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Tax and royalty benchmark
Mining in the Northwest Territories

April 2020

Contents

Executive summary

PricewaterhouseCoopers LLP ("PwC," "we," or "us") was engaged by the Government of the Northwest Territories (GNWT) to assess the tax and royalty competitiveness of its minerals sector. To do so, we have assessed taxes and royalties paid over the life of mine (LOM) for two representative mines: a base metal mine with initial capital investment of $400 million and a large diamond mine with initial capital investment of $1.2 billion. For each representative mine, we have compared the Northwest Territories with 21 other jurisdictions ("the comparison jurisdictions").

Our analysis is separated into three phases:

- Phase 1 includes comparison of mining taxes and royalties between the Northwest Territories and the comparison jurisdictions (collectively referred to as "direct taxes"). This phase provides an update of a similar study conducted in 2007/8 ("the Two Ducks Report") by Two Ducks Resources to allow comparison over time.
- Phase 2 adds to Phase 1 to include payroll taxes, property taxes, fuel taxes, and carbon taxes (collectively referred to as "indirect taxes").
- Phase 3 provides a comparison of total after-tax costs for the Northwest Territories and six other jurisdictions, taking into account underlying differences in costs of mine development and operation in those jurisdictions. The six jurisdictions are Alaska, British Columbia, Quebec, Saskatchewan, South Africa, and Western Australia, which were selected by GNWT based on the findings of Phase 1 and Phase 2.

We then present an assessment of whether the Northwest Territories is receiving a fair return on its mineral resources by comparing the division of cash flows between mining companies and governments and taking into account economic alternatives.

Methodology

The analyses conducted in Phases 1 and 2 are based on our representative diamond and base metal mines. The assumptions underlying these model mines are based on those used in the Two Ducks Report to ensure comparability between the analyses. We worked with GNWT to develop additional assumptions around applicable indirect taxes used in Phase 2.

Our Phase 3 cost model includes variation in transportation and energy infrastructure, wages and salaries, operational costs, and exploration costs. We have assumed that the deposit type, mining method, and equipment requirements are otherwise the same across jurisdictions. The fair return analysis builds on the work done in Phases 2 and 3 to assess the split of cash flow between mining companies and governments.

Results

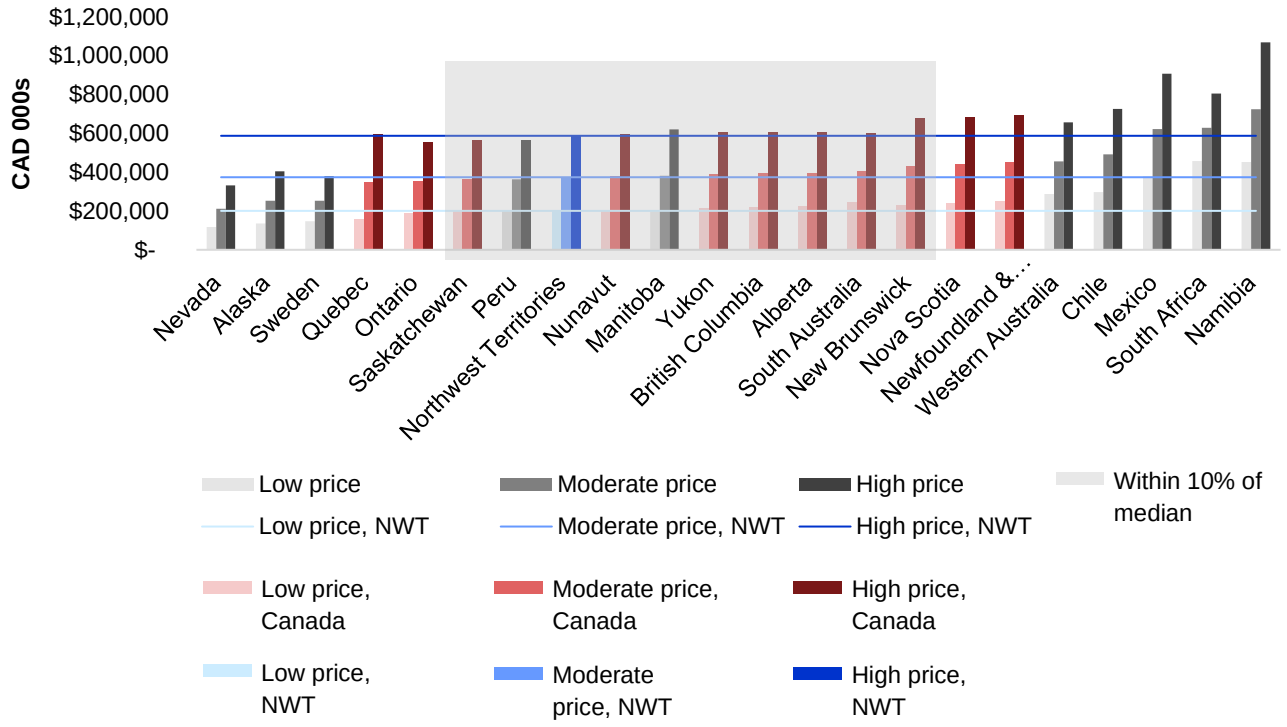
Phase 1: Direct taxes

Diamond

The figure below shows the net present value (NPV) of direct taxes on our representative diamond mine. Northwest Territories has the eighth lowest taxes among the comparison jurisdictions in the low and moderate price scenarios and the seventh lowest in the high price scenario. Many jurisdictions are in a similar tax range. At moderate prices, ten jurisdictions including Northwest Territories have total taxes within 10% of the median total taxes among the comparison jurisdictions. In some cases, the difference in total taxes paid over the life of mine is as little as $10

million. At all prices, the jurisdictions with the lowest direct taxes are Nevada, Alaska, and Sweden. The jurisdictions with the highest total taxes are Chile, South Africa, Mexico, and Namibia.

Figure 1: NPV of taxes and royalties over LOM, diamond (sorted by total taxes and royalties in moderate price scenario)

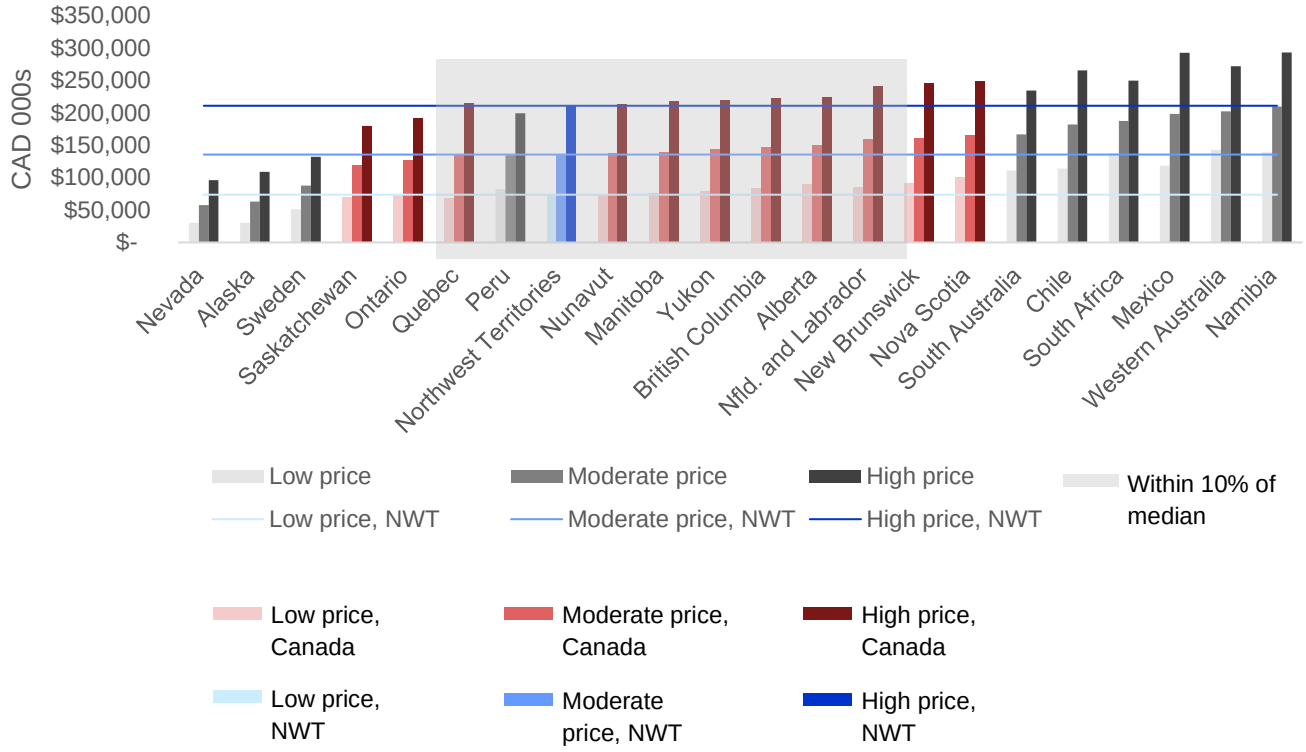


Compared to 2007/8, Northwest Territories has maintained the same average ranking at all price levels, where a higher rank corresponds to lower tax levels. The jurisdictions whose ranking increased the most were Alaska, Nevada, Peru, and Quebec. Corporate income taxes in Nevada and Alaska decreased substantially due to the 2017 US tax reforms. Peru underwent a mining tax reform in 2011 that has increased its ranking for some types of mines. Quebec introduced several reforms in 2013 that have lowered its overall mining taxes. The jurisdictions whose ranking decreased the most were Alberta, New Brunswick, Newfoundland, and Mexico. Mexico introduced a new mining tax, effective in 2014, that has significantly increased overall mining tax liabilities. Alberta, New Brunswick, and Newfoundland have not had major changes to their tax regimes.

Base metals

For our base metal mine, Northwest Territories has the seventh lowest direct taxes in the low and moderate price scenarios and the sixth lowest in the high price scenario. As in the diamond model, jurisdictions around the middle of the range have similar tax rates. At moderate prices, nine jurisdictions including Northwest Territories have total taxes within 10% of the median level. At all prices, the jurisdictions with the lowest total taxes are Nevada, Alaska, Sweden and Saskatchewan. The jurisdictions with the highest total taxes are Chile, Western Australia, Mexico, and Namibia.

Figure 2: NPV of taxes and royalties over LOM, base metal (sorted by total taxes and royalties in moderate price scenario)



Since 2007/8, the Northwest Territories' rank among the comparison jurisdictions moved from seventh to sixth; seventh to eighth, and sixth to seventh at low, moderate, and high prices, respectively.

The jurisdictions whose ranking among the comparison jurisdictions increased the most were Alaska, Peru, Nevada, and Saskatchewan. The jurisdiction with the greatest decrease in ranking is Mexico, followed by New Brunswick, Alberta, and British Columbia.

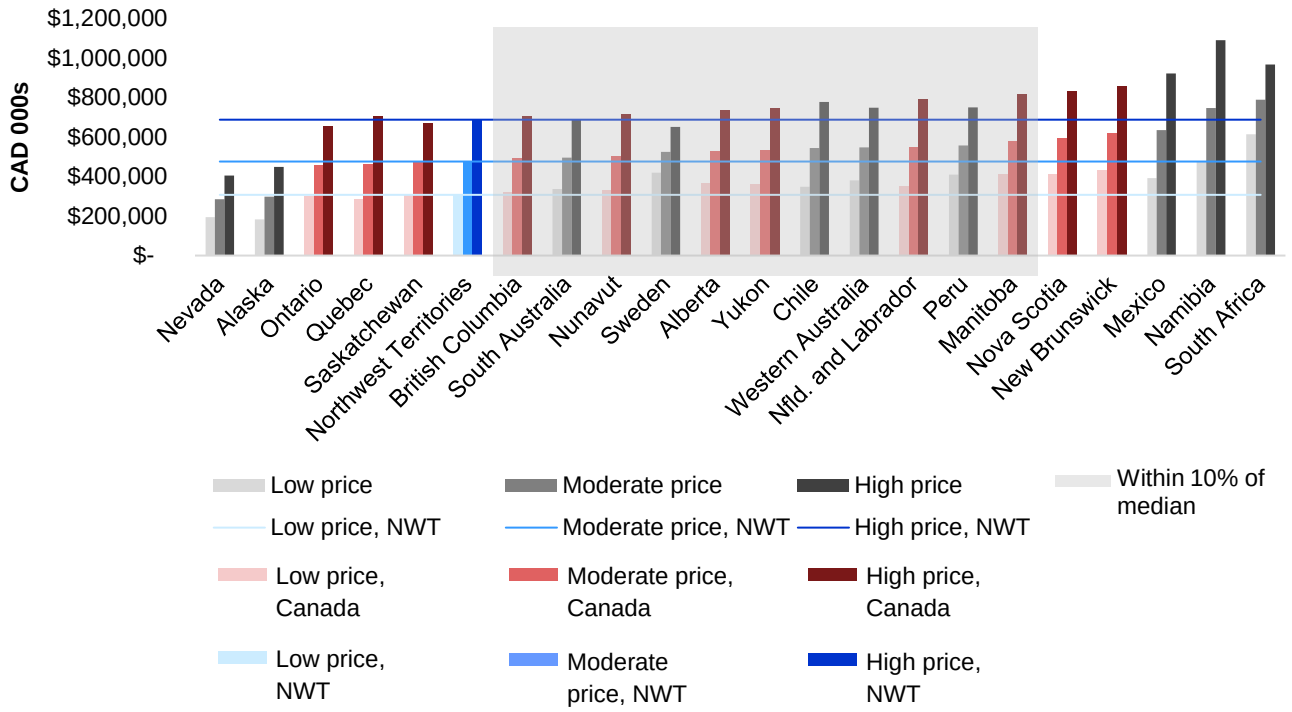
Phase 2: Direct and indirect taxes

Our indirect tax analysis includes property tax, payroll tax, fuel tax, and carbon tax. Northwest Territories is unique in imposing a property tax on the entire territory, while several other jurisdictions in Canada and the US impose little or no property tax for remote properties that do not receive municipal services. Canada, Sweden, and South Africa are the only countries in the comparison jurisdictions to impose a carbon tax.

Diamond

When taking into account both direct and indirect taxes, the Northwest Territories has the fifth lowest taxes in the low-price scenario and the sixth lowest taxes in the moderate and high-price scenarios. The Northwest Territories has the ninth-lowest direct taxes, which is the lowest of any jurisdiction in Canada except for British Columbia. Rankings of indirect taxes are the same at all price levels because the taxes apply to costs that are held constant across jurisdictions. The largest component of indirect taxes in the Northwest Territories is payroll tax, followed by property tax. Unlike the Northwest Territories, some Canadian jurisdictions charge little or no property tax on mines located in remote areas that do not receive municipal services.

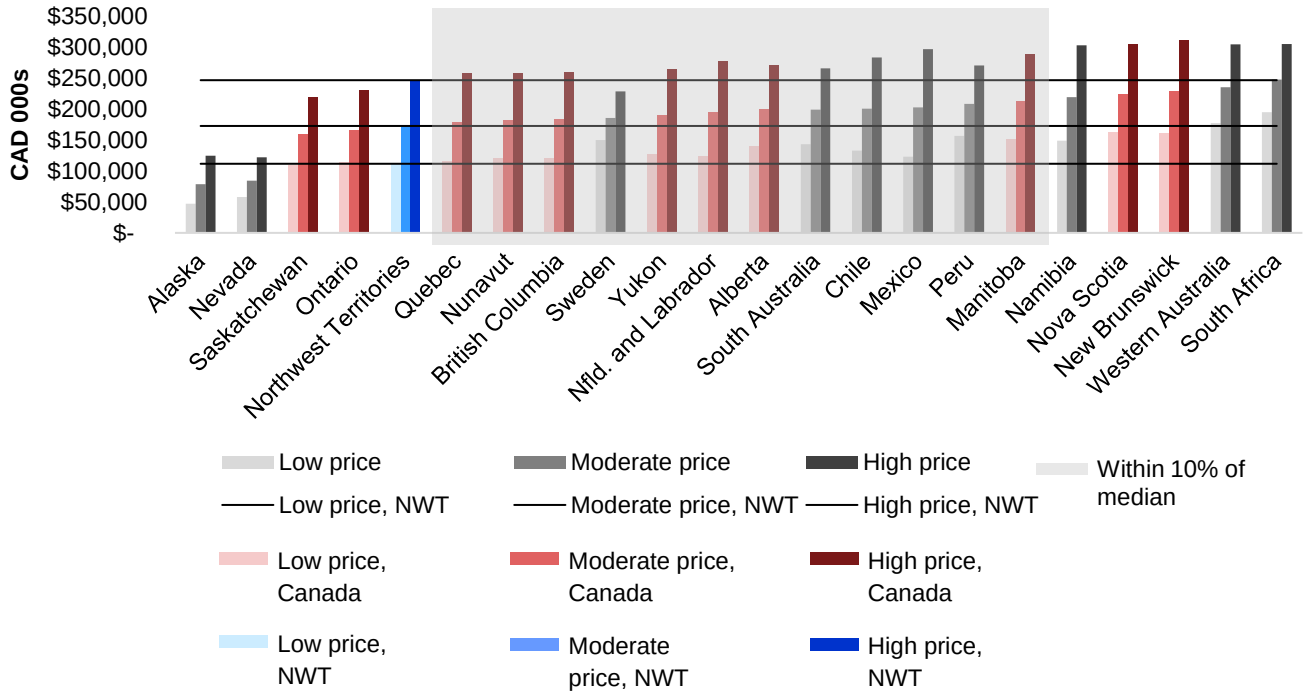
Figure 3: Total direct and indirect taxes over LOM, diamond (sorted by total direct and indirect taxes under moderate prices)



Base Metals

The figure below shows total direct and indirect taxes for all comparison jurisdictions. When taking both types of tax into account, the Northwest Territories has the fourth, fifth and sixth lowest taxes of all comparison jurisdictions for low, moderate, and high prices, respectively. This is an increase in rank relative to the direct tax only results, which reflects the Northwest Territories' relatively low indirect taxes. Northwest Territories has the eighth-lowest indirect taxes, and the third-lowest among Canadian jurisdictions. In particular, Northwest Territories has a relatively low carbon tax incidence compared to other jurisdictions in Canada, and a lower property tax than certain other jurisdictions where property tax applies. Property tax often applies in less-remote regions that provide municipal services from which mines may benefit.

Figure 4: Total direct and indirect taxes over LOM, base metal (sorted by total LOM direct and indirect taxes under moderate prices)



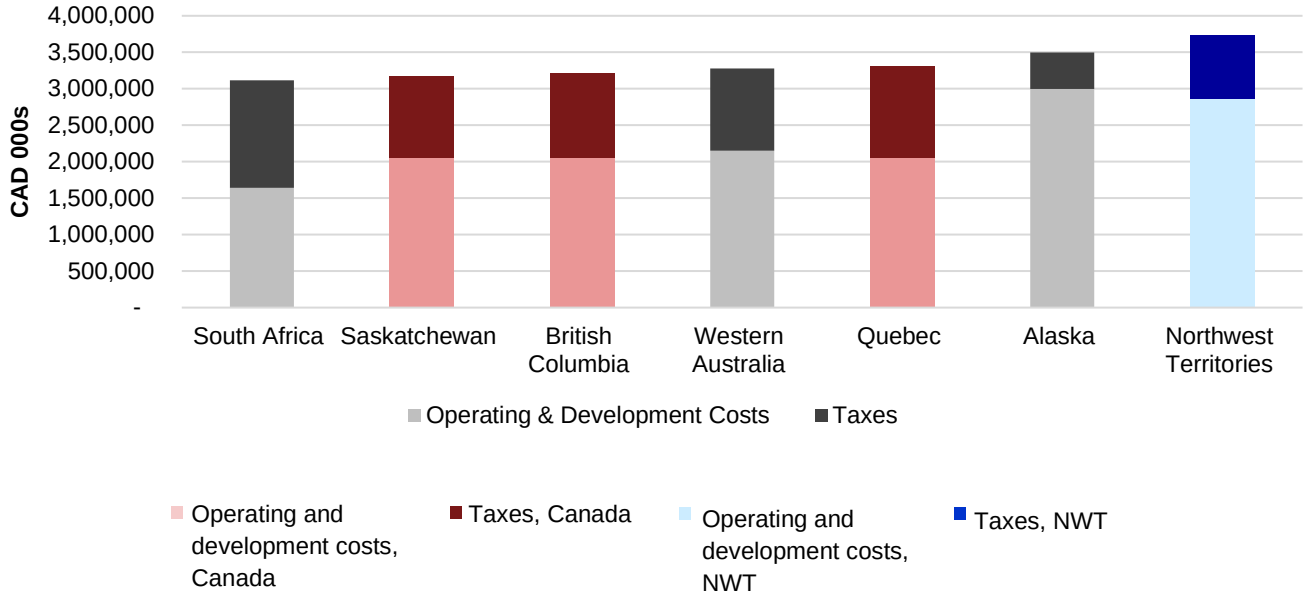
Phase 3: Total cost analysis

Our Phase 3 analysis incorporates variations in cost driven by transportation and energy infrastructure, wages and salaries, and other variation in operating cost such as maintenance and inventory. We have characterized the infrastructure needs in each jurisdiction based on typical mines in operation, as well as exploration projects.

Diamond

Figure 5 shows total costs including direct and indirect taxes for the Phase 3 comparison jurisdictions. Of all jurisdictions, the Northwest Territories has the highest total costs, taking both mining costs and taxes into account. Alaska's total costs are close to those in the Northwest Territories because we have assumed a mine location that is also within the Arctic Circle, and therefore operates under similar conditions. These costs are largely driven by infrastructure requirements, which in northern regions typically involve a diesel-powered generator and annual construction of an ice road. These areas also incur higher operating costs due to transportation, the need to maintain higher inventory, maintenance, and other factors. In most other mining regions in Canada, typically mines and exploration projects are located close to all-season public highways and mines can connect to the power grid via a transmission line.

Figure 5: Total costs (at moderate price level), diamond (sorted by lowest to highest total costs)

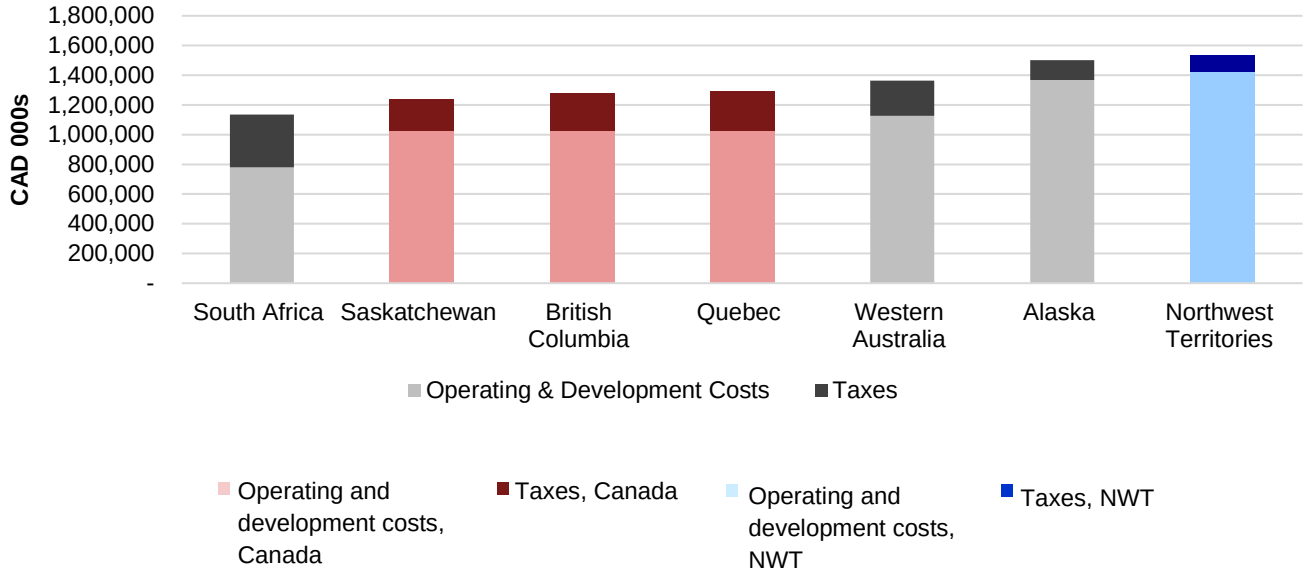


It is important to note that total taxes represent a relatively small portion of total costs in the Northwest Territories. In this analysis, tax rates are determined both by the tax regime in the jurisdiction, and the pre-tax returns. For example, Northwest Territories' tax levels are similar to those in British Columbia, but Northwest Territories' higher costs lead to lower profits, which results in lower taxes paid. On average, total taxes represent 32.6% of the total costs, with the highest being 47.3% (South Africa) and the lowest being 14.3% (Alaska).

Base Metals

The following graph illustrates the total costs including taxes (at the moderate price level) by jurisdiction, ranked from lowest to highest. Similar to the diamond mine analysis, the Northwest Territories has the highest total cost, with Alaska having slightly lower costs in Northern regions. Unlike the diamond model, the base metal cost model for Northwest Territories and Alaska assumes the need for a port, which adds to capital and operating costs.

Figure 6: Total costs (at moderate price level), base metals (sorted by lowest to highest total costs)



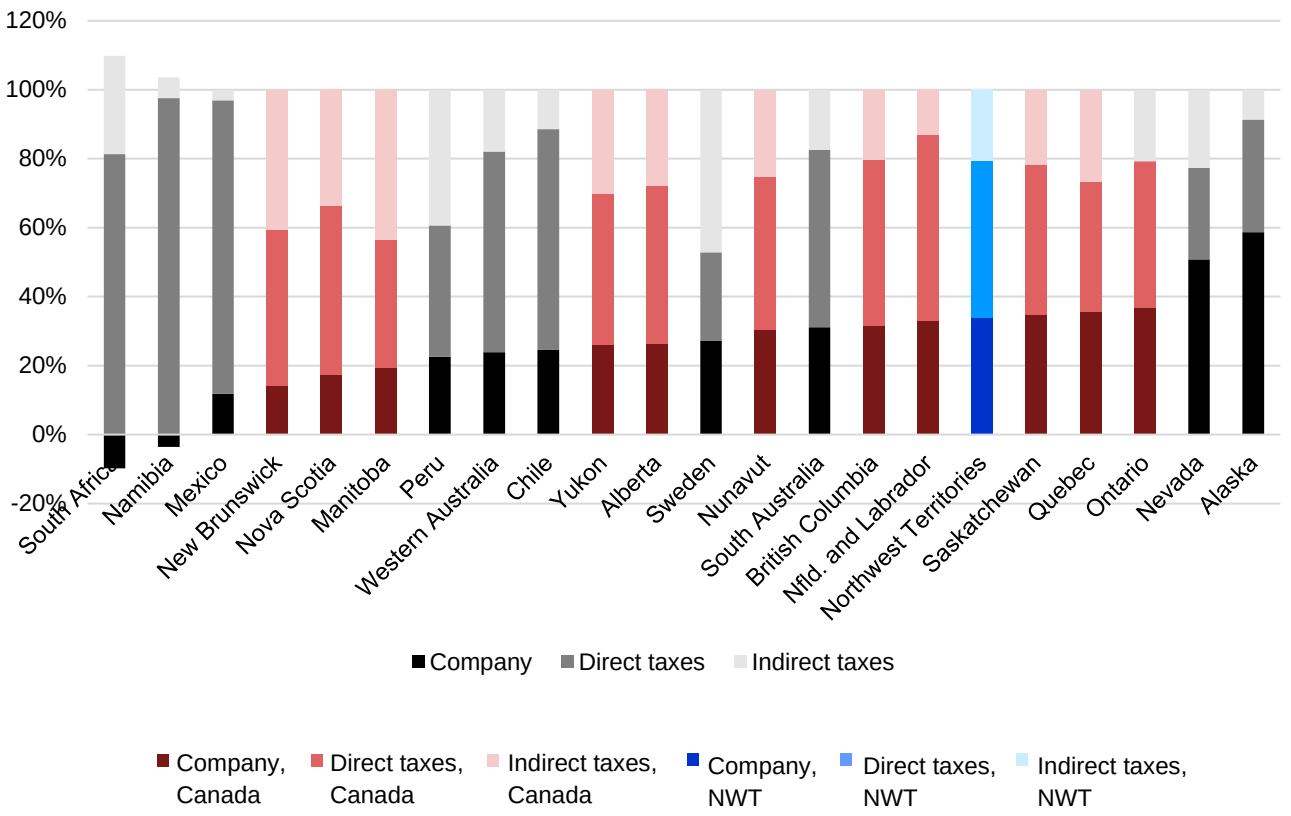
Similar to the diamond analysis, total taxes are relatively small compared to operating and development costs. This is driven both by variation in tax levels and in profits. On average, total taxes represent 16.8% of the total costs, with the highest being 31.4% (South Africa) and the lowest being 7.2% (Northwest Territories).

Fair return assessment

We also examined whether the Northwest Territories is getting a fair return on its mineral resources. There is no single right level for the balance between government revenues from mining and maintaining competitiveness at a level that attracts mining investment. It is an important question because there is typically a trade-off between tax rates and mining activity. Higher rates enable governments to capture a larger share of pre-tax cash flows, while lower rates may encourage greater investment, but provide a smaller share of pre-tax cash flows to governments. The right balance for each jurisdiction depends on a range of factors including costs and alternative options for economic development. When costs are held constant, Northwest Territories collects a share of pre-tax returns that is comparable to other comparison jurisdictions.

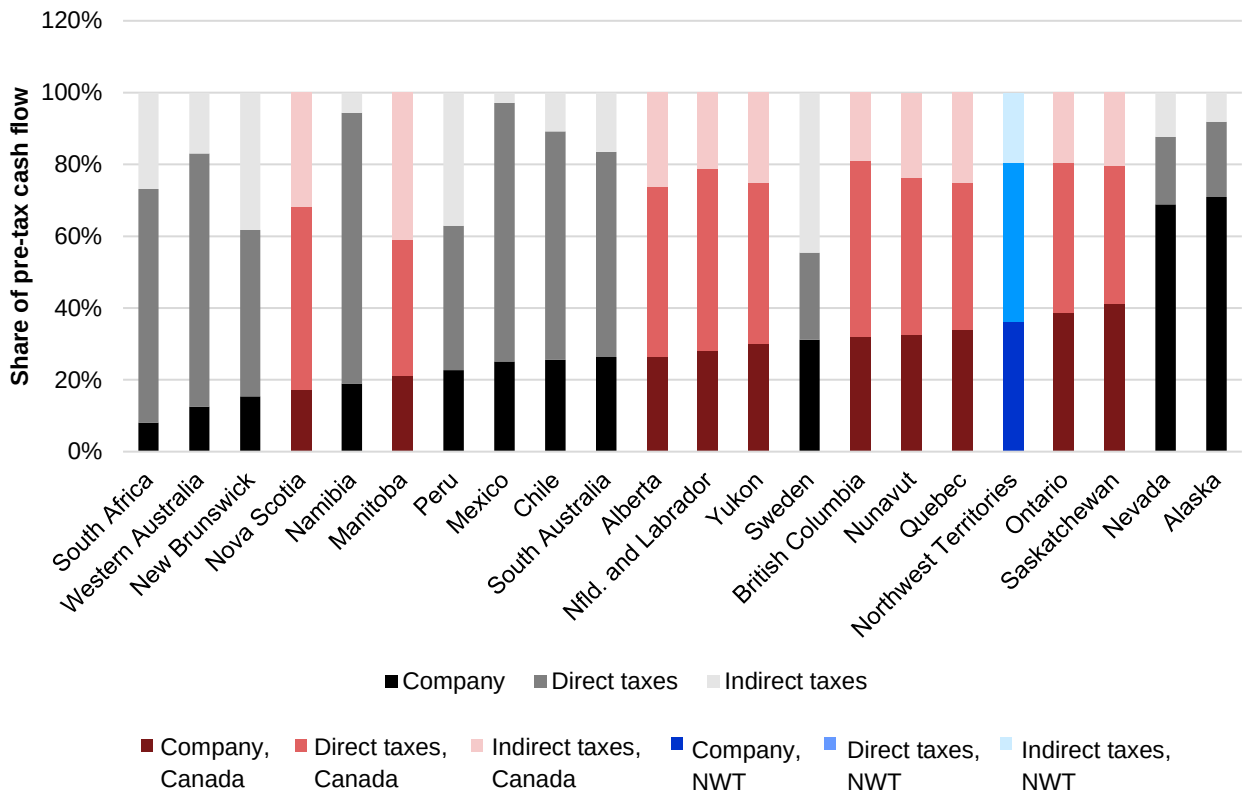
Below we present the division of pre-tax cash flows between companies and governments for diamonds at moderate prices, holding costs constant as in Phase 2. In this scenario, the Northwest Territories captures 66% of pre-tax return, of which the majority is direct taxes. This is the seventh lowest share of all comparison jurisdictions, and is in line with most other jurisdictions in Canada. Alaska captures the lowest share at 45% of pre-tax return, while South Africa captures the highest share at 110%. Taxes can be higher than 100% of pre-tax return due to taxes on production, which are incurred regardless of profit levels. We note that if a company expects a negative after-tax return, they will not build a mine. Therefore, these results are theoretical, and highlight a lack of tax competitiveness at our assumed price and cost levels.

Figure 7: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, diamond, moderate prices



For the model base metal mine the Northwest Territories, the government captures 64% of pre-tax return at moderate prices, with the remaining 36% going to the mining company. Nevada and Alaska have substantially lower taxes in this scenario, capturing just 31% and 32% of pre-tax return, respectively.

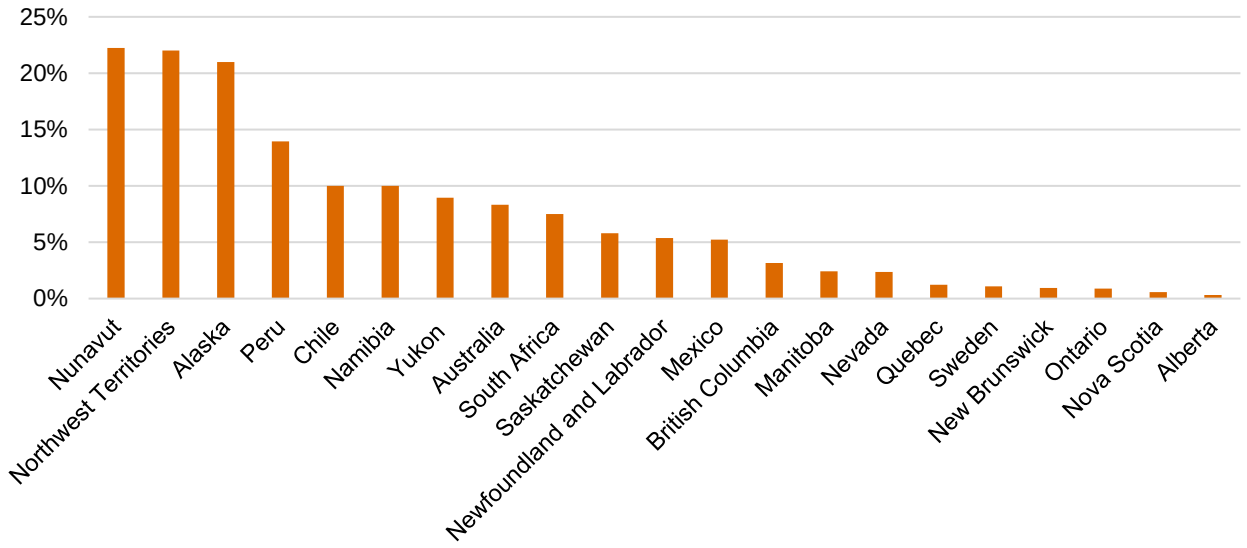
Figure 8: Division of pre-tax cash flow, sorted from highest government share to lowest, base metal, moderate prices



At low prices, most jurisdictions including Northwest Territories yield a negative expected return for the mining company, meaning that the mine would not be built if low prices are expected over the life of the mine. In our total cost analysis, high costs in Northwest Territories mean that expected after-tax return in the Northwest Territories is negative for base metals under most price scenarios. This reflects the fact that base metal mines will not be developed in the Northwest Territories unless a deposit type is particularly favourable, or when investors anticipate relatively high prices over the mine life. For diamonds, companies operating in the Northwest Territories are able to achieve positive returns despite high costs, but deposits must be sufficiently large and of relatively high quality to do so.

Another consideration in our fair return analysis is the importance of mining in a jurisdiction's economy. Mining accounts for a relatively large share of the economy in the Northwest Territories compared to other jurisdictions in our study. In 2017, mining accounted for 22% of GDP in the Northwest Territories.

Figure 9: Mining as a % of total GDP, comparison jurisdictions



These results, taken together, suggest that Northwest Territories' tax regime is in line with other jurisdictions in Canada, and thus receiving a fair return. Due to the high operating costs, any increases in tax rates would likely further damage Northwest Territories' competitiveness. Continuing to attract mining investment is important for the Northwest Territories because of the economic importance of mining within the territory.

Implications for competitiveness

When taking into account total costs of mine development and operation, Northwest Territories has the highest post-tax cost among our comparison jurisdictions. Expected after-tax return on diamond mining is positive under all three price scenarios, meaning that mines would still be built in the Northwest Territories, but would provide a lower after-tax return to companies compared to other jurisdictions. Expected after-tax return for base metal is negative in all scenarios, meaning that these mines would not be built unless deposits are of high quality and/or prices are expected to be relatively high. Our results do not mean that no mines will be built in the Northwest Territories under any circumstances. Rather, they highlight the fact that cost competitiveness is a major challenge in the Northwest Territories. Therefore, only relatively high-grade deposits are likely to be developed under the status quo. This suggests that to increase its mine development potential, the Northwest Territories will need to focus on the underlying drivers of its high costs, rather than tax and royalty policy.

Taxes are one tool that governments use to address cost competitiveness and encourage new investment and exploration activity; however, lowering taxes is unlikely to be effective for the Northwest Territories. Taxes make up a relatively small portion of total costs in the Northwest Territories because tax rates are relatively low (usually below the median among the comparison jurisdictions), and lower profits lead to lower corporate income taxes. In order to lower costs, the Northwest Territories should consider developing energy and transportation infrastructure that would lower costs for mining companies, as well as encouraging the development and use of technologies that can overcome challenges of operating in northern Canada. Any potential infrastructure development should be carefully assessed, taking into account the full potential costs and benefits to society.

Introduction

PricewaterhouseCoopers LLP ("PwC," "we," or "us") was engaged by the Government of the Northwest Territories (GNWT) to assess the tax and royalty competitiveness of its minerals sector. To do so, we have assessed taxes and royalties paid over the life of mine (LOM) for two representative mines: a base metal mine with initial capital investment of $400 million, and a large diamond mine with initial capital investment of $1.2 billion. For each representative mine, we have compared the Northwest Territories with 21 other jurisdictions ("the comparison jurisdictions").

Our analyses are separated into three phases:

- Phase 1 includes comparison of mining taxes and royalties between the Northwest Territories and the comparison jurisdictions (collectively referred to as "direct taxes").
- Phase 2 adds to Phase 1 indirect taxes such as payroll taxes, property taxes, fuel taxes, and carbon taxes (collectively referred to as "indirect taxes").
- Phase 3 provides a comparison of total after-tax costs for the Northwest Territories and six other jurisdictions, taking into account underlying differences in costs of mine development and operation in those jurisdictions. The six jurisdictions, Alaska, British Columbia, Quebec, Saskatchewan, South Africa, and Western Australia were selected by GNWT based on the findings of Phase 1 and Phase 2.

The report also includes an assessment of whether the Northwest Territories is receiving a fair return on its mineral resources by comparing the division of cash flows between mining companies and governments and taking into account economic alternatives.

Our analysis for Phase 1 has been prepared to be, to the extent possible, consistent with a 2007/8 report prepared by Two Ducks Resources for the Government of the Northwest Territories ("the Two Ducks Report"). All assumptions and inputs are identical between our analysis and the Two Ducks Report, and prices have not been inflated. Consequently, the variations between the Two Ducks Report and our study are attributed to:

- Changes in the underlying tax and royalty legislative regimes.
- Modifications to the methodological approach taken by Two Ducks, which we made only when we identified inconsistencies between Two Ducks' approach and our understanding of the relevant tax regime.

All results presented in this document are net present value (NPV) amounts over the life of mine (LOM), using a 10% discount rate. For each representative mine, we present results based on three different levels of resource prices. The Two Ducks Report refers to this variation as the internal rate of return (IRR), but for further clarity we refer to the scenarios as low price, moderate price, and high price. The prices in question are consistent with Two Duckss Report scenarios, which are referred to in the Two Ducks Report as 10%, 15%, and 20% IRR. Red coloring on charts indicates Canadian jurisdictions.

Phases 2 and 3 were not part of Two Ducks' mandate and thus no comparison between our findings and Two Ducks' findings was made in those phases.

The key authors of this study are:

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Glossary of terms

The following provides definitions of key terms used throughout this report.

Average effective tax rate: The average effective tax rate is the total tax paid divided by the base. When we refer to average effective tax rate for Phase 1 results, the relevant base is pre-tax profit.

IRR: Internal rate of return (IRR) is a measure of profit on a given investment. It measures the discount rate that would be required for the net present value of an investment to be zero. This metric is commonly used reported by mining companies when assessing mine development potential.

NPV: Net present value (NPV) is a metric that summarizes the value of future cash flows by discounting cash in future years relative to the present. Mine cash flows and taxes are presented in this report using the NPV of the metric over the life of mine, using a 10% discount rate.

Profit: In this report, profit is typically used to refer to the value of cash flows, which can be presented either pre-tax, or after tax has been deducted. The cash flows presented in this report represent operating revenues less operating costs, capital costs, and other expenses.

Background on direct mineral taxation

Mining companies are generally subject to taxation on mining activities in addition to general corporate income taxes and other applicable taxes. There are a number of reasons for this. Mining activities involve the extraction of a resource that often belongs to the state. There is also a perception that mining operations can generate 'resource rent' (discussed in more detail below), which should be shared, at least in part, with the state.

In addition, mining has many unique characteristics that set it apart from other economic activities and tend to justify differing tax treatments. These include:

- lengthy and costly exploration phases preceding start-up and production, with no certainty that a mineral deposit will be found or exploited;
- locations that are not near major urban centres and power sources, which often require miners to spend significant amounts on housing and community expenditures as well as power and infrastructure;
- capital intensive development, requiring specialist skills and equipment;
- long duration of the mining project lifecycle, which can span several decades and be subject to various changes in political regimes;
- commodity prices that have large cyclical swings and are unpredictable;
- increasing costs of production as projects progress and the resource becomes less accessible; and
- significant mine closure and reclamation expenses after income has ceased, as well as upfront bonds and guarantees for these expenses.

Theoretical literature on the taxation of the mining sector has been guided by the “resource rent” principle since the 1980s. Resource rent is typically defined as the surplus amount above the level of profit required to motivate an investor in the resource industry to invest and, in theory, this amount can be taxed without impacting a company's decision making. It differs slightly from the concept of “economic rent” used for other economic activities in that the required level of profit for a mining operation includes a payment to the owner of the natural resource. More recently, the existence of resource rent has been called into question as the potentially high profits to be earned from the discovery of new deposits provide the incentive for exploration (i.e., they are part of the profit required to motivate investors in the resource industry).

Resource rent is very difficult for governments to measure and tax, especially given the long lives of mining projects and the unpredictability of commodity prices. In practical terms, however, the resource rent principle supports the argument that taxation should be based on profit not on production or sales. Taxation based on profit encourages the economically efficient exploitation of mineral resources, as well as the search for new deposits, and therefore maximizes tax revenue generation for governments over the long term. Conversely, taxation based on production levels or the value of sales with no tax relief for the amount of investment made by the company tends to distort investment decisions. As a result, marginal projects such as those with lower grade ore or significant capital expenditure requirements may not be undertaken or may be abandoned prematurely under a taxation regime based on gross revenues.

Despite the clear advantage of profit-based taxes and royalties in the long run, they also tend to result in governments initially receiving lower or no revenues. This lag is particularly characteristic of the mining industry, where the capital-intensive nature of the industry means that governments typically give incentives such as accelerated deductions for pre-production exploration and development, allowing companies to recoup a significant portion of their investment before paying taxes and royalties. This can result in long delays before mining companies begin to pay tax and royalties if the taxation regime is purely profit-based. Therefore, governments often use a combination of profit-based taxation such as income tax and profit-based mining taxes

and royalties, as well as production-based royalties to ensure a minimum flow of revenue to the government from the outset.

Governments face the difficult task of not only imposing an appropriate level of taxation, but also finding the right balance between income taxes and royalties. In particular, when deciding on the correct level and type of taxation, policy makers must assess the trade-off between maximizing immediate government revenues and attracting investments that trigger extensive economic benefits over the long term. Once taxation and other costs force the after-tax profit on capital employed to be below the rate that can be earned elsewhere for the same level of risk, investment in the industry will decrease as mining companies allocate their capital to alternative jurisdictions, or are unable to attract financing for projects.

Methodology

This section describes the methodology we applied in each phase of our analysis.

Phase 1

In the preparation of this study, and the underlying models developed, a primary consideration was to ensure that the results of the current analysis be comparable to the 2007/8 study, the Two Ducks Report, previously provided to the GNWT. In order to achieve this goal, our study used similar assumptions to those used in the Two Ducks Report where possible. As a result, where there has been no change in direct taxation of mining operation in a particular jurisdiction, it should be expected that the tax liability as determined in our models would be similar to the models included in the Two Ducks Report, unless we found inaccuracies in the Two Ducks Report.

Consistent with the Two Ducks Report, the underlying models were run using two representative mines: base metal mine with initial capital investment of $400 million, and a large diamond mine with initial capital investment of $1.2 billion. These two mine models are representative of a medium scale base metal mine and a large scale diamond mine, respectively. The hypothetical mine financial parameters were adjusted to run at different profit levels, which was achieved by varying annual revenues while keeping costs constant. We refer to these scenarios as Low Price, Moderate Price, and High Price. The prices in question are consistent with Two Ducks' scenarios, which are based on three assumed levels of pre-tax IRR, and were referred to in the Two Ducks Report as 10%, 15% and 20% IRR. We have not evaluated whether these profit assumptions are reasonable. Cost and revenue escalation were built into the model at 2% per year.

For each jurisdiction, it was assumed that all income is earned and all expenditures are incurred by a single corporate entity in that jurisdiction. No allowance for or calculation of tax on repatriation of earnings to another jurisdiction has been considered. Similarly, no allowance for or calculation of limitations of deductibility on payments to non-resident related parties has been considered under the assumption there are no non-resident related parties. Additionally, while other corporate structures may result in a lower tax liability in certain jurisdictions, these structures have not been considered by us.

Further, for each jurisdiction the following assumptions, which were used in the Two Ducks Report, were used in our modelling for both hypothetical mines:

- The royalty and tax liabilities were computed using currently legislated rules as well as future changes to tax regimes which have been announced by the time of our analysis.
- When timing of deductions is discretionary, deductions were taken in a manner that optimizes the total tax liability.
- No taxes on distributions to shareholders were considered, except as noted.

The following table summarizes specific inputs related to the hypothetical mines and are consistent with the Two Ducks Report. The annual revenue and operating cost inputs documented in the Two Ducks Report were presented in Year 1 real dollars and then adjusted to nominal dollars in the underlying cash flow models. We have presented the information consistently, with the revenue and operating cost inputs being in 2019 real dollars and adjusted these amounts to nominal dollars in the underlying cash flow model.

Table 1: Parameters of representative mine models

Description	Base Metal Mine	Diamond Mine
Duration of mine development (years)	3	3
Mine operating life (years)	15	15
Annual gross revenue base:		
Low Price	$290M	$357M
Moderate Price	$318M	$431M
High Price	$350M	$517M
Annual operating costs	$215M	$143M
Mining as a % of operating costs	34%	65%
Capital costs		
Exploration (before development)	$38M	$225M
Initial mine development	$80M	$250M
Sustaining mine development	$0M	$250M
Infrastructure	$40M	$75M
Initial mining plant & equipment cost	$80M	$275M
Initial milling plant & equipment cost	$150M	$375M
Total initial capital investment	$400M	$1,200M
Sustaining capital, as % of initial cost (annual %)		
Mining	3%	3%
Milling	3%	3%
Private net smelter return (NSR) royalty rate	1%	0%

Costs include on-site processing, but do not include transportation to markets or any downstream activities such as cutting and polishing (for diamonds) or smelting and refining (for base metals).

In addition to the above, it was assumed that 50% of the initial capital investment would be financed with debt with an annual interest rate of 4.25%. It was assumed that pre-production interest expenses were capitalized, and the debt would be repaid in 5 years in equal instalments with any shortfall in meeting annual debt repayments added to debt, and with payments rescheduled over the remaining term. We noted that in the Two Ducks Report, the interest payments were considered as a deduction to get to annual net cash flow while the debt payments were not. We have prepared the analysis consistent with the Two Ducks Report; however, in general if one includes interest payments in the cash flow, you would also include the debt repayments as it would be considered a levered model and discounted using a cost of equity rate.

The resulting cash flows for each hypothetical mine were then run under all three profit scenarios for each jurisdiction, considering applicable mining taxes and royalties. For clarity, we ran six cash flow models for each jurisdiction, three for the base metal mine and three for the diamond mine (one for each of the low price, moderate price and high price). The cash flow models were discounted using a 10% discount rate to arrive at an NPV, which is used as the primary basis of comparison of the different jurisdictions. In addition to considering the overall NPV, we also considered the NPV of the LOM mining taxes and royalties as a basis of comparison.

In our review of the Two Ducks work, we have identified a number of errors in their application of tax codes, some of which would have material effects on the ranking of jurisdictions. We have not been able to correct these errors, but have highlighted how they would affect the comparison of rankings over time. This analysis is presented alongside our Phase 1 results.

Phase 2

Phase 2 of this study includes indirect taxes applicable to mines in each of the comparison jurisdictions. Specifically, this Phase adds property tax, fuel tax, payroll tax, and carbon tax to the models prepared for Phase 1. The Two Ducks report did not include indirect taxes; therefore, we have not included any comparison of changes in indirect taxes over time. We have assumed that Two Ducks' estimates of operating costs do not include any indirect taxes, and have added indirect taxes to the operating costs.

To determine the tax liability from indirect taxes, we used assumptions based on information provided by GNWT regarding the attributes of the mines currently operating in the territory. In particular, GNWT provided the following data regarding diamond mines:

- The assessed value for property tax purposes of four diamond mine sites in the territory, three of which were operational;
- The average employment income of all employees at the mine sites;
- The average diesel consumption of the three operating mines, split between "motive" and "non-motive" consumption; and
- The average tonnes of CO2 emitted at 2.663kg/litre and 2.734kg/litre rates.

We have used this data as a proxy for the attributes of a large-scale diamond mine model for all jurisdictions. As there are no base metal mines currently operating in the Northwest Territories, we have estimated the attributes using the data for the large diamond mine, based on the ratio of total expected gross revenue over the life of the respective mines. Using this method, we assumed that data for the medium-scale base metal mine is approximately 35.52% of that of our representative large-scale diamond mine. As a check of reasonableness, we calculated the ratio of total initial capital expenditures between base metal mine and a diamond mine. The large-scale diamond mine has initial capital expenditures of approximately $1.2 billion, compared to $400 million for the medium-scale base metal mine. This yields a ratio of approximately 33%. This result supports the reasonability of the 35.52% factor used to prorate the data inputs for indirect taxes.

Based on this methodology, we have assumed the following inputs which have been used for calculating the indirect taxes in all jurisdictions:

Table 2: Assumptions used for calculating indirect taxes

Base	Assumption- large diamond mine	Assumption- medium base metal mine
Assessed value for property tax purposes	$577,837,000	$205,238,000
Diesel consumption per year relating to transportation on public roads	28,443,000 litres	10,102,000 litres
Diesel consumption per year relating to mine operations	30,982,000 litres	11,004,000 litres
Gasoline consumption per year	nil	nil
Gross salaries payable to employees per year	$83,933,000	$29,812,000
CO_2 emitted per year	162,467 tonnes	57,705 tonnes

Additionally, GNWT provided data on mines currently operating in the territory for a single year of mine operations. In order to calculate the liability of indirect taxes over the LOM in our models, the following assumptions have been made:

- No indirect tax is applicable prior to the mine commencing production (i.e., property value, payroll, fuel consumption, and CO2 emissions are nil during the construction period)
- All years of operations over the LOM have the same quantum of indirect taxes applicable.

While this assumption is simplistic, we do not expect them to have a significant impact on the ranking of the comparison jurisdictions.

It should be noted that, in applying these inputs to the comparison jurisdictions, further assumptions were made in order to tailor the above inputs to the specific indirect taxes of each jurisdiction. Where applicable, this has been noted in our description of secondary taxes in each regime.

Phase 3

Phase 3 of this study accounts for the variation in cost structure over the full mine life cycle between comparison jurisdictions, thereby enabling a holistic comparison of competitiveness. For the purposes of this assessment, we have assumed that the geology of the representative mines and the mining method does not vary across jurisdictions. Therefore, the variation in LOM cost was based on a comparison of the following factors across the comparison jurisdictions:

- Energy and transportation infrastructure
- Wages and salaries
- Logistics and transportation operating costs
- Maintenance
- Other factors (e.g. administration, procurement, IT expense)

As in other Phases, we do not include transportation to markets or downstream refining and processing in either costs or revenues. Phase 3 includes an assessment of seven comparison jurisdictions that were selected by GNWT based on the results of Phases One and Two. These are: Northwest Territories, Quebec, Saskatchewan, British Columbia, Alaska, Western Australia, and South Africa.

We estimated the LOM costs using Infomine software, which estimates costs for mine development and operation, and mineral processing based on user-inputted parameters on deposit size, mining method, and other factors. Mining methods and deposit characteristics were based on common deposit types among the comparison jurisdictions. For base metals, the deposit type is a volcanogenic massive sulphide deposit with copper, lead, zinc, gold, and silver. It is assumed to be mined with a combination of open pit and underground methods. For diamonds, the deposit type is kimberlite pipes, the usual diamond formation, and is assumed to be mined open pit.

Below, we describe our approach to estimating variation in cost factors.

Energy and transportation infrastructure

One of the major drivers of cost in the Northwest Territories compared to other jurisdictions is the lack of infrastructure compared to other jurisdictions. A typical mine in the Northwest Territories (and other remote regions of Canada) would need to provide a power generating station (typically diesel), airstrip, and winter ice roads connecting to a highway. Some mining companies also build ports that are used in the summer months when ice melts to allow access.

We estimated the infrastructure needs of mines in each of the comparison jurisdictions by reviewing public filings of mines and, where possible, exploration projects, located in those comparison jurisdictions. Using this information, we developed a “typical” infrastructure profile for each jurisdiction, which naturally does not represent every mine in those jurisdictions. We focused on particular regions within each jurisdiction based on common locations of mines and exploration projects, and with guidance from GNWT.

Table 3 presents our infrastructure assumptions for each of the comparison jurisdictions:

Table 3: Transportation and energy assumptions for comparison jurisdictions in Phase 3

Jurisdiction	Region	Transportation infrastructure	Power infrastructure
Northwest Territories	No major variation in infrastructure needs between regions	Ice road, possible port construction, air strip	Diesel generating station
Alaska	Northwest Arctic Borough (Arctic circle)	Deepwater port, private road connecting to port	Diesel generating station
British Columbia	Northwestern British Columbia/ Golden Triangle area	Private road connecting to existing ports or highway	Transmission line to provincial power grid
Saskatchewan	Northern Saskatchewan	Private road connecting to existing highway, airstrip	Transmission line to provincial power grid
South Africa	No major variation in infrastructure needs between regions	Rail transportation to industrial ports	Transmission line to power grid
Quebec	Matagami area	Private road connecting to existing highway, airstrip	Transmission line to provincial power grid
Western Australia	No major variation in infrastructure needs between regions	Private road connecting to existing highway, airstrip	Diesel generator with fuel supply via pipeline

We estimated the costs of this assumed infrastructure using custom inputs from Infomine. We note that in Quebec, the provincial government sometimes provides infrastructure support, such as through the Plan Nord, which is designed to promote development in the North by providing road and power infrastructure to areas with development potential. However, this was not relevant to estimated costs in the region we selected, as typically mines in that region are able to connect to the provincial highways power grid using private roads and transmission lines.

Wages and salaries

We estimated wages and salaries using Infomine's Costmine data, which provides data on wages and salaries by position for jurisdictions in the United States and Canada. For Australia and South Africa, we estimated the average ratio of mining wages relative to Canada using data from Statistics Canada, Statistics South Africa, and the Australian Bureau of Statistics. Compared to Canada, wages are on average 25% higher in Australia and 74% lower in South Africa. We applied these ratios to the average Canadian earnings for each position based on Infomine.

Operating costs

Overall operating costs are generally higher in remote northern areas such as the Northwest Territories. These higher costs are the result of a number of contributing factors including higher transportation costs, the need to carry more inventory due to seasonal access, and greater wear and tear on equipment. We have estimated these effects using a multiplier from the Mining Association of Canada's 2015 report entitled "Levelling the Playing Field." The report uses data from mines in Canada to show that operating costs are on average 1.30 times higher for base metal mines and 1.46 times higher for diamond mines.[1] We have applied this ratio to our model mines in the Northwest Territories and Alaska to reflect their northern locations.

Exploration

Generally, exploration is costlier in areas that are remote from supply centres. While most exploration sites are in remote regions, mines in the NWT are generally further from the nearest supply centre. We used results from the "Levelling the Playing Field" report to estimate how remoteness would affect exploration costs.[2] The MAC report estimated the typical cost ratio between non remote (<50 km to a supply centre), remote (51-500 km to a supply centre), and very remote mines (>500 km to a supply centre). Assuming that mines in the NWT were very remote

[1] MAC 2015, "Leveling the Playing Field: Supporting Mineral Exploration and Mining in Remote and Northern Canda."
[2] Ibid

and mines elsewhere are remote, we estimated exploration costs for all regions based on real exploration costs for selected mines in the Northwest Territories.

Due to data limitations, we have not incorporated the length of the exploration process in the comparison jurisdictions. Thus, to the extent that the exploration process in Northwest Territories takes longer than the other comparison jurisdictions, it will increase relative costs in Northwest Territories.

Fair return

Our fair return assessment is based on the analysis done in Phases 1 and 3, as well as secondary research on the comparison jurisdictions. The fair return analysis uses the division of cash flows between mining companies and governments as a basis for discussion on whether governments are receiving a fair return on their mineral resources, taking into account mining costs, as well as economic alternatives.

Phase 1 results: direct tax competitiveness

This section presents the competitiveness rankings of our Phase 1 analysis, taking into account corporate income taxes and royalties, i.e. "direct taxes." It then compares our results to the Two Ducks Report from 2007/8, and explores the reasons for the changes in tax competitiveness. For the purpose of this report, the "rank" sorts the jurisdictions by tax levels, with the lowest taxes corresponding to a rank of one and the highest corresponding to a rank of 22.

Our findings: rankings and competitiveness

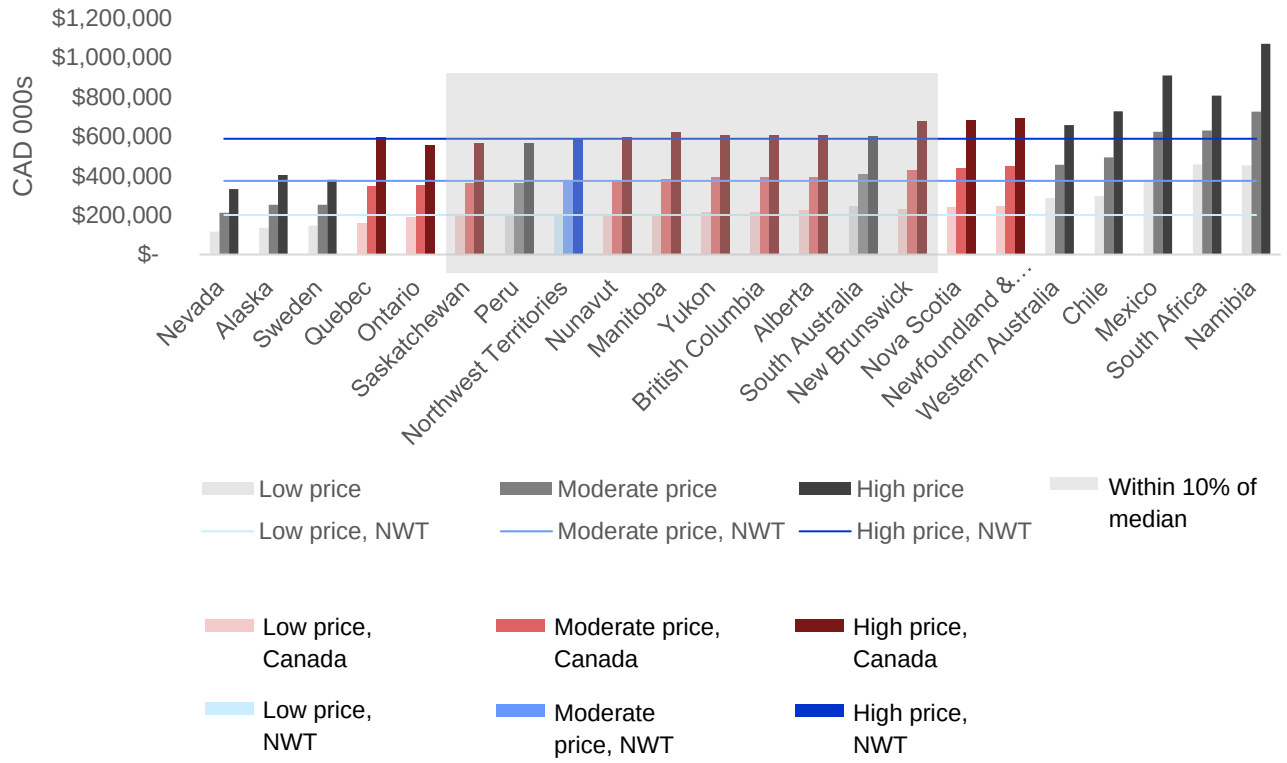
Below we present our findings on direct tax competitiveness, taking into account corporate income taxes and royalties ("total taxes"). All results are presented as an NPV over the LOM, using a 10% discount rate.

Total taxes and royalties

Diamonds

These results include both corporate taxes and royalties for the diamond mine model.

Figure 10: NPV of taxes and royalties over LOM, diamond (sorted by total taxes and royalties in moderate price scenario)



At moderate diamond prices, Northwest Territories has the eighth lowest LOM taxes and royalties combined among the comparison jurisdictions. As shown in the figure above, many jurisdictions are in a similar tax range: ten jurisdictions including Northwest Territories have total taxes within 10% of the median total taxes among the comparison jurisdictions. The median jurisdictions are those with tax levels such that half the jurisdictions in our sample have higher taxes, and half have lower taxes. In our sample of 22 jurisdictions, the median jurisdictions are always those with the eleventh and twelfth lowest taxes.

Table 4 presents total taxes, rank, and proximity to median value at moderate price levels. The same information for low and high price levels is presented in Appendix C. The overall results are similar. At high diamond prices, Northwest Territories has the seventh lowest total taxes of all comparison jurisdictions in contrast to the high ranking under moderate and low prices, Quebec has higher total taxes compared to the Northwest Territories under high prices.

At all prices, the jurisdictions with the lowest total taxes are Nevada, Alaska, and Sweden, and the jurisdictions with the highest total taxes are Chile, South Africa, Mexico, and Namibia.

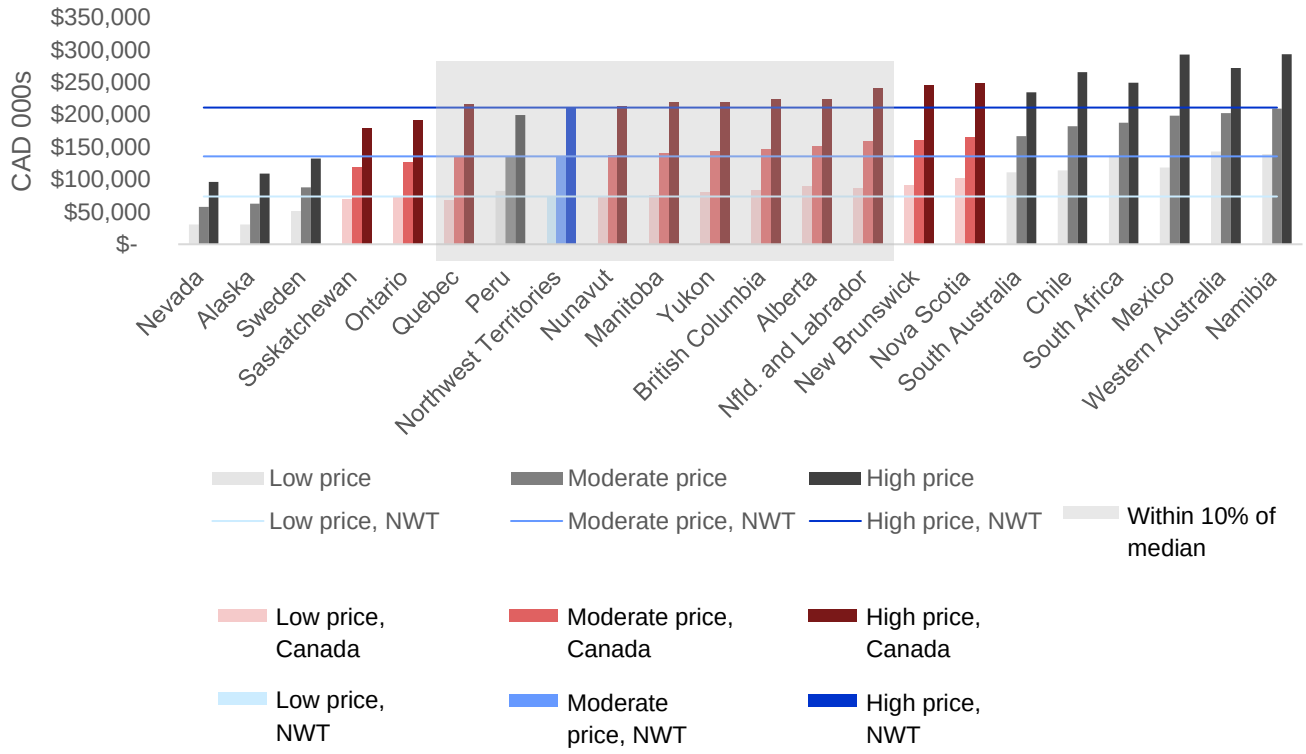
Table 4: Ranking of jurisdictions by taxes and royalties at moderate prices, diamond (000s)

Jurisdiction	Moderate price: Rank	Moderate price: Total taxes	+/- 10% from median tax value
Nevada	1	$211,397	
Alaska	2	$252,206	
Sweden	3	$253,208	
Quebec	4	$347,063	
Ontario	5	$350,890	
Saskatchewan	6	$361,373	Within 10%
Peru	7	$362,506	Within 10%
Northwest Territories	**8**	**$373,779**	**Within 10%**
Nunavut	9	$378,601	Within 10%
Manitoba	10	$380,480	Within 10%
Yukon	11	$391,215	At median
British Columbia	12	$392,171	At median
Alberta	13	$394,222	Within 10%
South Australia	14	$406,701	Within 10%
New Brunswick	15	$428,678	Within 10%
Nova Scotia	16	$438,509	
Newfoundland	17	$449,017	
Western Australia	18	$455,886	
Chile	19	$492,368	
Mexico	20	$621,815	
South Africa	21	$628,305	
Namibia	22	$724,251	

Base metals

These results include both corporate taxes and royalties ("total taxes") for the base metal model.

Figure 11: NPV of taxes and royalties over LOM, base metal (sorted by total taxes and royalties in moderate price scenario)



At moderate metals prices, the Northwest Territories has the eighth lowest total taxes among the comparison jurisdictions. Its placement is comparable at low prices (sixth lowest) and at high prices (eighth lowest). Full results for low and high price scenarios are available in Appendix C, and are similar to the moderate price level. As with diamonds, many mid-ranking jurisdictions have similar tax rates: nine jurisdictions including Northwest Territories have total taxes within 10% of the median level.

At all prices, the jurisdictions with the lowest total taxes are Nevada, Alaska, Sweden and Saskatchewan, and the jurisdictions with the highest total taxes are Namibia, Mexico, Western Australia and Chile.

Table 5: Ranking of jurisdictions by total taxes and royalties at moderate prices, base metal (000s)

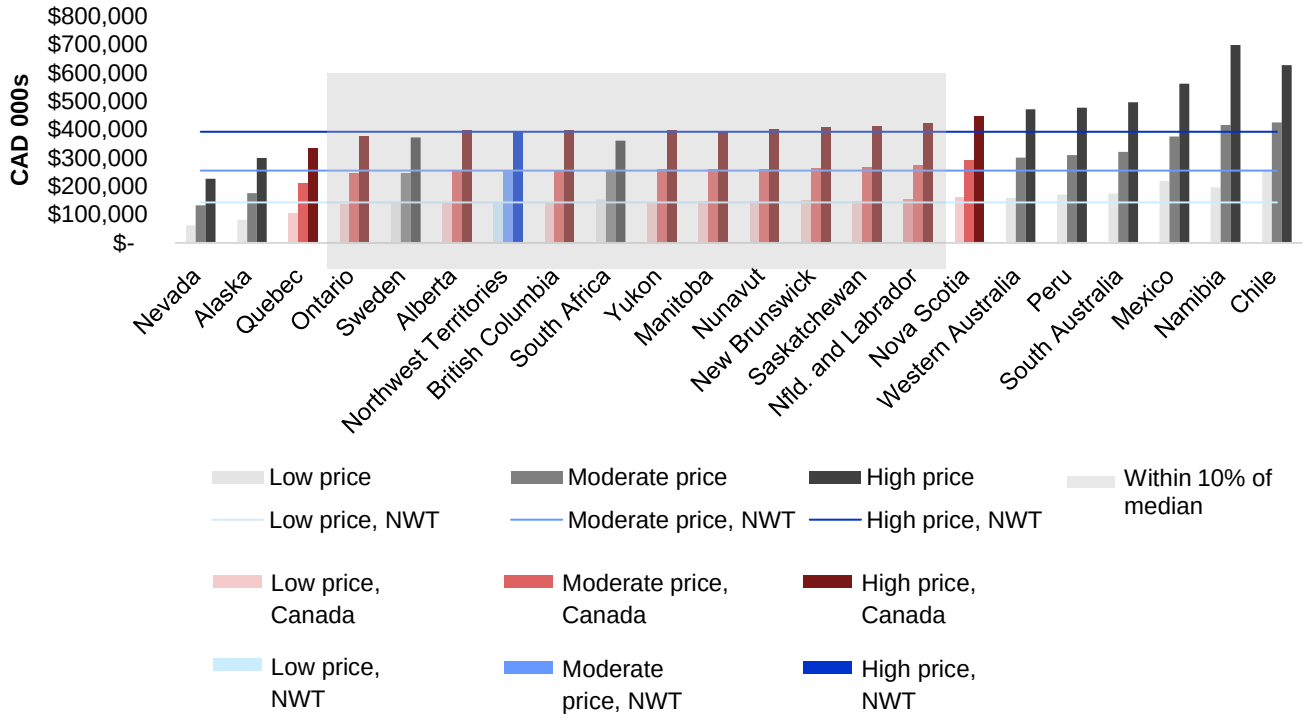
Jurisdiction	Moderate price: Rank	Moderate price: Total taxes	+/- 10% from median tax value
Nevada	1	$57,840	
Alaska	2	$62,920	
Sweden	3	$88,018	
Saskatchewan	4	$119,527	
Ontario	5	$127,401	
Quebec	6	$134,543	Within 10%
Peru	7	$134,947	Within 10%
Northwest Territories	**8**	**$135,719**	**Within 10%**
Nunavut	9	$137,510	Within 10%
Manitoba	10	$140,158	Within 10%
Yukon	11	$143,926	At median
British Columbia	12	$147,221	At median
Alberta	13	$150,794	Within 10%
Newfoundland	14	$159,585	Within 10%
New Brunswick	15	$160,935	
Nova Scotia	16	$165,745	
South Australia	17	$166,933	
Chile	18	$182,219	
South Africa	19	$187,710	
Mexico	20	$198,727	
Western Australia	21	$202,470	
Namibia	22	$209,681	

Corporate income taxes

This section assesses jurisdictions' corporate income taxes. There is not significant variation among effective corporate tax rates: many of the comparison jurisdictions have similar corporate income tax rates, including Northwest Territories and most Canadian comparison jurisdictions. When comparing the jurisdictions, it is important to note that some are countries, while others are sub-national jurisdictions. Corporate taxes are often a combination of both national and sub-national rates, meaning that sub-national jurisdictions do not have full control over their corporate income tax rates.

Diamonds

Figure 12: NPV of corporate income taxes over LOM, diamond (sorted by corporate income taxes in moderate price scenario)



Looking only at corporate income tax, Northwest Territories has the eighth lowest taxes at the low and high price levels, and seventh at the moderate price level. Full results for low and high price scenarios are available in Appendix C, and are similar to the moderate price level.

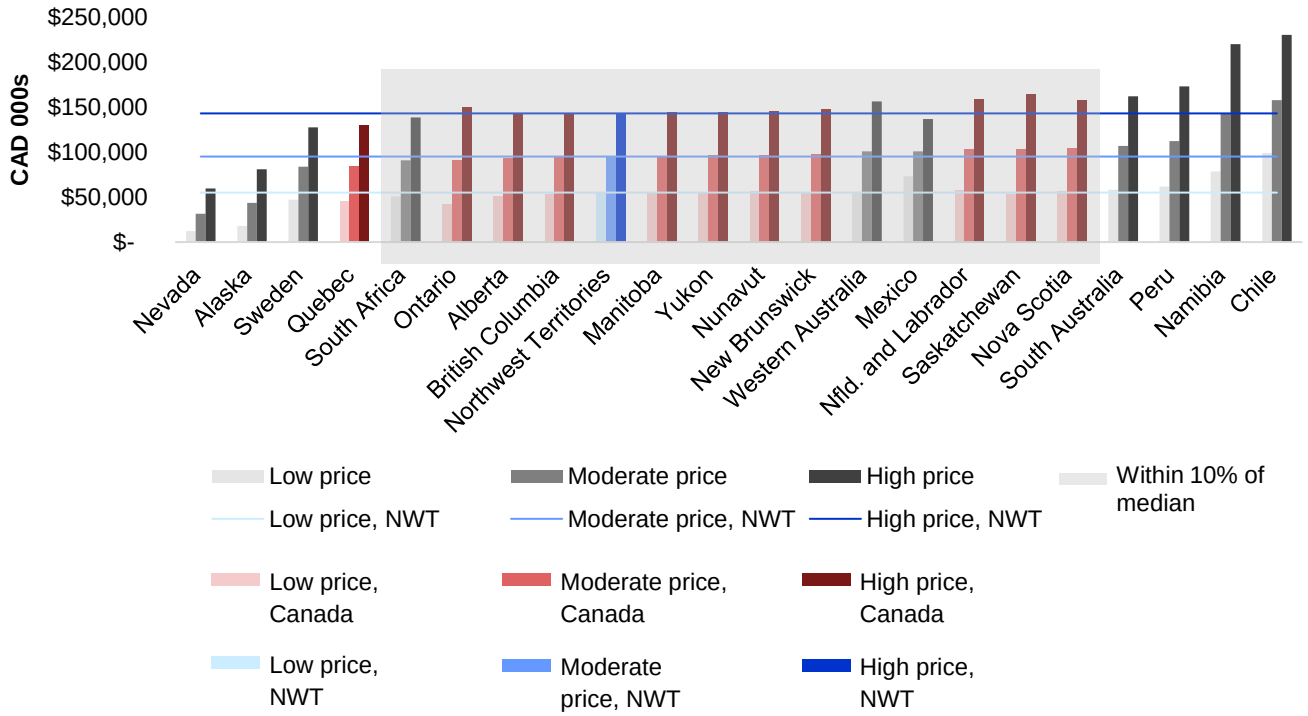
At all price levels, the jurisdictions with the lowest corporate income taxes are Nevada, Alaska and Quebec, while the jurisdictions with the highest corporate income taxes are Peru, South Australia, Namibia, Mexico, and Chile. Many jurisdictions have similar amounts of corporate tax owed, with 12 of the 22 jurisdictions including Northwest Territories within 10% of the median amount.

Table 6: Ranking of jurisdictions by corporate income taxes at moderate price levels, diamond (000s)

Jurisdiction	Moderate price: Rank	Moderate price: Total taxes	+/- 10% from median tax value
Nevada	1	$133,178	
Alaska	2	$175,897	
Quebec	3	$210,239	
Ontario	4	$243,860	Within 10%
Sweden	5	$247,045	Within 10%
Alberta	6	$254,691	Within 10%
Northwest Territories	**7**	**$255,563**	**Within 10%**
British Columbia	8	$256,137	Within 10%
South Africa	9	$258,494	Within 10%
Yukon	10	$258,574	Within 10%
Manitoba	11	$259,145	At median
Nunavut	12	$260,385	At median
New Brunswick	13	$264,633	Within 10%
Saskatchewan	14	$266,662	Within 10%
Newfoundland	15	$273,638	Within 10%
Nova Scotia	16	$290,789	
Western Australia	17	$301,796	
Peru	18	$310,659	
South Australia	19	$321,755	
Mexico	20	$376,101	
Namibia	21	$416,071	
Chile	22	$425,179	

Base metals

Figure 13: NPV of corporate income taxes over LOM, base metal (sorted by corporate income taxes in moderate price scenario)



Focusing only on corporate income tax, Northwest Territories has twelfth lowest taxes at low prices and ninth lowest taxes at moderate or high prices. Full results for low and high price scenarios are available in Appendix C. Overall, amounts of corporate income tax do not vary significantly: 14 of 22 jurisdictions, including Northwest Territories and most Canadian jurisdictions, have corporate income tax amounts within 10% of the median.

Western Australia's and South Africa's corporate taxes are very sensitive to the price levels. Western Australia ranks third, sixth and fourteenth at low, moderate and high price levels, respectively, while South Africa ranks twentieth, fifteenth and fifth for low, moderate and high price levels respectively.

At all prices, the jurisdictions with the lowest corporate income tax are Nevada and Alaska, and the jurisdictions with the highest corporate income tax are Namibia and Chile.

Table 7: Ranking of jurisdictions by corporate income taxes at moderate prices, base metal (000s)

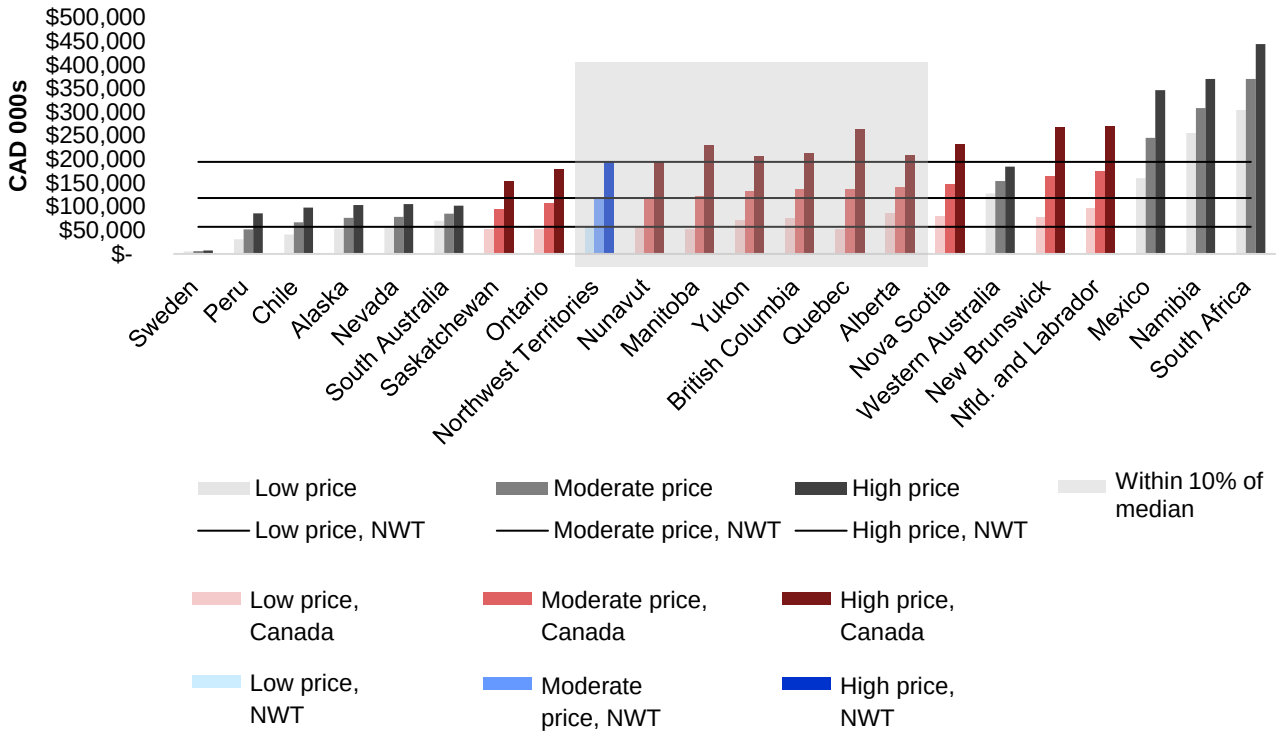
Jurisdiction	Moderate price: Rank	Moderate price: Total taxes	+/- 10% from median tax value
Nevada	1	$31,301	
Alaska	2	$43,518	
Sweden	3	$83,561	
Quebec	4	$84,108	
Ontario	5	$90,618	Within 10%
Western Australia	6	$91,044	Within 10%
Alberta	7	$92,551	Within 10%
British Columbia	8	$93,485	Within 10%
Northwest Territories	**9**	**$94,922**	**Within 10%**
Yukon	10	$95,049	Within 10%
Manitoba	11	$95,711	At median
Nunavut	12	$96,713	At median
New Brunswick	13	$97,684	Within 10%
Mexico	14	$100,646	Within 10%
South Africa	15	$100,681	Within 10%
Saskatchewan	16	$103,265	Within 10%
South Australia	17	$103,357	Within 10%
Newfoundland	18	$103,834	Within 10%
Nova Scotia	19	$106,891	
Peru	20	$112,142	
Namibia	21	$142,825	
Chile	22	$157,567	

Royalties

This section compares jurisdictions on the NPV of total royalties over the LOM. There is more variability in royalty regimes compared to the overall tax regime. Northwest Territories' rank in terms of royalties is similar to its overall rank, and it is generally within 10% of the median royalty value, or below.

Diamonds

Figure 14: NPV of royalties over LOM, diamond (sorted by royalties in moderate price scenario)



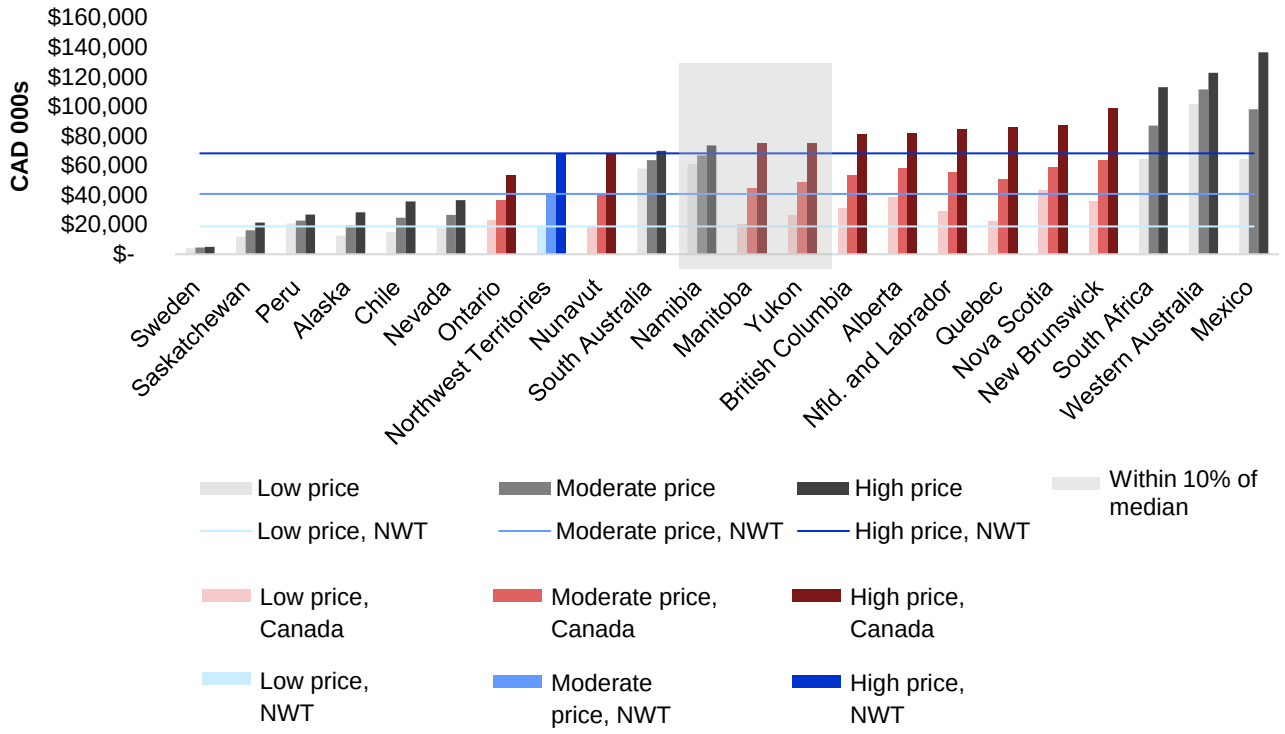
Among all 22 jurisdictions, the Northwest Territories collects the tenth lowest royalties at low and high diamond prices, and the ninth lowest at moderate diamond prices. Full results for low and high price scenarios are available in Appendix C. Generally, amounts of royalty owed are more variable between jurisdictions compared to corporate income tax. At moderate prices, seven jurisdictions including Northwest Territories are within 10% of the median amount. At all prices, the jurisdictions with the lowest royalties are Sweden, Peru, and Chile, while the jurisdictions with the highest royalties are Newfoundland, Mexico, Namibia and South Africa.

Table 8: Ranking of jurisdictions by total royalties at moderate prices, diamond (000s)

Jurisdiction	Moderate price: Rank	Moderate price: Total taxes	+/- 10% from median tax value
Sweden	1	$6,164	
Peru	2	$51,847	
Chile	3	$67,189	
Alaska	4	$76,309	
Nevada	5	$78,219	
South Australia	6	$84,946	
Saskatchewan	7	$94,711	
Ontario	8	$107,030	
Northwest Territories	**9**	**$118,216**	**Within 10%**
Nunavut	10	$118,216	Within 10%
Manitoba	11	$121,335	At median
Yukon	12	$132,641	At median
British Columbia	13	$136,034	Within 10%
Quebec	14	$136,824	Within 10%
Alberta	15	$139,531	Within 10%
Nova Scotia	16	$147,721	
Western Australia	17	$154,090	
New Brunswick	18	$164,046	
Newfoundland	19	$175,379	
Mexico	20	$245,714	
Namibia	21	$308,180	
South Africa	22	$369,810	

Base metals

Figure 15: NPV of royalties over LOM, base metal (sorted by royalties in moderate price scenario)



In terms of royalties only, Northwest Territories has the sixth lowest taxes at low metals prices, and the eighth-lowest at moderate or high prices. Full results for low and high price scenarios are available in Appendix C. Royalty amounts owed are variable between jurisdictions, and there is a large difference between the lowest royalty jurisdictions and the highest. At moderate price scenarios, three jurisdictions are within 10% of the median amount, while Northwest Territories is below the median amount.

At all prices, the jurisdictions with the lowest royalties are Sweden and Saskatchewan, and the jurisdictions with the highest royalties are South Africa, Mexico, and Western Australia.

Table 9: Ranking of jurisdictions by total royalties at moderate prices, base metal (000s)

Jurisdiction	Moderate price: Rank	Moderate price: Total taxes	+/- 10% from median tax value
Sweden	1	$4,457	
Saskatchewan	2	$16,262	
Alaska	3	$19,402	
Peru	4	$22,805	
Chile	5	$24,652	
Nevada	6	$26,539	
Ontario	7	$36,783	
Northwest Territories	**8**	**$40,796**	
Nunavut	9	$40,796	
Manitoba	10	$44,446	
Yukon	11	$48,877	At median
Quebec	12	$50,435	At median
British Columbia	13	$53,736	Within 10%
Newfoundland	14	$55,751	
Alberta	15	$58,243	
Nova Scotia	16	$58,854	
New Brunswick	17	$63,250	
South Australia	18	$63,576	
Namibia	19	$66,856	
South Africa	20	$87,028	
Mexico	21	$98,081	
Western Australia	22	$111,426	

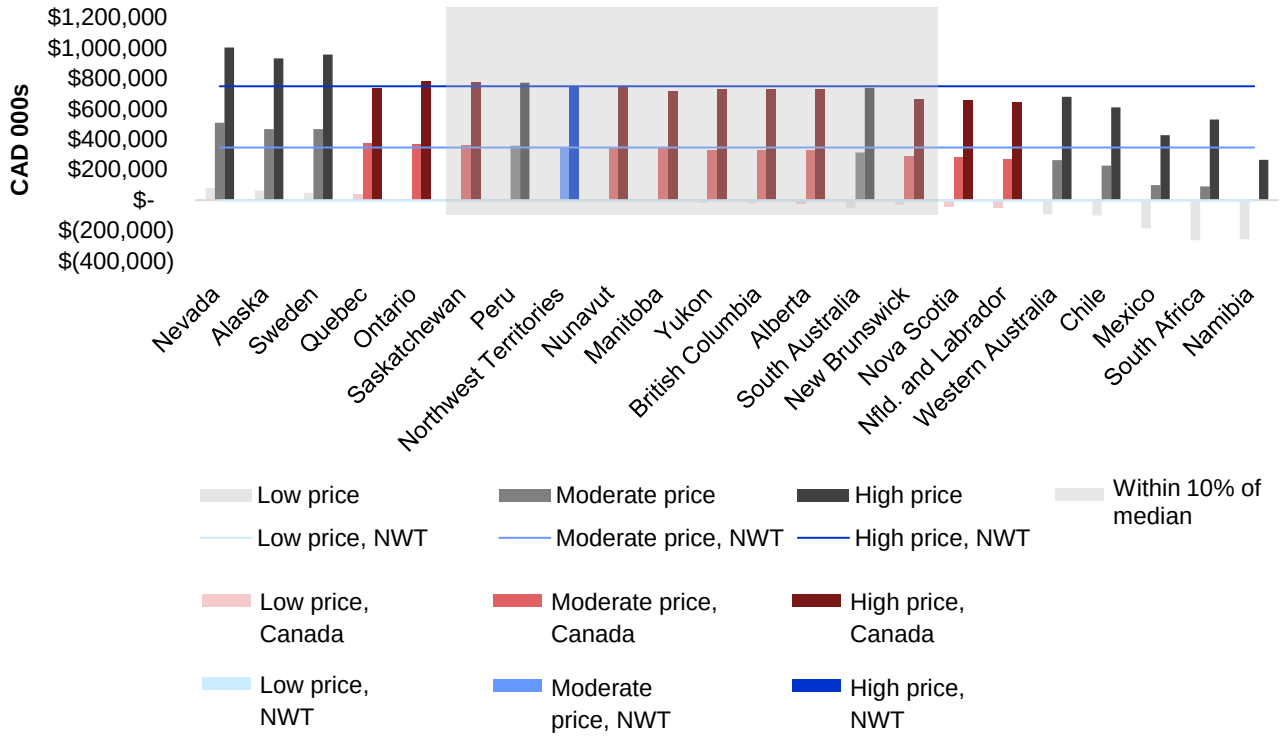
Cash flow comparison

In order to assess the post-tax profit accruing to mining companies, we compare the post-tax cash flows, i.e. the pre-tax cash flow less total taxes discounted at 10% over the life of the mine. The competitiveness rankings of the cash flow are the same as those for overall taxes because this model includes minimal variation in pre-tax cash flow.

It is possible for the post-tax cash flow of a mine to be negative because some taxes are applied on production, rather than profits. If a mining company expects the cash flow of a mine to be negative, it will not be built. We note that the "low," "moderate," and "high" prices using an imposed internal rate of return. Therefore, they do not necessarily correspond to realistic prices in commodity markets. Negative cash flows should be interpreted with caution, and do not necessarily represent a realistic scenario.

Diamonds

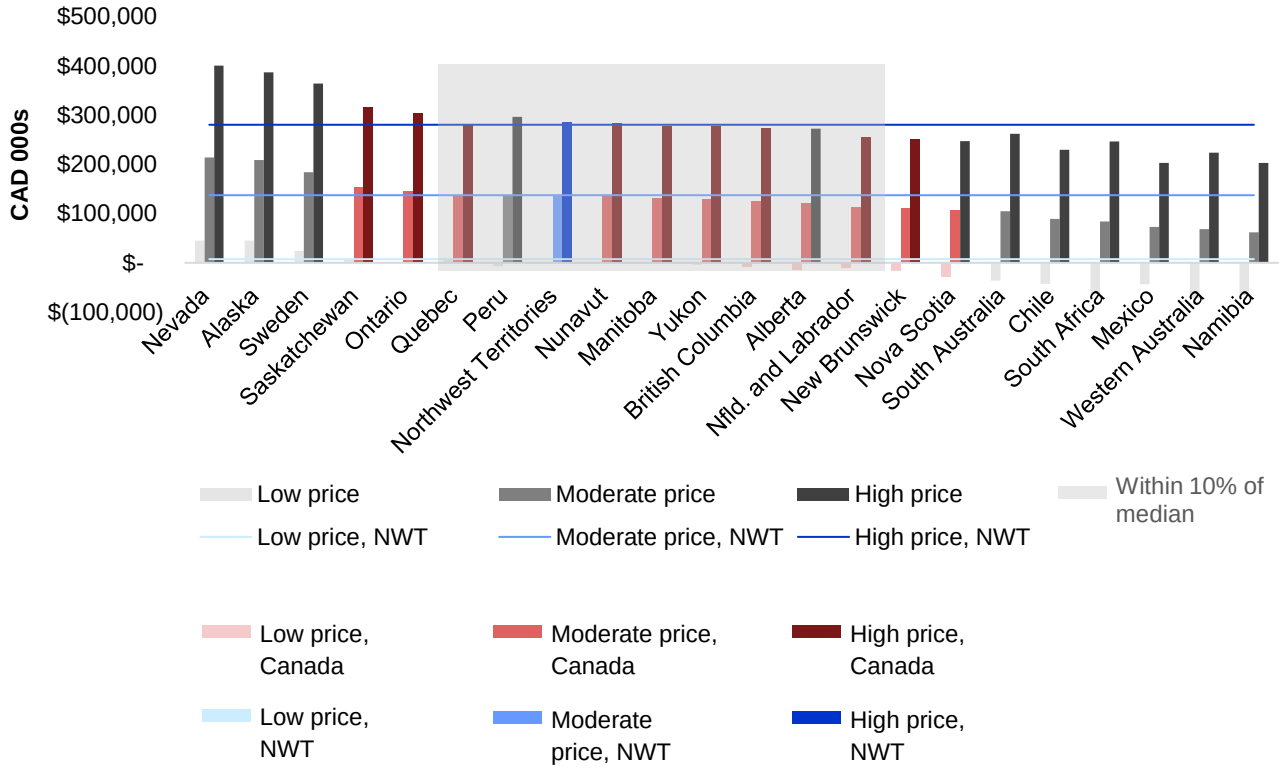
Figure 16: NPV of post-tax cash flow *over LOM, diamond (sorted by* post-tax cash flow *in moderate price scenario)*



In our low price diamond model, only five of the jurisdictions yield a positive cash flow: Nevada, Alaska, Sweden, Quebec and Ontario. Northwest Territories has a very small negative cash flow. At moderate diamond prices, cash flow is positive in all jurisdictions except Namibia. At high diamond prices, the fair value in all jurisdictions in positive.

Base metals

Figure 17: NPV of post-tax cash flow over LOM, base metal (sorted by post-tax cash flow in moderate price scenario)



In our low price model, eight jurisdictions have a positive cash flow: Nevada, Alaska, Sweden, Quebec, Saskatchewan, Northwest Territories, Ontario and Nunavut. Northwest Territories has a small positive value of $1.7 million. At moderate and high prices, cash flow is positive for all jurisdictions.

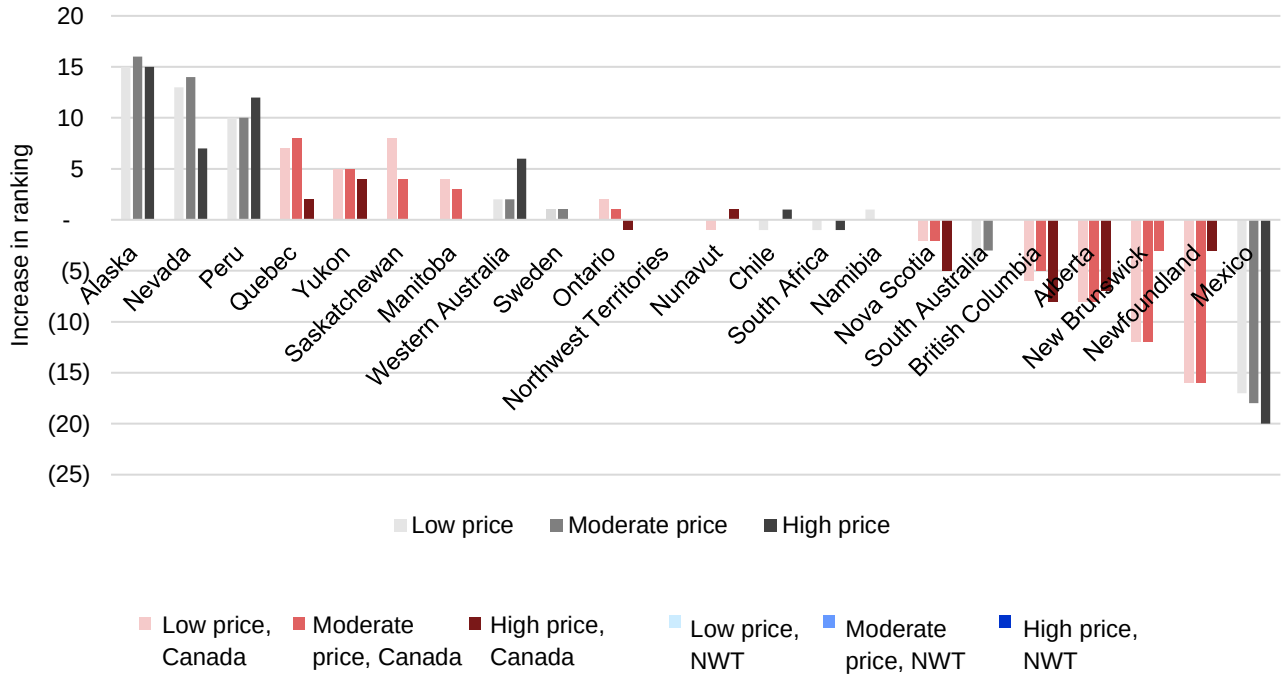
Comparison with Two Ducks rankings

Below, we compare the rankings of jurisdictions between the Two Ducks Report and our analysis. A higher ranking is indicative of lower taxes, with one being the lowest taxes and 22 being the highest. The following section discusses the reasons for changes in rankings as compared to the Two Ducks Report. The Northwest Territories has maintained a similar ranking since 2007/8. The jurisdictions whose rank increased the most were Alaska, Nevada, Peru and Quebec, while the jurisdictions whose rank decreased the most were Mexico, Newfoundland, New Brunswick, and Alberta.

Diamonds

Figure 18 presents the average change in competitiveness ranking between the Two Ducks Report and our analysis.

Figure 18: Increase in competitiveness ranking for total taxes and royalties 2007/8 to 2018/19, diamonds (sorted by rank increase at moderate prices)



Between the two reports, Northwest Territories has maintained the same average ranking at all price levels. Of the 22 jurisdictions, it has the seventh lowest taxes and royalties at high prices, and the eighth lowest for low and moderate prices.

At all price levels, the jurisdictions whose rankings increased the most were Alaska, Nevada, Peru, and Quebec. Taxes in Nevada and Alaska were lowered substantially due to the 2017 US tax reforms, which are described in more detail below. Peru underwent a mining tax reform in 2011 that has increased its ranking for some types of mine. Quebec introduced several reforms in 2013 that have increased its ranking in low and moderate price scenarios; however, the increase in the high price scenario has been smaller because of the profit-based nature of the tax.

The jurisdictions that experienced the greatest decrease in rank were Mexico, Newfoundland, New Brunswick, and Alberta. Mexico introduced a new mining tax, effective in 2014, that has significantly increased overall mining tax liabilities. Alberta, New Brunswick, and Newfoundland have not had major changes to their tax regimes, but their ranks have decreased as their provincial tax rates have increased marginally while other jurisdictions have reduced their taxes.

Overall, change in rank is similar at all price levels. However, there are some exceptions. Nevada, Quebec, and Saskatchewan increased their ranking less in the high-price scenario compared to low and moderate price scenarios because their tax systems are partially based on profit levels.

The table below summarizes the ranking in 2018/19, ranking in 2007/8, and the change at moderate prices. Results for low and high prices are presented in Appendix C: Taxes and competitiveness ranking for all price levels.

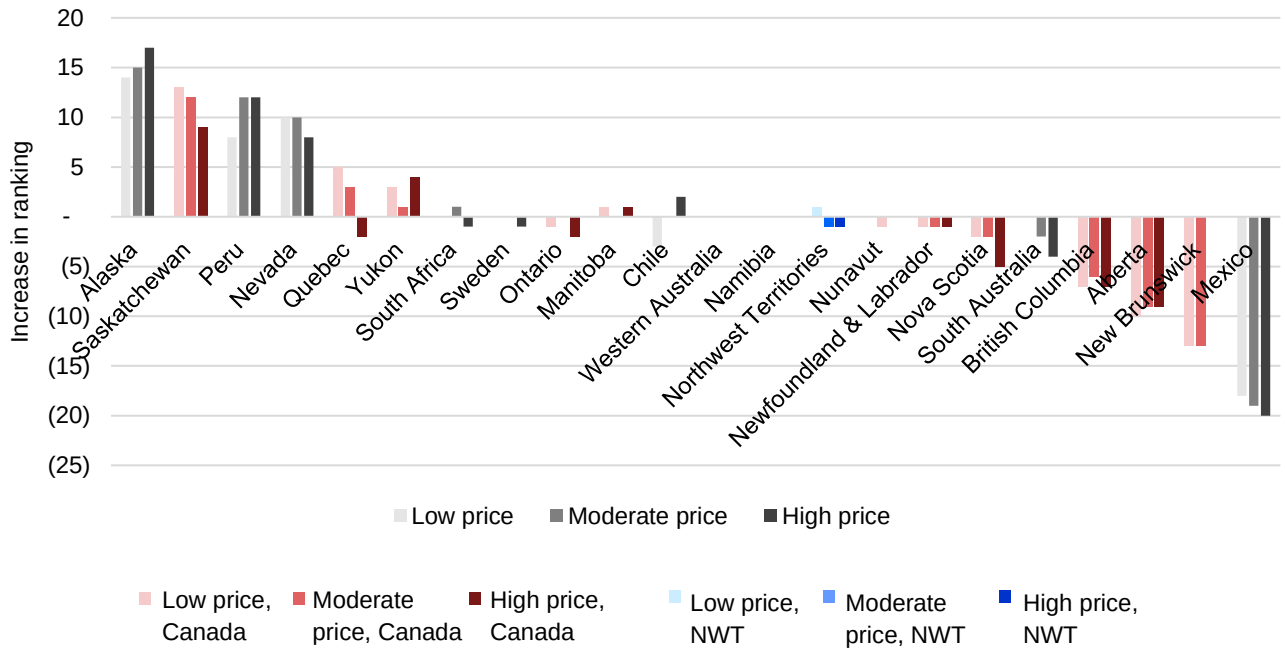
Table 10: Competitiveness ranking for total taxes and royalties, 2007/8, 2018/19 and change at moderate prices, diamonds

Jurisdiction	Rank, 2018 /19	Rank, 2007 /8	Change
Nevada	1	15	14
Alaska	2	18	16
Sweden	3	4	1
Quebec	4	12	8
Ontario	5	6	1
Saskatchewan	6	10	4
Peru	7	17	10
Northwest Territories	**8**	**8**	**-**
Nunavut	9	9	-
Manitoba	10	13	3
Yukon	11	16	5
British Columbia	12	7	(5)
Alberta	13	5	(8)
South Australia	14	11	(3)
New Brunswick	15	3	(12)
Nova Scotia	16	14	(2)
Newfoundland	17	1	(16)
Western Australia	18	20	2
Chile	19	19	-
Mexico	20	2	(18)
South Africa	21	21	-
Namibia	22	22	-

Base metals

The graph below presents the average change in competitiveness ranking between the Two Ducks Report and our analysis.

Figure 19: Increase in competitiveness ranking for total taxes and royalties 2007/8 to 2018/19, base metals (sorted by rank increase at moderate prices)



The Northwest Territories increased one rank, from seventh to sixth; decreased one rank, from seventh to eighth, and decreased one rank from sixth to seventh at low, moderate, and high prices, respectively.

The jurisdictions with the largest increase in ranking were Alaska, Peru, Saskatchewan and Nevada. As noted above, Alaska and Nevada have benefitted from the 2017 US tax reform, while Peru underwent a mining tax reform in 2011. Saskatchewan has not had any significant changes with respect to base metals.

The jurisdictions with the greatest decreases in ranking are Mexico, followed by Alberta, New Brunswick, and British Columbia. As noted above, Mexico introduced a mining tax in 2014 where before it did not have mining-specific taxes, leading to a substantial increase in taxes owed. British Columbia, Alberta, and New Brunswick did not undergo major changes.

The table below shows the rank in 2018/19, rank in 2007/8, and the change at moderate prices. Results for low and high prices are presented in Appendix C: Taxes and competitiveness ranking for all price levels.

Table 11: Competitiveness ranking for total taxes and royalties, 2007/8, 2018/19 and change, base metal (sorted by 2018/19 rank at moderate prices)

Jurisdiction	Rank, 2018/19	Rank, 2007/8	Change
Nevada	1	11	10
Alaska	2	17	15
Sweden	3	3	-
Saskatchewan	4	16	12
Ontario	5	5	-
Quebec	6	9	3
Peru	7	19	12
Northwest Territories	**8**	7	**(1)**
Nunavut	9	8	(1)
Manitoba	10	10	-
Yukon	11	12	1
British Columbia	12	6	(6)
Alberta	13	4	(9)
Newfoundland & Labrador	14	13	(1)
New Brunswick	15	2	(13)
Nova Scotia	16	14	(2)
South Australia	17	15	(2)
Chile	18	18	-
South Africa	19	20	1
Mexico	20	1	(19)
Western Australia	21	21	-
Namibia	22	22	-

Trends causing movement in rankings

This section provides more detail on the reasons for the changes in the competitiveness of the tax regimes. There are two main reasons for the changes: significant tax reforms, and tax rate changes. In some cases, there were multi-jurisdictional changes in tax regimes that did not have a significant impact on the competitiveness of the respective jurisdictions. Where observed, these changes have also been discussed below. The tax regimes of each jurisdiction and their significant changes since 2007/2008 have been summarized in Appendix A: Summary of tax regimes.

In some cases, there were errors in Two Ducks' analysis of tax regimes, which may have impacted the relative rankings of jurisdictions. We summarize those errors and their impacts below.

Summary of changes significant for competitiveness

The competitiveness of each jurisdiction depends on the mineral, scale of mine, and prices. However, some jurisdictions have undergone significant changes that have affected their competitiveness across categories. Below we summarize the most significant overall tax changes, which are described in more detail below.

Table 12: Summary of significant tax changes affecting competitiveness, 2007/8 to 2018/19

Jurisdiction	Description of change	Impact on competitiveness
Alaska and Nevada	The 2017 US tax reform reduced the statutory corporate income tax rate from 35% to 21%, introduced accelerated depreciation on certain assets, and eliminated the alternative minimum tax rate, among other changes that have had a significant net positive effect on tax competitiveness.	Increase
Peru	A 2011 reform changed mineral taxation from revenue-based to profit-based, which is beneficial for lower profit mines, but may be more costly for higher-profit mines.	Depends on profit
Quebec	In 2013, Quebec moved away from a flat royalty structure to a combination of minimum tax and profit-based tax, generally increasing mining tax payable. The increase is larger for higher-profit mines, which is reflected in the changes in ranking.	Decrease
Saskatchewan	On June 2, 2010, the Government of Saskatchewan introduced a new royalty regime for the province. The royalty is applied to net profit at rates graduated from 1% to 10%. A five-year initial royalty holiday was also included as part of the new royalty regime.	Decrease (for diamonds)
Mexico	In 2014, Mexico introduced two taxes on mining companies: the Special Duty on Mining applied at 7.5% of net profit and the Extraordinary Duty on Mining that is applicable only to sales of gold, silver, and platinum at a 0.5% rate. These both increased tax collected from mining activities.	Decrease

Significant tax reforms

Corporate income tax reforms

US tax reform

On December 22, 2017, a major reform of the US corporate income tax system was enacted as a result of the passing of the Tax Cuts and Jobs Act. The reform resulted in a number of changes including the following significant changes:

- A significant reduction in the corporate income tax rate from 35% to 21%.
- Elimination of the alternative minimum tax. Prior to the reform, companies could be liable for alternative minimum tax which would be payable at a rate of 20% of adjusted alternative minimum taxable income. Any tax paid under this regime could be used to offset corporate income tax in years when it was payable, however.
- Changes to the loss carry forward/carry back regime to only allow losses to be carried forward and limiting the claim in any given year to 80% of taxable income. Losses can be carried forward indefinitely.
- Complex changes to interest deductibility rules.
- Changes to the tax depreciation of short-lived capital assets to provide for a quicker deduction on investments in those assets.

The federal reforms mentioned also affect the income tax calculation in states that conform with federal rules. Alaska has rolling conformity with federal rules; therefore, the reforms also apply to Alaska corporate income tax.

As a result of these changes, the ranking of the US jurisdictions, Alaska and Nevada, significantly improved. The reduction in the corporate income tax rate results in a lower federal income tax payable over the LOM. The elimination of the alternative minimum tax also decreases the NPV of the tax liability of the US mines as no minimum tax will be payable when loss carry forward balances are utilized in the mines' first profitable years.

Mining tax reforms

Mexico mining tax reform

At the time of writing of the Two Duck's report, Mexico did not have any tax specific to the mineral sector. However, the Government of Mexico introduced a mining tax regime on October 31, 2013 which became effective in 2014. The new regime introduced two taxes on mining companies: the Special Duty on Mining applied at 7.5% of net profit and the Extraordinary Duty on Mining which is applicable only to sales of gold, silver, and platinum at a 0.5% rate. The Special Duty on Mining is deductible for corporate tax purposes, however, denies any deduction associated with capital expenditures which results in this tax being levied essentially on operating cash flow.

The introduction of these new taxes resulted in a significant increase to the total tax liability over the LOM for Mexico.

Peru mining tax reform

In 2011, Peru underwent a mining tax regime reform which resulted in substantial changes to the calculation of its mineral taxes. Prior to the reform, mining taxes were calculated as 1% - 3% of gross revenues less certain deductions. Following the reform, several new taxes were introduced (the New Mining Royalty, Special Mining Tax, and Special Mining Contribution), all of which are profit-based taxes with the applicable rate varying based on the operating margin of the company.

The effect of the reform on the ranking of Peru depends on the profits of the mine, as the new regime graduates the applicable tax rate based on the operating margin of the company.

Quebec mining tax reform

In 2013, the Quebec Government implemented several reforms to its mining tax regime to change its previous royalty calculation of 12% of net profit to a combination of minimum mining tax and mining tax based on profit. It also introduced a new refundable mining tax credit when a mine is in a loss position. These changes generally increased the mining tax payable in Quebec.

Saskatchewan diamond royalty

On June 2, 2010, the Government of Saskatchewan introduced a new royalty regime for the province. The royalty is applied to net profit at rates graduated from 1% to 10%. A five-year initial royalty holiday was also included as part of the new royalty regime.

Prior to 2010, Saskatchewan did not have a royalty regime applicable to diamonds. As such, the Two Ducks Report included a calculation of the royalty that would be payable using the legislation applicable to base metals.

Relative to the calculation in the Two Ducks Report, we noted that there was an increase in the mining tax payable from approximately $231 million under the Two Ducks Report model for the 20% IRR diamond mine to approximately $477 million in our model over the entire LOM.

Investment incentives - Accelerated depreciation

There have been changes in legislation in several jurisdictions since the Two Ducks Report, which have affected the timing of depreciation deductions taken over the life of the mine models prepared. Notably, this has occurred in Canada with the introduction of the Accelerated Investment Incentive Allowance in 2018, as well as in the United States, with an update to the bonus depreciation regime for property acquired after September 27, 2017. Each of these changes effectively allows a company to claim a deduction for its capital costs faster, resulting in an increase to the NPV of the deduction taken on such equipment. However, in Canada the change in rules since 2007/2008 regarding the deduction of exploration and development expenditures and tax depreciation on certain mining asset

classes has resulted in the deduction available from those expenditures/assets being deferred. Moreover, the new US rules supplement bonus depreciation rules that were already in place.

The implications of these changes would be to change the timing of certain deductions. As such, this could impact the NPV of the tax liability of the mines; however, we do not expect the effect to be significant.

Headline tax rates

Table 13: Canadian jurisdictions - current combined corporate income tax rates

Province/Territory	Combined Rate	Per Two Ducks
Northwest Territories	26.5%	31.0%
Nunavut	27.0%	32%
British Columbia	27.0%	31%
Alberta	27.0%	30%
Saskatchewan[1]	25.0%/27.0%	30%
Manitoba	27.0%	33%
Ontario[1]	25.0%/27.0%	32%
Quebec	26.6%	31.4%
New Brunswick	29.0%	32%
Nova Scotia	31.0%	32%
Newfoundland and Labrador	30.0%	34%
Yukon[1]	17.5%/27.0%	35%

[1]Province/territory has a lower rate for profits from manufacturing and processing activities

[2]Provincial income tax rate will decrease to 8% by 2022 as a result of the passage of Bill 3, Job Creation Tax Cut

[3]Provincial income tax rate will decrease to 11.5% in 2020

The headline tax rates shown are combined federal and provincial corporate income tax rates. There was a decrease in the federal corporate tax rate from 19.5% in 2007/8 to 15% in 2019. The residual change in each jurisdiction is attributed to a change in the provincial tax rate.

Table 14: Canadian jurisdictions - mining tax rates

Province/Territory	2019	Per Two Ducks
Northwest Territories & Nunavut	lower of 13% of net profits or stepped scale of 5% to 14% of net profits	stepped scale up to 13% of net profits
British Columbia	2% of net revenue + 13% of net profits	2% of net revenue or 13% of net profits
Alberta	higher of 12% of net profits or 1% of mine mouth revenue	1% of net revenue or 12% of net profits
Saskatchewan		
metals	stepped scale of 5% to 10% of net profit	3% of net revenue + 10% of net profit
diamonds	1% of net revenue + 10% of net profits	
Manitoba	stepped scale from 10% to 17% of net profits	18% of net profits
Ontario		
metals	10% of net profits	10% of net profits
diamonds	lower of 13% of net profits or stepped scale of 5% to 14% of net profits	stepped scale up to 13% of net profits
Quebec	stepped scale of 16% to 28% of net profit, with a minimum tax on a stepped scale of 1% to 4% of mine mouth revenue	12% of net profits
New Brunswick	2% of net revenue + 16% of net profits	2% of net revenue + 16% of net profits
Nova Scotia	higher of 2% of net revenue or 15% of net profits	2% of net revenue or 15% of net profits
Newfoundland and Labrador	15% of net profits + 20% of royalty allowance claimed	16% of net profits
Yukon	stepped scale of 0% to 12% of mine mouth revenue	stepped scale, up to 12% of net profits

Table 15: Foreign jurisdictions - income tax rates

Jurisdiction	2019	Per Two Ducks
Western Australia		
metals	30%	30%
diamonds	30%	30%
South Australia	30%	30%
Alaska	21% + 1% to 9.4%	35% + 9.4%
Nevada	21% + 0%	35% + 0%
Sweden	21.4%	28%
South Africa		
metals	28%	29% + 5%
diamonds	28%	29% + 5%
Namibia		
metals	37.5%	35% + 55% + 10%
diamonds	55%	35% + 55% + 10%
Chile	25%	17% + 42%
Peru	29.5%	30%
Mexico		
metals	30%	28% + 10%
diamonds	30%	28% + 10%

Table 16: Foreign jurisdictions - mining royalty rates

Jurisdiction	2019	Per Two Ducks
Western Australia		
metals	2.5% to 7.5% of mine mouth revenue	5% of net revenue
diamonds	5% of mine mouth revenue	7.5% of net revenue or 22.5% of net profits
South Australia	3.5% to 5% of net revenue	up to 3.5% of net revenue
Alaska	stepped scale of 0% to 7% on net profits + 3% of net profits	stepped to 7% of net profits + 3% of net profits
Nevada	stepped scale of 0% to 5% of net revenue	5% net profits
Sweden	0.2% of net revenue	0.2% of net revenue
South Africa		
metals	stepped scale of 0% to 7% of net revenue	4% of net revenue
diamonds	stepped scale of 0% to 7% of net revenue + 5% of gross revenue	5% of net revenue
Namibia		
metals	3% of net revenue	3% of net revenue
diamonds	10% of net revenue	10% of net revenue
Chile	stepped scale of 0% to 14% of net profits	5% of net profits
Peru	stepped scale of 1% to 12% of net revenue + 2% to 8.4% of net revenue	stepped to 3% of net revenue
Mexico		
metals	7.5% of net revenue + 0.5% of gross revenue	none
diamonds	7.5% of net revenue	none

Other changes

Repeal of capital taxes

At the time of the preparation of the Two Ducks Report, several provinces levied capital tax based on the taxable capital of the company. These provinces included New Brunswick, Nova Scotia, Ontario, Quebec, Saskatchewan, and Manitoba. Capital taxes have all since been phased out. The phase-out of the tax would increase the competitiveness of each of these jurisdictions, however they were generally insignificant relative to the income tax and mining taxes in each jurisdiction.

Interest deductibility limitations

At the time of the Two Ducks Report, interest deductibility was often limited by means of thin capitalization rules. In general, the rules operated to deny the deductibility of interest expense where the debt-to-equity ratio of a corporation's funding by a related non-resident exceeded a prescribed ratio.

In recent years, the Organisation for Economic Co-operation and Development ("OECD") launched an initiative to address base erosion and profit shifting ("BEPS") by multinational corporate groups, which involves reducing the tax base and shifting profits from high-tax to low-tax jurisdictions. As part of its BEPS project, the OECD issued a

recommendation for its member countries to adopt interest deductibility limitations calculated based on earnings before interest, depreciation and tax ("EBITDA"). Any denied interest in a year will generally be available for carry forward to be applied against taxable income in future years. As such, the new interest deductibility limitations would be expected to decrease the NPV of discounted cash flows, and not the overall undiscounted taxes payable.

While preparing the models, we noted that there were changes to the deductibility of interest in the following jurisdictions:

- South Africa – Deduction of related party interest effectively limited to 60% of EBITDA.
- Peru – Deduction of interest limited to 30% of EBITDA beginning in 2021. Currently, the non-deductible calculation is based on equity.
- Sweden – Interest deductions are limited to 30% of a company's EBITDA.
- US – Deductible interest determined as 30% of adjusted taxable income.

Significant anomalies found in the Two Ducks calculations

The following table summarizes the anomalies we found in the Two Ducks calculations and their materiality to our overall results. Given that we did not have access to Two Ducks models, we were not able to correct these anomalies. The table shows how much each anomaly would increase the total undiscounted tax paid in our model, and should be taken into account when comparing rankings between the Two Ducks work and this study. The difference in the tax value is presented for the 20% IRR (high price) scenario, which would be associated with the largest possible differences from the figures presented in the Two Ducks report. At other price levels, the differences would be smaller.

Table 17: Summary of anomalies found in the Two Ducks Report and impact on LOM direct taxes

Jurisdiction	Anomaly (Variable)	Timing Difference or Absolute Value Difference	Difference on the undiscounted amount of tax over LOM
Chile	Second Tier Tax	Absolute Value Difference	$197M at 20% IRR
Mexico	Profit-Sharing Payment	Absolute Value Difference	$185M at 20% IRR
Chile	Corporate Tax Rate	Absolute Value Difference	$128M at 20% IRR
South Africa	State Mining Royalty	Absolute Value Difference	$44M at 20% IRR
Alaska	Exploration Tax Credit	Absolute Value Difference	$41M at 20% IRR
Alberta	Processing Allowance	Absolute Value Difference	$35M at 20% IRR
Sweden	Investment Allowance	Absolute Value Difference	$11M at 20% IRR
Canada (provinces and territories)	Exploration and Development Expenditures	Absolute Value Difference	Immaterial
United States, Alaska, Nevada	Depreciation, Development, and Depletion Deductions (US Federal, Alaska) Net Proceeds Tax (Nevada) Mining Tax (Alaska)	Absolute Value Difference	Immaterial
Various	Depreciation, Development, and Exploration Deductions	Timing Difference	No difference

Timing of depreciation, development, and exploration deductions

There were multiple jurisdictions where there was difficulty in determining how the Two Ducks Report calculated deductions on a year-over-year basis for certain depreciation, development, and exploration expenditures. The total aggregate deduction over the life of the mine in these instances, however, was consistent with our models unless otherwise noted. As a result, there were timing differences in these deductions between our models and those

prepared by Two Ducks. This difference in timing would affect the NPV of tax payments but should not affect the undiscounted amount of tax over the LOM.

South Africa state mining royalty

There was a discrepancy of approximately $44 million undiscounted between our calculation of the state mining royalty for the base metal mine and Two Ducks calculation at 20% IRR. The calculation presented in the Two Ducks Report resulted in a lower tax liability than as calculated by us. This difference is caused by the royalty rate used by Two Ducks; they applied a flat percentage of 4%/5% to net revenue for base metals/diamonds respectively while our understanding is that the royalty rate is a stepped scale of 0% to 7% based on revenue and earnings plus a 5% royalty for diamond sales only. We are not aware of any changes to the governing legislation since 2007/8 that would cause this change.

Canada - Treatment of exploration and development expenditures

There is a difference between the deductions taken as Canadian Exploration Expenditures ("CEE") and Canadian Development Expenditures ("CDE") between the models prepared by Two Ducks and those prepared by us. At the time of the Two Ducks Report, all exploration and development expenditures were treated as CEE and eligible for immediate deduction. From 2013 to 2017, new rules were phased in to treat development expenditures as CDE, the principle difference being that deductions of CDE expenditures are amortized at a rate of 30%, similar to the treatment of other fixed assets. It appears that all exploration and development costs have been treated as CEE by Two Ducks, however there is a difference between the total deduction over the life of the mine from CEE expenditures in their model and the total exploration and development expenditures we treated as CEE and CDE in our models. This difference should be relatively immaterial to the rankings of the jurisdictions.

Alberta - Processing allowance

The Two Ducks models assumed a processing allowance when calculating the net revenue royalty. It appears that all other eligible costs were already deducted and no processing allowance should have been assumed. The undiscounted processing allowance listed as a deduction on the 20% IRR base metal mine model for Two Ducks was $292 million.

Chile - Corporate tax rate

The corporate income tax rate applicable in Chile once profits are distributed to foreign shareholders is 35%. This was also the applicable rate at the time of the Two Ducks Report based on prevailing legislation at that time. Two Ducks used an effective tax rate of 42%. It is not clear why this was done. The effect on the tax liability on the 20% IRR base metal mine would be an overstatement of taxes payable of $128 million over the life of the mine.

Chile - Second tier tax

In order to remain consistent with Two Ducks, the models prepared include second-tier tax which is applicable once profits are distributed to shareholders. This is inconsistent with other jurisdictions where no allowance for the withholding tax, which is applicable on distribution of the after-tax profits is calculated. This is also inconsistent with the overarching assumption used by Two Ducks that no taxes on distributions to shareholders is considered. This second-tier tax is $197 million on the 20% IRR Base Metal Mine model over the LOM with no discounting based on the PwC-prepared model.

Mexico - Profit sharing payment

Mexico's legislation provides that there is a mandatory profit-sharing payment for all corporations based on the profits of the company. This additional payment on the 20% IRR base metal mine model for Two Ducks was $185 million over the LOM. This has been included in the models prepared by us to be consistent with Two Ducks, however we understand that tax planning is available to reduce or mitigate this payment. The payment has been classified as an infrastructure cost rather than a tax on our models, as it is not a tax payable to a government authority.

US - Depreciation, development, and depletion deductions for federal and Alaska income tax, Nevada net proceeds tax, and Alaska mining tax

We note that the deductions claimed in the models prepared by Two Ducks for depreciation, depletion, and development differed from the models prepared by us over the LOM. It is not clear what was causing this difference, but it should not create a significant impact to the ranking of the jurisdictions.

US Alaska - Exploration tax credit

Alaska provides a credit against state mining license tax for exploration expenses incurred. Two Ducks did not include this incentive in its model. The value of the credit based on the PwC-prepared 20% IRR base metal mine model over the life of the mine is approximately $41 million undiscounted.

Sweden – Investment allowance

The Two Ducks Report models included a deduction for an “investment allowance” in their calculation of corporate income tax. Our understanding is that there was no such allowance available as of 2007/8 and this deduction may relate to an allowance that was repealed in the 1990s. We have excluded this allowance from our analysis. The effect of the allowance was an understatement of corporate income tax over the LOM of approximately $11 million for the 20% IRR base metal mine model in the Two Ducks Report.

Phase 2 results: direct and indirect competitiveness

This section presents our analysis of overall tax competitiveness taking into account both direct taxes and indirect taxes. In this analysis, we include four types of indirect taxes: property tax, fuel tax, payroll tax, and carbon tax. We provide a description of each of these taxes, followed by analysis on their implications for tax competitiveness in the comparison jurisdictions. All figures in this section are calculated over the LOM using a 10% discount rate, consistent with the Phase 1 analysis.

Types of indirect taxation

This subsection describes the types of indirect taxation included in this study and provides a high-level overview of the applicable rates in each comparison jurisdiction.

Property tax

Property tax is generally based on the assessed value of the property (including the land and any buildings attached to that land) multiplied by a rate specified by the region in which the property is located. The calculation of this rate may further be broken down into various components; however, the aggregate rate is applied to the assessed value to get the annual property tax liability.

We have assumed for all jurisdictions that the assessed value is calculated in a manner similar to that calculated in the Northwest Territories. More specifically, we have assumed the assessed value is that of the land and building, but does not include the value of the underlying minerals to be mined. Further, where a property tax is based on the unimproved value of the land (i.e., excluding the value of any buildings or other equipment attached to the land), we have assumed this value is insignificant for the purpose of calculating property tax, on the basis that mines are generally located in remote areas where the value of land is relatively low.

In calculating the property tax liability for each jurisdiction, we needed to make an assumption on the location of the mine where property tax was levied at the municipal/region level. To the extent possible, we used rates applicable in common areas where mines are known to be located. However, it should be noted that there may be variances in the property tax rate depending on the precise jurisdiction selected, which may affect the rankings of the comparison jurisdictions.

Fuel tax

Fuel tax is generally levied on the purchase of different types of fuels at flat rates per litre/gallon. While these taxes can apply to a wide variety of fuels, for simplicity purposes and considering data limitations, we have only considered fuel tax on diesel.

Further, some jurisdictions provide exemptions from fuel tax or credits/refunds of fuel tax paid depending on how the fuel is used. For instance, many provinces in Canada either provide an exemption from tax or a refund of tax paid on fuel used off public roads and in a mine site. For purposes of applying these exemptions, we have generally assumed the “non-motive” fuel is used exclusively at the mine site and “motive” fuel is used for transportation on public roads.

Payroll tax

Payroll tax is generally a tax paid by employees and employers based on salaries/wages/benefits paid by a company to its employees. Such taxes can either be paid by the employer paying the remuneration or the employee receiving the remuneration. Even where a tax is paid by an employee, the employer may be responsible for withholding that

tax as a source deduction. As such, payroll tax is not a tax on the mining company's production or profit, but rather contributes to operating costs via wages.

We have only considered the employer's portion of payroll taxes in our models. We have not considered the taxes that the mine would have withheld on its employees' gross pay in satisfaction of the employee portion of the liability. We have also assumed that the average salaries provided by GNWT represent the gross pay to employees and no other taxable benefits are provided.

In some jurisdictions, the type of work performed by the employee affects the payroll tax being considered. Notably, this affected the determination of the rate for workers' compensation contributions in most Canadian jurisdictions. For simplicity, we have assumed that all employees perform mining-related work.

Carbon tax

Carbon taxes in the comparison jurisdictions are based on a variety of metrics including fuel consumption and CO_2 output. Where a tax is based on CO_2 output, we have used the carbon output at the higher rate provided by GNWT (i.e., 2.734kg/litre of diesel). We have not considered CO_2 output from sources other than fuel consumption.

We note that some provinces in Canada use a "cap-and-trade" system as a form of taxing carbon emissions. At a high level, under such a system a company is granted a set allowance of emissions per year. If they exceed those emissions, they are required to purchase additional allowances from other companies which are emitting less than their allowed amount. Such a system leaves the pricing of emissions to fluctuate based on supply and demand. We have not quantified payments under such a system, as it will depend on the initial allowance provided to them by the regulating authority and the pricing of additional emission credits, if they exceed that threshold. Instead, we have assumed that the cost to mines of cap-and -trade would be equivalent to the Federal carbon tax system in Canada, which seen as the minimum acceptable to the Federal government.

The following table summarizes the various secondary tax rates utilized in our models. Please refer to the discussion of individual jurisdictions for a more detailed description of the calculation of each tax in each respective jurisdiction.

Table 18: Indirect tax rates applied in Phase 2 analysis

Jurisdiction	Property tax rate[1]	Payroll tax rate	Fuel tax		Carbon tax	
			Motive fuel ($ Per Litre)	Non-motive fuel ($ Per Litre)	Base	Rate
NWT	1.246% - 1.605%	11.248%	0.131	0.071	Tonnes of CO_2	$20 - $50 per tonne
Alberta	2.0443%	9.028%	0.170	0.040	Litres of diesel	$0.0537 to $0.1341 per litre
British Columbia	5.7199%	10.288%	0.190	0.070	Tonnes of CO_2	$40 - $50 per tonne
Manitoba	4.9988%	10.728%	0.180	0.040	Litres of diesel	$0.0537 to $0.1341 per litre
New Brunswick	4.5521%	9.748%	0.255	0.040	Litres of diesel	$0.0537 to $0.1341 per litre
Newfoundland and Labrador	2.5100%	10.278%	0.205	0.205	Tonnes of CO_2	$20 per tonne
Nova Scotia	3.0910%	9.278%	0.194	0.040	Cap and Trade	
Ontario	5.9237%	12.638%	0.183	0.040	Litres of diesel	$0.0537 to $0.1341 per litre
Saskatchewan	1.8661%	8.088%	0.190	0.190	Litres of diesel	$0.0537 to $0.1341 per litre
Quebec	1.9500%	18.900%	0.242	0.040	Cap and Trade	
Yukon	1.4600%	10.680%	0.112	0.112	Litres of diesel	$0.0537 to $0.1341 per litre
Nunavut	1.1170%	9.468%	0.131	0.131	Litres of diesel	$0.0537 to $0.1341 per litre
Western Australia	0.0000%	15.000%	0.260	0.002	N/A	N/A
South Australia	N/A	14.450%	0.260	0.002	N/A	N/A
Peru	N/A	9.000%	0.666	0.666	N/A	N/A
Mexico	0.2000%	3.000%	N/A	N/A	N/A	N/A
Namibia	1.1097%	0.900%	N/A	N/A	N/A	N/A
South Africa	2.3500%	2.000%	0.290	0.290	Litres of diesel Tonnes of CO_2	$0.0087 per litre $4.16 - $7.15 per tonne
Chile	1.4000%	2.400%	0.060	0.060	N/A	N/A
Sweden	0.5000%	31.000%	N/A	N/A	Tonnes of CO_2	$170.82 per tonne
Alaska	0.9060%	7.650%	0.067	0.067	N/A	N/A
Nevada	N/A	9.130%	0.135	0.135	N/A	N/A

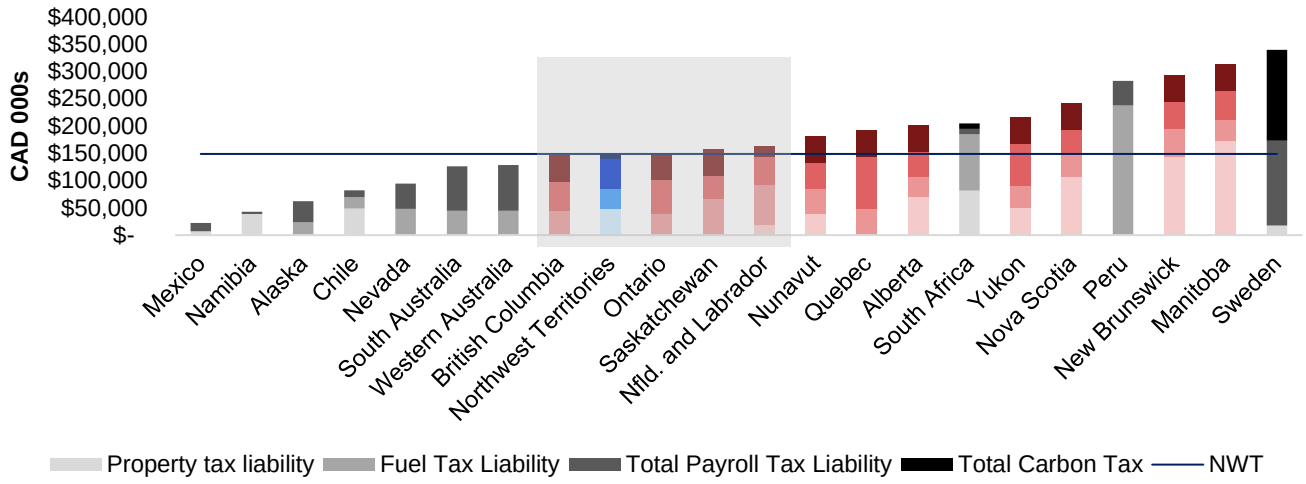
[1]In determining the property tax rates for the various jurisdictions, we made assumptions as to the location of the mine as property tax is levied at the municipal/regional level in many jurisdictions. There could be variances in the rate depending on the jurisdiction chosen.

Ranking and competitiveness

Diamond

Figure 20 shows total indirect taxes by jurisdiction, ranked from lowest to highest.

Figure 20: Total indirect taxes over LOM by type, diamond (sorted by total indirect taxes), red indicates Canadian jurisdictions, blue indicates NWT

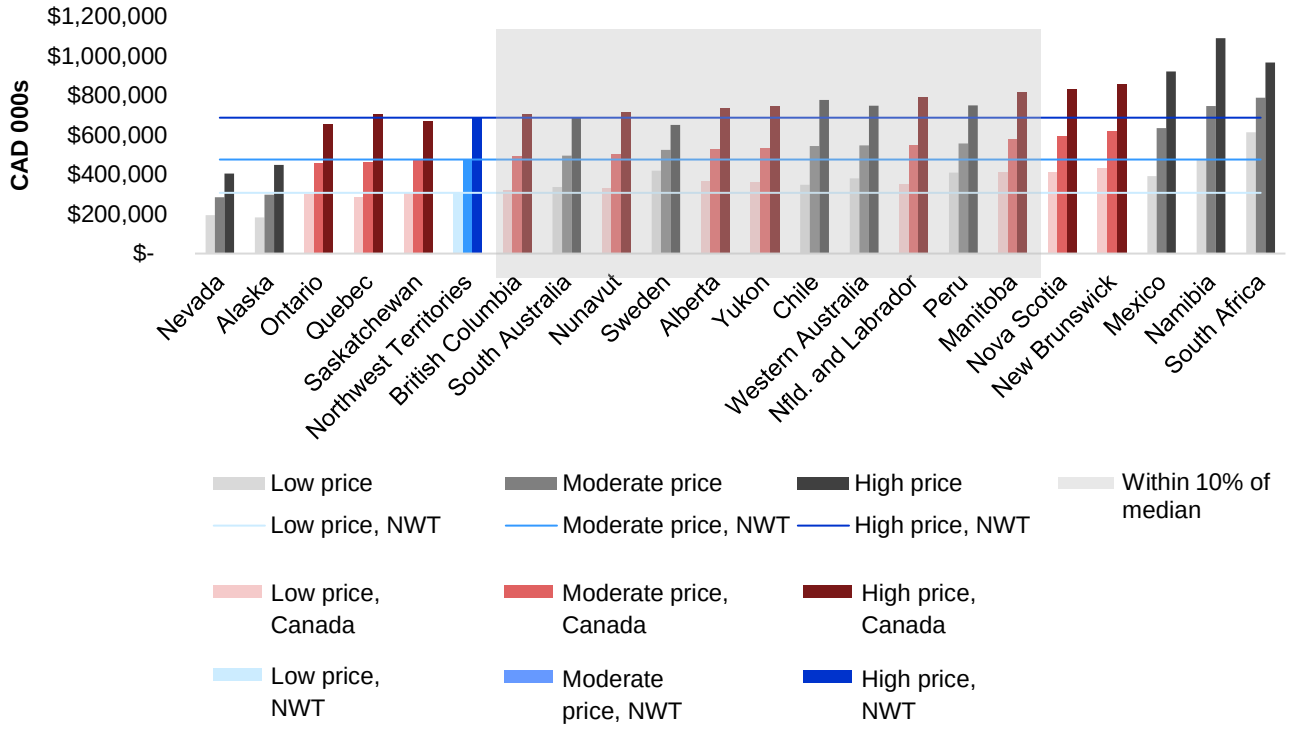


There are several important observations from our analysis of indirect taxes:

- **Indirect taxes are material**: indirect taxes are comparable in magnitude with direct taxes. For ten jurisdictions, indirect taxes are higher than direct taxes at low price levels (Ontario, Quebec, Nunavut, Sweden, Alberta, Yukon, Peru, Manitoba, Nova Scotia, and New Brunswick). For three jurisdictions (Sweden, Peru and Manitoba) indirect taxes are higher than direct taxes at moderate price levels.
- **Indirect taxes vary substantially by jurisdiction**: compared to direct taxes, there is relatively wider variation in indirect taxes. Mexico has the lowest indirect taxes at $22 million for the representative diamond mine, while Sweden has the highest at $340 million over the LOM on a present value basis.
- **The importance of each tax varies by jurisdiction**: each jurisdiction has a different breakdown of indirect taxes. For example, for some jurisdictions, property tax is the largest indirect tax, while others do not charge any property tax. For those jurisdictions where the mine would most likely be in a remote location, the property taxes have been assumed to be zero.
- **Indirect taxes are not related to profits**: they are based on the size of the operation and do not vary with profit levels, meaning that they make up a relatively higher share of the overall tax burden at lower profit levels.

The Northwest Territories has the ninth lowest total indirect taxes, an amount within 10% of the median. Indirect taxes in the Northwest Territories are slightly lower than most other Canadian jurisdictions. We note that the carbon tax is relatively low in Northwest Territories compared to other Canadian jurisdictions.

Figure 21: Total direct and indirect taxes over LOM, diamond (sorted by total direct and indirect taxes under moderate prices)



When taking into account both direct and indirect taxes, Northwest Territories has the fifth lowest overall taxes of all comparison jurisdictions under low prices, and the sixth lowest under moderate and high prices. For many jurisdictions, the inclusion of indirect taxes significantly affects their overall competitiveness and ranking compared to the other comparison jurisdictions.

There are ten jurisdictions whose ranking increased with the inclusion of indirect taxes. The jurisdictions whose ranking increased the most compared to direct taxes are Chile, South Australia, British Columbia, and Western Australia. Chile levies a property tax, payroll tax, and fuel tax, but at relatively low rates, while South Australia has no property and carbon taxes for mines, unlike most comparison jurisdictions.

The jurisdictions whose ranking decreased the most compared to their direct taxes ranking are Peru, Manitoba, Sweden, and New Brunswick. Sweden has the highest indirect taxes of any comparison jurisdiction, the majority of which are accounted for by payroll and carbon taxes, which are levied at 31%, the highest carbon tax of any comparison jurisdiction for our representative mine.

Unlike Sweden, Manitoba and New Brunswick have high property tax rates at 4.9988% and 3.961%, respectively, of the assessed value of land. For the purposes of this analysis, we have made simplifying assumptions on the municipality of the representative mines based on common locations for mines. We note that the property tax rate can significantly impact overall indirect taxes, and that our calculations are sensitive to assumptions about location. Please see Appendix B: Summary of indirect taxes by jurisdiction for full details.

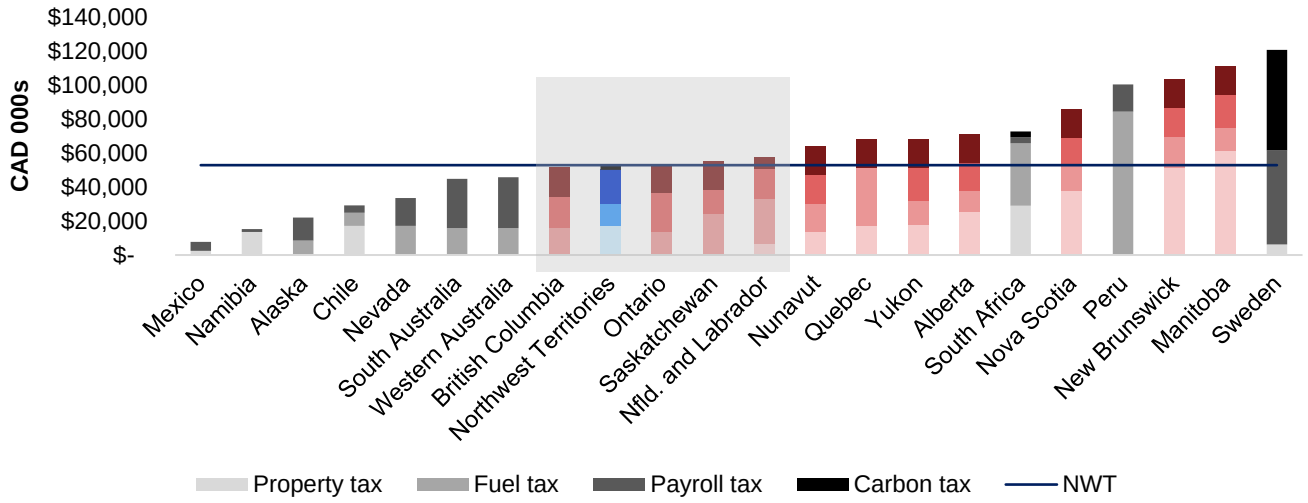
Table 19: Ranking of jurisdictions by tax competitiveness, diamond (sorted by ranking of LOM direct and indirect taxes, moderate prices)

Jurisdiction	Direct and indirect taxes- Rank	Total indirect tax- Rank	Direct taxes only- Rank	Direct and indirect taxes
Nevada	1	5	1	285,645
Alaska	2	3	2	297,527
Ontario	3	10	5	456,313
Quebec	4	14	4	464,854
Saskatchewan	5	11	6	470,631
Northwest Territories	6	9	8	475,627
British Columbia	7	8	12	492,898
South Australia	8	6	14	495,874
Nunavut	9	13	9	501,805
Sweden	10	22	3	524,467
Alberta	11	15	13	528,984
Yukon	12	17	11	533,482
Chile	13	4	19	543,273
Western Australia	14	7	18	546,571
Newfoundland & Labrador	15	12	17	550,088
Peru	16	19	7	556,441
Manitoba	17	21	10	578,210
Nova Scotia	18	18	16	592,808
New Brunswick	19	20	15	618,135
Mexico	20	1	20	634,616
Namibia	21	2	22	745,714
South Africa	22	16	21	788,952

Base metal

Figure 22 shows the total indirect taxes applicable to our representative base metal mine.

Figure 22: Total indirect taxes by type over LOM, base metal (sorted by total indirect taxes), red indicates Canadian jurisdictions, blue indicates NWT

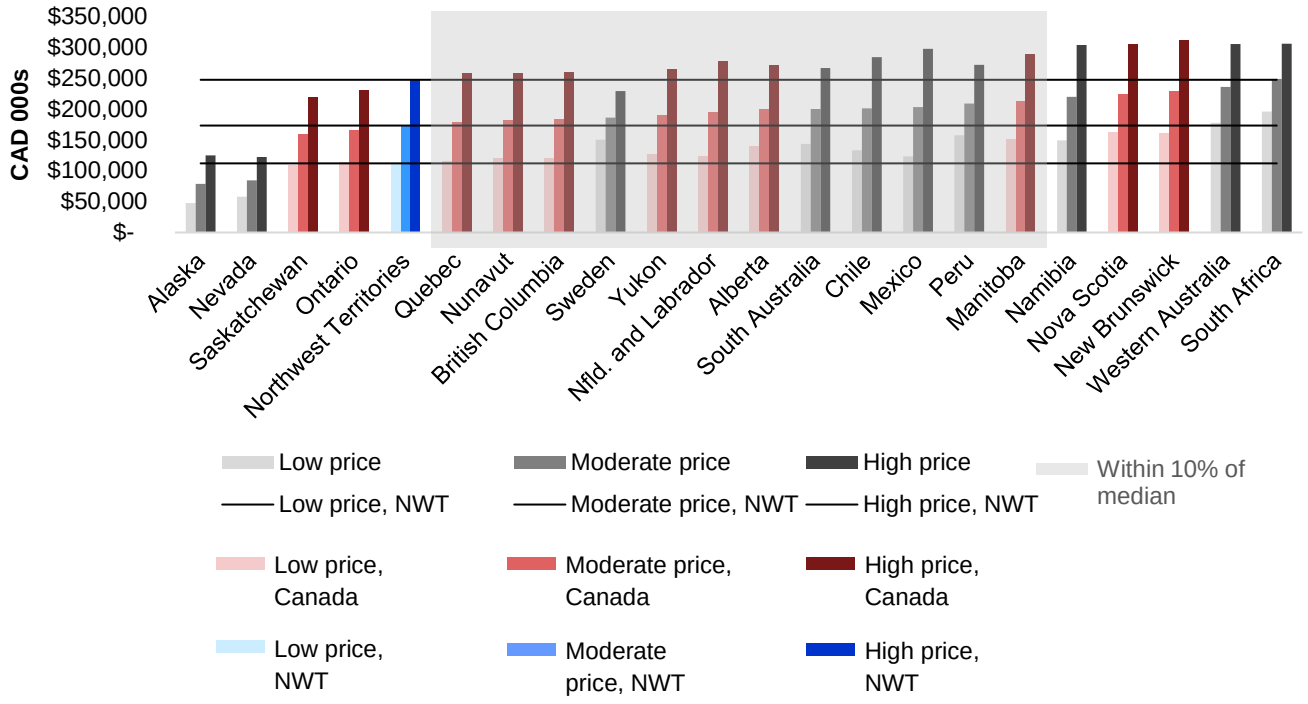


For the base metal mine, the Northwest Territories has the ninth lowest indirect taxes of all comparison jurisdictions. Overall, the ranking of the comparison jurisdictions in relation to indirect tax liability is similar for the two representative mines (diamond and base metal).

Similar to the diamond model, indirect taxes are material for the base metal model. In 11 jurisdictions, indirect taxes are higher than direct taxes at low price levels (Nevada, Saskatchewan, Quebec, Nunavut, Sweden, Yukon, Alberta, Peru, Manitoba, Nova Scotia and New Brunswick). For two jurisdictions (Sweden and Manitoba) indirect taxes are higher than direct taxes at moderate price levels.

The figure below shows total direct and indirect taxes for all comparison jurisdictions. When taking both types of tax into account, Northwest Territories has the fourth, fifth and sixth lowest taxes of all comparison jurisdictions for low, moderate and high prices, respectively.

Figure 23: Total direct and indirect taxes over LOM, base metal (sorted by total LOM direct and indirect taxes under moderate prices)



For base metal mines, the jurisdictions whose ranking increased the most compared to our ranking of direct taxes only are Mexico, Namibia, and Chile. These three jurisdictions have the lowest indirect taxes of any jurisdiction, although they are among the least competitive for base metal in terms of direct taxes only.

The jurisdictions whose ranking decreased the most compared to our ranking of direct taxes only are Peru, Manitoba, Sweden, and New Brunswick, which are consistent with the diamond analysis. Manitoba has the highest property taxes, while Peru has no property taxes and fuel taxes account for their high indirect tax liability. Sweden has one of the lowest property taxes of 0.5%, but the highest payroll and carbon taxes. As in other jurisdictions, property tax rates vary by municipality and these results would be sensitive to municipality choice. For the purpose of our analysis, we have selected representative municipalities based on common locations of mines.

Table 20: Ranking of jurisdictions by tax competitiveness, base metal (sorted by ranking of LOM direct and indirect taxes, moderate prices)

Jurisdiction	Direct and indirect taxes- Rank	Total indirect tax- Rank	Direct taxes only- Rank	Direct and indirect taxes
Alaska	1	3	2	78,958
Nevada	2	5	1	84,458
Saskatchewan	3	11	4	159,547
Ontario	4	10	5	166,610
Northwest Territories	**5**	**9**	**8**	**173,151**
Quebec	6	14	6	179,268
Nunavut	7	13	9	182,849
British Columbia	8	8	12	184,246
Sweden	9	22	3	186,169
Yukon	10	15	11	189,860
Newfoundland & Labrador	11	12	14	195,289
Alberta	12	16	13	199,602
South Australia	13	6	17	199,721
Chile	14	4	18	201,240
Mexico	15	1	20	203,258
Peru	16	19	7	209,016
Manitoba	17	21	10	213,373
Namibia	18	2	22	219,900
Nova Scotia	19	18	16	223,684
New Brunswick	20	20	15	229,170
Western Australia	21	7	21	235,707
South Africa	22	17	19	248,435

Cash flow comparison

To assess the profits going to mining companies, we compare post-tax cash flows, which are pre-tax cash flow less total direct and indirect taxes discounted at 10% over the life of the mine. This is comparable to the after-tax profit, taking into account both direct and indirect taxes. The competitiveness rankings of the post-tax cash flow are the same as those for total taxes because this model includes minimal variation in pre-tax cash flow.

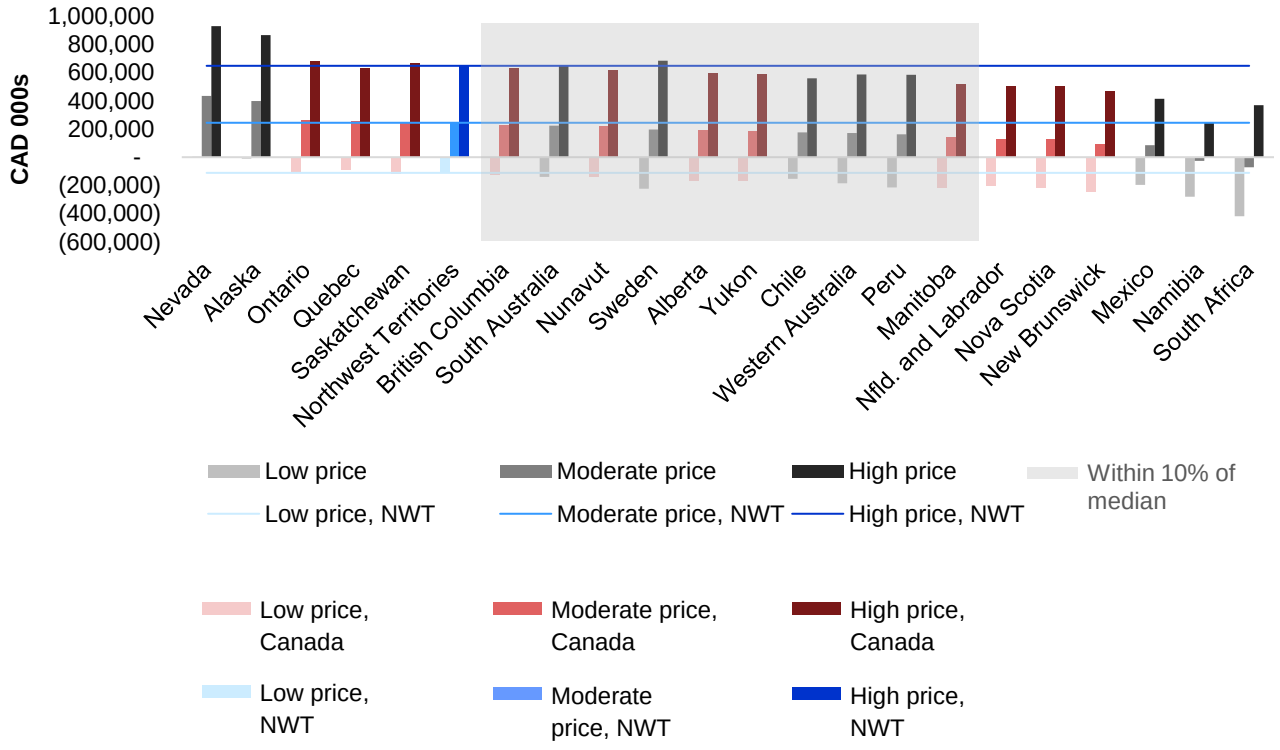
As noted in the cash flow analysis for Phase 1, we estimated the price levels based on different internal rates of return in order to illustrate the impact of mine profit levels on overall tax competitiveness. Therefore, these price levels do not necessarily correspond to real prices that may be considered “low” or “high” compared to market trends. The reader should keep this in mind when assessing the cash flow analysis, particularly in the case of

jurisdictions that appear to yield a negative cash flow. Our results for a particular jurisdiction should be viewed in relative terms to the other jurisdictions rather than in absolute terms.

We also note that given the way that indirect taxes are collected, they are typically considered by mining companies as operating costs, rather than as taxes (e.g. personal income tax and payroll tax are included in salaries paid to employees). Given that we have added indirect taxes to an assumed level of operating costs, the cash flow levels, and particularly negative cash flows, should be interpreted with caution. This model provides a guide of relative tax levels between jurisdictions, rather than an accurate estimate of tax paid for the operation.

Diamond

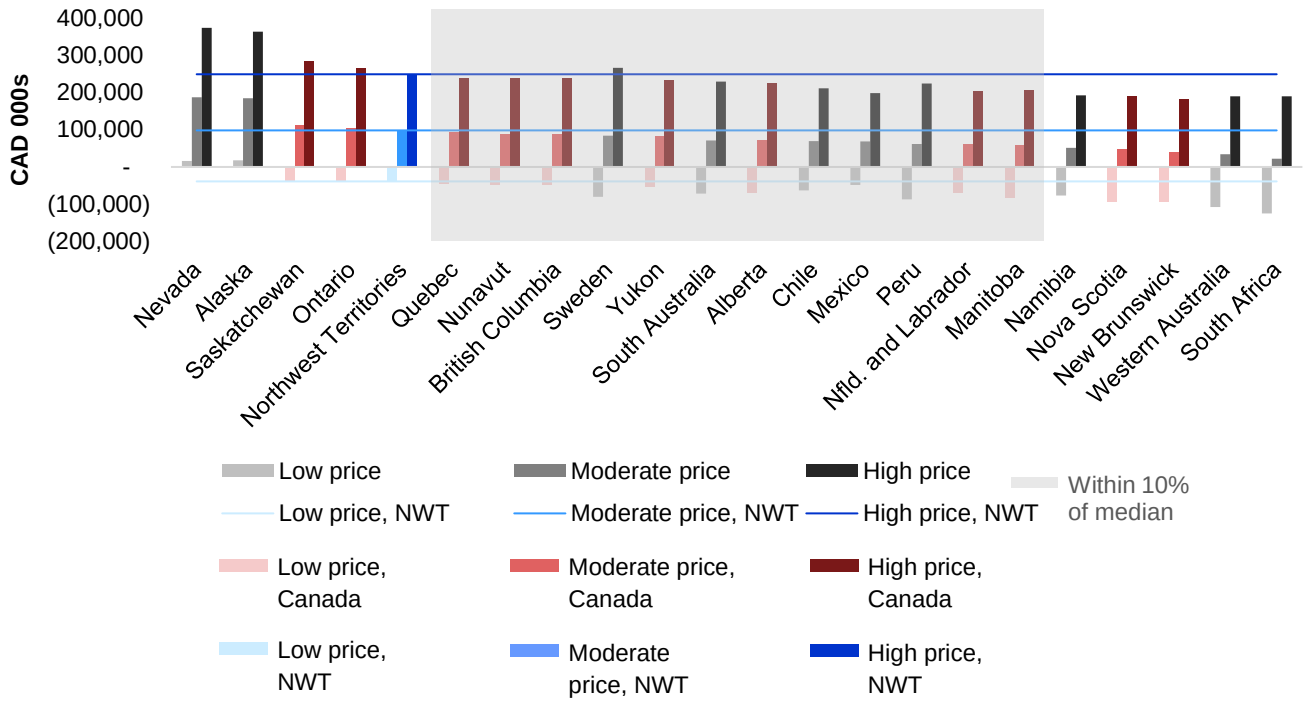
Figure 24: Post-tax cash flow by jurisdiction, diamond (sorted from highest to lowest at moderate price level)



At low prices, only Nevada has a positive cash flow, whereas at moderate price level, only Namibia and South Africa are the jurisdictions with negative cash flows. All the jurisdictions have positive cash flows at the high price level.

Base metals

Figure 25: Post-tax cash flow by jurisdiction, base metals (sorted from highest to lowest at moderate price level)



At low prices, Nevada and Alaska are the only two jurisdictions with positive cash flows. At both moderate and high levels, however, all the jurisdictions have positive cash flows.

Phase 3 results: Total cost analysis

This section presents our analysis of overall mining competitiveness, taking into account direct taxes and indirect taxes as well as the variation in capital and operating costs between comparison jurisdictions, thereby enabling a holistic comparison of competitiveness. We have assumed consistent geology of the mines and mining methods across all jurisdictions for the purposes of this assessment. Phase 3 includes an assessment of the following seven comparison jurisdictions, selected by GNWT based on the results of Phases One and Two: Northwest Territories, Alaska, British Columbia, Quebec, Saskatchewan, South Africa and Western Australia (the comparison jurisdictions). All figures in this section are calculated over the LOM using a 10% discount rate, consistent with the Phase 1 and Phase 2 analysis.

In this section, we introduce a new metric for comparison: total cost. In this context, total cost refers to the total mine capital and operating costs, including direct and indirect taxes. This is in contrast to Phase One and Two, where only taxes were presented because costs were held constant.

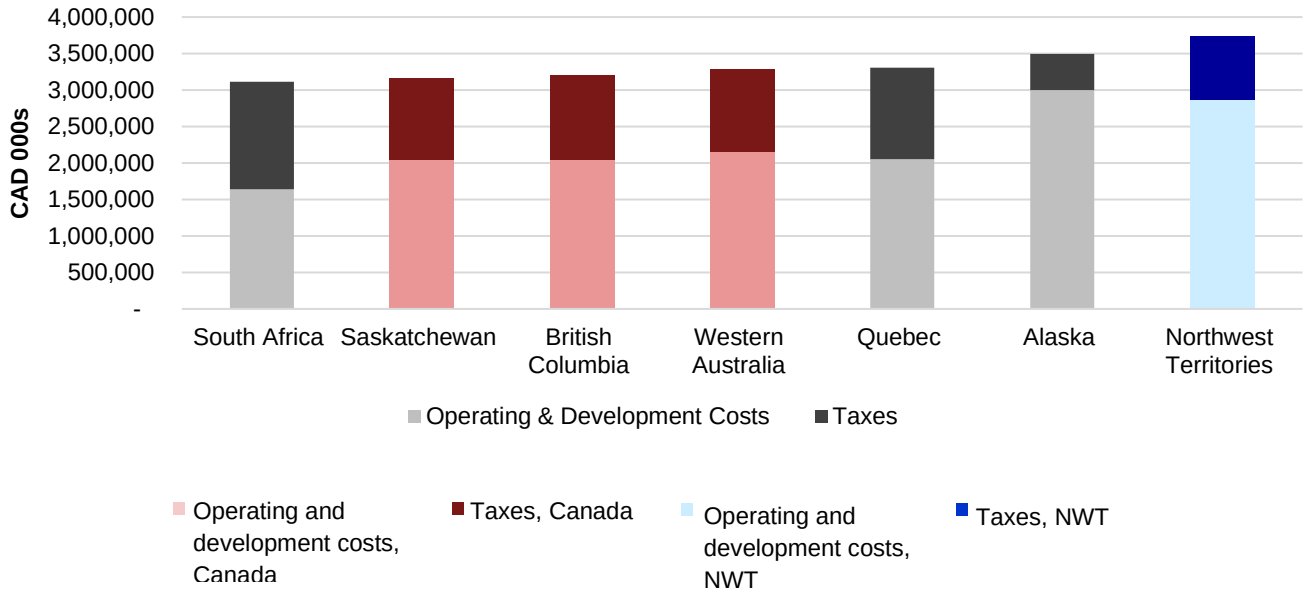
As in Phase 1 and 2, we have used three price levels, low, moderate and high. Price levels were calculated in order to provide a certain internal rate of return (IRR), which is a measure of profit. For the base metal mine in Phase 3, we have taken the same approach, basing our IRRs on the costs in the median cost jurisdiction. For the diamond mine in Phase 3, we have based low, medium, and high price levels on actual revenues of mines in the Northwest Territories, with input from GNWT.

Results of Phase 3: Ranking and competitiveness

Diamond

Figure 26 illustrates the total costs including taxes (at moderate price level) by jurisdiction, ranked from lowest to highest. Because we have assumed the same commodity prices for all jurisdictions, the jurisdiction with the lowest total costs also represents the jurisdiction with the highest post-tax cash flow.

Figure 26: Total costs (at moderate price level), diamond (sorted by lowest to highest total costs)



Of all the comparison jurisdictions, Northwest Territories has the highest total costs. This is mainly driven by the total operating and development costs of roughly $2.9 billion, the second highest out of the seven jurisdictions. Total taxes are $867.5 million, the second lowest of the comparison jurisdictions. Northwest Territories has the second highest capital and operating costs, and with the addition of the taxes has the highest total costs. Alaska has even higher capital and operating costs, but its taxes are significantly lower than those of Northwest Territories.

On the other end of the spectrum, South Africa has the highest absolute taxes out of all, yet it still maintains the lowest post-tax costs due to low capital and operating costs. Quebec, British Columbia, and Saskatchewan have similar capital and operating costs. The factors driving these results are discussed in the section below. We note that our cost analysis does not take into account additional factors that may make it easier or harder to operate in certain jurisdictions such as regulation, political stability, and access to markets for inputs and outputs.

An important result here is that is that total taxes represent a smaller share of total costs than capital and operating costs. On average, total taxes represent roughly 32.6% of the total costs, with the highest being 47.3% (South Africa) and the lowest being 14.3% (Alaska). This suggests that taxes have limited ability to offset differences in capital and operating costs.

The table below presents the rank of comparison jurisdictions by total costs, capital and operating costs, and taxes. Capital and operating costs form the majority of total costs, and therefore the ranking of post-tax costs is similar to the ranking of capital and operating costs.

The ranking of jurisdictions at each price level is similar because prices impact total (i.e. post-tax) costs primarily through taxes, which form a relatively small portion of total costs. Higher prices may impact operating costs due to competition for inputs, but overall this effect is not material.

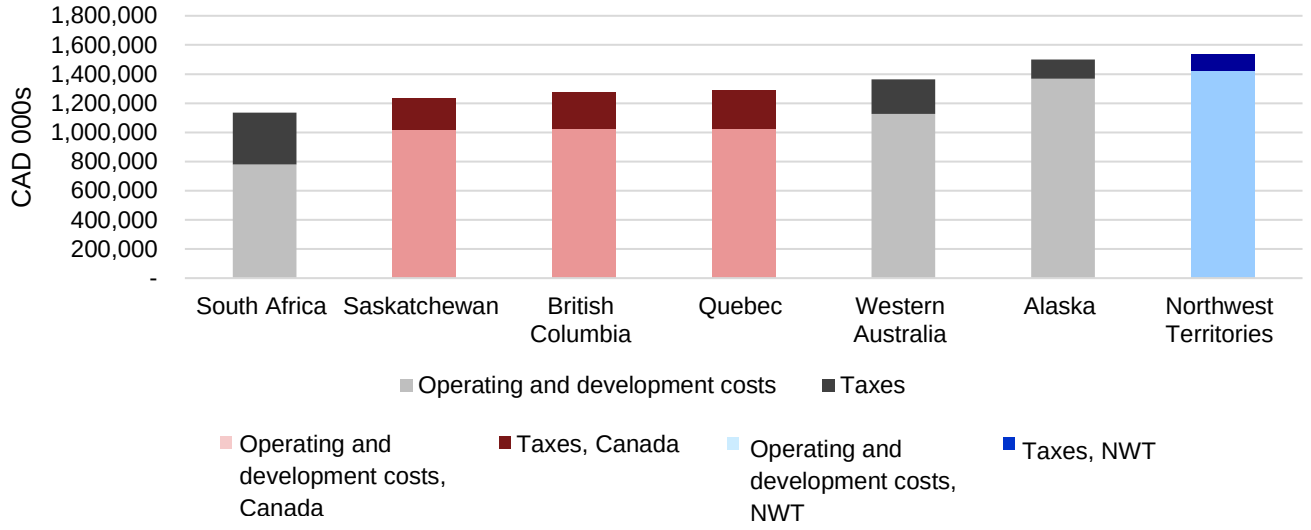
Table 21: Ranking of comparison jurisdictions by total cost competitiveness at moderate prices, diamond (sorted by ranking of total costs under moderate prices) (000s)

	Total Costs - Rank	Total Capital and operating costs - Rank	Total Taxes - Rank	Total Costs - Value	Total Operating & Development costs - Value	Total Taxes - Value
South Africa	1	1	7	$3,115,620	$1,641,853	$1,473,767
Saskatchewan	2	2	3	$3,167,057	$2,049,013	$1,118,044
British Columbia	3	3	5	$3,208,049	$2,049,013	$1,159,037
Western Australia	4	5	4	$3,277,689	$2,150,169	$1,127,520
Quebec	5	4	6	$3,304,711	$2,053,543	$1,251,168
Alaska	6	7	1	$3,497,232	$2,997,703	$499,529
Northwest Territories	7	6	2	$3,733,819	$2,866,331	$867,488

Base metals

Figure 27 illustrates total post-tax costs (at the moderate price level) by jurisdiction, ranked from lowest to highest total cost. Similar to diamond mines, we have assumed the same commodity prices for the comparison jurisdictions; therefore, the jurisdiction with the lowest total costs also represents the jurisdiction with the highest post-tax cash flow.

Figure 27: Total costs (at moderate price level), base metals (sorted by lowest to highest total costs)



As a share of total costs, total taxes are relatively small compared to operating and development costs. On average, total taxes represent 17.5% of the total costs, with the highest being 31.4% (South Africa) and the lowest being 7.2% (Northwest Territories).

The Northwest Territories has the highest post-tax costs, consistent with the results for diamond mines. This result is mainly driven by the total capital and operating costs of roughly $1.4 billion, the highest out of the comparison jurisdictions, and total taxes of $111.1 million, the lowest of the comparison jurisdictions. Despite the lower taxes that the jurisdiction imposes, Northwest Territories still has the highest post-tax costs. Costs in Northwest Territories are higher for a number of reasons, the largest of which is the need for dedicated transportation and energy infrastructure. Other factors are discussed in the section below. Although South Africa has the highest taxes out of the comparison jurisdictions (49.3% of pre-tax profits), it still has the lowest post-tax costs because its capital and operating costs are substantially lower (leading to higher pre-tax profits) than the other comparison jurisdictions, mainly driven by relatively low labour costs.

As with the diamond analysis, we have found that price levels do not affect our overall results in terms of competitiveness ranking.

Table 22: Ranking of comparison jurisdiction by total costs competitiveness at moderate prices, base metals (sorted by ranking of total costs under moderate prices)

	Total Costs - Rank	Total Capital and operating costs - Rank	Total Taxes - Rank	Total Costs - Value	Total Operating & Development costs - Value	Total Taxes - Value
South Africa	1	1	7	$1,135,409	$778,712	$356,697
Saskatchewan	2	2	3	$1,235,683	$1,022,436	$213,247
British Columbia	3	3	5	$1,275,765	$1,024,927	$250,839
Quebec	4	4	6	$1,290,633	$1,024,927	$265,706
Western Australia	5	5	4	$1,364,286	$1,127,475	$236,812
Alaska	6	6	2	$1,500,412	$1,367,896	$132,516
Northwest Territories	7	7	1	$1,537,185	$1,426,053	$111,132

The total costs including taxes is largely driven by the capital and operating costs. The table above illustrates that the rankings of competitiveness based on total costs are very similar to those based on total operating and development costs. An exception is Quebec, British Columbia, and Saskatchewan. These provinces have similar capital and operating costs; therefore taxes affect their ranking relative to each other.

Discussion of cost drivers

This section discusses the drivers of the cost variation between jurisdictions.

We estimated the characteristics of a "typical" mine in each jurisdiction based on documentation of operating mines and exploration projects. We used these characteristics, as well as secondary data, to estimate costs of capital expenditure, operating expenditure, construction of any needed transportation infrastructure, and exploration. Therefore, our analysis takes into account the following factors:

- Transportation infrastructure
- Energy infrastructure
- Labour costs
- Operating costs associated with remoteness, such as shipping and inventory
- Maintenance
- Other factors (e.g. administration, procurement, IT expense)

Please refer to the Methodology section for more details.

The table below summarizes our assumptions around energy and transportation infrastructure required in each jurisdiction.

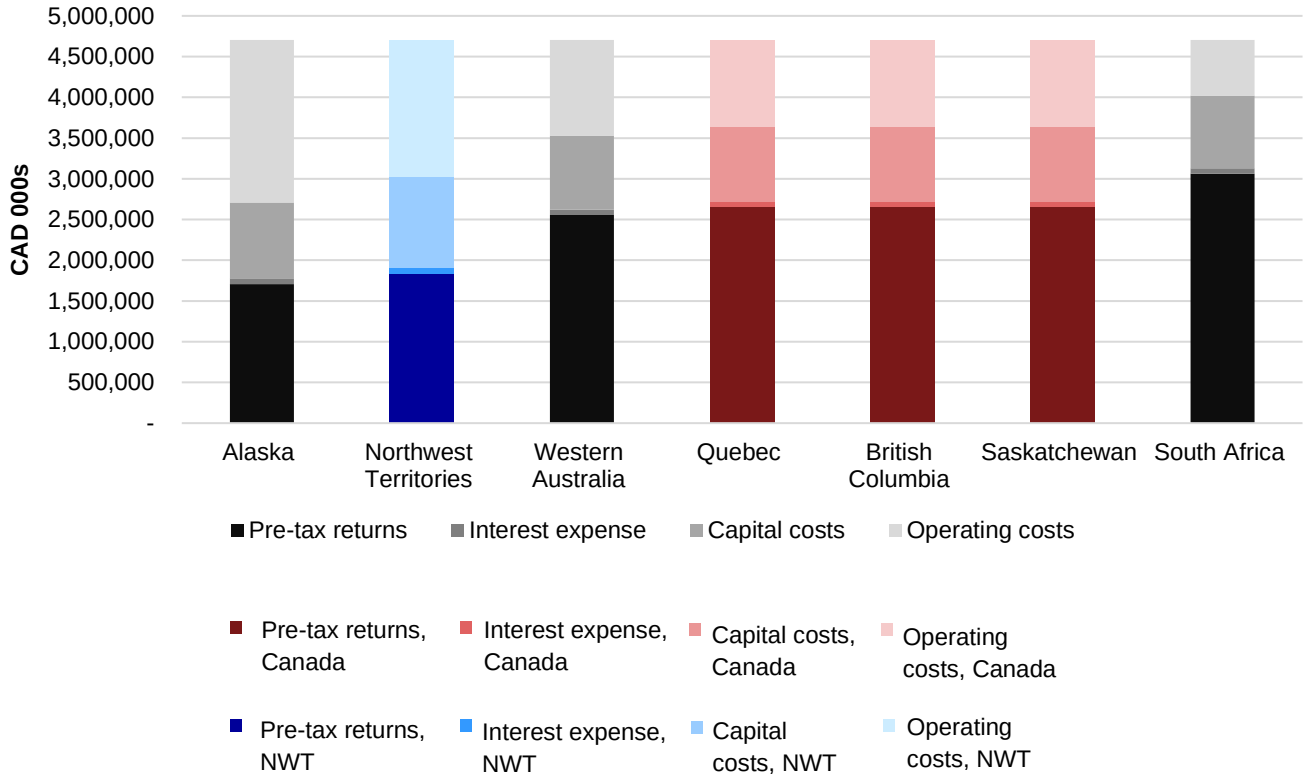
Table 23: Assumptions on energy and transportation infrastructure

Jurisdiction	Region	Transportation infrastructure	Power infrastructure
Northwest Territories	No major variation in infrastructure needs between regions	Ice road, air strip, Deepwater port for base metal mine	Diesel generating station
Alaska	Northwest Arctic Borough (Arctic circle)	Deepwater port, private road connecting to port	Diesel generating station
British Columbia	Northwestern British Columbia/ Golden Triangle area	Private road connecting to existing ports or highway	Transmission line to provincial power grid
Saskatchewan	Northern Saskatchewan	Private road connecting to existing highway, airstrip	Transmission line to provincial power grid
South Africa	No major variation in infrastructure needs between regions	Rail transportation to industrial ports	Transmission line to power grid
Quebec	Matagami area	Private road connecting to existing highway, airstrip	Transmission line to provincial power grid
Western Australia	No major variation in infrastructure needs between regions	Private road connecting to existing highway, airstrip	Diesel generator with fuel supply via pipeline

Diamond

Based on the approach described above, Figure 28 shows the breakdown of total costs over the LOM for diamonds.

Figure 28: Breakdown of costs over LOM based on moderate diamond price, diamond (sorted by pre-tax profits), red indicates Canadian jurisdictions, blue indicates NWT



The Northwest Territories generates the second-lowest pre-tax profit due to relatively high capital and operating costs. High capital costs are based on the need to build a diesel power generating station, as well as an annual ice road because all-season roads are not available. Operating costs are also higher due to the operation of this infrastructure, as well as higher costs of inputs due to shipping, logistics, and maintenance.

Western Australia's relatively high costs are largely driven by labour costs, which we have estimated to be 23% higher than the Canadian average. Although mines in Western Australia are remote, infrastructure challenges are not significantly greater than other comparison jurisdictions. Quebec, British Columbia, and Saskatchewan have similar capital and operating costs. Most mines in those jurisdictions are able to connect to existing highways using private roads, and can construct transmission lines to connect to the power grid.

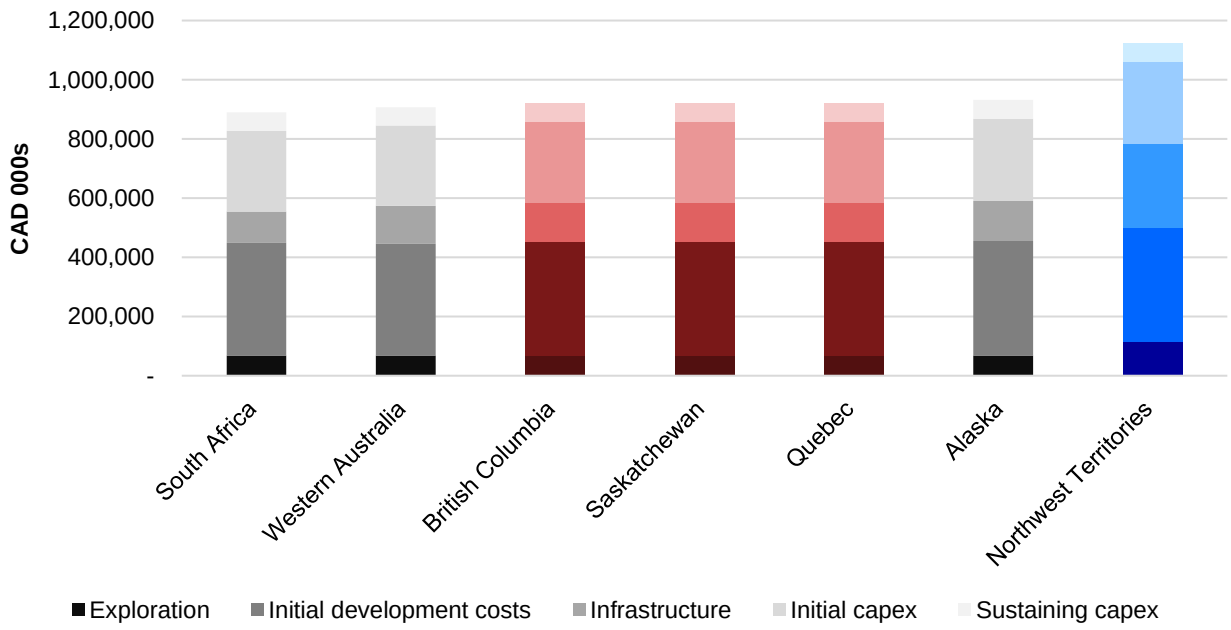
South Africa generates the highest pre-tax profits by a significant margin. This is mainly driven by the lower operating costs in terms of materials and labour.

Table 24: Mining and processing operating costs per tonne by jurisdiction, diamond (sorted by total operating cost/tonne)

	South Africa	British Columbia	Saskatchewan	Quebec	Western Australia	Northwest Territories	Alaska
Mining cost/tonne	$26.60	$40.45	$40.45	$40.66	$44.17	$65.42	$78.75
Processing cost/tonne	$5.58	$9.29	$9.29	$9.29	$11.07	$13.56	$15.13
Total operating cost/tonne	$32.19	$49.74	$49.74	$49.95	$55.24	$78.98	$93.88

Based on our analysis South African diamond mines incur roughly $26.60 per tonne in mining and $5.58 per tonne in processing, which are 59.3% and 58.8% lower than those of Northwest Territories, respectively. The total operating cost per tonne for South Africa is 59.2% lower than the Northwest Territories. This result is driven by the additional operating costs associated with remote mine locations, as well as labour costs. Northwest Territories ranks sixth of the seven jurisdictions for operating cost per tonne; which is reflected in its ranking of pre-tax profits.

Figure 29: Breakdown of capital costs by jurisdiction, diamond (sorted by total capital costs), red indicates Canadian jurisdictions, blue indicates NWT



The capital costs of mines within various jurisdictions are very comparable, with the exception of Northwest Territories. Due to the climate of the regions in which mines operate, ice roads must be built and maintained at an estimated $112,500 per kilometer annually. Mines in the Northwest Territories seldom has access to a nearby power transmission lines; therefore, they must operate a diesel power generator, which is estimated to cost roughly $6.24 per tonne of production, which is included in operating cost per tonne. Based on the level of production we assumed, both these costs add up to roughly $62.5 million per year - this is the biggest driver in the high capital and operating costs in the Northwest Territories.

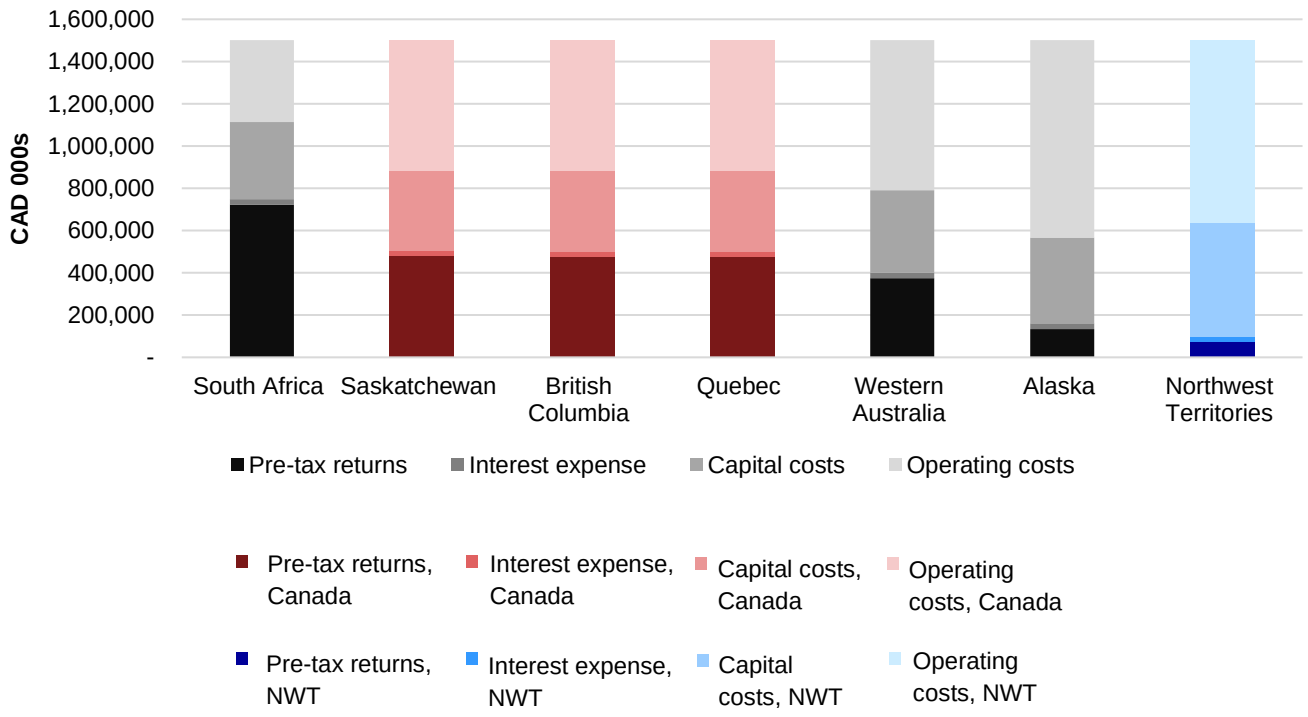
Our analysis of existing mines and exploration projects in the comparison jurisdictions show that typical mines in these regions have access to public roads or rail infrastructure (usually via a private road to a highway or rail connection) and existing power grids (via a transmission line). The exception is Alaska, which has many similar

cost challenges to Northwest Territories including the need for diesel power generation and port construction. However, based on our analysis of typical mines in Alaska, we have assumed that no ice road will be used, which lowers infrastructure costs over the project lifetime.

Base metals

Figure 30 shows total costs over the LOM for base metal.

Figure 30: Breakdown of costs over LOM based on moderate base metal price, base metals (sorted by pre-tax profits)



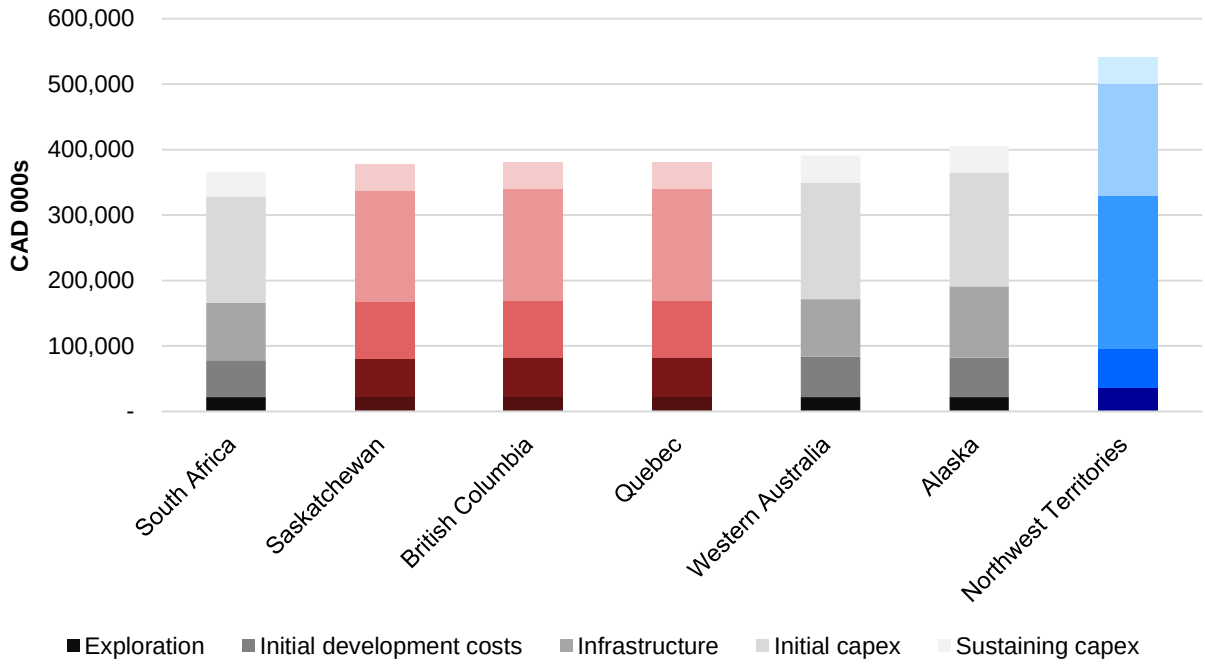
Overall, the results are similar to our diamond analysis. South Africa generates the highest pre-tax profits by a significant margin, driven by the lower operating costs for both materials and labour. The capital costs across the jurisdictions are generally comparable, with the exception of Northwest Territories that require additional infrastructure to be built based on its climate and geology.

Table 25: mining and processing operating costs per tonne by jurisdiction, base metals (sorted by total operating cost/tonne)

	South Africa	British Columbia	Quebec	Saskatchewan	Western Australia	Northwest Territories	Alaska
Mining cost/tonne	$22.65	$41.37	$41.37	$41.37	$47.92	$60.02	$63.33
Processing cost/tonne	$13.85	$17.87	$17.87	$17.87	$20.19	$23.23	$26.82
Total operating cost/tonne	$36.50	$59.24	$59.24	$59.24	$68.11	$83.25	$90.15

South Africa's operating cost per tonne is the least expensive out of all the jurisdictions. Due to similarities in the characteristics of the sample of mines in the regions, we found that British Columbia, Saskatchewan and Quebec have the similar operating costs. Alaska is the most expensive region with a total operating cost of $90.15 per tonne.

Figure 31: Breakdown of capital costs by jurisdiction, base metals (sorted by total capital costs), red indicates Canadian jurisdictions, blue indicates NWT



The results of the capital costs are similar to the diamond analysis. Northwest Territories is again the most expensive jurisdiction, due to the need for additional transportation and energy infrastructure. Our model base metal mine also includes a port, which adds to both capital and operating costs. The ice roads must be built and maintained at $94,200 per kilometer annually. Northwest Territories also seldomly has access to nearby power transmission lines; therefore, they must operate a diesel power generator, which is estimated to cost roughly $6.24 per tonne of production. Based on the level of production we assumed, both these costs add up to roughly $45.6 million per year - this is the biggest driver of high costs in the Northwest Territories.

Fair return assessment

This section provides an assessment of whether the Northwest Territories is receiving a fair return on its mineral resources. At the heart of this question is the trade-off between tax rates and mining activity. Higher rates enable governments to capture a larger share of pre-tax cash flows, while lower rates may encourage greater investment, but provide a smaller share of pre-tax cash flows to governments. Furthermore, in an industry based on exhaustible assets, governments must consider the trade-off between tax collection from exiting mining operations and the incentive for exploration and delineation of new discoveries to sustain the industry and associated mining taxes in the longer term. The right balance for each jurisdiction depends on a range of factors including costs and alternative options for economic development. The taxes assessed through this study are set at the national, sub-national, and municipal levels, meaning that all these levels of government would be involved in the taxation decision.

The total pre-tax cash flow from developing a mine is split between the tax revenue to government and the profits to the mining company. Before discussing the sharing of this profit between government and company, we note that corporate investment decisions are typically made on the basis of meeting a set of minimum return criteria which include size measures such as metal produced, annual cash flow, or net present value, and minimum return measures such as IRR, payback period, or operating margins.

As noted elsewhere in this report, “low,” “moderate,” and “high” prices do not necessarily correspond to real commodity prices, but should be interpreted as an illustration of low, moderate and high profit mines. In reality, a mine with negative expected post-tax earnings would not meet the criteria for development by mining companies, and so would not be constructed. On this basis, we should restrict the discussion of fair return to government to the cases where companies would realistically develop mines.

The fair return analysis has three components. First, we compare the division of pre-tax profits between companies and governments, holding costs constant across all jurisdictions as per Phase 2 findings (fair return under constant costs). We then assess fair return taking into account variation in costs between jurisdictions, based on Phase 3 results (fair return including cost variations). Finally, we discuss how the economic alternatives to mining play into the interpretation of fair return (economic alternatives).

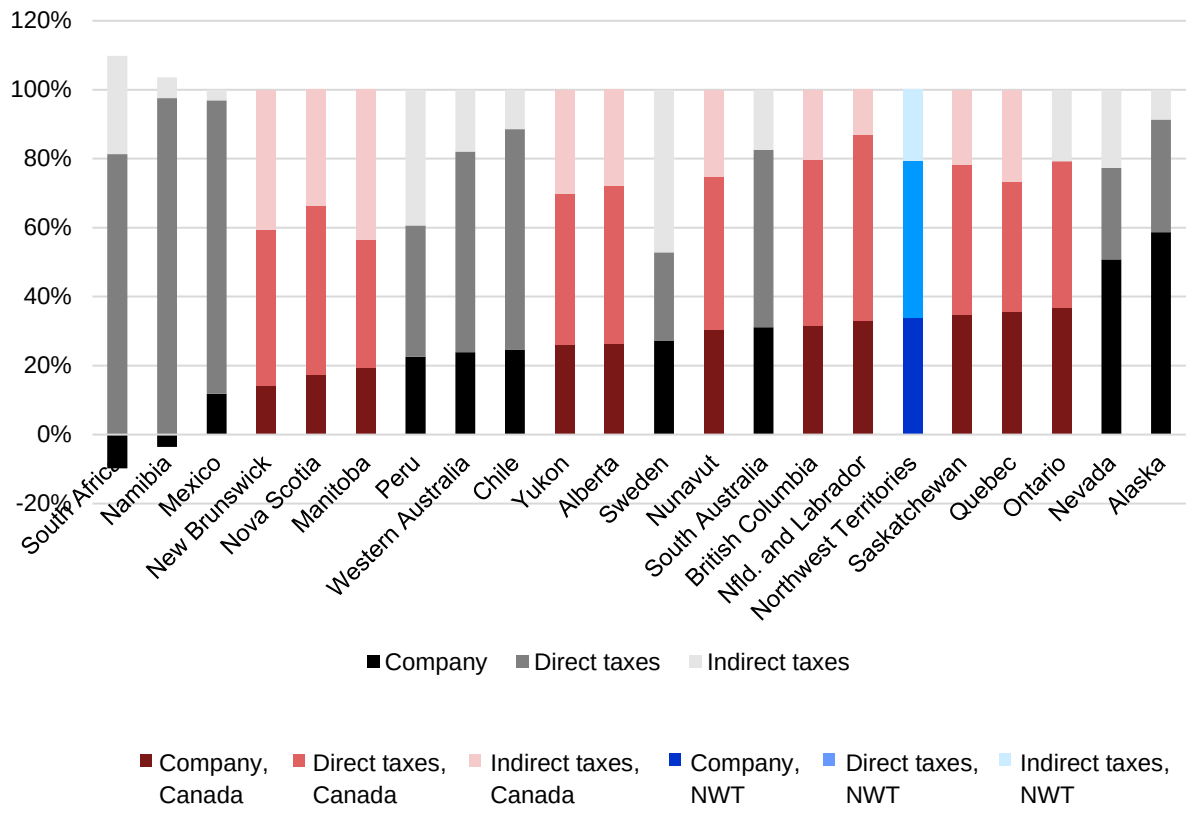
Fair return under constant costs

Under constant cost and revenue assumptions in Phase 2, pre-tax cash flow, which is essentially pre-tax profit, is the same in all jurisdictions. We compare the division of this pre-tax cash flow between the company and governments. The company share would be the company’s post-tax profit, and the government share is collected in the form of direct and indirect taxes. The government share of pre-tax cash flow can be considered the average effective tax rate for the mine. The following describes our findings in this regard for diamond and base metal mines.

Diamond

At moderate prices, the Northwest Territories captures 66% of pre-tax profit, of which the majority is direct taxes. In other words, the company has an effective tax rate of 66% of cash flow. The nominal (non-discounted) rate would be even higher. The share of pre-tax profits paid in taxes is highly variable across the set of comparison jurisdictions, and ranges from a low of 41% in Alaska to a high of 110% in South Africa, with a median value of 73% and an average of 74%. The values within Canada are also highly variable with a high of 86% in New Brunswick and a low of 63% in Ontario. The jurisdictions in Canada that have diamond reserves fall within a smaller range: from 70% in Nunavut to 65% in Quebec.

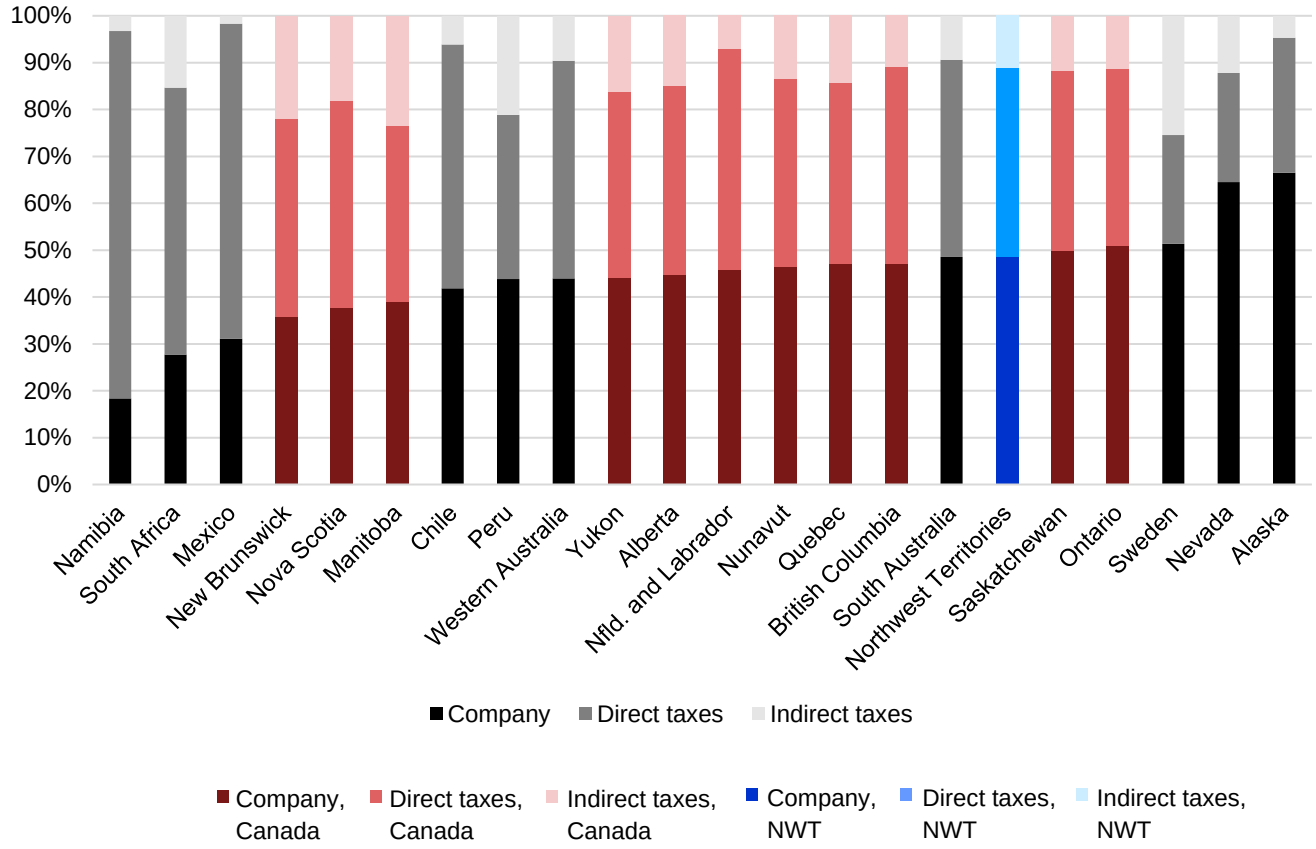
Figure 32: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, diamond, moderate prices



In certain jurisdictions, the government share is greater than 100% of pre-tax profit. This can be the case due to taxes on production and inputs, which are incurred regardless of profit levels. We note that if expected post-tax cash flow was negative, a mine would not be built. We further note that the jurisdictions with the highest government share of pre-tax cash flow (Mexico, Namibia, and South Africa) have relatively low labour costs, meaning that pre-tax profit would be relatively high compared to this analysis, where costs are held constant. This issue is addressed in more detail below with the incorporation of cost variation in the fair return discussion.

At high prices, we would expect the average effective tax rate (government share) of pre-tax profits to decrease. This is in fact the case for all jurisdictions including Northwest Territories, which captures 51% of pre-tax profit, with the majority collected through direct taxes. The range of values across comparison jurisdictions is 33% in Alaska to 82% in Namibia, with a median value of 55%. At higher revenues, indirect taxes make up a smaller share of total pre-tax profit because they are calculated based on spending, which was assumed in our analysis to be constant regardless of commodity prices.

Figure 33: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, diamond, high prices



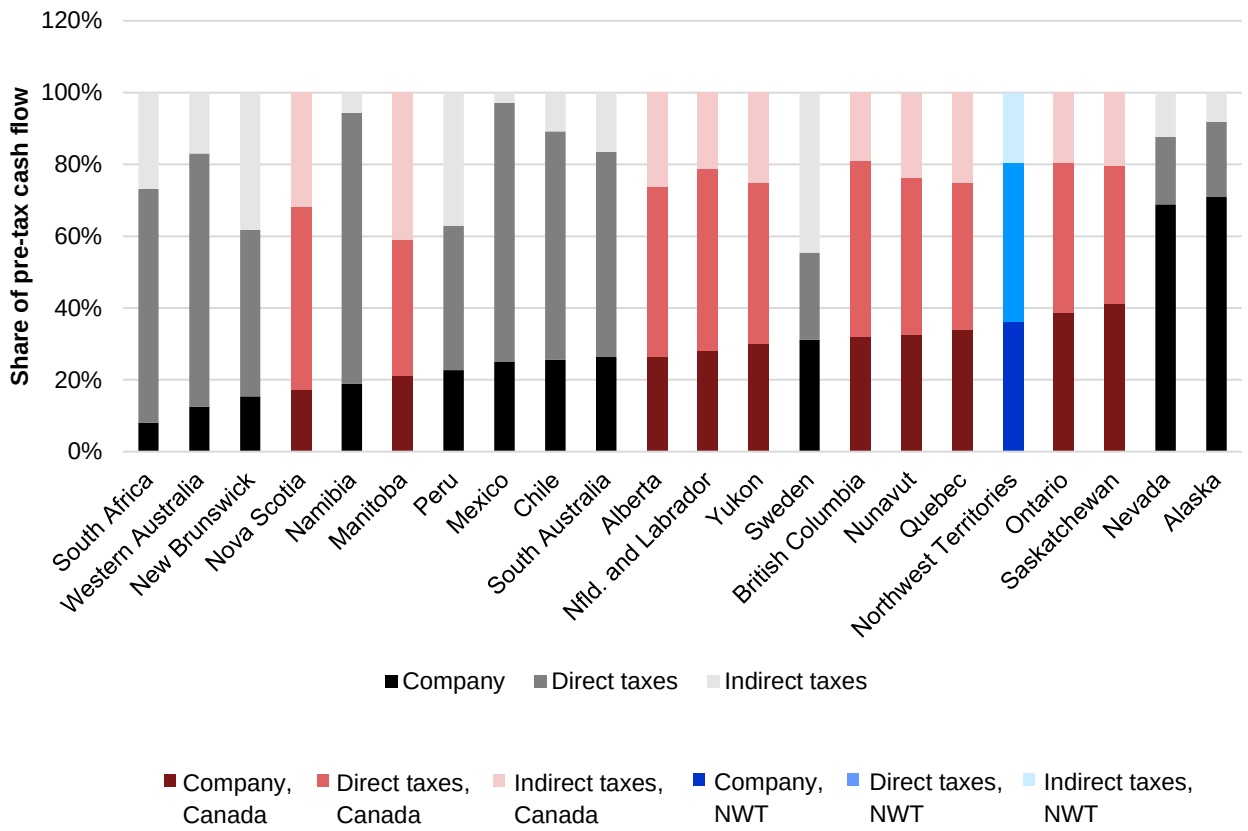
At low prices, 15 of the 22 jurisdictions including the Northwest Territories yield a negative profit for the company. This can occur when production is taxed, but profits are low. With negative expected profit, a mine would not be built; therefore, we have omitted the low price scenario from this discussion.

Base metals

Low prices yield negative after-tax profits in most jurisdictions. We therefore omit this scenario in our fair return analysis, as these mines would not be built.

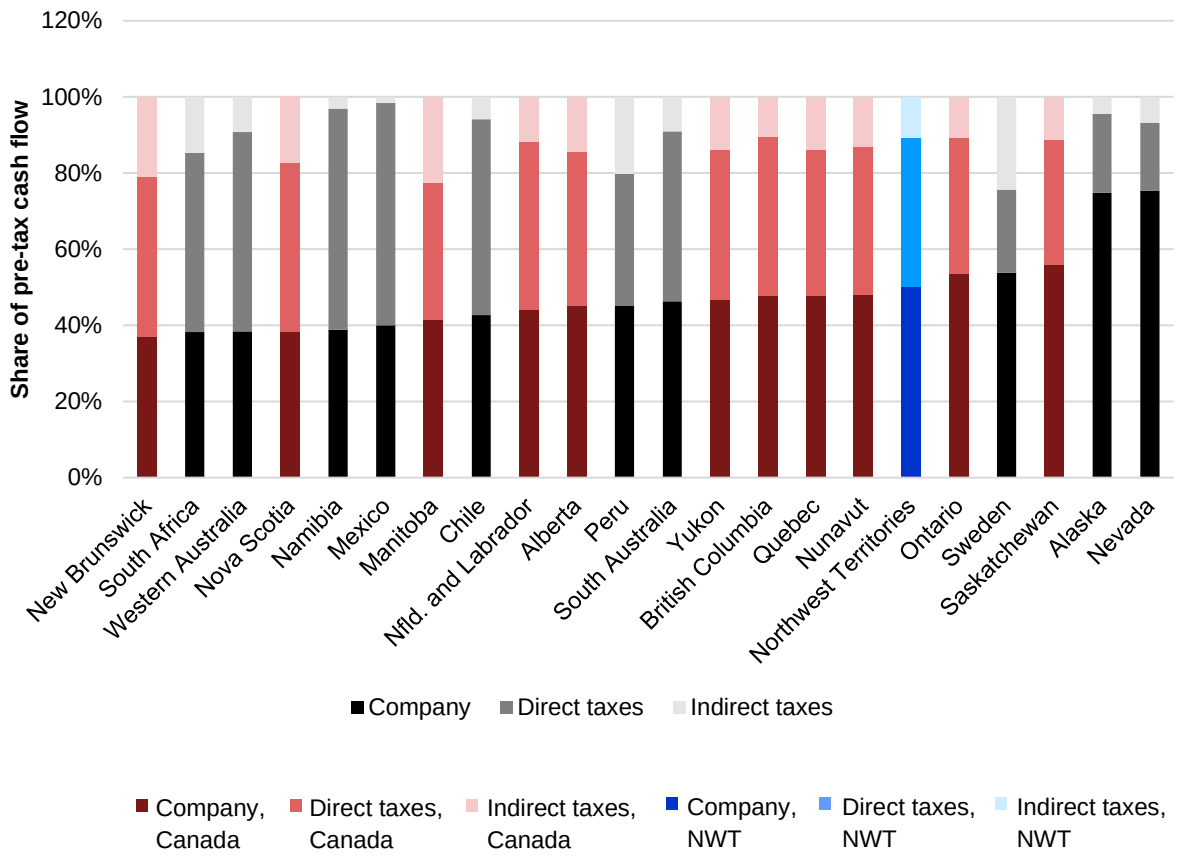
In a moderate price scenario, all jurisdictions yield a positive after-tax profit on our base metal mine. In the Northwest Territories, the government captures 64% of pre-tax profit, with the remaining 36% going to the mining company. The government's share in the Northwest Territories is slightly lower than the median of 73% among the comparison jurisdictions. Nevada and Alaska have substantially lower taxes in this scenario, capturing 31% and 32% of pre-tax profit, respectively.

Figure 34: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, base metal, moderate prices



In a high-price scenario, Northwest Territories captures 50% of pre-tax profit, with 39% collected through direct taxes and 11% collected through indirect taxes. The Northwest Territories' government share is slightly lower than the median among comparison jurisdictions of 54%. The highest government tax share is in New Brunswick, which collects 63% of pre-tax profit as taxes.

Figure 35: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, base metal, high prices



Conclusion

For both diamond and base metal cases under moderate and high price scenarios, the total taxes collected in the NWT fall within the lower third of the distribution of the 22 jurisdictions assessed. Jurisdictions that collect taxes equating to a higher percentage of pre-tax NPV than the NWT are deemed less competitive from a tax perspective, yet maintain productive mining sectors due to other factors affecting costs such as deposit quality, labour costs, and access to infrastructure.

These comparative results, which do not take cost into account, could be interpreted to mean that the NWT could collect a higher share of profits without significantly impacting on overall investment. If so, it is possible to conclude that the NWT may not be receiving a fair return on its mineral resources. However, to more fully explore this issue, we must expand the fair return assessment to incorporate the more realistic scenarios developed in Phase 3 whereby remoteness factors are built into NWT capital and operating cost estimates.

Fair return including cost variations

The previous section assessed the division of pre-tax profits assuming that costs are the same across all jurisdictions. Under that assumption, the NWT is highly competitive falling in the lower third of taxes collected

across comparison jurisdictions. From a fair return perspective, we raised the question of whether the NWT could in fact capture a higher share of profit without impacting investment.

To more fully address the issue of the fairness of government returns, this section models a more complete scenario by taking into account the variation in pre-tax capital and operating costs across the seven Phase 3 comparison jurisdictions. Variation in cost affects the profit sharing results in the following ways:

- Cost drives pre-tax profits, which in this analysis vary by jurisdiction
- Profits affect direct taxes paid
- Varying costs of inputs (e.g. labour) affect indirect taxes paid

Therefore, both pre-tax profit and the government's share of pre-tax profit will be different than in the constant-cost analysis. In this section, the breakdown is shown as a share of revenue rather than of pre-tax profit in order to illustrate the underlying cost variations. The interpretation of the "company" value is the same, which is post-tax profit going to the company. As in the constant-cost analysis, the government share can be interpreted as the average effective tax rate on cash flows.

We find that given the relatively high capital and operating costs in the Northwest Territories, prices must be relatively high for mines to generate positive after-tax profits for mining companies. Even with high prices, the profits are comparatively low, allowing for only a limited level of taxation while remaining competitive. Consequently, the Northwest Territories has relatively low taxes in relation to the comparison jurisdictions, usually below the median level among the 22 comparison jurisdictions.

Diamond

Taking cost variation into account, the Northwest Territories provides the lowest post-tax profit to mining companies, which is largely driven by relatively low pre-tax profits as a result of higher costs. These low pre-tax profits combined with average or below-average tax rates have led to relatively low amounts of tax collected in these jurisdictions.

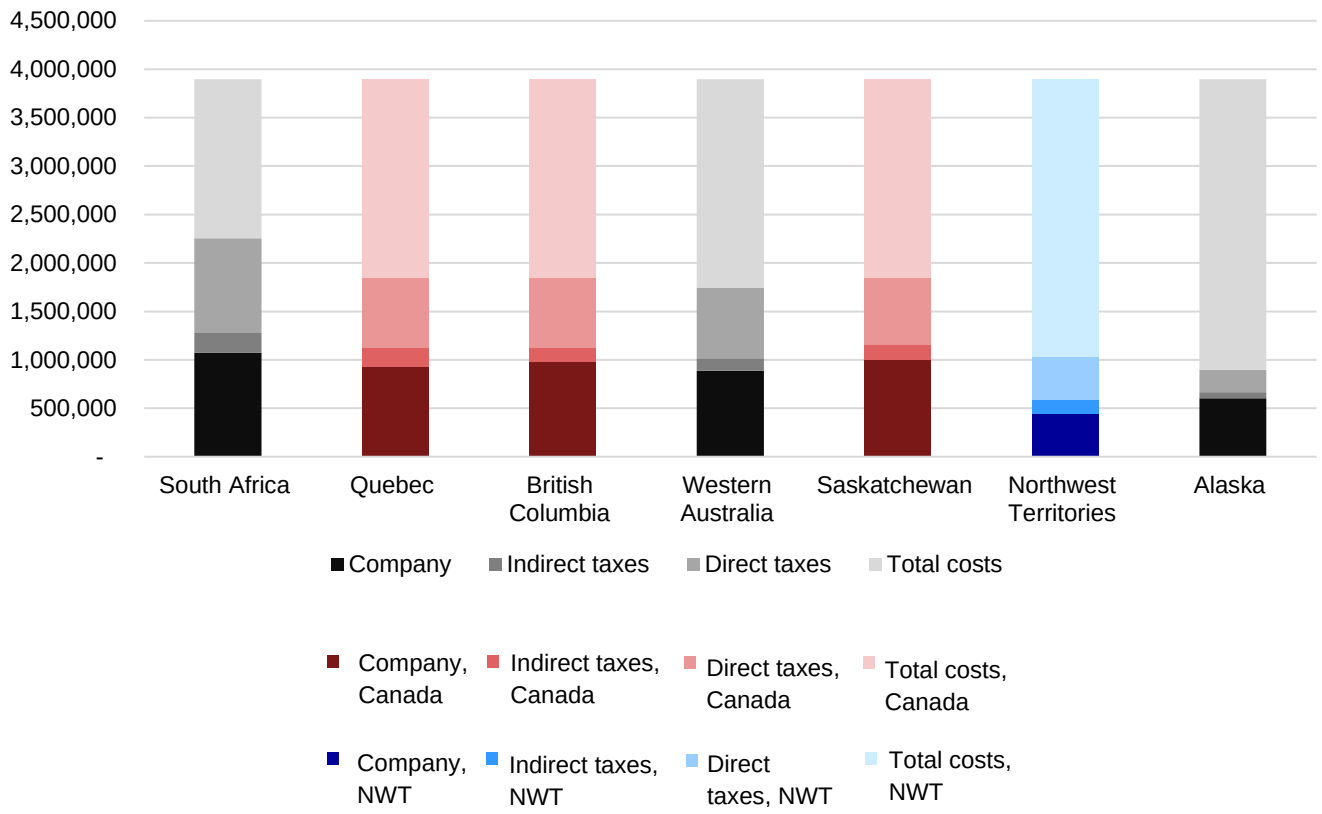
By contrast, South Africa has by far the lowest costs (largely driven by low labour costs), providing the highest post-tax profit to the company. South Africa also provides the highest tax revenue to governments, due to a combination of the high profits and high tax rates in that jurisdiction. We note that our analysis does not consider the cost of capital impact due to relatively high political risk or uncertainty, which would likely negatively impact the cash flows of mining projects in South Africa.

From a fair value perspective, we consider two metrics. The first measures taxes collected as a percentage of the total revenue generated - $3.8 billion in all jurisdictions. The Northwest Territories' taxes as a share of revenue (15%) are the second-lowest after Alaska (7.6%) and less than half the highest jurisdiction (30.4%) in South Africa. Given the high cost environment associated with remoteness in these jurisdictions, capturing a higher share of revenue through taxes would correspondingly reduce the company profit. As companies have their own minimum investment criteria, higher taxes could result in a negative investment decision in which case no taxes would be collected. In this sense, the NWT is receiving a fair return.

From the company perspective in the moderate price scenario, South Africa yields an after-tax return of 33.8% of revenue, Alaska and Northwest Territories have the lowest after-tax returns out of all the regions (company share of revenues of 25.7% and 20.6%, respectively).

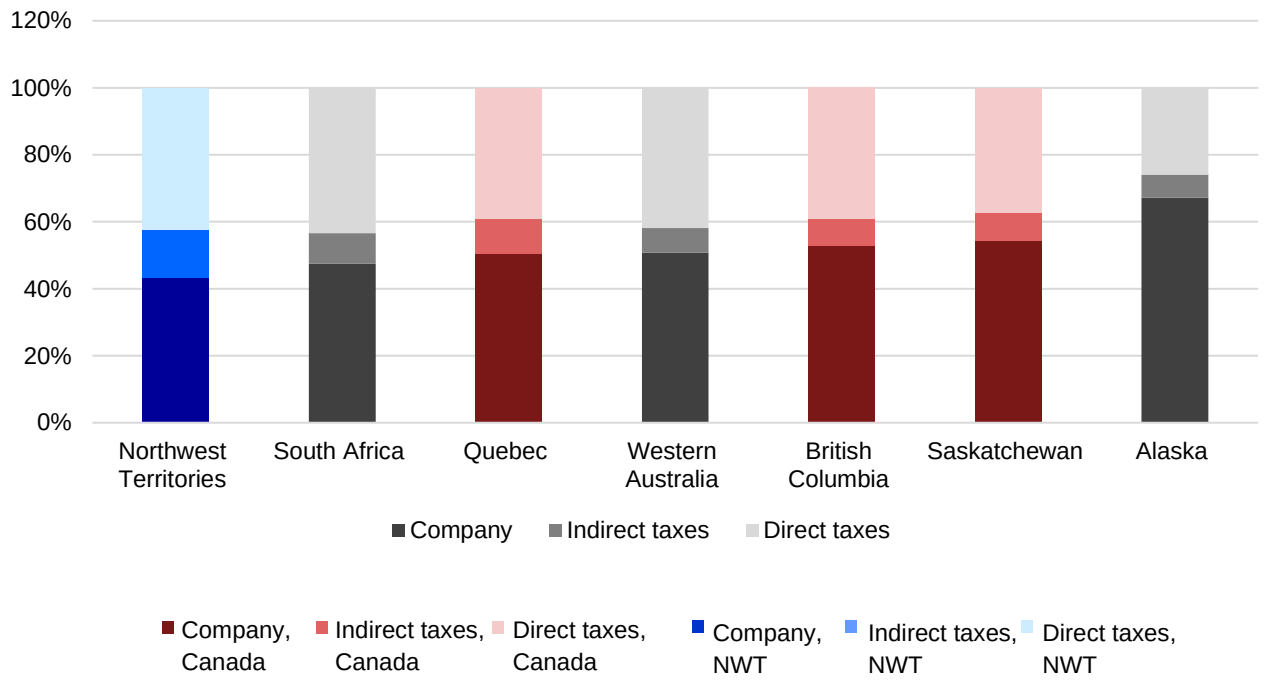
The figure below shows mine revenues divided into four categories: costs, company, direct taxes, and indirect taxes. Costs include capital costs, operating costs, and interest expense, while the "company" category refers to the mining company's post-tax earnings. Assumed revenue is the same ($3.8 billion) in all jurisdictions.

Figure 36: Division of NPV of revenues, sorted from highest tax revenue to lowest, diamond, low prices



The second metric we can consider is the effective average rate of tax across the jurisdictions on a cash flow basis. Even though the pre-tax profit is different in each jurisdiction we can compare the sharing of this profit on a percentage basis. Here we see that the NWT collects 57%, while Alaska has the lowest at 33%. Given the low level of pre-tax profit, this percentage provides a fair return and is comparable to other jurisdictions.

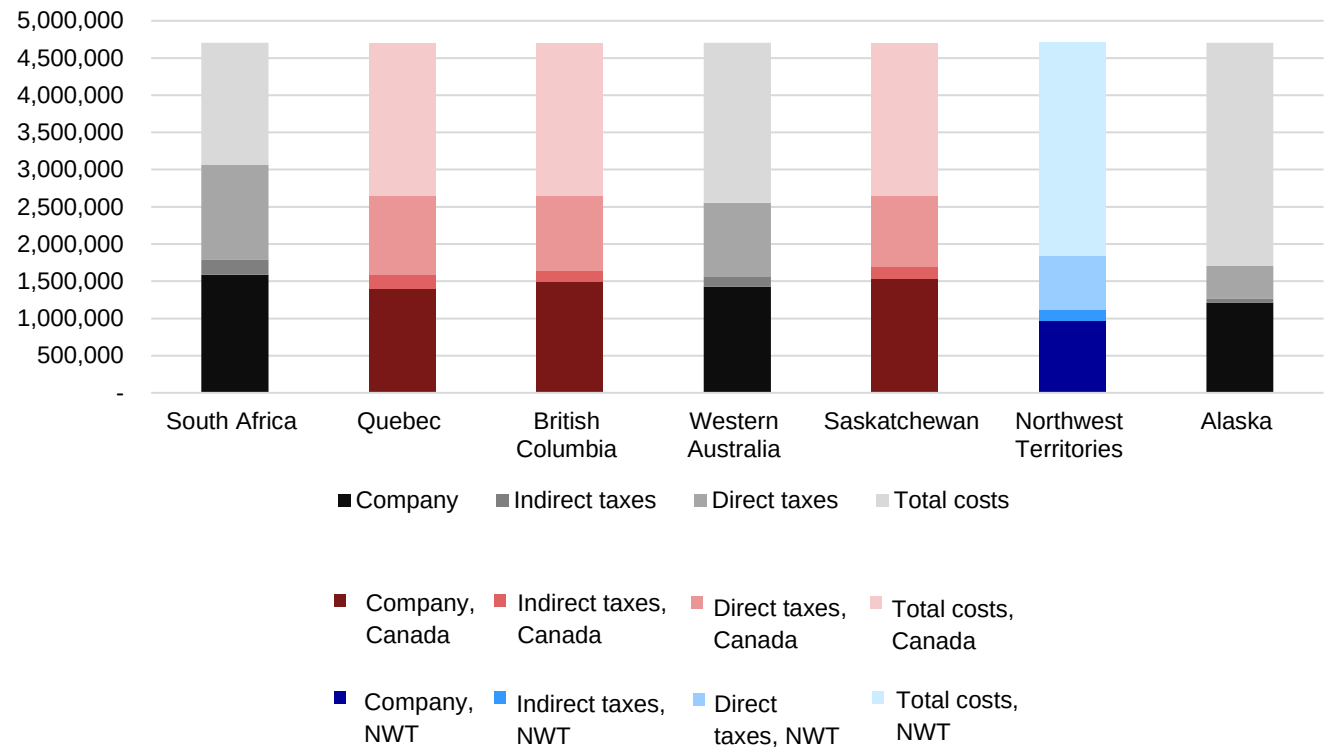
Figure 37: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, diamond, low prices



The ranking of the after-tax profits is the same under the moderate and low price scenarios, except that Western Australia ranks higher than Quebec in the moderate scenario. This is mainly driven by the higher direct taxes imposed by Quebec.

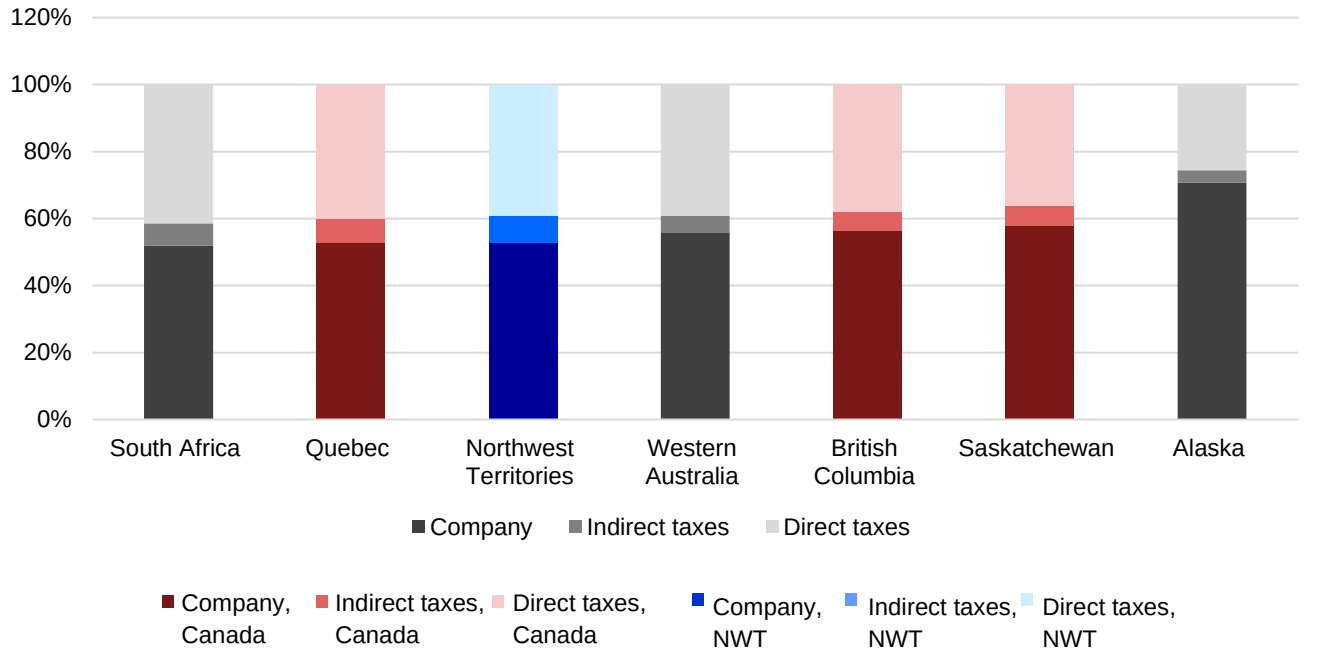
In the moderate price scenario, South Africa yields an after-tax profit of 33.8% of revenue, while imposing the highest taxes as a percentage of revenues (31.3%). Similar to the low price scenario, Alaska and Northwest Territories have the lowest after-tax profits out of all the regions (company share of revenues of 25.7% and 20.6%, respectively).

Figure 38: Division of NPV of revenues, sorted from highest tax revenue to lowest, diamond, moderate prices



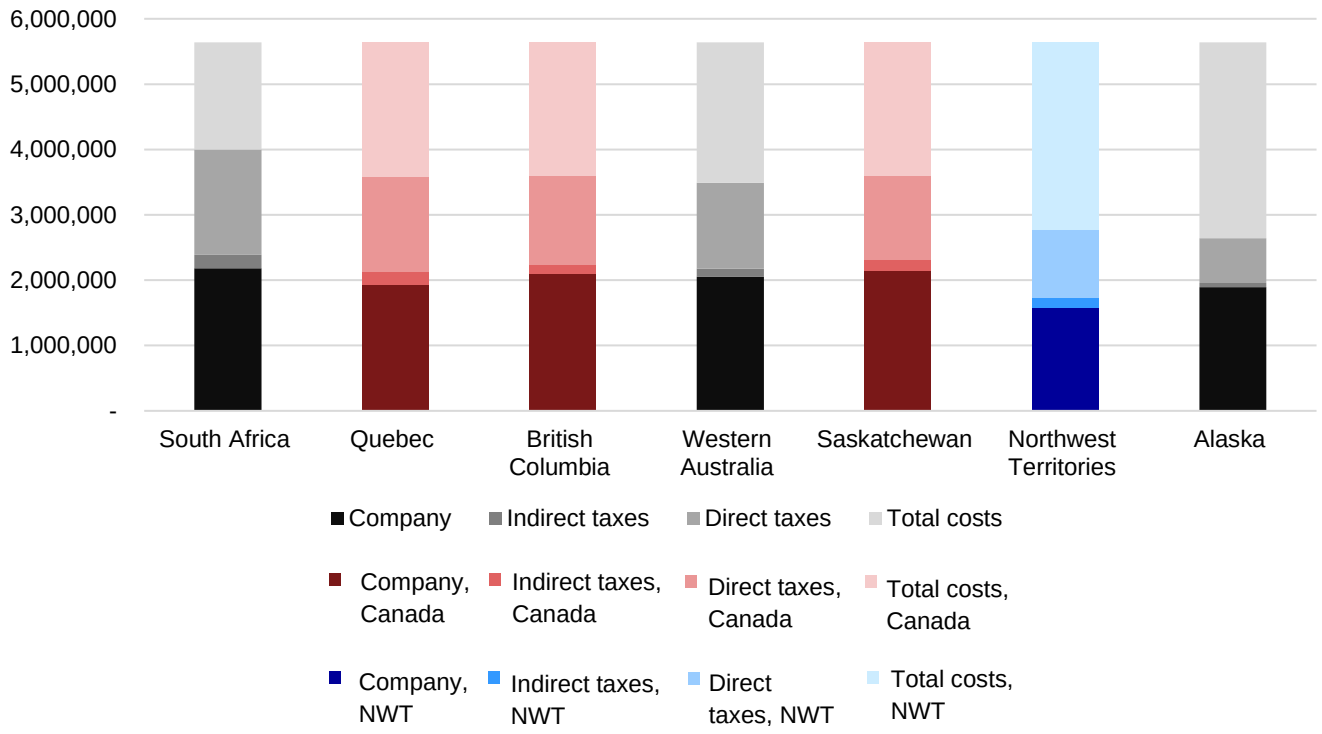
At moderate prices, South Africa captures the lowest share of pre-tax profit, but the highest absolute value of tax revenue. Northwest Territories captures 47% of pre-tax profit, but the lowest absolute value of tax revenue, as shown in the figure above.

Figure 39: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, diamond, moderate prices



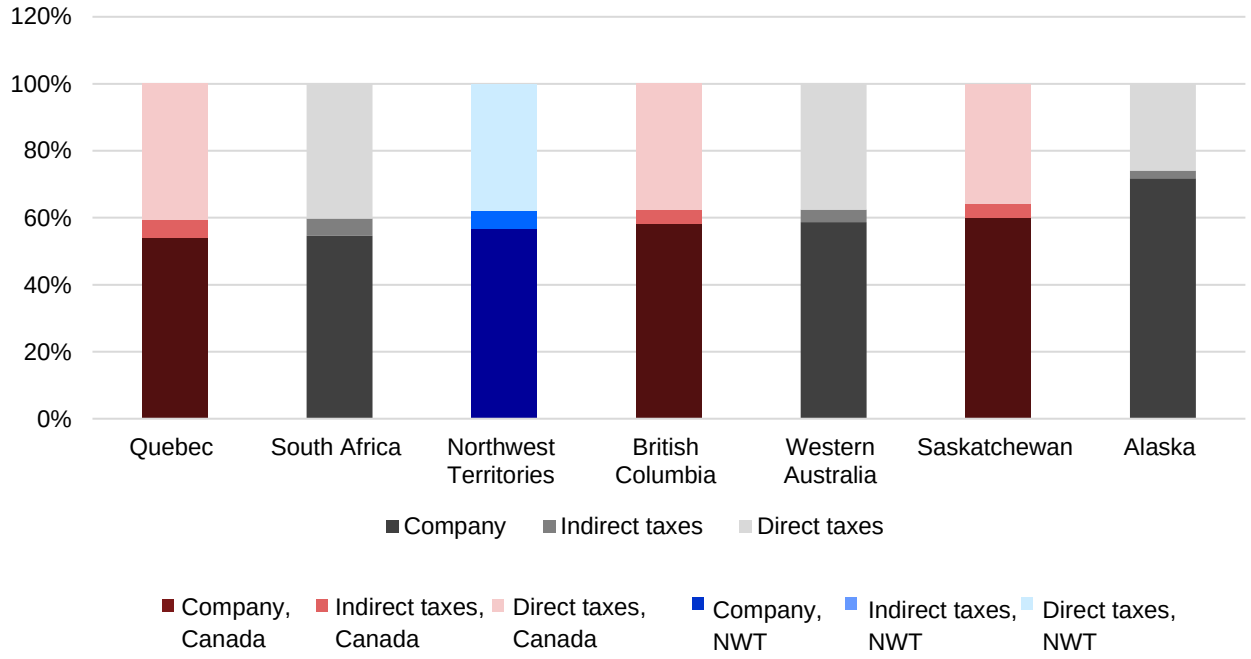
At high prices, South Africa generates the highest pre-tax profits at 70.9% of revenues, while Northwest Territories generates the second lowest pre-tax profits at 49.2% of revenues (Alaska's pre-tax profits of 46.8% is the lowest). At higher prices, the rankings remain the same at moderate prices. Northwest Territories continues to generate the lowest after-tax profits at 27.9% of revenues. The relatively low tax rates in Northwest Territories do not fully offset the higher costs and infrastructure needs of the jurisdiction.

Figure 40: Division of NPV of revenues, sorted from highest tax revenue to lowest, diamond, high prices



At high prices, the division of pre-tax profit between companies and governments is between 36% and 41% in all jurisdictions except Alaska, which has the lowest average effective tax rate at 28%.

Figure 41: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, diamond, high prices

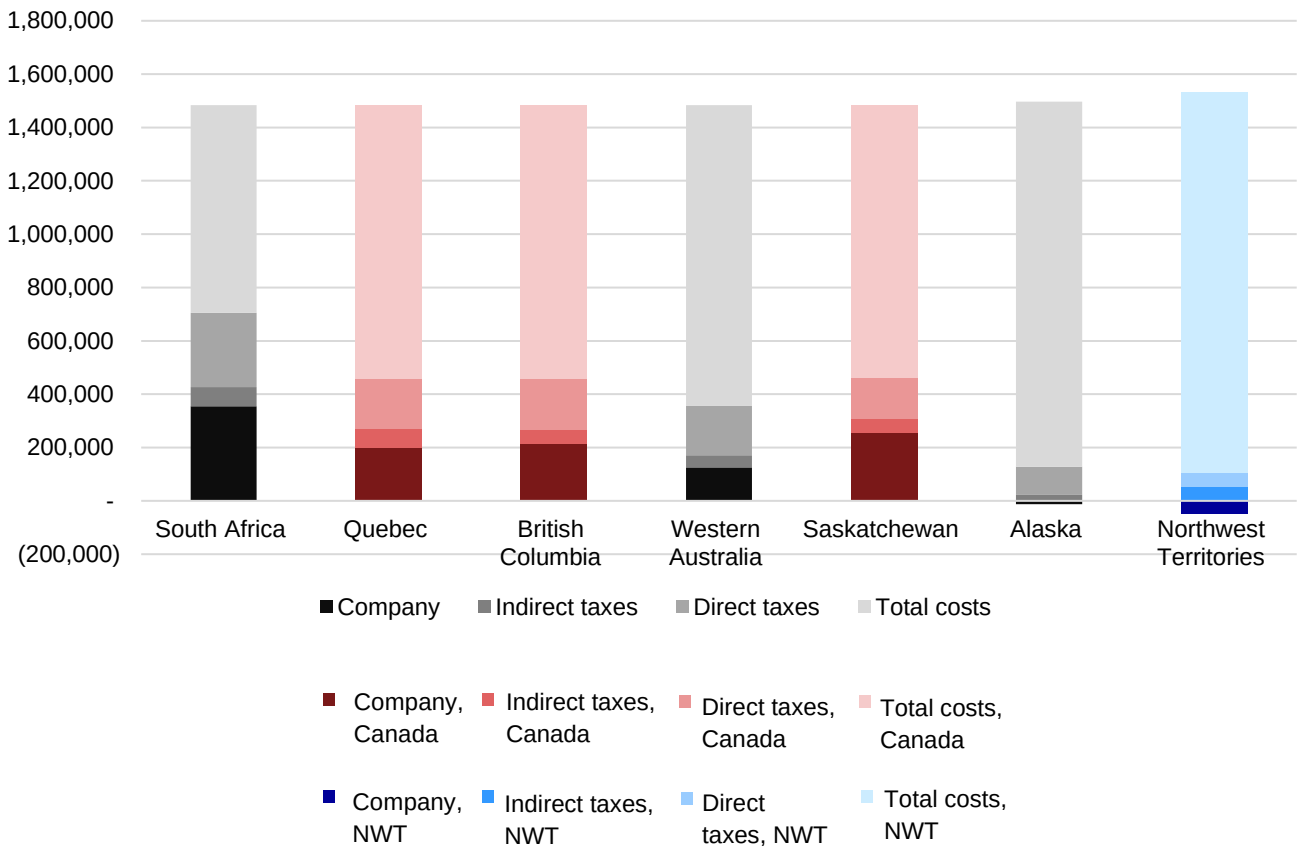


Consistent with our understanding of diamond mines in Northwest Territories, the results of our analysis illustrate positive after-tax profits of diamond mines in Northwest Territories at all price levels. The model provides an illustration of the fact that costs are substantially higher in Northwest Territories relative to other jurisdictions, and that the relatively low tax rate do not offset them.

Base metals

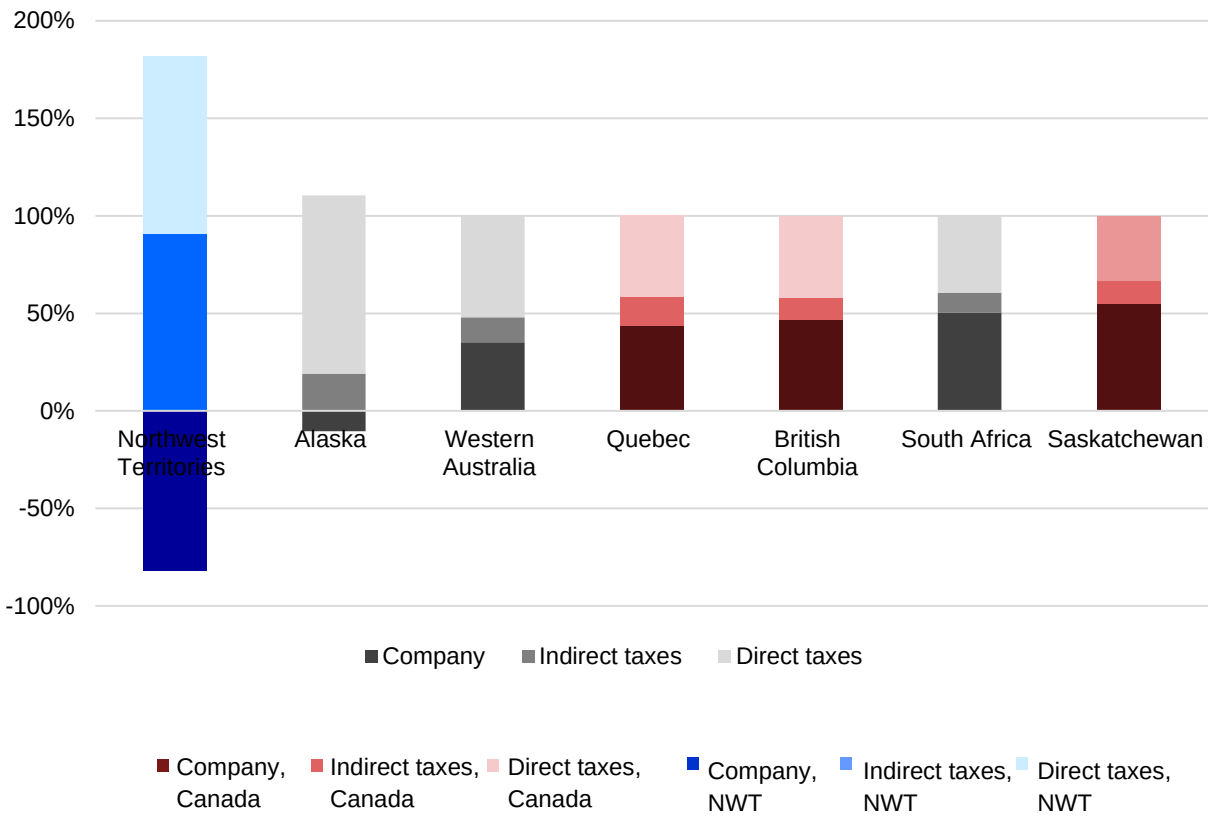
Figure 42 shows division of revenues between costs, company, direct taxes, and indirect taxes. Similar to the diamond mine analysis, South Africa's taxes are the highest of the comparison jurisdictions at 23.7% of revenues. Northwest Territories' taxes are the lowest at 7.1% of revenues, but the territory generates the lowest after-tax profits at -3.2% of revenues. In the low price scenario, post-tax company earnings are negative for the Northwest Territories and Alaska, meaning that a mine would not be built in these jurisdictions. In this case, those jurisdictions' relatively low tax rates only partially offset the high costs.

Figure 42: Division of NPV of revenues, sorted from highest tax revenue to lowest, base metals, low prices



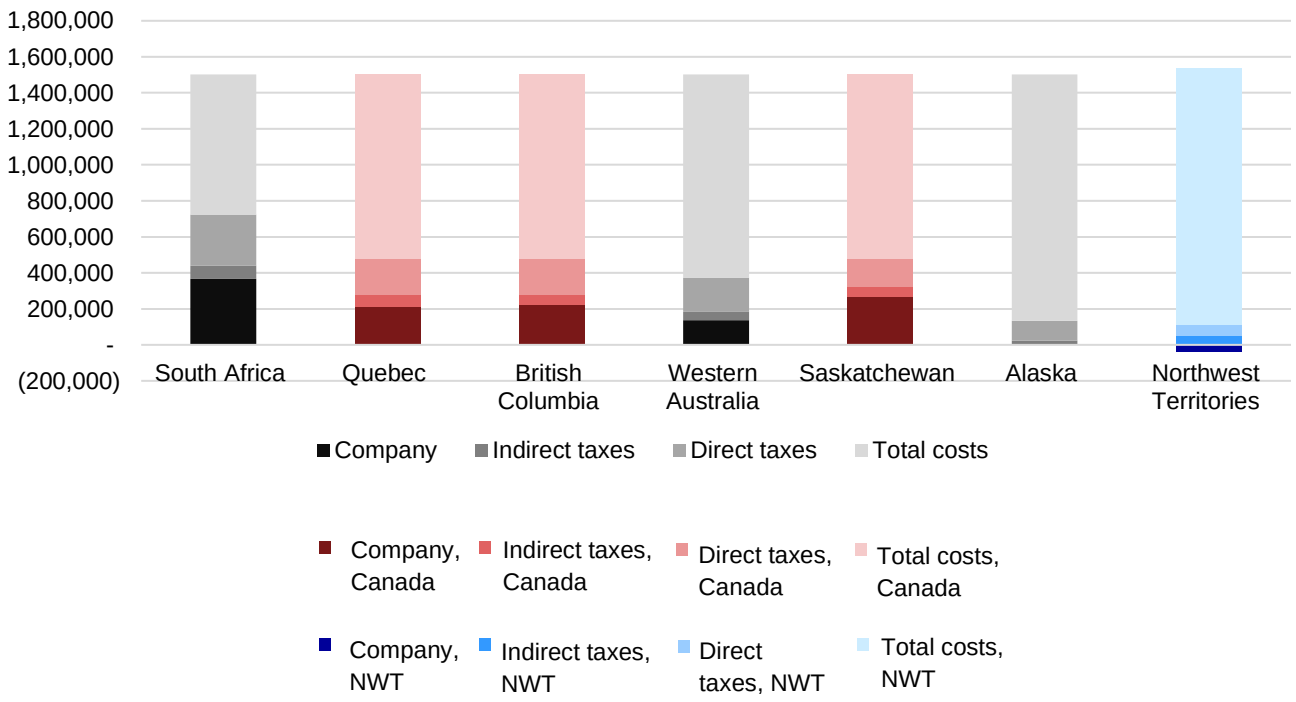
At low prices, profits are negative in Alaska and the Northwest Territories, meaning that the average effective tax rate is greater than 100% i.e. the value of the total taxes collected is greater than total pre-tax profit. This reflects the fact that lower-profit base metal mines are unlikely to be developed in these areas, even with low taxes such as those in Alaska.

Figure 43: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, base metals, low prices



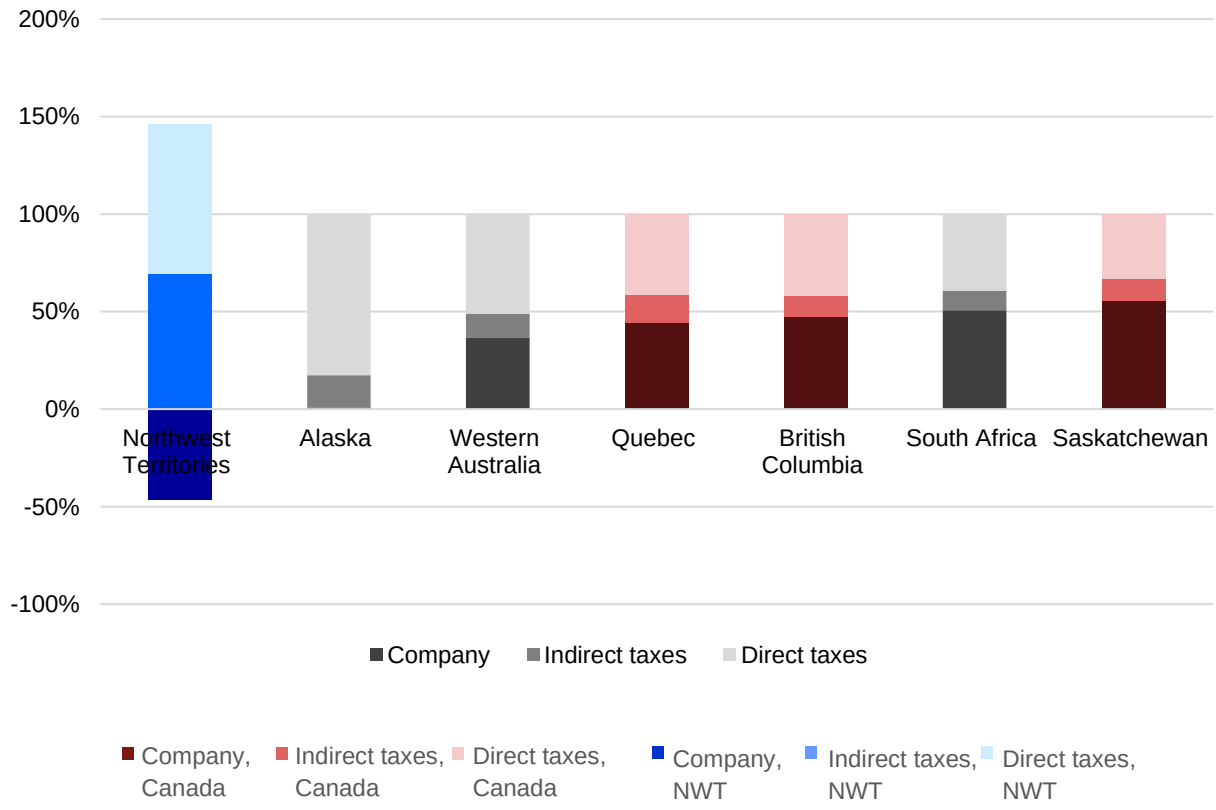
At moderate price level, the ranking remains the same as in the low price scenario, except Alaska now generates positive after-tax profits. Northwest Territories still generates an after-tax profit of -2.3% of revenues, despite having the lowest total taxes as a percentage of revenues of 7.4%. The biggest driver of Northwest Territories' negative after-tax profit is the significantly higher operating costs in the region, particularly infrastructure related capital costs.

Figure 44: Division of NPV of revenues, sorted from highest tax revenue to lowest, base metals, moderate prices



At moderate metals prices, Saskatchewan has the lowest average effective tax rate at 45%, while pre-tax profits are negative in the Northwest Territories, and after-tax profits are close to zero in Alaska.

Figure 45: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, base metals, moderate prices



The rankings are consistent at the high price scenario as the moderate price scenario. Northwest Territories now generate a positive after-tax profit of 1.0% of revenues, and still maintains the lowest present value of total taxes as a percentage of revenues (8.5%). At all price levels, Northwest Territories exhibits the lowest taxes as a percentage of revenues, and yet continues to rank the lowest in terms of after-tax profits.

Figure 46: Division of NPV of revenues, sorted from highest tax revenue to lowest, base metals, high prices

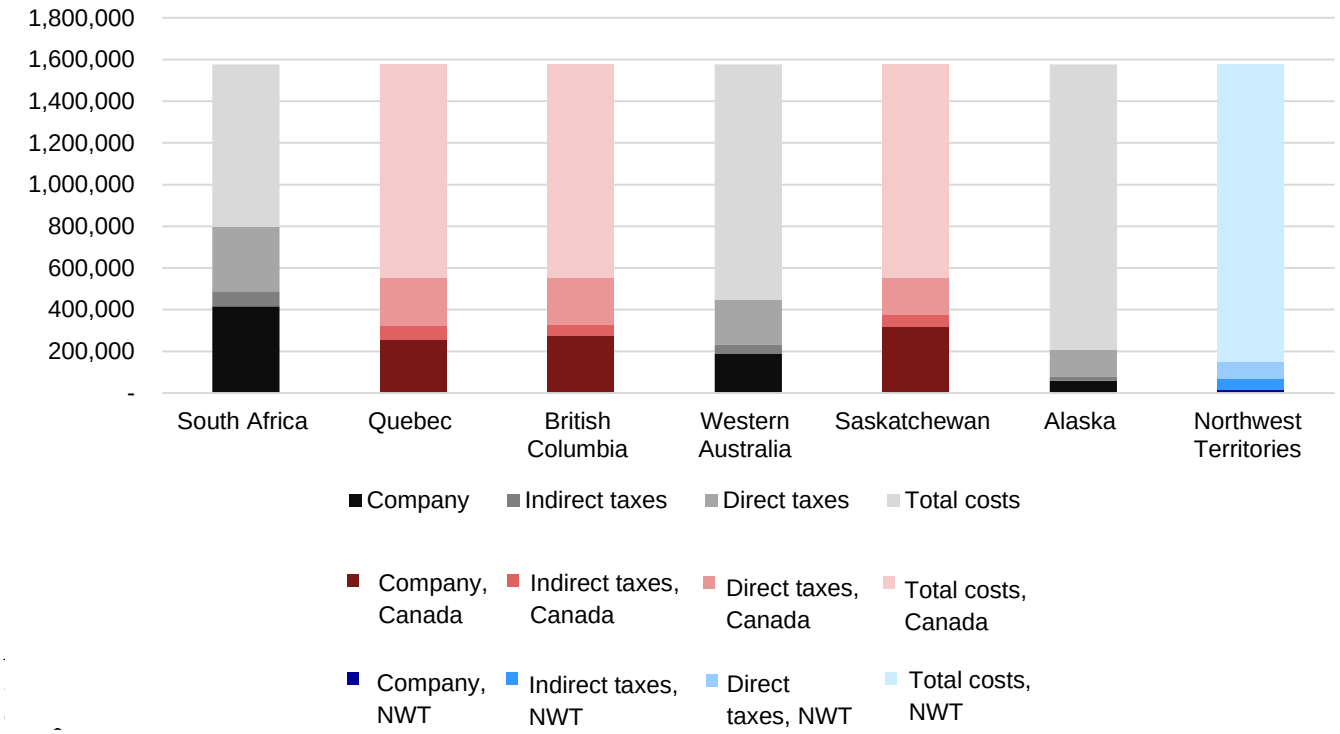
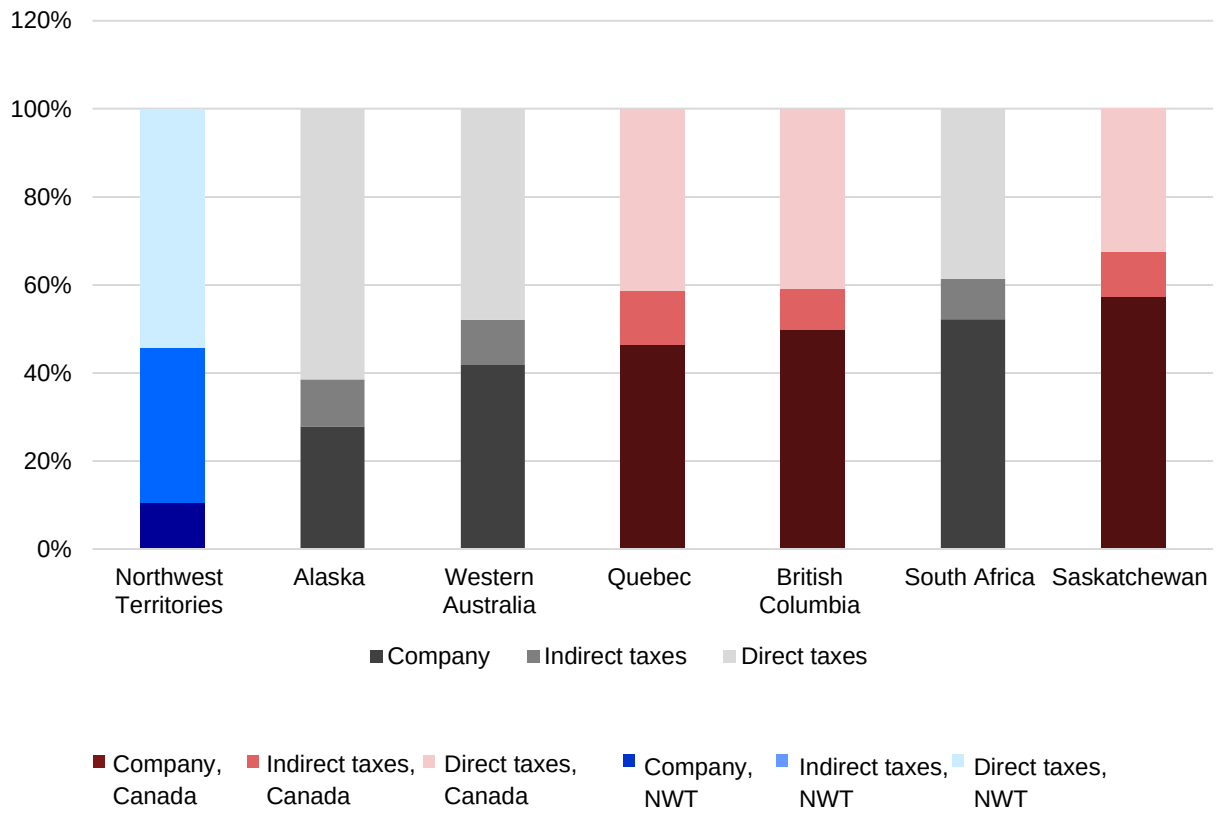


Figure 47: Division of NPV of pre-tax cash flow, sorted from highest government share to lowest, base metals, high prices



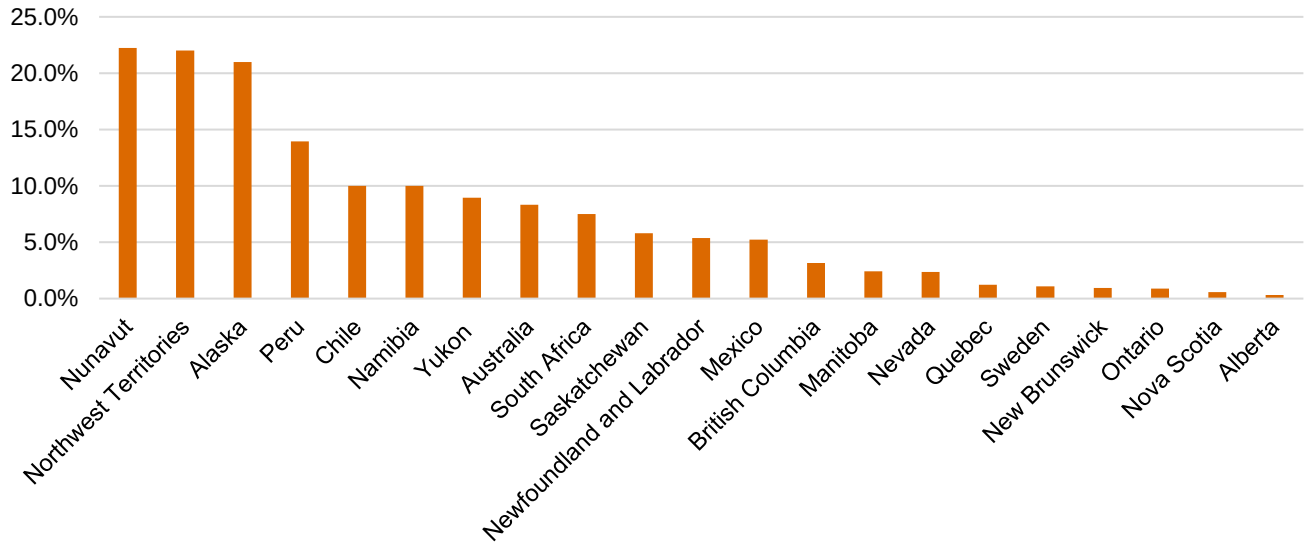
Currently there are no base metal mines operating in Northwest Territories, which is likely a result of its relatively high capital and operating costs that are not offset by its relatively low tax rates. Our results indicate the difficulty of developing a profitable mine in the territory, given the high costs. As noted in the diamond section, factors excluded from our model, such as variation in grade and deposit structure, also affect the economics of mine development. This explains why we still see base metal mines operating in Western Australia. Transportation represents a higher cost for base metals compared to diamonds because diamonds have a much higher value per weight, and can be transported by plane. In contrast, base metals are heavy for their value, and must be transported by port from the Northwest Territories.

Economic alternatives

Jurisdictions such as Northwest Territories may place more focus on attracting mining activity if they lack viable alternative industries. In this case, promoting mining may be a cost-effective way to generate economic activity, tax revenue and employment, relative to other options. In the Northwest Territories, mining is the largest economic sector, accounting for 22% of GDP. The next largest sectors are public administration, real estate rental and leasing, and construction at 16%, 9%, and 8% respectively. Jurisdictions with less reliance on mining may have more choice over how to encourage economic activity.

The graph below shows mining as a share of overall GDP for the comparison jurisdictions in this study. We note that comparison of countries with sub-national jurisdictions somewhat biases results because within any country, mining tends to be concentrated in certain regions where mining accounts for a higher share of GDP. However, it is clear that in the Northwest Territories, mining provides a relatively high share of GDP.

Figure 48: Mining as a share of total GDP, comparison jurisdictions



Sources: Canada: Statistics Canada. Table 36-10-0400-01 Gross domestic product (GDP) at basic prices, by industry, provinces and territories, percentage share. Australia: Australian Bureau of Statistics. Chile: US Department of Commerce. Mexico: National Institute of Statistics and Geography (INEGI). Namibia: US Department of Commerce. Peru: Banco Central de Reserva del Peru. South Africa: Statistics South Africa. Sweden: Statistics Sweden (SCB). United States: Federal Reserve Economic Data.

Summary of fair return analysis

We assessed the division of pre-tax profits between mining companies and governments, holding costs constant across jurisdictions. In this analysis, the Northwest Territories' share of pre-tax profits is slightly below the median among the comparison jurisdictions. Although it is beyond the scope of this report to determine what is "fair" or not, we note that Northwest Territories' share of pre-tax cash flows is in the range of other jurisdictions in Canada.

We also assessed division of profits taking into account variation in costs between jurisdictions. Because costs are relatively high in the Northwest Territories, most of our model mines would not be profitable for the mine owners, except under high prices. This situation means that the taxes collected by Northwest Territories are relatively low because low profit leads to low corporate taxes collected on profit. Any increases in tax rates would decrease companies' ability to operate profitable mines in the Northwest Territories. Compared to other jurisdictions, Northwest Territories depends on mining for a large share of its GDP. These results, taken together, suggest that Northwest Territories' tax regime is in line with other jurisdictions in Canada

Conclusion

Summary of results

This report has assessed the mining tax and royalty competitiveness of the Northwest Territories in comparison with 22 other mining jurisdictions. We found that in terms of corporate income taxes and royalties (direct taxes), Northwest Territories has the sixth, seventh, or eighth lowest taxes among the comparison jurisdictions, depending on the commodity and prices. Many of the comparison jurisdictions are clustered around similar amounts of taxes owed, and many Canadian jurisdictions including Northwest Territories are generally within 10% of the median direct taxes.

Including indirect taxes (property, fuel, payroll and carbon taxes), Northwest Territories' relative rank increases compared to other comparison jurisdictions. Overall, it has the fourth, fifth or sixth-lowest taxes, depending on the commodity and price scenario. The Northwest Territories has relatively low indirect taxes compared to other jurisdictions, particularly other Canadian jurisdictions. This is driven by different taxes in different jurisdictions, but one factor is Northwest Territories' relatively low carbon tax burden. We also assessed total LOM costs in seven comparison jurisdictions in order to conduct a holistic assessment of competitiveness. For the purpose of this assessment we held deposit type, grade, and mining method constant. Drivers of capital and operating costs include required transportation and energy infrastructure, wages, transportation, inventory, maintenance, and other operating costs. The Northwest Territories had the highest post-tax costs of the comparison jurisdictions, largely driven by additional needs in terms of transportation and energy infrastructure, as well as transportation and logistical challenges. A typical mine in the Northwest Territories requires an on-site power plant, as well as the construction of an annual ice road which, among other factors, raise the cost of construction and operation compared to mines in less remote locations.

Implications for competitiveness

In our total cost analysis (Phase 3), the high costs and low profit levels of our model mines result in the Northwest Territories having the lowest taxes. However, the Northwest Territories' relatively low tax rates do not offset the high costs. In fact, taxes make up a relatively low proportion of total costs in the Northwest Territories, an average of 7.9% for diamonds and 7.2% for base metals. Under most price scenarios, this results in a negative after-tax profit for a mining company, meaning that those mines would not be built in the Northwest Territories.

In reality, mines can be profitable in the Northwest Territories and other northern regions. This would depend on favourable geology, expectations of high prices, or both. However, the Northwest Territories will not attract development of relatively lower quality deposits, or in moderate or low-price environments. Given that taxes make up a relatively small share of total post-tax costs in our total cost analysis, lowering taxes would not be an effective lever to increase Northwest Territories' competitiveness in mining. In order to boost competitiveness in the Northwest Territories, the government will need to address the underlying drivers of high costs in the territory. One way to do this is through infrastructure construction, given that infrastructure is a major driver of high costs in the territory. Transportation infrastructure and energy infrastructure such as all-weather roads, ports, and transmission lines can significantly lower costs for mining companies. Another is to encourage the development and use of technology that can help overcome the cost challenges of operating in northern regions.

Appendix A: Summary of tax regimes

Mining taxation in the Northwest Territories

Corporate income tax

In Canada, income tax is levied by both the federal and provincial / territorial governments.

Consistent with other industries, mining companies in the Northwest Territories ("NWT") are subject to federal and territorial corporate income taxes at a rate of 15% and 11.5%, respectively. The NWT, along with Alberta and Ontario, has the lowest general corporate tax rate in Canada; however, certain provinces/territories have a lower rate for manufacturing and processing income.

Certain tax incentives are available to mining companies through the federal corporate income tax system such as accelerated tax depreciation for grassroots exploration, certain grandfathered pre-production mine development expenses and certain depreciable property acquired before the commencement of commercial production. It should however be noted that the federal government is gradually phasing out some of these incentives over the next two years.

On November 21, 2018, the Government of Canada released new enhanced capital cost allowance ("CCA") rules applicable to certain capital property acquisitions occurring after that date. These rules provide that an entity gets additional tax depreciation in the year of acquisition relative to the previously enacted legislation. These rules will be gradually phased out beginning in 2023 with a full phase-out by 2028.

NWT mining royalty

At the territorial level, the NWT levies a single Mining Royalty on all mining activity in the territory that occurs on Crown land.

The mining royalty is calculated based on the value of output of a mine and is equal to the lesser of:

1. 13% of the value of the output of the mine; and
2. The value of the output of the mine calculated at graduated rates ranging from 0% - 14%.

Value of output

The value of output is generally equal to the market value of the minerals produced from the mine less certain allowable deductions and allowances including

- transportation costs to smelter, treatment plant, or refinery;
- operating costs;
- a depreciation allowance (discussed below);
- a development allowance (discussed below);
- a processing allowance (discussed below);
- exploration costs incurred elsewhere in the NWT (discussed below);
- contributions to a mining reclamation trust.

Depreciation allowance

A depreciation allowance is deductible in calculating the value of output of the mine. An operator is allowed a deduction of up to 100% of its expenditures on depreciable assets until the assets are fully written off.

Development allowance

A development allowance is deductible in calculating the value of output of the mine. Similar to the Depreciation Allowance, the expenditures are eligible for a deduction of up to 100% of the expenditures incurred or can be carried forward for deduction. Expenditures eligible for development allowance treatment include prospecting, exploration, and mine development expenditures.

Exploration expenditures incurred elsewhere in the NWT but not relating to the property for which the NWT Mining Royalty is being calculated are deductible, however the deduction is limited to 10% of the modified value of output for the mine.

Processing allowance

A processing allowance is deductible in calculating the value of output of the mine. This allowance is equal to 8% of the cost of processing assets employed in the NWT used to further process ore. The deduction is limited to 65% of the modified output of the mine. A portion of the processing allowance may be denied if the processing assets are used to process ore that has been mined outside of the NWT.

Corporate income taxation elsewhere in Canada

Corporate income tax

Federal corporate income tax is based on corporate taxable income determined according to federal legislation. With the exception of Alberta and Quebec, corporate income tax levied in the Canadian provinces and territories is based on taxable income determined for federal purposes. Alberta and Quebec each have separate governing legislation for calculating income for provincial tax purposes. Except for the differences to be discussed, the determination of income for each of those provinces is generally consistent with the determination of income for federal purposes.

The Federal Government levies an income tax of 15%. The province/territories levy corporate income tax at the following rates:

Table 26: Corporate income tax rates for Canadian provinces and territories

Province/Territory	Federal Rate	Provincial/Territorial Rate	Combined Rate
Northwest Territories	15.0%	11.5%	26.5%
Nunavut	15.0%	12.0%	27.0%
British Columbia	15.0%	12.0%	27.0%
Alberta	15.0%	12.0%[2]	27.0%
Saskatchewan[1]	15.0%	10.0% / 12.0%	25.0% / 27.0%
Manitoba	15.0%	12.0%	27.0%
Ontario[1]	15.0%	10.0% / 11.5%	25.0% / 27.0%
Quebec	15.0%	11.6%[3]	26.6%
New Brunswick	15.0%	14.0%	29.0%
Nova Scotia	15.0%	16.0%	31.0%
Newfoundland & Labrador	15.0%	15.0%	30.0%
Yukon[1]	15.0%	2.5% / 12.0%	17.5% / 27.0%

[1]Province/territory has a lower rate for profits from manufacturing and processing activities

[2]Provincial income tax rate will decrease to 9% by 2022 as a result of the passage of Bill 3, Job Creation Tax Cut

[3]Provincial income tax rate will decrease to 11.5.% in 2020

Some provinces have specific nuances to their income tax calculation including some incentives available to mining companies in relation to their provincial corporate income tax liability.

British Columbia

The Government of British Columbia provides a Mining Exploration Tax Credit ("BCMETC") for eligible corporations conducting grassroots mineral exploration in British Columbia. This credit is a permanent incentive provided by the provincial government and provides a refundable credit of 20% (or 30% in certain areas) of qualified mining exploration expenditures less any assistance received. Qualifying mining exploration expenditures can include prospecting, drilling, trenching, digging test pits, and costs to carry out geological surveys, among other costs.

Quebec

The Government of Quebec provides for a refundable Quebec Resource Tax Credit for eligible exploration expenses in Quebec. This is a refundable credit at rates varying from 12% to 38.75%, depending on the location of the mine, what is being mined, and the corporation's status. Eligible expenditures are those incurred for the purpose of determining the existence, location, extent, or quality of a mineral resource.

The Government of Quebec also provides the Quebec Investment Tax Credit equal to 4% to 32% of purchases of qualifying property with the rate depending on the size of the corporation and the region in which the asset will be used. Qualifying property is considered equipment that is used solely in Quebec primarily for the purpose of processing ore (other than ore in respect of gold and silver). The ore being processed must be extracted from a mineral resource in Canada.

Ontario

Ontario harmonized its corporate income tax regime with the federal regime as of April 23, 2015. However, Ontario continues to levy the Ontario Corporate Minimum Tax ("CMT") on corporations operating in Ontario. CMT may be applicable where a corporation, along with its associated corporations, have at least $100 million in gross revenue and at least $50 million in total assets. The tax is based on accounting income with certain adjustments and is calculated at a rate of 2.7%. The tax is only payable to the extent it exceeds the corporations Ontario corporate tax otherwise payable. Any CMT paid can be carried forward and credited against a corporations Ontario income tax liability for a period of up to 20 years.

Mining royalty regimes elsewhere in Canada

Alberta

Royalty taxes applicable to mining companies in Alberta is dependent on the type of mineral that is being extracted. For metallic minerals (including base metals and diamonds), the royalty is structured to allow a reduced royalty prior to the operator recovering its capital cost, at which point there is an increase in the royalty payable.

The royalty for metallic minerals (including base metals and diamonds) is generally calculated as:

- 1% of mine mouth revenue during the pre-payout phase; and
- 12% of net profits during the post-payout period (subject to a minimum royalty of 1% of mine mouth revenue.

Mine mouth revenue is generally defined as gross revenue from the mine less costs incurred from the mine mouth to the point of sale and less an allowance in respect of capital expenditures.

Net profit is generally net revenue form the mine less allowable exploration and development costs, recovering costs, processing costs, transportation and disposal costs, and an allowance in respect of capital expenditures.

The applicable royalty calculation is based on whether the mine is in the pre-payout or post-payout period. Payout is the date on which gross revenues in respect of the mine, computed from the time of first sale, equals the aggregate of the costs and allowances claimed for exploration, development, and the mining, processing, transportation, or disposition of the mineral. The purpose of the royalty structure is to allow an operator to recover its initial capital cost prior to being subject to the higher royalty rate.

Significant changes since 2007/8

There have been no significant changes since 2007/8.

British Columbia

Mineral royalties in British Columbia are levied under the *Mineral Taxation Act*. The royalty is calculated in two stages for each mine:

- 2% tax on "net current proceeds"; and
- 13% tax on "net revenue"

The 2% tax is based on net current proceeds. Net current proceeds is equal to gross revenue plus proceeds from government grants and subsidies less operating expenses, post-production development costs, and certain non-capital reclamation costs. No deduction is allowed for exploration, pre-production development, and other capital costs. The 2% tax is meant to serve as a form of minimum tax during the initial years of production as a company recovers its capital expenditures. Any tax paid based on the 2% calculation can be credited in future years against tax payable on "net revenue".

The 13% tax is based on net revenue, with net revenue being equal to net current proceeds less capital costs, exploration costs, pre-production development costs, and an investment allowance. Where this calculation results in a loss, the loss can be carried forward. The investment allowance is calculated as a percentage of the accumulated losses of the mine (which would include all development, exploration, and capital costs) and is meant to serve as a deduction for the cost of capital of these accumulated losses. The percentage rate applied is equal to a mark-up of the federal bank rate.

The government also provides for a new mine allowance for mines that begin commercial production before January 1, 2020. The allowance allows for 133% of qualifying capital costs incurred for a new or expanded mine to be deductible for mineral royalty purposes.

Significant changes since 2007/8

There have been no significant changes since 2007/8.

Saskatchewan

Saskatchewan levies multiple different mining taxes on various minerals.

Base metals are subject to a royalty on the net profit of the mine. The rate applicable is initially 5%, increasing to 10% once a threshold of 1 million metric tonnes of mineral have been extracted after the beginning of production. Net profit is equal to the gross value of all mineral sales less direct operating costs, exploration and pre-production expenses, depreciation, and reclamation and decommissioning costs. Where there is a loss in the year, that loss can be carried forward.

The royalty regime also provides for a 10-year exemption from royalties for new base metal mines. Additionally, the royalty is not payable until the original capital cost of the mine has been recovered by the operator. For purposes of calculated the amount needed to be recovered before the royalty becomes applicable, certain exploration, development, and design costs are eligible for a step-up in the cost allowing 150% of the costs actually incurred to be treated as having been incurred.

On June 2, 2010, the Government of Saskatchewan introduced a new royalty regime for diamond mines. The royalty is charged at 1% of the value of production which is increased to up to 10% of profits once the original capital investment in the mine is recovered. The new regime also provides for a five-year initial royalty holiday.

Significant changes since 2007/8

The new diamond royalty regime was introduced in 2010. The capital tax originally applicable to mining companies was also repealed. There were no other significant changes since 2007/8.

Manitoba

Manitoba levies a mining royalty based on the operator's profit from a mine during the year. The rate applicable is graduated based on the operator's total profit for a year and ranges from 10% to 17%. The operator's profit is equal to gross mining revenue and processing revenue, less operating expenses as well as allowances for depreciation,

exploration, and processing. The processing allowance provides an additional deduction in relation to processing assets on top of the depreciation allowance that is taken on those assets.

The regime provides for a tax holiday on new mines that exempts a mine from Manitoba mining tax until its profits exceed the total cost of capital assets acquired before commencement of commercial production.

Manitoba also levies a special tax equal to 0.5% of mining profits which is fully refundable for taxpayers that operate exclusively in Manitoba.

Significant changes since 2007/8

The mining royalty rate has decreased from a flat 18% rate in 2007/8 to a graduated rate of 10% - 17%. Additionally, Manitoba capital tax has been phased out.

New Brunswick

New Brunswick has a two-tier royalty regime: 2% applied to net revenue or 16% applied to net profit.

The first-tier is equal to 2% of the net revenue derived from a mine and becomes effective once a mine is active and operational. This tax is based on gross revenue less certain costs and allowances including transportation, refining, and milling costs, and a processing allowance based on the capital costs of processing assets. This royalty is deductible for purposes of calculating the second-tier tax.

The second-tier tax is equal to 16% of the net profit of a mine exceeding $100k. Net profit is calculated as gross revenue less allowable costs and allowances for depreciation, financing, exploration, and processing. Exploration expenditures are eligible for a step-up allowing 150% of the expense incurred to be treated as deductible. The processing allowance is calculated in reference to the capital cost of processing assets and allows an additional deduction on top of the depreciation allowance claimed on the processing assets.

Significant changes since 2007/8

Capital tax has been phased out since 2007/8. There have been no other significant changes.

Newfoundland and Labrador

Newfoundland and Labrador levies two levels of mining tax on income derived from mining operations in the province.

The first mining tax is based on the taxable income from mining operations at a rate of 15%. Taxable income is based on net profit, with specific deductions allowable for a processing allowance and royalty allowance. The processing allowance provides a deduction based on the cost of processing assets employed in the province, and is calculated on top of the depreciation deduction that is already available. The royalty allowance is equal to the greater of 20% of taxable income after all other deductions and royalties paid for the right to mine other than those paid to the Crown.

A credit is provided for the first ten years after achieving commercial production. The credit allows an operator to reduce their mining tax otherwise payable by the amount of personal or corporate income tax paid to the province in the year. The credit is limited to $2 million per year.

The second mining tax is based on the royalty allowance claimed by the operator. The tax is equal to 20% of the royalty allowance claimed, less any royalties actually paid.

Significant changes since 2007/8

There have been no significant changes.

Nova Scotia

Nova Scotia mining tax regime generally taxes an operator based on the greater of 2% of its net revenue or 15% of its net income. However, an alternative method is available where an operator files notice to the Minister to pay a royalty based on production. Smaller mining companies with income less than a prescribed amount may also have the option to pay tax equal to 2% of its net revenue only.

For purposes of calculating the 2% tax, net revenue is defined to include gross revenue less certain deductions for marketing, processing, and transportation.

For purposes of calculating the 15% tax, net income is defined to be net revenue less other operating costs and a depreciation and processing allowance. Accelerated depreciation allowing a deduction for 100% of depreciable costs is permitted in the first three years of operations, reverting to a declining balance basis thereafter. The processing allowance allowed is a deduction on top of the depreciation already claimed on processing assets and is based on the original cost of processing assets purchased.

Significant changes since 2007/8

Nova Scotia capital tax was repealed in 2011.

Nunavut

Nunavut follows the same regime as the NWT.

Significant changes since 2007/8

There have been no significant changes.

Ontario

Ontario has separate tax regimes for the mining of diamonds and base metals.

The tax on base metal mining is calculated as 10% of net profit from operations including deductions for a depreciation allowance. Ontario also allows a processing allowance which is based on the original cost amount of processing assets times a rate between 12% and 20%, depending on the type and location of the processing asset. The allowance is constrained to between 15% and 65% of mining and processing income after deducting all expenses (except the maximum does not apply if a semi-fabricating plant is built in Northern Ontario). This allowance is in addition to the depreciation allowance allowed for processing assets.

Ontario also has other beneficial concessions in its mining tax code, including an exemption on the first $500,000 of taxable profit per year and a three- or ten-year exemption on the first $10 million of taxable profit, depending on the location of the mine.

The calculation of the diamond royalty is similar to the base metal calculation in that it is based on net profit and includes a deduction for processing assets. However, no exemption at the beginning of the LOM is available. Further, the calculation of the royalty is equal to the lesser of 13% of net profit or net profit times graduated rates ranging from 5% to 14%.

The Ontario Diamond Royalty also provides an Ontario Community Economic Development incentive, which allows a deduction for certain qualifying donations and other expenditures. Additionally, a deduction is allowed calculated based on a percentage of allowances or net profit in addition to the deduction for the allowances claimed.

Significant changes since 2007/8

Ontario capital tax has been phased out. There have been no other significant changes.

Quebec

Quebec levies two levels of mining tax on mine operators in the province: a mining tax on net profit and a minimum tax based on Mine Mouth Output Value ("MMOV"). The effective tax rate for mining profits is graduated from 16% to 22.9% based on the profit margin on the mine. The minimum tax rate based on MMOV is 1% on the first $80 million of MMOV and 4% on the remainder.

MMOV is generally equal to the value of the output of the mine less expenses, depreciation, and processing allowance relating to assets/expenses incurred for handling/processing ore after the first accumulation site. Any tax paid on the minimum tax based on MMOV can be credited against tax payable under the net profit calculation. Any unused credit can be carried forward to a future year.

Net profit is calculated in a manner consistent with other jurisdictions with an allowance for exploration, depreciation, development, and processing. An additional deduction is available for Northern Quebec mines which provides a deduction of up to $2 - 5 million (depending on the location of the mine) which can be claimed in the first 36 months after the mine has reached commercial production.

Quebec also provides a refundable credit for losses incurred from a mining operation. The refund is designed to replace the ability to carry forward losses incurred from mining.

Significant changes since 2007/8

There were substantial changes from 2007/8 to 2019 as a result of a change in Quebec's mining tax regime. In 2007/8, the Quebec mining royalty was equal to 12% of net profit. Changes were implemented in 2013 to create the current regime.

Yukon

The Yukon levies a mining royalty on all hard rock mining with the applicable rate ranging from 0% to 12% based on the value of output of the mine.

The profit subject to the royalty is based on the value of output from the mine less deductions including a depreciation allowance. Unlike other provinces/territories, no processing allowance is permitted. Costs incurred are generally not eligible for carryforward and must be claimed in the year they were incurred. Costs eligible for treatment as community infrastructure or economic development costs are eligible for carryforward. The deduction for these expenses in a given year is limited based on the income of the mine.

Significant changes since 2007/8

Prior to 2010, expenses incurred prior to commencement of production of a mine were not deductible as there was no provision to carry forward the expenses. Commencing in 2010, pre-production exploration and development

expenditures can be pooled and carried forward. Expenses relating to development are amortized over the LOM on a units-of-production basis.

Mining Regimes Outside of Canada

Australia

Corporate income tax is levied in Australia at the federal level at a rate of 30%; the states/territories do not levy a corporate income tax. The tax is based on taxable income which equals net profit with deductions for exploration costs, depreciation, amortized development costs, and state mining taxes. Losses are eligible to be carried forward and cannot be carried back.

Mining tax is determined at the state/local level; there is no mining tax levied at the federal level.

Significant changes since 2007/8

A temporary incentive was provided through an additional deduction for certain assets purchased between December 18, 2008 and December 18, 2009. This appeared in the Two Ducks Report models as an “investment allowance”. This special allowance is no longer applicable.

Western Australia

Western Australia levies two forms of mineral royalty: specific rate (which is calculated on the quantum of mineral produced) and ad valorem (which is based on the royalty value of the mineral produced).

Currently, the ad valorem system is used for calculating mining tax for Western Australia. The rate charged depends on the type of ore mined and the level of processing that is done by the operator. The mining royalty rates for base metals range from 2.5% to 7.5%.

Royalties for diamonds are site-specific and negotiated directly with the government. The royalty can either be based on net profit or royalty value. Currently, Australia’s only diamond mine is paying an ad valorem royalty of 5% based on an agreement it negotiated with the government in 2009.

Significant changes since 2007/8

Prior to 2009, Australia's only diamond mine had a royalty based on either 22.5% of net profit or 7.5% of royalty value. As mentioned previously, this was subsequently negotiated to a 5% ad valorem royalty in 2009.

South Australia

All royalties in South Australia are based on an ad valorem calculation. The rates vary depending on the type of mineral mined, and range from 3.5% to 5%. The rate applicable to diamonds is 3.5%.

South Australia provides an initial reduced royalty rate for the first 5 years of production. The reduction sets the royalty rate at 2% for the first five years of production. However, the 2018 State Budget announced the discontinuation of the reduced royalty rate for any applications for new mines not received by July 1, 2020.

Significant changes since 2007/8

At the time of the preparation of the Two Ducks Report, the reduced royalty rate was 1.5%.

United States

The United States federal government levies a corporate income tax on all US corporations. The current federal corporate income tax rate is 21%, after having been reduced from 35% as a result of the US tax reform in 2017. The base for determining the corporate income tax liability is net profit determined as accounting income with certain adjustments. Adjustments include the allowance of a depreciation and depletion allowance, deduction for state and municipal taxes, and adjustments for any non-deductible interest. Where a company is in a loss position, losses can be carried forward, but the utilization of loss carry forwards to reduce taxable income is limited to 80% of taxable income in the year.

Income tax may also be levied at the state level. There are no federal taxes specific to the mining sector.

Alaska

Alaska levies a corporate income tax with net profit generally determined in a similar manner to net profit for federal purposes. Alaska has rolling conformity with federal legislation, and as such the effect of the US corporate income tax reform also affects calculation of taxable income for Alaskan state tax purposes. The tax rate applied is graduated, and ranges from 1% to 9.4% depending on the taxable income of the corporation.

Alaska levies two separate mining taxes: a mining license tax and a production royalty. The mining license tax is calculated at rates ranging from 0% to 7% depending on the net income of the corporation. The production royalty is calculated at 3% of net income of the corporation. There are certain differences between net income determined for state mining tax purposes and income for corporate income tax purposes, such as the treatment of exploration costs, but the approach is similar. Corporations are able to apply for a 3.5 year exemption from the mining license tax from the commencement of production. Alaska also provides an Exploration Incentive Credit equal to 50% of the mining license tax liability which can be applied to reduce the mining license tax payable.

The state corporate income tax and mining taxes are deductible in computing income for federal income tax purposes.

Nevada

Nevada does not levy a corporate income tax.

Nevada levies a mining royalty which is based on net proceeds from mining. The applicable rate is graduated from 2% - 5% depending on the operating margin of the corporation. The taxable base is gross proceeds from the sale of minerals less allowable deductions. There is no carry forward or carry back provision where a company is in a loss year.

Significant changes since 2007/8

On December 22, 2017, a major tax reform in the United States was enacted under the Tax Cuts and Jobs Act. Significant changes included the following:

- Reduction in the US federal income tax rate from 35% to 21%.

- Repeal of the alternative minimum tax regime which previously applied a minimum tax of 20% of alternative minimum taxable income. This tax could be credited against future income tax liabilities or could be refunded in certain circumstances.
- Changes to the loss carry forward/carry back regime to only allow losses to be carried forward indefinitely and limiting the claim in any given year to 80% of taxable income.
- Changes limiting the deduction of interest based on "adjusted taxable income".
- Changes to the tax depreciation of short-lived capital assets to provide for a quicker deduction on investments in those assets.

Sweden

In Sweden, corporations are currently subject to corporate income tax at a rate of 21.4%. This rate is set to decrease to 20.6% in 2021. The taxable base is net profit including income from certain capital gains. An allowance for depreciation is allowed and non-capital loss carry forwards may be applied to reduce taxable income.

Mining companies are required to pay a tax of 0.2% of the value of the minerals mined. This tax is split evenly between the landowners and the Swedish government, and is deductible for corporate income tax purposes.

Significant changes since 2007/8

There have been no significant changes from 2007/8. There were changes to the interest deductibility rules in 2019.

Peru

Corporations in Peru are subject to income tax at a rate of 29.5%. The taxable base is generally all income, including most capital gains, less deductions for expenses which were incurred to earn that income. A deduction is also permitted for depreciation based on what is recorded for financial reporting purposes, however prescribed limits for various asset classes apply.

Mining companies in Peru are subject to multiple levels of mining taxation: the New Mining Royalty ("NMR"), Special Mining Tax ("SMT"), and Special Mining Contribution ("SMC"). The base for all mining taxes is operating profit, obtained from deducting cost of sales and operating expenses from gross income. NMR applies to metallic and non-metallic minerals at progressive rates ranging from 1% to 12% based on the operating margin of the company. A minimum NMR of 1% of revenue is also applicable. The SMT applies to metallic minerals only and is charged at progressive rates ranging from 2% to 8.4%, based on the operating margin of the company. The SMC applies to metallic minerals only where a company has entered into a tax stability agreement with the state. The SMC is calculated at progressive rates ranging from 4% to 13.12% based on operating margin.

Significant changes since 2007/8

There was a significant reform since 2007/8, resulting in a change from a simple royalty of 1% - 3% of gross receipts less certain deductions, to the current regime.

Chile

In Chile, corporations are generally subject to corporate income tax under one of two systems: First Category Tax ("FCT") and Partially Integrated Systems ("PIS"). The system that is applicable to a company depends on who holds the shares of the company. The applicable rate for the FCT is 25% and the applicable rate for the PIS is 27%. The taxable base for corporate income tax is taxable profit. Where the company is in a loss position, the losses can be

carried forward indefinitely. When after-tax earnings are distributed to shareholders, a secondary withholding tax applies at a rate of 35%. The original tax paid can be credited against the withholding tax liability.

Royalties on mineral extraction is based on net taxable income with certain adjustments. The applicable rate ranges from 0.5% to 14% depending on the quantum of mineral mined and the operating margin of the company. This tax is deductible for corporation income tax.

Significant changes since 2007/8

As a result of a reform in 2014, there was a change in the initial corporate tax rate from 17% in 2007/8 to 25%/27% in 2019. There was no change in the effective tax rate after distribution of income, which has remained at 35%.

Mexico

In Mexico, corporations are generally subject to a corporate income tax of 30% at the federal level. There is no state or local taxation based on income. The base used to determine the tax liability is net income recognized on an accrual basis. Losses can be carried forward for up to 10 years.

Two levels of mining tax are imposed in Mexico. The Special Duty on Mining applies a 7.5% tax on the net profit on sales of extracted minerals. Net profit for purposes of this tax is generally calculated in a manner similar to net income for corporation income tax; however, certain deductions are not permitted such as depreciation and interest. The second level of mining tax is the Extraordinary Duty on Mining which is applicable to sales of gold, silver, and platinum. The 0.5% rate applicable is applied to the gross revenue from the sale of those minerals. Both taxes are deductible for determining income for corporate income tax.

In addition to taxes, Mexico also has a compulsory employee profit sharing regime that requires that 10% of annual profits be distributed to employees. The amount paid for this profit sharing is deductible in determining income for corporate income tax purposes.

Significant changes since 2007/8

Mexico introduced a mining tax regime on October 31, 2013 which became effective in 2014. Prior to this, there was no additional taxation on the mineral resource sector.

As of January 1, 2008, the asset tax in Mexico was replaced by a flat tax on business income (“Impuesto Empresarial a Tasa Unica" (IETA)), which was subsequently repealed effective January 1, 2014.

Namibia

In Namibia, corporations are generally subject to corporate income tax at a rate of 32%. However, diamond mining companies are subject to a higher rate of 55%, and other mining companies are subject to a rate of 37.5%. The taxable base is gross income less certain deductions including depreciation allowance and non-capital losses carried forward.

A 3% mining tax is levied on the market value of base metals, and a 10% tax is levied on rough diamonds. An additional levy of 2% is charged on the export of rough diamonds.

Significant changes since 2007/8

The general corporate income tax rate was reduced from 35% to 32%. In 2019, the Minister of Finance proposed to disallow the deductibility of royalties by non-diamond mining companies in future taxation years, and to increase the export levy on diamonds from 2% to 15%.

South Africa

Corporations in South Africa are generally subject to a corporation income tax of 28%. Lower rates can apply to certain companies such as small business corporations and companies in special economic zones. The taxable base is net profit. If the company is resident in the country, the company is subject to tax on worldwide income. Losses can be carried forward indefinitely.

A royalty is applied at a rate varying from 0.5% to 7%. The applicable rate is dependent on whether the mineral is refined or unrefined, and the profits of the mine. The royalty is deductible for corporation income tax purposes.

Significant changes since 2007/8

The general corporate income tax rate has decreased from 29% to 28%.

Appendix B: Summary of indirect taxes by jurisdiction

Canada

Federal Taxation

Property Tax

There is no property tax levied at the federal level in Canada.

Fuel Tax

Canada levies an excise tax on fuel of $0.10 per litre of gasoline and $0.04 per litre of diesel. Exemptions to this tax may be available for certain uses; however, we have assumed no exemption is available for purposes of our modelling.

Payroll Tax

All employers in Canada (excluding Quebec, which has its own regime) are required to contribute a portion of employee earnings towards the Canada Pension Plan (CPP). Additionally, all employers in Canada are required to make contributions towards Employment Insurance (EI). Both of these programs are partially funded by employer contributions and partially funded by employee contributions, which employers are also required to withhold from their employees' gross pay, as a source deduction. Only the employer portion of these contributions has been considered in the models prepared.

The CPP contributions are determined based on an employee's pensionable income, which is, generally, their gross pay and taxable benefits. Employer CPP contributions is calculated as 5.1% of pensionable earnings in excess of $3,500 up to a maximum of $53,900 per employee. It has been assumed that all employee earnings will be taxed at a rate of 5.1% for purposes of calculating the CPP liability in the various Canadian jurisdictions.

The EI contributions are calculated in a similar manner to CPP, where the calculation is based generally on gross pay up to an annual limit of $53,100 per employee. We have assumed that the taxable base for CPP and EI are equal. The employer portion of the contribution is calculated as earnings multiplied by 2.268%. It has been assumed that all employee earnings will be taxed at this rate.

Carbon tax

To advance the objectives of the Pan-Canadian Framework on Clean Growth and Climate Change (the "Framework") and reduce greenhouse gas (GHG) emissions, the Canadian government passed the Greenhouse Gas Pollution Pricing Act, which received Royal Assent on June 21, 2018.

In accordance with the Framework, the federal government requires all provinces and territories to adopt a form of carbon pricing and established a Federal Carbon Pricing Backstop (the "FCPB") program for provinces that (i) do not have their own carbon tax program or (ii) whose provincial program does not meet federal standards. The FCPB program has two components:

- a charge on certain fuels (the "Carbon Levy"), applicable as of April 1, 2019 in Manitoba, New Brunswick, Ontario and Saskatchewan and July 1, 2019 in Nunavut and the Yukon. The Carbon Levy is generally imposed on producers, distributors, emitters, importers and certain users of fuel and combustible waste, along with air, marine, rail or road carriers, which have business activities in the above provinces and territories. Rates vary by type of fuel, and are equivalent to CAD 20 per CO2e (carbon dioxide equivalent) tonne in 2019 increasing annually until they reach CAD 50 per CO2e tonne in 2022. These rates applicable in 2022 were applied to various fuel types in order to translate the carbon tax to a per litre amount. For

instance, the carbon tax on gasoline and diesel once rates have reached the 2022 maximum will be $0.1105/litre and $0.1341 respectively;

- an Output-Based Pricing System ("OBPS"), which applies as of January 1, 2019 to industrial facilities whose greenhouse gas emissions exceed certain thresholds. Facilities below the thresholds may elect to opt into the OBPS, allowing for similar treatment as their competitors with varying emissions outputs.

As both systems (Carbon Levy and the OBPS) are now in force, businesses are expected to comply with the FCPB program (with the July 1 Carbon Levy start date for Nunavut and Yukon).

The different types of registrations will trigger specific calculations and reporting requirements. Returns are filed on a monthly or quarterly basis, depending on each particular entity's type of registration.

Provinces that have their own provincial carbon programs are not subject to the FCBP. The provincial carbon programs vary by province and are as follows:

- Alberta: Alberta's provincial Carbon tax program was repealed by Bill 1, An Act to Repeal the Carbon tax, which received Royal Assent on June 4th, 2019. According to the Bill, the Climate Leadership Act was repealed immediately at the beginning of the day on May 30, 2019. As a result of the above, the federal government announced, on June 13, its intent to implement the federal fuel charge in Alberta as of January 1, 2020.
- British Columbia: Carbon tax at a rate of CAD 40 per tonne in 2019 increasing by CAD 5 per tonne each year until it reaches CAD 50 per tonne on 1 April 2021.
- Newfoundland and Labrador: Carbon tax at a rate of CAD 20 per tonne in 2019.
- Northwest Territories: Carbon tax, effective 1 July 2019, at CAD 20 per tonne, increasing annually to CAD 50 per tonne by 2022.
- Nova Scotia: Cap-and-trade system.
- Quebec: Cap-and-trade system.

Northwest Territories taxation

Property tax

We have assumed that the applicable property tax rate for the mine is 1.246% of the assessed value as provided by GNWT. This property tax is increased by Yellowknife CPI annually.

Fuel tax

Diesel fuel is subject to tax at a rate of $0.091 per litre for motive purposes and $0.031 per litre for non-motive purposes under the Northwest Territories Petroleum Products and Carbon Tax Act. No exemption for mining companies is available.

Payroll tax

Payroll tax includes an amount for worker's compensation equal to 1.88% of payroll to employees working in mining operations. A payroll tax of 2% of employment income is also applicable, as confirmed by GNWT.

Carbon tax

The Government of Northwest Territories has released its own carbon pricing system in the territory. The carbon tax became effective September 1, 2019 charging $20 per tonne of CO_2 emitted, increasing annually to $50 per tonne by 2022. Based on the amount of CO_2 generated by a litre of diesel fuel, the rate applicable to diesel fuel consumption is $0.055 per litre in 2019 increasing to $0.137 per litre by 2022. The legislation provides for a rebate of a portion of the tax which has been factored into our models. After this rebate, the effective rate applied to diesel is $0.009 per litre in 2019 increasing to $0.022 in 2022.

Alberta Taxation

Property tax

For purposes of the Alberta jurisdiction, we have used the property tax rate applicable in Wood Buffalo, Alberta. The property tax liability is 2.0443% of assessed value as applicable to industrial/non-residential property located in a rural region.

Fuel tax

Gasoline and diesel are subject to tax of $0.13 per litre under the Alberta Fuel Tax Act. An exemption from such tax is available for marked fuel purchased for commercial purposes to be used in a motor vehicle that is not required to be licensed or registered under any federal or provincial enactment in respect of its operation. It has been assumed this exemption will apply to the non-motive diesel fuel for modelling purposes.

Payroll tax

Alberta does not levy a provincial payroll tax.

We have assumed that the mine will have a liability for workers' compensation contributions of 1.66%, being the rate applicable to workers in the mining industry.

Carbon tax

Alberta's provincial Carbon tax program was repealed by Bill 1, An Act to Repeal the Carbon tax, which received Royal Assent on June 4th, 2019. According to the Bill, the Climate Leadership Act was repealed immediately at the beginning of the day on May 30, 2019. As a result of the above, the Federal government has announced its intent to implement the federal fuel charge in Alberta as of January 1, 2020. Therefore, we have applied the federal carbon tax rates in calculating the carbon tax liability of the Alberta mine.

British Columbia Taxation

Property tax

We have assumed that property tax will not be applicable to the British Columbia mine under the assumption that it will be located in a remote area where any property tax charged will be insignificant. Generally, where a mine is in a remote area, the mine will not be subject to property tax as it is not within the jurisdiction of any municipality.

Fuel tax

Gasoline and diesel fuel are subject to tax at a rate of $0.145 and $0.150 per litre respectively under the BC Fuel tax Act. The applicable rate is reduced to $0.03 per litre if the fuel is coloured (i.e., used for a prescribed type of motor vehicle operating in a mine). We have assumed that motive diesel fuel is subject to the high rate of $0.15 per litre and the non-motive fuel is eligible for taxation at the low rate of $0.03 per litre.

Payroll tax

British Columbia levies a 1.95% employer health tax which we have included in our models. We have also included a workers compensation contribution equal to 0.97% of salaries on the basis that all employees are involved in mining.

Carbon tax

British Columbia has a carbon tax program that allows it to be exempt from the federal carbon tax. The British Columbia carbon tax has been calculated using the applicable rate of $40 per tonne of CO_2 emitted in 2019, increasing in $5 increments to $50 per tonne of CO_2 emitted by 2022.

Manitoba taxation

Property tax

We have assumed that the applicable property tax rate for the mine is the applicable rate in the Thompson area to a commercial property. The rate used is 4.9988%.

Fuel tax

Gasoline and diesel fuel are subject to tax at a rate of $0.140 per litre and $0.1401 per litre respectively under the Manitoba Fuel tax Act. Marked diesel fuel is exempt from tax if used in a mining operation for specified purposes. We have assumed that the motive diesel fuel is subject to the high rate of $0.1401 per litre and the non-motive fuel is eligible for the exemption.

Payroll tax

Manitoba levies a 2.15% payroll tax which we have included in our models. We have also included a workers compensation contribution equal to 1.21% of salaries on the basis that all employees are involved in mining.

Carbon tax

The federal carbon tax regime is applicable in Manitoba which we have included in our models.

New Brunswick taxation

Property tax

We have assumed that the applicable property tax rate for the mine is the applicable rate in the Bathurst area to industrial property. The rate used is 3.961%.

Fuel tax

Gasoline and diesel fuel are subject to tax at a rate of $0.155 and $0.215 per litre respectively under the New Brunswick Gasoline and Motive Fuel tax Act. Certain gasoline and diesel fuel is exempt from tax if used in a mining operation for specified purposes. We have assumed that the motive diesel fuel is subject to the high rate of $0.155 per litre and the non-motive fuel is eligible for the exemption.

Payroll tax

New Brunswick does not levy a payroll tax. We have included a workers compensation contribution equal to 2.38% of salaries on the basis that all employees are involved in mining.

Carbon tax

The federal carbon tax regime is applicable in New Brunswick.

Newfoundland and Labrador taxation

Property tax

We have assumed that the applicable property tax rate for the mine is the applicable rate in the Long Harbour Mount Arlington Heights area to industrial property. The rate used is 0.055%.

Fuel tax

Gasoline and diesel fuel are subject to tax at a rate of $0.165 per litre under the Newfoundland Revenue Administration Act. No exemption for mining companies is available.

Payroll tax

Newfoundland levies a payroll tax of 2% on the total of all salaries paid to employees in excess of $2 million. We have also included a workers compensation contribution equal to 0.91% of salaries on the basis that all employees are involved in mining.

Carbon tax

Newfoundland levies a carbon tax of $20 per tonne of CO2 emitted as of 2019. We have assumed this rate is applicable going forward.

Nova Scotia taxation

Property tax

We have assumed that the applicable property tax rate for the mine is the applicable rate in the Halifax area to a rural commercial property. The rate used is 3.091%.

Fuel tax

Gasoline and diesel fuel are subject to tax at a rate of $0.155 and $0.154 per litre respectively under the Nova Scotia Revenue Act Regulations. A mine operator is able to file notices with the commissioner for a refund of the fuel tax paid in relation to fuel used to operate machinery for mining purposes in certain circumstances. We have assumed that the fuel used for non-motive purposes will be eligible for this treatment, and as such have treated fuel tax on non-motive fuel as not taxable.

Payroll tax

Nova Scotia does not levy an employer health tax or payroll tax. We have included a workers compensation contribution equal to 1.91% of salaries on the basis that all employees are involved in mining.

Carbon tax

Nova Scotia has implemented a cap-and-trade carbon tax system whereby companies are allotted a certain amount of allowable emissions per year and can engage in trading those allowances with other companies based on its needs. Each year, there is a reduction in the allowable emissions to encourage companies to reduce pollution. We have not been able to quantify the impact of this system as prices will fluctuate based on supply and demand, however, for comparison purposes, we have assumed the federal carbon tax regime should approximate a minimum standard and have applied that in our models.

Ontario taxation

Property tax

We have assumed that property tax will not be applicable to the Ontario mine under the assumption that it will be located in a remote area where any property tax charged will be insignificant. Generally, where a mine is in a remote area, the mine will not be subject to property tax as it is not within the jurisdiction of any municipality. Rate, it will be subject to Ontario land tax which is determined based on negotiations between the mine operator and the Government of Ontario.

Fuel tax

Gasoline and diesel fuel are subject to tax at a rate of $0.147 and $0.143 per litre under the Ontario Gasoline Tax Act and Ontario Fuel tax Act respectively. Purchases of coloured diesel fuel are exempt from tax when used for any purpose other than when number plates are attached or the vehicle is used for pleasure or recreation. We have assumed that the fuel used for non-motive purposes will be eligible for this exemption, and as such have treated fuel tax on non-motive fuel as not taxable.

Payroll Tax

Ontario levies an employer health tax at rates ranging from 0.98% - 1.95% depending on the total yearly payroll of the corporation. We have assumed the highest rate applies to all payroll as the reduction from the lower rates is insignificant. An exemption is also available from employer health tax on the first $490,000 of yearly salaries in certain circumstances. However, we have assumed this exemption does not apply as generally employers with greater than $5 million of annual payroll are not eligible. We have also included a workers compensation contribution equal to 3.32% of salaries on the basis that all employees are involved in mining.

Carbon Tax

The federal carbon tax regime is applicable in Ontario.

Saskatchewan taxation

Property tax

We have assumed that property tax will not be applicable to the Saskatchewan mine under the assumption that it will be located in a remote area where any property tax charged will be insignificant. Generally, where a mine is in a remote area, the mine will not be subject to property tax as it is not within the jurisdiction of any municipality.

Fuel tax

Diesel fuel is subject to tax at a rate of $0.15 per litre under the Saskatchewan Fuel tax Act. No exemption for mining companies is available.

Payroll tax

Saskatchewan does not levy a provincial payroll tax. However, we have included contributions to the Saskatchewan Workers' Compensation Board at a rate of $0.72 per $100 of remuneration for employees in open pit mining.

Carbon tax

The federal carbon tax regime is applicable in Saskatchewan

Quebec taxation

Property tax

We have assumed that property tax will not be applicable to the Quebec mine under the assumption that it will be located in a remote area where any property tax charged will be insignificant. Generally, where a mine is in a remote area, the mine will not be subject to property tax as it is not within the jurisdiction of any municipality.

Fuel tax

Fuel tax is levied at $0.202/litre of diesel. Two exemptions are given to mining companies. Coloured fuel for non-highway use is exempt from tax when used solely for a purpose other than supplying a propulsion engine. An exemption is also provided as a refund on non-coloured fuel oil when the fuel oil is used to operate a motor vehicle registered for use exclusively on private land or a private road and used for mining operations. The company would need to apply for this exemption within the specified time limits and meet conditions according to the regulations. We have assumed the non-motive fuel will be eligible for these exemptions.

Payroll tax

Unlike other provinces and territories, Quebec does not follow the CPP regime. Instead, it has implemented a similar system that operates exclusively in Quebec. As such, payroll tax consists of Quebec Parental Insurance Plan ("QPIP") contributions levied at 0.74% of employee remuneration, employer health tax of 4.26% of employee

remuneration in the primary sector, worker's compensation contributions of 5.60% at the general rate, and contributions to the Workforce Skills Development and Recognition Fund at 1% of employee remuneration.

Carbon tax

Quebec has implemented a cap-and-trade carbon tax system whereby companies are allotted a certain amount of allowable emissions per year and can engage in trading those allowances with other companies based on its needs. We have not been able to quantify the impact of this system as prices will fluctuate based on supply and demand, however, for comparison purposes, we have assumed the federal carbon tax regime should approximate a minimum standard and have applied that in our models.

Yukon taxation

Property tax

We have assumed that the applicable property tax rate for the mine is the applicable rate in the village of Mayo. The rate is 1.46% to be applied to the assessed value.

Fuel tax

Diesel fuel is subject to tax at a rate of $0.072 per litre under the Yukon Fuel Oil Tax Act. There are some exemptions available. No tax is payable on fuel oil purchased and used for heating ore as part of a mineral extraction process in respect of which a valid permit has been issued. No tax is payable on fuel oil that a permit holder purchases for own use for mining, including mining exploration and development. We have assumed that none of the fuel purchased will be exempt for purposes of our modelling.

Payroll tax

Payroll tax includes an amount for worker's compensation contributions. A rate of $8.17 per $100 of employment income is applicable for employees in diamond drilling, and a rate of $3.31 per $100 of employment income is applicable for employees in metal mining.

Carbon tax

The federal carbon tax regime is applicable in the Yukon Territory which we have included in our models.

Nunavut taxation

Property tax

We have assumed that the applicable property tax rate for the mine is 1.117% of the assessed value. This is the rate stipulated by the Government of Nunavut for the province as applicable to mining property (class 4).

Fuel tax

Diesel fuel is subject to tax at a rate of $0.091 per litre under the Nunavut Petroleum Products Tax Act. No exemption for mining companies is available.

Payroll tax

Payroll tax includes an amount for worker's compensation. A rate of $2.10 per $100 of employment income is applicable for employees under the Workers' Safety and Compensation Commission of the Northwest Territories and Nunavut (WSCC).

Carbon tax

The federal carbon tax regime is applicable in Nunavut.

Australia

Federal taxes

Property tax

No property taxes are levied at the federal level in Australia.

Fuel tax

Australia levies a fuel tax of $0.418 on gasoline and diesel purchases. Fuel tax credits may be available for mining companies. A credit of $0.158 per litre is available for diesel used in heavy vehicles travelling on public roads and a credit of $0.416 per litre is available for all other business uses. We have assumed that the motive fuel is eligible for the low-rate credit and the non-motive is eligible for a credit at the higher rate.

Payroll tax

Australia requires that all companies contribute a superannuation levy of 9.5% of employee earnings. The purpose of the levy is to fund a superannuation fund or retirement savings account for employees to support them once they retire. The contribution rate is scheduled to increase to 12% in 2025.

Carbon tax

There is no carbon tax levied in Australia at the federal level.

Western Australia

Property tax

Mining tenements are exempt from land tax in Western Australia.

Fuel tax

There is no state-level fuel tax in Western Australia

Payroll tax

Payroll tax is charged at varying rates from 0% to 6.5% depending on the total payroll of the payer. Based on the assumption that annual wages paid by the mines will be between $7.5 and100 million, it has been assumed that 5.5% will be the applicable rate for both mines.

Carbon tax

There is no carbon tax levied in Western Australia.

South Australia

Property tax

South Australia levies a land tax based on “site value”. In broad terms, this means the value of the land, excluding the value of any buildings or other improvements on the land. It has been assumed the value of the land of the mines will be immaterial given their presumed remote location.

Fuel tax

There is no state-level fuel tax in South Australia

Payroll tax

Payroll tax is charged at varying rates from 0% to 4.95% depending on the total payroll of the payer. Based on the assumption that annual wages paid by the mines will be greater than $1.7 million each year, it has been assumed that 4.95% will be the applicable rate for both mines.

Carbon tax

There is no carbon tax levied in South Australia.

Peru

Property tax

No property or land taxes are levied in Peru.

Fuel tax

Fuel taxes of up to PEN 1.27 and PEN 1.70 are levied per litre of gasoline and diesel respectively. This fuel tax has been assumed to be applicable to the mine. Further, the flat tax has been converted to Canadian dollars at the current exchange rate.

Payroll tax

Peru requires employers pay a 9% health contribution on gross salaries. This has been included in our models as a payroll tax.

Employers are also required to obtain insurance for high risk workers (such as those in the mineral extraction industry) We have not quantified this additional expense and do not expect it to be significant over the life of mine.

Carbon tax

No carbon tax is applicable in Peru.

Mexico

Property tax

Property tax is levied on the assessed value of property at rates determined for the region of the mine. The property tax rate has been assumed to be 0.2% based on the most recent information available.

Fuel tax

No fuel tax is applicable in Mexico

Payroll tax

Payroll tax is levied at the state level on salaries and other benefits paid to employees. We have used the rate applicable in Mexico City of 3% of salaries in our models.

Carbon tax

Mexico levies a carbon tax through a tax on the purchase of motor vehicles. This tax has not been quantified.

Namibia

Property tax

Property tax is calculated based on the assessed value of land. The rate applicable is 1.10968%, based on 2015/2016 information for Windhoek, a city in Namibia.

Fuel tax

Fuel tax is calculated based on the recommended retail price of the motor vehicles purchased multiplied by a flat rate of 0.00003 and deducted by a flat amount of 0.75. We have not been able to quantity this tax. It is expected that the fuel tax will be immaterial for the purposes of Phase 2.

Payroll tax

Employers are required to make social security contributions which is calculated at 0.9% based on the employee earnings paid.

Carbon tax

Carbon tax is calculated based on the number of passenger and double cab vehicles purchased as well as pneumatic tyres purchased. The carbon levy rate is $3.46 and $0.86 for each of the vehicles and tyres respectively. We have not been able to quantify these taxes and it is expected that the carbon tax will be immaterial for the purposes of Phase 2.

South Africa

Property tax

Property tax is calculated based on the assessed value of land. The rate applicable is based on 2015/16 information using the average of the tax rates on industrial properties in four municipalities (Cape Town, eThekwini, Johannesburg, Tshwane).

Fuel tax

Fuel tax is calculated based on the amount of petrol and diesel purchased. The tax rate applicable is $0.31/litre and $0.29/litre for petrol and diesel respectively.

Payroll tax

Payroll tax includes payments for the Skills Development Levy and Unemployment Insurance Fund which are both calculated at 1% of the remuneration payable to employees.

Carbon tax

Carbon tax is levied based on various metrics including amount of C02e emitted, petrol purchased, diesel purchased, and electricity generated from non-renewable sources. The rate applicable to the amount of C02e emitted begins at $10.40/tonne (can be reduced to $4.16/tonne), and increases with CPI+2% annually until 2022, and increases with CPI until 2030. The tax rate applicable on petrol and diesel purchased is $0.0078/litre and $0.0087/litre for petrol and diesel respectively. We have been able to quantify only the portion of carbon tax relating to the amount of CO2e emitted and the amount of diesel purchased.

There is an additional tax on non-renewable electricity generated of $0.003/kWh. We have not quantified this in our models as it is expected to be insignificant.

Chile

Property tax

Property tax is calculated based on the assessed value of land at the federal level. The rate on non-farming property in Chile is 1.4% annually.

Fuel tax

Fuel tax is calculated based on the amount of diesel purchased with a rate of 6% (assuming the favourable national rate as per the OECD report on Chile's tax expenditures on fossil fuels).

Payroll tax

Payroll tax includes social security contributions and is calculated at 2.4% of the workers' gross salary. (Rate obtained from PwC's worldwide tax summaries).

Carbon tax

Carbon tax will be gradually introduced under the Chilean tax reform. The government is currently in discussions regarding the rates that will be applied for purposes of calculating the carbon tax. As such, we have not quantified this tax.

Sweden

Property tax

Property tax is calculated based on the assessed value of land at the federal level. We have used the applicable rate for industrial property of 0.5% in our models.

Fuel tax

Sweden does not levy a fuel tax.

Payroll tax

Sweden levies a "social fee" of 31% of payments made to employees which we have included in our models. A reduced rate is available for employees over the age of 65; however, we have assumed this will not apply.

Carbon tax

Carbon tax is levied on fossil fuels in relation to their carbon content. In 2019, the tax is 1180 SEK per tonne of carbon emissions. We have quantified this tax and converted it to Canadian dollars.

United States

Federal taxes

Property tax

No property tax is levied in the US at the federal level.

Fuel tax

A fuel tax on diesel of $0.243 per gallon (approximately $0.064 per litre) is levied at the federal level.

Payroll tax

Employers are subject to social security tax at the federal level. The tax is 6.2% on the first $132,900 of earnings per employee. We have applied the 6.2% to total employment income to quantify this tax under the assumption that no employees exceed the threshold.

A federal unemployment tax is levied on wages paid to employees. The tax is limited to 6% of the employees' wages, limited to $420 of tax per employee per year. We have not quantified this tax given that the number of employees in each mine is not known. However, we do not expect the tax to be significant.

A 1.45% tax for employers is also applied for Medicare which we have calculated based on employment income. There is an additional Medicare tax of 0.9% on wages in excess of $200k per year. We have assumed that no employee will earn greater than $200k annually, and as such, no additional tax at the 0.9% rate has been calculated in the models.

Carbon tax

There is no federal carbon tax levied in the US.

Alaska

Property tax

Property tax is calculated based on the assessed value of land. We have used the applicable rate in the Kenai region of 0.906% in our models.

Fuel tax

A fuel tax on diesel of $0.0095 per gallon (approximately $0.003 per litre) is levied in Alaska.

Payroll tax

No payroll tax is levied at the state level in Alaska.

Carbon tax

No carbon tax is applicable in Alaska.

Nevada tax

Property tax

Property tax in Nevada is dependent on whether the mine is considered patented or non-patented for property tax purposes. Where a mine is considered non-patented, property tax does not apply. Where a mine is considered patented, the property is subject to property tax; however, no value is attributed to the minerals beneath the ground and on the land if $100 of labour has been performed in the previous year. We have assumed that the mine will not be subject to property tax on the basis that no value should be assigned to the minerals beneath the ground and the value of the land is deemed nil.

Fuel tax

A fuel tax on diesel of $0.27 per gallon (approximately $0.071 per litre) is levied in Nevada.

Payroll tax

Nevada levies a payroll tax equal to 1.48% of wages after deduction of health benefits. We have calculated this tax assuming no deduction for health benefits is applicable.

Carbon tax

No carbon tax is applicable in Nevada.

Appendix C: Taxes and competitiveness ranking for all price levels

Phase 1

Total taxes and royalties

Diamonds

Table 27: Ranking of jurisdictions by taxes and royalties, at low prices, diamond (000s)

Jurisdiction	Low price: Rank	Low price: Total taxes	+/- 10% from median tax value
Nevada	1	$116,830	
Alaska	2	$135,118	
Sweden	3	$146,947	
Quebec	4	$157,351	
Ontario	5	$188,744	
Manitoba	6	$198,211	Within 10%
Saskatchewan	7	$198,783	Within 10%
Northwest Territories	**8**	**$200,474**	**Within 10%**
Peru	9	$202,321	Within 10%
Nunavut	10	$203,174	Within 10%
Yukon	11	$214,440	At median
British Columbia	12	$217,467	At median
Alberta	13	$223,830	Within 10%
New Brunswick	14	$229,599	Within 10%
Nova Scotia	15	$241,984	
South Australia	16	$245,710	
Newfoundland	17	$248,415	
Western Australia	18	$287,150	
Chile	19	$296,320	
Mexico	20	$378,638	
Namibia	21	$451,669	
South Africa	22	$457,227	

Table 28: Ranking of jurisdictions by taxes and royalties, at high prices, diamond (000s)

Jurisdiction	High price: Rank	High price: Total taxes	+/- 10% from median tax value
Nevada	1	$332,473	
Sweden	2	$379,853	
Alaska	3	$403,974	
Ontario	4	$552,952	Within 10%
Peru	5	$563,235	Within 10%
Saskatchewan	6	$563,934	Within 10%
Northwest Territories	**7**	**$587,228**	**Within 10%**
Nunavut	8	$594,636	Within 10%
Quebec	9	$597,572	Within 10%
South Australia	10	$598,544	Within 10%
Alberta	11	$604,355	At median
Yukon	12	$604,952	At median
British Columbia	13	$607,542	Within 10%
Manitoba	14	$619,505	Within 10%
Western Australia	15	$657,271	Within 10%
New Brunswick	16	$675,295	
Nova Scotia	17	$680,294	
Newfoundland	18	$692,469	
Chile	19	$725,997	
South Africa	20	$805,233	
Mexico	21	$907,799	
Namibia	22	$1,068,607	

Base metals

Table 29: Ranking of jurisdictions by taxes and royalties, at low prices, base metal (000s)

Jurisdiction	Low price: Rank	Low price: Total taxes	+/- 10% from median tax value
Nevada	1	$30,326	
Alaska	2	$30,519	
Sweden	3	$51,145	
Quebec	4	$68,009	
Saskatchewan	5	$69,646	
Northwest Territories	**6**	**$73,759**	
Ontario	7	$73,911	
Nunavut	8	$74,796	Within 10%
Manitoba	9	$75,716	Within 10%
Yukon	10	$80,079	Within 10%
Peru	11	$82,225	At median
British Columbia	12	$83,831	At median
Newfoundland	13	$85,959	Within 10%
Alberta	14	$89,874	Within 10%
New Brunswick	15	$91,230	Within 10%
Nova Scotia	16	$101,732	
South Australia	17	$110,881	
Chile	18	$114,008	
Mexico	19	$118,525	
South Africa	20	$137,529	
Namibia	21	$139,163	
Western Australia	22	$143,379	

Table 30: Ranking of jurisdictions by taxes and royalties, at high prices, base metal (000s)

Jurisdiction	High price: Rank	High price: Total taxes	+/- 10% from median tax value
Nevada	1	$96,104	
Alaska	2	$109,187	
Sweden	3	$132,252	
Saskatchewan	4	$179,507	
Ontario	5	$192,136	
Peru	6	$199,638	Within 10%
Northwest Territories	**7**	**$211,073**	**Within 10%**
Nunavut	8	$213,769	Within 10%
Quebec	9	$215,919	Within 10%
Manitoba	10	$218,855	Within 10%
Yukon	11	$219,511	Within 10%
British Columbia	12	$223,326	Within 10%
Alberta	13	$224,003	Within 10%
South Australia	14	$234,423	Within 10%
Nfld. and Labrador	15	$241,643	Within 10%
New Brunswick	16	$246,251	
Nova Scotia	17	$249,386	
South Africa	18	$249,706	
Chile	19	$265,810	
Western Australia	20	$272,210	
Mexico	21	$292,830	
Namibia	22	$293,446	

Corporate income taxes
Diamonds

Table 31: Ranking of jurisdictions by corporate income taxes, at low prices, diamond (000s)

Jurisdiction	Low price: Rank	Low price: Corporate income tax	+/- 10% from median tax value
Nevada	1	$61,959	
Alaska	2	$81,722	
Quebec	3	$104,943	
Ontario	4	$136,115	Within 10%
Alberta	5	$138,689	Within 10%
British Columbia	6	$141,799	Within 10%
Sweden	7	$141,829	Within 10%
Northwest Territories	**8**	**$143,109**	**Within 10%**
Yukon	9	$144,492	Within 10%
Nunavut	10	$145,810	Within 10%
Manitoba	11	$146,980	At median
Saskatchewan	12	$147,219	At median
New Brunswick	13	$151,792	Within 10%
Newfoundland	14	$152,005	Within 10%
South Africa	15	$153,110	Within 10%
Western Australia	16	$159,182	Within 10%
Nova Scotia	17	$162,297	
Peru	18	$171,023	
South Australia	19	$175,165	
Namibia	20	$195,733	
Mexico	21	$218,242	
Chile	22	$255,027	

Table 32: Ranking of jurisdictions by corporate income taxes, at high prices, diamond (000s)

Jurisdiction	High price: Rank	High price: Corporate income tax	+/- 10% from median tax value
Nevada	1	$226,727	
Alaska	2	$300,650	
Quebec	3	$333,723	
South Africa	4	$361,501	Within 10%
Sweden	5	$372,457	Within 10%
Ontario	6	$374,410	Within 10%
Manitoba	7	$390,352	Within 10%
Northwest Territories	**8**	**$392,642**	**Within 10%**
British Columbia	9	$395,793	Within 10%
Alberta	10	$396,342	Within 10%
Yukon	11	$398,395	At median
Nunavut	12	$400,050	At median
New Brunswick	13	$408,895	Within 10%
Saskatchewan	14	$411,356	Within 10%
Newfoundland	15	$422,746	Within 10%
Nova Scotia	16	$448,339	
Western Australia	17	$472,382	
Peru	18	$477,391	
South Australia	19	$496,620	
Mexico	20	$561,812	
Chile	21	$628,010	
Namibia	22	$698,830	

Base metals

Table 33: Ranking of jurisdictions by corporate income taxes, at low prices, base metal (000s)

Jurisdiction	Low price: Rank	Low price: Corporate income tax	+/- 10% from median tax value
Nevada	1	$12,396	
Alaska	2	$17,866	
Ontario	3	$41,705	
Quebec	4	$45,367	
Sweden	5	$47,078	
South Africa	6	$50,773	Within 10%
Alberta	7	$51,198	Within 10%
Saskatchewan	8	$52,869	Within 10%
British Columbia	9	$52,915	Within 10%
Manitoba	10	$54,026	Within 10%
Western Australia	11	$54,043	At median
Northwest Territories	**12**	**$54,946**	**At median**
New Brunswick	13	$55,180	Within 10%
Yukon	14	$55,598	Within 10%
Nunavut	15	$55,982	Within 10%
Nova Scotia	16	$56,670	Within 10%
Nfld. and Labrador	17	$57,774	Within 10%
South Australia	18	$58,128	Within 10%
Peru	19	$61,496	
Mexico	20	$72,931	
Namibia	21	$78,159	
Chile	22	$99,011	

Table 34: Ranking of jurisdictions by corporate income taxes, at high prices, base metal (000s)

Jurisdiction	High price: Rank	High price: Corporate income tax	+/- 10% from median tax value
Nevada	1	$59,620	
Alaska	2	$80,841	
Sweden	3	$127,344	
Quebec	4	$129,804	
Mexico	5	$136,763	Within 10%
South Africa	6	$138,455	Within 10%
Alberta	7	$142,163	Within 10%
British Columbia	8	$142,273	Within 10%
Northwest Territories	**9**	**$142,852**	**Within 10%**
Yukon	10	$143,619	Within 10%
Manitoba	11	$144,264	Within 10%
Nunavut	12	$145,547	Within 10%
New Brunswick	13	$147,814	Within 10%
Ontario	14	$149,516	Within 10%
Western Australia	15	$156,266	Within 10%
Nova Scotia	16	$157,067	Within 10%
Nfld. and Labrador	17	$158,172	Within 10%
South Australia	18	$161,939	
Saskatchewan	19	$164,418	
Peru	20	$172,857	
Namibia	21	$219,830	
Chile	22	$230,003	

Royalties
Diamonds

Table 35: Ranking of jurisdictions by royalties, at low prices, diamond (000s)

Jurisdiction	Low price: Rank	Low price: Royalties	+/- 10% from median tax value
Sweden	1	$5,119	
Peru	2	$31,298	
Chile	3	$41,293	
Manitoba	4	$51,232	
Saskatchewan	5	$51,565	
Quebec	6	$52,408	
Ontario	7	$52,629	
Alaska	8	$53,396	
Nevada	9	$54,871	
Northwest Territories	**10**	**$57,364**	**Within 10%**
Nunavut	11	$57,364	At median
Yukon	12	$69,948	At median
South Australia	13	$70,546	
British Columbia	14	$75,668	
New Brunswick	15	$77,807	
Nova Scotia	16	$79,687	
Alberta	17	$85,141	
Newfoundland	18	$96,410	
Western Australia	19	$127,968	
Mexico	20	$160,396	
Namibia	21	$255,937	
South Africa	22	$304,117	

Table 36: Ranking of jurisdictions by royalties at high prices, diamond (000s)

Jurisdiction	High price: Rank	High price: Royalties	+/- 10% from median tax value
Sweden	1	$7,396	
Peru	2	$85,844	
Chile	3	$97,987	
South Australia	4	$101,924	
Alaska	5	$103,324	
Nevada	6	$105,746	
Saskatchewan	7	$152,578	
Ontario	8	$178,542	
Western Australia	9	$184,888	Within 10%
Northwest Territories	**10**	**$194,586**	**Within 10%**
Nunavut	11	$194,586	At median
Yukon	12	$206,557	At median
Alberta	13	$208,012	Within 10%
British Columbia	14	$211,749	Within 10%
Manitoba	15	$229,153	
Nova Scotia	16	$231,955	
Quebec	17	$263,849	
New Brunswick	18	$266,400	
Newfoundland	19	$269,724	
Mexico	20	$345,988	
Namibia	21	$369,777	
South Africa	22	$443,732	

Base metal

Table 37: Ranking of jurisdictions by royalties, at low prices, base metal (000s)

Jurisdiction	Low price: Rank	Low price: Royalties	+/- 10% from median tax value
Sweden	1	$4,067	
Saskatchewan	2	$11,872	
Alaska	3	$12,653	
Chile	4	$14,997	
Nevada	5	$17,930	
Northwest Territories	**6**	**$18,813**	
Nunavut	7	$18,813	
Manitoba	8	$20,118	
Peru	9	$20,729	
Quebec	10	$22,642	Within 10%
Ontario	11	$23,137	At median
Yukon	12	$26,053	At median
Newfoundland	13	$29,288	
British Columbia	14	$30,917	
New Brunswick	15	$36,050	
Alberta	16	$38,677	
Nova Scotia	17	$43,605	
South Australia	18	$58,012	
Namibia	19	$61,004	
Mexico	20	$64,482	
South Africa	21	$64,598	
Western Australia	22	$101,674	

Table 38: Ranking of jurisdictions by royalties at high prices, base metal (000s)

Jurisdiction	High price: Rank	High price: Royalties	+/- 10% from median tax value
Sweden	1	$4,908	
Saskatchewan	2	$21,335	
Peru	3	$26,781	
Alaska	4	$28,346	
Chile	5	$35,807	
Nevada	6	$36,484	
Ontario	7	$53,681	
Northwest Territories	**8**	**$68,222**	**Within 10%**
Nunavut	9	$68,222	Within 10%
South Australia	10	$70,005	Within 10%
Namibia	11	$73,616	At median
Manitoba	12	$75,237	At median
Yukon	13	$75,247	Within 10%
British Columbia	14	$81,053	Within 10%
Alberta	15	$81,840	Within 10%
Newfoundland	16	$84,576	
Quebec	17	$86,116	
Nova Scotia	18	$87,447	
New Brunswick	19	$98,437	
South Africa	20	$112,944	
Western Australia	21	$122,694	
Mexico	22	$136,564	

Comparison with Two Ducks rankings

Diamond

Table 39: Competitiveness ranking for total taxes and royalties, 2007/8, 2018/19 and change at low prices, diamonds

Jurisdiction	Rank, 2018 /19	Rank, 2007 /8	Change
Nevada	1	14	13
Alaska	2	17	15
Sweden	3	4	1
Quebec	4	11	7
Ontario	5	7	2
Manitoba	6	10	4
Saskatchewan	7	15	8
Northwest Territories	**8**	**8**	**-**
Peru	9	19	10
Nunavut	10	9	-1
Yukon	11	16	5
British Columbia	12	6	-6
Alberta	13	5	-8
New Brunswick	14	2	-12
Nova Scotia	15	13	-2
South Australia	16	12	-4
Newfoundland	17	1	-16
Western Australia	18	20	2
Chile	19	18	-1
Mexico	20	3	-17
Namibia	21	22	1
South Africa	22	21	-1

Table 40: Competitiveness ranking for total taxes and royalties, 2007/8, 2018/19 and change at high prices, diamonds

Jurisdiction	Rank, 2018 /19	Rank, 2007 /8	Change
Nevada	1	8	7
Sweden	2	2	-
Alaska	3	18	15
Ontario	4	3	-1
Peru	5	17	12
Saskatchewan	6	6	-
Northwest Territories	7	7	-
Nunavut	8	9	1
Quebec	9	11	2
South Australia	10	10	-
Alberta	11	4	-7
Yukon	12	16	4
British Columbia	13	5	-8
Manitoba	14	14	-
Western Australia	15	21	6
New Brunswick	16	13	-3
Nova Scotia	17	12	-5
Newfoundland	18	15	-3
Chile	19	20	1
South Africa	20	19	-1
Mexico	21	1	-20
Namibia	22	22	-

Base metal

Table 41: Competitiveness ranking for total taxes and royalties, 2007/8, 2018/19 and change at low prices, base metal

Jurisdiction	Rank, 2018 /19	Rank, 2007 /8	Change
Nevada	1	11	10
Alaska	2	16	14
Sweden	3	3	-
Quebec	4	9	5
Saskatchewan	5	18	13
Northwest Territories	**6**	**7**	**1**
Ontario	7	6	-1
Nunavut	8	8	-
Manitoba	9	10	1
Yukon	10	13	3
Peru	11	19	8
British Columbia	12	5	-7
Newfoundland & Labrador	13	12	-1
Alberta	14	4	-10
New Brunswick	15	2	-13
Nova Scotia	16	14	-2
South Australia	17	17	-
Chile	18	15	-3
Mexico	19	1	-18
South Africa	20	20	-
Namibia	21	21	-
Western Australia	22	22	-

Table 42: Competitiveness ranking for total taxes and royalties, 2007/8, 2018/19 and change at low prices, base metal

Jurisdiction	Rank, 2018 /19	Rank, 2007 /8	Change
Nevada	1	9	8
Alaska	2	19	17
Sweden	3	2	-1
Saskatchewan	4	13	9
Ontario	5	3	-2
Peru	6	18	12
Northwest Territories	7	**6**	**-1**
Nunavut	8	8	-
Quebec	9	7	-2
Manitoba	10	11	1
Yukon	11	15	4
British Columbia	12	5	-7
Alberta	13	4	-9
South Australia	14	10	-4
Newfoundland & Labrador	15	14	-1
New Brunswick	16	16	-
Nova Scotia	17	12	-5
South Africa	18	17	-1
Chile	19	21	2
Western Australia	20	20	-
Mexico	21	1	-20
Namibia	22	22	-

Phase 2
Ranking and competitiveness
Diamond

Table 43: Ranking of jurisdictions by tax competitiveness, diamond (sorted by ranking of LOM direct and indirect taxes, low prices)

Jurisdiction	Direct and indirect taxes- Rank	Total indirect tax- Rank	Direct taxes only- Rank	Direct and indirect taxes
Alaska	1	3	2	182,417
Nevada	2	5	1	193,662
Quebec	3	14	4	284,532
Ontario	4	10	5	299,214
Northwest Territories	**5**	**9**	**8**	**307,221**
Saskatchewan	6	11	6	312,760
British Columbia	7	8	12	323,218
Nunavut	8	13	9	332,895
South Australia	9	6	14	336,074
Chile	10	4	19	348,308
Nfld. and Labrador	11	12	17	352,727
Yukon	12	17	11	360,698
Alberta	13	15	13	364,784
Western Australia	14	7	18	380,333
Mexico	15	1	20	391,533
Peru	16	19	7	409,360
Manitoba	17	21	10	411,084
Nova Scotia	18	18	16	412,763
Sweden	19	22	3	419,519
New Brunswick	20	20	15	431,263
Namibia	21	2	22	476,602
South Africa	22	16	21	612,936

Table 44: Ranking of jurisdictions by tax competitiveness, diamond (sorted by ranking of LOM direct and indirect taxes, high prices)

Jurisdiction	Direct and indirect taxes- Rank	Total indirect tax- Rank	Direct taxes only- Rank	Direct and indirect taxes
Nevada	1	5	1	405,430
Alaska	2	3	3	447,921
Sweden	3	22	2	650,251
Ontario	4	10	4	655,628
Saskatchewan	5	11	6	670,451
Northwest Territories	**6**	**9**	7	**687,257**
South Australia	7	6	10	687,427
British Columbia	8	8	13	704,826
Quebec	9	14	9	706,481
Nunavut	10	13	8	715,581
Alberta	11	15	11	737,824
Yukon	12	17	12	745,528
Western Australia	13	7	15	748,406
Peru	14	19	5	750,076
Chile	15	4	19	776,884
Nfld. and Labrador	16	12	18	791,915
Manitoba	17	21	14	815,118
Nova Scotia	18	18	17	832,703
New Brunswick	19	20	16	858,601
Mexico	20	1	21	920,600
South Africa	21	16	20	965,952
Namibia	22	2	22	1,089,280

Base metal

Table 45: Ranking of jurisdictions by tax competitiveness, base metal (sorted by ranking of LOM direct and indirect taxes, low prices)

Jurisdiction	Direct and indirect taxes- Rank	Total indirect tax- Rank	Direct taxes only- Rank	Direct and indirect taxes
Alaska	1	3	1	47,478
Nevada	2	5	2	58,238
Saskatchewan	3	11	3	109,917
Northwest Territories	**4**	**9**	**4**	**111,949**
Ontario	5	10	5	113,582
Quebec	6	14	6	115,848
Nunavut	7	13	7	121,050
British Columbia	8	8	8	121,358
Mexico	9	1	9	123,271
Nfld. and Labrador	10	12	10	124,358
Yukon	11	15	11	126,295
Chile	12	4	12	133,210
Alberta	13	16	13	140,127
South Australia	14	6	14	143,745
Namibia	15	2	15	149,291
Sweden	16	22	16	150,145
Manitoba	17	21	17	151,955
Peru	18	19	18	157,236
New Brunswick	19	20	19	161,127
Nova Scotia	20	18	20	162,953
Western Australia	21	7	21	177,634
South Africa	22	17	22	195,676

Table 46: Ranking of jurisdictions by tax competitiveness, base metal (sorted by ranking of LOM direct and indirect taxes, high prices)

Jurisdiction	Direct and indirect taxes- Rank	Total indirect tax- Rank	Direct taxes only- Rank	Direct and indirect taxes
Nevada	1	5	2	122,204
Alaska	2	3	1	124,955
Saskatchewan	3	11	3	218,738
Sweden	4	22	16	229,054
Ontario	5	10	5	230,541
Northwest Territories	**6**	**9**	**4**	**247,232**
Nunavut	7	13	7	257,603
Quebec	8	14	6	258,929
British Columbia	9	8	8	259,273
Yukon	10	15	11	264,890
South Australia	11	6	14	266,285
Peru	12	19	18	271,320
Alberta	13	16	13	271,670
Nfld. and Labrador	14	12	10	277,880
Chile	15	4	12	283,776
Manitoba	16	21	17	289,568
Mexico	17	1	9	297,372
Namibia	18	2	15	303,499
Nova Scotia	19	18	20	305,129
Western Australia	20	7	21	305,220
South Africa	21	17	22	305,910
New Brunswick	22	20	19	312,021

Appendix D: Limitations

We refer to our recent discussions and your request for us to prepare a report comparing the tax regime of the Northwest Territories to the comparison jurisdictions considered in the Two Ducks Report. This document is provided in accordance with our engagement letter with the GNWT, dated March 25, 2019 (the "Contract").

This document has been prepared solely for your use for the purpose set out in the Contract. It is not to be used for any other purpose or distributed to any other third party. We do not accept or assume responsibility for any other purpose or to any other person to whom this report is shown or into whose hands it may come except where expressly agreed by our prior consent in writing.

This document is intended to be a narrative to outline key differences in the approach of the studied jurisdictions in certain income and mining tax matters. This report does not reflect an opinion on these matters and is not a recommendation as to how you may choose to proceed on any item or what actions you may take as a result of the provision of this information.