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AN INVESTIGATION INTO THE CONTRADICTORY NATURE OF THE MINERAL ROYALTY

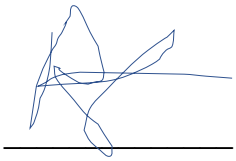
Ruan Gerard Kemp

A Research Report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Mining Engineering (Mineral Economics).

Hermanus, May, 2017

DECLARATION

I declare that this Research Report is my own, unaided work. It is being submitted for the degree of Master of Science in Mining Engineering at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



RG Kemp

26 October 2017

“Freedom is the freedom to say that two plus two make four. If that is granted, all else follows.”

George Orwell, *Nineteen Eighty-Four,* (Orwell, 1949)

ABSTRACT

The purpose of this study was to mathematically analyse the South African mineral royalty formulae for an objective factual understanding of the intents and effects of the royalty, against which official and academic perceptions of its intents and effects are juxtaposed.

The core principles of the royalty are that it should not be a tax on beneficiation, and that the royalty rate should be floating so that both a minimum rate and a variable rate on gross sales applies.

The minimum rate of 0.5% of Gross Sales ensures that the state '(as custodian)' always receive compensation for the 'permanent loss' of non-renewable resources. The variable rate on Gross Sales is a function of the formula and provides for additional compensation from profitable mines, with the intent that profitable mines should pay higher rates.

In order to avoid penalising refined mineral producers for adding value, the parameters in the formula is adjusted, so that there are differential rates for refiners and miners.

A comprehensive literature review has revealed that these core principles have not been sufficiently questioned, and a further two conjectures was also identified, namely that the variable royalty rates collect 'rent', and that, because it is a cost, the royalty will impact on cut-off grade.

In order to test these conjectures the royalty rates were restated as royalty payable; R, and it was shown that the royalty is in fact two separate flat rates, simultaneously charged:

$Rr = 0.5\%\ gross\ sales + 8\%\ EBIT$ for refined minerals, and
$Ru = 0.5\%\ gross\ sales + 11.11\%\ EBIT$ for unrefined minerals

Analysis on this basis has revealed that, in order to satisfy the core principle of not being a tax on beneficiation, the differential rates are applied on the wrong part of the formula, and should be applied to the minimum charge instead.

It was further illustrated that the device which makes the royalty rates float is the profitability ratio (X), which is the quotient of earnings before interest and tax (EBIT) over gross sales, as per the mineral royalty formulae. This device is borrowed from the gold tax formula, where, in

combination with a depletion allowance, it had the effect of providing equitable relief for marginal mines – in direct contradiction to the royalty.

In combination with the royalty it was illustrated that gold mines do not pay income tax up to a profitability of 5.978%, from the historic 5%, and that the combination thereafter can be stated as:

$Y = 39 - \frac{137}{X}$, which compares against the gold tax of $Y = 34 - \frac{170}{X}$

Applying the method to test the conjecture that the royalty collects rent it was shown that the royalty impedes the formation of economic rent and collects a rent on land instead, with the flat charge on gross sales compensating the state '(as custodian)' for the depletion of non-renewable resources, and the flat charge on EBIT payable to the state for the permission to mine.

In the application of the method to test the impact of the royalty on cut-off grade it was shown that only the minimum charge has an impact, with a seemingly insignificant factor impact of 1.005. That only the minimum charge should be considered as cost for cut-off grade estimations, may be of significant import to the mine planner.

The charge on EBIT would however have an impact if the operation is highly geared, as the royalty does not allow interest deductions. It was illustrated that the royalty effectively raises the interest rate on loans by a factor of 1.087 for refined minerals, and 1.125 for unrefined minerals.

In testing the conjecture that the royalty penalises mining and incentivises refining it was confirmed that the minimum charge on gross sales is necessarily a tax on beneficiation. This may be offset at certain profitability by the differential rates, and a working formula was provided:

$$X = \frac{4.5\%\,(Z-1)}{72\%-Z}$$

Where Z is the price differential between refined and unrefined products, that is unrefined mineral price as a percentage of refined mineral price.

For all price differentials that are equal to, or lower than 72%, refining will attract a higher royalty, and the royalty can be regarded as a tax on beneficiation. For price differentials that

are higher, there are a certain minimum profitability required, given by X, where after the beneficiation effort is acknowledged.

Further research is suggested to investigate actual price differentials between different stages of processing for different commodities.

Other research suggestions are provided at the end of this report, as well as recommendations to National Treasury.

DEDICATION

I dedicate this work to Gerard Kemp and Pieter Stoltz, who taught me as much about integrity as about mining.

And to my family, who for a while had to share me with a formula; thanks.

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ABBREVIATIONS

ANC:	African National Congress
BEE:	Black Economic Empowerment
CIT:	Corporate Income Tax
DMDB:	Draft Mineral Development Bill, 2001
DMR:	Department of Mineral Resources
DTC:	Davis Tax Commission
DWT:	Dividend Withholding Tax
EBIT:	Earnings Before Interest and Tax
GFSM:	Government Finance Statistics Manual
IASB:	International Accounting Standards Board
IFRS:	International Financial Reporting Standards
IMF:	International Monetary Fund
MPRDA:	Mineral and Petroleum Resources Development Act, 2002
MPRDAB:	Mineral and Petroleum Resources Development Amendment Bill, 2013
MPRRA:	Mineral and Petroleum Resources Royalty Act, 2008
MRT:	Mineral Royalty Tax
NSR:	Net Smelter Return
ROA:	Return on Assets
ROE:	Return on Equity
RRT:	Resource Rent Tax
SARS:	South African Revenue Services
SIMS:	State Intervention in the Minerals Sector
SMC:	State Mining Company
ZACC:	South Africa: Constitutional Court

CHAPTER ONE: INTRODUCTION

1.1 The Mineral Royalty in context

The private ownership of mineral resources in South Africa was ended through the Mineral and Petroleum Resources Development Act of 2002, which declared that mineral resources are "the common heritage of all the people of South Africa and the State is the custodian thereof for the benefit of all South Africans" (MPRDA, 2002).

To give effect to section 3(2)(b)[1] of this Act, the Mineral and Petroleum Resources Royalty Act (MPRRA) of 2008 was subsequently passed in order to provide for "the compensation to the State (as custodian) for the country's permanent loss of non-renewable resources" (National Treasury, 2008).

The mineral royalty is thus the instrument through which the state's ownership of mineral resources was consummated. Effectively, where the MPRDA nationalised mineral resources, the MPRRA nationalised royalties.

From a certain perspective – 'royalty nationalisation being seen as the thin edge of the wedge of mine nationalisation' (Fine, 1983) – these changes appear radical. However, according to Capps (2012), this strategy was 'classical bourgeois reform' [i.e. not radical] in that "the state may fulfil the 'class function' of modern landed property and realise a part or the whole of the rent that would otherwise have accrued to an independent landlord class. Marx termed this 'socialised' form of ground rent 'universal state rent' or, simply, a 'state tax'." (*Ibid*.)

Thus, Capps (2012) argued that the purpose of resource nationalisation was to reverse South Africa's history of racialized dispossession and to "give white monopoly capital a taste of what it had been like to be black."

While this line of thinking seems to conflate redistribution with retribution, it does explain the dancing in parliament upon the passing of the MPRDA on June 26: Freedom Day – the day the Freedom Charter was adopted, and its enactment on May 1: Workers' Day (Rocha, 2016).

[1] "(2) As the custodian of the nation's mineral and petroleum resources, the State, acting through the Minister, may — *(b)* in consultation with the Minister of Finance, determine and levy, any fee or consideration payable in terms of any relevant Act of Parliament." (MPRDA, 2002)

These may be mere 'ideological symbolisms', but the trajectory of recent policy proposals contradicts the notion that the nationalisation of the mining industry is mere socialist rhetoric:

- Proposed ministerial discretion in "determining the levels of beneficiation, relevant percentages and developmental pricing conditions in respect of local beneficiation" in the Mineral and Petroleum Resources Amendment Bill of 2013 (MPRDAB, 2013);
- The deletion of the 'first-in, first-assessed' principle in the MPRDAB;
- the call to "advantage state mining above other mining interests and which are to be included in the current amendments" (ANC, 2015);
- "the reservation of select strategic mineral properties for development by the [state mining company] SMC to supply downstream industries at developmental prices" (*Ibid*.);
- the issuing of the Africa Exploration, Mining and Finance Corporation Draft Bill, 2015, in order to establish the SMC; and
- The arbitrary[2] gazetting of the 2016 Reviewed Broad-Based Socio-Economic Empowerment Charter for the South African Mining and Minerals Industry which:
    - not only repeals the "once empowered, always empowered principle, but do so retrospectively, eliminating any ownership credits" (Leon, 2016), and
    - introduces a development royalty of 1% of turnover, over and above the existing mineral royalty, and various other obligations that already serve community development (DMR, 2016).

These proposals are in line with the suggestions of the ANC's State Intervention in the Minerals Sector (SIMS) report which sought to achieve the "desired outcomes of state control" through higher rent share, a state-owned mining company, and compulsory beneficiation to maximize "developmental impact" (SIMS, 2012).

However, these proposals contradict Chief Justice Mogoeng's reasoning in dismissing AgriSA's claim that its mineral rights were expropriated through the MPRDA[3]. Chief Justice Mogoeng argued that "The MPRDA makes no provision for the state to be a beneficiary of the new mineral and petroleum dispensation" and that:

[2] Regulatory intervention outside the rule of law; by fiat

[3] A succinct case note is provided by Winks (2013). For a comprehensive treatment see Van der Vyver (2012).

> “The state, as the custodian of these resources, is not seeking or supposed to be a co-contender with people or business entities for the right to prospect for or mine these minerals” (ZACC, 2013).

The cause of the contradiction between a ‘custodian of mineral resources’ and a state mining company appears to be one of deception. Indeed, according to Capps (2013), the drafters of the mineral bills deliberately ‘juggled’ with the wording and settled with ‘state custodianship’ in order to avoid compensation claims. However, Mostert (2014) argued:

> “There may be a purpose in "fudging" core notions such as the one of state custodianship of mineral resources in the MPRDA, or the notion of "land as a national asset" in the Green Paper [on Land Reform, 2011]. Evading a clear meaning of such concepts may be the only way, for instance, of achieving a negotiated transformation.”

If the purpose is not to deliberately mislead, the question then is what gets sacrificed in such a ‘negotiated transformation’? In terms of the mineral royalty, Cawood (2010) commented that: “Balancing the design considerations proved to be a very long and complex process in South Africa and political pressure caused the Act to perhaps become too complex with regard to the requirements of the gross sales base.”

With clarity being an obvious victim of ‘negotiated transformation’, this current research investigates the extent to which the royalty formula says one thing, but does another.

1.2 Problem Statement

One of the instruments for ‘nationalisation by other means’, proposed by the SIMS report, is higher rent share (SIMS, 2012). It is in this light that proposals for new tax instruments in the mining and minerals space should be read.

Consider the arbitrary gazetting of the 2016 Reviewed Charter, calling for mining companies to “contribute a minimum of 1% of annual turnover towards local community development and labour sending areas” (DMR, 2016), over and above the current royalty.

Then consider that in the Draft Mineral Development Bill (DMDB), as precursor to the MPRDA, the purpose of the royalty was envisioned to be “for the benefit of any community or local

government *affected by mining*, for the purpose of rural and local economic development and social upliftment" (DMDB, 2001).

Yet, when introducing the royalty bills, the Minister of Finance stated that:

> "Both labour unions and mining companies have requested that revenues from mining and petroleum royalties be ring-fenced for projects identified in mining towns. The earmarking or ring-fencing of mineral royalty revenues is not supported. Not only is earmarking contrary to sound fiscal policy, but also earmarking would negate the underlying principle of the MPRDA that the minerals of our country belong to all South Africans" (Ministry of Finance, 2008).

Buchanan (1980) would have agreed, as he argued that: "The power to tax, per se, does not carry with it any obligation to use the tax revenue raised in any particular way. The power to tax does not logically imply the nature of spending." However, Buchanan warned that:

> "a much more severe, and possibly intractable, problem arises when we allow the agents of Leviathan [the rulers] to incorporate what we may call "non-personal" arguments in their utility functions, when we allow these agents to promote or to seek to further a set of "objectives" that can be plausibly "legitimized" on what may be called "public interest" or "general welfare" grounds. In such a setting, tax limits per se may be ineffective in containing government (*Ibid*.)."

Buchanan proposed earmarking as a countermeasure:

> "Effectively designed earmarking may limit the extent to which government, any government, can exploit the taxpaying public; government may be given a positive incentive to provide the goods and services that taxpayers want. The decision makers, whoever these may be, can be kept "honest" (*Ibid*.)."

Seen from this perspective, if the wishes of labour unions and mining companies ('the taxpaying public') were heeded, as was the original intent of the royalty in the Minerals Development Bill (2001), it would not have been necessary to call for a 'development royalty' as per the Reviewed Charter (2016). Since it was not, and since the 'custodian of mineral

resources' aspires to be a state mining company in the 'public interest' on 'general welfare' grounds[4], more tax instruments in the mining and mineral space can be expected.

In an academic response to the publication of the SIMS report, Cawood and Oshokoya (2013) argued that: "It will not be wise to replace existing law and policy instruments until there is a better understanding of the distinction between fact and public perception about the impact of the current system." This current research contributes to such an understanding of the mineral royalty.

1.3 Objectives of the project

The purpose of this study was to mathematically analyse the mineral royalty formulae for an objective factual understanding of its intents and effects, against which official and academic perceptions of its intents and effects are juxtaposed.

A preliminary investigation of the literature has revealed a number of opinions but a lack of technical understanding of the royalty; which gives rise to a number of contradictions. Thus, the rationale for focusing on the mathematical structure of the formulae was to avoid further saturating the existing literature with political economic debate as per this Chapter in sections 1.1 and 1.2. Instead, the objective was to delineate a definitive understanding of the royalty, which in turn may then inform debates about wealth creation and redistribution in the field of mineral taxation.

1.4 Research Questions

The specific research questions that are mathematically questioned are developed from the comprehensive literature review in Chapter 2. These research questions relate to the 'core principles' of the Royalty Act that was affirmed by the Davis Tax Committee (DTC) in a closed session with the South African Revenue Services (SARS) and various industry bodies. The session deliberated on "the current Mineral Royalty Tax (MRT) regime and the challenges facing the South African mining industry in respect of the practical application of the legislative framework that governs the imposition and calculation of the MRT" (KPMG, 2016).

[4] These are the workings of the 'Developmental State' according to Edighejji (2010); 'Dirigiste dogma' according to Lal (2002). 'Development Economics' is a school of thought that advocates central planning and state interventions as key to economic growth.

The following ‘core principles’ identified by the session serve as the working hypotheses that are tested in this current research:

- “The MRT is not intended to be a tax on beneficiation – hence the reason why the MRT is determined at an arm’s length price[5] at the ‘first saleable point’ (“FSP”) for each respective mineral resource.
- The MRT formula is a ‘floating rate formula’ and was designed to always capture a minimum royalty payable in any given year of assessment, irrespective of the profitability of a mine, in order to account for the depletion of the mineral resource base of the country. The formula however makes provision for the scenario that taxpayers will pay more MRT when profits are high and *vice versa”* (*Ibid*.).

1.5 Limitations

This current research is concerned with the technical soundness of the royalty given its purported intents. The contradictions identified may inform an understanding of the incidence of the royalty, but an alternative to the current royalty regime is not suggested.

A further shortcoming relates to the history of political negotiation which influenced the design considerations of the royalty. This has not been researched.

Lastly, no legal opinion was sought in regards to the findings of the research.

1.6 Structure of the report

Chapter 1: Introduction

This first chapter places the South African Mineral royalty in context, from which the research problem is identified. The research objectives are set out and a working hypothesis provided.

[5] Such prices that would be paid in an open market

Chapter 2: Literature Review

This chapter delineates the main themes in the literature that constitute an understanding of the royalty, from which specific research questions are identified which would allow testing the effects of the royalty against its purported intents.

Chapter Three: Method

In this chapter, the royalty formulae are unpacked and the method of 'reading' the royalty is applied in comparison to the gold tax, from which the royalty formula borrows its profitability ratio. Preliminary findings are made.

Chapter Four: Analysis

This chapter applies the method of reading the royalty – introduced in Chapter 3 – to test the specific research questions identified in Chapter 2.

Chapter Five: Conclusion

The final chapter summarises the findings of the research. Recommendations are made to National Treasury and the Davis Tax Committee. Suggestions for further research are provided.

1.7 Conclusion

This chapter introduced the proposed research: to discern between fact and opinion regarding the mineral royalty by testing the extent to which the royalty's purported intents contradict its effects. The following chapter is a summary of a comprehensive literature review, from which the specific research questions will be drawn.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Perhaps the secret genius of the South African mineral royalty is that it does one thing, even while the 'royalty literature' purports that it does something completely different. The purpose of this literature review was firstly to find the main themes in the literature that constitute an understanding of the royalty, and secondly identifying the specific research questions which would allow testing the effects of the royalty against its purported intents.

This review broadly identifies two categories of writings as 'royalty literature'. On the one hand, there are the official writings by organs of state, notably the Explanatory Memorandum to the Mineral and Petroleum Resource Royalty Act (National Treasury, 2008), and an internal National Treasury document (National Treasury, 2013) on which the Davis Tax Commission (DTC, 2015) relied on in their deliberations on mineral taxation. On the other hand, there are academic writings, which in turn can be divided into pre-implementation and post-implementation analyses of the royalty.

Falling under the latter category, this current study differs from previous studies in that it analyses the structure of the royalty in order to test its efficacy. The structure of the royalty will be unpacked in chapter 3; this chapter looks at how the royalty is understood in the literature, and the extent to which these understandings are questioned.

2.2 **The official view:** An Explanatory Memorandum to the Act

The Royalty Act provides no guidance as to the intents and purposes of the royalty, other than providing for the actual imposition of the royalty: "A person that wins or recovers a mineral resource from within the Republic must pay a royalty for the benefit of the National Revenue Fund in respect of the transfer of that mineral resource" (MPRRA, 2008).

The royalty for refined minerals is given as: $$Y = 0.5 + \frac{EBIT}{12.5 * gross\ sales} * 100$$

For unrefined minerals, the royalty formula is: $$Y = 0.5 + \frac{EBIT}{9 * gross\ sales} * 100$$

Where Y, expressed as a percentage, is the rate to be applied to gross sales to determine the royalty payable (MPRRA, 2008).

The intents and purposes of the royalty are provided for by the "Explanatory Memorandum for the Mineral and Petroleum Resources Royalty Bill" (National Treasury, 2008). The memorandum states that the MPRRA "gives effect to section 3(2)(b) of the Mineral and Petroleum Resources Development Act" (MPRDA), which in turn states that:

> "As the custodian of the nation's mineral and petroleum resources, the State, acting through the Minister, may – in consultation with the Minister of Finance, determine and levy, any fee or consideration payable in terms of any relevant Act of Parliament" (MPRDA, 2002).

Thus, according the Explanatory Memorandum, "the royalty bills which complements the MPRDA provides for the compensation to the State (as custodian) for the country's permanent loss of nonrenewable resources" (National Treasury, 2008).

The document differentiates between refined and unrefined minerals, and between the minimum and maximum royalty rates applicable. The 'intercept' rate of 0.5% for both refined and unrefined minerals is identified as the "minimum charge in order to ensure that Government (as custodian) always receives some level of royalty payments for the permanent loss of non-renewable resources" (*Ibid*.).

In terms of the differential rates, the memorandum explains that:

> "The key difference between both the refined versus the unrefined formulae lies in the 9 versus 12.5 constants. The two constants effectively seek to neutralise some of the difference between the different refined versus unrefined mineral bases. Refined mineral resources have higher gross sales (tax base) than unrefined minerals because more value addition occurs as minerals are refined. The higher 12,5 constant seeks to offset this higher refined base" (*Ibid.*).

The document does not expound on how the different constants were decided upon, other than state that it was for 'equity reasons' – "this differential is to be expected because the tax base (gross sales) for unrefined minerals is smaller given the lower level of processing/ refinement compared to fully refined minerals" (*Ibid*.).

In terms of the variable rate, which is a function of the formula, the memorandum makes a number of statements, which form the foundation of the current investigation. Firstly, the document states that Earnings before Interest and Tax (EBIT) and Gross Sales are 'the parameters' that "ensure that the royalty percentage rate varies according to the profitability of a mine" (*Ibid*.). Secondly, and in relation to the first, the memorandum states that: "A formula approach was used for setting these rates as opposed to utilising flat rates (e.g. a flat 3 per cent), thereby making these rates adjustable in light of business conditions." And thirdly, as conclusion to the prior premiss:

> "the formulae provide equitable relief for mines during marginality (e.g. during start-up operations, when a mine is at the end of its life span or during times of low commodity prices) while at the same time providing the fiscus with higher revenue potential when more favourable economic conditions exist (e.g. commodity booms and high grade mines)" (*Ibid*.)

This statement is reiterated in a different paragraph in the same document:

> "The variable royalty percentage rates provide automatic royalty liability relief for marginal mines. At the same time, the variable royalty percentage rates provide Government with additional income during times of high commodity prices. As a matter of fairness, Government shares in both the downside risks and upside benefits associated with mining. This sharing takes into account cyclical commodity prices and declining ore grades" (National Treasury, 2008).

2.3 **The official view:** An internal National Treasury document and a Tax Commission

The Davis Tax Commission (DTC) was mandated by the Minister of Finance in 2013 to "inquire into the role of the tax system in the promotion of inclusive economic growth, employment creation, development and fiscal sustainability" (DTC, 2015). The committee published its 'First Interim Report on Mining' in June, 2015, and suggested that:

> "new tax instruments are not necessary, particularly since the mineral royalty has been carefully designed to achieve a strong balance of ensuring that the royalty is responsive to different economic circumstances, capturing rents when profits are high and ensuring a measure of cover (for the fiscus) in the form of a minimum revenue stream during weak economic cycles and low commodity prices" (*Ibid*.).

The above statement contains two important elements. Firstly, that new mineral tax instruments are not necessary. This is in response to the State Intervention in the Mineral Sector report prepared for Afican National Congress' National Executive Committee, which proposed a 50% Resource Rent Tax in addition to corporate income tax and a 1% royalty on revenue (SIMS, 2012). And secondly, in relation to calls for new tax instruments, the notion of "capturing rents when profits are high" (DTC, 2015).

It is significant to note that neither the MPRDA, nor the MPRRA and its Explanatory Memorandum mentions 'rent.' The only mention of 'rent' in 'official royalty literature' prior to the SIMS report is a single mention in the the Department of Minerals and Energy's 1998 White Paper on Minerals and Mining Policy:

> "Through adding value or beneficiating mineral resources a country can maximise the rent it derives from exploitation of its natural resource base and have it serve as a foundation for further industrial development" (DME,1998).

In this sense, 'rent' seems to denote 'wealth'. Nevertheless, the concepts of 'rent' and beneficiation, brought to the fore since the ANC's State Intervention in the Minerals Sector report and other writings by its co-author Jourdan (2014), are important in understanding the mineral royalty.

In terms of beneficiation, the Davis Tax Committee stated that:

> "The royalty formulae are designed so that a higher rate results from the unrefined minerals than for refined. The apparent rationale for this is that the State wants to place a levy on taxpayers to the extent they have depleted national resources belonging to the country and not on the value added due to beneficiation" (DTC, 2015).

This 'core principle' – that the mineral royalty tax (MRT) is "not intended to be a tax on beneficiation" – was reiterated a year after the publication of the interim report in a closed session on the MRT between the DTC, the South African Revenue Services (SARS), and various industry bodies (KPMG, 2016).

In terms of the concept of 'rent', the DTC expounded that:

> "The royalty rate formula is designed to marginally increase the rate of taxation depending on the profitability of the mine. In other words, within a certain profitability

> range the rate formula is designed to capture rents. This capture of rent provides relative tax neutrality as revenue varies based on project profitability" (DTC, 2015).

Referring to an internal treasury document, the DTC report suggested that "South Africa already has an element of [Resource Rent Tax] RRT built into its royalty levy", and that: "The profitability measure contained in the royalty charge is comparable to an RRT" (DTC, 2015).

The internal treasury document provided the following definition:

> "Resource rents represent surplus revenues from a deposit after deducting costs (exploration, development, and extraction) and a normal rate of return to capital (includes a risk free component and a risk premium that compensates a risk-averse investor for the risks incurred in the activity)" (National Treasury, 2013).

In the International Monetary Fund report compiled for the DTC, it is stated that: "South Africa introduced a variable royalty system as a proxy for taxation of *mineral rent,*" (IMF, 2015). The report defined rent as: "Revenues in excess of all necessary costs of production including the minimum rate of return to capital (sometimes "super-normal profits")" (*Ibid*.).

2.4 **The official view:** A summary

In summary, the official understanding of the royalty seems to be that it is a mechanism to compensate "the State (as custodian) for the country's permanent loss of nonrenewable resources" (National Treasury, 2015). This compensation consists of a minimum charge on gross sales for both refined and unrefined minerals, and a further charge on gross sales that varies with profitability, so as to provide relief for marginal mines. The charges differs between refined and unrefined minerals, so as not to be a tax on beneficiation.

When it comes to an understanding of the formula, however, there are slight variances in the official royalty literature. Whereas the Explanatory memorandum to the MPRRA understood the formula to allow for "higher revenue potential when more favourable economic conditions exist" (National Treasury, 2008), the Davis Tax Commission understands the variable rate of the formula as a rent capturing mechanism (DTC, 2015).

Another discrepency in the official royalty literature is that while the DTC variously refers to the royalty as the 'royalty tax' or the 'royalty levy', the Minister of Finance in answering a

question for written reply stated that “royalties are regarded as non-tax revenues, as they are a resource rent rather than a tax,” (National Assembly, 2011). National Treasury, on the other hand, classifies the royalty as non-tax revenue under ‘rent on land’ (National Treasury, 2015).

2.5 **The academic view:** Pre-Implementation

The seminal pre-implementation analyses of the royalty Act can be found in a doctoral thesis by Cawood (1999), the subsequent proposal in a peer-reviewed journal for a “new royalty for South African mineral resources” by Cawood and Minnit (2001), and a further proposal to National Treasury by Cawood and Macfarlane (2003). The royalty proposed by Cawood (2003) took the form:

$$Y\% = 1 + \frac{X}{50}$$ (Cawood and Macfarlane, 2003)

Where:
Y is the royalty rate, expressed as a percentage.
X is profitability – the ‘profit-to-revenue ratio’ (Cawood and Minnit, 2001), expressed as a percentage.

Note that at maximum profitability of 100%, the maximum royalty rate will be 3%.

This is the structure of the formula that was adopted in the MPRRA, where earnings before interest and tax (EBIT) is the measure of profit, and gross sales the measure of revenue. For the current royalty formula, the minimum rate is set at 0.5% instead of the proposed 1%, and the maximum profitability for refined minerals is assumed 60% (Cawood, 2010), set at 56.25% to get the 12.5 constant in the denominator when the maximum rate is 5%. For unrefined minerals; the maximum profitability was assumed 60%, set at 58.5% to get the constant 9 when the maximum rate is 7%.

The maximum rates adopted are in contrast to the 3%, which Cawood and Macfarlane (2003) argued to be in line with international best practice. It should however be noticed that at the closed session deliberations that took place a year after the DTC interim report on mining was released, it was reported that in terms of the maximum rates: “Industry had very little comment in respect of the reasonableness of these rates as they apply in the MRT formula, as in practice these rates are never achieved” (KPMG, 2016).

Another important difference is that Cawood and Macfarlane (2003) suggested the royalty rate should apply over 'net smelter return' [which is defined as "Gross value minus processing, refining, transport from the mine to the point of sale, handling fees, insurance, sampling and assaying during transport and marketing costs" (*Ibid*.)], whereas the MPRRA stipulates Gross Sales as the tax base, and instead differentiates between refined and unrefined minerals by adjusting the parameters of the formula.

In terms of the concept of 'rent', the studies discussed above all indicated that the royalty is a major rent-capturing instrument, while Cawood (1999) defined 'Mineral rent' as:

> "the present value of the future stream of net revenues that mineral deposits can generate over time, where net revenues are the difference between total revenues and total costs and costs include a competitive return on investment."

A comprehensive treatment of the concept of 'mineral rent' or 'resource rent' is provided in a handbook on Mining Royalties co-authored by Cawood (in Otto et al., 2006), which in turn drew on the work by Otto and Cordes (2002). Otto and Cordes (2002) defined rent as the difference between the existing market price of a commodity and the opportunity cost of producing it, where opportunity cost is a post-tax measure that includes a minimum return on investment. In linking rents to taxation, Otto and Cordes (*Ibid*.) argued that:

> "When the public owns subsurface mineral deposits, the government, as the representative for citizens, should capture a fair return for the depletion of national wealth in addition to regular taxation. One measure of a fair return is the differential value of a deposit (in terms of ore grade or extraction costs) compared to the marginal deposit currently in production. This measure is the definition of resource rent for a given deposit."

The South African mineral royalty seems to heed the above understanding through the utilisation of the variable rate based on profitability, because, as Land (2010) explained: "The rent potential of different resource deposits varies as a function of "quality". However, Otto and Cordes (2002) further argued that:

> "Rents, as a pure distributional surplus, should be collected as part of a tax on some definition of economic profits or rent tax or by imposing a higher tax on net income. Collecting rents as a factor payment, however, implies an assessment or appropriation

not based on profit. This assessment then becomes a cost in production accounting and taxation."

In this regard, the South African mineral royalty seems contradictory in that the tax base is gross sales and not profit, over which a minimum rate applies, regardless of profitability, and because the official understanding of the royalty seems to be that of a factor payment: a "rent on land" (National Treasury, 2015).

2.6 **The academic view:** Post-Implementation

After the promulgation of the MPRRA, Cawood (2010) introduced the new royalty in an academic paper providing a brief background to, and an explanation of its main features. Cawood (2010) did however note that: "Balancing the design considerations proved to be a very long and complex process in South Africa and political pressure caused the Act to perhaps become too complex with regards to the requirements of the gross sales base."

The first significant analysis of the mineral royalty is a concise paper by Van der Zwan and Nel (2010), wherein the royalty was conceptually analysed for potential unintended consequences. The authors stressed that the level of the royalties is not internationally competitive, as initially pointed out by Cawood and Macfarlane (2003), and that such levels could hypothetically "reduce the mineral extractor's profit before tax by between 10% and 14%", and discourage exploration (Van der Zwan and Nel, 2010).

Using hypothetical values, the authors also found that "in some instances, the legislation could result in higher mineral royalties on refined minerals than on unrefined minerals", and suggested that "the mechanism to promote downstream beneficiation be researched to establish whether the legislators ought to reconsider these provisions in the light of their impact on the mining industry" (*Ibid*.).

The same aspects of the royalty were subsequently assessed by Cawood (2011) to "establish the potential impact of mining royalties on State revenues, industry affordability, and explore whether the dual formula system is likely to encourage miners to become refiners." Cawood (2011) applied the royalty rates over historic financial results and illustrated affordability for the miner as well as significantly higher revenues for the state. However, by using historical datasets, one has to make the assumption that the incidence of the royalty, had it been implemented historically, would not have changed market behaviour.

Cawood (2011) pointed at this potentiality by looking at the impact on the gold pay limit[6], and showed that had the royalty been in force historically: "it would cause the pay limit to rise, thus causing a fall in production". Using Chamber of Mines gold mine data over fifteen years, Cawood estimated an increase in pay limit of 0.04g/t, causing a reserve reduction of 1.4%. Even though it seemed insignificant, Cawood (*Ibid*.) raised the concern that:

> "although an increase in the pay limit is not critical for already developed high-grade mines, the impact would be significant for mines that are already operating on or close to the average grade of their reserves. For mines that do not have ready-developed high grade reserves in stock, it would mean premature closure."

In terms of the question of promoting downstream beneficiation, Cawood's preliminary assessment, using magnitude of cost indices, indicated that "it is unlikely that the policy objective of value addition will be achieved under the current two formulae," and suggested that further "in-depth analysis using actual and mine specific information" (*Ibid*.) be conducted.

This was the aim of research by Oshokoya (2012), who modelled historic financials from Anglo American Platinum (Amplats), and found that:

> "it was more advantageous to the miner to produce concentrates and not refined products. Even in the case whereby significant royalty savings were obtained on the application of the royalty formula for refined products as opposed to that of unrefined products, these savings were eradicated on addition of on-going refinement capex. This indicated that the MPRR for refined products was a disincentive because value was destroyed as the miner-turned-refiner's profitability decreased the more."

Ndlovu (2014), Executive Head of Processing at Amplats, indicated the same; that in the platinum group metals (PGM) value chain, the "earliest logical exit is after concentrating to sell PGM concentrate", but that options are limited in that: "Limited short term tolling capacity is available – someone will have to deploy additional capacity or closure of existing mines to release current capacity."

The relation between the cost of additional capacity and the differential royalty rates lies at the heart of Oshokoya's probe in that it is "the government's objective to promote local beneficiation of South Africa's minerals for maximum economic benefit" (Oshokoya, 2012).

[6] Average grade at which an ore block can be mined to break even.

Oshokoya (2012) recommended that further research be conducted to assess how "the MPRRA regime would better facilitate the miner-turned-refiner to realise sufficiently more profits than the miner-only," and suggested inter alia that:

> "this could be achieved either by reducing the maximum rate; or manipulating the F-factor of 12.5 (which determines the maximum rate for refined rate); or manipulating the royalty base to allow for deduction of some costs (marketing, transport, other operating and/or capital) attributed to refining" (*Ibid*.).

Cawood (2011) also suggested that it "would perhaps be more effective to have one formula and allow the costs of refinement to be deducted from sales revenue [i.e. net smelter return, as per the recommendations of Cawood and Macfarlane (2003)]. Alternatively, factor *f* in the refined formula can be increased so that the maximum rate is significantly reduced."

This persuasion was reiterated in a response to the ANC's SIMS report's call for a Resource Rent Tax, wherein Cawood and Oshokoya (2013) argued that: "The existing fiscal instruments are adequate, but could be 'tweaked' so that the important economic linkages can be established and managed for accelerated benefit."

Van der Zwan (2013) also responded to the publication of the SIMS report with a paper assessing whether the royalty effectively balances the interests of stakeholders, and whether the royalty regime can be improved. He found that the royalties considerably increased the state's take, and suggested comparative research to assess whether South Africa is tax competitive.

However, in terms of the differential rates, Van der Zwan (2013) reiterated the observation by Van der Zwan and Nel (2010) that "in some instances, the legislation could result in higher mineral royalties on refined minerals than on unrefined minerals", but argued that this was not an insurmountable problem because:

> "an extractor who would be subject to a higher royalty on the transfer of the refined mineral resource than it would be on the unrefined mineral resource could structure its operations in a manner to avoid this. If the unrefined mineral is transferred by the extractor at an arm's length price to a related entity that refines the mineral, this should result in the royalty being imposed on the transfer of an unrefined mineral, even though refinement can still be done within South Africa and perhaps even by the same group of entities as the extractor" (Van der Zwan, 2013).

This reading implies an understanding of the unrefined rate as a kind of penalty; a concept also expressed by Oshokoya (2012) who stated that: “based on the provisions of the Act, refiners would contribute lesser than miners to fiscus. This implies the penalty that miners would pay for not beneficiating their products to specified levels”. Oshokoya (2012) also interpreted the differential rate as an incentive, as her research aims to assess whether “the regime’s provision of reduced rate for refined minerals is enough incentive to encourage mining companies to add-on establishment of beneficiation facilities.”

This sentiment is shared by Birch (2016) who mentioned that: “The difference between refined and unrefined rates was introduced to encourage companies to beneficiate the commodities”.

Following on Cawood’s (2011) preliminary assessment of the royalty’s impact on pay limit, the focus of Birch’s study (2016) was to model the impact of the royalty on cut-off grades. Birch argued that because the royalty is levied on sales, it “should be considered a cost and be taken into account in determining the cut-off grade.”

Based on this assumption, Birch found that, at a selection of Witwatersrand gold type deposits, “there is generally approximately a 1 g/t difference between the cut-off grade including mineral resource royalty and excluding mineral resource royalty” (*Ibid*.) Birch did however remark: “that the reductions in life-of-mine, gross sales, costs, profits and net present values caused by the royalty is not consistent.

Birch indicated that “each mine is affected by the mineral resource royalty in a different way, ranging from the minimal to the ‘very significant’, and suggested that:

> “a complete study should be conducted across all the mines to establish the impact of the introduction of the mineral resource royalty on the industry”, which “could then be used to guide future policy changes as proposed in the SIMS document” (*Ibid*.).

2.7 **The academic view:** A summary

As with the ‘official royalty literature’, the ‘academic royalty literature’ responded significantly to the publication of the State Intervention in the Minerals Sector (SIMS) report which called for the introduction of a Resource Rent Tax (RRT). Where the Davis Tax Committee (2015) likened the royalty to a RRT, Cawood and Oshokoya (2013) suggested that the royalty is in fact “a more efficient instrument for collecting resource rents than a RRT” in that:

> "with the royalties being at the first stream of income generation, capturing of the rent portion is not only calculated but assured from the beginning. This would be one example of sustained rent-capturing in a near-optimal manner" (*Ibid*.).

The official and academic literature are also in agreement that the royalty should remain. This is evident from Cawood and Oshokoya's (2013) argument that: "It will not be wise to replace existing law and policy instruments until there is a better understanding of the distinction between fact and public perception about the impact of the current system". The DTC also stated that the "mineral royalty charge is reasonably new and needs to be given a chance to prove itself." (DTC, 2015).

Setting the 'academic royalty literature' apart from the 'official royalty literature' however, is that the letter is concerned with measuring the impact of the royalty, and questioning whether it can be improved. What is missing from the royalty literature is that neither the incidence of the royalty, nor the technical soundness of the royalty are questioned.

2.8 Conclusion

This literature review has outlined the official and academic understandings of the royalty, from which the author identified the following conjectures:

1. The variable royalty rate provides equitable relief to marginal mines.
2. The variable royalty rate collects rent.
3. The differential royalty rates penalise mining and incentivise refining.
4. The royalty is a cost and will impact on cut-off grade.

The term 'conjecture' is used here as per the Concise Oxford Dictionary (1995) definition:

i. "The formation of an opinion on incomplete information"
ii. "(in textual criticism) the guessing of a reading not in the text"

The four conjectures identified here will be tested in chapter 4 by using the royalty formula as the 'text'. The following chapter illustrates the method of 'reading' the royalty formula.

CHAPTER THREE: METHOD

3.1 Introduction

A recurring theme identified in the literature review as per the previous chapter, is the call for more data:

- "More in depth analysis using actual and mine-specific information is required…" (Cawood, 2011).
- "…complete study should be conducted across all the mines to establish the impact" (Birch, 2016).
- "…there is little by way of data to measure its success at this stage" (DTC, 2015).

The author is however of the opinion that the structure of the royalty provides enough evidence to allow for a robust analysis. Of significant import is the profitability ratio (X), which is the quotient of earnings before interest and tax (EBIT) over gross sales. Since gross sales is the sum of EBIT and costs, the profitability ratio can serve as a proxy for costs, and since X is a ratio, it allows for the modelling and comparison of all profitability scenarios.

Furthermore, the author suggests that the determination of the impact of the royalty is not a question of data. Empirical research will inform one of the impact of the royalty *in conjunction with a host of other variables*, both seen and unseen. Using hypothetical case studies will inform one of hypothetical impacts. And by using historical data one has to assume that the incidence of the royalty, has it been implemented historically, would not have changed market behaviour.

The method proposed to determine the impact of the royalty, is to investigate the royalty formula itself; i.e. 'reading' the formula. The following sections restate the royalty formulae, and then compare it with the gold tax formula, from which the royalty borrows the profitability ratio.

3.2 **The Royalty unpacked:** Refined Minerals

The Mineral and Petroleum Resources Royalty Act (MPRRA, 2008) gives the royalty rate for refined minerals as:

$$Yr = 0.5 + \frac{EBIT}{12.5 * gross\ sales} * 100$$

Where Yr, expressed as a percentage, is the rate to be applied to gross sales to determine the royalty payable.

The formula can be stated in simpler form as:

$$Yr = 0.5 + \frac{8 * EBIT}{gross\ sales}$$ or as:

$$Yr = 0.5 + 8X \qquad \text{[Formula 1]}$$

Where X, the ratio of Earnings Before Interest and Tax over Gross Sales is the 'profitability ratio', stated as a number.

According to Kotze (1937), the design criteria for the profit to revenue sliding scale X, was to measure the 'relative richness' of the ore, and not value or profit.
Cawood (2010:204) restated the royalty rate formula as:

$$Yr = 0.5 + \frac{X}{12.5}$$

Where X is stated as a percentage.

The application of the formula reveals that it is in effect two separate flat tax rates simultaneously charged.

The royalty payable (Rr) is:

$$Rr = gross\ sales * Yr$$
$$Rr = gross\ sales * (0.5 + 8X)$$
$$Rr = 0.5\%\ gross\ sales + 8\%\ EBIT \qquad \text{[Formula 2]}$$

Van der Zwan and Nel (2010) and Van der Zwan (2013) also restated the formula as such, but did not expound on the significance of the fact that the royalty is in effect two flat rate levies.

If the royalty rate is measured against EBIT, as the measure for profit from where the royalty is indeed paid, it can be seen that the profitability ratio moves from numerator in Formula 1 to denominator in Formula 3. The royalty rate over EBIT thus is:

$$Yr_P = \frac{R}{EBIT}$$

$$Yr_P = \frac{0.5\%\ gross\ sales + 8\%\ EBIT}{EBIT}$$

$$Yr_P = 8 + \frac{0.5}{X} \qquad \text{[Formula 3]}$$

Where Yr_P *is* royalty rate over EBIT, and;
Where X is stated as a number.

Because a negative EBIT is assumed nil and because the royalty rate over gross sales for refined minerals is capped at 5% (MPRRA, 2008), the above formulas are correct for profitability (X) between 0% and 56.25%:

$$Yr = 0.5 + 8X$$

$$X = \frac{5 - 0.5}{8}$$

$$X = 56.25\%$$

3.3 **The Royalty unpacked:** Unrefined Minerals

The MPRRA (2008) gives the royalty rate for unrefined minerals as:

$$Yu = 0.5 + \frac{EBIT}{9 * gross\ sales} * 100$$

Where Yu, is the royalty rate for unrefined minerals, expressed as a percentage.
The formula can be stated in simpler form as:

$$Yu = 0.5 + 11.11X \qquad \text{[Formula 4]}$$

Where X is stated as a number.

The royalty payable (Ru) for unrefined minerals is:

$$Ru = 0.5\%\ gross\ sales + 11.11\%\ EBIT \qquad \text{[Formula 5]}$$

It can be seen that the royalty is in fact two separate flat rates simultaneously charged.

The royalty rate over EBIT for unrefined minerals is:

$$Yup = 11.11 + \frac{0.5}{X} \qquad \text{[Formula 6]}$$

Where Yup, is the royalty rate for unrefined minerals over EBIT, expressed as a percentage. Where X is stated as a number.

Because a negative EBIT is assumed nil and because the royalty rate over gross sales for unrefined minerals is capped at 7% (MPRRA, 2008), the above formulas are correct for profitability (X) between 0% and 58.5%:

3.4 **The Royalty unpacked:** Preliminary Findings

Of particular importance to the current investigation is Formulas 2 and 5, which indicate that the royalty is two separate flat tax rates simultaneously charged. While restating the royalty in this manner should not affect the accounting treatment of the royalty, it illustrates that the static charge on profits in effect raises the corporate income tax (CIT) rate.

Let P denote EBIT, or profit before royalty, and G denote gross sales, then profit after royalty P' is given by:

$$P' = P - (8\%\ P + 0.5\%\ G)$$
$$P' = 92\%\ P - 0.5\%\ G$$

So, tax after royalty, $T\text{-}r$:

$$T\text{-}r = 28\%(92\%\ P - 0.5\%\ G)$$

And total effective tax Tt payable:

$$Tt = T\text{-}r + Rr$$

Where Rr is royalty payable as per Formula 2, then:

$$Tt = 28\%(92\% P - 0.5\% G) + (8\% P + 0.5\% G)$$

$$Tt = 33.76\% P + 0.36\% G$$

For unrefined:

$$Tt = 28\%(88.88\% P - 0.5\% G) + (11.11\% P + 0.5\% G)$$

$$Tt = 36\% P + 0.36\% G$$

For refined minerals, the CIT rate is effectively raised from 28% to 33.76%, and for unrefined minerals, from 28% to 36%. While this treatment is correct in terms of the rates applicable, it should be noted that whereas CIT allows the deduction of interest payments, the royalty does not.

Another preliminary observation from stating the royalty as two flat tax rates is that only at a certain profitability will the charge payable on profits exceed the charge payable on sales. For refined minerals, the point where royalty payable on profits equals royalty payable on sales is where:

$$8\% \, EBIT = 0.5\% \, gross \, sales$$

And since: $EBIT = gross \, sales * X$

$$8\% \, (gross \, sales * X) = 0.5\% \, gross \, sales$$

$$X = 6.25\%$$

For unrefined minerals:

$$11.11\% \, (gross \, sales * X) = 0.5\% \, gross \, sales$$

$$X = 4.5\ \%$$

Thus, for refined minerals at profitability rates below 6.25%, the royalty targets revenue, while for unrefined minerals, the royalty targets revenue below profitability rates of 4.5%. This seems contradictory to the stated intent of the differential royalty rates:

> "The key difference between both the refined versus the unrefined formulae lies in the 9 versus 12.5 constants. The two constants effectively seek to neutralise some of the difference between the different refined versus unrefined mineral bases. Refined mineral resources have higher gross sales (tax base) than unrefined minerals because

more value addition occurs as minerals are refined. The higher 12,5 constant seeks to offset this higher refined base" (National Treasury, 2008).

An intuitive reading of this contradiction is that the differential rates are applied over the wrong part of the formula; that the differentiation should instead be on the 0.5% of sales.

The impact of the 0.5% charge on sales can be illustrated by plotting Formulas 4 and 6 over the full range of profitability scenarios (Figure 3.4-1.):

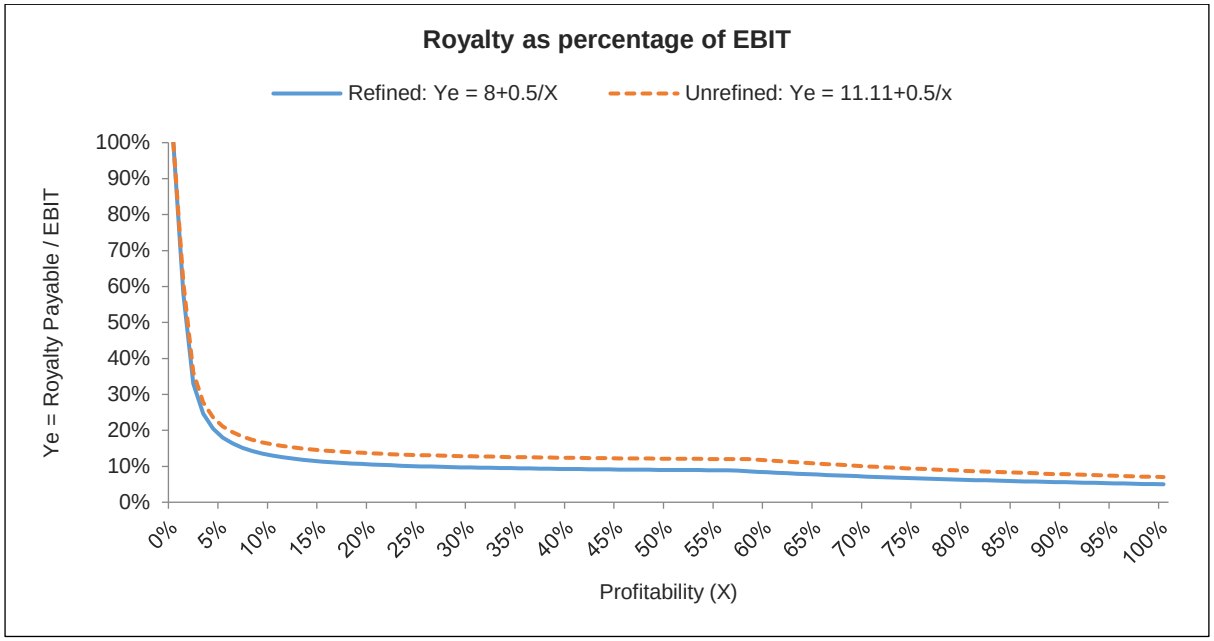


Figure 3.4 - 1. Royalty rate over EBIT illustrates a regressive tax. Source: Kemp (2016).

From Figure 3.4-1, it can be seen that the state's share of profits is considerably higher at the margin, and lower as profit increases, which, according to Land (2010:246) is the definition of a regressive tax.

Based on these preliminary insights, the author suggests that the profitability rates of 4.5% and 6.25% may be useful when looking for a definition of 'marginal'.

Finally, restating the royalty as two flat rates allows one to compare it with the gold tax, from which the royalty formula borrows the profitability ratio.

3.5 Application of the method to test the impact of the royalty on the gold tax

The current gold tax formula is:

$$Y = 34 - \frac{170}{X} \qquad \text{(SARS, 2015)}$$

Where X represents the ratio of profit over revenue, stated as a percentage.

The tax payable (T) is:

$$T = profit * (34 - \frac{170 * revenue}{profit})$$

$$T = 34\% * (profit - 5\% \ revenue)$$

$$T = 34\% \ profit - 1.7\% \ revenue \qquad \text{[Formula 7]}$$

In other words, tax amounts to 34% of taxable profit, to the extent that profit exceeds 5% of revenue, the so-called 'tax-tunnel'. According to Van Blerck (1992) this "indicates the fact that the formula is simply a flat tax rate, subject to a depletion allowance." This compares to the royalty payable:

$$Rr = 0.5\% \ gross \ sales + 8\% \ EBIT \qquad \text{[Formula 2]}$$

To borrow Van Blerck's terminology; the mineral royalty is simply a flat tax rate, in addition to a depletion charge. This combination of a depletion allowance and a depletion charge creates a tax distortion; which can be illustrated by plotting the combined effect of the royalty and the gold tax in comparison to the royalty and the gold tax only in Figure 3.5-1.:

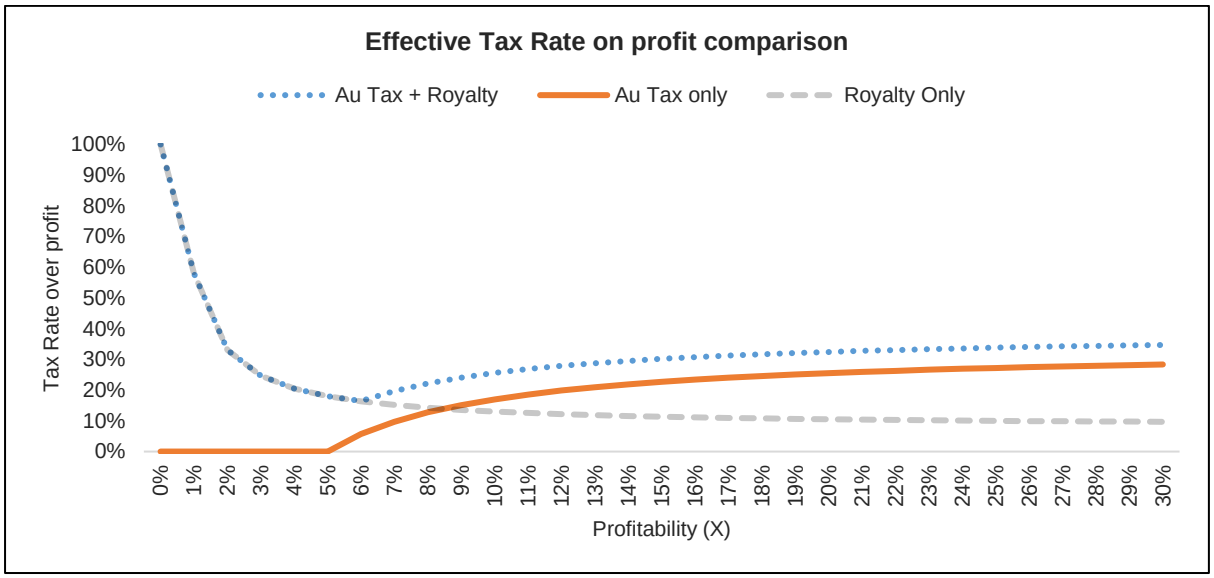


Figure 3.5 - 1 Tax Rate on Profit comparison. Source: Kemp (2016).

From the graph, it is evident that the combined tax is equal to the royalty tax up to an approximate profitability of 6%, from where the combined tax follows the gold tax inflated by the royalty. This is because of the combination of the 'tax tunnel' depletion allowance combined with the royalty 'depletion charge'.

It is also evident that gold mines pay no income tax before the approximate profitability of 6%. Because the royalty paid is an allowable deduction for income tax determination, the exact point where income tax becomes payable is where the tax tunnel from the gold formula fully absorbs the royalty. It is derived from tax payable on the current gold tax formula 7:

$$T\text{-}r = 34\%\ P' - 1.7\%\ G$$

Where $T\text{-}r$ represents income tax payable after royalty, P' represents EBIT after royalty, and G; revenue.

For our present purpose the terms profit (or taxable income) for the gold tax, and EBIT for the royalty, is considered equivalent. It should however be kept in mind that whereas the gold tax allows the deduction of interest payments, the royalty do not.

Profit after royalty is given by:

$$P' = P - (8\%\ EBIT + 0.5\%\ gross\ sales)$$

Or: $$P' = P - (8\%\ P + 0.5\%\ G)$$

$$P' = 92\%\ P - 0.5\%\ G$$

So: $$T\text{-}r = 34\%(92\%\ P - 0.5\%\ G) - 1.7\%\ G$$

$$T\text{-}r = 31.28\%\ P - 1.87\%\ G$$

$$T\text{-}r = 31.28\%\ (P - 5.978\%\ G)$$

The effective rate on EBIT thus is:

$$Y\text{-}r = \frac{31.28\%\ (P - 5.978\%\ G)}{P}$$

Or: $$Y\text{-}r = 31.28 - \frac{(31.28)(5.978)}{X}$$ when X is expressed as a percentage.

From the above formula it is evident that no income tax will be payable where X is smaller or equal to 5.978, that is, at profitability up to 5.978%, gold mines pay no income tax.
The combined tax payable thereafter (Tt) is simply the sum of $T\text{-}r$ and R:

$$Tt = 31.28\%\ P - 1.87\%\ G + 0.5\%\ G + 8\%\ P$$

$$Tt = 39.28\%\ P - 1.37\%\ G$$

$$Tt = 39.28\%\ (P - 3.487\%\ G)$$

And the effective rate on profit is:

$$Yt = \frac{39.28\%\ (P - 3.487\%\ G)}{P}$$

Or: $$Yt = 39.28 - \frac{(39.28)(3.487)}{X}$$

Or: $$Yt = 39.28 - \frac{137}{X}$$

Or: $$Yt \approx 39 - \frac{137}{X}$$ [Formula 8]

The above combined gold tax and royalty formula is correct for profitability between 6% and a nearly impossible 56%, where after the refined royalty tax is capped. Plotted in Figure 3.5-2., the formula appears thus:

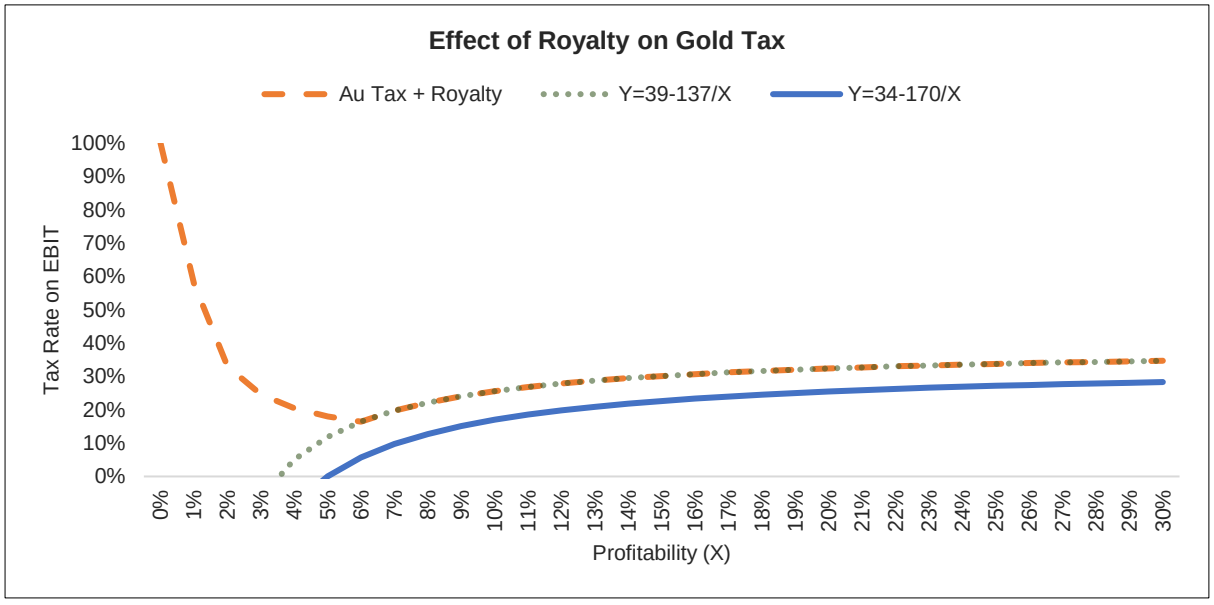


Figure 3.5 - 2. Effect of Royalty on the Gold Tax. Source: Kemp (2016).

The impairment to the original gold tax formula by the introduction of the royalty is evident from the graph (Figure 3.5-2.); where for instance, a mine with a profitability of 2% pays the

same effective rate as a mine with a profitability of 22%. This contradicts the design criteria of the profitability ratio; which was to measure the 'relative richness' of the ore (Kotze,1937).

Also note, that instead of a tax tunnel, there is now a 'tax pit', where between profitabilities of 3% and 12%, gold mines will pay lower effective combined tax rates than the corporate income tax of 28%.

In regards to the structure of the gold tax formula, Luttrell-West (1947:176) explained that:

> "this type of formula, which has also been used as a basis of lease consideration for many years, has caused considerable misunderstanding, mainly because its true significance from a taxation point of view has never been expressed. In fact, about three years ago, the writer [Luttrell-West] had the privilege of discussing the origin of this type of formula with its author [Kotze], and learned that the design was governed mainly by the *purely mathematical concept of a suitably shaped curve* with the proviso that as far as possible the incidence of the rate should not be the cause of inefficient mining" [Kemp's emphasis].

According to Cloete and Van Rensburg (1984), the gold tax is a variant of a resource rent tax (RRT) in that higher profitability leads to higher tax rates. Considerations fundamental to its development were:

- "To maximise the utilization of the patrimony of the country, the mining of lower grade ores was emphasised.
- Any tax hastening the closure of mines producing at low levels of profitability was to be avoided.
- The tax system had to be equitable regarding all ore grades and mines. Intra-marginal mines were to provide the risk premium and the state's share of profits" (*Ibid*.: 1984:265).

Van Blerck (1994) argued that:

> "the gold-tax formula system has proved its worth, providing automatic support to the gold industry in times of difficulty, earning an automatic premium for the State in times of high profitability, and lowering economic ore grades for the good of the country as a whole."

It is significant that the current royalty purports to aspire to achieve the same goals as the gold tax, as evinced from the literature review in chapter 2, especially in regard to:

> "automatic royalty liability relief for marginal mines. At the same time, the variable royalty percentage rates provide Government with additional income during times of high commodity prices" (National Treasury, 2008).

However, given the contradictory shapes as plotted in Figure 3.5-3., it must be acknowledged that at least one of the tax formulas will not achieve these goals.

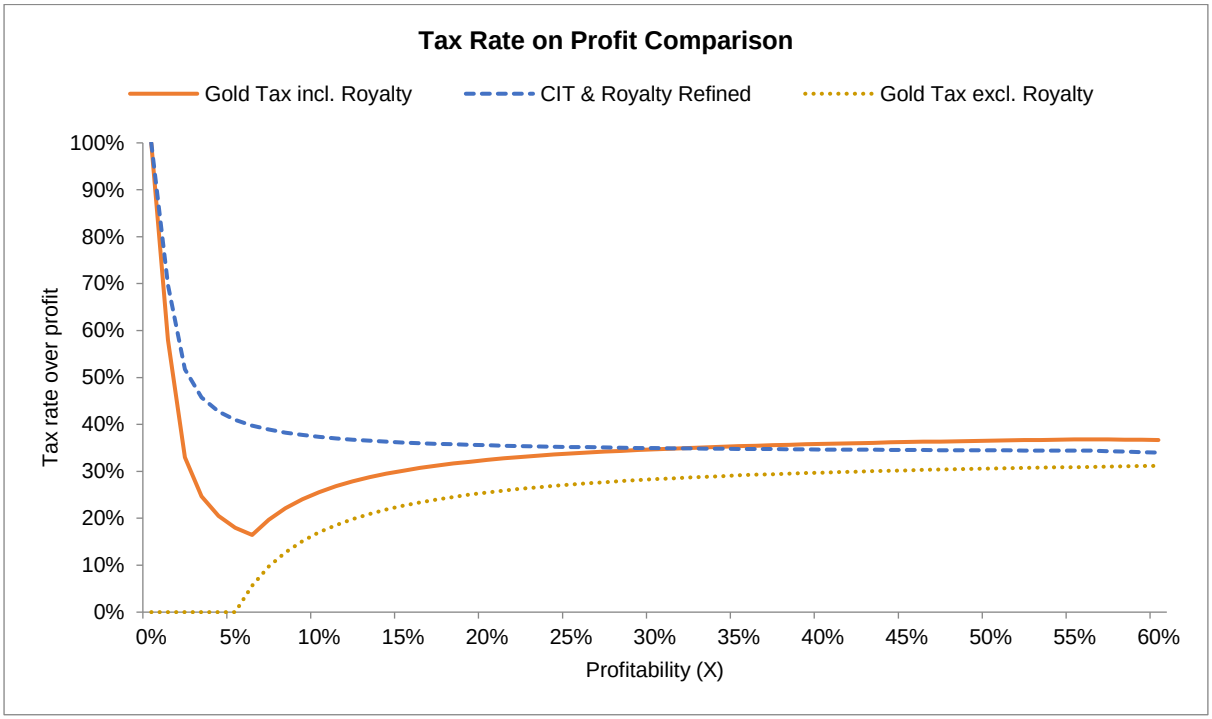


Figure 3.5 - 3. Comparison of gold tax, gold tax including royalty, and non-gold refined. Source: Kemp (2016).

Another advantage of the gold tax formula is highlighted by Van Blerck (1994):

> "The automatic premium factor in times of high profitability also reduces the temptation for government to impose surcharges in such periods… thus promoting certainty and stability in the eyes of investors, local and foreign".

At the hand of this investigation, the incidence of the royalty appears not only to be a surcharge, but one that imposes a premium during marginality.

3.6 Conclusion

This chapter introduced a method to investigate the impact of the royalty and illustrated that a considerable amount can be learned from the royalty formula itself. The royalty rate formula was shown to be two flat rates simultaneously charged. The preliminary finding indicated that:

- the royalty tax is regressive;
- the royalty raised the effective Income Tax from 28% to % to 33.76% for refined minerals, and for unrefined minerals from 28% to 36%; and
- the differential royalty rates between refined and unrefined minerals are applied over the wrong part of the formula.

Application of the method to test the royalty's impact on the gold tax has revealed that:

- Gold mines do not pay income tax up to a profitability of 5.978%, from the historic 5%.
- The combination of income tax and royalty beyond this was stated as: $Yt = 39 - \frac{137}{X}$, which compares against the gold tax of $Y = 34 - \frac{170}{X}$
- Instead of the historic 'tax tunnel', gold mines now enjoy a 'tax pit.'

While the royalty literature largely corresponds with the gold tax literature in terms of the purpose and intents of the respective tax formulas, the shape of the royalty formula pointedly contradicts the shape of the gold tax formula.

This contradiction will be discussed in chapter 5. The following chapter applies the method introduced in chapter 3 to test the conjectures identified in the literature review.

CHAPTER FOUR: ANALYSIS

4.1 Introduction

From the literature review, the author has identified a number of opinions around the royalty that have not been confirmed as fact. The method of 'reading' the royalty, introduced in the previous chapter, will be used in this chapter to test the following conjectures:

1. The variable royalty rate provides equitable relief to marginal mines.
2. The variable royalty rate collects rent.
3. The differential royalty rates penalise mining / incentivise refining.
4. The royalty is a cost and will impact on cut-off grade.

While conjectures 3 and 4 have been the focus of prior research, notably Oshokoya (2012) and Birch (2016), it is again questioned here through the method proposed. The first two conjectures have not been questioned in the literature identified, and this will be the major contribution of this current investigation.

4.2 **Conjecture 1**: The variable royalty rates provide equitable relief to marginal mines

This conjecture is presented in the form of an argument. The Explanatory Memorandum to the MPRRA states that Earnings before Interest and Tax (EBIT) and Gross Sales are 'the parameters' that "ensure that the royalty percentage rate varies according to the profitability of a mine" (National Treasury, 2008). It then states that: "A formula approach was used for setting these rates as opposed to utilising flat rates (e.g. a flat 3 per cent), thereby making these rates adjustable in light of business conditions." (Ibid.)

As conclusion to the premise it states that "the formulae provide equitable relief for mines during marginality (e.g. during start-up operations, when a mine is at the end of its life span or during times of low commodity prices) while at the same time providing the fiscus with higher revenue potential when more favourable economic conditions exist (e.g. commodity booms and high grade mines)" (Ibid.)

In relation to the premise on the parameters that informs the profit to revenue ratio, it may be noted that while it is a profitability measure, it is also used to derive a rate to be applied over revenue, as opposed to profit, as is the case with the gold tax.

In relation to the second premise, it was shown in the preliminary finding in chapter 3 that the formula is in fact two flat rate levies simultaneously charged. The rates as such do not vary; it is profitability that varies, and with it the combined rates.

Figure 4.2-1. illustrates that even a flat tax rate of 28% for the corporate income tax (CIT), also varies progressively with profitability when measured over sales, as opposed to profit.

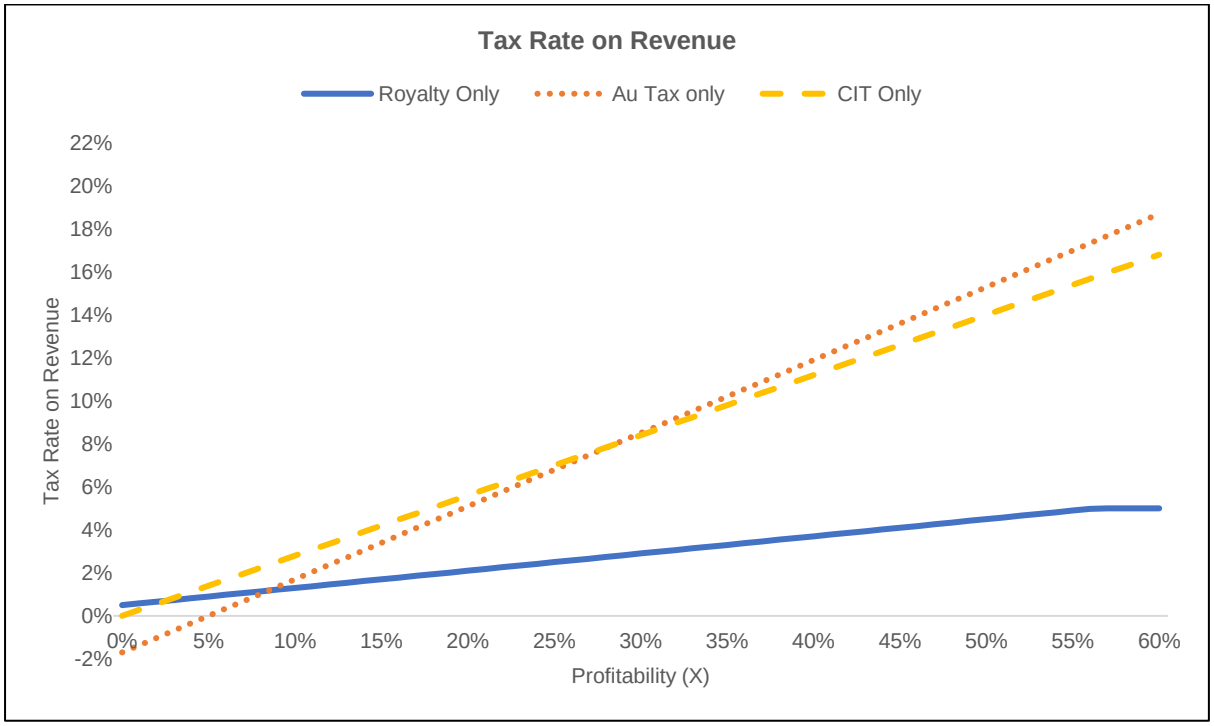
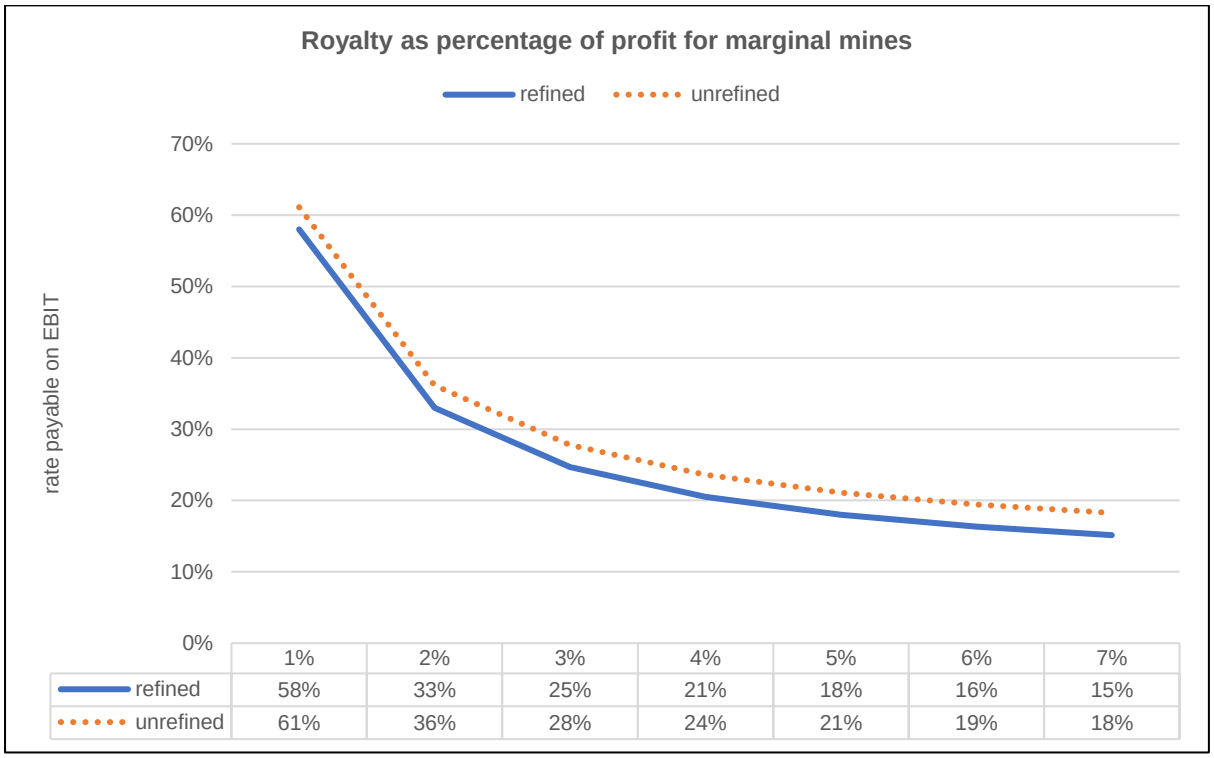


Figure 4.2 - 1. Royalty rate over sales. Source: Kemp (2016).

It can be noted from Figure 4.2-1 that the gradient for the refined minerals royalty is 8%, and the intercept on the y axis is 0.5%, as per Formula 2. The gradient for the gold tax is 34% and the intercept is minus 1.7%, as per formula 7. The gradient for CIT is of course 28%; which exposes the faulty logic behind the conjecture that a “formula approach was used for setting these rates as opposed to utilising flat rates (e.g. a flat 3 per cent), thereby making these rates adjustable in light of business conditions” (National Treasury, 2008).

Since the profitability ratio is a measure of a mine's ability to pay, the test for 'equitable relief for marginal mines' needs to be applied over profit, not sales.

The regressive shape of the royalty was illustrated in Figure 3.4-1 in chapter 3. If one zooms in to marginal level, as illustrated in Figure 4.2-2., it is clear that the royalty disregards profitability.



	1%	2%	3%	4%	5%	6%	7%
refined	58%	33%	25%	21%	18%	16%	15%
unrefined	61%	36%	28%	24%	21%	19%	18%

Figure 4.2 - 2. Royalty rate on EBIT at the margin. Source: Kemp (2016).

In chapter 3 section 4, it was suggested that profitability of 6.25% for refined minerals, and 4.5% for unrefined minerals may serve as definitions of marginality, since that below these ratios a higher portion of the royalty is paid from sales as opposed to EBIT. The royalty rate over profit for refined minerals at 6.25% is:

$$Yr_P = 8 + \frac{0.5}{X} \qquad \text{[Formula 3]}$$

$$Yr_P = 16\%$$

At maximum profitability of 56.25%, where after the royalty rate is capped, tax payable as a percentage of profit is 8.88% The marginal mine therefore pays 82% higher a rate than a highly profitable mine.

For marginal unrefined minerals, the royalty rate over profit at 4.5% profitability is:

$$Yup = 11.11 + \frac{0.5}{X} \qquad \text{[Formula 6]}$$

$$Yup = 22.22\%$$

This compares with the rate at maximum profitability of 58.8% of 11.96%. Hence, the marginal unrefined operation pays 86% higher a rate than a highly profitable one.

Based on the above, it can be inferred that the state's share of industry profits will be higher during times of marginality. This can be illustrated by assuming a normal distribution of profitability, and assuming 10% mean industry profitability during times of low commodity prices, and 30% mean industry profitability during times of high commodity prices. Figure 4.2-3 illustrates the distributions of profitability during a slump and a boom, and Figure 4.2-4 illustrates the state's share of industry profits during such a slump compared to its share during such boom.

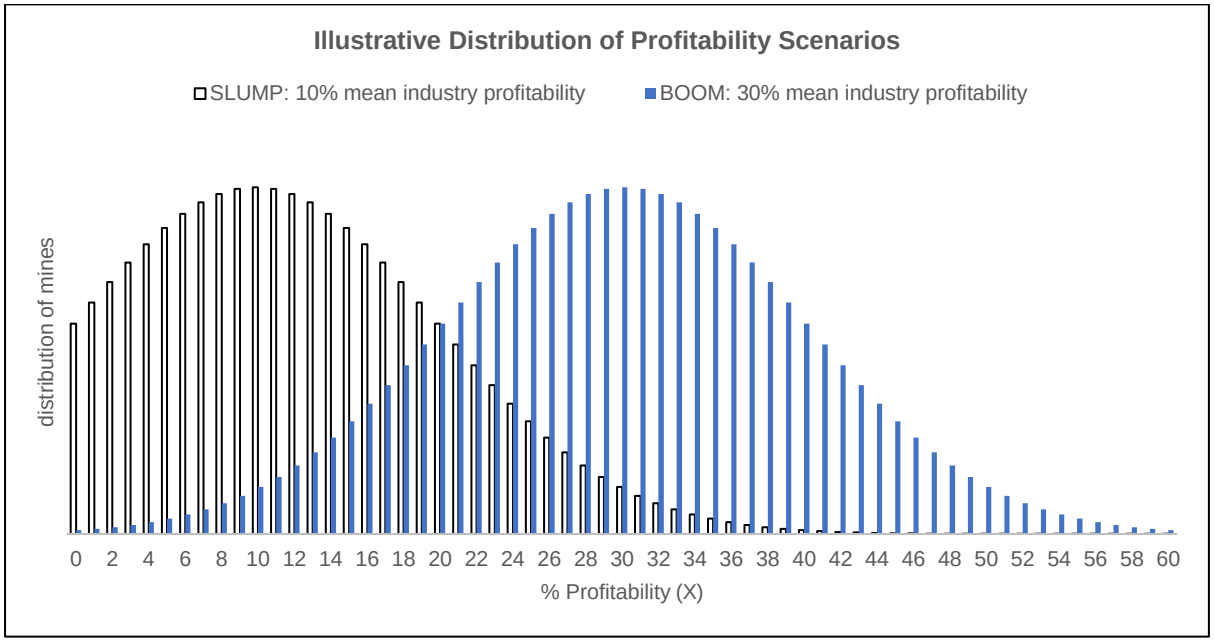


Figure 4.2 - 3. Distribution of profitability during a slump and a boom. Source: Kemp (2016).

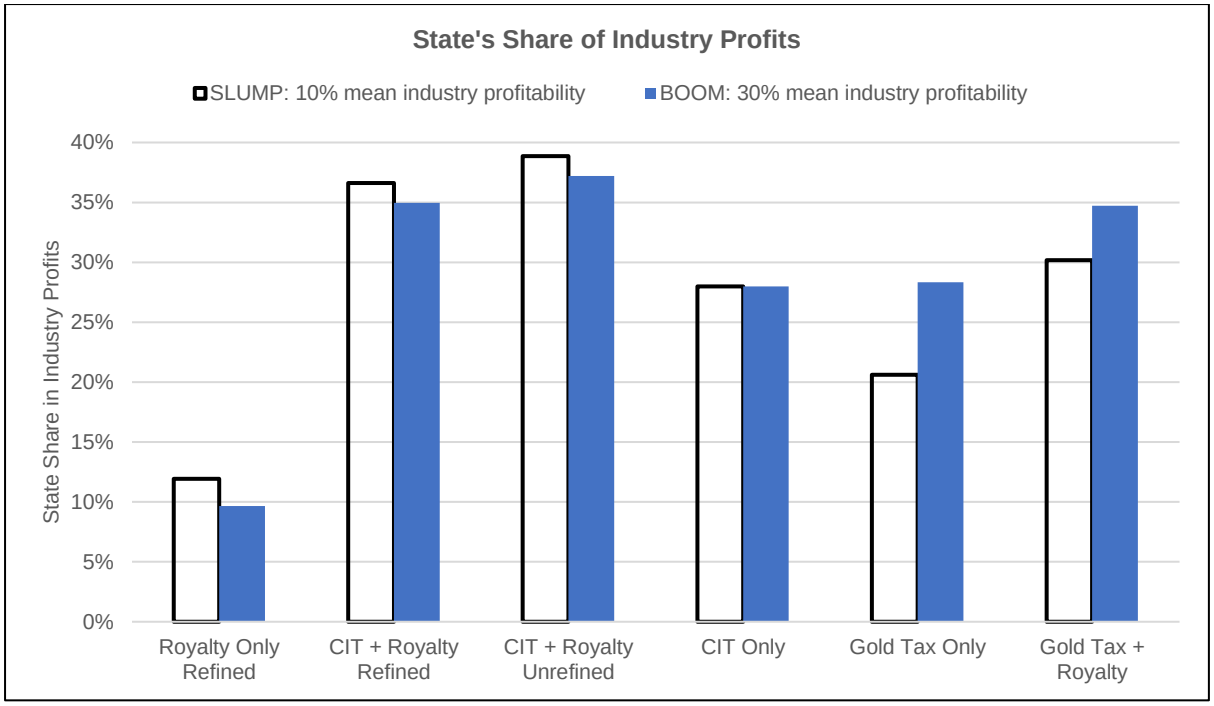


Figure 4.2 - 4. Comparison of state's take during a slump and a boom. Source: Kemp (2016).

From Figure 4.2-4, it is apparent that the state's take is higher during times of marginality, and that the royalty, in contradiction to its stated intents, provide royalty relief for profitable mines, as opposed to marginal ones. It is also noteworthy that the gold tax performs as per its stated claims, but that the incidence of the royalty narrows the difference between gold tax rate relief during the slump and higher taxation during the boom.

This finding confirms that the variable royalty rates do not provide equitable relief to marginal mines. It also casts doubt over the claim that the royalty collects rent.

4.3 **Conjecture 2:** The variable royalty rate collects rent.

From the literature review, it was learnt that:

- "the royalty is responsive to different economic circumstances, capturing rents when profits are high" (DTC, 2015)
- "within a certain profitability range the rate formula is designed to capture rents" (*Ibid*.).
- "with the royalties being at the first stream of income generation, capturing of the rent portion is not only calculated but assured from the beginning. This would be one

example of sustained rent-capturing in a near-optimal manner" (Cawood and Oshokoya, 2013).

This 'rent portion' is the flat 8% charge on EBIT for refined, which is the slope parameter when the royalty rate is plotted over gross sales, as illustrated in Figure 4.2-1. When both the minimum portion and 'rent portion' for refined minerals are plotted over EBIT in Figure 4.3-1. below, it can be seen that the cause for the regressive slope is the minimum charge of 0.5% of sales, and that the 8% flat charge is exactly that; flat. The question is whether it collects 'rent', which in turn is a question of what is being meant when using the term 'rent'.

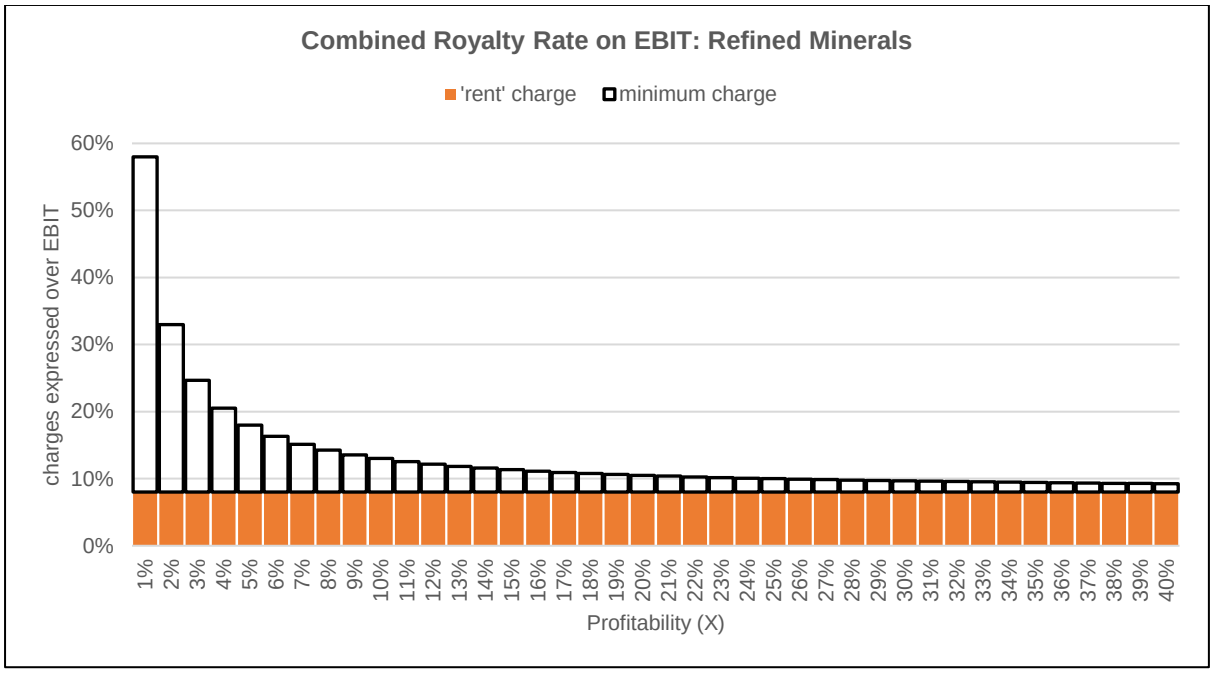


Figure 4.3 - 1. Combined Royalty Rate on EBIT for refined minerals. Source: Kemp (2016).

4.3.1 **Conjecture 2:** Towards a definition of 'rent'.

In order to investigate the concept of 'rent,' it is important to first recognise that the incidence of the royalty revolves around the question of ownership. This was indeed the purpose of the royalty in giving effect to section 3(2)(b) of the MPRDA, which stated that:

"As the custodian of the nation's mineral and petroleum resources, the State, acting through the Minister, may – in consultation with the Minister of Finance, determine

> and levy, any fee or consideration payable in terms of any relevant Act of Parliament" (MPRDA, 2002).

This 'levy' is the royalty which "provides for the compensation to the State (as custodian) for the country's permanent loss of nonrenewable resources" (National Treasury, 2008).

However, in the case between Agri South Africa and the Minister of Minerals and Energy, Chief Justice Mogoeng argued that: "The MPRDA makes no provision for the state to be a beneficiary of the new mineral and petroleum dispensation," and that:

> "it is not necessary to define the word "custodian". What is however clear is that, whatever "custodian" means, it does not mean that the state has acquired and thus has become owner of the mineral rights concerned" (ZACC, 2013).

Chief Justice Mogoeng concluded that: "There can be no expropriation in circumstances where deprivation does not result in property being acquired by the state" (*Ibid*.).

However, according to Otto et al. (2006), the justification for a royalty may be to "either obtain compensation for the permanent loss of a nonrenewable national resource (that is, an ownership transfer tax), or generate revenue in return for the government's permission to mine (a use tax)."

The question is whether Chief Justice Mogoeng would have come to the same conclusion had he known that the South African royalty was designed to collect both an ownership transfer tax and a use tax. Prior to the nationalisation of mineral rights by the MPRDA in 2002 and prior to the implementation of the royalty in 2010, Cawood and Minnit (2001) identified that:

> "The proposed mineral rights system described in the White Paper, through the reservation of the state's 'right to mine' principle, suggests two layers of compensation. The formula [proposed by Cawood and Minnit, (*Ibid*.)] provides for sharing the benefits between the owner of the mineral resource and the state, who has the right to mine these minerals."

According to Cawood and Minnit (*Ibid*.), the minimum portion of the royalty was to compensate the owner of the resource, and the surplus portion, based on a measure of profitability, was to compensate the state. Since then, private ownership of the mineral resource has been abolished through the MPRDA, but the two layers of compensation remain.

In the minority report to the Chief Justice Mogoeng judgement, Justice Froneman argued:

> "But even if acquisition is a necessary requirement for expropriation, as the main judgment holds, I do not see how it can be avoided that the state acquired, in a material and substantive sense, at least some of the power and competencies that previously vested in private ownership… In ordinary language that means that the money that the owner would have received under the Minerals Act is now kept by the state. To me that looks like the acquisition of the benefit by the state" (ZACC, 2013).

If the royalty is understood in this sense, which seems to be the understanding of National Treasury as it classifies the royalty as a non-tax revenue under 'rent on land' (National Treasury, inter alia 2015:190), then the concept of 'rent' can be understood in its traditional sense as a payment to an owner or landlord for the use of land. Therefore, as to the question whether the royalty collects rent, the answer must be in the affirmative; with the state as landlord and the mine as tenant.

This understanding of rent will however not only cast doubt on the Chief Justice Mogoeng judgement, but may also affect the accounting treatment of royalties under IFRS16 proposed by the International Accounting Standards Board. Under the new standard, tenants will be required to recognise lease assets and liabilities on the balance sheet, measured at present value of unavoidable future lease payments, and recognise depreciation of lease assets and interest on lease liabilities on the income statement over the lease term (IASB, 2016). The depreciation of lease assets will be the payment of the royalty, which would cause a rather bizarre contradiction, as depreciation is an allowable deduction in determining the royalty rate.

On the other hand, if Chief Justice Mogoeng's judgement holds, then the royalty cannot be regarded as a lease payment, and an alternative understanding of 'rent' is required.

Otto et al. (2006) described 'rents' as "gifts or payments for which recipients contribute nothing," and in the literature, this is variably referred as 'economic rent', 'mineral rent', or, as per the Minister of Finance: "royalties are regarded as non-tax revenues, as they are a 'resource rent' rather than a tax" (National Assembly, 2011).

From the perspective of the owner of the resource – the state (as custodian), the royalties received can be classified as 'resource rents' in that they indeed are "gifts or payments for which recipients contribute nothing". One may therefore be inclined to describe the royalty as

a ‘rent-seeking’ mechanism, which Congleton et al. (2008) defined as “the rational decision to invest in contesting pre-existing wealth or income, rather than undertaking productive activity.”

From the perspective of the owner of the mine, however, ‘resource rents’ may be defined as: “Revenues in excess of all necessary costs of production including the minimum rate of return to capital (sometimes “super-normal profits”)” (IMF, 2015), or:

> “Resource rents represent surplus revenues from a deposit after deducting costs (exploration, development, and extraction) and a normal rate of return to capital (includes a risk free component and a risk premium that compensates a risk-averse investor for the risks incurred in the activity)” (National Treasury, 2013).

The argument for the taxation of such rents is that they are solely the products of earth’s parsimony. According to Land (2010): “The case for rent taxes reflect three attributes of exhaustible resources”:

- “their relative fixity in supply, at least once discovered (generating Hotelling rent[7]),
- the differing qualities of deposits (generating ‘Ricardian rent’); and
- the notion that somehow property rights to a nation’s resources are at least partly owned collectively” (*Ibid*.).

The South African mineral royalty seems to acknowledge the ‘fixity in supply’ attribute of mineral resources through the concept of compensation for the “country’s permanent loss of nonrenewable resources.” However, any opportunities for Hotelling rent was abolished by the ‘use-it-or-lose-it’ principle embodied in the MPRDA.

According to Chief Justice Mogoeng: “The free or unregulated right to sterilise mineral rights was terminated with effect from 1 May 2004” (ZACC, 2015), when the MPRDA abolished the private ownership of natural resources. Chief Justice Mogoeng argued that this right, “otherwise known as the entitlement not to sell or exploit minerals”, gave holders “the latitude to sterilise mineral rights for as long as they wanted to and benefit from their value-enhancing effect on the land” (Ibid.).

[7] A static model indicating that the rate of change in the price of a non-renewable resource should equal the rate of change in the interest rate, so that in a rising price environment higher net present values can be realised if extraction is postponed. The optimal rate of extraction is under monopoly.

In terms of the attribute of “differing qualities of deposits (generating ‘Ricardian rent’)” (Land, 2010), the mineral royalty purports to “marginally increase the rate of taxation depending on the profitability of the mine. In other words, within a certain profitability range the rate formula is designed to capture rents” (DTC, 2015).

This understanding seems to be in line with the suggestion by Otto and Cordes (2002) that :

> “One measure of a fair return is the differential value of a deposit (in terms of ore grade or extraction costs) compared to the marginal deposit currently in production. This measure is the definition of resource rent for a given deposit”.

However, the royalty does no such thing, as evinced by formulae 2 and 5, and illustrated in Figure 4.3-1. If its intent is to capture rents, it may capture such portion that is rent under 8% of EBIT for refined minerals and 11.11% of EBIT for unrefined minerals, regardless of profitability, which once again raises the question of whether it does.

According to Otto and Cordes (2002): “Rents, as a pure distributional surplus, should be collected as part of a tax on some definition of economic profits or rent tax or by imposing a higher tax on net income.” And according to Harman and Guj (2013):

> “it is not necessary to devise a special taxation regime to collect economic rents. The company income tax has a tax base of company profits that includes both normal profit and any economic rent, and so this tax collects some economic rents.”

As was shown in section 3.4 of chapter 3, the royalty did effectively raise the corporate income tax for refined minerals from 28% to 34%, and for unrefined minerals from 28% to 36%.

However, even here the royalty fails the test as a rent collection mechanism on two counts. Firstly, the royalty formula disregards interest payments as a deductible cost, and it has to be submitted that there is no definition of economic rent that allows the cost of debt to be disregarded.

Secondly, the suggestion that rents exist at net income (as given by Otto and Cordes, 2002; and Harman and Guj, 2013), do not acknowledge the fact that from the perspective of the owner of the mine, any distributional surplus can only ever exist as dividends, when distributed, or when distributional surpluses are retained, as capital gains. There is thus

another layer of charges to be taken into account before one can arrive at the 'minimum rate of return to capital' required; namely the dividend withholding tax and the capital gains tax.

Furthermore, in South Africa, the original owners of the mine, who provided 100% of equity, was further subjected to dilution through a 26% equity divesture, otherwise known as Black Economic Empowerment (BEE). According to the Davis Tax Committee (2015):

> "Whilst government is not the intended beneficiary of BEE or B-BBEE largesse, the compulsory transfer of equity stakes of businesses (in all its manifestations) to previously disadvantaged persons comes at an undeniable cost to business, a cost which from the perspective of business is akin to a tax"

It is submitted that a minimum rate of return is an after-tax measure, and that 'rent' only exists when after tax profits exceeds the cost of equity.

This can be illustrated by conceiving of an all-equity funded refined minerals operation, assuming all distributable profits distributed, and ignoring nuisance taxes, then the equity providers' profits, Opr, after deducting 0.5% of gross sales, 8% of EBIT, 28% income tax, 26% equity divesture, and 15% dividend withholding tax (DWT), can be stated as:

$$Opr \approx 85\% \{74\% [72\% (92\% EBIT - 0.5\% gross\ sales)]\}$$

$$Opr \approx 41.6\% EBIT - 0.23\% gross\ sales \qquad \text{[Formula 9]}$$

For unrefined minerals, the equity providers' profits, Opu, is:

$$Opu \approx 85\% \{74\% [72\% (88.88\% EBIT - 0.5\% gross\ sales)]\}$$

$$Opu \approx 40.2\% EBIT - 0.23\% gross\ sales \qquad \text{[Formula 10]}$$

These can be restated as the equity providers' share of EBIT, Drr:

$$Drr \approx \frac{42\% EBIT - 0.23\% gross\ sales}{EBIT}$$

$$Drr \approx 42 - \frac{23}{X} \qquad \text{[Formula 11]}$$

Where X is stated as a percentage.

And for unrefined minerals, the equity providers' share of EBIT, Dru, is:

$$Dru \approx 40 - \frac{23}{X} \qquad \text{[Formula 12]}$$

Where X is stated as a percentage.

In the absence of the royalty, the equity providers' share of profits, $Op\text{-}r$, can be stated as:

$$Op\text{-}r \approx 85\% \{74\% [72\% EBIT]\}$$

$$Dr\text{-}r \approx 45\%$$

It can be seen that in the absence of the 0.5% charge on revenue, profit keep for refined minerals is 8% lower after the royalty, and for unrefined minerals 11.11% - the so-called rent portion.

When the revenue charge is included, owners of profitable operations share in circa 40% of profits, while owners of operations with profitability below 10% have access to less than 40% of profits, plotted in Figure 4.3-2. This is of course the shape of a rent tax; had it been plotted over the state's take. The inverse therefore holds.

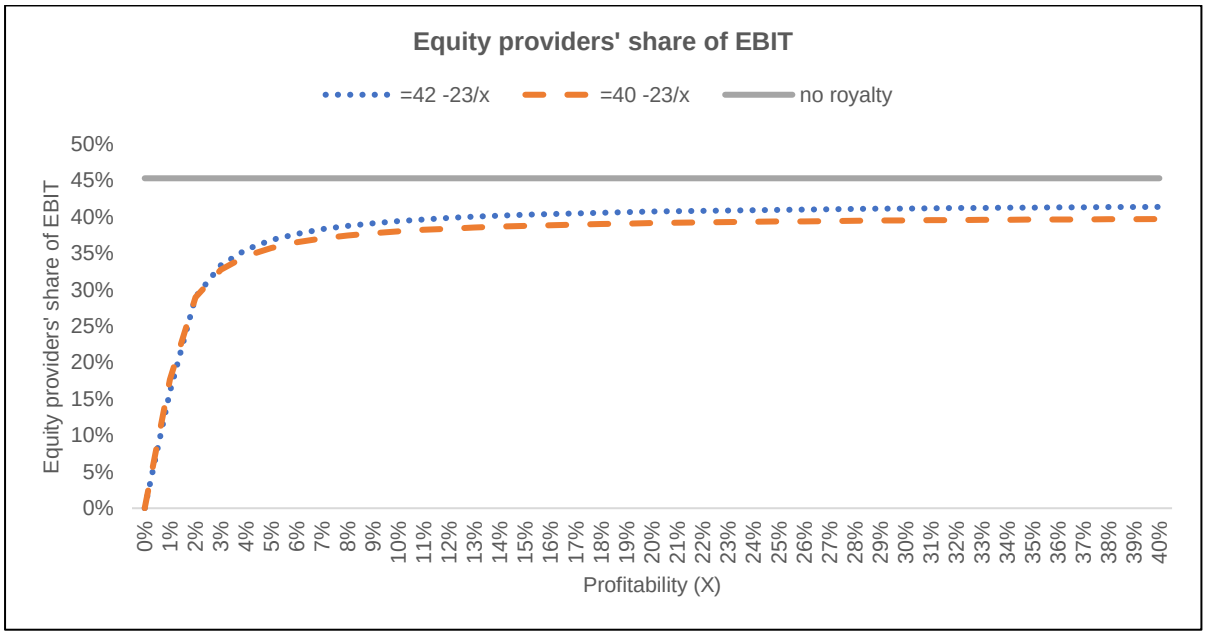


Figure 4.3 - 2. Equity providers' share of profits. Source: Kemp (2016).

Having established an after-tax profit keep from formulae 9 and 10, one can define 'rent' as where after-tax profit keep exceeds the minimum return required. For refined minerals, rent is where:

$$41.6\%\ EBIT - 0.23\%\ gross\ sales > quantum\ of\ minimum\ return\ required$$

If minimum required rate of return is stated as a return on equity (ROE_{min}), then rent exists where:

$$\frac{41.6\%\ EBIT - 0.23\%\ gross\ sales}{EQUITY} > ROE_{min}$$

$$41.6\%\ EBIT - 0.23\%\ gross\ sales > ROE_{min} * EQUITY$$

A working definition for rent for equity funded refined minerals can thus be stated as:

$$rent_r = 41.6\%\ EBIT - 0.23\%\ gross\ sales - (ROE_{min} * EQUITY) \qquad \text{[Formula 13]}$$

And for equity funded unrefined:

$$rent_u = 40.2\%\ EBIT - 0.23\%\ gross\ sales - (ROE_{min} * EQUITY) \qquad \text{[Formula 14]}$$

If the results from formulae 13 and 14 are positive, then as for the question whether the royalty collects rent, the answer is in the affirmative: For refined minerals, 8% of such surplus will be appropriated by the royalty, and 11.11% for unrefined minerals, as per formulae 9 and 10.

For debt funded operations the above formula for refined minerals can be restated as:

$$rent_r = 85\% * 74\% \{72\% [(92\%\ EBIT - 0.5\%\ gross\ sales) - interest]\} - (ROE_{min} * EQUITY)$$

and for unrefined minerals as:

$$rent_u = 85\% * 74\% \{72\% [(88.88\%\ EBIT - 0.5\%\ gross\ sales) - interest]\} - (ROE_{min} * EQUITY)$$

Return on equity is of concern to the owner of the mine. Providers of debt, on the other hand, are interested in return on assets instead (Bodie et al., 1992), which can be stated as:

$$ROA = \frac{EBIT}{ASSETS}$$

In any accounting period, the absolute minimum ROA should be no less than the interest rate on the company's debt. At the brink of not being able to pay interest on debt the interest will equal ROA. Restating the formula at the minimum with post royalty EBIT for refined thus gives one:

$$\frac{92\%\ EBIT - 0.5\%\ gross\ sales}{ASSETS} = interest$$

$$92\% \left(\frac{EBIT - 0.543\%\ gross\ sales}{ASSETS}\right) = interest$$

$$\frac{EBIT - 0.543\%\ gross\ sales}{ASSETS} = 108.69\%\ interest$$

It can thus be shown that the royalty effectively raises the interest rate by a factor of at least 1.0869 for refined minerals. For unrefined minerals; by a factor of at least 1.1251:

$$\frac{88.88\%\ EBIT - 0.5\%\ gross\ sales}{ASSETS} = interest$$

$$88.88\% \left(\frac{EBIT - 0.562\%\ gross\ sales}{ASSETS}\right) = interest$$

$$\frac{EBIT - 0.562\%\ gross\ sales}{ASSETS} = 112.51\%\ interest$$

The royalty therefore decreases the margin between the return on assets and the cost of borrowing. This is ironic as the royalty may impede the formation of 'economic rent'.

If 'economic rent' is regarded as the difference between the market price and the 'supply price of investment' (Baunsgaard, 2001), it is clear that the royalty raises the supply price of investment, and can therefore not be neutral – it will affect economic behaviour and influence production decisions.

4.3.2 **Conjecture 2:** Summary

Three perspectives on rent can be identified. From the viewpoint of the owner of the resource – the state (as custodian) – the royalties collect 'resource rent' because by definition the royalties are "gifts or payments for which recipients contribute nothing". This is the only perspective that goes unchallenged when questioning the royalty's rent-capturing abilities.

A second perspective is that the royalties collect 'rent' in its traditional meaning, as a 'rent on land'. The challenge for such a viewpoint is not whether it does collect rent, it certainly does, but because the state denies ownership of the property in question. If the alternative meanings of 'rent', and the use of the term by organs of state prove to be incorrect, then this second understanding may cast doubt on a constitutional court judgement absolving the state of expropriation on the basis that the state does not derive any benefit from being the 'custodian'.

Under this second understanding the royalty is in essence a lease, and under the new IFRS16 standard, the royalty will cause an accounting paradox in that royalty payments will be accounted for as depreciation of lease assets while depreciation is itself an allowable deduction in determining EBIT.

The third perspective is the most doubtful – that the royalty collects 'economic rent'. If one considers that the combined formula's tax take, as illustrated in Figures 4.3-1, has a regressive shape, and that the equity provider's share of profits has a progressive shape, as illustrated in Figure 4.3-2., it has to be acknowledged that the royalty was certainly not 'designed' to capture rents.

If the 'rent portion' is considered on its own, then such 'design' can be considered to be of the shotgun type, as the charge is levied regardless of profitability. To test the claim that the royalty collects rent for a particular operation a working definition of rent was provided for an equity funded refined minerals operation:

$$rent_r = 41.6\%\ EBIT - 0.23\%\ gross\ sales - (ROE_{min} * EQUITY)$$

And for equity funded unrefined minerals operation:

$$rent_u = 40.2\%\ EBIT - 0.23\%\ gross\ sales - (ROE_{min} * EQUITY)$$

Only if the result is positive can the claim be made, and then of such distributional surplus the royalty will collect 8% for refined, and 11.11% for unrefined.

4.4 **Conjecture 3:** The differential royalty rates penalise mining and incentivise refining.

Since the incidence of any tax can never be an incentive (other than perhaps an incentive to avoid the tax), the conjecture that 'the differential rates incentivise refining' may be more aptly stated in the negative; that 'the royalty is not a tax on beneficiation.'

A preliminary finding of unpacking the royalty in section 3.4 in chapter 3 suggested that the differential rates are applied over the wrong part of the formula; that differentiation between refined and unrefined minerals should be over the minimum portion of sales and not the profit portion. The finding indicated that for refined minerals at profitability rates below 6.25%, the royalty targets sales, as opposed to profits, while for unrefined minerals, the royalty targets sales up to profitability rates of 4.5%.

The indication that refiners should pay a higher portion of royalties from sales at low profitability seems contradictory to the stated intent of the differential royalty rates:

> "Refined mineral resources have higher gross sales (tax base) than unrefined minerals because more value addition occurs as minerals are refined. The higher 12,5 constant seeks to offset this higher refined base" (National Treasury, 2008).

The 12.5 constant is of course the 8% charge on EBIT for refined minerals, while the 0.5% charge on sales is not adjusted. This contradiction is magnified if one considers that the minimum 0.5% is supposed to be the part that compensates the owner of the resource.

The Davis Tax Committee's interpretation of the differential rates was that:

> "The apparent rationale for this is that the State wants to place a levy on taxpayers to the extent they have depleted national resources belonging to the country and not on the value added due to beneficiation" (DTC, 2015).

It can be shown though, that the 0.5% minimum charge will necessarily be a tax on beneficiation.

Apart from self-refining, platinum industry concentrate purchase arrangements at the time of writing (September 2016) consisted of either selling concentrate to a refiner for a percentage of the metal price, or toll treating arrangements for a percentage of the metal price in addition to a toll treating cost. Two actual but confidential examples are provided in Table 4.4.

Mine Z, having no refining capacity of its own, can either build its own refinery, toll treat its concentrate at refiner Y, or sell its concentrate to refiner X. Assuming there is a market for concentrate, spare toll treat capacity, and access to development capital, the choice made will solely be informed by project economics; i.e. profitability.

The crux of the matter is that under all three scenarios, the same amount of mineral resources is exploited, and yet the minimum royalty payable will vary significantly. Ignoring other precious metals and base metals, if Mine Z self-refines, it will pay 100% of 0.5% on the value of the recoverable platinum, palladium, rhodium and gold contained. If Miner Z sells concentrate to refiner X instead, it will only pay 84% (as per industry arrangement in Table 4.4.) of 0.5% on the value of the recoverable metal contained. In this case, gross sales for mining therefore equals 84% of gross sales of self-refining.

Price Received: % of metal price	**Sell concentrate to refiner X**	**Toll treat concentrate at refiner Y**
Platinum	84%	90%
Palladium	84%	90%
Rhodium	84%	90%
Gold	84%	80%
Other Precious Metals	0%	65% - 80%
Base Metals	0%	80%
Toll Cost (R/t concentrate)	0	3450

Table 4.4. Examples of actual platinum concentrate purchase arrangements in 2016. Source: Anonymous (2016).

If the minimum royalty of 0.5% of sales is expressed as royalty per tonne milled, or royalty per unit of mineral contained, refining will always attract a higher royalty than mining. This invalidates the claim that the levy applies to miners “to the extent they have depleted national resources belonging to the country and not on the value added due to beneficiation”. Hence, the question is whether the differential rates (the different rates as applicable to refined versus unrefined minerals) on profits can ‘offset’ this tax on beneficiation.

While the combined rate (the minimum charge and the rent charge) for unrefined minerals will always be higher than the combined rate for refined minerals at any given profitability, the test whether the combined royalty is a tax on beneficiation is where the quantum of royalty payable is higher for refining than for mining, given the same profitability.

Differently put; the combined rate will acknowledge the beneficiation effort where the quantum of royalty payable is higher for not refining than for refining the minerals, given the same profitability.

Of import is the profit differential between the two rates; that is $9/12.5 = 72\%$, and the price differential between the products, that is unrefined mineral price as a percentage of refined mineral price, 84% in this example, which can be stated as Z.

In order to find the profitability at which the quantum of royalty is the same for refining and for mining, formulae 2 and 5 are set equal:

$$0.5\%\ gross\ sales\ r + 8\%\ EBITr = 0.5\%\ gross\ sales\ u + 11.11\%\ EBITu$$

Since $EBIT = gross\ sales * X$, and since Z is unrefined mineral price as a percentage of refined mineral price:

$$0.5\%\ gross\ sales + 8\%\ gross\ sales.\ X = 0.5\%\ gross\ sales.\ Z + 11.11\%\ gross\ sales.\ X.\ Z$$

$$0.5\% + 8\%\ X = 0.5\%\ Z + 11.11\%\ X.\ Z$$

$$11.11\%\ X\ (72\% - Z) = 0.5\%\ (Z-1)$$

$$X = \frac{4.5\%\ (Z-1)}{72\%-Z} \qquad \text{[Formula 15]}$$

If solving for Z, the formula can be restated as:

$$Z = \frac{8\%\ X\ refined + 0.5\%}{11.11\%\ X\ unrefined + 0.5\%} \qquad \text{[Formula 16]}$$

Note from the denominator in formula 15 that if the price differential between refined mineral and unrefined mineral, Z, is equal to the profit differential, 72%, there is no profitability rate at

which the quantum of royalty payable will be the same. If plotted, the quantum of royalty payable lines between refined mineral and unrefined minerals will run parallel, with the refiner paying a higher royalty. For all price differentials that are equal to, or lower than 72%, refining will attract a higher royalty, and the royalty can be regarded as a tax on beneficiation.

Applying formula 15 using the price differential of 84% from the actual example in Table 4.4., the profitability at which mining and refining attracts the same royalty is 6%. This means that at profitability below 6% the royalty can be regarded as a tax on beneficiation. In other words, the differential rates on profit only 'offsets' the tax on beneficiation caused by the minimum charge at profitability above 6%, given an 84% price differential.

The price differential will differ from operation to operation and from commodity to commodity. Further research is suggested to compare actual price differentials against the profit differential of 72% of the royalty.

In Figure 4.4-1 the full range of price differentials and the full range of profitability scenarios are graphed. The area above the line is where the beneficiation effort is acknowledged in terms of taxation. The area below the line is where the royalty can be regarded as a tax on beneficiation.

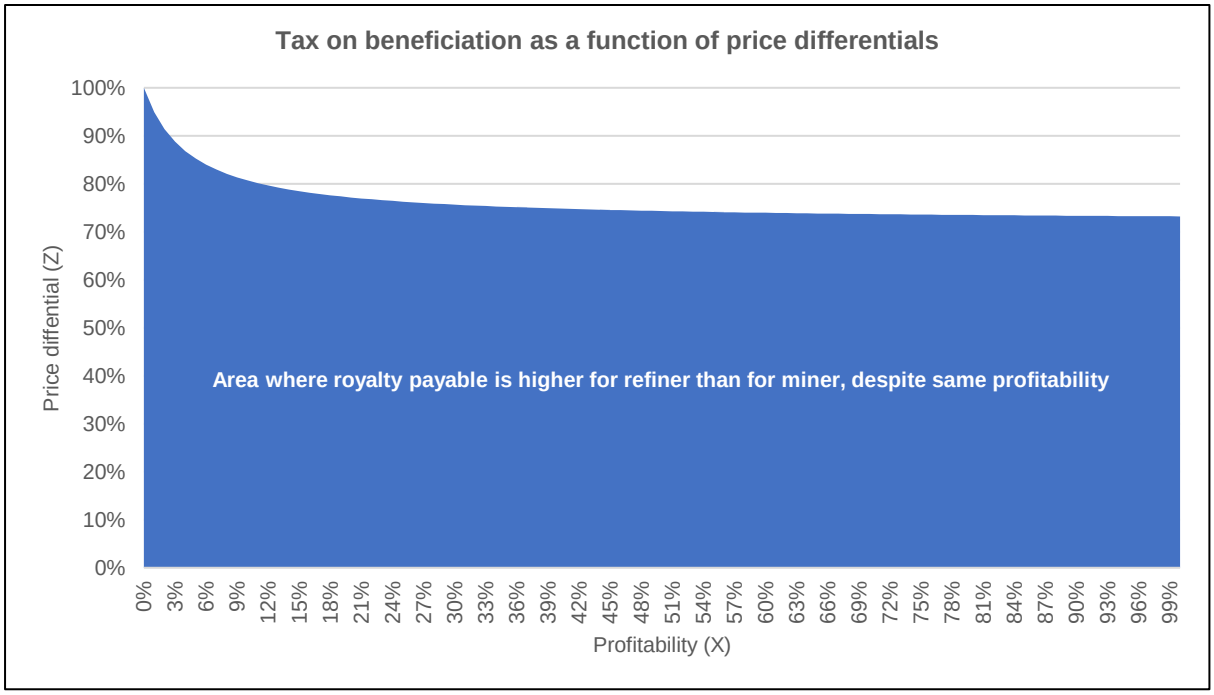


Figure 4.4 - 1. Tax on beneficiation as a function of price differentials. Source: Kemp (2016).

It is clear from Figure 4.4 -1 that the differential rates on profit only 'offsets' the price differential to a limited extent. This illustrates that the royalty formulae are inelastic to actual industry arrangements.

Cawood (2011) and Oshokoya (2012) indicated that the differential rates are not likely to make refiners out of miners, and suggested adjusting the 'f-factor' of 12.5.

However, while an increase in the f-factor for refined will accommodate a wider range of price differentials, it will not remedy the fact that wherever the price differential for any particular commodity at any particular mine is lower than the profit differential of the royalty formulae, the royalty will remain a tax on beneficiation.

The minimum charge of 0.5% on sales remains a tax on beneficiation, irrespective of the f-factor.

4.5 **Conjecture 4:** The royalty is a cost and will impact on cut-off grade.

At its simplest, the concept of a cut-off grade is that grade where revenue per unit equals costs per unit, i.e. the 'breakeven' grade. According to Lane (1988), it is a "theoretical boundary between ore and waste", and is "calculated with reference solely to costs, prices and capacities quite regardless of the way the grades actually vary within the mineralised body being mined" (*Ibid*.).

Birch (2016) provided a variation of a cut-off grade formula as:

$$grade = \frac{\frac{Total\ Fixed\ Costs}{units} + Unit\ Variable\ Costs}{Price * Mine\ Recovery\ Factor}$$

The purpose of the Birch study (2016) was to model the impact of the royalty on cut-off grades at a selection of Witwatersrand gold type deposits. Birch argued that because the royalty is levied on sales it "should be considered a cost and be taken into account in determining the cut-off grade."

An intuitive understanding however is that since unit revenue equals total unit cost at breakeven, EBIT should be zero – as EBIT is revenue minus cost – and only the 0.5%

minimum royalty charge should be regarded as a cost. The impact of the royalty on cut-off grade, therefore, seems straightforward:

Since only the 0.5% royalty on sales applies when EBIT is zero, the impact is simply:

$$grade = \frac{\frac{Total\ Fixed\ Costs}{units} + Unit\ Variable\ Costs}{Price * Mine\ Recovery\ Factor - 0.5\%\ Price}$$

$$grade = \frac{\frac{Total\ Fixed\ Costs}{units} + Unit\ Variable\ Costs}{99.5\%\ (Price * Mine\ Recovery\ Factor)}$$

$$\Delta g = 1.00503$$

Where Δg is the impact of the royalty on the cut-off grade; in other words, the incidence of the royalty raises the cut-off grade by a factor of 1.00503.

However, according to Birch (2016), “mining companies are approaching the question of mineral resource costs and its impact on the cut-off grade in six possible ways”:

1. “Ignore the implications and continue calculating the cut-off grade in the way it was done prior to the introduction of the tax;
2. Use the minimum rate (0.5%);
3. Estimate the expected rate that will be applied by looking at the historical rate;
4. Estimate the expected rate by modelling the optimised cash flow based on the break-even grade, and then determine the expected rate and use that as an additional cost for break-even grade calculations;
5. Assume the highest rate will be applied, depending on whether the mine is applying the refined (5%) or unrefined (7%) rate; or
6. Use some sort of profitability optimisation equation that applies a variable rate depending on the profitability, and determine if there is a higher profit to be made even if the profitability rate is lower” (*Ibid*., 2016).

The Birch study used method 4, and found that: “Each mine is affected by the mineral resource royalty in a different way, even though the same methodology for the modelling has been kept consistent” (*Ibid*., 2016)

The current author suggests a seventh approach to measure the impact of the royalty on cut-off grade; the method of the current investigation to 'read' the royalty formula itself, as introduced in chapter 3 and applied in chapter 4.

From formulae 2 and 5, we know that the royalty is effectively two flat rate levies.

For refined minerals, post royalty EBIT, Q, can thus be stated as:

$$Q = EBIT - (8\%\ EBIT + 0.5\%\ gross\ sales)$$

$$Q = 92\%\ (P - C) - 0.5\%\ P$$

$$Q = 91.5\%\ P - 92\%\ C$$

Where P is gross sales as a product of p (unit price), y (yield), g (grade) and u (units). And where C is total unit costs as a product of c (total cost per unit), and u (units).

Breakeven point is where post-royalty EBIT is zero, and substituting the component parts:

$$0 = 91.5\%\ p.y.g.u - 92\%\ c.u$$

$$91.5\%\ p.y.g.u = 92\%\ c.u$$

$$g = \frac{92\%\ c}{91.5\%\ p.y.g}$$

$$\Delta g = 1.00546$$

It would appear that the impact of the royalty on the cut-off grade is a specific factor. As a test, the royalty parameters can be applied to other cut-off grade formulae. Below is Lane's formula for an operation where the concentrating plant is limiting throughput:

$$g = \frac{h + \frac{f+F}{H}}{(p-k)y}$$ (Lane, 1988)

Where:
h is processing variable costs in Rand per tonne

f is total fixed costs in Rand per annum

F is opportunity cost in Rand per annum

H is processing capacity

p is price in Rand per gramme

k is marketing variable cost in Rand per tonne

y is yield

Applying the refined royalty parameters gives one:

$$g = \frac{92\%h + \frac{92\%f+F}{H}}{91.5\%(p-k)y}$$

Assume opportunity cost is zero and let $p - k$ be equivalent to gross sales per unit, then:

$$g = \frac{92\% \left(h + \frac{f}{H}\right)}{91.5\ \%py}$$

$$\Delta g = 1.00546$$

From the above test on Lane's formula, it indeed seems that the impact of the royalty on the cut-off grade is a specific factor. While opportunity cost was ignored above for simplicity, it is in fact an important parameter in present value maximisation (Lane, 1988). To account for it here would require a formula within a formula, as the opportunity cost will be inflated by the royalty, as well as by tax, as discussed in section 4.4.

Nevertheless, the exercise has illustrated that there is benefit in thinking of the royalty as two flat rates, especially in regards to the fact that for profitable mines, the bulk of the royalty is paid from EBIT, and not sales. Following approach 5 identified above will erroneously sterilise potentially minable ore. Of the six approaches, it is the author's opinion that approach 2 is the soundest, as it most closely resembles the theoretical impact of the royalty on cut-off grade.

And perhaps this is the secret genius of the royalty; that it is charged on gross sales, but only increases the cut-off grade by a factor of 1.00546 for refined minerals. For unrefined minerals, the impact on the cut-off grade is a factor of 1.00566.

While this impact may appear immaterial, it should be noted that the ore not mined because of the higher cut-off will be sterilised – a 'permanent loss of nonrenewable resources', caused by the royalty.

To test the impact of the royalty on the cut-off grade for gold mines one needs to compare the gold tax payable (formula 7) with the post-royalty gold tax payable (formula 8):

Gold Tax:	**Post Royalty Gold Tax:**
$T = 34\% P - 1.7\% R$	$T = 39.28\% P - 1.37\% R$

Where:
P is taxable income or EBIT
Q is post royalty taxable income or EBIT
R is revenue or gross sales as a product of *p* (unit price), y (yield), g (grade) and *u* (units).
C is total unit costs as a product of c (total cost per unit), and u (units).

Gold Tax:	**Post Royalty Gold Tax:**
$Q = P - (34\% P - 1.7\% R)$	$Q = P - (39.28\% P - 1.37\% R)$
$Q = 66\% P + 1.7\% R$	$Q = 60.72\% + 1.37\% R$
$Q = 66\% (p.y.g.u - c.u) + 1.7\% p.y.g.u$	$Q = 60.72\% ((p.y.g.u - c.u) + 1.37\% p.y.g.u$
$Q = 67.7\% p.y.g.u - 66\% c.u$	$Q = 62.09\% p.y.g.u - 60.72\% c.u$

At breakeven, Q is zero, so:

$67.7\% p.y.g.u = 66\% c.u$	$62.09\% p.y.g.u = 60.72\% c.u$
$g = \frac{66\% c}{67.7\% p.y}$	$g = \frac{60.72\% c}{62.09\% p.y}$
$\Delta t = 0.97489$	$\Delta t = 0.97794$

Where Δt is the impact of the gold tax on the cut-off grade, stated as a factor. The incidence of the gold tax lowers the cut-off grade by a factor of 0.97489, while the incidence of the royalty heightens it by 0.312% to 0.97794.

In other words, despite the royalty, a gold mine can still mine marginal ore at 97.79% of economic cut-off as long as its overall profitability is greater than 6%, as illustrated in section 3.5, and Figure 3.5-2, repeated here:

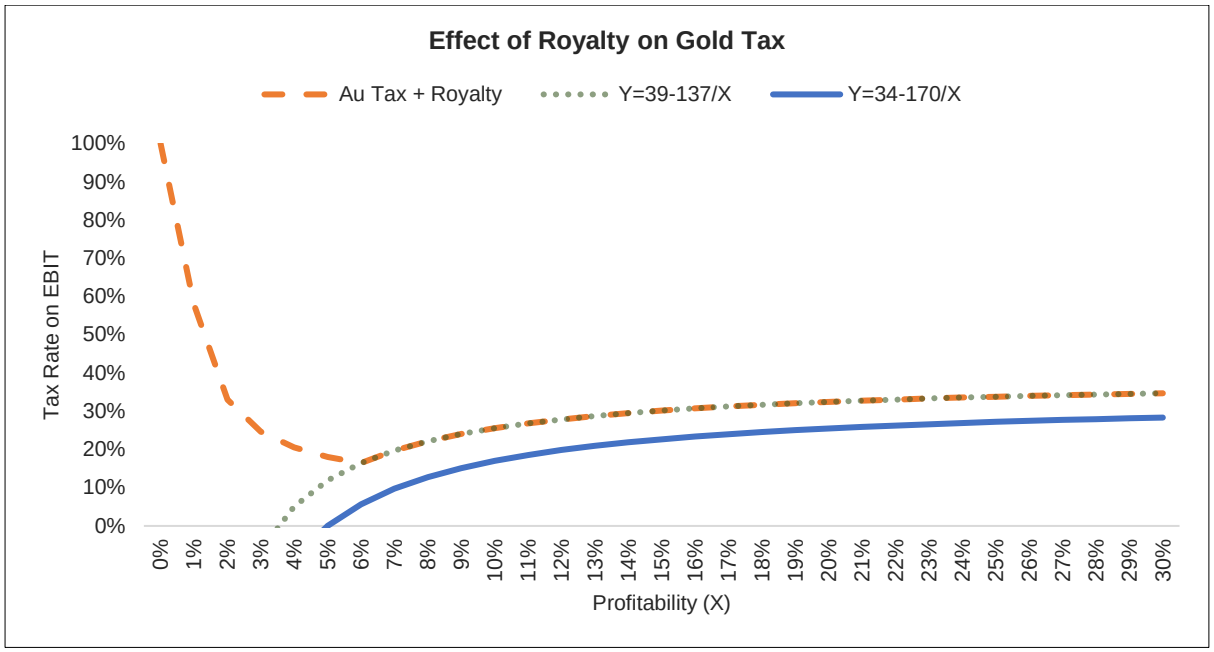


Figure 4.5 - 1. Effect of Royalty on the Gold Tax. Source: Kemp (2016).

The impact of the royalty on cut-off grades appears to be a specific factor, and it also appears to be rather immaterial. However, what seems insignificant on its own may in conjunction with a host of other input parameters for cut-off grade estimation, have a greater impact than the royalty formula suggests.

4.6 Conclusion

This analysis has questioned four conjectures identified in the literature review from the perspective of the royalty formulae itself. The main findings are that:

- Because of the minimum rate payable on sales, the royalty does not provide equitable relief to marginal mines.
- The state's share of industry profits is in fact higher during times of marginality.

- The royalty appears to collect a rent on land, which may cast doubt on a Constitutional Court judgement absolving the state of expropriation on the basis that the state does not derive any benefit from being the ‘custodian’.
- The claim that the profit portion of the royalty collects economic rent can only be made when it can be shown that after-tax profit keep is higher than the minimum required return on equity.
- In the absence of such evidence, the rent-capturing ability of the royalty should be understood as rent-seeking by a rentier state instead, which casts further doubt on the claim that the state does not derive any benefit from being the ‘custodian’.
- Because of the minimum rate payable on sales, the royalty is necessarily a tax on beneficiation.
- The combined rate (minimum charge and ‘rent charge’) may offset this tax on beneficiation at certain profitability as long as the profit differential between the refined and unrefined mineral royalty rates are lower than the price differential between the refined product and the unrefined product at a particular mine.
- The royalty is a cost and does have an impact on cut-off grade, but not significantly more than the minimum charge on sales of 0.5%, for a factor impact of circa 1.005. This represents the portion of ore that will be sterilised; a ‘permanent loss of non-renewable resources’, caused by the royalty.

The next chapter will collate the contradictions of the mineral royalty identified through chapters 1 to 4, attempt an interpretation, suggest further research, and conclude.

5. CHAPTER FIVE: CONCLUSION

5.1 Discussion

Chapter 3 has shown that the royalty, which borrows its profitability ratio from the gold tax formula, pointedly contradicts the shape of the gold tax, whose "design was governed mainly by the *purely mathematical concept of a suitably shaped curve"* (Luttrell-West ,1947). It was shown that the incidence of the royalty not only distorts this shape, but also contradicts its own intentions as illustrated in Chapter 4.

The necessary question arises: how did this happen? Specifically, how did the profitability ratio, which was designed to measure the 'relative richness' of the ore (Kotze, 1937) – a proxy for Ricardian rent – to derive a tax rate over profit, find its way into a formula to derive a tax on gross sales?

Upon the implementation of the royalty, Cawood (2010) commented that: "Balancing the design considerations proved to be a very long and complex process in South Africa and political pressure caused the Act to perhaps become too complex with regard to the requirements of the gross sales base."

While the history of the political negotiation, which influenced the design considerations of the royalty has not been researched here, its effects have been made obvious. And that is that a very useful instrument, which has served the gold mining industry since 1918 (Van Blerck, 1992), has been negotiated out of context. Out of relevance.

Indeed, there is no need for the profitability ratio, and hence no need for the royalty formulae. The royalty could be restated as a 0.5% charge on gross sales – an 'ownership transfer tax' as compensation for the permanent loss of non-renewable resources, and an 8% charge on EBIT for refined minerals (11.11% for unrefined minerals) – 'a use tax' as payment to the government for the permission to mine (as per Cawood and Minnit, 2001, and Otto et al., 2006).

The irrelevance of the formula can be illustrated by considering a 'new' tax, with a similar formula:

$$Y = \frac{EBT}{3.57 * gross\ sales} * 100$$

Where EBT is earnings before tax

And Y, expressed as a percentage, is the rate to be applied to gross sales to determine the tax payable.

The reasoning for this tax is provided by the Explanatory Memorandum to the 'new' tax:

> "A formula approach was used for setting this rate as opposed to utilising a flat rate [e.g. a flat 28 per cent], thereby making this rate adjustable in light of business conditions. In essence, the formula provides equitable relief for mines during marginality… while at the same time providing the fiscus with higher revenue potential when more favourable economic conditions exist (e.g. commodity booms and high grade mines)" (National Treasury, 2008).

Plotted in Figure 5.1-1, the tax convincingly illustrates the reasoning behind it:

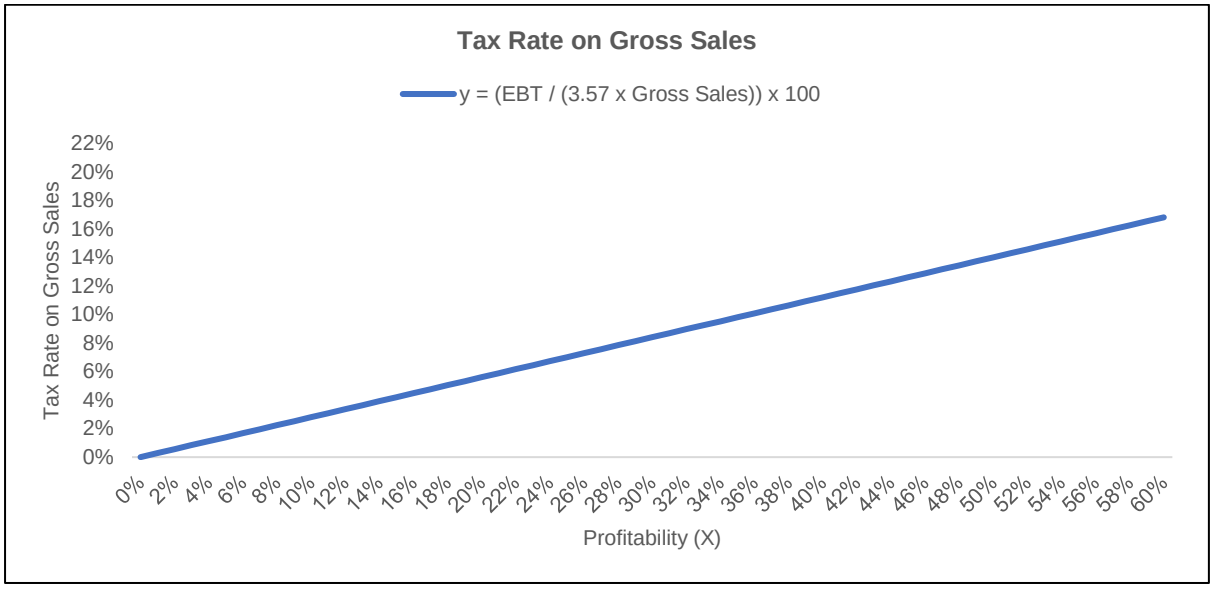


Figure 5.1 - 1. Tax rate over gross sales illustrates a progressive tax. Source: Kemp (2016).

However, the formula can be restated in simpler form as:

$$Y = 28 * \frac{EBT}{gross\ sales}$$

or simply: $Y = 28\ \% * X$
Where X, the profitability ratio, is stated as a percentage.

Tax payable, T, is:

$$T = 28\% * \frac{EBT}{gross\ sales} * gross\ sales$$

$$T = 28\%\ EBT$$

This 'new' tax is of course the existing corporate income tax.

Applying the understanding of the royalty from the literature review to the flat corporate income tax (CIT), it now becomes a "floating rate formula" (KPMG, 2016). Paraphrasing the Davis Tax Commission:

> "The [CIT] rate formula is designed to marginally increase the rate of taxation depending on the profitability of the mine. In other words, within a certain profitability range the [CIT] rate formula is designed to capture rents" (DTC, 2015).

And according to the Explanatory Memorandum to the [Corporate Income Tax]:

> "The variable [CIT] percentage rates provide automatic tax relief for marginal mines. At the same time, the variable [CIT] percentage rates provide Government with additional income during times of high commodity prices. As a matter of fairness, Government shares in both the downside risks and upside benefits associated with mining. This sharing takes into account cyclical commodity prices and declining ore grades" (National Treasury, 2008).

It is inconceivable that the Corporate Income Tax would receive such complicated justification – it is considered fair because it is proportional. The question then is why the royalty is explained to such an extent, and still being misunderstood? Is the lack of clarity a victim of 'negotiated transformation', or is the royalty formula designed to hide the fact that it charges twice?

With that question remaining unanswered, the following sections summarise the main findings of the research.

5.2 **Conjecture 1**: The variable royalty rate provides equitable relief to marginal mines.

In section 4.2, it was shown that the royalty, in contradiction to its stated intents, provide royalty relief for profitable mines, as opposed to marginal ones. It was also illustrated that because of the minimum charge, the state's share in industry profits is in fact higher during times of marginality.

When both the minimum portion and the 'variable rent portion' for refined minerals were plotted over EBIT (as proxy for ability to pay) in Figure 4.3-1 (repeated here), it was shown that the cause for the regressive slope is the minimum charge of 0.5% of sales, and that the variable rate, when plotted over EBIT, is a flat 8% charge.

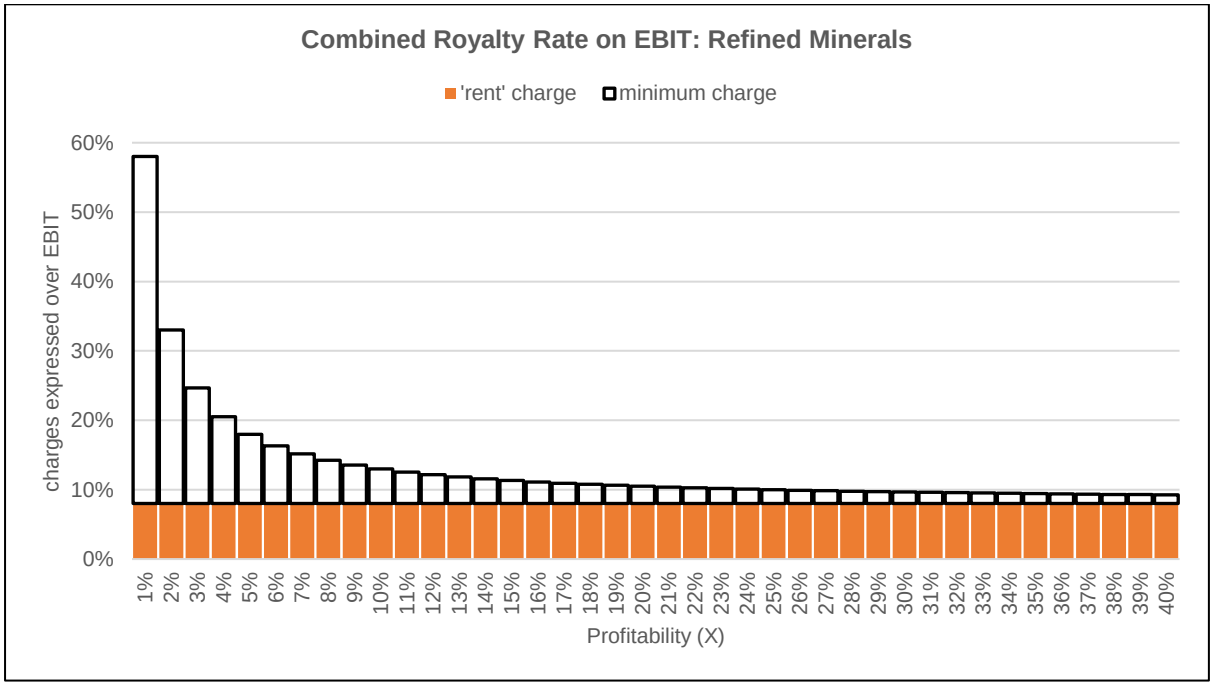


Figure 5.1 - 2. Combined Royalty Rate on EBIT for refined minerals. Source: Kemp (2016).

From Figure 4.3-1., it should be evident that the conjecture – that the variable royalty rate provides equitable relief to marginal mines – is logically impossible to be true.
Furthermore, the semblance of proportionality of the 'rent' charge is illusory because the rent charge disregards interest payments.

5.3 Conjecture 2: The variable royalty rate collects rent.

In section 4.3, it was shown that the royalty does not collect economic rent, that it is not designed to do so, and in actual fact impedes the formation of economic rent. For this reason, it was suggested that the royalty be understood to collect a rent on land instead.

This understanding is in line with the Minister of Finance's guidance that:

> "Revenues from Mineral and Petroleum Royalties are included as part of non-tax revenues, in line with the IMF classification outlined in the Government Finance Statistics Manual (2001) – Chapter 5. In terms of how we implement this classification, refer to the 2014 Budget Review, Table 3 (under Rent on Land)" (Ministry of Finance, 2015)

The relevant IMF classification reads:

> "General government units may own subsoil assets in the form of deposits of minerals or fossil fuels and may grant leases that permit other units to extract these deposits over a specified period of time in return for a payment or series of payments. These payments are often described as "royalties," but they are rents that accrue to owners of assets in return for putting the assets at the disposal of other units for specified periods of time" (GFSM, 2001).

The concept of rent is further defined as:

> "Payments to a government unit as the owner of land and subsoil assets are recorded in rent... Rent is the property income received from certain leases of land, subsoil assets, and other naturally occurring assets" (*Ibid*.)

In this context, the conjecture – that the variable royalty rate collects rent – is correct.

However, as pointed out in Chapter 4.3, the capturing of this rent casts doubt on a Constitutional Court judgement absolving the state of expropriation on the basis that the state does not derive any benefit from being the 'custodian' – that it does not 'own' the mineral resources.

This potential legal oversight was identified before the imposition of the royalty by the Chamber of Mines (2001): “the capacity to impose royalties in respect of the exploitation of mineral rights would imply the acquisition of those rights by the State.”

After the imposition of the royalty, Van der Vyver (2012) argued that:

> “The State no longer regulates mining operations in a supervisory capacity, it now imposes restrictive rules and regulations because it has become the owner of mineral and petroleum resources… Further evidence that the power vested in the Minister derives from expropriation of the existing prospecting and mining rights may be derived from the fact that royalties must be paid to the State in respect of minerals removed and disposed of during the course of prospecting or mining operations.”

Furthermore, since the royalty is in essence a lease (GFSM, 2001); under the new IFRS16 standard (IASB, 2016), the royalty will cause an accounting paradox in that royalty payments will be accounted for as depreciation of lease assets while depreciation is itself an allowable deduction in determining EBIT.

Simply put; under this understanding of rent, the royalty will not work, and will have to be revisited.

The only other alternative understanding of rent is as “gifts or payments for which recipients contribute nothing” (Otto et al. 2006). Under this understanding of rent, the conjecture also holds true, and the royalty can be seen as a ‘rent-seeking’ mechanism, which Congleton et al. (2008) defined as “the rational decision to invest in contesting pre-existing wealth or income, rather than undertaking productive activity”.

Under this understanding, the royalty is just another tax (or ‘tax like charge’ (DTC, 2015) – along with the compulsory 26% equity divesture and recent proposals such as development pricing and compulsory beneficiation – that encroaches on ownership rights (Leon, (2009); Langalanga, (2015)). In this sense, the royalty contributes to what Leon (2009) identified as ‘creeping expropriation’.

5.4 Conjecture 3: The differential royalty rates penalise mining and incentivise refining.

In section 4.4, it was shown that the minimum rate payable on sales is necessarily a tax on beneficiation. It was also shown that the combined rate may offset this tax on beneficiation at certain profitability as long as the profit differential between the refined and unrefined rates are lower than the price differential between the refined product and the unrefined product.

According to Cawood (2011); “The inability to engineer a clear intersection opportunity is problematic for the decision whether or not to spend the additional capital in order to benefit from the switch from the unrefined to the refined formula.”

This intersection, as shown by this research, is where the price differential - unrefined product price as a percentage of refined product price – is bigger than the 72% profit differential of the royalty rates. A working formula was provided:

$$X = \frac{4.5\%\ (Z-1)}{72\%-Z} \qquad \text{[Formula 15]}$$

Where X is the profitability at which mining and refining will attract the same royalty, and where Z is the price differential – unrefined product price as a percentage of refined product price, stated as a number.

Since the numerator in Formula 15 is necessarily negative, it is obvious that Z has to be greater than 72% for there to be any profitability where the refiner pays the same royalty as the miner, and by implication a lower rate than the miner at higher profitability.

Cawood (2011) and Oshokoya (2012) indicated that the differential rates are not likely to make refiners out of miners, and suggested adjusting the ‘f-factor’ of 12.5. However, while an increase in the f-factor for refined will accommodate a wider range of price differentials, it will not remedy the fact that wherever the price differential for any particular commodity is lower than the profit differential of the royalty formulae, the royalty will remain a tax on beneficiation. This indicates that the differential rates are arbitrary, and inelastic in terms of price differences between refined and unrefined products, which could vary widely across different commodities.

Thus, the ‘core principle’ of the royalty; that it is “not intended to be a tax on beneficiation” (KPMG; 2016), does not hold. And the conjecture that the differential royalty rates penalise mining and incentivise refining remains a conjecture.

The real issue with this conjecture is perhaps best described by Roberts (2015) in a paper entitled “The other resource curse: extractives as development panacea”, wherein it was pointed out that: “the prevailing assumption that natural resources can easily be monetized to generate public goods and leveraged for industrial transformation – lies behind recurring policy disappointments since the independence era.”

Indeed, the concept of taxing a mine into a factory has all the makings of a policy disappointment.

According to Jeffery (2016):

> “The DMR’s emphasis on this particular type of beneficiation also overlooks the extent of the beneficiation intrinsic in the mining process. What mining does, in essence, is to convert unsevered mineral deposits in the ground into mineral products with a realisable market value. This in itself should be seen as a vital form of beneficiation, for which mining companies should be given credit.”

In this light, it is the author’s opinion that Cawood’s (1999, 2001, 2003) proposal for net smelter return as tax base – as opposed to gross sales – should be reconsidered.

5.5 **Conjecture 4**: The royalty is a cost and will impact on cut-off grade.

In section 4.5 it was shown that there is benefit in thinking of the royalty as two flat rates, especially in regards to the fact that for profitable mines, the bulk of the royalty is paid from EBIT, and not sales.

It was suggested that the secret genius of the royalty is that it is charged on gross sales, but because it is effectively two separate charges, it only increases the cut-off grade by a factor of 1.00546 for refined minerals, and by a factor of 1.00566 for unrefined minerals.

This is the direct theoretical impact of the royalty rates. The actual impact will of course depend on whether the royalty is understood by the mining engineer as two flat rate charges, as well

as on a host of other variables, such as level of gearing and required rate of return, which will differ from operation to operation.

The conjecture that the royalty is a cost and will impact on cut-off grade is true. Because it is true, it is of concern. The portion that is not mined as a result of the royalty will be sterilised – contradicting the intent of the royalty to serve as a compensation for the 'permanent loss of non-renewable resources'.

In this way, the effect of the royalty is in direct opposition to the effect of the gold tax. Because of the gold tax tunnel, mining below economic cut-off was made possible. According to Kotze (1937):

> "The State can regard the reduction of its share of profits by the mining of unpayable ore near the margin with perfect equanimity, and even with satisfaction, for the spending of every £1 in handling such ore probably results indirectly in at least 5s. flowing into its coffers, besides giving additional employment and stimulating production of foodstuffs and other commodities. If the ore were left intact in the ground, these benefits would be permanently lost (Kotze, 1937)."

The Holloway tax commission of 1945 also warned against predatory taxation:

> "if the rate of tax precludes the working of low grade ore or militates against the opening up of new workable mining propositions it harms the economy of the country" …
>
> "the Government should bear in mind that every increase in cost is tantamount to throwing away part of the country's patrimony" (Holloway et al., 1945).

It is clear that the concept of custodianship of mineral resources, which are the common heritage of the country, is the same post the MPRDA as it has been for close on a century. What has changed is the compensation payable to the state.

5.6 Recommendations

In a closed session in May 2016 between the Davis Tax Committee (DTC), the South African Revenue Services (SARS) and various industry bodies, it was agreed that the Explanatory Memorandum for the Mineral and Petroleum Resources Royalty Bill, 2008, should be issued in final (KPMG, 2016).

The findings of this current research have import to both National Treasury's Explanatory Memorandum and the DTC's final report on Mining for the Minister of Finance.
For example, in terms of the variable rates, according to the Davis Tax Committee:

i. "The royalty rate formula is designed to marginally increase the rate of taxation depending on the profitability of the mine.
ii. In other words, within a certain profitability range the rate formula is designed to capture rents" (DTC, 2015).

Whereas this research has shown that:

i. The rate of taxation is a flat 8% of EBIT for refined minerals and a flat 11.11% of EBIT for unrefined minerals, with no regard to the profitability of the mine. This proportional tax appears progressive when plotted as a rate over revenue against profitability in the same way the proportional Corporate Income Tax of 28% appears progressive. See Figure 5.1-1. This progressivity is a function of profitability; it is not a function of the formula.

   The same mistake is made in the Explanatory Memorandum, which states:

   > "A formula approach was used for setting these rates as opposed to utilising flat rates (e.g. a flat 3 per cent), thereby making these rates adjustable in light of business conditions. In essence, the formulae provide equitable relief for mines during marginality… while at the same time providing the fiscus with higher revenue potential when more favourable economic conditions exist (e.g. commodity booms and high grade mines)" (National Treasury, 2008).

   Once again, higher revenue potential to the fiscus is not a function of the formula; it is a function of profitability. Also, the formula makes no distinction between low and high-grade mines; which contradicts the original purpose of the profitability ratio.

ii. 8% of rent for refined minerals and 11.11% of rent for unrefined minerals may be captured as long as return on equity is higher than the required rate of return. This could happen anywhere or nowhere on the profitability range.

It is recommended that the Davis Tax Committee take note of these oversights in their deliberations for the final report to the Minister of Finance. It is furthermore recommended that the term 'rent' be categorically defined when used in policy and regulatory documents.

5.7 Suggestions for further research

5.7.1 A legal enquiry into the mineral royalty as an instrument through which the MPRDA expropriated mineral rights

This research has mathematically shown that the royalty does not capture economic rent, and suggested that it collects a rent on land instead. Since the royalties are reported as 'rent on land' in the national accounts (Ministry of Finance, 2015) and since the international accounting convention is that royalties are "payments to a government unit as the owner of land and subsoil assets" (GFSM, 2001), it is difficult to understand Chief Justice Mogoeng's argument that: "whatever "custodian" means, it does not mean that the state has acquired and thus has become owner of the mineral rights concerned" (ZACC, 2013).

A preliminary literature review (Winks, 2013; Badenhorst, 2013; Van den Bergh, 2009; Van der Schyff, 2006; and Mostert, 2014) has revealed that the incidence of the royalty has not been adequately questioned as an implication of ownership of mineral resources.

The possibility has however been pointed out by Leon (2009) as a form of indirect or 'creeping expropriation, and more pointedly by Van der Vyver (2012):

> "evidence that the power vested in the Minister derives from expropriation of the existing prospecting and mining rights may be derived from the fact that royalties must be paid to the State in respect of minerals removed".

Fortunately, for the legal scholar who may be interested in such an investigation, Mogoeng added that:

> "it would... be inappropriate to decide definitively, that expropriation is in terms of the MPRDA incapable of ever being established... I accept that a case could be properly pleaded and argued, to demonstrate that expropriation did take place. That is the avenue that must be left open" (ZACC, 2013).

5.7.2 An investigation into the concept of 'permanent loss of non-renewable resources'

As pointed out in section 5.5, there is an unresolved contradiction between a permanent loss of non-renewable resources caused by the royalty, and the concept of the royalty as 'compensation' for the permanent loss of non-renewable resources.

A question that needs to be asked is whether something can be lost if it has not been found, and in relation to this question, the concept of 'finder's keepers'. Of relevance is that the perceived 'expropriatory nature' of the MPRDA and the MPRRA may serve as a disincentive to exploration (Chamber of Mines, 2001).

According to Otto et al. (2006):

> "A country that taxes the pure rent associated with mining has to be prepared to subsidize new exploration or conduct exploration itself. Otherwise, it is destined to watch its mining sector decline over time as its known mines are depleted and not replaced."

In this light, consider that during a decade-long commodity price boom the South African mining industry contracted at an annual rate of 1% (Harvey, 2015); a performance which is in sharp contrast to its geological potential.

South Africa's mineral endowment was rated number one in the world in a 2010 Citi Bank report which valued it at US$2.5 trillion (Citi, 2011)[8]. The Department of Mineral Resources followed up with their own 'pounds-in-the-ground' analysis and declared it to be worth US$3.5 trillion (DMR, 2012).

What was lost on the DMR, however, is the irony: that an endowment that is worth trillions of dollars when left in the ground is regarded as a "permanent loss" when it is extracted.

[8] The report was based on 2007 United States Geological Survey data. According to the compiler of the report it was purely just an inventory analysis to which long term commodity prices were applied (Sainsbury, 2015).

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