



Quantitative impacts of royalties on mineral projects



Eric V. Lilford

Department of Mineral and Energy Economics, Curtin Graduate School of Business, Curtin Business School, Curtin University, 78 Murray Street, Perth, WA 6000, Australia

ARTICLE INFO

Keywords:

Royalty
Resources sterilisation
Cut-off grade
Gold price
Sustainability

ABSTRACT

Policy-makers and legislators, typically representing a government body, are quick to impose royalties and other measures to secure income from natural resources operations. While this is undeniably appropriate, the question that is seldom asked by the same regulators is what impact does such an imposition beyond profit-based taxes have on the actual operation. Through taking away a percentage of the revenue that would otherwise have been due to the operation, what will the royalty do to the Resources-base, to the economic life of the operation, or to employment at the operation in the longer term? What royalty rate is optimal, being at what rate the operator pays and the government receives an equitable amount of revenue, and beyond what rate will the impact raise the possibility that the operator decides to discontinue operating? This paper introduces and quantifies a number of the impacts, including resources sterilisation, associated with royalties in the resources sector, using a gold operation as an example to outline the consequences of royalties based on revenue.

1. Introduction

Mineral exploitation has occurred for thousands of years and will continue for thousands to come as the world's population continues to grow and its collective demand for consumptive minerals and other consumable products continues unabated. Different commodities and metals are required for different activities in support of the *status quo* to sustain life and to enhance commercial and industrial growth, with the application of previously innocuous minerals, including lithium, graphite and cobalt, becoming ever-more important.

A notable anomaly with our planet Earth is that minerals are not evenly or equitably distributed from country-to-country, presenting opportunities, and often supporting conflict, for countries to establish trade-links with each other in order to benefit and generate foreign income from product sales. In general, to support their respective populations, all countries require agricultural security, a mix of refined minerals and metals and access to potable water to survive and thrive. With these in place, infrastructural, commercial and social development can occur, with the activities supported by a skilled populace.

In his paper published in 2004, Tilton (Tilton, 2004) highlights the position taken by many governments, through taxes and royalties, to "...increase the contribution of mining to the domestic economy." In the same paper, he then considers Chile to present his views on higher taxes and possibly the imposition of royalties on mining operations to ensure that the government, and hence the country at large, benefits economically from these mining activities. The paper concludes, amongst its other findings, that increasing taxes on mining operations

may reduce exploration and development activities in the longer term and that the near-term gains through higher taxes and royalties are unlikely to offset longer-term welfare issues.

Recognising previous research on the topic of mining taxes and royalties, incorporating Hotelling's research and views on the finite nature of natural resources (Hotelling, 1931) and the associated Ricardian Rent, very little, other than an introductory paper on the topic (Lilford, 2003), a submission by the Chamber of Mines in South Africa to the government on the proposed Royalty Bill (Chamber of Mines of South Africa, 2003) and possibly very few others not found, has been published on the impacts on the industry and a mining operation's deposit in terms of its cut-off grade, mineral sterilisation and life of mine arising from these imposed taxes and royalties. This paper therefore discusses, and quantifies through an example, the importance of optimising the use of depleting natural resources, initially from a government's perspective. It then balances that with the expectations and views of the exploiting company in terms of required returns on the significant capital commitments of exploration, development and production of the minerals.

Ideally, both sides of the government-and-company natural resources equation are satisfied equitably, but this is seldom the case.

This paper will also provide an overview of the various sources of benefits accruing to a government (the Government or State) and will then consider the same for the explorer and exploiter (the Company or Operator). The various discussion points will be considered in an operating gold mine case, with the results being derived and supported by numerically modelled solutions.

E-mail address: e.lilford@curtin.edu.au.

As a final and notable point, this paper is the first paper that actually quantifies the implications of royalties and will provide the basis for additional research papers to follow.

2. Overview

The fact that a country's mineral wealth is a national, natural asset, the benefits of which must be shared with the inhabitants of that nation, is not disputed (Hotelling, 1931). The supporting arguments to this statement typically highlight how the natural resource originated or came to exist in the first instance, without the intervention or assistance of human endeavor. Geological activities over geological time and consequently the land itself provided the natural, inherent wealth associated with a mineral deposit, while the realisation of that wealth can only be achieved through the intervening human activity of exploitation and beneficiation, requiring significant capital investment.

Other than the specific technical skills required to exploit a mineral deposit, as well as access to significant capital to explore, develop and exploit it, any natural person has the right to access and ultimately exploit or at least benefit from that wealth. There are a few caveats on the former part of this statement, covering aspects including skills and abilities, but these are for another discussion.

Over time, many national and regional economies have benefited socially and economically from the development of natural resources, including through:

- employment of human capital;
- removing reliance on social welfare and Government grants due to direct and indirect employment;
- skills development and training that can be applied within and outside the industry;
- capital procurement supporting local industries;
- infrastructure development including roads, railways, power, water and others;
- environmental improvements on previously invaded or destitute land;
- payroll taxes;
- taxes on profits;
- royalties on income;
- import and export duties;
- value added tax (VAT) or some other form of additional tax;
- development of supporting services industries;
- funding for research and innovation; and
- capital markets access.

The above list is not all inclusive and there are additional benefits associated with resources exploitation not included. However, beyond the positive aspects listed above, there are also negative factors that must be considered in balanced thinking that goes hand-in-hand with the listed benefits, including:

- natural resources are a depleting asset and hence must be optimised on extraction;
- environmental impacts of exploitation may be detrimental and permanent;
- Dutch Disease (skills aggregating in one sector to the detriment of another or others), (Kareem Ismail, 2010); and
- stranded communities may evolve once resources are depleted.

Although the benefits list is longer than the detriments list, this does not mean that the benefits outweigh the negatives. However, the converse is not true either. It is necessary to consider the details around the implications of the rules, policies and laws before any conclusion may be drawn. It is also likely that the conclusion derived for a specific asset or commodity class in a specific location or jurisdiction may not be applicable to another asset or commodity class, although the discussion being put forward is somewhat generic.

3. Optionality

A number of papers have been published on the topic of Real Options (ROs) and how to apply the RO valuation (ROV) techniques to resources opportunities (Haque et al., 2014). With the significant uncertainties around commodity prices and exchange rates and how these variables may correlate (Haque et al., 2016), mining companies continue to explore for and exploit mineral deposits, generating income and profits that Governments are obliged to tax. Much of the research around ROs has delved into the mathematics surrounding ROV techniques with commensurate proving or disproving of the reliability and usefulness of the technique.

Inherent within any mineral project is the notion of optionality, which may be associated with economic factors including commodity prices and exchange rates (Haque et al., 2016), or with technical and managerial flexibility factors (Dimitrakopoulos and Jewbali, 2013; Groeneveld et al., 2012; Sabour and Wood, 2009). Armed with ROV techniques, a mineral project valuer is then positioned to appropriately model flexibility and choice-outcomes associated with the project and its associated management team in order to derive an optimal and often maximum value and return on investment.

In considering optionality, these valuation practitioners will typically consider deriving the value of a mining operation from a specific perspective, being the perspective of the overall minerals industry, or from that of a company or of a specific operation or management team (Brennan and Schwartz, 1985). Seldom is an optionality assessment conducted by a Government department, its representatives or from the bodies tasked with advising on taxation and royalty legislation. This is a significant oversight since that Government body is placed in a position of power to provide the greatest benefit to the people who voted it in. This position of power cannot be abused and decisions made cannot solely consider the short and possibly the medium term benefits of its collective decisions. This is even more-so the case when considering a country's natural mineral endowment and the mining industry, which tends to provide longevity beyond many future elections and changes in Government parties and personnel.

Governing bodies need to accept and factor in numerous potential outcomes associated with the decisions they have previously legislated and other decisions and legislation they wish to introduce and implement in the future. These include decisions around taxation and royalty rates on natural resources.

RO analysis can assist in determining an optimal royalty and tax rate to be applied to mining operations, and this provides an area requiring further research, notably after considering the analysis in the rest of this paper.

4. Government policies

Governments typically require that the exploitation of the country's natural resources benefits the entire country's populace and not just the mineral project's owners, investors and other stakeholders. Since mineral resources are known to be a depleting asset once exploitation commences, these Governments establish rules and regulations not only governing the safe, healthy and least environmentally damaging criteria to exploit the assets, but also around how the State will receive financial benefits from the exploitation and production from the operating mines once they have been developed. In addition, Governments also want to ensure that their country's minerals industry is attractive from an investment standpoint to attract local and foreign investment and development income.

In the detailed study commissioned by the World Bank on Mining Royalties (Otto et al., 2006), the authors provided significant discussion points relating to royalties and taxes typical to the mining industry, worldwide. The near-300 page document also provides worked examples highlighting the different outcomes dependent on which royalty regime is applied to a specific example. While the document provides excellent

Download English Version:

<https://daneshyari.com/en/article/5104176>

Download Persian Version:

<https://daneshyari.com/article/5104176>

[Daneshyari.com](https://daneshyari.com)