Insights into Designing Fiscal Regimes for Impact Benefit Agreements

by

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Abstract

Impact benefit agreements (IBAs) have become a popular tool to manage and mitigate the impacts of resource development activities, and share the monetary and/or non-monetary benefits from development activities with impacted communities. The largely confidential nature of these agreements has made it difficult for communities to learn from past agreements and associated outcomes. This report provides practical recommendations for designing equitable fiscal regimes in IBAs. This report identifies, describes, and qualitatively assesses fiscal instruments and systems for extractive industries using a set of potential community objectives. Then, a method to quantitatively evaluate alternative fiscal regimes is employed for the base metal mining sector, using a modified discounted cash flow model of a representative base metal mine. The results suggest that more aggressive fiscal regimes could be negotiated for IBAs in the base metal mining sector while still ensuring that a given resource project is economically viable. The study also suggests that combining a few fiscal instruments can help to balance between the inherent trade-offs of a given fiscal instrument.

Keywords: impact benefit agreement; community development; sustainable development; resource management; resource governance; fiscal regimes

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List of Acronyms

BA	Benefit Agreement
BSA	Benefit-sharing agreement
CDA	Community development agreement
CIF	Cost, insurance and freight
CSR	Corporate social responsibility
FOB	Free on board
IBA	Impact benefit agreement
NPV	Net present value
NSR	Net smelter return
NSV	Net smelter value
PSC	Production-sharing contract

Chapter 1. Introduction

Relying on resource extraction to achieve sustainable development is challenging. During an economic boom, resource-based communities are forced to cope with increased demands on housing, physical infrastructure, and social services (Ryser, Markey, Manson, & Halseth, 2014). But volatility in international markets and depletion of non-renewable resources complicate long-term planning in resource-based regions (Blunt, 2014). When economic downturns occur, resource-based communities experience declining employment and revenue that strain public services (Ryser et al., 2014). Unfortunately, if the economic downturn persists, the resource-based community may be unable to provide these services, and the community will depopulate and/or remain in distress. Moreover, the benefits and costs of large-scale resource development are often unevenly distributed, with much of the revenue from mining accruing to the private firms extracting the resource, while the large social and environmental costs are felt at the local level (O'Faircheallaigh, 2013).

To help address the adverse environmental, social, and economic impacts of resource development, impacted communities around the world have been negotiating bilateral agreements with private resource developers and/or senior governments to provide a more equitable sharing of benefits (Nwapi, 2017; Söderholm & Svahn, 2015; Tordo, Johnston, & Johnston, 2010). These agreements are generally classified as benefit agreements (BAs) but are also referred to as community development agreements (CDAs), benefit-sharing agreements (BSAs), and impact and benefit agreements (IBAs). For consistency throughout this report, these agreements will be referred to as IBAs.

Negotiating an IBA can be beneficial to both the local or Indigenous community impacted by resource development and the project proponent. These project-specific benefit agreements typically include preferential Indigenous or local access to employment and business development opportunities, opportunities for community development, Indigenous or local participation in environmental management, and stipulations for the sharing of project revenues (Natural Resources Canada, 2016; O'Faircheallaigh, 2016; O'Faircheallaigh & Gibson, 2012; Rodon, Lemus-Lauzon, & Schott, 2018). IBAs can also help the project proponent gain community consent for the

proposed activity, meet international standards of Corporate Social Responsibility (CSR), cultivate and maintain a good reputation, and reduce uncertainty and investment risk associated with project approval and construction (Blunt, 2014; Craik, Gardner, & McCarthy, 2017; Lapierre & Bradshaw, 2008; Tysiachniouk & Petrov, 2018)).

1.1. Purpose and Rationale of Report

IBAs are generally confidential in nature. As such, the unavailability of these agreements has limited their study to a select number of researchers (Craik et al., 2017). Additionally, much of the current literature on IBAs is better oriented towards the governance community rather than impacted communities. Previous studies have mainly focused on the purpose of IBAs (Blunt, 2014; Gibson, 2006; Papillon & Rodon, 2017; Söderholm & Svahn, 2015; Tysiachniouk & Petrov, 2018), how and if IBAs can be integrated into existing regulatory processes (Galbraith, Bradshaw, & Rutherford, 2007; Gibson, 2006), and the power dynamics within and surrounding IBA negotiation processes (Blunt, 2014; Caine & Krogman, 2010; O'Faircheallaigh, 2013). Other studies have focused on guidelines and best practices for negotiation IBAs (e.g. O'Faircheallaigh, 2016; Cascaden, 2018). However, there has been very little research on how to design fiscal instruments in IBAs to achieve community objectives (Gunton et al. 2020).

This report addresses this gap in the literature by evaluating alternative fiscal instruments and systems used in IBAs for sharing monetary benefits between project developers and communities.

The purpose of this report is to:

1. Review and synthesise existing literature on fiscal instruments and systems to highlight the advantages and disadvantages associated with each instrument and system

2. Develop and employ a methodology to quantitatively evaluate and compare fiscal regimes negotiated for IBAs

3. Gain and share insights on best practices for fiscal regime design and IBA negotiation

1.2. Report Methodology

An overview of the steps taken to complete this report can be found in Figure 1. First, a literature review was conducted. This literature review focused on the fiscal instruments and systems that can be used to share revenues from resource development activities. Through this literature review, a set of potential community objectives was synthesised. These potential community objectives were then used as a standard to identify the qualitative advantages and disadvantages of various fiscal instruments and systems. To quantitatively compare alternative fiscal regimes, a set of quantitative evaluative criteria and associated indicators was developed – again, using the list of potential community objectives. This set of quantitative evaluative criteria was then used to evaluate the performance of alternative fiscal regimes, whose outcomes were estimated using a financial model.

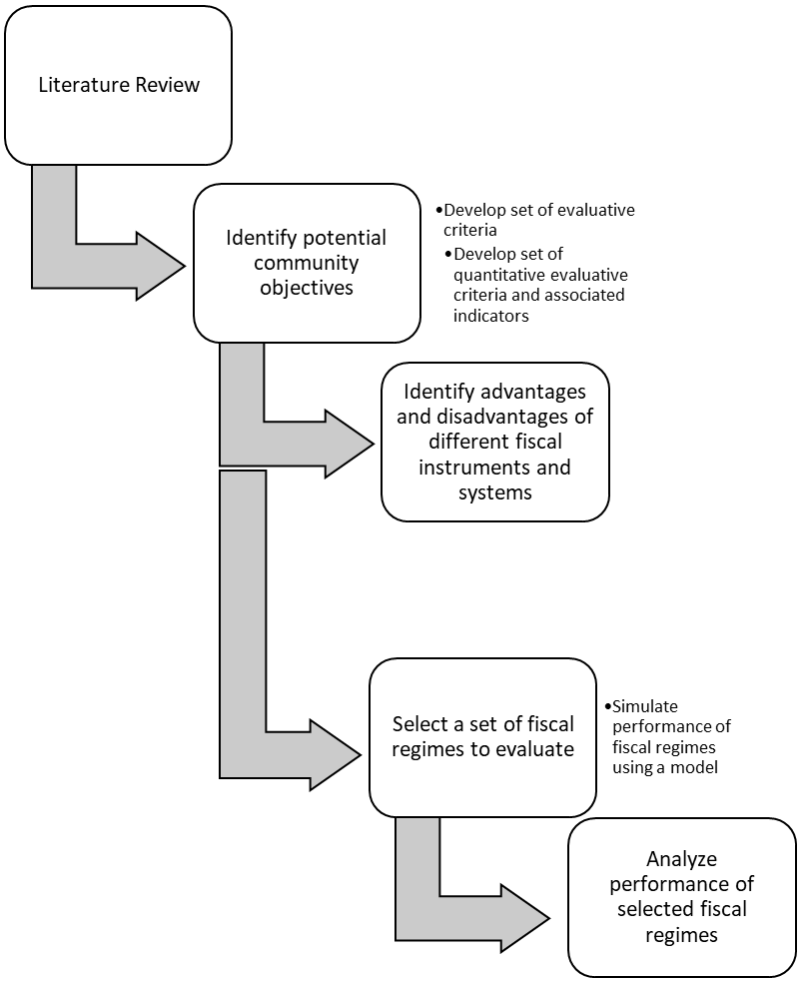

Figure 1. Report methodology

1.3. Structure of Report

This report is divided into five chapters. Chapter 1 introduces the research area, identifies the purpose of this report, and outlines the methodology and structure that this report follows. Chapter 2 provides an introduction to the characteristics of extractive industries, describes the role of fiscal regimes, emphasises the importance of fiscal regime design, and provides an overview of potential community objectives when it comes to outcomes associated with fiscal regime implementation. Chapter 3 describes alternative fiscal instruments and systems that can be used to share resource revenues and identifies their respective advantages and disadvantages in relation to the potential community objectives described in Chapter 2.4. Chapter 4 uses quantitative evaluative criteria and financial modeling to evaluate the performance of alternative fiscal regimes for the base metal mining sector. Lastly, Chapter 5 summarizes the key findings of this report and provides recommendations for fiscal regime design.

Chapter 2. Background & Context

2.1. Introduction

To adequately describe the advantages, disadvantages, and challenges of each fiscal system and instrument used for petroleum and mineral extraction projects, it is important to understand the basic characteristics of extractive industries as well as the purpose of well-designed fiscal regimes for the extractive sector. Consequently, this chapter describes the special characteristics of extractive industries, describes the role of fiscal regimes, emphasises the importance of fiscal regime design, and provides an overview of potential community objectives when it comes to outcomes associated with fiscal regime implementation.

2.2. Extractive Industries and Their Characteristics

Extractive industries, such as petroleum and/or mineral development projects, posses a set of unique characteristics which differentiate them from all other industries. Natural resource projects are generally high-risk projects, as they require a substantial amount of capital, experience long lead times before any return on investment is achieved, demand long exploration and pre-production periods during which there is no revenue generated, and are long-term projects whose viability is often tied to highly volatile commodity markets, uncertain site geology, uncertain input costs and political risk (Fiscal Affairs Department, 2012; Guj, 2012; Guj, Bocoum, Limerick, Meaton, & Maybee, 2013). Additionally, natural resource projects can generate sizeable economic rents, or surplus revenues in excess of all costs of production including a normal return on capital (Fiscal Affairs Department, 2012; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; T. Gunton & Richards, 1987; Johnston, 1994). Extractive industries are also often characterised by the presence of asymmetric information between private investors/project developers and host governments. Specifically, the project developers are better informed about the technical and commercial aspects of a resource project; they are therefore able to calculate a more accurate value of the economic rent generated by a project. Meanwhile, the host government is better informed about its future fiscal intentions. Lastly, natural resource projects often involve the exploitation of exhaustible resources.

Although extractive industries may generate economic rent, the magnitude of rent is highly variable. As stated above, economic rent is any surplus revenue after accounting for or deducting all production costs, including a normal return. Therefore, the magnitude of economic rent generated by a resource development project is dependent on the type and grade of the mineral deposit, commodity sales prices, and production costs. If commodity sales prices were to increase while the cost of production remained stable, economic rent would increase. Similarly, if commodity prices remained constant but production costs were reduced, the amount of economic rent generated would also increase. However, if either production costs increased, or commodity prices decreased, the economic rent generated by the resource project would lessen.

2.3. What Are Fiscal Regimes and Why Do They Matter?

Natural resource ownership laws often require the 'reasonable' or 'fair' sharing of rents between resource companies and host governments. While extractive industries can generate sizeable rents, the ownership of the in-situ resource is not always private; in fact, while extraction and marketing of natural resources is often undertaken by private firms, ownership of the in-situ resource is commonly held through some form of collective ownership by various levels of government, including local and Indigenous communities (Garnaut & Clunies Ross, 1983; Guj, 2012). Therefore, the distribution of resource rent among governments, private sector developers, Indigenous communities and other stakeholders is impacted by the legal system governing resource ownership. For example, in Canada, most natural resources are owned by the Crown, and Indigenous communities have various rights and titles to natural resources that are in the process of being defined by the courts. Under this legal framework, the community or host government that owns the resource has the right to charge the private developer for the publicly owned in-situ natural resource that the private developer is extracting (Freebairn, 2015; Garnaut, 2010; T. Gunton, 2003).

Additionally, the exploitation of non-renewable resources requires the reinvestment of economic rent in other forms of capital, and so host governments, on behalf of residents, should collect economic rent or other revenues from private resource developers to contribute to local sustainability (Hartwick, 1977). Although resource revenues must be shared with impacted communities in return for the sale of publicly-owned resources and to contribute to local sustainability, private investors should at

least be compensated at a rate which provides an adequate incentive to explore, develop, and produce (Fiscal Affairs Department, 2012).

Proceeds from natural resource production are shared with resource owners using fiscal regimes. A fiscal regime is the set of fiscal instruments or tools – such as taxes, royalties, bonuses, etc. – which determine how the revenues from natural resource developments are shared between companies and resource owners (Natural Resource Governance Institute, 2015). In theory, fiscal regimes should maximize the net present value (NPV) of resource owner revenues from extractive industries, and therefore resource rents should be targeted for taxation (Fiscal Affairs Department, 2012; Garnaut & Clunies Ross, 1983).

How resource owners extract natural resource revenues is important. A poorly designed fiscal regime can lead to the over-taxation or under-taxation of an extractive industry. Consequently, market distortions and sub-optimal results may follow. For example, over-taxation, and the capturing of revenues beyond economic rent, may lead to high grading – a selective extraction process in which the highest grade of resource is extracted, while the lesser quality resource is left under-developed (Guj, 2012; T. Gunton & Richards, 1987). However, the fiscal regime and fiscal instrument choice ultimately depends on the strategic objectives and administrative capabilities of the host government (Guj, 2012; United Nations Conference on Trade Development, 1995).

2.4. Potential Community Objectives

A combination of fiscal instruments should be selected and used to achieve a balance between multiple community objectives. The following table (Table 1) provides an overview of some potential community objectives which an Indigenous or subnational government may have when it comes to receiving revenue from resource development activities. These potential community objectives were synthesised through the literature review process described in Chapter 3.2.

Potential Objective	Definition	Reference
Magnitude of payments/revenue generating potential	Concerning the optimal sharing of economic rent, this objective focuses on the maximisation of economic rent captured by the host government through a fiscal regime.	(Atkins & Macfadyen, 2008; Daniel, Goldsworthy, Maliszewski, Mesa Puyo, & Watson, 2010; Fiscal Affairs Department, 2012; Garnaut, 2010; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; T. Gunton & Richards, 1987; Hogan, 2012; O'Faircheallaigh & Gibson, 2012; United Nations Conference on Trade Development, 1995)
Administrative efficiency	The amount of administrative complexity and cost required to audit and manage a given fiscal instrument or regime. An optimal fiscal regime is one that is simple to administer and/or aligned with governmental capacity and/or value of the resource.	(Fiscal Affairs Department, 2012; Freebairn, 2015; Garnaut, 2010; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; Hogan, 2012; Natural Resource Governance Institute, 2015; O'Faircheallaigh & Gibson, 2012; United Nations Conference on Trade Development, 1995)
Neutrality	A neutral fiscal regime is one that does not distort or alter investment or production behaviours and decisions. In other words, a neutral fiscal regime does not distort a producers' after-tax relative to pre-tax costs. To accomplish true neutrality, no more or no less than the economic rent must be captured through a fiscal regime.	(Garnaut, 2010; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; T. Gunton & Richards, 1987; Hogan, 2012; Tordo et al., 2010; United Nations Conference on Trade Development, 1995)
Stability of income	Defined as the variability or volatility of monetary receipts, received by the host government, over time. An optimal fiscal regime will provide relatively stable revenue to a host government and/or include provisions to guarantee a minimum annual income to the host government.	(Freebairn, 2015; Garnaut, 2010; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; T. Gunton & Richards, 1987; Hogan, 2012; O'Faircheallaigh & Gibson, 2012; Tordo et al., 2010)
Level of community involvement in project decision-making	This objective is concerned with the amount of project decision-making power which a host government may have under a given fiscal system.	(T. Gunton & Richards, 1987; Johnston, 1994)

Table 1. A list of potential community objectives for fiscal regimes from the perspective of an Indigenous or subnational government.

Many of these potential objectives are tied to one-another. Theoretically, a neutral fiscal regime will maximise the economic rent generated by a particular resource project and therefore also maximise the revenue obtained by the host government. On the other hand, a fiscal regime that prioritizes administrative simplicity will usually provide the host government with early, stable and predictable revenues (Fiscal Affairs Department, 2012; Garnaut, 2010; Hogan, 2012; Tordo et al., 2010).

There is also an inherent incompatibility amongst a number of the mentioned community objectives. Administratively simple systems are not neutral and reduce the revenue raising potential of the project, since they do not target economic rents (Fiscal Affairs Department, 2012; Garnaut, 2010; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013). Meanwhile, neutral systems require control of costs by the host government and can be a burden to administer (Guj, 2012; Guj et al., 2013; United Nations Conference on Trade Development, 1995). Since several of these potential objectives are incompatible, compromises must be made and a balance between objectives must be obtained.

Each individual fiscal instrument has its own unique characteristics. As such, a given fiscal package or regime will impact each objective in a different way. Therefore, it is important to understand the characteristics and effects of individual fiscal systems and tools before designing a fiscal regime.

Chapter 3. Fiscal Instruments and Systems for Extractive Industries

3.1. Introduction

The purpose of this chapter is to provide Indigenous or local communities – who may find themselves as a negotiating party in one of these agreements – with a general understanding of the inherent risks and advantages associated with the use of different fiscal systems and instruments. As such, this chapter provides a detailed account of the fiscal systems and tools which are used to share revenues between extractive companies and owners of property rights, and impacted parties. This chapter finishes with a qualitative comparison[1] of the fiscal instruments and systems subsequently described.

3.2. Literature Review Methods

A literature review was completed to identify and analyse the fiscal tools and systems which can be used in IBAs and other revenue-sharing agreements. All of the reviewed documents were found using search engines, with the keywords “fiscal regime”, “fiscal system”, “natural resource”, “benefit agreement”, “revenue sharing”, “community”, “resource taxation”, “rent”, “extractive industries”, and “mining” in various combinations. Additionally, the reference lists of all reviewed documents were consulted to identify related literature.

3.3. Bonuses

Bonuses are single, or sometimes staged, lump sum payments which are triggered by specified events over a resource project’s life cycle. There is a variety of payment triggers for bonuses. Cash bonuses are sometimes paid after negotiations end and development contracts are signed (known as signature bonuses). Bonus payments can be due periodically over the lifetime of a project (for example every year or every quarter), or bonuses may be triggered by the start of production and/or when specified

[1] See Table 16

production milestones are reached. The specific bonus triggering events, payment rates, and longevity of payments depends on legislation or negotiation outcomes.

Regardless of the triggering event, bonus payments are based on ex ante, or forecasted, project profits rather than ex post, or actual, profits. Consequently, bonus payments are economically regressive in nature – where the proportion of government take decreases as project profitability increases.

Advantages	
Characteristic	**Description**
Administratively efficient	Bonuses do not require cost control or accounting measures and are therefore simple to administer.
Provides predictable and possibly stable income to the community	Bonus payments are determined during the negotiation phase, and therefore the magnitude and scheduling of payments are known to the IBA signatory and private investor prior to production. Annual bonus payments provide stable income to communities.
Disadvantages	
Characteristic	**Description**
Not neutral	Bonus payments are based on ex ante, or forecasted, project profits rather than ex post, or actual, profits. They therefore do not reflect project profitability and can be viewed as additions to costs of a project. Heavy bonus payments in the beginning stages of a resource project have the potential to make the project uneconomical.
Relatively low revenue generating potential	Bonus payments are not neutral and reduce the amount of rent generated by a given resource project. As a result, the amount of rent available for a community to capture is reduced. It is also unlikely that the sum of bonus payments made to a community equals 100% of the rent generated by the project. And so, the community foregoes the possibility of collecting maximum revenues from the project.
Low level of community involvement in project decision-making	Bonus payments, in singularity, do not increase the level of community involvement in project decision-making.

Table 2. Advantages and Disadvantages of Bonuses

3.4. Cash Bonus Bidding

Cash bonus bidding occurs through an auction-like process, during which the rights to exploit a given resource are auctioned to the highest bidder. Although competitive bidding systems can include bid variables other than bonus payments, such as conditional taxes, this literature review mainly discusses cash bidding auctions without other bid variables. Firms within the auction bid an amount up to the NPV of the resource site (Garnaut & Clunies Ross, 1983; T. Gunton & Richards, 1987). Since the NPV of the resource site is an ex ante calculation of resource rents, efficient firms that expect higher revenue and/or lower costs will have a higher NPV and therefore outbid less efficient firms who expect lower net benefits.

In theory, competitive bidding captures all resource rents, is administratively simple, and does not distort development or operating decisions (Fiscal Affairs Department, 2012; Garnaut, 2010; Garnaut & Clunies Ross, 1983; T. Gunton & Richards, 1987). In a competitive auction, firms may pay an amount equal to the NPV of the resource site; therefore, bidding may effectively capture expected rent. However, in some instances, bonus bids may not reach the NPV of the resource (see, for example, Plourde, 2010, for Alberta's experience with cash bonus bidding and oil sands projects). Since the firms estimate their own projected future costs and revenues, the governmental entity does not need to employ cost control methods, and so the fiscal tool is simple to administer. Additionally, payments are front-end loaded and neutral, thereby not affecting development or operating decisions.

To be successful, competitive bidding requires reliable information on the nature of the resource, that a significant number of qualified bidders participate in the auction, collusion between bidders is averted, public policy is stable, and that licence terms, as well as royalty and tax obligations are transparent (Fiscal Affairs Department, 2012; T. Gunton & Richards, 1987; Natural Resource Governance Institute, 2014). If only a small number of bidders are within the auction, or there is collusion between bidders, the highest bid will be undervalued, and governmental receipts will not be maximised. Likewise, bids may lose value with unstable public policy or unclear terms, as risk to the investor is increased and their NPV of the resource decreased (reflecting the increased risk).

Auctions only maximise value when there is significant knowledge about the resource base, therefore governments may benefit from acquiring exploration data itself (Fiscal Affairs Department, 2012; Tordo et al., 2010). In most cases, companies will not invest in exploration activities without the security of promised extraction rights, in the event of proven resources; doing so would place too much risk on the private investor. When governments self-acquire exploration data, the uncertainty, and therefore risk, inherent in resource exploration is minimised for the private investor. Minimising risk for private investors increases their forecasted NPV of the resource and therefore increases the magnitude of the highest bid. In comparison to the oil and gas industry, the mining industry generally has more knowledge gaps about a given resource base. As a consequence of this uncertainty in the mining sector, cash bonus bidding is more often used in the oil and gas sector (Fiscal Affairs Department, 2012).

Advantages	
Characteristic	**Description**
Maximises the revenue generating potential of a project	A well-planned bonus bidding auction maximises the revenue raising potential of a project, as it efficiently captures the ex ante resource rents of a project.
Administratively efficient	Bonuses do not require cost control or accounting measures. Moreover, private firms, in the auction, estimate their own projected future costs and revenues. The administrative burden imposed on IBA signatories when cash bonus bidding is used is very low.
Neutral	Cash bonus bidding results in the capture of economic rent to be generated by a resource development. As such, cash bonus bidding does not impact investment and production behaviours.
Disadvantages	
Characteristic	**Description**
Unstable revenue	The Payment from cash bonus bidding occurs only once. As such, the revenue provided to the host government is not stable.
Low level of community involvement in project decision-making	Cash bonus bidding, without the addition of other bid variables, does not increase the level of governmental involvement in project decision-making.

Table 3. Advantages and Disadvantages of Cash Bonus Bidding

3.5. Royalties

Resource royalties are some of the most common fiscal tools used to share resource revenues with traditional resource owners (Guj et al., 2013; T. Gunton & Richards, 1987). Generally, royalties are the vehicle through which private investors/companies compensate resource owners for the loss of their non-renewable resource. Royalty payments can be output-based (production or value-based) or profit-based.

Production- and value-based royalties (known as volumetric and ad valorem royalties respectively) are taken from gross revenues. As a result, they are economically regressive and not neutral; yet, they are generally administratively simple, and guarantee that the governmental entity receives revenue in the early stages of production (Fiscal Affairs Department, 2012; Guj et al., 2013; Johnston, 1994; Natural Resource Governance Institute, 2014). Neither production- or value-based royalty rates vary with project costs and therefore they do not reflect the profitability of a project. Instead, these royalties are essentially an addition to project costs and are highly regressive. The regressive and non-neutral nature of these payments can cause distortions to investment and production decisions. These royalty systems reduce the quantity of rent generated by a resource project and thus reduce the sum of revenue that can be received by the governmental entity. To increase the overall governmental take, refinements are needed to make these royalties responsive to profitability (for example, sliding-scales). Volumetric and ad valorem royalties do not require the detailed calculation and auditing of costs. Consequently, they are relatively administratively simple. However, some royalty systems allow a netback of processing and transportation costs, therefore increasing the administrative burden. Different royalty types may bring significantly different levels of administrative complexity. Since volumetric and ad valorem royalties are not profit-based, they ensure that revenue flows to the governmental entity when production starts.

Profit-based royalties are more economically efficient but are administratively complex (Guj, 2012; United Nations Conference on Trade Development, 1995). Further discussion about these royalties can be found below.

3.5.1. Specific Rate/Volumetric Royalties

When volumetric royalties are implemented, a fixed monetary amount is charged per physical unit of the resource produced and sold. Specifically, the royalty is levied on a measure of the volume or weight of the produced resource. For example, a volumetric royalty may stipulate that an extractive company must pay, to the governmental entity, a specified amount of dollars per tonne, dollars per barrel, or dollars per cubic metre. Volumetric royalties are always taken from gross revenues.

For enforcement and accuracy of payments, volumetric royalties require that the volume or weight of the resource produced and sold is audited by the governmental entity. Auditing is necessary to validate the amount of actual production, on which the fixed rate is levied. For auditing purposes, there are two possible paths through which an extracted resource can be sold. Either the extracted resource is sold in an at-arm's-length transaction to a third party, or the extracted resource is used by the extractive company or a related company (Guj et al., 2013). If the resource is sold in an at-arm's-length transaction to a third party, the measure of production, on which the royalty rate is applied, can be found in sale invoices. When the extracted resource is not sold at-arm's-length, and sales invoices are unavailable, company shipment records may be used. Regardless of whether sale invoices or company shipment records can be readily found and used, the governmental entity must still carry-out physical audits to ensure that all sales are being recorded and reported by the extractive company. The frequency of physical audits required is usually less when the resources extracted are sold in an at-arm's-length transaction to a third party (See Figure 2. for the volumetric royalty verification processes recreated from Guj et al. (2013)) .

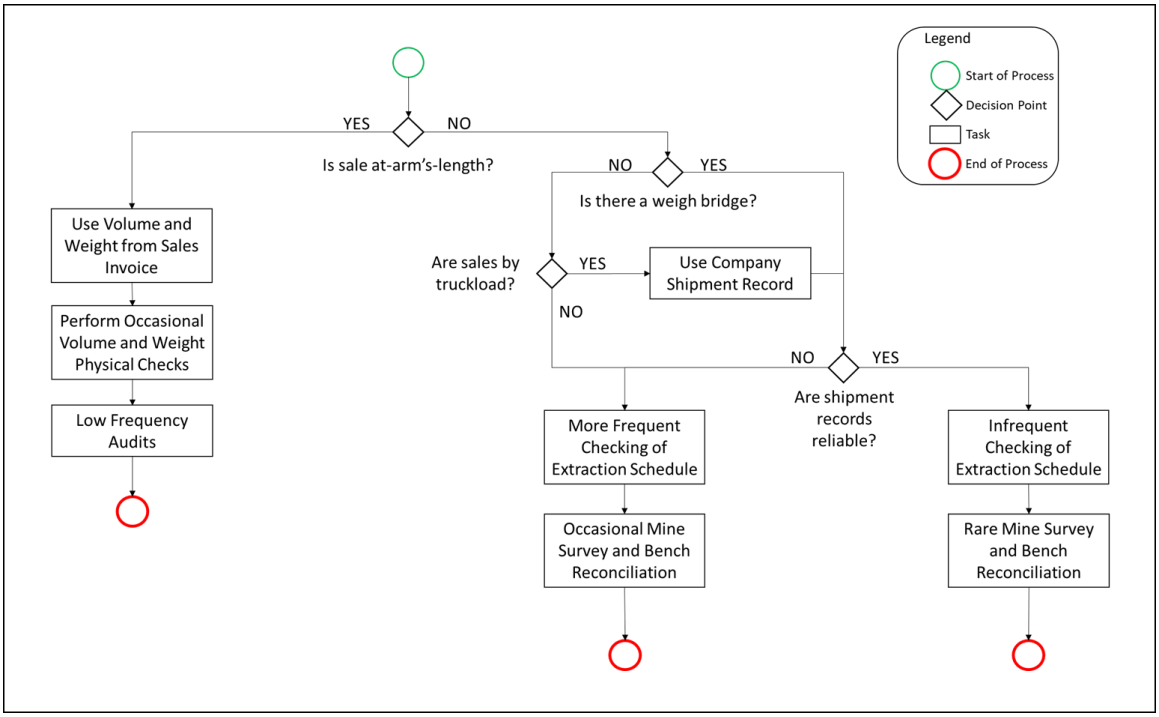

Figure 2. Volumetric royalty verification process, recreated from Guj et al. (2013).

As suggested by Guj et al. (2013), volumetric royalties are best suited for and usually applied to bulk, low-value commodities. Volumetric royalties are highly economically inefficient (not neutral) since they are charged on gross production, do not reflect project profitability, and essentially raise the cut-off grade (therefore distorting project investment and production behaviours); however, volumetric royalties are very administratively efficient. In any fiscal regime, administration costs should be balanced against likely revenues. Low-value commodities do not justify the devotion of scarce resources to the administration of sophisticated and administratively complex fiscal tools. Due to the level of economic inefficiency characteristic of volumetric royalties, their application to high-value commodities is not advised. If volumetric royalties were levied on high-value commodities, there would be a high level of risk to revenue since a significant amount of in-ground resources would become prematurely uneconomic.

Due to the disconnect between volumetric royalty rates and resource market values, royalty regulations for volumetric royalties should indicate the frequency of future rate reviews and whether the rate used will be linked to a suitable index. Rates used in volumetric royalties are pre-defined and therefore do not reflect the dynamic market value of any given resource. Meanwhile, the negotiated royalty rate may also be eroded

by inflation. To make these rates more flexible, royalty regulations should include rules for rate revisions. It may also be useful to index a royalty rate in such a way that the rate reflects inflation.

Advantages	
Characteristic	**Description**
Administratively efficient	Although auditing processes are needed for volumetric royalties, detailed financial auditing and cost accounting procedures do not need to be employed by governmental entities. Overall, volumetric royalties are easy to administer and are one the most administratively efficient royalty and tax options.
Relatively stable revenue to the community	Payments to the IBA signatory depend on project production. Since project production is relatively stable, volumetric royalty receipts are also relatively stable.
Disadvantages	
Characteristic	**Description**
Relatively low revenue-generating potential	Volumetric royalties are levied on gross production and therefore increase the cut-off grade of an extracted resource. As such, the NPV of the resource is lowered using these royalties. Moreover, volumetric royalties, alone, do not fully capture resource rents.
Not neutral	Volumetric royalties are taken from gross revenue which can distort investment and extraction decisions.
Low level of community involvement in project decision-making	Volumetric royalties do not increase the level of governmental involvement in project decision-making.

Table 4. Advantages and Disadvantages of Volumetric Royalties

3.5.2. Value-Based/Ad Valorem Royalties

With an ad valorem royalty, a percentage rate is applied to the value of the mineral(s) or other resource products sold by the extractive company. These value-based royalties are taken from gross revenues and provide income to the governmental entity as long as the mine is producing. To compensate for the economic distortions caused by ad valorem royalties, rates are relatively low, typically ranging between 2% and 10%, with developing countries commonly using rates between 2.5% and 5% (Johnston, 1994). Theoretically, the value base (or price), on which the percentage rate is applied, should fairly reflect the value of the mineral as it leaves the mine. This

maximises the economic efficiency or neutrality of the royalty, as the levied rate will not cut into the costs incurred during downstream processing of the mineral (Fiscal Affairs Department, 2012; Guj, 2012; Guj et al., 2013).

Since mineral sales rarely take place at the mine-head, it is necessary to come up with a valuation method for the extracted mineral. The royalty base used can vary from the gross sale value of the mineral, without any cost deductions, to a value obtained by netting back all processing and transportation costs incurred downstream of the mine site. If a netback valuation method is used, different valuation points can be reached by allowing certain deductions. Allowable deductions may include:

- Smelting and refining costs
- Sea freight
- Insurance
- Charter liability insurance
- Umpire assays
- Unloading supervision at port of discharge
- Demurrage/despatch at port of discharge
- Packaging costs
- Other items that may be approved by the collecting authority

Alternatively, if an acceptable invoice or contestable market is unavailable for the mineral, an accurate grade for the resource must be documented and then referenced to available market information.

In their report, Guj et al. (2013) describe several valuation points which can be used for various metals (Tables 5-6). For bulk and base metals, valuation point 3, in tables 5 and 6, is recommended. For gold, however, valuation point 2, in table 7, is recommended since domestic transportation costs for gold are relatively low (as a proportion of the sale value) in comparison to those for bulk and base metals.

Valuation Point 1	Sold CIF	The purchaser takes actual delivery of the goods when the goods cross the ship's rail in the port of destination—generally an overseas port. CIF (cost, insurance and freight) is a contract of sale whereby the seller pays the cost of transport of the goods to the destination. The goods are insured, and legal delivery occurs.
Valuation Point 2	Deduct ship freight costs, insurance, and any legal costs.	Free on board (FOB) value is the value of the mineral at the ship's rail at the export port.
Valuation Point 3	Deduct ship-loading cost, demurrage and any post-mine legal fees, and insurance and domestic transport costs to port.	Mine-site/gate value

Table 5. Royalty values at various valuation points for crushed and screened bulk ore (e.g., iron ore and manganese) sold to an export market *(Guj et al., 2013)*.

Valuation Point 1	Gross sale value of refined metal.	The value of the contained metals based on assay results and published market prices.
Valuation Point 2	Add credits for other metals. Deduct refinery and smelting costs, penalties for impurities, non-domestic transport costs, insurance, and any legal costs.	Generally known in commercial sector as "net smelter value" (NSV) at the smelter.
Valuation Point 3	Deduct local transport and security and market costs.	Net smelter return (NSR) at the mine site/gate.

Table 6. Royalty values for base metals (e.g., zinc, copper, and lead) at various valuation points *(Guj et al., 2013)*.

Valuation Point 1	Gross sale value of refined metal.	The value of the gold and any other precious group metals sold, based on the assay results and the published market price.
Valuation Point 2	Deduct refining costs, non-domestic transport costs, insurance, and any legal costs.	Market value when unrefined metal leaves the country.
Valuation Point 3	Deduct local transport and security and marketing costs.	Mine-site/gate value

Table 7. Royalty values for gold at various valuation points (Guj et al., 2013).

The further downstream the valuation point is placed, the lower the royalty rate should be. If this is not the case, the royalty will be unfavourable to the extractive company and will disincentivize investments in downstream processing.

Although neutrality increases as the valuation point approaches the mine-head value, administrative efficiency decreases. Netback systems include the deduction of a range of project operating and capital costs which can complicate the administration of the royalty. Essentially, sophisticated valuation methods are more economically efficient or neutral but are also more of an administrative burden. As such, the valuation method selected reflects a trade-off between ease of administration and neutrality.

Advantages	
Characteristic	**Description**
Relatively administratively efficient	The level of administrative burden imposed on the host government is dependent on the valuation point and valuation method used. However, since ad valorem royalties usually do not require the detailed financial auditing and cost accounting procedures necessary when calculating project profitability, the overall administrative burden is low – bearable.
Relatively stable revenue to the community	Payments to the community depend on project sales or the value of the produced resource. Since project production is relatively stable, ad valorem royalty receipts are also relatively stable.
Disadvantages	
Characteristic	**Description**
Relatively low revenue-generating potential	Ad valorem royalties are levied on gross production and therefore increase the cut-off grade of an extracted resource. As such, the NPV of the resource is lowered using these royalties. Moreover, ad valorem royalties, alone, do not fully capture resource rent.
Not neutral	Ad valorem royalties are taken from gross revenue which can distort investment and extraction decisions.
Low level of governmental involvement in project decision-making	Ad valorem royalties do not increase the level of governmental involvement in project decision-making.

Table 8. Advantages and Disadvantages of Ad Valorem Royalties

3.5.3. Profit-Based Royalties

One of the rarer form of royalties is the profit-based royalty. A profit-based royalty highly resembles a corporate income tax but has a few differentiating factors. With a profit-based royalty, a pre-defined or negotiated percentage rate is applied to a measure of net income or profit. Profit-based royalties differentiate from corporate income taxes in a few areas. Firstly, they are mainly used by sub-national tiers of government, and unlike a corporate income tax, profit-based royalties are levied at the project level rather than the corporate entity level. In comparison to the deductions allowed under corporate income taxes, profit-based royalties have capital recovery rules which are setup to promote revenue flows to government earlier in the project lifecycle, incorporate methods to bring the measure of profit closer to that generated by the value of the

resource (for example via a netback system), and sometimes substitute the deductibility of interest payments with return on capital regulations (Guj et al., 2013).

Advantages	
Characteristic	**Description**
High revenue-generating potential	Profit-based royalties reflect project profitability and are almost fully neutral fiscal tools. As such, the NPV and rent of the resource is maximised, and so is the potential community take.
Almost fully neutral	The royalty is based on project profitability and is therefore almost fully neutral. Profit-based royalties, however, do capture some quasi-rents which are needed to incentivise future investments; therefore profit-based royalties are not fully neutral fiscal tools.
Disadvantages	
Characteristic	**Description**
Administratively inefficient	Profit-based royalties are administratively inefficient because they require unique deductions on gross revenue, and measurements of project costs to determine profit. These calculations and measurements require a certain set of financial skills and therefore the administrative burden imposed by profit-based royalties is high.
Unstable revenue flows to the community	This is levied on project profits, which can be variable over time due to market conditions, project costs, and/or production levels. Consequently, revenue flows to the government may be highly variable.
Low level of government involvement in project decision-making	Profit-based royalties do not increase the level of governmental involvement in project decision-making.

Table 9. Advantages and Disadvantages of Profit-Based Royalties

3.6. Taxes

3.6.1. Property Tax

Governmental entities can capture a portion of resource revenues through property taxes. Property taxes are usually applied as a percentage of a site's value. The value of a site can be determined using either the NPV of the mineral reserve, the book value or depreciated book value of capital expenditures, or the market value of comparative sites (T. Gunton & Richards, 1987).

Advantages	
Characteristic	**Description**
Administratively efficient	Complex calculations, cost control and accounting processes are not needed. Property taxes impose a very low administrative burden on a host government.
Stable revenue to the community	Payments to the host government depend on a site's value. Since payments do not depend on a variable factor, property tax receipts are stable.
Disadvantages	
Characteristic	**Description**
Low revenue-generating potential	Property taxes fail to capture sizeable resource revenues and are additions to project costs (non-reflective of project profitability).
Not neutral	Property tax is considered an addition to costs since it is not dependent on project profitability. This causes distortions to production and investment decisions.
Low level of governmental involvement in project decision-making	Property taxes do not increase the level of governmental involvement in project decision-making.

Table 10. Advantages and Disadvantages of Property Taxes

3.6.2. Lease Fee

Lease fees can be used by host governments to obtain relatively small but consistent revenues from holders of public resource rights. While private leaseholders are required to maintain a minimum level of activity to maintain their lease, lease fee payments depend on the size of the land leased. The private leaseholder will annually pay a specified rate per unit of leased land.

Advantages	
Characteristic	**Description**
Administratively efficient	Complex calculations, cost control and accounting processes are not needed. Lease fees impose a very low administrative burden on a host government.
Stable revenue to the community	Payments to the host government depend on a site's size. Since payments do not depend on a variable factor, lease fee receipts are stable.
Disadvantages	
Characteristic	**Description**
Low revenue-generating potential	Lease fees fail to capture sizeable resource revenues and are additions to project costs (non-reflective of project profitability).
Not neutral	A lease fee is considered an addition to costs since it is not dependent on project profitability. This causes distortions to production and investment decisions.
Low level of governmental involvement in project decision-making	Lease fees do not increase the level of governmental involvement in project decision-making.

Table 11. Advantages and Disadvantages of Lease Fees

3.6.3. Economic Rent-Based Tax

Economic rent-based taxes are fully neutral fiscal tools which are most commonly used in the oil and gas sector (Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; T. Gunton & Richards, 1987). With an economic rent-based tax, a specified percentage rate is applied to a measure of economic rent. As previously stated, economic rent is defined as the revenue surplus derived after deducting all costs of production from gross revenue, including a pre-defined "normal" rate of return. In theory, this "normal" rate of return should represent a minimum rate to encourage investment in a project. Since capital and recurrent operating costs are deducted from revenue when incurred, tax-collecting entities may receive no revenue for a number of years, until the company has recovered their initial financial investment plus the pre-defined rate of return. As such, economic rent-based taxes may not provide revenues to the host government in the earlier years of production.

The determined rate of return, used in these rent-based taxes, is implemented as an annual uplift and is generally expressed as the long-term bond rate (LTBR) plus a risk

premium (Guj et al., 2013; Johnston, 1994). Uplifts allow the private company to recover an additional percentage of capital costs through cost recovery. For example, an uplift of 20% on capital expenditures of $100 million would allow the contractor to recover $120 million. Since the entitlement to financial rewards is proportional to the level of risk taken, risk premiums are added to the LTBR when the tax-receiving governmental entity does not share in the ultimate risk of the resource project.

Like ad valorem royalties, the administration of rent-based taxes becomes more complex when a taxing point closer to the point of extraction is used. If a taxing point closer to the point of extraction is used, the host government can net back costs from the point of sale to the taxing point. Doing this will give the gross revenue from which allowable costs are deducted.

At the taxing point, allowable costs are deducted. A positive value denotes the level of profit, on which the rent-based tax is levied. However, a resulting negative value, for any given year, indicates that expenditures have exceeded revenues. Consequently, the negative cash flows are carried forward to the next year and are uplifted at the specified rate of return. These losses are then used to offset project profits in the new year. Rent-based taxes cannot be levied on negative cash flows.

Advantages	
Characteristic	**Description**
Maximises the revenue generating potential of a project	Rent-based taxes capture no more or less than the economic rent generated by a resource development project. As such, the NPV and rent of the resource is maximised, and so is the potential government take.
Neutral	This tax is completely rent-based and is therefore fully neutral. Properly formulated economic-rent based taxes are the most neutral type of tax.
Disadvantages	
Characteristic	**Description**
Administratively inefficient	Rent-based taxes require more detailed financial data than any other royalty or tax system. Additionally, practical implementation can be complex, as a “normal”, risk-adjusted rate of return needs to be calculated, and the enforcement, administration and auditing of these taxes is likely to be complex. The administrative burden imposed on the host government is high.
Unstable revenue to the community	This tax is levied on economic rent and therefore the magnitude of tax receipts depends on commodity prices and exchange rates, as well as the costs allowed to be deducted from gross revenues. Consequently, revenue flows to the government may be highly variable.
Low level of government involvement in project decision-making	Economic rent-based taxes do not increase the level of governmental involvement in project decision-making.

Table 12. Advantages and Disadvantages of Economic Rent-Based Taxes

3.7. Hybrid Regimes

Hybrid regimes are royalty or tax systems which combine numerous fiscal tools into one system. Therefore, hybrid systems can be broken up into individual fiscal tools. Hybrid regimes are implemented to achieve and balance a set of desired governmental objectives.

Hybrid systems often try to balance neutrality, revenue generation and revenue stability by combining a profit- or rent-based royalty or tax with a volumetric or ad valorem royalty. Economic neutrality and revenue generation increase by the inclusion of a profit- or rent-based component. The inclusion of a volumetric or ad valorem fiscal component ensures that the community will receive a minimal amount of consistent

revenue throughout the project's production phase. These output-based royalties eliminate risks to economic certainty faced by communities, where there is a possibility that the community may collect no revenue if, in any given year, there is no taxable profit or rent (Guj et al., 2013).

Although hybrid systems can offer the benefits of the individual fiscal tools involved, they also introduce some disadvantages associated with each tool. Hybrid systems with profit- or rent-based royalties/taxes make the system more administratively inefficient and add some revenue instability (since only a minimal unit-based or ad valorem component will be accepted by industry to work in collaboration with profit- or rent-based components). The use of a volumetric or ad valorem component makes the system less economically neutral and reduces the amount of revenue that can be received by government in the case of windfall profits. Additionally, the inclusion of an output-based royalty component will lower the NPV of the resource site, as the cut-off grade is increased, and production may prematurely become uneconomic (Guj, 2012; Johnston, 1994).

Advantages	
Advantages are variable	The main advantages of the hybrid system depend on the individual fiscal components which make up the system.
Disadvantages	
Disadvantages are variable	The main disadvantages of the hybrid system depend on the individual fiscal components which make up the system. However, hybrid systems generally are less administratively efficient since they consist of multiple fiscal components. The combination of fiscal tools often leads to the administration of the overall system by different agencies, since one agency alone may lack the capacity to administer all a hybrid system's components.

Table 13. Advantages and Disadvantages of Hybrid Regimes

3.8. Production-Sharing Contracts

Production-sharing contracts (PSCs) are a type of contractual system in which the extractive company or private investor takes the role of a contractor for the governmental entity. Although these contractual systems are more commonly used in the oil and gas industry, they are sometimes employed in the mining industry (Guj, 2012). Within a PSC, the extractive company provides the technical and financial

services for resource exploration and development. Consequently, the extractive company bares the technical and financial risks of the project. As compensation for the risks taken and services rendered by the extractive company, the company receives a share of the resource produced, while the governmental entity receives the balance. For PSCs, it is important to note that the resource or physical product is the medium of compensation to the contractor, and not cash (Fiscal Affairs Department, 2012; Johnston, 1994).

Although PSCs inherently split production between extractive companies and host governments, resource royalties are sometimes used in conjunction. In the rarer instances where royalties are in place within a PSC, royalty rates may range as high as 15% (Johnston, 1994). In instances where royalties are not in place, the level of government take should compensate for the lack of resource royalties.

However, extractive companies may be entitled to recover some, or all, of the costs of exploration and development; therefore, cost control and accounting procedures are often necessary. When cost recovery is allowed, extractive companies deduct allowable costs from gross production. While most PSCs have cost recovery ceilings, ranging between 30% and 60% of costs incurred, some PSCs have no cost recovery ceilings. Other PSCs do not allow cost recovery at all (Johnston, 1994). In systems where cost recovery is allowed, when operating costs as well as depreciation, depletion and amortization (DD&A) amount to more than the pre-determined cost recovery limit, the balance is often carried forward and recovered later. In some cases, if the contractor's claimed costs are less than the cost recovery ceiling, the difference, or excess produce, goes directly to the governmental entity. No matter the case, cost recovery programs require the governmental entity to audit claimed costs. These necessary cost control and accounting procedures add to the administrative load and can be a burden to host governments if they lack the capacity to effectively monitor and audit capital and recurrent costs.

After royalties and costs are deducted from gross production, the remaining profit resource is shared between the extractive company and the host government. Profit resources can be split between the two entities in several ways. The first option is to split profit production using a fixed rate or percentage. For example, in a fixed 60%/40% split, in favour of the governmental entity, profit production is shared between the contractor

and governmental entity at the defined rate. The contractor is therefore entitled to 40% of the profit resource, while the government collects 60% of the profit resource. Alternatively, profit production can be split between a contractor and a governmental entity on a sliding-scale basis. Specifically, sliding-scale splits for PSCs are usually based on either the daily rate of production (DROP), cumulative production from the project, an R factor, or a rate of return (ROR) system (Fiscal Affairs Department, 2012).

To determine the distribution of production within a PSC, a total of four steps need to be followed (Figure 3) (Johnston, 1994). First, if royalties are in place, they must be deducted from gross production. Secondly, before profit production is calculated and split, the contractor may recover costs up to the cost recovery ceiling. Then, profit production is calculated and split according to the PSC agreement. Taxes may then be taken from the contractor's share of the profit resource.

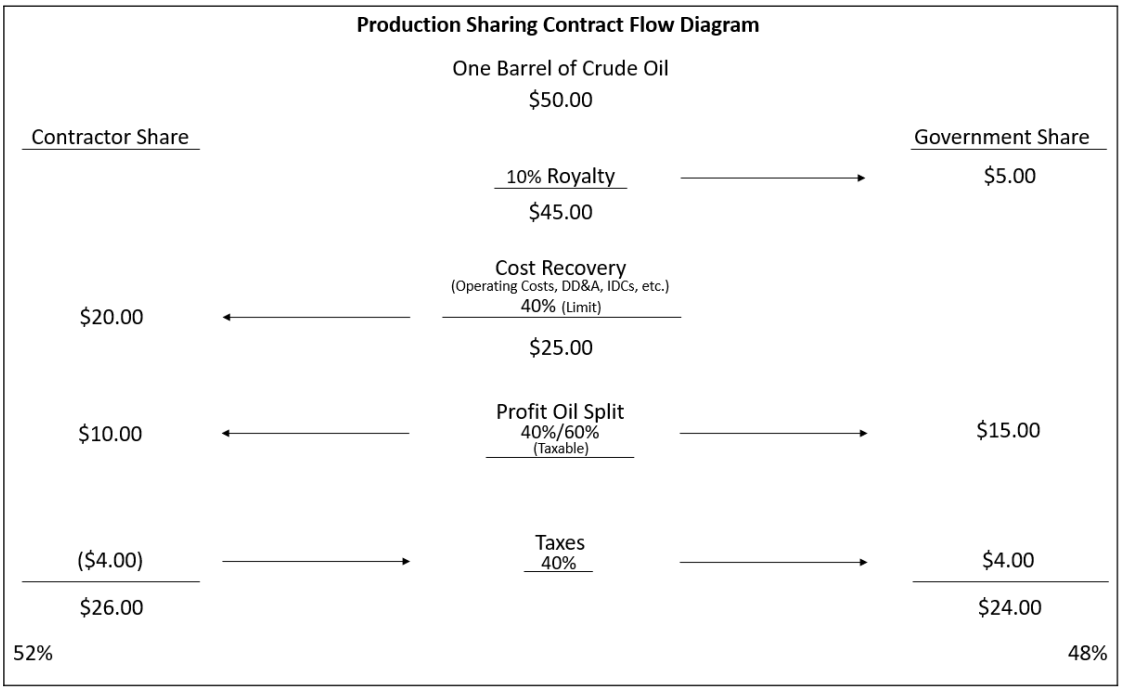

Figure 3. Production sharing contract flow diagram (Johnston, 1994). Within the PSC represented in this diagram, a 10% volumetric royalty is imposed, there is a 40% cost recovery ceiling, a fixed profit split of 40%/60%, in favour of the governmental entity, and a 40% tax rate. Note that cost recovery is calculated using gross production (before royalties) rather than net production.

These contractual systems specialize in the sharing of physical product rather than cash, and therefore the governmental entity can receive its monetary revenue using one of two different methods. Either the product is separately marketed, thorough the creation of and sale via a government agency, or the producer markets the product on the government's behalf (Guj et al., 2013; T. Gunton & Richards, 1987).

In PSC systems, the governmental entity is usually involved in project management and decision-making processes. Under these contracts, the governmental entity remains the owner of the resource and is therefore involved in the decision-making processes. The host government is involved in the budgeting and auditing phases of the project and may sometimes actively participate in exploration and development operations. Often, a PSC will stipulate the formation of a joint management committee where both the private investor and governmental entity are represented. This joint management committee oversees project operations. However, as a consequence of joint management, bureaucratization of the management process may occur (United Nations Conference on Trade Development, 1995).

When establishing a PSC, there are numerous design options to consider. Consequently, detailed negotiations between the project investor and governmental entity are required. Through a negotiation process, cost recovery options, the form of production sharing, method for product marketing, and level of government involvement must be determined. If all conditions are not captured in a comprehensive contract document, disputes will arise during the project life-span.

Advantages	
Characteristic	**Description**
Can maximise the revenue generating potential of a project	Where economic neutrality is maximised, the NPV of the resource is also maximised. Since PSCs are capable of being mostly or fully neutral, they are also capable of maximising the economic rent generated by a resource. Consequently, the revenue raising potential of a project is also maximised, since the host government is able to extract a higher magnitude of economic rent.
Capable of being neutral	In instances where full cost recovery is allowed, no royalties are added, and the split of profit produce is fixed (ie. not on a sliding scale), PSCs are almost fully neutral. They do not distort exploration and production decisions. However, under these circumstances, a PSC essentially acts as a profit-based tax; it therefore appropriates quasi-rents which are needed to incentivise future investments, and full economic neutrality is not met. To be fully neutral, a PSC must incorporate interest cost recovery features (like within an economic rent-based tax).
Potential for community involvement in project decision-making	In PSC systems, the governmental entity is usually involved in project management and decision-making processes. This occurs since the governmental entity remains the owner of the resource and the extractive company or private investor takes the role of a contractor for the governmental entity.
Disadvantages	
Characteristic	**Description**
Administratively inefficient	PSCs often require accounting for and deducting project costs as well as auditing these costs. Additionally, involvement in complex project management decisions further adds to the administrative burden placed on host governments under PSCs. Moreover, if the governmental entity were to sell their share of the profit produce, marketing and sales infrastructure would have to be developed and managed.
Unstable revenue flows to the community	Since splits under a PSC depend on project profits, income to the host government will vary depending on commodity market prices, levels of production, and project costs. Since these three determining factors are individually dynamic, income to the host government is variable under a PSC.

Table 14. Advantages and Disadvantages of Production-Sharing Contracts. The advantages and disadvantages of PSC systems are not uniform. Instead, they depend on the specific terms of any given PSC.

3.9. Service Contracts

Due to the rarity of pure, or non-risk service contracts, this section will only describe risk service contracts. While pure service contracts exist, their use is very rare since all risk is placed on the governmental entity (Johnston, 1994).

Like PSCs, service contracts are most common in the oil and gas industry, and stipulate that the private investor takes on the roll of contractor. In service contracts, the natural resource firm, or private investor, provides the technical, financial, and commercial services required for resource exploration and development. In return for their services, the governmental entity allows the private investor to recover project costs through the sale of the resource. In addition to cost recovery allowances, the governmental entity also pays the contractor a fee based on a pre-negotiated percentage of the remaining revenue.

Service contracts only slightly differ from PSCs and therefore the main advantages and disadvantages for service contracts are similar to those of PSCs. From a legal standpoint, the contractor never owns any of the production under service contracts. Unlike PSCs, service contracts stipulate that payments to the governmental entity are in cash rather than in kind. Other than these two main points of distinction, the two contractual systems are very similar. Profit splitting is conducted in the same manner similar and arithmetic/revenue distribution calculations are the same. Because the difference between PSCs and service contracts is so minute, the main characteristics as well as advantages and disadvantaged of the two systems are very similar.

For the advantages and disadvantages of service contracts, refer to those under production-sharing contracts.

3.10. Joint Ventures

Joint ventures are a unique type of agreement which stipulate and define how revenue is shared between private investors and governmental entities. Specifically, joint ventures share resource revenues through government equity participation. The shared project equity entitles the governmental entity to receive a share of revenues or production and/or dividend payments. Profit production is split according to the equity

shares, as defined in the joint venture arrangement (Figure 4). Although joint ventures appear to be a type of fiscal system, they are not since they can be implemented within either a concessionary or PSC system (as seen in Figure 4) (Johnston, 1994).

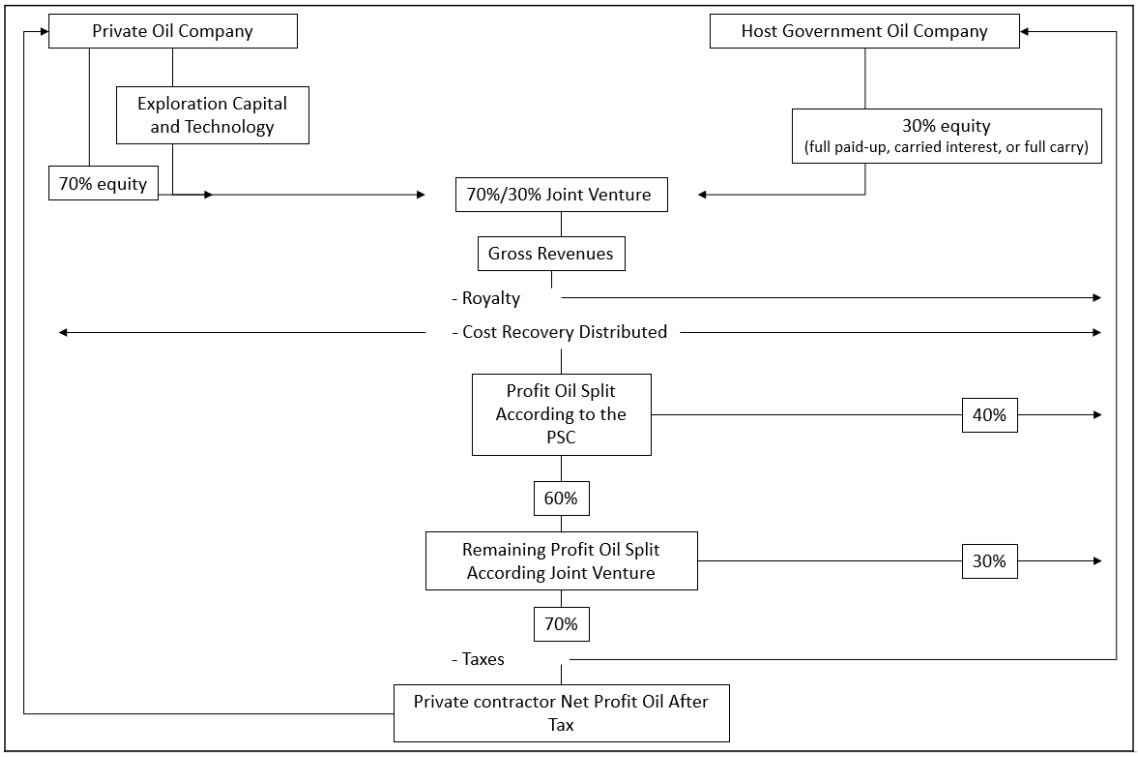

Figure 4. The distribution of project revenues under a PSC system with a joint venture and royalty included (Johnston, 1994). The joint venture in this example stipulates a 70%/30% equity split in favour of the private contractor. Meanwhile, the PSC stipulates a 60%/40% profit oil split, in favour of the private contractor. After royalties and costs are deducted from gross revenue, the remaining profit oil is split according to the PSC. The remaining profit oil is then split again according to the joint venture. As such, in this example, the joint venture acts as another layer of taxation. Then, once taxes are deducted from the remaining balance, post the joint venture split, the remaining profit oil goes to the private oil company.

While the revenue distributing arithmetic remains the same, there are two possible types of joint ventures (United Nations Conference on Trade Development, 1995). The first type is an equity joint venture. In an equity joint venture, a joint stock company is established in which each partner owns a certain percentage of equity. Alternatively, there are contractual joint ventures. Within a contractual joint venture, the partnership is not constituted to a joint stock company and therefore assumes no

separate corporate identity. Instead, the relationship is governed by an agreement under which each partner owns an undivided share of production

In joint ventures, governmental involvement is extended beyond the budget and auditing phase to include the implementation phase of resource development (United Nations Conference on Trade Development, 1995). The equity-sharing component of joint ventures allows for the governmental entity to actively participate in decision-making and management processes. In fact, sometimes joint ventures are used to ensure that governments get a “seat at the table” or to facilitate the transfer of knowledge. Since joint ventures require cost control, accounting, auditing procedures, and management decisions from the governmental partner, they have a high admirative burden. Additionally, like under PSCs and service contracts, joint management within joint ventures can lead to a bureaucratization of management processes, and further reduce administrative efficiency.

The governmental entity has a few different options to obtain project equity (Fiscal Affairs Department, 2012). The first option is to obtain fully paid-up equity, where the governmental entity pays for shares in the project. Another option is for a carried interest arrangement to be made. Under a carried interest arrangement, the private resource company finances governmental participation in the project. The costs and interest charges incurred by the private company are then offset against future government shares from the project. Alternatively, the government may negotiate free equity in the project – where the free equity is usually partially offset against other tax payments (Fiscal Affairs Department, 2012).

Each equity-gaining option shifts the proportion of risk placed on the governmental entity and private investor respectively. With fully paid-up equity, project costs are shared between the private company and the government. As such, fully paid-up equity equally distributes project risks between the private investor and government. In comparison to fully paid-up equity, carried interest arrangements lower the risk to government since the private company originally finances governmental participation in the project. Opposite to fully paid-up equity, a full carry or free equity arrangement places high risk on the private company and very little risk on the government.

Advantages	
Characteristic	**Description**
Can maximise the revenue generating potential of a project	Where economic neutrality is maximised, the NPV of the resource is also maximised. Since joint ventures are capable of being mostly neutral, they are also capable of maximising the economic rent generated by a resource. Consequently, the revenue raising potential of a project is also maximised, since the host government can extract a higher magnitude of economic rent.
Capable of being neutral	In instances where the host government gains fully paid-up equity, or gains equity through a carried interest arrangement, joint ventures are fully neutral. They do not distort exploration, production or investment decisions. When free equity is negotiated, however, the neutrality of the fiscal system is reduced.
Potential for government involvement in project decision-making	In joint ventures, the host government owns a percentage equity of the resource project. Consequently, the governmental entity may be involved in project management and decision-making processes.
Disadvantages	
Characteristic	**Description**
Administratively inefficient	As illustrated in Figure 4, costs must always be deducted before revenues are split. Due to the cost control, accounting, and auditing procedures necessary within joint ventures, administrative efficiency is reduced. Moreover, joint management of the project may further reduce the administrative efficiency of the system.
Unstable revenue flows to the community	Since splits within a joint venture depend on project profits, income to the host government will vary depending on commodity market prices, levels of production, and project costs. Since these three determining factors are individually dynamic, income to the host government is variable.

Table 15. Advantages and Disadvantages of Joint Ventures.

3.11. Qualitative Comparison of Fiscal Tools and Systems to Potential Community Objectives

A comparison matrix was developed to illustrate the relative advantages and disadvantages associated with each previously described fiscal instrument and system (Table 16). The evaluation criteria used mirrors the potential community objectives described in Chapter 2.4. This comparison matrix was adapted from C. Gunton, Batson, Gunton, Markey, & Dale, 2020.

Fiscal Instrument	Evaluation Criteria				
	Revenue Generation	Administrative Efficiency	Neutrality	Stability of Income	Decision-making Power
Production-sharing and Service contracts					
Joint venture					
Bonuses/Fixed payments					
Cash bonus bidding					
Volumetric royalty					
Ad valorem royalty					
Profit-based royalty					
Property tax					
Lease fee					
Economic rent-based tax					
Hybrid Regime (Fixed payments, ad valorem royalty, and rate)					
Performance:	Good		Satisfactory	Poor	

Table 16. Qualitative comparison matrix of fiscal instruments and systems used in revenue-sharing agreements.

Chapter 4. An Evaluation of Fiscal Regimes Negotiated in the Base Metal Mining Sector

4.1. Introduction

IBAs have become a popular tool used to address social, environmental and economic issues stemming from resource development; however, there is considerable debate about how effective they have been in achieving their objectives (O'Faircheallaigh, 2013; O'Faircheallaigh & Gibson, 2012). Consequently, an important research priority is the evaluation of IBAs to assess their effectiveness and identify best practice guidelines for negotiating them. This chapter addresses this research need by focusing on one of the key components of IBAs: the provisions for revenue generation for impacted communities. This chapter focuses on quantitatively evaluating the revenue generating capacity and revenue stability provided through IBAs in the base metal mining sector. The chapter begins by describing the concept of economic rent – a concept that can be used as a reference standard for assessing the effectiveness of revenue generating measures. This is followed by a description of the methodology and discussion of the findings and implications for IBAs.

Natural resource projects can generate sizeable economic rents, or surplus revenue in excess of all costs of production including a normal return on capital (Fiscal Affairs Department, 2012; Garnaut & Clunies Ross, 1983; Guj, 2012; Guj et al., 2013; T. Gunton & Richards, 1987; Johnston, 1994). The magnitude of economic rent generated by a resource development project is dependent on the type and grade of the mineral deposit, commodity sales prices, and production costs. The rent reflects the market value of the in-situ resource and because it is estimated after covering all costs including a return to capital, it is theoretically possible for communities to collect the rent while still preserving the economic viability of the project. Consequently, measuring the proportion of rent accruing to the community is a good metric for evaluating the effectiveness of IBA revenue-sharing stipulations.

Payments to resource-owners for the rights to extract natural resources are collected by what can be termed fiscal regimes. A fiscal regime is the set of fiscal instruments that are designed to collect revenue from resource extraction for the owner of the natural resource (Natural Resource Governance Institute, 2015). In theory, fiscal

regimes should collect the rent, or economic value of the in-situ resource deposit (Fiscal Affairs Department, 2012; Garnaut & Clunies Ross, 1983).

However, the design of a fiscal regime to collect rent is challenging and should take into account multiple objectives such as revenue generating potential, administrative complexity, economic neutrality, stability of revenue flows over time, and responsiveness to windfall profits. If the fiscal regime is poorly designed, it can create market distortions and sub-optimal results such as high grading of the resource and/or failure to pay the owner adequate compensation for the resource rights (T. Gunton, 2003). A well-designed fiscal regime on the other hand can generate a stable flow of revenue for natural resource owners and ensure that they collect the economic value of their natural resource, while ensuring efficient resource extraction.

4.2. Evaluation Methods

The first step in the evaluation of IBA fiscal regime provisions was to collect data on revenue-collecting measures in existing IBAs within the natural resource sector. A database of fiscal regimes and tools used in IBAs was created based on a literature review using existing inventories such as the Columbia Centre for Sustainable Investment's (CCSI) Community Development Agreement Database, various government websites and a literature review of IBAs based on key word searches on Google Scholar and Google. A total of 78 agreements from numerous countries, including Australia, Canada, Ghana, Greenland, Laos, Mongolia, and Papua New Guinea were identified for review (database available at: http://www.sfu.ca/rem/planning/research/IBA/Database.html). A subset of the 78 agreements was chosen for a detailed evaluation of their respective fiscal regimes. The agreements selected within this subset are those for mining projects for which there is sufficient publicly available detail on the fiscal regimes to allow for evaluation. The mining sector was chosen for evaluation because there are a number of publicly available IBAs in the mining sector. The evaluation needs to be restricted to a specific sector due to the significant differences between resource sector economics that impact the evaluation method.

Based on these criteria, ten IBAs were selected for detailed evaluation (Table 17). The fiscal regimes employed in these IBAs use four types of fiscal instruments: a

fixed payment royalty system, in which the community receives a predetermined fixed payment at various points during the project's development and operation, a profit-based royalty that collects a percentage of mining net revenue, an ad valorem royalty that collects a percentage of project revenue, and a joint venture, in which a percentage of project equity is held by the community. One of the fiscal regimes uses only fixed payments, five regimes take a percentage of senior governments' mining royalty revenue, which is generated by a profit-based royalty system, one regime uses fixed payments and a profit-based royalty, and the remaining three regimes use a combination of fixed payments and an ad valorem royalty (with one of these three regimes also incorporating a joint venture or equity sharing component).

Regime	**Project Name**	**Location**	**Resource(s) Extracted**	**Fiscal Tool(s)**	**Rate**	**Triggering Factor and Conditions**
1[2]	Mary River Mine	Nunavut, Canada	Iron ore	Single fixed payment	$5,000,000 CAD	On date IBA is signed
				Single fixed payment	$5,000,000 CAD	Within 5 days of project receiving Water License
				Single fixed payment	$10,000,000 CAD	Within 5 days of construction decision
				Single fixed payment	$750,000 CAD	Single payment
				Multiple fixed payments	$1,250,000 CAD	Starts 1 year after construction decision. Payment in each calendar quarter. Payment stops when commercial production begins.
				Multiple fixed payments	$1,000,000 CAD	Yearly payment for the first 2 years of agreement.

[2] The Mary River Project Benefit Agreement includes a number of advanced payments. It was assumed that the signing bonus, along with the payments triggered by water license receival and construction approval, were incurred in year one.

Regime	Project Name	Location	Resource(s) Extracted	Fiscal Tool(s)	Rate	Triggering Factor and Conditions
				Multiple fixed payments	$250,000 CAD	Yearly payment staring when the agreement comes into effect. Payment stops when commercial production begins.
				Multiple fixed payments	$25,000 CAD	Yearly payment.
				Ad valorem royalty	1.19%	Yearly. Starts when commercial production begins
2	Raglan Mine	Quebec, Canada	Nickel, copper, cobalt, platinum, palladium	Single fixed payment	$1,000,000 CAD	Within 30 days of project authorisation
				Single fixed payment	$1,000,000 CAD	within 30 days of the start of commercial production
				Multiple fixed payments	$300,000 CAD	Yearly for 5 years. Starts the first year of commercial production.
				Multiple fixed payments	$500,000 CAD	Yearly for years 6-10.
				Multiple fixed payments	$800,000 CAD	Yearly. From year 11 onwards.
				Multiple fixed payments	$250,000 CAD	Yearly. Starts the first year of commercial production.
				Profit-based royalty	4.5%	Paid yearly. Calculated monthly.

Regime	Project Name	Location	Resource(s) Extracted	Fiscal Tool(s)	Rate	Triggering Factor and Conditions
3	New Afton Mine	British Columbia, Canada	Gold, silver, copper	Profit-based royalty	37.5%	Paid yearly by a provincial government. The specified percentage is a proportion of B.C. Mineral Tax Revenue[3].
4	Copper Mountain Mine	British Columbia, Canada	Copper	Profit-based royalty	35%	Paid yearly by a provincial government. The specified percentage is a proportion of B.C. Mineral Tax Revenue.
5	Mount Milligan	British Columbia, Canada	Copper, gold	Profit-based royalty	12.5%	Paid yearly by a provincial government. The specified percentage is a proportion of B.C. Mineral Tax Revenue.
6	Mount Polley	British Columbia, Canada	Copper, gold	Profit-based royalty	18.5%	Paid yearly by a provincial government. The specified percentage is a proportion of B.C. Mineral Tax Revenue.

[3] British Columbia's (B.C.) mineral tax is a two-part tax, imposed on a mine-by-mine bases. The two components of this tax are: a 2% net current proceeds tax, and a 13% net revenue tax. Here, net current proceeds is defined as, the amount by which the operator's gross revenue and proceeds from government grants and subsidies, for the mine's operation, exceeds the current operating costs (excluding capital costs); whereas net revenue is defined as, the amount by which net current proceeds exceeds the sum of: capital costs (net of any proceeds from the disposition of capital assets in the year); exploration costs; pre-production and development costs; an annual "investment allowance"; and the "new mine allowance" (PricewaterhouseCoopers, 2016). The net current proceeds tax is a form of minimum tax which is fully deductible from the net revenue tax.

Regime	Project Name	Location	Resource(s) Extracted	Fiscal Tool(s)	Rate	Triggering Factor and Conditions
7	Kemess Underground Project	British Columbia, Canada	Gold, copper	Profit-based royalty	11.67%	Paid yearly by a provincial government. The specified percentage is a proportion of B.C Mineral Tax Revenue.
8	Oyu Tolgoi	Southern Gobi Desert, Mongolia	Gold, copper	Multiple fixed payments	$5,000,000 USD[4]	Yearly
9	Kainantu Gold Mine	Eastern Highlands, Papua New Guinea	Gold, copper	Ad valorem royalty[5]	1.4%	Yearly. Rate levied on Free on Board price
				Ad valorem royalty	0.5%	Yearly. Rate levied on Free on Board price
				Single fixed payment	140,000 Papua New Guinea Kina[6]	Unspecified
				Single fixed payment	20,000 Papua New Guinea Kina	Unspecified
				Single fixed payment	30,000 Papua New Guinea Kina	Unspecified
				Single fixed payment	25,000 Papua New Guinea Kina	Paid when mine construction starts.
				Single fixed payment	600,000 Papua New Guinea Kina	Paid during mine construction.

[4] Using public information from the Bank of Canada, and search dates from January 2, 2017 – December 29, 2017, an average conversion rate from USD to CAD was calculated. The conversion rate used was therefore 1.30.

[5] The Kainantu Gold Mine and Ramu Nickel Cobalt Project are located in Papua New Guinea (PNG). Therefore, revenue is shared to impacted communities by the State of PNG. The indicated ad valorem rates, for both agreements, has been converted to reflect the proportion of mineral value which flows to the impacted communities. Originally, these values were expressed as a proportion of the ad valorem royalty which the State of Papua New Guinea collects from a base metal project – stipulated within Papua New Guinea's Mining Act, 1992. Based on PNG's Mining Act 1992, it is assumed that the State collects a 2% FOB ad valorem royalty for base metals.

[6] When converting Papua New Guinea Kina to CAD, a ninety-day conversion rate average was calculated (starting May 26, 2019). Therefore, a conversion rate of 0.39688 was used.

Regime	Project Name	Location	Resource(s) Extracted	Fiscal Tool(s)	Rate	Triggering Factor and Conditions
				Single fixed payment	140,000 Papua New Guinea Kina	Unspecified
				Single fixed payment	60,000 Papua New Guinea Kina	Unspecified
				Single fixed payment	60,000 Papua New Guinea Kina	Unspecified
10	Ramu Nickel Cobalt Project	Madang, Papua New Guinea	Nickel, cobalt	Ad valorem royalty	1.3%	Yearly. Rate levied on Free on Board price
				Investment return	5% project equity	
				Single fixed payment	1,000,000 Papua New Guinea Kina	Unspecified
				Multiple fixed payments	100,000 Papua New Guinea Kina	Yearly. Payment begins when agreement comes into effect. Payment ends when the first royalty payment is made to the State of Papua New Guinea.
11	Hypothetical Fiscal Regime	-	-	Single fixed payment	$5,000,000 CAD	On date IBA is signed
				Single fixed payment	$5,000,000 CAD	Within 5 days of construction decision
				Multiple fixed payments	$5,000,000 CAD	Yearly. Starts the year in which the construction decision is made. Payments stop when commercial production begins.
				Multiple fixed payments	$650,000 CAD	Yearly. Starts during first year of commercial production.

Regime	Project Name	Location	Resource(s) Extracted	Fiscal Tool(s)	Rate	Triggering Factor and Conditions
				Two-tiered profit-based royalty	Tier 1: 4.5% Tier 2: 39%	Lump sums are deductible from the income-based royalty. Like the B.C. mineral tax, Tier 1 is levied on a calculation of Net Current Proceeds, while Tier 2 is levied on a measure of Net Revenue.

Table 17. Description of the analysed fiscal regimes and their respective mining projects. All agreements have been made available at: http://www.sfu.ca/rem/planning/research/IBA/Database.html

The next step in the evaluation was to quantitatively evaluate the effectiveness of each fiscal regime in generating revenue and collecting resource rents for the community signing the IBA, and in providing the community with stable payments over time. To quantify the rent collecting and revenue generating abilities of each fiscal regime, a measurement of percent rent captured by a community was used. The percent rent collected by a community positively correlates to the magnitude of revenue received. The measurement of percent rent captured by a community mirrors the calculation for the average effective tax rate, as seen below:

$$\%\, rent\ captured = \left(\frac{NPV\ of\ payments\ to\ community}{NPV\ of\ the\ pre\ tax\ net\ cash\ flow\ from\ the\ project}\right) \times 100\%$$

$$; NPV\ of\ the\ pre\ tax\ net\ cash\ flow\ from\ the\ project = Resource\ Rent$$

Meanwhile, for each fiscal regime, revenue stability was indicated by the coefficient of variation of the community's annual revenue throughout the project's production phase. Using the coefficient of variation allows for an accurate comparison of income variability between alternative fiscal regimes, which produce respectively different means for annual community income.

$$Coefficient\ of\ Variation = \left(\frac{\sigma}{\mu}\right) \times 100\%$$

$$;\ \sigma = standard\ deviation$$

$$\mu = mean$$

Additionally, the range of a community's annual income, throughout all project phases, was used to further indicate revenue stability. In particular, the maximum and minimum annual income was identified for each evaluated fiscal regime.

Estimating revenue generated by the fiscal regime and resource rents from mining projects is challenging because the estimation is based on mines that are currently operating and therefore requires forecasting past and future revenue flows. Another complication is that each mining operation has different costs and revenues that are not possible to estimate based on publicly available information. The only feasible method for addressing these challenges in estimating resource revenues was to construct a discounted cash flow (DCF) mining model based on a representative mine and use the model to estimate the magnitude of resource revenue and proportion of resource rent which flows to an impacted community for the ten IBAs being evaluated. The modified discounted cash flow mining model used in the evaluation is based on publicly available data from an open-pit copper and gold mine recently constructed in British Columbia, Canada. Key assumptions for the mine model are summarised in Table 18.

Beginning of Construction	Year 2
End of Construction	Year 4
First Year of Production	Year 5
Last Year of Production	Year 29
Copper Production (lbs/year)	74,636,000
Gold Production (oz/year)	33,437
Total Copper Prod'n over Life of Project (lbs)	1,865,900,000
Total Gold Prod'n over Life of Project (oz)	835,923
Total Capital Expenditures (millions of 2018 Can $)	637
Capital Depreciation Rate (%)	25
Copper per unit operating costs (2018 Can $/lb copper)	2.6
Treatment/Refining/Transport Cost ($/lb copper)	0.37
Amortization period on the mine debt (years)	25
General and Administration costs	1% gross annual sales
Annual Contribution to Reclamation (millions of 2018 Can $)	5
Debt financing (%)	60
Equity Financing (%)	40
Interest rate (%)	7
Discount Rate (%)[7]	10

Table 18. Hypothetical base metal project: key assumptions.

[7] A 10% discount rate was chosen to approximate the discount rate used by private mining companies. It is important that the discount rate used to calculate the NPV of revenue to each party be identical, as the resulting NPVs are then used to determine rent distribution via the average effective tax rate (AETR) formula. The 10% private discount rate is inflated to reflect the inherent political, geological, and economic risks of large resource development projects (Fiscal Affairs Department, 2012; Luca & Mesa Puyo, 2016; Smith, 2002).

The mine model is designed to use different assumptions for cost of production, quantity of production, and commodity prices to reflect the potential variation among mines and uncertainty regarding future market conditions. A number of assumptions were tested, and three scenarios were chosen for presentation to reflect uncertainty and potential variation in mining revenues. The scenarios are based on three different commodity price assumptions: a reference price, high price, and low price. The reference price scenario uses annual year-end prices of gold and copper over ten years (2008 to 2017) converted to constant 2018 dollars. The low and high price scenarios are estimated based on a +/- 10% variation from the reference price. In all three price scenarios, commodity prices vary from year to year, consistent with the market price cycles experienced during the previous ten years. Changes in costs and output were also tested in the modeling but these changes had similar impacts on revenue and rent distribution estimates as the changes in prices, given that changes in all of these assumptions impacted net revenue, and net revenue are the principal determinants of rent generated by the mine. Therefore, the three price scenarios provide a range of estimates that also capture potential variation in mining costs.

A discount rate of 10% was used to calculate the NPV of the project, which is defined as project rent, and the net present value of the revenue streams accruing to the various parties. Alternative higher and lower discount rates were also used to test the impact on revenue estimates. For ease of presentation, they are not reported in this paper, but the results show that the lower the discount rate, the higher the rent estimates and the lower the percentage of rent collected by the IBA.

The coefficient of variation of annual community revenue was used to indicate the relative stability of each fiscal regime. The coefficient of variation is the ratio of the standard deviation to the mean. Therefore, unlike the standard deviation, the coefficient of variation allows for comparisons to be made between data series, even if the mean of each series is significantly different.

Fiscal Regime Assumptions and Boundaries

When summarising the tax and royalty structures in Table 16, and inputting each fiscal regime into the model, several assumptions and boundaries were made. In general, it was assumed that:

1. payments are made in full and on time, as to not incur any interest payments,

2. decisions are made in a timely manner, and therefore do not trigger any additional payments, and

3. no project suspension occurs.

Additionally, the tax and royalty structures described and tested do not include payments which:

1. depend on internal budgeting processes or matching contribution,

2. occur through the provision of non-financial benefits, and/or

3. come directly from a government entity that is not a signee in the bilateral IBA.

4.3. Results

Model outputs for the proportion of project rent accruing to the community for the different fiscal regimes under the three commodity scenarios are summarised in Figure 5. The variability in annual payments is also summarised, in Table 19 and Figure 6. Here, income variability is indicated by the range of the community's annual revenue and the coefficient of variation of payments received, by the community, throughout the project's life.

Under low, reference, and high market price scenarios, the ten negotiated fiscal regimes capture relatively modest proportions of economic rent for communities. Specifically, the percentage of rent collected by the community under the ten evaluated fiscal regimes ranges from 1.01% to 52.62% under the low market price scenario, 1.03% to 18.79% under the reference market price scenario, and 1.12% to 11.89% under the high market price scenario.

Fiscal regimes 1 and 8 capture the highest proportion of rent, regardless of the commodity scenario and will therefore be the main focus for comparative analysis. Under the low price scenario, regimes 1 and 8 collect over 50% of economic rent for

communities. Under the reference case, they collect 18.6% and 18.8% respectively. Finally, under the high price scenario, they collect 11.9% and 11.3% respectively. Their rent-capturing abilities significantly decrease under reference and high market price scenarios because a large proportion of the revenue collected is based on fixed payments that are insensitive to changes in mining profits resulting from higher prices (Figure 5). The fiscal regimes that collect the lowest proportion of rent are those based on a percentage of senior government mining royalties, which are calculated as a percent of mining profits (3, 4, 5, 6, 7).

Although fiscal regimes 1 and 8 capture similar proportions of rent for the impacted community (Figure 5), fiscal regime 1 generates a higher minimum and maximum value of annual community revenue under all commodity market scenarios (Table 19). Fiscal regime 1 provides a minimum annual income between $2.65 million and $3.24 million Canadian and a maximum annual income of $22.03 million Canadian, depending on the commodity market scenario; whereas, fiscal regime 8 provides a minimum annual income of $0 Canadian and a maximum annual income of $6.50 million Canadian. Regimes 1 and 8 differ in this regard because, unlike fiscal regime 8, fiscal regime 1 includes provisions for the community to receive a minimum annual income throughout all phases of project development. Additionally, fiscal regime 1 stipulates that substantial bonus payments be paid during the project's pre-production phases.

Throughout the project's production phase, fiscal regime 8 provides the most stable income to communities (Figure 6). Under all commodity market scenarios, fiscal regime 8 has a coefficient of variance equal to 0, indicating that this regime is composed only of annual fixed payments which are unresponsive to fluctuations in commodity markets and project profits and/or costs.

In contrast to fiscal regime 8, fiscal regime 1 includes an ad valorem royalty, in addition to numerous fixed payments (Table 16). Since annual community revenue generated through fiscal regime 1 is influenced by fluctuations in commodity market prices, annual community revenue is less stable (Figure 6). The coefficient of variation calculated under regime 1 is 14.3%, regardless of commodity market scenario.

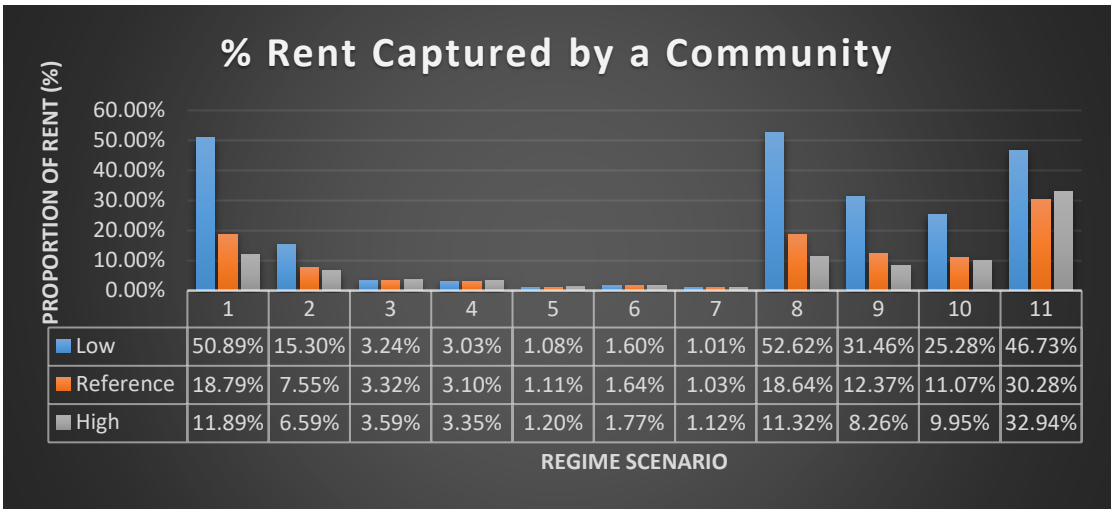

Figure 5. **Proportion of resource rent retained by a community under each market price scenario.**

		1	2	3	4	5	6	7	8	9	10	11
Low Market Price	Minimum (million CA$)	$2.65	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.04	$0.65
	Maximum (million CA$)	$22.03	$5.48	$5.14	$4.80	$1.71	$2.54	$1.60	$6.50	$6.62	$7.31	$41.14
Reference Market	Minimum (million CA$)	$2.94	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.04	$0.90
	Maximum (million CA$)	$22.03	$6.48	$7.03	$6.56	$2.34	$3.47	$2.19	$6.50	$7.35	$8.74	$48.93
High Market Price	Minimum (million CA$)	$3.24	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.04	$2.32
	Maximum (million CA$)	$22.03	$8.96	$8.92	$8.32	$2.97	$4.40	$2.77	$6.50	$8.09	$10.11	$71.34

Table 19. **Community range in annual income throughout all project phases, for each fiscal regime under low, reference and high market price scenarios.**

Figure 6. **Community income stability (denoted by the coefficient of variation) for each fiscal regime under low, reference and high market price scenarios.**

Fiscal regimes 5, 6 and 7 consistently provide maximum annual community incomes which are less than those under regime 8; however, regimes 2, 3, 4, 9 and 10, only provide maximum annual community incomes less than regime 8 under the low commodity market scenario.

Despite this, fiscal regimes 2, 3, 4, 5, 6, 7, 9 and 10 (those mentioned in the previous paragraph) all have more volatile annual community incomes and capture less overall rent than fiscal regimes 1 and 8.

The results show that all ten negotiated IBAs could be designed to collect significantly more revenue while still ensuring that the project is economically viable. To illustrate this, a hypothetical fiscal regime was evaluated along with the ten IBAs. The hypothetical regime (regime 11) generated significantly more revenue. The hypothetical regime uses a combination of fixed payments and a profits-based royalty that is set at a higher level of 4.5% (tier 1) and 39% (tier 2), after the investors recover their initial investment in the project. This fiscal regime collects 30.45% of the rent for the community under the reference case scenario. Under the low and high price scenarios, the community collects 46.7% and 32.9% of the rent respectively.

In comparison to fiscal regime 1 – the best performing negotiated fiscal regime, regarding its ability to capture rent for communities – fiscal regime 11 provides less stable, but significantly higher payments to a community throughout the life of a project (Table 19 and Figure 6). Fiscal regime 11 yields maximum yearly payments between $41.14 and $71.34 million Canadian to the impacted community, while fiscal regime 1 yields a maximum yearly payment of $22.03 million Canadian to the impacted community throughout the life of the project.

Like regime 1, fiscal regime 11 provides a guaranteed minimum annual income to the community throughout the project's life. However, since annual revenue provided through regime 11 is sensitive to project economics, regime 11 provides a lower guaranteed minimum annual income to the community compared to regime 1. Under regime 11, the guaranteed minimum annual income to the community ranges between $0.65 million and $2.32 million Canadian, whereas fiscal regime 1 provides a minimum annual income between $2.65 million and $3.24 million Canadian.

4.4. Discussion of Results

This study illustrates that the fiscal regimes in the ten negotiated IBAs evaluated collect a small proportion of the economic rent generated from mineral development and therefore more aggressive fiscal regimes could be used to collect significantly more revenue for the community while still ensuring the economic viability of the mining project. These results suggest that communities need to design better fiscal regimes in their IBAs to collect a larger share of mining project benefits.

While the design of an optimal fiscal regime is beyond the parameters of this paper, several observations can be made. First, it is important for each community negotiating an IBA to develop an economic model of the proposed project to estimate the project rents; the community thereby identifies the magnitude of revenue that can be collected while still ensuring that the project is feasible from the perspective of the investors. This, in effect, identifies the size of the net project benefit that can be shared with the community. Second, the community needs to identify its fiscal objectives regarding items such as the stability of revenue flow and magnitude of revenue collected to assist it in designing the fiscal regime, and then evaluate fiscal options relative to these objectives by testing different regime options in the model, that is specific to the proposed project. Based on the evaluation of the fiscal regimes in this paper, a fiscal regime that combines fixed payments with a profit-based royalty, similar to the hypothetical regime (11), is an attractive option for consideration, as a minimum guaranteed income is ensured and windfall profits can be captured. Third, the community needs to consider the relationship between the proposed fiscal regime and other community objectives such as employment, local purchasers, community infrastructure and environmental mitigation that could be included in the IBA. These other provisions may reduce the rent available to be collected under the fiscal regime and the community will need to carefully assess the trade-off between the fiscal objectives and other IBA components.

Admittedly, due the confidential nature of IBAs, the number of mining fiscal regimes evaluated in this chapter is small and more evaluations would be helpful along with more analysis of the dynamics of negotiations, to better understand why various fiscal regimes are developed. Evidence assessed in this study suggests that base metal mining IBAs, negotiated to date, have not been particularly effective at collecting a fair

share of the benefits of resource projects for the impacted communities, and that there is significant potential for communities to improve the fiscal provisions in IBAs by undertaking better analysis of project economics and revenue options.

Chapter 5. Recommendations and Conclusion

5.1. Introduction

This report identifies and describes the various fiscal instruments and systems that can be used to share privately accrued revenue from resource development with impacted communities. Furthermore, the relative advantages and disadvantages associated with employing each tool is discussed, and a set of qualitative and quantitative evaluative criteria is proposed. The quantitative evaluation framework was then used to assess the performance of alternative fiscal regimes levied for the base metal mining sector in British Columbia, Canada. Overall, this assessment of alternative fiscal regimes was completed to gain insight into the process of designing an optimal fiscal regime.

5.2. Recommendations

There is no single fiscal regime that is optimally designed for all natural resource sectors, projects, locations and/or communities. Instead, fiscal regimes should be designed to reflect and respond to unique project economics, community objectives, and political contexts. The following recommendations are provided to assist communities through the process of negotiating and designing well-informed fiscal regimes for resource development projects through IBAs.

First, communities who are in the process of negotiating IBAs should identify a set of community fiscal objectives for fiscal regime-dependent parameters such as the stability of revenue flow and magnitude of revenue collected. These objectives can then be converted into an evaluative framework to assess alternative fiscal regimes. If preferred, communities may also weight these set of objectives or evaluative criteria to further refine the evaluation process.

Second, during the negotiation process, the negotiating community should develop an economic model of the proposed resource project to illustrate project economics and generate an estimation of project rent. This model can then be used in conjunction with the developed evaluative framework to assess fiscal regime options and inform the final design of the levied fiscal regime. Following these steps maintains

community-specific objectives as a focal point throughout the fiscal regime design process, thereby ensuring that the final, levied fiscal regime aligns with the needs and/or objectives of the impacted community.

Lastly, negotiating communities may want to expand on the aforementioned process to incorporate the provision of non-monetary benefits from an IBA – such as community infrastructure development, environmental mitigation, preferential procurement practices, employment, and training. Non-monetary provisions may reduce the rent available to be collected under the fiscal regime and so the negotiating community will need to assess trade-offs between fiscal objectives and non-monetary objectives.

5.3. Conclusion

An impact benefit agreement can be a valuable tool used to ensure an equitable sharing of monetary and/or non-monetary benefits from resource development activities with impacted communities and manage or mitigate project impacts beyond basic regulatory requirements. From the perspective of a project proponent, IBAs may help to foster community support for a given project and therefore garner the social licence to operate. However, the largely confidential nature of IBAs has created a situation in which opportunities for social learning and assessing success have become limited.

This report attempts to distill practical recommendations for designing fiscal regimes in IBAs. To accomplish this, fiscal instruments and systems for extractive industries were identified, described, and qualitatively assessed based on a set of potential community objectives. Then, using a quantitative evaluative framework, alternative fiscal regimes for the base metal mining sector were evaluated using a discounted cash flow (DCF) mining model based on a representative mine.

Fiscal instruments have unique characteristics that influence natural resource development, management processes and outcomes, profits, and ultimately, the revenues shared with impacted communities. Analyzing each potential fiscal instrument against the evaluative criteria of revenue generating potential, administrative efficiency, neutrality, stability of income, and level of community involvement in project decision-making, it is clear that no individual instrument out-performs others in all evaluative

areas; trade-offs exist. Generally, a neutral fiscal instrument, that maximizes revenue raising potential, is administratively inefficient and provides unstable income to communities, and vice versa.

To balance trade-offs between different community objectives or evaluative criteria, numerous fiscal instruments can be combined into a fiscal regime. Based on the quantitative evaluation of alternative fiscal regimes (Chapter 4), it may be attractive to design a fiscal regime with both a stable, fixed payment component as well as a more neutral profit-based component. Doing this ensures a minimum guaranteed income to the community while still allowing windfall profits to be captured.

Additionally, an analysis of alternative fiscal regimes negotiated for the base metal mining sector in B.C. suggests that negotiated base metal mining IBAs have not been effective at collecting a fair share of resource revenue for impacted communities. In fact, there seems to be potential for communities to negotiate and levy more aggressive fiscal regimes while ensuring project viability. To quantify a fair share (resource rent) and ensure efficient resource development, it is suggested that communities develop and utilize an economic model of the proposed project to analyze project economics and design a well-informed fiscal regime.

Fiscal regime design for IBAs takes place during the agreement negotiation process. As with any negotiation, the outcomes are influenced by respective bargaining power, existing power dynamics, and other contextual factors. Consequently, while this report provides practical recommendations for designing fiscal regimes in IBAs, it is important to acknowledge that negotiating a fiscal regime is a complex process that requires contextual dynamics to be taken into account when developing a negotiation strategy (Caine & Krogman, 2010; O'Faircheallaigh, 2016; Peterson St-Laurent & Billon, 2015; Szablowski, 2011). These issues are beyond the parameters of this paper, but it is important to acknowledge their importance in determining the structure of fiscal regimes and the components of an IBA.

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