “backstop” is uncertain.

[4] A recent *Bloomberg News* article (Wingrove, 2018) summarizes these details of the federal backstop on carbon pricing.

[5] For background on Australia’s political battles over its carbon tax, see *BBC News*, 2014.

[6] For details on Ontario’s repeal of its provincial cap and trade program, see *CBC News*, 2018.

5 Considerations for Alberta's Policy Makers

In light of the analysis in the preceding sections, in this final section we offer some take-away considerations for Alberta policy makers. It is important to realize that—other things held equal—little can be achieved *on the issue of global warming* (as opposed to localized air pollution and other possible problems) at the provincial level. Holding the policies in other jurisdictions constant, the actions of the Alberta government are a symbolic gesture that has virtually no effect on the level of global emissions. Note that we are *not* merely pointing out that Alberta is a small player in the global economy. Rather, we are pointing to the much more serious issue of “leakage”, whereby economic activity can be displaced from aggressive jurisdictions and relocate to jurisdictions with weaker standards. Even if the Alberta government enacted a draconian carbon tax that reduced emissions from the province to zero, that outcome would largely occur because individuals and businesses would simply move elsewhere, bringing their emissions with them. The economic cost of such a disruption would not be matched with significant reduction in *global* emissions, as the emitters would simply have moved.

While discussing the concept of leakage, we should acknowledge that the Alberta approach to carbon-mitigation policy contains measures to protect energy-intensive exporters from losing competitiveness. Specifically, the Carbon Competitiveness Incentive (CCI) program replaced the “Specified Gas Emitters Regulation (SGER) on Jan 1, 2018, and will be phased in over 3 years”. According to its official website, the CCI “is a made-in-Alberta plan designed in consultation with industry” to ensure, among other aims, that “our industries thrive in a carbon competitive global market” (Alberta Government, 2019). A more technical presentation from the Alberta climate change office indicates that the intent of the CCI regulation is to “[r]educe impacts on competitiveness and carbon leakage by providing a portion of free allocations to regulated sectors and facilities” (Carmichael 2018: slide 5; bold added).

However, in the context of the present study, the concern over leakage is *not* that particular energy-intensive sectors of Albertan industry would suffer undue competitive pressure with a provincial carbon tax. Valid though that observation is, the point here is that a *provincially based* carbon tax will not meaningfully alter *global* greenhouse-gas emissions, because of the problem of leakage. Yes, by providing free allowances and/or exemptions (for example, on crude oil exports), a carbon tax regime can minimize the economic harm to a local jurisdiction that enacts a new carbon tax. However, by the very same token, such restrictions reduce the applicability of the carbon tax, and thus rein in its ability to alter behaviour.

To reiterate, the fundamental problem with *localized* attempts to deal with *global* emissions is that the smaller the jurisdiction, the easier it is for businesses and households

to simply relocate to avoid a sufficiently onerous carbon tax. The carbon tax regime can be altered to minimize this possibility, but only at the cost of reducing its impact on even the emissions tied to the smaller jurisdiction. The point still remains that a localized jurisdiction cannot reduce global emissions as much as larger jurisdictions, even taking into account the relatively smaller “footprint” of the smaller jurisdiction to begin with.

From these considerations we can immediately draw a second implication: It makes little sense for Alberta to have a carbon tax *higher* than the minimum required at the federal level. The pragmatic difficulties of a unilateral provincial carbon tax apply similarly to a provincial carbon tax that is more aggressive than the federal standard imposed on its peers.

Third, if we assume the federal backstop is in place, it is arguably less economically damaging for Alberta to have its provincial version of a carbon tax (at only the federally required minimum rate), in order to have discretion over the use of the collected funds. Rather than the relying on the federal program to (in theory) return all of the funds taken from Albertans in a *lump-sum* fashion, the Alberta government could target the funds to reduce the tax *rates* of the provincial tax code. However, if the federal carbon tax is removed in the future, at that point (because of earlier considerations) Albertans would be better off if they had gotten rid of their provincial carbon tax as well. [7] Thus, expectations about federal policy and considerations of “political inertia” at the provincial level must come into play, when deciding whether it makes sense to override the federal program in order to have more control over the disbursement of carbon tax receipts.

Fourth, if Alberta is to retain its own provincial carbon-tax program, then no *additional* policies (such as caps on emissions from certain sectors) should be added on top of the basic tax, and existing emission control policies should be repealed, including the accelerated coal phase-out, renewable power mandates, and so forth. Even if one accepts the basic argument of a negative externality requiring government intervention, an appropriately sized carbon tax is all that is required to correctly realign incentives for households and businesses to make “socially optimal” decisions. To allow policy makers to add redundant restrictions on particular sectors of the economy, or to require arbitrary percentages of renewable power by specific dates, will guarantee that emission reductions occur at a much higher cost than is necessary.

[7] It is true that a theoretically optimal package could be constructed, whereby the Albertan government—even in the absence of a federal backstop—could enact a carbon tax and use the receipts to reduce the most distortionary of taxes on labour and capital, in order to have a (very modest) impact on global emissions while possibly boosting the province’s conventional economy. However, as the discussion in this study has made clear, even in theory such an outcome is a “knife edge” result, while in practice it would be politically impossible to hope for such a deal to be approved and then maintained. Among other problems, it is unlikely that the public and many policy makers would be content to impose higher electricity and fuel prices on poorer citizens in order to fund tax rate reductions for wealthy individuals and businesses.

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