SOUTH AFRICA

TECHNICAL ASSISTANCE REPORT—FISCAL REGIMES FOR MINING AND PETROLEUM: OPPORTUNITIES AND CHALLENGES

September 2015

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SOUTH AFRICA

FISCAL REGIMES FOR MINING AND PETROLEUM : OPPORTUNITIES AND CHALLENGES

A Report Prepared for

The South African Tax Review Committee

(Chair, Judge Dennis Davis)

Philip Daniel, Martin Grote, Peter Harris, and Alpa Shah

April 2015

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PREFACE

In response to a request from the National Treasury of South Africa, on behalf of the South African Tax Review Committee, chaired by Judge Dennis Davis, (the Davis Tax Committee, DTC) a technical assistance mission from the Fiscal Affairs Department (FAD) visited Cape Town, Johannesburg and Pretoria, January 15 to 30, 2015. The mission's task was to advise the DTC on the fiscal regimes and revenue potential for extractive industries (mining and petroleum) in South Africa. The mission team consisted of Mr. Philip Daniel (Head), Mr. Martin Grote, and Ms. Alpa Shah (all FAD), and Professor Peter Harris (Legal Department External Expert). Mr. Daniel made a preliminary visit to South Africa, November 10 to 15, 2014.

In Pretoria, the mission met with Judge Davis and members of the DTC Mining Sub-Committee. The mission met with staff of the National Treasury, the Department of Trade and Industry, the Department of Mineral Resources, the South African Revenue Service, Statistics South Africa, the South African Diamond and Precious Metal Regulator, and the State Diamond Trader. The mission also met with representatives of the National Union of Mine Workers.

In Cape Town, the mission met with staff of PetroSA, and with the Offshore Petroleum Association of South Africa. The mission met with representatives of Shell, Total, ExxonMobil, and Anadarko. The mission also met with staff of Allan Gray, Standard Bank, and PwC.

In Johannesburg, the mission had discussions with the Chamber of Mines of South Africa, and with representatives of Anglo American, Anglo Gold Ashanti, Glencore, and the Aggregate and Sand Producers of South Africa (APASA). The mission also met with Messrs. Martin Creamer and Kenneth Creamer of Creamer Media, and with Professor Fred Cawood, Head, School of Mines, University of Witwatersrand.

The mission appreciates the advice, comment and information provided by these institutions, companies, and individuals, including the comments of the DTC on the draft report submitted on February 5, 2015. The mission acknowledges the excellent cooperation of the authorities and of the Secretariat to the DTC (Head, Mr. Vinesh Pillay).

The mission expresses its thanks for the vital cooperation of the IMF Senior Resident Representative in Pretoria, Mr. Axel Schimmelpfennig, and his staff, in particular Ms. Sandra du Plessis and Ms. Nasha Mavee.

ABBREVIATIONS, ACRONYMS AND GLOSSARY

ACE	Allowance for Corporate Equity (for tax purposes)
ACC	Allowance for Corporate Capital (for tax purposes)
AMD	Acid Mine Drainage
AETR	Average Effective Tax Rate
B-BBEE or BEE	Broad-Based Black Economic Empowerment
BEPS	Base Erosion and Profit Shifting
bl	barrel
Bonus	Lump sum payment made for mineral (oil, gas, or mining) rights, or at contract signature, or at certain production thresholds
Carried interest	A participating interest in a project where the holder does not pay a commercial price for the interest or whose obligations are contributed ("carried") in part by other parties
CGT	Capital Gains Tax
CIT	Corporate Income Tax
CoM	Chamber of Mines
CT	Carbon Tax
DMR	Department of Mineral Resources
DTC	Davis Tax Committee
EI	Extractive Industries
EMV	Expected Monetary Value
FAD	Fiscal Affairs Department
FARI	Fiscal Analysis of Resource Industries (FAD modeling system)
Free equity	Shares in a mining company allocated to a state entity for nil consideration (in practice often accompanied by tax concessions, or contribution of rights or infrastructure, and hence not strictly "free")
GDP	Gross Domestic Product
HDSA	Historically Disadvantaged South Africans
IMF	International Monetary Fund
IOC	International Oil Company
IRR	Internal Rate of Return
ITA, 1962	Income Tax Act, No. 58 of 1962
MM	Petroleum industry conventional term for "million"
METR	Marginal Effective Tax Rate
MPRDA	Mineral and Petroleum Resources Development Act, No. 28 of 2002
NCF	Net Cash Flow
NDP	National Development Plan
NOC	National Oil Company
NPV (x)	Net Present Value (at discount rate of x)

NSR	Net smelter returns (valuation of mineral content of semi-processed product)
OECD	Organization for Economic Cooperation and Development
Petroleum	Crude oil and natural gas
PGMs	Platinum Group Metals
Production Sharing	Fiscal scheme for petroleum in which production at a surface delivery point is shared between a state entity and a private contractor
PSC (or A)	Production Sharing Contract (or Agreement)
pwc	Professional services firm, formerly PriceWaterhouseCoopers
R&D	Research and Development
Rents	Revenues in excess of all necessary costs of production including the minimum rate of return to capital (sometimes "super-normal profits")
Ring Fence	Fiscal boundary within which costs and revenues of companies in common ownership may be consolidated for tax purposes
ROR	Rate of Return
Royalty	Charge for the fact of extracting minerals, usually now *ad valorem* (a percentage of gross revenues), but can be a specific charge by volume or weight. May also vary with price. Term also used in "net profits royalty" where some costs are deducted.
RRT	Resource Rent Tax
SA	South Africa
SARS	South African Revenue Service
Shale	A compacted sedimentary host rock for unconventional oil or gas; its low permeability requires hydraulic fracturing ("fracking") for extraction
SIMS	State Intervention in the Minerals Sector, ANC Policy Discussion Document
SLP	Social and Labor Plan
Thin Capitalization	Extensive use of debt, relative to equity, in financing a project or firm
Treaty shopping	Use of treaty networks to reduce total tax liability
UJV	Unincorporated joint venture (two or more companies acting together with undivided participating interests in a project; not the same legally as a partnership)
Uplift	Addition for tax deduction or cost recovery purposes to the cost of capital assets or of losses carried forward (the former sometimes "investment allowance," the latter sometimes "accumulation rate")
VAT	Value Added Tax
VIT	Variable Income Tax
WEO	IMF World Economic Outlook
WHT	Withholding tax

WTI   West Texas Intermediate (US oil price benchmark)

Executive Summary

This report is designed to assist in the overall review of South Africa's tax system. The Davis Tax Committee (DTC) was established by the Minister of Finance in 2013. The DTC will consider whether the current mining tax regime is appropriate. The DTC's review takes place within the context of its overall review of the corporate tax system, and other features of the South African tax system. Coverage of upstream oil and gas is included in this report.

Mining has historically been the mainstay of the South African economy. Mineral exports remain the principal contributor to foreign exchange earnings on the current account. Mining enterprises are significant employers. The sector's contribution to government revenue, however, is down from a peak of nearly 29 percent in 1981—of which nearly 93 percent came from gold—to just 2.5 percent in 2013/14 with a negligible contribution from gold.

South Africa is not yet a significant producer of crude oil or natural gas. Oil and gas exploration nevertheless shows promise. In the past 10-15 years almost all potential offshore acreage has been licensed, with participants including most of the major international oil companies (IOCs). Strong interest also exists in shale gas potential in the Karoo Basin.

Taxation is far from top of the list in current challenges facing the development of EI in South Africa. Returns to mining activities in South Africa appear to have declined. Depletion of known reserves has become severe in long-established sections of the mining industry. Depletion particularly affects the traditional gold mining sector. Coal has become the leading mine product by value with iron ore possibly the most profitable. Labor costs in mining have risen sharply and major strikes have recently occurred.

The national goal of economic and social transformation in favor of Historically Disadvantaged South Africans (HDSA) has major impact on the mining sector. The government also gives high priority to industrial development using mining as a base. Infrastructure constraints (electricity, water, and transport) have become acute, bearing heavily on the mining industry.

New proposals for state participation in upstream petroleum ventures follow long debate about state involvement in mining. The 2014 Amendment Bill for the Minerals and Petroleum Resources Development Act (MPRDA) of 2002 introduced the possibility of a "free carried interest" of 20 percent in petroleum ventures, with an option for additional paid equity interests. The upstream petroleum exploration companies made strong representations about these provisions; the President referred the Bill back to Parliament in January 2015 for other reasons but the petroleum provisions also came under renewed scrutiny. Additional actual or proposed indirect levies, some as environmental charges, bear upon the mining

sector. Thus the operation of the current fiscal regime, or of new proposals, is circumscribed by multiple other considerations.

The task is to examine the fiscal regime with a view to generating a sustainable revenue contribution from mining and petroleum in future—which requires both an attractive climate for new investment to develop the tax base and a fiscal system that secures a reasonable contribution to state revenues from production and a higher share from especially profitable operations.

The General Regulatory and Fiscal Framework

The primary feature of the EI legislative framework is the dislocation between the governing sector legislation (the MPRDA) and the income tax and royalties laws. In the context of the Income Tax Act 1962 (ITA), this reflects a lack of adjustment to the fundamental shift wrought from 2002 whereby "old order" EI rights were transferred into new order rights There seems no good reason why concepts used in the sector legislation should not form the basis of the fiscal regime for the EI in the ITA.

The income tax rules that frame the EI fiscal regime are scattered throughout the ITA. There is a lack of comprehensive reconciliation rules and so it is often difficult to determine whether a general rule is rendered ineffective by a more specific rule. Irrespective of whether SA engages in a much needed general rewrite of the ITA, it should bring together the fragmented rules for its EI fiscal regime and locate them in a dedicated part of the ITA. There should be separate parts for mining and petroleum. The special rules should be revisited and new rules should be based on consistent and coherent policy. Income from EI should be calculated independently for each EI right and protected from manipulation by transfer pricing rules. Ring-fencing (and policy based breaches) should be designed against this background.

The Royalties Act has two fundamental difficulties; the adjustment of royalties according to the profitability of the EI operator and differentiation between refined and unrefined resources. Both of these features should be reconsidered.

The SA approach to fiscal stability is equally fragmented. The limited provision for petroleum in the ITA and royalties is less than comprehensive. SA needs to provide a stable investment environment and needs to revisit its approach to fiscal stability across the range of matters that can affect the fiscal environment faced by EI operators. This report suggests a review of fiscal stability schemes that results in greater uniformity of treatment across EI sectors.

Mining and Minerals Fiscal Regime

The royalty and CIT regime alone present few obstacles to investment and production but the revenue yield is poor. Additional indirect impositions have raised costs and there is uncertainty in the regulatory and fiscal environment. The accretion of royalty and income tax

amendments over time, and now of sector legislation, has created a difficult legal framework. The urgent challenge is to have in place a fiscal regime perceived to be both stable and credible by all parties.

Three reform choices face South Africa.

1. A comprehensive reform of royalty, corporate income tax (CIT), and use of some form of cash flow tax that affects only highly profitable operations:

   - Flat rate royalty on gross revenue defined by a reference price or net smelter returns (NSR);

   - Standard CIT within mining ring fence with economic depreciation and allowance for corporate capital (ACC); and

   - Additional cash flow tax or resource rent tax (RRT) applicable only in highly profitable circumstances, with royalty a credit towards it.

2. Maintain current structure but with partial reforms.

3. Do very little—a choice in itself.

The mission favors the full reform but recognizes the challenges in so doing. Thus the report sets out an alternative. This involves maintaining the existing variable royalty scheme with improvements to valuation provisions by using a reference price or NSR. It also retains the 100 percent capital allowance for mine capital expenditure. Both options would reform the system so that better incentive for exploration expenditure is present.

Upstream petroleum fiscal regime

The current royalty and CIT regime alone would probably be unstable in the event of a significant and profitable discovery. It is very generous by international standards, partly for historical reasons. That has to be balanced against expectations of companies when they committed to exploration programs. The MPRDA amendment proposals, however, leave existing holders of exploration rights unclear about their obligations for state participation if they apply for a production right. Whatever the outcome, companies will seek a stability assurance encompassing all the obligations and rights – not just tax and royalty. The approach taken also affects public financial management of petroleum revenues.

Three options for upstream petroleum fiscal reform present themselves.

1. Delete new provisions altogether in revision of MPRDA amendment bill.

   - The State would still be free, through a corporation, to negotiate participation case-by-case as a commercial transaction;

- Additional tax could be introduced in Schedule 10 but applicable only to those without stability agreements (or newcomers), or by mutual agreement, and structured not to deter marginal projects.

2. A comprehensive shift to a production sharing agreement (PSA) system.

3. Define state participation option precisely and publish a model participation agreement.

In all cases, the royalty and CIT regime needs revision.

The mining royalty system is not suited to petroleum. *Royalty* could be set at flat rate on gross proceeds at the delivery point determined in a field development plan – probably at 5 percent. The *ring-fence for CIT* around oil and gas activities is appropriate; limit deduction of 10 percent of assessed losses against non-oil and gas income to actual expenditures not uplift. Treatment of *exploration and development capital expenditure* should be unified with write-off over five or six years, commencing in the year of commencement of commercial production.

Exploration expenditure requires clear and improved treatment. The mission suggests a review of the treatment of *unsuccessful exploration expenditure* and introduction of amortization *of the cost of acquisition of petroleum rights* (over the set depreciation period or life of asset). The current *uplifts* on exploration and development expenditure should be replaced with an *allowance for corporate capital (ACC)* on unredeemed capital expenditure balances at an annual rate (looking at region of 10 percent but expressed as margin over a bond rate). This ACC would also replace deduction of interest.

International Taxation

SA has a sophisticated approach to international tax issues and is well positioned to monitor developments in coming years. In the face of a broad and diverse tax treaty network, SA is taking steps to address issues arising from BEPS. In particular, the broadening of withholding taxes is a sensible move, although there are some areas in which further consideration may be given including withholding taxes on service fees, rents, and payment for the use of intangible property (not covered by the current royalty withholding tax). Strategic use of deduction denial might also be considered.

Transfer pricing remains a challenge, but SA has an appropriate legislative framework and will continue to work on transfer pricing issues at a practical level. Given the concessionary nature of a number or rules in the EI regime and the potential manipulation thereof, SA should consider the introduction of transfer pricing rules in a domestic context. SA seeks to tax indirect offshore upstream sales of EI rights, but there are a number of improvements that might be considered in this regard.

I. INTRODUCTION

A. The South African Tax Review Committee

1.   **This report is designed to assist in the overall review of South Africa's tax system**. The Department of the National Treasury has requested the Fiscal Affairs Department (FAD) of the International Monetary Fund to assist the deliberations of the South African Tax Review Committee, Chaired by Judge Dennis Davis, (the Davis Tax Committee, DTC) on the taxation of extractive industries (EI) with a focus on the revenue potential of the mining sector.

2.   **The DTC was established by the Minister of Finance in 2013**. As noted in the 2013 Budget Review, the DTC will consider whether the current mining tax regime is appropriate, taking account of:

    (i)   the agreement between Government, Labour and Business to ensure that the mining sector contributes to growth and job creation, remains a competitive investment proposition, and all role players contribute to better working and living conditions;

    (ii)   the challenges facing the mining sector, including low commodity prices, rising costs, falling outputs and declining margins, as well as its current contribution to tax revenues.

The DTC's review takes place within the context of its overall review of the corporate tax system, and other features of the South African tax system.

3.   **Coverage of upstream oil and gas is included in this report.** The scope of FAD's work was confirmed during a preliminary visit in November 2014. The authorities and the DTC requested the full mission to include evaluation of the fiscal regime for oil and gas.

4.   **A data and analysis supplement accompanies this report.** The supplement contains an account of mining in the South African economy, with detailed Figures and Tables. It also contains simulation modeling results from stylized projects in the mining and petroleum sectors, together with international comparisons.

B. Overall Issues for EI in South Africa

Minerals, oil, and gas in South Africa

5.   **Mining has historically been the mainstay of the South African economy.** Mineral exports remain the principal contributor to foreign exchange earnings from merchandise exports (30.4 percent in 2013, Figure A1[1]). Mining enterprises remain significant employers at 6 percent of wage employment—though numbers are much reduced from the past. The sector's contribution to government revenue, however, is down from a peak of nearly 29 percent in 1981—of which nearly 93 percent came from gold—to just 2.5 percent in 2013/14 with a negligible contribution from gold.[2] Large-scale mining began in South Africa in the nineteenth century: the sector is thus mature and some minerals, particularly gold, are substantially depleted given current techniques, costs, and prices. The country still has enormous resources, however, and products such as coal and iron ore have assumed great importance.

6.   **South Africa is not yet a significant producer of crude oil or natural gas.** During the apartheid era South African state-sponsored firms developed technology for producing synthetic fuels and petrochemical inputs from coal. One natural gas project at Mossel Bay was developed for gas-to-liquids conversion. These activities were developed in response to international sanctions that limited oil and petroleum product imports and production continues today. In 2004 the former state company, SASOL, commenced imports of natural gas from Mozambique for distribution and for petrochemical inputs.

7.   **Oil and gas exploration nevertheless shows promise.** In the past 10-15 years almost all potential offshore acreage has been licensed, with participants including most of the major international oil companies (IOCs).[3] Strong interest also exists in shale gas potential in the Karoo Basin, with five blocks likely to be licensed for exploration in the near future. Offshore conditions for exploration and development are extremely challenging: in addition to water depth, deep sea currents and surface weather conditions add to the cost and risk of operations. Although offshore exploration targets are large oil fields (in the region of one billion barrels of recoverable reserves), associated gas is a strong possibility. Both shale gas and offshore associated gas would be sold in the domestic market, making both pricing and competition in potential supply critical matters.

Considerations influencing fiscal regimes

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[1] References to Tables and Figures in the Analysis Supplement are preceded with "A". This main report is self-contained but these references will assist readers who wish to consult the supplement.

[2] Marius van Blerck, 1992, *Mining Tax in South Africa*; DMR, 2014,*The South African Mining Industry* (SAMI)

[3] A licensing map is available from the regulatory agency at http://www.petroleumagencysa.com/index.php/maps.

8.   **Taxation is far from top of the list in current challenges facing the development of EI in South Africa**. The "fiscal regime" broadly defined in the language of this report (see Box 1) has, however, become much more important with recent proposals for amendment of the MPRDA that include possible extensions of concessional participation by the state in petroleum activities, or by enterprises representing HDSA. Other challenges have dominated debate in recent times.

Box 1. Defining the Fiscal Regime

The fiscal regime for mining, oil and gas, is the combined system of tax and non-tax instruments used to raise government revenue from natural resource extraction activity. It includes not only conventional instruments such as royalty and income tax on profits, but also contractual schemes such as production-sharing or risk service contracts. The fiscal regime also includes instruments of state participation because these have fiscal effect on the division of revenues, even where held by a commercially operating state-owned enterprise. The fiscal regime may also include taxes, fees, levies and charges which accrue to the state by way of additions to input costs.

Mandated requirements that do not directly add to fiscal revenues may form part of the fiscal regime. These can include, for example, obligations to supply product to the domestic market at prices below export parity, or obligations to support acquisition of equity interests by designated citizens.

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9.   **Returns to mining activities in South Africa appear to have declined.** While a decline is not universal, data from *pwc*, a professional services firm, suggest reductions in returns to capital employed in the mining industry over a number of years.[4] According to data from Statistics SA (Figure A4) returns to capital employed in the mining industry fell to 3.6 percent in 2013 from nearly 21 percent in 2008. Most of the causes are not fiscal. The recent sharp falls in commodity export prices on world markets have played a part, but the sector did not prosper as expected during periods of high prices. The mining sector is substantially reliant on reinvestment decisions by South African domiciled companies. New foreign investment in the mining sector has remained significant in Rand terms (Table A6). Large mining houses such as Anglo-American and BHP Billiton that were previously listed on the Johannesburg Stock Exchange (JSE) have delisted and moved domicile, mainly to London.

10.   **Depletion of known reserves has become severe in long-established sections of the mining industry**. Depletion particularly affects the traditional gold mining sector. Gold mining now largely consists of deep underground operations, where even marginal ores have limited availability. New techniques (and higher prices) would be required to make it possible to go even deeper, where additional resources are already known to exist. Depletion also affects the diamond and platinum sectors with respect to known reserves. Substantial new discoveries of kimberlite pipes bearing diamonds appear to be unlikely. For platinum, however, significant new

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[4] *pwc* 2014, SA Mine, sixth edition, http://www.pwc.co.za/en/publications/sa-mine.jhtml.

reserves may be available in the known reef systems, possibly leading to new mine developments as well as extensions of existing ones.

11. **Coal has become the leading mine product by value with iron ore possibly the most profitable**. South Africa is a large consumer of coal for power generation, while exporting coal of higher quality after further screening and washing. Coal exports were 29 percent of total production by volume in 2012 but a higher proportion by value. The privately-owned Richards Bay coal terminal is an efficient export facility and is expandable. Production of iron ore is centered on four large mines—iron ore is one sector where foreign direct investment is important with Anglo-American and Glencore strongly represented.

12. **Labor costs in mining have risen sharply and major strikes have recently occurred.** In the face of significant secular falls in productivity in gold mining resulting, in part, from depletion and limited new investment in mechanization, workers across the industry have still secured rates of wage increase. Unit labor costs in mining outpaced those of other sectors since 2000 (Figure A5) though reduced productivity as ore grades fell, and capital investment did not compensate, mattered as much as wage rises. A large-scale strike in 2014 at platinum mines in and around Rustenburg was settled only after five months. In 2012 tragic deaths occurred during workers' protests at Marikana, into which inquiries continue. Living conditions at mine townships, in addition to wage levels, appear to have contributed to the intensity of industrial action and protests. Debate continues about the appropriate extent of responsibility of mining companies for direct provision of housing and amenities compared with the alternative of paying "living-out" allowances to workers.

13. **The national goal of economic and social transformation in favor of HDSA has major impact on the mining sector.** Under the Mining Charter and the relevant Codes of Good Practice for Broad-Based Black Economic Empowerment (B-BBEE) mining companies were to have transferred 26 percent of equity ownership in their operations to HDSA companies (a process more commonly known as Black Economic Empowerment, BEE) by November 2014, with a report on compliance due to be published in 2015. In most cases, BEE is financed by the transferring company with repayment out of subsequent dividends: where an enterprise fails no recourse is available. Thus the process has an unavoidable effect on anticipated returns to domestic private investment. BEE requirements also apply to new foreign investors. BEE also affects the commercial structure of the industry, since BEE interests have usually been transferred into companies distinct from the original company structure.[5] Uncertainty also remains over the issue of "once empowered, always empowered": in other words, if a BEE company is sold or sells its interest in a mine, other than to another BEE entity, does the original investor have a further obligation to create a new 26 percent BEE interest?

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[5] As reported by companies in discussions with the mission, the availability of data on such an effect is not clear.

14.   **The government gives high priority to industrial development using mining as a base**. Thus policy is directed towards promoting "linkages"[6] and, in particular, "beneficiation" of minerals. "Beneficiation" in South African usage means transformation of mineral commodities beyond the stage of the first saleable product, using domestic investment and labor, to produce a higher quality mineral product or fabricated product of which the mineral commodity is the core material. Linkages and beneficiation are promoted by policy encouragement, regulation, and in some cases fiscal incentives. In public discourse, beneficiation appears to secure greater attention than the imperative of generating fiscal revenues. Debate continues over the use of export taxes to promote beneficiation: the one prominent example so far is the diamond levy on exports, designed (so far without great success) to promote a domestic cutting and polishing industry.

15.   **Infrastructure constraints have become acute, bearing heavily on the mining industry.** Power generation and distribution remains the responsibility of ESKOM, the state-owned electricity utility, which has for some time been unable to maintain consistent supply to industrial and residential consumers. Frequent load-shedding has caused supply interruptions which, in turn, have forced some enterprises to invest in their own power infrastructure. In order to provide for better supply, ESKOM's regulated tariffs have been raised substantially, but remain at higher levels for residential consumers than for industrial users (Figure A6). Many mining and beneficiation processes rely on intensive water use for cooling, separation, or washing of product before sale. Water supply is also reputedly now constrained, according to the mission's discussions with the private sector. Finally, transportation infrastructure at railways and ports is overloaded, notably the two main rail connections to ports that transport bulk materials such as iron ore and coal.

16.   **New proposals for state participation in upstream petroleum ventures follow long debate about state involvement in mining.** The 2014 Amendment Bill for the MPRDA of 2002 introduced the possibility of a "free carried interest" of 20 percent in petroleum ventures, with an option for additional paid equity interests. The upstream petroleum exploration companies made strong representations about these provisions; the President referred the Bill back to Parliament in January for other reasons but the petroleum provisions also came under renewed scrutiny.[7] The ANC's report on State Intervention in the Mineral Sector (SIMS) of 2012 considered the possibility of new state equity participation in the mining sector but came down in favor of additional taxation, and regulation to encourage linkages and beneficiation. Two state-owned mining enterprises operate but as commercial enterprises in their own right. The fiscal implications of state participation in mining or petroleum have not been set out; the motivation

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[6] In the sense described by Albert O. Hirschman (1958), *The Strategy of Economic Development.* New Haven, Conn.: Yale University Press

[7] Chapter IV analyzes these proposals in detail as part of the petroleum fiscal regime.

for these interventions appears to be non-fiscal, in search of "control", or technology and skills development benefits.

17.   **Additional actual or proposed indirect levies, some as environmental charges, bear upon the mining sector.** Discussed in detail in Chapter III, some of these function as taxes on inputs or otherwise raise costs of production.

18.   **Thus the operation of the current fiscal regime, or of new proposals, is circumscribed by multiple other considerations.** South Africa's current fiscal position is challenging[8] and hence the requirement for the DTC to examine the revenue potential of the mining sector, taking account of wider considerations for transformation and the generation of employment. The task is to examine the fiscal regime with a view to generating a sustainable revenue contribution from mining and petroleum in future—which requires both an attractive climate for new investment to develop the tax base and a fiscal system that secures a reasonable contribution to state revenues from production and a higher share from especially profitable operations.

C. Outline of the Report

19.   **The main report has four further chapters**:

Chapter II – Legal Framework for Mining and Petroleum Fiscal Regime;
Chapter III – Mining and Minerals Fiscal Regime;
Chapter IV – Upstream Petroleum Fiscal Regime;
Chapter V – International Tax Issues for EI.

20.   **The principles followed are adapted to South Africa's circumstances from those of a number of IMF publications**. The report therefore does not contain a separate discussion of resource taxation principles or goals.[9] The accompanying supplement deals with fiscal regime simulations for mining and petroleum, which are summarized in chapters III and IV of this main report, and with background data and information on mining and minerals in the South African economy.

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[8] See IMF Article IV Consultation Staff Report, December 2014..

[9] In particular, two policy papers: *Fiscal Regimes for Extractive Industries, Design and Implementation* (IMF 2012); *Spillovers from International Taxation* (IMF 2014); and a handbook by Jack Calder, *Administering Fiscal Regimes for Extractive Industrie*s, IMF 2014; and chapters in P. Daniel, M. Keen and C. McPherson (editors), *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*, Routledge, London, 2010.

II. Legal Framework for Mining and Petroleum Fiscal Regimes

A. Income Tax Act and Mineral Royalty Act

21.   **The laws that frame SA's EI fiscal regime are highly customized and complex, incorporating substantial amounts of uncertainty and inconsistency**. Policy underlying similar conceptual issues goes in different directions in similar cases. The laws that frame the royalty and income tax regimes in SA reflect the long and deep history of mining in SA. This long history has resulted in many overlaying amendments with apparently little in the way of rationalization and fundamental restructuring. This is also true of the income tax law generally. This has been particularly acute in recent years when the pace of change has accelerated and government policy with respect to the mining and petroleum fiscal and regulatory regimes has not always been consistent or holistic. While at a technical level it seems that careful consideration is typically given to the policy considerations of each adjustment to the law and those policy considerations are clear, balanced and well-articulated, the bigger picture seems different. At the broader level, the EI are subject to substantial amounts of uncertainty and inconsistency in policy, which is not conducive to a stable investment environment.

22.   **The issues faced in structuring the legal framework for SA's EI fiscal regime are the same as in other countries.** This is true even if the weighting of the issues, and their political sensitivity, are different or nuanced in SA. Most countries impose income tax on EI participants. In that context, special issues arise in the EI due to: the highly regulated nature of the EI, high capital investment, high risk and speculation, long-term commitment, impact on and interface with local communities, long delays before substantial income flows, potential for high returns and need for high rehabilitation costs often after production has ceased. This section considers the special rules in the ITA that apply because of these particular features of the EI. At points it compares the royalty regime and then specifically considers some issues with respect to royalties at the end of this section.

Scope of the EI Fiscal Regime

Regulation under the MPRDA as a Backdrop

23.   **If a special regime or rules are to apply to EI then a first issue is defining the scope of that regime—define the activities that constitute EI**. The regulatory regime provides a logical method for defining the activities that constitute EI. In the SA context, the MPRDA distinguishes between and defines "minerals" and "petroleum" and then defines activities in respect of these in terms of, for minerals, "prospecting operations" and "mining operation", for petroleum, "exploration operation" and "production operation" and, for both, "reconnaissance operation" (s. 2). The MPRDA then provides a full suite of related definitions that support the regulation of these operations including the various rights required to be held for purposes of conducting these activities.

24.   **The MPRDA definitions are necessarily comprehensive, in that they define the scope of activities covered by the regulatory regime**. However, this does not suggest that they must also provide perfect certainty as to their scope. The scope of activities falling within MPRDA regulation is defined slightly differently depending on whether mineral operations or petroleum operations are involved.

25.   **In order to comply with the terms of a mining right, the holder of the right must comply with the terms of a "mining work programme".** This program is approved by the Minister of Minerals and Energy (s. 25(2)(c)). A mining work program typically incorporates requirements as to how the minerals will be brought to a marketable state (see Mineral and Petroleum Resources Development Regulations Reg. 11). For example, in the platinum industry this requires details as to how the holder of the license intends to process the ore so that it is saleable. While the mining work program is clearly regulated by the MPRDA, an issue is whether the activity of processing is technically a "mining operation".

26.   **In the context of processing activities conducted in the mining license area, the better view seems to be that processing required by a work program is a "mining operation"**. This is because the definition of "mine" (as a noun) specifically refers to "structures... used in connection with... processing" in the mining right area and (as a verb) includes "any operation or activity incidental thereto, in, on or under the relevant mining area".

27.   **More difficult is the situation where processing required by a mining work programme occurs outside the mining license area.** While s. 1 of the MPRDA defines "processing", the scope of regulation of processing is not expressly clear. However, "beneficiation" clearly includes processing and so is subject to the requirements of s. 25. Further, the activities of a "mineral processing plant operating separately from a mine" are subject to the requirements of s. 26 and it is clear that a social and labor plan and the Broad-Based Socio-Economic Empowerment Charter (authorized by s. 100) can apply to such activities.

28.   **Also difficult is the case where processing facilities are used to process not only the right holder's minerals, but also minerals from the mines of a third party**. In both the case of processing outside the mining area and third party processing, it seems the better view is that processing is regulated by the MPRDA (and see s. 93 regarding suspension orders) and certainly regulations can be made under the MPRDA regarding "processing... any mineral" (s. 107(1)(b)). The MPRDA Amendment Bill of 2014 would make clearer reference to a "mine processing site" as opposed to the "area of the mine".

29.   **The issues of scope under the MPRDA with respect to petroleum are slightly different.** The definition of "processing" (which includes refining) does not apply to petroleum. However, there are situations in which use of the word "processing" in the MPRDA may apply to petroleum. If it does, it seems likely it would include refining of petroleum and perhaps this means that "production" of petroleum cannot include refining (a usual distinction in the

industry). However, the regulation-making power for processing in s. 100 clearly only applies to minerals (which excludes petroleum). The situation is far from clear.

30. **The DMR has also been having issues with persons conducting activities under another person's mining right, whether by way of simple sub-contract or lease of the right**. Under the MPRDA it is possible that the contractor or lessee is "mining", however, it seems that the contractor would be doing so illegally. This is because s. 5A of the MPRDA provides that "[n]o person may... mine... or commence with any work incidental thereto on any area without... a... mining right". It is not clear how s. 5A is to be reconciled with s. 11 of the MPRDA, which requires the permission of the Minister of Minerals and Energy for transfer of a mining right but under which the Minister may also permit a lease (or sublease) of a mining right. The DMR confirms that it is not their practice to permit leases of new order mining rights.

To What Extent does the ITA follow the MPRDA?

31. **By contrast, the ITA has multiple definitions of what is within the scope of the EI.** Part of the reason for this seems to be that the ITA was not brought into line with the MPRDA concepts when the latter were introduced in 2002. One reason for this may have been the protracted transition period from old-style EI rights to the new MPRDA rights. Even though some old-style rights still exist, the transition seems sufficiently progressed for a reconsideration of the ITA approach. While the scope of the MPRDA concepts lacks a certain clarity at the edges, this does not mean that the existing ITA rules are a substantial improvement on them. Perhaps the greatest difficulty with the ITA provisions is the lack of consistency between them.

32. **The starting point to understanding the scope of the EI regime under the ITA is to note that, as a general rule, the income of a business entity is calculated on a global basis**. That is, losses from one trade may be set against income of the entity from another trade (s. 20). Historically, only "income" was subject to tax and not "capital gains", hence capital expenditure was as a general rule not deductible and the global approach only applied to income/revenue amounts and deductions. However, since income tax was introduced, mining has always been subject to special rules for "capital expenditure". The global approach only applies on an entity-by-entity basis and, in particular, there is no provision permitting the setting of losses of one member of a corporate group against the profits of another group member (there is no group relief). Broadly, this did not change with the introduction of capital gains tax in 2001. Rather, in many ways capital gains tax was bolted onto the income tax rather than being integrated into it.

33. **As a consequence of this history, many of the special rules for the EI under the ITA only apply to "capital expenditure";** operating expenses continue to fall within the global approach. This is in contrast with the MPRDA, which regulates operating expenditure falling within a miner's work program.

34. **Perhaps the key provisions in the ITA applying to mining are those that are triggered by the joint definition of "mining operations" and "mining"** (s. 1). These include

the rules for permitting the deduction of capital expenditure (s. 15(a) and s. 36) (and its recoupment), special rule on trading stock (s. 15A), contributions to a rehabilitation fund (s. 37A), prospecting expenditure (s. 15(b)) and the disposal of mining property (s. 37).

35.   **The definition of "mining operations" and "mining" was not updated to be consistent with the definition in the MPRDA when the latter was introduced**. There are many inconsistencies between these two definitions. Under the ITA, "mining" includes "every method or process by which any mineral is won". Despite a definition in the MPRDA (which excludes petroleum), there is no definition of "mineral" for ITA purposes. This leads to uncertainty; for example, it seems that quarrying and processing clay, slate, sand and stones are not mining for income tax purposes when those substances are clearly covered by the MPRDA (and as discussed below, the Royalty Act). Inevitably, the ITA definition gives rise to difficult issues with respect to processing (when does "mining" end?), although it may not provide the same answers as under the MPRDA definition.

36.   **In determining the scope of "mining operations", another area that is causing SARS some difficulty is subcontracting of mining activities**. The position seems to be that a person contracted to win minerals from the mining area of another person who holds a right may be considered to be conducting "mining operations" for ITA purposes if the contractor takes sufficient risk with respect to that winning. As a consequence, the contractor may access the various (concessional) ITA provisions that apply to mining operations. This seems irregular when compared with s. 5A of the MPRDA, which as discussed above prohibits mining without a mining right. The ability to access special mining provisions under the ITA seems to encourage breach of s. 5A. A more consistent approach would be to align ITA treatment with the developing DMR approach that only persons with a mining right can "mine".

37.   **Petroleum is specifically excluded from the definition of "mineral" under the MPRDA but not from the definition of "mining" under the ITA**. It seems that previously the definition of "mining" in the ITA specifically included "natural oil", a phrase that is still defined in the ITA (and used in some sections, e.g., s. 10(1)(o), with a different definition of the phrase used in s. 12D) and resembles the definition of "petroleum" in the MPRDA, but is not the same. The Tenth Schedule of the ITA applies to "oil and gas companies" and applies to calculation of their "oil and gas income". The critical definitions of "oil" and "gas" in the Tenth Schedule (para. 1), when combined, are broadly consistent with the mentioned definitions of "natural oil" and "petroleum".

38.   **Both the definition of "natural oil" and "petroleum" refer to "any liquid, solid hydrocarbon or combustible gas existing in a natural condition in the earth's crust".** By contrast, the definitions of "oil" and "gas" in the Tenth Schedule of the ITA additionally require that the substance consists "primarily of hydrocarbons". This bizarre combination of definitions seems to raise a strange possibility. A company with a production right under the MPRDA that derived income from a substance within the definition of "petroleum" but which does not consist "primarily of hydrocarbons" would be subject to the mining regime under the ITA and not the oil

and gas regime (or even partly to both with respect to income under the same production right). Even if that is impossible, the confusion caused by such an inconsistent mix of definitions seems unfortunate and representative of the fragmented nature of SA's fiscal regime for EI and the ITA generally.

To What Extent does the MPRRA follow the MPRDA and ITA?

39.   **The situation under the ITA contrasts dramatically with the situation under the Mineral and Petroleum Resources Royalty Act, 2008 (MPRRA).** Initially, the MPRRA follows more closely the MPRDA. In particular, "mineral resource" under the MPRRA (s. 1) includes both "minerals" and "petroleum" as defined under the MPRDA. However, royalties are imposed on a person who "transfers" a mineral resource (s. 2). Even though that person is referred to as an "extractor", that person need not be the holder of a right regulated under the MPRDA. In the normal case it will be the holder of a right that is subject to the imposition of a royalty and multiple charges are prevented by imposing a royalty only on mineral resources that have not been "previously disposed of". Confusingly, only "registered persons" are required to provide royalty returns in terms of s. 5 and s. 6 of the Mineral and Petroleum Resources Royalty (Administration) Act, 2008, and persons holding a right under the MPRDA "must" register (s. 2). How the royalty would be collected from unregistered persons is not clear.

40.   **This failure in the MPRRA to follow the MPRDA regulation may again raise difficult issues.** In particular, it raises the issue of when is a mineral resource separately identifiable from other material. Is the disposal of a right to extract minerals a disposal (in whole or in part) of the minerals or is the disposal of a stockpile of unprocessed ore a disposal of minerals? It is standard procedure to ensure that royalties are imposed at the latest at the point of export. This was previously the practice in SA, but this was changed in 2010 when the practice became tracing exports to an overseas sale. This clearly puts the royalty regime beyond the regulatory scope of the MPRDA, although presumably the relevant mineral right holder would remain within that scope.

Interface between Special EI Rules and General ITA Rules

41.   **Once the scope of an EI fiscal regime has been set, there is an issue as to the location of the special rules that make up that regime**. There is also an issue as to how those special rules interact with the general rules of the tax law in question. As to location, the SA approach to special rules for mining in the ITA is in stark contrast to the special rules for petroleum. The "mining regime" is scattered throughout the ITA. There is an attempt to isolate the special rules for petroleum in the Tenth Schedule of the ITA. The latter approach seems more instructive and can assist in retaining the structure of the general rules (part of the problem with navigating the ITA is that general rules are constantly mixed with special rules). The collecting of special rules can (but need not) be in a separate schedule, they can be placed in a dedicated division of the relevant tax law. Some countries have also considered placing the special rules for the EI in a

special tax law. No matter which form is adopted, the issue of interface between the general rules and special rules remains the same.

42.   **There is some uncertainty as to the interface of the special mining rules and other ITA rules of a more general nature.** In some cases the disapplication of a general rule for mining operations is express in that rule—the deduction under s. 12C, s. 12E and s. 13, and see s. 11D regarding research and development expenditure and oil and gas or mineral exploration or prospecting. In other cases it is not so clear: s. 12I and proposed s. 12L, particularly if the benefit of a provision is granted as a matter of discretion. Some of the special mining rules such as s. 15(1)(a) specifically disapply other provisions. Again, this fragmentation could be addressed by bringing together all of the special rules that apply to mining.

43.   **It seems that because "mining" under the ITA can include petroleum extraction, the exclusion of mining from the operation of specific provisions of the ITA will also exclude petroleum operations**. This is despite the prescription in s. 26B that the income of an oil and gas company is determined under the general rules of the ITA but subject to the provisions of the Tenth Schedule. What is less clear is whether any of the specific provisions for mining operations apply to oil and gas companies. This might be an issue where the ring fence for a particular expense is broader or narrower under the mining provision than under a Tenth Schedule provision. For example, s. 15, s. 15A, s. 36, s. 37 and s. 37A make no reference to "natural oil" or "oil and gas". It seems likely that at least s. 15A on trading stock would also apply to oil and gas companies.

44.   **There might also be reconciliation issues between general provisions of the ITA and the provisions of the Tenth Schedule.** One example is the question of whether the general deduction rule in s. 11 can apply to amounts that otherwise fall to be deducted under paragraph 5 of the Tenth Schedule. Again, this might be important because as a general rule amounts deductible under s. 11 are not subject to a ring-fence. Indeed, s. 26B presumes that "taxable income of any oil and gas company" is "defined" in the Tenth Schedule, but that seems an inaccurate statement as there is no such definition in the Tenth Schedule. Outside of s. 26B, there are no express rules that reconcile the provisions of the Tenth Schedule with the remainder of the ITA.

45.   **There is again a major contrast between mining and petroleum under the ITA when it comes to the location of tax rates.** As a general rule, mining is subject to standard income tax rates. A special rate formula applies "in respect of the taxable income derived by any company from mining for gold [and certain by-product minerals] on any gold mine". This gold mining formula raises a number of issues, some of which are discussed below in Chapter III. For present purposes, it is enough to note that the formula requires the segregation of "taxable income from mining for gold" from the remainder of a company's taxable income. There are few legislative rules for performing this apportionment, although given the long term standing of this formula an acceptable practice has built up with some administrative discretion. These rates of tax for mining are located in the annual rates law. The rates for the current year are located in paragraph

3 of Appendix I of the Rates and Monetary Amounts and Amendment of Revenue Laws Bill, which is currently before Parliament.

46.   **By contrast, the rates for petroleum are set out in paragraph 2 of the Tenth Schedule of the ITA, not in the annual rates law.** One critical consequence of this is that a fiscal stability agreement in terms of paragraph 8 of the Tenth Schedule can apply to the rate of tax "on taxable income derived from oil or gas income". Leaving aside the disparate location of these rates, an important point is that except in the case of taxable income from mining for gold and taxable income from oil or gas (terms which themselves are not precisely defined), there is no legislative framework for distinctly identifying taxable income from mining. This impacts on the manner in which (the fragmented) ring-fencing operates. It is also something that would have to be addressed if a special rate of tax were to apply to mining income or, depending on its nature, some form of additional tax were to apply to mining (such as a resource rent tax).

Reconnaissance

47.   **Expenditure incurred in reconnaissance and exploration is another area where there is no coordination between the MPRDA and the ITA**. The MPRDA regulates reconnaissance permits (s. 13 to s. 15 for mining and s. 74 to s. 75 for petroleum), prospecting rights (s. 16 to s. 19 for mining), technical co-operation permits (s. 76 to s. 78 for petroleum) and exploration rights (s. 79 to s. 82 for petroleum). There is a suite of definitions that detail the scope of what is covered under each of these rights.

48.   **It is largely impossible to relate this regulatory environment to rules in the ITA.** The body of the ITA seems to make no reference to reconnaissance, as such. The renewal of a reconnaissance permit does not trigger capital gains taxation (para. 67C of the Eighth Schedule). Further, a gain on the disposal of a petroleum reconnaissance permit is oil and gas income for the purposes of the Tenth Schedule (para. 1, definition of "oil and gas right"). It seems that this means that "reconnaissance operations" (as defined in the MPRDA) are subject to general income tax rules.

49.   **In particular, expenditure incurred in reconnaissance may be deductible under s. 11 of the ITA.** However, there seem to be two risks here. One is that the expenditure is incurred pre-trading (not in the "production of income"), although s. 11A permits a deduction for pre-trading expenses. Depending on the facts, the reconnaissance expenditure might also be seen to be part of an existing mining business. In the context of petroleum reconnaissance, under paragraph 6 of the Tenth Schedule a person holding a petroleum right (including a reconnaissance permit) is deemed to be carrying on a trade and expenditure is deemed to be incurred in the production of income. While not express, this would seem to disapply s. 11A. The second risk is that such expenditure might be considered to be "of a capital nature". This seems unsatisfactory and the treatment of expenditure incurred under a reconnaissance permit should be clarified, at least for mining.

Exploration

50.   **By comparison, the ITA does have some special rules for "prospecting" and "exploration".** "Prospecting" is not defined (although s. 15(b) includes "surveys, boreholes, trenches, pits and other prospecting work preliminary to the establishment of a mine") and so it is not clear whether the definition in the MPRDA is relevant or whether, for example, "prospecting" in the ITA may be interpreted sufficiently broadly to cover activities falling within the definition of "reconnaissance operations" as defined in the MPRDA (which specifically excludes "prospecting"). The body of the ITA does not have a definition of "exploration", although uses that term in a number of contexts with the term "prospecting".

51.   **"Exploration" is defined in the Tenth Schedule of the ITA, but there are substantial differences between this definition and the definition of "exploration operation" in the MPRDA**. In particular, it seems possible that the definition in the Tenth Schedule might include at least some activities that fall within the definition of "reconnaissance operations" in the MPRDA.

52.   **S. 15(b) of the ITA particularly allows a deduction for expenditure incurred in "prospecting operations".** However, as the deduction is only from income derived from mining operations, if the person incurring the expenditure has not yet proceeded to conducting mining operations there can be no deduction under s. 15(b). It seems that any mining operations would be sufficient to secure the deduction, even if the prospecting is not related to them. The tax administration has some discretion over the timing and allocation of the deduction. If the person incurring the expenditure conducts no mining operations, it seems that the person would have to look to other rules (e.g., s. 11) if seeking a deduction. It seems that the 150 percent deduction for research and development expenditure under s. 11D is available for "research and development carried on to develop technology used for" mineral or oil and gas exploration or prospecting. It is presumed (though not clear) that s. 15(b) and s. 11D are mutually exclusive.

53.   **By contrast, it is clear that all expenditure on exploration is deductible in calculating taxable income from oil and gas for purposes of the Tenth Schedule of the ITA** (para. 5(1)). Further, the 100Main percent uplift in paragraph 5(2)(a) is available for all exploration expenditure, but only if it is of a capital nature. What is and what is not "of a capital nature" is not defined in the ITA and depends on a complex body of case law. In addition, only 50 percent uplift is available for "post-exploration" expenditure of a capital nature. As "exploration" and "post-exploration" are not defined by reference to whether an activity is conducted under an exploration or production right, there is likely to be difficulty in determining whether particular expenditure qualifies for 100 percent or 50 percent uplift.

54.   **Indeed, the difference in tax treatment between "exploration" and "post-exploration" expenditure may have distorting effects.** It may be desirable from a tax perspective to hold an exploration right for as long as possible to support an argument that capital expenditure must be exploration expenditure. Placing such an important tax difference

(between 100 percent, 50 percent or no uplift) on two particularly difficult distinctions (capital/revenue and exploration/post exploration) seems mistaken. In addition, the interface between these rules and the 150 percent deduction for research and development expenditure in s. 11D is not express.

Development and Production

55.   **As noted above, the general ITA rules apply in calculating income from mining, but this is subject to some important exceptions**. Typically, operating expenditure is deductible under the general deduction rule in s. 11. The rule for trading stock in s. 22 is adapted for purposes of application to "mining operations" (s. 15A), which as noted above is presumed to include petroleum operations.

56.   **The most important special rule for mining operations is the deduction in s. 15(a) of the ITA for "capital expenditure" defined in terms of s. 36**. As discussed above with respect to s. 15(b) (exploration), the deduction is only available against "income derived by the taxpayer from mining operations" and so expenditure incurred prior to commencement of those operations is not covered by s. 15. S. 36(11) contains a highly customized definition of "capital expenditure" which covers expenditure on many development and production activities. However, there is no direct relationship between expenditure on activities covered by this definition and activities regulated under the MPRDA, e.g., with respect to a mining or production right. A reconciliation rule ensures that any prospecting expenditure deducted under s. 15(b) is not "capital expenditure" for the purposes of s. 36 (s. 15(b)(iii)).

57.   **The primary category of capital expenditure is that on shaft sinking and mine equipment and as a rule interest, finance charges and management fees are excluded**. However, capital expenditure does include "expenditure on development, general administration and management ... prior to the commencement of production or during any period of non-production" and here even interest on loans may be included. There is little in the way of definitions to assist with interpretation of this addition (e.g., does "production" relate to anything under the MPRDA?) and it seems that at least some of these expenses may be deductible under the general provision of s. 11 of the ITA.

58.   **Not all capital expenditure incurred in mining operations is covered by s. 36(11).** Particular issues arise with respect to the cost of intangibles (including the mining right, options and goodwill) and the cost of land and surface rights. Certain capital expenditure for employees is covered by the deduction (such as with respect to housing, hospitals, schooling, motor vehicles and recreation facilities) but spread out over ten years. However, similar capital expenditure for the community in which mining operations are conducted is not covered (so called discretionary or informal expenditure not covered by the social and labor plan). While an obvious deduction for accounting purposes, it is not clear how in this case an EI operator would get direct tax relief for this business expense. A deduction may be available if the community registers a public

benefit organization under s. 30 and the operator makes a "donation" of "cash or property" (s. 18A). It is not clear that this would cover all benefits and services provided to local communities.

59.   **As a whole, the capital expenditure regime for mineral operations is little more than a disarmingly confusing and fragmented depreciation regime**. The deductible amount under s. 15(a) of the ITA is reduced by amounts received from disposals of assets whose cost has in whole or in part been previously deducted ("capital expenditure incurred", defined in ITA s. 36(11)). Any excess amount received is included in income (para (*j*) of the definition of 'gross income' in ITA s. 1). This is effectively a balancing charge. For amounts that are incurred in activities regulated by a mining right and that do not fall within that regime, one is again left searching for the relevant tax treatment in the general rules of the ITA.

60.   **In addition to the deduction for capital expenditure, certain gold mines are entitled to an uplift of what is effectively the unredeemed amount of qualifying capital expenditure** (para. (c) of the definition of "capital expenditure" in ITA s. 36(11)). The uplift rate is 10 percent for post-1973 mines and 12 percent for post-1990 mines applied on a compound basis. The overall effect of this is of a style similar to an ACC, but of a peculiar nature where only certain expenses are counted (e.g., generally not operating expenses) and there is the potential to deduct and include for uplift at least some interest expense (see above). The effect of the uplift is to put pressure on identifying certain types of expenditure from certain types of activities.

61.   **Similar pressure occurs in the context of petroleum development and production due to the distinction between "exploration" and "post-exploration" in the Tenth Schedule of the ITA** (noted above). The increases of 100 percent and 50 percent in capital expenditure on exploration and post-exploration activities (respectively) are not compounded in the way that the additional allowance for gold mining companies is.

62.   **This mechanism of using 100 percent and 50 percent increases in the Tenth Schedule of the ITA is particularly distorting.** The increases are once and for all and are not apparently subject to recoupment if capital expenditure is redeemed. In particular, proceeds on disposal of an asset that qualified for the deduction is not increased by a similar percentage. There could be an incentive to sell an asset into a petroleum company and buy it back shortly after for a very significant tax advantage (subject to the general anti-abuse rule).

Decommissioning and Rehabilitation Expenditure

63.   **The nature of extraction in the EI and particularly mining requires large expenditure on decommissioning and rehabilitation.** As a consequence, EI right holders are required to secure environmental authorizations for purposes of conducting mining operations in terms of s. 24 of the National Environmental Management Act, 1998. EI right holders are required to provide "financial or other security to cover the risks to the State and the environment of non-compliance with conditions attached to environmental authorizations". The method of providing the security is laid out in the Mineral and Petroleum Resources Development

Regulations (Reg. 53) and are primarily by way of contribution to a trust fund meeting the requirements of the ITA (s. 37A) or by provision of a financial guarantee approved by the DMR.

64.   **S. 37A of the ITA provides an EI operator with a deduction for "cash paid" to a trust or company meeting the requirements of the section**. The operator must hold a "a permit or right in respect of prospecting, exploration, mining or production" or, so it seems, not the holder of the permit or right but, according to the terms of that permit or right, engaged in prospecting, exploration, mining or production. While these activities are not defined, it seems logical to interpret them in the context of the MPRDA. A company or trust that meets the requirements of s. 37A is exempt from tax (s. 10(1)(cP)). There are several restrictions on investments that such a trust or company may make and penalties for transfers from the trust or company before DMR provides a closure notice.

65.   **The requirement of a cash payment into the trust or company has made the form of financial provision contemplated by s. 37A of the ITA unpopular**. Many EI operators prefer to provide various forms of financial guarantees. This route does not lead to a deduction and no provisioning is permitted. It appears that some EI operators may have tried to replace their rehabilitation trusts with a DMR approved guarantee and exposed themselves to double taxation of the full value of the trust fund when it was transferred out of the fund. This is under the penalty provisions which would tax the trust fund at the trust rate (40 percent) and also include the value in the income of the EI operator. The DMR also has particular difficulties with old-style EI rights, which do not have as part of their terms a legal requirement to establish a trust fund.

66.   **Presuming that actual expenditure by an EI operator on rehabilitation is not covered by reimbursement from a trust fund, an issue is the ITA treatment of such expenditure**. It seems that the deduction for capital expenditure under s. 15(a) cannot apply because expenditure "in respect of infrastructure or environmental rehabilitation" is excluded from the definition of "capital expenditure" in s. 36(11) (para. (e) of the definition). The general deduction rule in s. 11 might apply, but there must be some risk that some types of rehabilitation expenditure might be "capital in nature". There must also be a risk that some types of rehabilitation expenditure might be incurred after an EI trade has ceased.

67.   **A difficult question is the extent to which s. 37A of the ITA applies to petroleum operations.** The terms of s. 37A are broad enough to apply to petroleum operations but s. 28B effectively gives priority to the Tenth Schedule. Rehabilitation could not be "exploration" for the purposes of the Tenth Schedule but one questions whether it could be "post-exploration" as defined in paragraph 1. Literally, it seems that rehabilitation is an "activity carried out after the completion of the appraisal phase", but one also questions whether a contribution to a rehabilitation fund could be. If that is possible, then a deduction would be available under paragraph 5(1) of the Tenth Schedule. An additional question would then be whether rehabilitation expenditure or a contribution to a rehabilitation fund could be "of a capital nature".

At issue is whether such payments might qualify for the 50 percent uplift. This area seems in need of clarification.

Losses and Ring-fencing

68.   **Most income tax laws provide (at least in some circumstances) for a loss of a taxpayer incurred on one activity to be set against income the taxpayer derives from another activity (sideways relief).** This is particularly so under the basic global approach adopted in the ITA. This can be distortive when taxpayers competing in the same industry are compared. One taxpayer may incur the full impact of losses whereas another may get relief for those losses by setting them against taxable income from another activity. Absent a system under which government provides cash payments for losses (government shares the full extent of downside as well as upside of activities) these distortions are present in all income tax laws that permit sideways relief.

69.   **While distortions arising from losses are inherent in most income tax laws, this can be particularly problematic in industries like the EI**. This is because the EI involve large upfront expenses and long lead times before income is derived. If one EI operator has income against which these large front loaded costs can be set, they are at a substantial competitive advantage to a new entrant in the industry that does not have access to that relief. In other words, sideways relief provides an advantage to large well established operators compared to new entrants. This can be particularly acute where, as in the SA EI tax regime, large amounts of capital expenditure are immediately deductible. The balancing factor is that allowing this relief subsidizes and so encourages investment in these large scale projects.

70.   **Sideways relief can also be problematic in the opposite direction, where losses from other activities may be set against income from EI**. This is the case where, as in many countries, the EI regime imposes a higher tax on income from EI than that imposed on other industries. At the moment, limitations on sideways relief under the ITA seem to be largely one way in character; they limit the use of deductions under the EI regime from being used against other income but have no apparent limitation on losses from other trade activities being set against income from EI (ITA s. 20). One exception is that foreign trade losses cannot be set against SA source income. In the future, should SA wish to tax EI at a higher rate than other industries, EI income will need to be protected from this form of set-off.

71.   **Further issues arise if different tax rates are applied to different activities or an attempt is made to limit the use of losses from one activity against the income from another activity**. In this case, rules are required for allocating income and expenses between activities - this is referred to as ring-fencing. Here there is no global calculation of income, but rather the calculation of income becomes "scheduler". While the SA income tax has scheduler features, its rules for allocating income and deductions between different activities are particularly confused and uncoordinated, at least in legislative form. The fragmented nature of the ITA rules applicable

to the EI that were discussed above is reflected in the ring-fencing rules that apply to income from EI.

Residual Position

72.   **A starting point is rules where there is no obvious ring-fence or limitation on sideways relief.** In particular, it seems that operating expenses incurred in the course of an EI trade that are deductible under the general provision of s. 11 of the ITA could give rise to a loss that could be set against the income of any other trade under s. 20. Similarly, the deduction provided under s. 37A for contributions to a rehabilitation fund is a general deduction. The same seems to be true of s. 11D (research and development expenditure), where that is applicable, possibly s. 11A (pre-trading expenditure) and s. 18A (contributions to public benefit organizations). The point seems to be that a mining business can have an assessed loss that is available for sideways relief under s. 20, at least where it has no "mining income" as discussed below.

Prospecting Ring-fence

73.   **The position with respect to general operating expenses can be contrasted with that for prospecting expenses under s. 15(b) of the ITA**. Here the deduction is only against "income derived from mining operations" and not income generally. "Income" is defined in s. 1 and is effectively "gross income" less exempt amounts, i.e., it is still essentially a gross concept before deductions (and so is contrasted with "taxable income"). This raises the point noted above that s. 15(b) can only be triggered once a miner has income and that income is from activities that constitute "mining operations". Before this, the general deduction rules must be considered.

74.   **Initially, the ring-fence for prospecting expenditure is around income from any mining operations, and not necessarily prospecting in the prospecting or mining right area giving rise to the income**. However, the Commissioner is given discretion to ring-fence the deduction against income from a particular "class" of mining operations. It seems that this discretion only applies where there is "income" from particular operations.

75.   **What is not clear is what happens if the deductible expenditure under s. 15(b) of the ITA exceeds the relevant "income".** One approach is to say that the deduction is limited to the amount of income, in which case the question arises as to whether the excess is deductible under general principles. A second approach is to say that the whole of the expenditure is nevertheless deductible. In either case, it is not clear how any excess would be quarantined and so may be available to set against the operator's income whatever its nature. This is because a person engaged in mining operations nevertheless only has one general amount of taxable income that is subject to tax and, as noted above; taxable income is effectively a global concept.

Mining Operations Ring-fence

76.   **The ring-fencing around s. 15(a) of the ITA is different again, and more complex.** As with s. 15(b), there is the preliminary requirement that the person seeking the deduction has "income derived from mining operations". However, s. 36, which identifies the amounts that can be deducted, incorporates additional requirements and limitations of a ring-fencing nature.

77.   **As a starting point, s. 36(7C) of the ITA appears inconsistent with s. 15(a).** S. 15(a) refers to income from mining operations generally, whereas s. 36(7C) refers to deduction from the income of "any producing mine". Literally, s. 36(7C) does not seem to provide for any particular ring-fence (and is at the least deficient for that purpose) and perhaps should be interpreted as an effective instruction that capital expenditure must be calculated on a mine by mine basis. S. 36(7E), (7F) and (7G) then provide limitations on the amount of deductible capital expenditure, which are effectively ring-fencing in nature.

78.   **A major issue when facing s. 36(7C) of the ITA is what constitutes a separate "mine".** There is no definition of this term and the relevance of the definition in the MPRDA is not clear. That definition leaves open the possibility of more than one mine existing in a mining right area, and this is consistent with discussions had with some mining companies. As a result, it would seem difficult to interpret "mine" in s. 36(7C) as encompassing all activities on a mining area, i.e., the concept in s. 36(7C) seems more obscure than requiring a separate calculation of capital expenditure by mining right area. Contiguous mines, especially if they are covered by different mining rights, seem to cause particular definitional issues.

General Mining Ring-fence

79.   **S. 36(7E) of the ITA is a general ring-fence around mining, which has what s. 15(b) lacks an effective limitation on the "amount" that can be deducted**. "Capital expenditure" (the deductible amount) is limited to "taxable income... derived... from mining". The change in terminology from "income" in s. 15 to "taxable income" in s. 36(7E) is critical as it is a change from a gross concept to a net concept. At some level, this phrase lacks definition, because, when it comes to applying tax rates, "taxable income" is "of any person" and so a global calculation (covering all activities). The implicit requirement in s. 36(7E) is that income and deductible amounts used in the calculation of taxable income must be allocated between activities that constitute mining and other activities. There is no legislative instruction regarding how this allocation (and any necessary apportionment) is to be performed.

80.   **Confusingly, what is being limited by s. 36(7E) of the ITA is precisely one of the elements that goes to making up taxable income from mining**. As the deduction in s. 15(a) would logically be a factor in determining that taxable income, that deduction (as determined according to s. 36) is excluded from the calculation of taxable income from mining for the purposes of s. 36(7E).

81.   **Further confusion is caused by another instruction in s. 36(7E) of the ITA.** "Taxable income from mining" is reduced by any "assessed loss incurred... in relation to such mine or mines in any previous year which has been carried forward from the preceding year of assessment". This is not a perfect match with s. 20 (which permits the loss carry forward), which rather refers to an assessed loss from a "trade". As such a loss from mining could not have resulted from capital expenditure referred to in s. 36; it could only result from the deduction of other amounts. Presuming those other amounts are not effectively ring-fenced, an assessed loss from mining may have been set against other non-mining income, in which case it would not be available for carry forward. Analyzing the precise consequences of this is more than challenging.

82.   **S. 36(7E) of the ITA proceeds to deal with excess capital expenditure for which a deduction is denied due to its limitation**. Such expenditure is carried forward and treated as capital expenditure incurred in the next tax year. In this way, a particular mining operation may be carrying forward an assessed loss from mining, which is not apparently quarantined and may be set against any non-mining income, and excess capital expenditure, which is quarantined and may only be used to reduce future mining income. The complex relationship between s. 15(a) and s. 36(7E) seems to be that if a person is conducting "mining operations" but has no income there from (maybe prior to production), then the capital expenditure will be rolled forward until income is derived and then may be used to trigger a deduction under s. 15(a).

Mine-by-mine Ring-fence

83.   **S. 36(7F) of the ITA goes further and provides for ring-fencing of capital expenditure on a mine by mine basis.** In this case the amount of capital expenditure "in relation to any one mine" is not to exceed the "taxable income ... from mining on that mine". Difficulties with identifying what is a "mine" were noted above, as was the concept of "taxable income". The prescription in s. 36(7F) requires income and expenses to be allocated per mine.

84.   **This is not to say that the taxable income from all mines operated by a person must total taxable income from mining as prescribed by s. 36(7E) of the ITA**. This is because it is not clear that a person can only conduct "mining" (verb) with respect to a "mine" (noun), or at least that is an issue that is not directly resolved by the ITA. As under s. 36(7E), taxable income under s. 36(7F) must be reduced by carried forward assessed losses, but these losses must be calculated on the narrower per mine basis. Carry forward of excess capital expenditure under s. 36(7F) of the ITA follows the rules for s. 36(7E).

85.   **Unlike s. 36(7E), s. 36(7F) of the ITA contains a discretion for disapplication.** The discretion must be exercised by the Finance Minister in consultation with the Minister for Mineral Resources. An additional effective exemption is provided by treating a number of pre-1984 mines as a single mine.

Breach of the Mine-by-mine Ring-fence

86.   **The mine-by-mine ring-fence created by s. 36(7F) of the ITA is then, in essence, subject to a limited breach under s. 36(7G).** Unfortunately, s. 36(7G), in itself, incorporates an overlapping ring-fence. If mining operations with respect to a mine commence post-1990, then any capital expenditure for that mine disallowed by s. 36(7F) is nevertheless deductible "from the total taxable income derived by the taxpayer from mining". This is a peculiar provision because technically the deduction is not under s. 15(a), but s. 36(7G) itself. This at least raises the issue as to whether the deduction under s. 36(7G) is subject to the overall limitation in s. 36(E), perhaps not. Identification of the income against which the deduction can be set is essentially the same as under s. 36(7E). However, the total amount deductible under s. 36(7G) is limited to 25 percent of total taxable income.

Petroleum Ring-fence

87.   **This unnecessarily complex matrix of ring-fences for mining can be contrasted with the ring-fence for petroleum.** For petroleum, the starting point is that the petroleum corporate tax rate is applied to "taxable income derived from oil or gas income" (para. 2 of the Tenth Schedule of the ITA). The definition of "oil and gas income" in paragraph 1 provides the effective test for allocating "receipts, accruals and gains" to petroleum operations. This is mirrored on the deductions side by the provisions of paragraph 5. A difficulty with paragraph 5 is that it is permissive, and it is not clear whether other amounts can be deducted in calculating oil and gas taxable income using the general provisions of the ITA. If so, there seems nothing to prevent an assessed loss from non-petroleum activities (deductible under s. 20) from reducing oil and gas taxable income.

88.   **However, there are rules in the Tenth Schedule of the ITA to restrict losses from petroleum operations being set against income from other activities**. The starting point is paragraph 5(3) which places a limitation on the use of "assessed losses" in respect of "exploration or post-exploration". There is a cross-reference to s. 20, which talks about the losses of a "trade". Paragraph 6 of the Tenth Schedule deems an oil and gas company to carry on a trade in respect of each oil and gas right. As these rights are effectively defined in terms of MPRDA rights, it seems clear that the losses must be calculated on a right by right basis. This can be contrasted with the confusing situation for mining.

89.   **Assessed losses from an oil and gas right may only be set against oil and gas income or income from refining of gas** (para. 5(3) of the Tenth Schedule of the ITA). The position seems to be that despite the assessed losses being calculated on a right by right basis, an assessed loss with respect to one petroleum right (e.g., an exploration right) may be set against income from another petroleum right. Unlike the ring-fencing for mining (limited to capital expenditure), the ring-fence for petroleum seems holistic and so would cover operating expenses that contribute to an assessed loss.

90.   **The specific reference to "refining of gas" is confusing and may be an overhang from the terms of the pre-MPRDA right for the Mossel Bay gas-to-liquids facility**. The phrase seems to suggest that refining is not "post-exploration" activity falling within the Tenth Schedule and yet paragraph 5(3) seems to recognize that refining can fall within the scope of an "oil and gas right" (defined with reference to the MPRDA).

91.   **Paragraph 5(4) of the Tenth Schedule of the ITA then provides a limited breach of this ring-fence.** Ten percent of excess losses may be set against any other income derived by the company. Any amount of losses that still cannot be used can be carried forward to future years. While not without doubt, it seems that the 10 percent applies to all excess losses available with respect to any year. In particular, it seems that a loss from year 1 may be used as to 10 percent against other income from that year and then in year 2 another 10 percent of the remaining amount may be used and again in year 3 and so on.

Acquisition and Disposal of EI Rights

Acquisition

92.   **The acquisition costs of an EI right are in essence a depreciating asset as the value reduces over the life of the right.** The same is true of the acquisition costs of land from which minerals are to be extracted, less the residual value of the land after extraction. As SA does not have a depreciation regime applicable to the EI as such, the treatment of acquisition costs is effectively one of analyzing the rules discussed above and especially the treatment of capital expenditure. An additional question is then the treatment of consideration received should the EI right holder dispose of the right.

93.   **It seems that the acquisition cost of a mining right cannot constitute "capital expenditure" for the purposes of s. 36(11) of the ITA**. This means that acquisition expenditure cannot qualify for a deduction under s. 15(a). There is some question about paragraph (e) of the definition of "capital expenditure", but acquisition costs do not seem to be "incurred in terms of a mining right" but rather incurred for the right.

94.   **The treatment of acquisition costs is more specific for petroleum under the Tenth Schedule of the ITA.** Paragraph 5 excludes from an immediate deduction expenditure "in respect of the acquisition of any oil and gas right". This is subject to an exception noted below where an election is made when a right is transferred. The residual position in both cases seems to be that the acquisition cost will fall into the cost base of the right as an asset for capital gains taxation purposes.

Disposal of Mining Right

95.   **The situation is more complex on disposal of a mining right.** S. 37 applies where a person disposes of "mining property", which is defined in terms of land on which mining is carried out and a right to "mine for minerals". S. 37 then applies to assets "contemplated" in s.

36(11), presumably in the context of the definition of "capital expenditure". The acquirer is deemed to have acquired the assets at their "effective value", which is then treated as "capital expenditure" of the acquirer for which the deduction rules under s. 15(a) and s. 36 apply. The seller has to bring in an equivalent amount to reduce continuing capital expenditure or as recoupment income (as discussed above). The "effective value" is determined by the Director General for Mineral Resources, but the Commissioner of SARS settles the value in cases of dispute.

96.   **This treatment in s. 37 of the ITA does not affect the residual treatment of consideration received for the land or mining right**. This residual treatment is typically capital gains tax treatment under the Eighth Schedule. There is relief from taxation of capital gains when a person "renews" an EI right (para. 67C of the Eighth Schedule), but it is not clear whether this applies on the substitution of say a prospecting right with a mining right. This is of no relevance in the context of a straight transfer of a mining right, which is what is currently being considered.

97.   **Where a mining right holder discovers a substantial reserve and this causes the value of the land or right to increase, taxation will be imposed on the gain realized**. However, only two-thirds of the gain realized is included in taxable income (para. 10 of the Eighth Schedule of the ITA). As this inclusion in taxable income is separate from other amounts so included (s. 26A of the ITA), it is not clear that such a capital gain may be reduced by assessed losses from mining operations under s. 20 (question of whether the capital gain is from carrying on a trade). Further, it is not clear that a gain on the disposal of a mining right is "taxable income derived by the taxpayer from mining" or a particular mine and so it is not clear that such a gain could be reduced by capital expenditure referred to in s. 36(11).

98.   **The acquirer is not permitted to write down the acquisition cost despite the fact that the gain effectively reflects the minerals that will be included in the acquirer's income as they are extracted**. The effect is a form of economic double taxation, although presumably the acquirer will incur a capital loss when the land and mining right are disposed of at the end of mine life. Such losses are quarantined and so may only be set against capital gains (though not limited to mining capital gains) and may not be carried backwards.

Disposal of Petroleum Right

99.   **The situation is again different in the case of disposal of petroleum rights under the Tenth Schedule of the ITA.** The residual capital gains tax treatment is as discussed in the context of a mining right. However, at the election of the parties to the disposal, paragraph 7 of the Tenth Schedule provides two other options.

100.   **The first option under paragraph 7 of the Tenth Schedule of the ITA is rollover treatment**: the acquirer takes over the seller's cost base in the right and the seller realises no gain. This treatment could prove politically sensitive should a substantial discovery be made and the petroleum right be disposed of for a large gain that goes untaxed. It is not clear what happens

to any carried forward losses of the seller. Those losses will pertain to the trade deemed to be carried on with respect to the petroleum right that is disposed of and so that trade must cease. This may cause the loss to cease to exist for s. 20 purposes. Additionally, it is not clear if treatment of carried forward losses should differ depending on whether the seller continues to hold some other petroleum right.

101.   **The second option under paragraph 7 of the Tenth Schedule of the ITA is "participation treatment" and is a fundamental exception to capital gains treatment under the ITA**. Under this option, any gain made by a seller is effectively treated as a revenue gain and so may be reduced by carried forward petroleum losses. If a large discovery is made, and the proceeds of sale exceed carry forward losses, this option will produce income that is taxable in full—no one third exclusion as under capital gains treatment). Offsetting this, the acquisition costs of the acquirer are treated as qualifying for an immediate deduction under paragraph 5 (but without the additional 100 percent or 50 percent deduction). So effectively capital gains treatment (and so its quarantining) is excluded for both the seller and the buyer.

Royalties

102.   **The scope of the MPRRA was discussed above.** That discussion considered in particular the interface of the MPRRA with the MPRDA and complications arising because the imposition of royalties is triggered by a "transfer" of minerals. It was also pointed out that there are some mining right holders (such as aggregate extractors) that are subject to royalties but not entitled to the benefits of the mining rules in the ITA.

103.   **Other problems seem to be caused by the valuation of minerals under the MPRRA and its interface with the rate formula.** The rate formula in s. 4 differentiates between "refined" and "unrefined" mineral resources, with a higher rate generally applying to unrefined resources. This differentiation was intended to reduce the potential that royalties would be imposed on value added to extracted minerals through processing (beneficiation). The identification of refined and unrefined resources in the First and Second Schedules seems a blunt instrument for excluding value added through beneficiation. Some resources are provided a specific concentrated value in these Schedules and others are provided a range. This then requires separate valuation rules depending on whether the concentration is specific or a range (s. 6 and s.7).

104.   **One problem with the valuation rules in the MPRRA is that the transaction price on transfer must be adjusted if the transfer is at a grade not mentioned in the Schedules**. This raises questions as to whether or not determining the royalty at the point of "transfer" is critical (as opposed to export or extraction).

105.   **A second problem occurs as a result of 2013 amendments and is where the Second Schedule of the MPRRA (unrefined resources) contains a range**. If the resources are transferred at a condition within that range, effectively the transaction price is used (s.

6A(1A)(b)). This means that because resources with a higher grade sell at a higher price, such resources also attract a higher royalty. As the higher grade may have been secured through processing, the result may tax beneficiation in a manner that is inconsistent with the original approach in the MPRRA. In particular, as discussed in Chapter III, this has caused an increase in the calculation of royalties payable by the coal industry.

106. **Other issues arise from the complexity of the royalty formula in s. 4 of the MPRRA.** This formula adjusts the royalty, within maximum and minimum rates, according to a person's "earnings before interest and taxes". This concept is largely derived from concepts used in the ITA, but it seems many details are not specified. Without drilling into the details of these concepts, the basic premise of the income adjustment may be questioned, at least when balanced against the simplicity of a flat rate royalty system. The MPRRA includes adjustments in relation to income while, as discussed above, the EI fiscal regime in the ITA includes some features consistent with a resource rent tax. These qualifications are to the confusion and complexity of both systems. Perhaps there would be greater policy clarity through a simple royalty, standard income tax and possible additional RRT with clear legal separation.

Recommendations

- Clarify MPRDA regulation of processing, leasing of rights and sub-contracting

- Amend the ITA to identify EI activities and EI rights by following MPRDA classifications and to follow MPRDA regulation generally

- Move the special rules that deal with particular features of mining to a new Part or Schedule in the ITA (or any rewritten version)

- Petroleum should be treated in a consistent manner, but in a separate Part or Schedule from mining

- Incorporate comprehensive reconciliation rules identifying which general rules of the ITA continue to apply to EI activities and which are overridden by the special rules in the new Parts

- Calculate income from EI activities on a right by right basis (activities with respect to each right deemed to be a separate trade)

- Apply transfer pricing rules in dealings between each EI trade conducted by an EI operator and an EI trade and non-EI trades conducted by the operator

- Ring-fencing should be on a right by right basis and in both directions (no loss from one right's activities against any other income and no loss from other activities against income from right's activities)

- Ensure that breaches of ring-fencing are based on clear policy objectives

- Define the particular breaches for reconnaissance expenses and exploration expenses

- Clarify and make explicit the treatment of reconnaissance, exploring, development and production and rehabilitation costs

- Revenue and capital amounts that go to make up EI income should be treated in a consistent fashion

- Deductions for capital expenditure (to the extent permitted) should contribute to carried forward losses from each EI ring-fence and not be carried forward separately

- The cost of EI rights, whether for an initial holder or a transferred holding, should be depreciated over the life of the right

- Amounts received on disposal of an EI right should be included directly in income

B. Fiscal Stability and Agreements

107. **As with much in the SA EI fiscal regime, the approach with respect to fiscal stability is fragmented.** The high levels of investment and long-term nature of the EI make fiscal stability a particular issue when deciding to invest or not. This reasonable need has to be balanced against the dynamic and changing nature of fiscal regimes generally, administrative issues and the often incomplete and asymmetric nature of information with respect to natural resources. While potential investors are concerned about major shifts in imposts during the life of a project, they are often less concerned about incremental shifts in generally applicable tax rules. Investors are particularly concerned about changes that target or discriminate against a particular industry or activity.

108. **EI rights may be issued on a wide range of terms and conditions (with respect to mining rights see s. 23(6) of the MPRDA).** However, there is no general practice in SA of concluding comprehensive EI agreements with large investors. In many countries, this is a practice and the agreements are often attached to or form part of terms on which an EI right is issued. Such agreements can give rise to substantial uncertainty unless there is a specific legislative provision setting out the extent to which an agreement can alter other applicable law, including the provisions of a tax law.

109. **SA does have provision for fiscal stability agreements in two areas, petroleum and royalties.** Recent debates regarding amendments to the MPRDA illustrate the limited nature of these provisions and their inability to protect investors from wider changes that can have a fiscal impact similar to taxes.

110. **Paragraph 9 of the Tenth Schedule of the ITA provides for the conclusion of fiscal stability agreements with petroleum right holders**. The Minister of Finance may enter into an agreement with the right holder guaranteeing that the provisions of the Tenth Schedule as at the date of the agreement will continue to apply for as long as the company holds the right. This

limited right of fiscal stability means that general ITA provisions applicable to petroleum can be altered despite an agreement. This puts pressure on the reconciliation issue discussed above as to when a particular issue is covered by a provision in the Tenth Schedule and when it is covered by a provision in other parts of the ITA.

111.	**It seems that the conclusion of a fiscal stability agreement will freeze the Tenth Schedule of the ITA both for the benefit and to the detriment of a right holder**. Paragraph 9(5) prescribes that taxable income from the relevant right "must be determined in terms of" the version of the Schedule applying to the agreement. So, for example, it seems that a right holder with an agreement before the recent introduction of the exemption from interest withholding into the Tenth Schedule would not be entitled to that exemption (subject to tax treaty). However, that right holder would continue to be entitled to the thin capitalization safe harbor deleted from that Schedule (presuming the agreement also pre-dates that deletion). To secure the benefit of the new exemption, the right holder would have to unilaterally terminate the agreement under paragraph 9(4), in which case the safe harbor would no longer be available.

112.	**Where an exploration right is converted into a production right, fiscal stability agreed with respect to the exploration right can be rolled over into the production right** (para. 9(7)(b) of the Tenth Schedule to the ITA). Fiscal stability can also be transferred with the transfer of the right (para. 9(2)). This is generally available with respect to an exploration right, but is only available with respect to a production right if the transfer is within the "same group of companies" (defined in s. 1). Under a peculiar provision (para. 9(3)), a right holder with a part interest in a right subject to fiscal stability may acquire a further interest in the right and that part will be subject to the same fiscal stability.

113.	**To date, ten petroleum fiscal stability agreements have been concluded, but the fiscal stability provision for royalties has been less popular**. S. 13 of the MPRRA provides the Minister of Finance with a power to conclude a royalty fiscal stability agreement. The agreement can only cover the matters specified in s. 14, which only covers the royalty formula in s. 4. So a royalty agreement would not have protected a right holder from the changes to the valuation rules in 2013. This may be a reason why such agreements have not been popular. The rules for transfer of a royalty fiscal stability agreement are essentially the same as for a petroleum agreement (except transfers of mining rights are covered) (s. 13(3) and (4)), as are the rules for termination (s. 13(5)).

114.	**The overall approach to assurances of fiscal stability requires review.** The scope of any assurance, and the means of implementing it, should be made more consistent both between mining and petroleum, and between income tax and royalties. An assurance of non-discrimination may provide a core approach to fiscal stability, at least residually, and could be combined with periodic review of the need for additional stability assurances. The need for fiscal stability assurances should diminish over time as confidence in a reformed fiscal regime for EI grows. One possibility for providing a uniform approach and framework for fiscal stability

assurances would be to design a separate Act covering all fiscal aspects which may be the subject of an agreement (perhaps including state participation) and those which are non-negotiable.

Recommendation

- Carry out a review of the scope, approach and framework for providing assurance of fiscal stability to EI rights holders.

III. SOUTH AFRICAN MINING FISCAL REGIME

A. Structural Change in the Country's Mineral Ownership Position

115.   **Until 2002, SA was one of the world's few remaining jurisdictions that maintained dual state and private ownership of mineral rights**. Only the exploitation of precious minerals and metals from both private and state-owned mineral rights required state mining leases and so a form of royalty, in addition to the CIT. With the promulgation of the MPRDA and the Mining Titles Registration Amendment Act, Act No. 24 of 2003 mineral rights ownership reverted to the State (on behalf of the people of SA). This provided the raison d'être for the introduction of a mineral and petroleum resources royalty regime, with effect from 1 March 2010. The other fiscal consequence was the often debt-financed transfer of a certain percentage of the company's share capital to HDSA.

116.   **The MPRDA mandates the development of the Broad-Based Black Economic Empowerment (B-BBEE) Charter for the South African mining industry**. According to paragraph 4.7 of the Mining Charter, applicants for mining licenses must prove that they seek and have obtained an—"*increase [in] participation and ownership by historically disadvantaged South Africans (HDSAs) in the mining industry.*" Mining companies agreed to achieve a 26 percent-HDSA ownership of mining industry assets within ten years from end-2004; compliance was being appraised at the time of the mission. Compliance eases conversion of 'old order mining rights' to 'new order mining rights' with a development and production term of 30 years and the possibility of renewal. Mining companies will be able to offset the value of the level of beneficiation achieved by the company against their HDSA ownership commitments (MPRDA s. 26). The 26 percent HDSA ownership applies to new applications granted.

Impact of recent regulatory changes on the fiscal regime

117.   **Public policies for extractive industries management should include a stable and predictable tax system plus transparent governance of collected revenues**. The South African National Treasury and SARS have generally achieved these goals. New policies for addressing discriminatory practices of the past have unavoidably complicated the fiscal framework. Proposals for B-BBEE equity shares, free carried interest in oil and gas ventures, the diamond export duty and various expenditure requirements under the social and labor plan (SLP) were not coordinated with fiscal requirements. These factors combined, have cut across the intended gatekeeper role of the Minister of Finance through the instrument of money bills.[10]

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[10] The South African Constitution provides in s.73 (2) that only the Cabinet member responsible for financial matters may introduce a money bill (defined in s.77) or a s. 214 bill (equitable shares and allocations of revenue). A South African money bill is defined as a bill that—(1) appropriates money; (2) imposes national taxes, levies, duties or surcharges; (3) abolishes or reduces, or grants exemptions from, any national taxes, levies, duties or surcharges; or (4) authorizes direct charges against the central treasury account.

B. Mining Tax Provisions of the Income Tax Act, 1962

118.   **Currently, the system is complex—especially with regard to the gold mining formula, and capital allowances with multiple ring-fences**. (Summary in Table 1.) With regard to tax rates and allowances, equal treatment of equity investment suggests the adoption of a single corporate rate (28 percent) for all economic sectors, and a move away from immediate deduction of capital expenditure. The uniform rate is already in place outside the gold sector, but modifying the capital allowance may prove difficult.

Accelerated capital allowance

119.   **Income from mining means income directly derived from the winning of minerals from the soil and mining for gold includes the extraction of uranium**. In addition to the normal CIT provisions, the following deductions may be made from mining income (s. 15, 36 and 11(a)): (1) certain prospecting expenditures, including surveys, boreholes, trenches, and pits preliminary to the establishment of a mine. In the case of other mining expenditures (not of a capital nature) if mining income is insufficient to absorb the deduction, the excess is available for deduction against other income. In the absence of mining income, prospecting expenditure is only deductible if it can be claimed as an expenditure actually incurred in the production of income (s. 11(a)) and is not of a capital nature. This will be the case if the company incurs prospecting expenditure as part of exploration operations to discover mineral deposits to sell at a profit.[11]

120.   **South Africa's CIT regime is attractive because of the 100 percent expensing rule for capital expenditure**. This is granted in lieu of other capital allowances. Immediate expensing eases the problem of distinguishing between capital and revenue expenditure, but is not consistent with the function of CIT as a tax on returns to equity—the capital allowance should approximate the depreciation of the economic value of the asset to its owners. When income is generated so that the 100 percent deduction is used it offers the normal return to capital (though clearly not during periods prior to generation of income), deductibility of interest on debt thus provides an element of double deduction, as does any additional allowance for gold mining capital expenditure.

A money bill should not deal with any other matter except—(1) a subordinate matter incidental to the appropriation of money; (2) the imposition, abolition or reduction of national taxes, levies, duties or surcharges; (3) the granting of exemption from national taxes, levies, duties or surcharges; or (4) the authorization of direct charges against the central treasury account.

[11] *pwc*, 2007-2008, Income Tax Guide, Lexis Nexis: 263-5.

Table 1. South Africa: Direct Tax Charges on Mining under the ITA

No.	Direct Taxes	Rate	Description
	Fiscal Provisions for Mining of Minerals		
1	**Corporate Income Tax for non-gold mines**	28%	Applies to mines, oil and gas extraction
	Gold Formula	$y = 34-(170/x)$	
	Capital Allowance Uplift factor	10% for post-1973 mines and 12% for post-1990 mines	
	Tax Depreciation: Investment Allowance/Accelerated Depreciation	100% immediate expensing	
	Loss Carry Forward	Unlimited	Tax benefit reduced by the imposition of a ring-fence between mining and non-mining income and a ring-fence per mining license
	Ring-fencing	at least two	
	Thin Capitalization (Debt:Equity Limit)	The safe harbor rule of 3 : 1 debt to equity has been removed in the latest tax law amendments	Recently, a discretionary limitation on interest deductibility, capped at 40% of EBITDA has been announced but not yet promulgated
2	**Capital Gains Tax**	28% with a capital gains inclusion rate of 66.7%	Applied on the transfer of mineral rights
	Mine Rehabilitation	0% or tax exemption of investment income	Contribution to approved rehabilitation trust fund are fully deductible
3	**Withholding Tax on Interest**	15%	Can be reduced by tax treaty
4	**Withholding Tax on Dividends**	15%	Can be reduced by tax treaty
5	**Witholding Tax on Royalties**	15%	Can be reduced by tax treaty
6	**Witholding Tax on Technical Services**	15%	A final tax with effect 1 Jan 2016 on management and technical services

121.   **If a mine derives both mining and non-mining income, the excess of mining expenditure over mining income that results in a mining loss can be offset against non-mining income**. (Curiously, this concession excludes capital expenditure but includes continuing general prospecting expenditure.) No portion of capital expenditure is allowable until the mine has reached production stage. Certain expenditures on assets such as residential housing for employees, furnishings and infrastructure, hospitals, schools, shops, recreation buildings and facilities, certain railway lines may be deducted over 10 years or shorter if the mine's life is less than 10 years—motor vehicles are expensed over 5 years.

Unintended consequences of ring-fences

122.   **The benefit of the capital allowance regime is restricted through 3 ring-fences:** (1) A ring-fence is imposed confining deduction of mining capital expenditure to mining income (since 1983); (2) A mine-by-mine ring-fence applies but 25 percent of excess capital allowances may be deducted against the taxpayer's other taxable income from mining (by discretion); and (3) Prospecting, capital, and revenue expenditures are segregated and bear different treatment.

123.   **Ring-fencing exists for purposes of protecting the revenue base**. In 1988-90, however, the Marais Technical Mining Tax Committee (Marais report) discussed the distorting impact of ring-fences on capital allocation in the mining industry (capital deepening per mine even though the project becomes more marginal because of ore grade depletion). The impact of accelerated capital allowances both during the prospecting and development phases is different for gold mines and other mines. Granting the 100 percent expensing rule was usually justified by the high costs of deep level mining, long lead times impacting on payback periods, the volatility of gold

price, and the difficulty of distinguishing between capital and current expenditure. The tax deferral benefit was, however, curtailed in that losses created by expensing could not be offset against the profits of another operating mine.

124.   **Prospecting capital expenditure with an unsuccessful outcome cannot be deducted if there is no earned mining income.** This undermines future delineation of exploitable ore bodies. In contrast, research and development (R&D) expenditures (prospecting is not dissimilar) qualify for a full deduction of capital and current expenditure incurred directly and solely on R&D undertaken in SA. Companies can deduct an additional 50 percent of the R&D expenditure.

125.   **Some manufacturing sectors enjoy beneficial capital allowances, affecting capital allocation in SA**. This distortion calls for a system where tax depreciation of capital assets should be more closely aligned with economic depreciation as manufacturing firms do not face ring-fencing restrictions. Companies qualifying for tax incentives under the s.12I (ITA) in respect of an industrial policy project get a 35 percent or 75 percent additional investment allowance depending on whether they have a preferred industrial status or operate in an industrial development zone respectively. Platinum mines with smelters or refining capacity can possibly access this tax preference, but that is not certain. A beneficiation activity within a vertically integrated mining operation benefits from immediate expensing. By contrast, a standalone beneficiation activity would only qualify for the accelerated straight-line 4-year write-off period (40:20:20:20). This complicates the "mining" from "beneficiation" distinction.[12]

126.   **Costs for physical infrastructure developed by mines in terms of the Social and Labor Plan (SLP), under the Mining Charter, appear deductible only under certain conditions**. The SLP requires expenditure on various infrastructure spending programs (roads, schools, clinics). If these structures were to be used by mine employees they would be deductible but if used by the community their tax deductibility is disallowed by SARS unless a Public Benefit Organization (PBO) is set up.

127.   **An additional capital allowance of 10 and 12 percent annually is allowed for unredeemed capital expenditure by post 1973 and post 1990 gold mines respectively**. The allowance ceases when the relevant capital expenditure has been redeemed. The uplift compensates the mine for the loss position until redemption (time value of money). Since interest on borrowings remains deductible this allowance creates a double deduction where capital expenditure is financed by interest bearing loans.

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[12] For simplicity, the mission modeled a straight line depreciation alternative over five years: the four year scheme, or declining balance depreciation, would produce roughly similar results.

Mine rehabilitation

128.   **South Africa's long-established practice of tax deductible contributions to mine rehabilitation trust funds appears no longer to be working**. The tax-free build-up of investment income and the withdrawals for mine decommissioning are now undermined by alternative schemes of insurance and bank guarantees (s. 10(1)(cP)). These recent pre-funding models may not sufficiently cover the clean-up costs. The mission was informed that the DMR has little choice but to withhold mine closure certificates, which free the company from further obligations. Many of the 1,700 mines, because of their age, have not built up resources in a mine rehabilitation trust fund. The DMR seeks to mitigate the financial risk to government from costly mine decommissioning and environmental clean-ups. The MPRDA stipulates that finances for mine rehabilitation can be provided through three methods: (1) the traditional mine rehabilitation trust fund or company; (2) the provision of a bank guarantee; and (3) an insurer provided financial guarantee or insurance policy. Lately, companies have disbanded the trust funding model and increasingly are pursuing the issuance of a bank guarantee or insurance instrument. Uncertainty exists as to whether remaining trust funds after completion could be accessed and transferred to a similar fund. Also, there are delays in getting timely disbursements from the trust fund for concurrent mine rehabilitation. Taxation is not the deterrent since regulatory concerns influence the pace of disbursements.

Acquisition of mineral and surface rights

129.   **Currently, no deductions from income are available for the acquisition of mineral/surface rights but the costs are included in the base cost of capital assets which attracts CGT on realization**. Many other countries permit amortization of acquisition costs of mineral rights (see Chapter II).

The gold formula

130.   **The ITA provides differentiated tax treatment for gold, natural oil and gas extraction and other mining**. Income tax is calculated separately for each mine. Uranium mining attracts gold mining tax treatment, as in South Africa uranium is won as a byproduct of gold mining. All mines, with the exception of gold, are taxed on their mining income at the standard company rate of 28 percent. In contrast, income derived from the *mining of gold* by companies is calculated according to a rate determined by formula.

131.   **The abolition of the STC and introduction of a 15 percent dividend WHT resulted in the adoption of the new 2013 single gold formula: y = 34-170/x**.[13] The formula has the economic effect that if a gold mine which makes a profit but has an X-factor of 5 per cent or less,

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[13] Where, Y is the percentage tax payable (tax rate) and X is the profit ratio of the mine. The profit ratio (X) is equal to taxable income from gold mining/gross mining income.

it pays no tax. This situation is described as "a mine operating within the tax tunnel". The revised formula establishes a maximum marginal rate of 34 percent but which, as a result of the 5 percent tax tunnel, theoretically only reaches an effective average rate of 32.3 percent (0.95 x 34). The current gold formula compared to the 28 percent CIT rate provides average effective rates (beyond the tunnel) ranging from greater than 5 percent to 32.3 percent. It is similar to the flat CIT rate of 28 percent if the profit to revenue (P/R) ratio exceeds 25 percent—rarely achieved; if the P/R ratio is between 5 and 20 percent the resulting average CIT rate ranges from >5 percent to 25 percent. Where one taxpayer operates more than one mine, the formula must be applied separately for each mine. Historically, the reason for the introduction of the gold-mining formula was to assist marginal mines and to encourage the extraction of low-grade ore. At a high gold price, mines tend to concentrate on mining low grade areas to remain within the tax tunnel. This system extends the life of South African gold mines as marginal operations are subsidized through the automatic granting of a lower tax rate.

132.   **Previous assessments have recommended abolition of this gold formula.** The Marais report recommended that non-gold mining companies should be taxed under the standard CIT regime and the gold formula should be removed. Also, the SIMS report argues for a standardization of the CIT regime for mines with the separate adoption of a progressive resource rent tax.

133.   **Retention of the special gold formula dispensation can no longer be justified**. Many deposits are essentially uneconomic, too deep for economic exploitation, and the rising cost structure due to regulatory measures, power shortages and rising labor costs has put most of the mines into a permanent loss position (or they continue to operate within the 0-5 percent tax tunnel). Only four gold mines retain the additional capital redemption allowance, which is in any case a double deduction when interest is already deductible. Moreover, the argument that the formula encourages mining of marginal ore at depths beyond 4,000 meters has fallen away since there are binding technological constraints on mining at those depths. The ACC system suggested below would provide a fair replacement for the formula, and would apply across the mining sector.

C. Reform Options

134.   **There are three options for the future of the mining tax and royalty system:** (1) a comprehensive mining tax reform, inevitably challenging; (2) the authorities could also maintain the current structure and embark on only partial adjustments: perhaps preferable when the tax regime is not perceived as an impediment to the industry's growth prospects—regulatory uncertainties seemingly constitute the main barrier to further investments and growth of the tax base; (3) Government may elect to do very little in respect of mining taxation but with the consequent risk that mining's contribution to public revenue, and perceptions of its contribution, will remain low. A comprehensive reform would propose the adoption of a flat royalty on gross sales (discussed under the royalty section and possibly creditable against the additional tax); the standard CIT within a license-by-license mining ring fence with economic depreciation and the

ACC; and an additional tax in the form of a cash flow tax that affects only highly profitable operations and does not deter marginal ones. The ACC (see Box 2.) would replace deduction of interest and provide a uniform annual tax free return on capital employed, after tax depreciation. In all three cases, a review of cost-increasing levies is needed.

Additional Taxation of Mineral Rent and the Royalty System

135.   **The inclusion of a flexible and progressive rent taxation mechanism should be considered over the medium term**. The SIMS report argues for the adoption of a resource rent tax (RRT) so that the state as custodian of the nation's mineral resources ensures that the people of South Africa are getting a larger share of the resource rents from their minerals. The report suggests that the nation's mineral assets have the potential for exceptional profits which should be shared between the people and the mining companies.

136.   **In 2008, South Africa introduced a variable royalty system as a proxy for taxation of mineral rent.** The system imposes a royalty on gross value but varies the rate according to an annual calculation of earnings before interest and tax (EBIT), interpreted also to include immediate expensing of capital.

137.   **Global practices in respect of resource rent taxes vary but in essence there are three options (Box 2):** (1) The *'Brown Tax,' or 'R-based cash flow tax,'* has as its base all current receipts less all current expenses (both non-financial), with immediate refund (or carry forward at interest) when this is negative; this is sometimes expressed as a tax surcharge on cash flow where accounting profit is adjusted by adding back depreciation and interest, and deducting any capital expenditure in full, then yields a base of net cash flow, forming the base for a surcharge (2) *Resource rent tax*. This replicates many features of the Brown Tax, with the investor receiving an annual *uplift* on accumulated losses until these are recovered.

138.   **The tax surcharge on cash flow could be one of the options for South Africa over the medium term**. It has the advantage of simplicity. The calculation takes gross revenues minus total cash expenditures, including capital expenditure, without deducting depreciation or interest. When the result is positive, tax is charged at a specific rate. Uplift on pre-production capital expenditure could also apply to allow the investor some compensation for the time value of money before the surcharge is triggered. If taxable income for the purposes of the surcharge is negative in a given year, the loss is carried forward to subsequent years, so the surcharge would not be triggered until the project has a positive cash flow. If a cash flow surcharge tax is introduced, it could be applied only to projects which commence after its introduction unless otherwise agreed by the parties. The rate and parameters should be specified in the law, and not be subject to negotiation or bidding. It would also be possible to impose this charge as a second tier of corporate income tax if the ACC is introduced, but again only for projects commence after introduction of the additional tier.

Mineral and Petroleum Resource Royalties

139.   **The royalty legislation came into effect on 1 March 2010, raising modest revenues with iron ore and gold contributing the most**. In 2013/14 iron ore contributed more than half of all royalty collections of R6.4 billion (Table 2). The average effective rate for iron ore is 4 percent whereas for the rest of the minerals it ranges between 1 and 1.5 percent with coal being at the bottom on 0.3 percent. South Africa's mineral royalty design is complicated by differentiating between refined and unrefined minerals in the profit-based formula:

- **Variable Royalty on Refined Minerals**—0.5 percent + [earnings before interest and taxes / (gross sales of refined mineral resources x 12.5) x 100], rate capped at 5 percent.

- **Variable Royalty on Unrefined Minerals**—0.5 percent + [earnings before interest and taxes / (gross sales of unrefined mineral resources x 9) x 100], rate capped at 7 percent.

Table 2. South Africa: Royalty Collections since 2011/12

Collections in R million	2011/12	% of total	2012/13	% of total	2013/14	% of total	Year-on-year growth
Coal	297,22	5,3%	435,66	8,7%	390,08	6,1%	-10,5%
Copper	79,31	1,4%	48,19	1,0%	36,55	0,6%	-24,2%
Diamonds	289,86	5,2%	174,78	3,5%	107,17	1,7%	-38,7%
Gold and / or uranium	817,06	14,6%	1.128,73	22,5%	837,53	13,0%	-25,8%
Industrial minerals /1	299,39	5,3%	185,58	3,7%	278,45	4,3%	50,0%
Iron ore	2.503,42	44,6%	1.920,54	38,3%	3.333,49	51,9%	73,6%
Manganese	149,32	2,7%	198,93	4,0%	235,28	3,7%	18,3%
Platinum	852,54	15,2%	460,65	9,2%	567,24	8,8%	23,1%
Zinc	142,68	2,5%	101,47	2,0%	47,85	0,7%	-52,8%
Other /2	180,75	3,2%	360,50	7,2%	586,28	9,1%	62,6%
Total	5.611,54	100,0%	5.015,04	100,0%	6.419,92	100,0%	28,0%

Source: South African Revenue Service.

1/ Industrial minerals are geological materials which are mined for their commercial value, which are not mineral fuels and are not sources of metallic minerals. They are used in their natural state or after beneficiation either as raw materials or as additives in a wide range of applications (i.e. industrial minerals are all those minerals other than gold, PGMs, coal, iron ore, chrome, manganese, diamonds, etc.).

2/ The commodities grouped under Other are: Chrome, Fluorspar, Nickel, Oil and Gas, Phosphates, Vanadium and Unspecified.

Box 2. Two Leading Forms of Additional Rent Tax[14]

1.   The 'Brown Tax,' or 'R-based cash flow tax,' has as its base all current receipts less all current expenses (both non-financial), with immediate refund (or carry forward at interest) when this is negative. Accounting and tax depreciation do not feature—all capital is immediately expensed—and there are no deductions for interest or other financial costs. There are two main variants:

- *Resource rent tax*. This replicates many features of the Brown Tax, with the investor receiving an annual *uplift* on accumulated losses until these are recovered. As originally designed the uplift rate is set at the minimum required rate of return for the investor; this choice is now widely questioned. Australia introduced this scheme in 1987 for petroleum, and for a time applied it to mining, while Angola's production-sharing scheme uses the mechanism. It is usually applied with *ring-fencing* by license.

- *Tax surcharge on cash flow*. Adjusting accounting profit by adding back depreciation and interest, and deducting any capital expenditure in full, yields a base of net cash flow. This, too, could form the base for a surcharge. Instead of permitting an annual uplift for losses carried forward, a simple uplift (investment allowance) could be added to capital costs at the start—this is done in the United Kingdom by a time-limited uplift on losses. In the UK, this surcharge is combined with conventional CIT, within the same sector-wide ring fence. The "R-factor" or payback ratio scale used in some PSCs is a further variant, as is the "investment credit" of Indonesian PSCs.

2.   Allowance for Corporate Equity (ACE) or Capital (ACC) schemes. The former amends the standard CIT by providing a deduction for an imputed return on book equity; tax depreciation remains, but becomes irrelevant in that faster depreciation reduces equity and hence future deductions by an offsetting amount. The latter also gives the interest deduction at a notional rate, so eliminating any distinction between debt and equity finance. Norway's special petroleum tax approximates the ACC, though its combination of uplift on total investment and limitation on interest deduction differs from a "pure" ACC. It also offers refund of the tax value of exploration losses and of ultimate losses on licenses.

3.   A central difference between these two types of rent tax is the timing of tax payments—which is generally earlier under the ACE/ACC. Under the Brown Tax, tax is payable only at the perhaps distant date in which costs have been fully recovered; under the ACE/ACC by contrast, it is payable as soon, roughly speaking, as annual income covers the annual cost of financial capital. *A key and contentious issue for both types is the choice of imputed rate of return* (for carry forward under the Brown Tax and for capital costs under the ACE/ACC).

Simplification proposals

140.   **The administration of the royalty is complex**. The royalty design was amended in 2014 to clarify rules associated with coal containing a range of grades. If the sale or disposal occurs at an average grade below the specified range, the value will be determined at the bottom point specified for the range. If the transfer occurs at a grade above the specified range, the value will be determined at the highest point specified for the range. If the transfer occurs between the bottom and top points, the average grade upon transfer will apply.

141.   **Under the revised rules, the range for coal will be from 19.0 MJ/kg to 27.0 MJ/kg.** The weighted average calorific value of 'low' and 'very low' quality coal required by Eskom's power stations is 19.0 MJ/kg. New power plants require coal with calorific values of between 22 MJ/kg and 24 MJ/kg. Coal that is exported is typically at 23 MJ/kg and above. The lower contribution by the coal sector to mineral royalties, compared to its share of total mineral sales and the very low estimated effective royalty rate for the coal sector suggested that the point

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[14] IMF, 2012, *Fiscal Regimes for Extractive Industries—Design and Implementation* (Washington: International Monetary Fund); available at http://www.imf.org/external/np/pp/eng/2012/081512.pdf

reference of 19.0 MJ/kg was not appropriate. The new minimum reference price is now 23 MJ/kg and above.

142.   **The use of a net smelter return (NSR) valuation system is a possible improvement.** "Net smelter return" is defined as the net revenue that the owner of a mining property receives from the sale of the mine's metal/non metal products less transportation, processing and refining costs. It is the valuation of the metal contained in bulk sale of ores, concentrates or mattes. The valuation thus automatically adjusts with the stage of beneficiation, reducing the need to distinguish refined from unrefined products. Integrated gold and platinum production, with refining, would continue to be valued as at present.

143.   **Initially, the extraction of aggregate, building sand and construction material was exempt from the royalty regime.** Later amendments included this category and subjected it to the unrefined mineral royalty formula with its inherent challenges of verifying volume and fair market value. Given that it is a high volume but low value commodity with many quality variations consideration should be given to impose a specific charge (R/ton of material removed)—which indeed is internationally the practice for these commodities. Using specific royalties on low value products (aggregates) would obviate the need for complex local transfer pricing rules that seek to establish an arm's length price.

144.   **Royalties on gross revenues provide early revenues for government when commercial production commences.** But, since they add to cost, they can make the extraction of some resource deposits unviable. Where royalties form a major part of the overall fiscal regime, they tend to become more complex because refinements are needed to make them responsive to profitability (using proxies like price, location, or production level). Royalty rates that vary with price have easy appeal but, do not vary with costs and so will not be appropriate across the marginal cost curve of possible mines. Moreover, any rate scale geared to prices requires frequent adjustment when forecasts are wrong.

145.   **The use of gross royalties protects revenue against overstatement of cost, but too little knowledge of costs can weaken the government's position**. Companies can reduce profit-related taxes by increasing deductible costs, and gross royalties can be used to guard against this. But if royalties yield significant revenue and prices fall, companies will argue for reduced rates and governments will have no sound basis to challenge their case if they have not been closely monitoring costs. Reviewing the short royalty collection history in South Africa, the adoption of a single flat royalty of 1.5 percent on gross revenue would have raised (over the four-year period the variable royalty regime has been in effect) a total royalty stream of R21.3 billion versus the actual collected total of R20.6 billion. This method would have implied a small rise for some mines in the lowest applicable rate of royalty (0.5 percent).

146.   **SARS lacks the necessary skills in-house for verification of quantities of minerals extracted and contained metals in concentrate**. These are core competencies in mine inspectorates or specialist service providers that monitor these aspects of mineral exports.

Presently, negotiations by the DMR with the South African Bureau of Standards are well-advanced aiming to make this Bureau responsible for verification of volumes of minerals and assaying their respective values of contained metal for royalty administration purposes.

D. Economic Assessment of Mining Fiscal Regimes

147. **Economic modeling is presented here on a stylized platinum project.**[15] SA's current regime and two possible alternative fiscal regime scenarios were evaluated. Table 3 presents the key terms of each of the scenarios. Scenario 1 presents the complete reform of the major elements of the fiscal regime, introducing a flat-rate royalty, reforms to the corporate income tax system involving a 10 percent ACC and 5 year depreciation period using the straight line method, as well as an additional cash flow surcharge. Under Scenario 1(a) the royalty is creditable against the cash flow surcharge, while in Scenario 1(b) it is not. Scenario 2 presents the proposed marginal reform, largely maintaining the status quo and simply applying the ACC while disallowing deductibility of interest expenses.

Table 3. Mining - Current Fiscal Regime and Possible Reform Scenarios

Fiscal provision	Current Regime	Scenario 1 (a)	Scenario 1 (b)	Scenario 2
Royalty				
Refined Minerals	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 12.5)] x 100. Maximum rate of 5%	2% Flat Rate, creditable against Cashflow Surcharge paid in a given year	2% Flat Rate	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 12.5)] x 100. Maximum rate of 5%
Unrefined Minerals	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 9)] x 100 . Maximum rate of 7%	2% Flat Rate, creditable against Cashflow Surcharge paid in a given year	2% Flat Rate	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 9)] x 100 . Maximum rate of 7%
Royalty Base	Gross Sales	Gross Sales	Gross Sales	Net Smelter Return
Income tax	28%	28%	28%	28%
Depreciation	Immediate Expensing of all Capital Expenditure	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1	Immediate Expensing of all Capital Expenditure
Allowance for Corporate Capital		10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital
Loss carry-forward	Unlimited	Unlimited	Unlimited	Unlimited
Additional Tax		Cashflow Surcharge at 20% with uplift on capital expenditure at 15%	Cashflow Surcharge at 20% with uplift on capital expenditure at 15%	
HSDA Requirements	26% Local Ownership	26% Local Ownership	26% Local Ownership	26% Local Ownership
Withholding Taxes:				
Dividends	15% (reduced to 5% in treaties)	15% (reduced to 5% in treaties)	15% (reduced to 5% in treaties)	15% (reduced to 5% in treaties)
Interest	15% (reduced to 0% in treaties)	15% (reduced to 0% in treaties)	15% (reduced to 0% in treaties)	15% (reduced to 0% in treaties)

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[15] The full project examples, simulations and results are presented in the separate Analysis Supplement, Chapter II. The platinum project together with iron ore and coal projects in the Supplement represent the most active precious metals and bulk mineral segments of the current SA mining sector.

Evaluation of Results

148.   **The current regime and proposed alternatives were evaluated against the key fiscal objectives of revenue-raising capacity, neutrality and progressivity, and placed in international context of other mineral-producing countries**. Figure 2 provides a summary of the key trends which emerge from the analysis of the regimes when applied to a stylized platinum project, described in Figure 1. Analysis of the stylized coal and iron ore projects display similar trends.

149.   **The current fiscal terms and reform scenarios were evaluated for revenue generating capacity using, firstly, the Average Effective Tax Rate (AETR) or "government take".** Figure 2 shows that for this platinum project the current regime generates an undiscounted AETR of 37 percent. The complete reform scenarios (scenarios 1(a) and 1(b)) improve the take of the regime through the introduction of the cash flow surcharge to 43 and 46 percent respectively, while maintaining the post-tax investor return on total funds at approximately 15 percent. The concessional financing of the BEE entity is assumed not to form part of the direct government take, and the rate of return is considered for the investor as a whole. However, the local ownership requirement has an impact on the non-BEE investor's cashflow and return across all scenarios.

Figure 1. Platinum Project Economics

Data in $mm 2015 terms		
Project Indicator	**Unit**	
Production	Years	19
Platinum	000 oz	1,754
Palladium	000 oz	1,087
Rhodium	000 oz	272
Gold	000 oz	28
Capital Costs	$ million	481
Sustaining Capital	$ million	180
Operating Costs - Mining	$ million	1,414
Operating Costs - Processing	$ million	565
Decommissioning	$ million	60
Unit Capex	$/oz	229
Unit Opex	$/oz	630
Total Unit Cost	$/oz	859
Price Assumptions (2015 real terms)		
Platinum	$/oz	1,600
Palladium	$/oz	850
Rhodium	$/oz	1,600
Gold	$/oz	1,200
Project Economics (2015 real terms)		
Project NCF (NPV0)	$ million	1,500
Pre-Tax Project IRR	%	19%

150.   **The revenue pattern over the cycle of the project under each scenario mainly reflects the production profile**. The cash flow surcharge has the effect of generating significant additional revenue once the project is generating sufficient positive cash flow, the effect of which is slightly reduced when the royalty is creditable against the surcharge. The 5 year depreciation profile has the effect of altering the timing of corporate tax payments in the early years of production. The marginal reform scenario has little impact on government revenue, with

the ACC providing some additional relief to the investor in the initial years of production when capital depreciation deductions are made in determining the corporate income tax payable. Disallowing interest deductions under this scenario has the effect of slightly increasing the overall AETR.

151.   **A key indicator of the effect on a marginal project is the "breakeven price" or the minimum primary mineral price required by the investor to meet its hurdle rate.** The price is expressed in constant values and the hurdle rate is assumed in the analysis at 12.5 percent in post-tax real terms. An alternative indicator to measure the burden on a marginal investment is the Marginal Effective Tax Rate (METR). The METR illustrates the relative fiscal wedge taken from the project by the fiscal regime at the margin of project viability. The reform scenarios score well for investment incentive when placed in international perspective. Under the current regime the METR is slightly lower than under the reform scenarios; however, given the similarity in break-even platinum prices (Figure 2), the difference in the METR among these regimes is not significant.

152.   **The progressivity of the fiscal regimes was evaluated by estimating the government share of total benefits**[16] **over a range of project results**. "Progressivity" here means the capacity of the fiscal regime to ensure that government receives a rising share of project cash flows as the intrinsic profitability of the project increases (up to a realistic maximum share) while bearing part of the downside when projects are less profitable. It shows how the government can approach higher taxation of realized rents, even if taxing all of them is not possible. Variation in project net present value (reflecting project profitability) was generated by adjusting the platinum price in constant real terms. At low profitability levels, all the scenarios place a lower burden on projects with lower pre-tax profitability. With the additional progressive fiscal elements, the recommended scenarios yield a higher share of total benefits for the government as the profitability of the project increases (Figure 2).

153.   **The revenue benefit from the full reform program (Option 1) is likely to be greater than simulated here.** The modeling assumes an accurate interpretation of the current regime, and full collection under it. In view of the complexities and distortions that prevail, full collection under a cleaned-up legal framework should already be greater. The combination of reform and a simplified legal framework has a high chance of bringing revenue increases in the medium term.

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[16] Total benefits mean revenue minus operating costs and replacement capital investment (the "cake" from which taxes are paid, debt is serviced, and equity providers are rewarded).

Figure 2. Simulation Results – Current Regime and Reform Scenarios
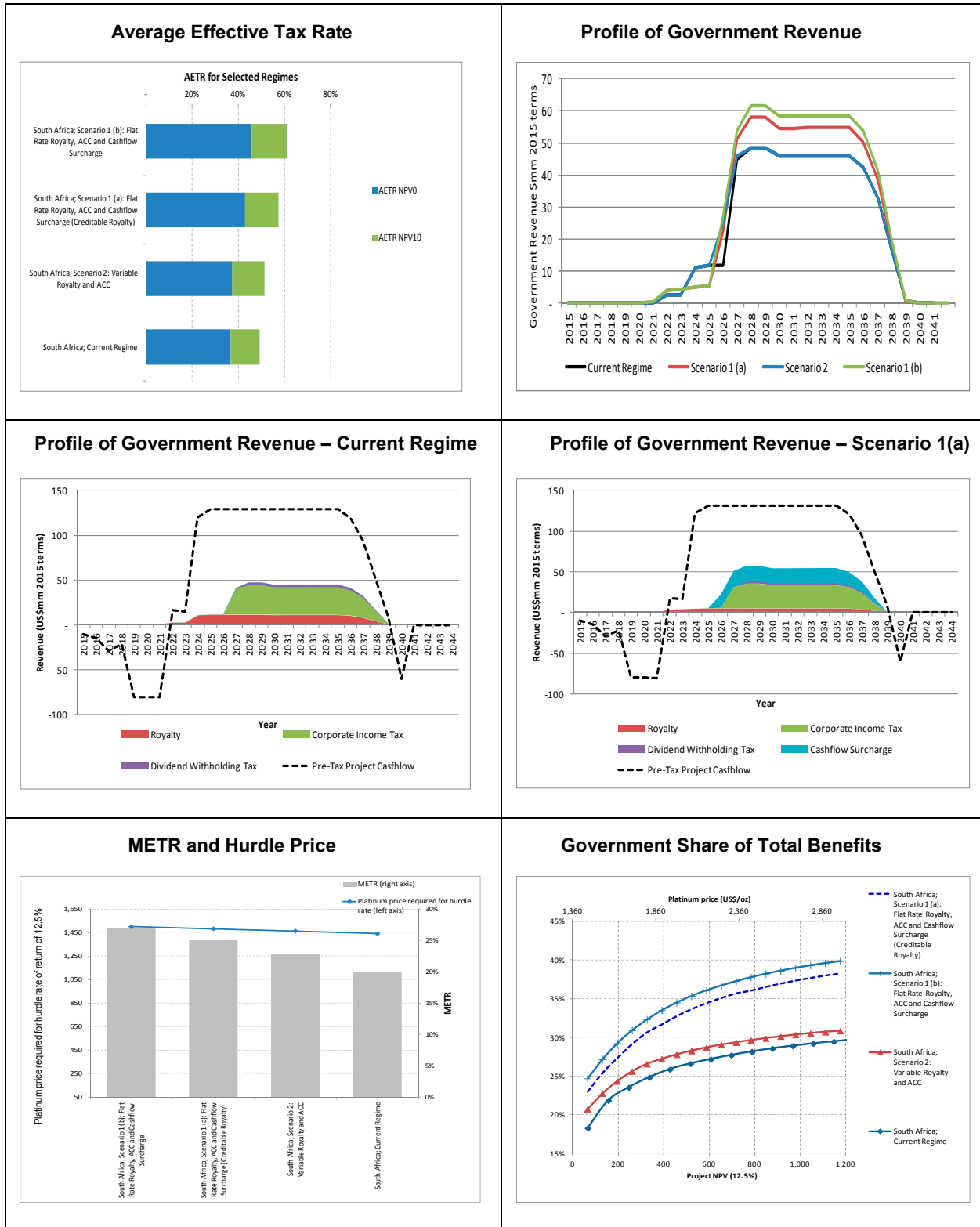
Recommendations

Option 1 – full reform program

- Align South Africa's capital allowances with other mining jurisdictions by bringing tax depreciation closer to economic depreciation of producing assets.

- Unify treatment of *exploration and development capital expenditure* with write-offs over five years, commencing when the asset is placed into service.

- Maintain a ring-fence for CIT purposes linked to a mining license, license-by-license and ensure this ring-fence is not breached either for income or expenditure purposes, except for unsuccessful exploration expenditure elsewhere by the taxpayer.

- Introduce an *allowance for corporate capital (ACC)* on unredeemed capital expenditure balances at an annual rate (say 10 percent but expressed as margin over a bond rate).

- Maintain the general rate of CIT (28 percent) for the extractive and non-mining sectors.

- Tax incentives such as the s. 12I for manufacturing allowance, accelerated capital allowances in the mining industry, and the additional capital allowance in the gold industry should be grandfathered for a time (sunset provision) where the incentive was granted on application.

- The tax deductibility of mine-developed physical infrastructure for surrounding mining communities should be permitted where these are compulsory outlays under the Social and Labor Plan.

- Introduce amortization of the cost of acquisition of mining rights (over the life of the asset)

- Clarify through sector legislation where mining stops and beneficiation starts so that tax legislation and administration is aligned to these regulatory boundaries.

- Withdraw the gold mine CIT formula for existing mines and do not extend it to the platinum sector.

- Consider over the medium term introduction of a surcharge on cash flow for new projects, with uplift at a maximum of 15 percent on initial capital outlays, or an additional tier of CIT under the ACC system.

- Convert the variable rate royalty into a flat royalty with rates of up to 2 percent on gross sales at the point of actual sale or first saleable product.

- Substitute the current profit based royalty on aggregate material with a specific royalty charge per ton of construction or aggregate material removed.

Option 2: Partial reform

- Maintain 100 percent capital allowance, while proceeding with other income tax reforms under Option 1.

- Defer a cash-flow or resource rent tax in favor of reform of the current royalty structure.

- Adopt a net smelter return calculation for the royalty base where bulk concentrates or ores are sold.

- Provide clear valuation guidelines, publish reference prices, simplify collections and coordinate between the DMR and the State Diamond and Precious Metals Regulator regarding mineral volume and value verification.

E.   Indirect Taxes and Other Charges on Mining

154.   **The SA mining fiscal regime contains numerous uncompetitive elements on the indirect tax side** (Table 4). A multiplicity of levies, environmental charges, trade taxes, payroll taxes and mining charter obligations result in a rising cost structure, and in the absence of cost-offsetting commodity price increases tend to sterilize otherwise exploitable ore reserves.

VAT and diesel refund

155.   **Given the high export share of mining and the zero-rating of exports, mining and quarrying is in a net credit position for VAT**—only 0.6 percent of VAT vendors are in the mining and quarrying sector. VAT is an issue, however, for diamond beneficiation as importers of rough diamonds experience debilitating cash flow consequences, waiting for VAT refunds. Relocation to the assigned Industrial Development Zone near the OR Tambo International Airport could resolve this matter.

Diesel rebates and contract mining

156.   **New forms of mining through sub-contracting have created problems for accessing the diesel refund or rebates**. The diesel refund policy was introduced on 4 July 2001 and is governed by the Customs and Excise Act No. 91 of 1964 (Customs Act), and provides special dispensation to specific industries with regard to off-road diesel used in performing primary activities associated with certain industries. The industries that are listed as beneficiaries of the diesel refund are: mining, farming, forestry, commercial fishing, coastal shipping, rail and freight haulage and harbor services, and electricity generating plants. Mining license holders—not contractors—get a rebate for the General Fuel Levy (201.5c/l of petrol and 197.5c/l of diesel) and the RAF charging element. The rationale behind the introduction of the diesel refund policy was to assist these industries in reducing their input costs on the basis that the above industries seldom make use of the infrastructure for which these levies were intended. The levy itself exists partly for environmental reasons. However, contractors cannot access these benefits as they are

not the mining right holder. A solution requires either the extension of the privilege to contractors or a mandate that the mining right holder must be the purchaser.

Table 4. South Africa: Indirect Tax and Other Charges on Mining

	Indirect Taxes and Charges that Increase Mining Costs and as a Consequence the Cutoff Grade of a Mineral Deposit		
1	**Variable Royalty on Refined Minerals**	0.5 + [earnings before interest and taxes / (gross sales in respect of refined mineral resources x 12.5) x 100	The royalty rate is capped at a maximum rate of 5%
	Variable Royalty on Unrefined minerals	0.5 + [earnings before interest and taxes / (gross sales in respect of unrefined mineral resources x 9) x 100	The royalty rate is capped at a maximum rate of 7%
2	**Transfer Duty on Mineral Rights Transactions**	8% ad valorem on the consideration for the property transfer	This applies to transactions where VAT is not imposed
3	**Securities Transfer Tax**	0.25% on the transfer of a security	Transfer of shares in a company or a right to receive any distribution from a company
4	**Skills Development Levy**	1% of payroll	Funds are utilized for sector-specific training of employees
5	**Unemployment Insurance Fund Contribution & Occupational Injuries and Diseases Levy**	1% on remuneration of employee payable by employer	
6	**Customs Duty**	Duty rates in South Africa vary from 0% to 45%, with an average duty rate of 18.74%	
7	**SACU Excise Tax on Fuel**	4c/liter of liquid fuel	
8	**General Fuel Levy**	201.5c/liter for petrol; 197.5 c/liter for diesel	
9	**Electricity Generation Levy**	3.5 c/kWh	This applies to all power generated from non-renewable sources
10	**Carbon Dioxide Vehicle Emission Levy**	R90 per g/km for passenger transport vehicles, R125 per g/km for goods transport vehicles	Levy is payable on new vehicles and is based on CO_2 emissions
11	**Proposed Carbon Tax**	R120/ton CO_2	With tax-free emission threshold of 60%
12	**Acid Mine Drainage**	water levy on mines	Proposed flat water use levy for all mines undermining polluter pays principle
13	**Diamond Export Duty for Unpolished Diamonds**	5% ad valorem of value of uncut diamond	Numerous exemptions exists that erode the effectiveness of the impost
14	**Non-deductibility of some Infrastructure Development Costs iro Social Labor Plan**		Costs cannot in all instances be recovered for contributions to local infrastructure, roads, schools and housing
15	**Debt-financed 26 percent HDSA Ownership Transfer**		Company incurs financing costs to finance for HDSAs the acquistion of co-stock

Environmental Charges

Carbon tax

157.   **According to the National Development Plan, South African mining's[17] Scope 1 and Scope 2 GHG emissions[18] constitute 15 percent of total SA's national carbon emissions**. The Department of Environmental Affairs indicates that mining in SA is only responsible for 13.5 percent of the country's total carbon emissions. Currently, the following energy taxes are imposed in South Africa and impact on the cost structure of the mining industry: the General Fuel Levy; the Electricity Generation Levy on non-renewable energy sources. These levies enhance the recent steep electricity tariff increases (Figure 2). Carbon levies include the Carbon Dioxide Vehicle Emission Levy, the proposed but not yet implemented Carbon Tax. If competing mining jurisdictions do not face these tax costs—which are otherwise laudable imposts internalizing the social costs of environmental degradation—the mining industry will face the prospect of more mine closures as commodity prices come under pressure. However, it is evident that individuals and agriculture have to absorb much higher electricity tariffs than mining and the industrial sectors—Figure 3, highlights the magnitude of this cross-subsidization.

Figure 3. Average Electricity Prices in c/kWh by Sector

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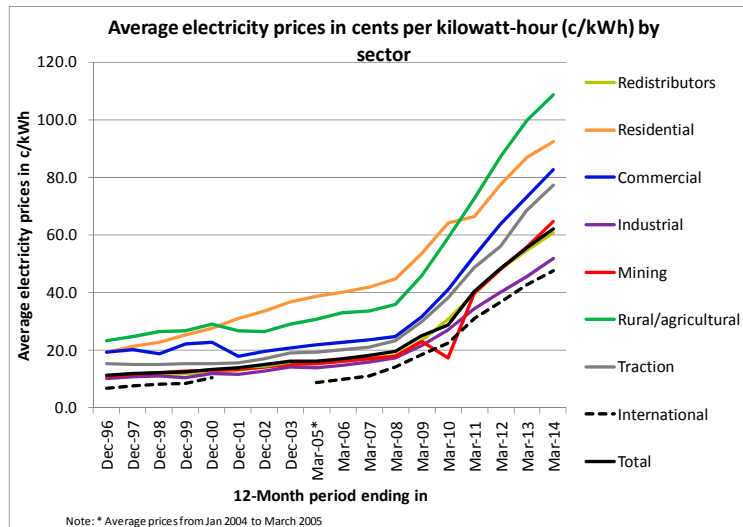
[17] Including gold, PGMs, coal, iron, steel, ferroalloys and aluminum smelting.

[18] Emissions directly incurred by the industry (scope 1) account for 3.6 percent of the national total, with the remaining 9.9 percent consisting of scope 2 emissions, mainly embedded in the purchase of electricity. The NDP further explains that the scope for increasing energy efficiency in the mining sector, while not insignificant, is limited, subject to developments in the electricity sector.

**Table 5. Countries with Carbon Taxes and their
Respective Levels in US$/ton CO2e**

No.	Country	US$/t of CO2e
1	Australia	21.54
2	British Columbia	28.00
3	Denmark	31.00
4	Finland,	48.00
5	France	20.00
6	Iceland	10.00
7	Ireland	28.00
8	Japan	2.00
9	Mexico, depending on fuel from US$1-4	2.50
10	Norway, depending on fuel from US$4-69	36.50
11	Sweden	168.00
12	Switzerland	68.00
13	United Kingdom	15.75
	Unweighted average, SA excluded	36.87
14	South Africa, US$12/ton of CO2e, with basic tax-free threshold of 60% of all stationary direct GHG emissions	4.80
	Source: World Bank Group, 2014, State and Trends of Carbon Pricing, Washington, DC.	

158.   **The current carbon tax proposal of R120/ton of CO_2 equivalent—only effective above an initially 60 percent tax free emission threshold—would add to mines' input costs**. The mission was advised that the carbon tax could increase the cost of a kWh of electricity by approximately 5c in the first year with resulting knock-on effects in the economy, eroding further the dented competitiveness of the mining sector. For 2013, *pwc* estimates that for 13 of the biggest mining companies mining a broad range of minerals, the Carbon Tax liability above the tax-free threshold of 60 percent would raise R2,5 billion for Scope 1 and 2 emissions, being equal to 0.64 percent of total mineral sales of R384 billion.[19] Both the NDP and the SIMS report assert that the currently proposed carbon tax would be damaging to the economy and suggest a delay in implementation. In particular, it may be necessary to exclude from the carbon tax Scope 2 emissions originating in the power generation sector.[20] Globally, there are currently 14 jurisdictions that have or are at the point of implementing a carbon tax (Table 5). In 2014, the unweighted average carbon tax charge is US$36.87/ton CO_2 equivalent—South Africa's initial carbon tax of US$4.8 is modest. Australia as a direct mining competitor has recently put the introduction of the carbon tax on hold and the comparison indicates that major mining jurisdictions hold back on this tax despite its merits on environmental grounds. The solution will be to consider mitigating measures rather than withdraw implementation of the tax.

Acid Mine Drainage

159.   **The government is introducing regulatory measures to mitigate environmental degradation stemming from the acid mine drainage**. In addressing the environmental consequences communities around the affected areas but also mines operating in these regions would enjoy the benefits of purified water which would attract a user fee. Consultations are

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[19] CDP South Africa 100 Climate Change Report 2013, http://www.nbi.org.za/Lists/Publications/Attachments/360/CDP_Report_2013.pdf.

[20] SIMS report: p. 37, (http://anc.org.za/docs/discus/2012/sims.pdf) and The National Development Plan stating: " A conditional carbon tax exemption could be applied to the electricity sector, provided it progressively moves to a lower carbon generation mix, as mandated in the Integrated Resource Plan," p 171. (http://www.gov.za/issues/national-development-plan/).

ongoing about how to structure such an environmental levy. Other environmental charges on liquid fuels and vehicles are in line with international standards. They apply to the entire South African economy, fulfilling a crucial role in the package of measures against climate change.

Beneficiation and Export Duty

160.   **Government policy actively pursues beneficiation of minerals.** S. 26 of the MPRDA, and the proposed MPRDA amendments, give effect to the policy. The Minister of DMR can delay the exportation of minerals if they are exported for beneficiation purposes. The proposed amendments increase these Ministerial powers further so that local minerals could be designated for local beneficiation. Under the amendments, producers of such designated minerals, before exporting the production, would have to offer a certain percentage of that production locally. The quantities, qualities and timeliness of this offer would be prescribed and the mine gate price or an agreed price would be used.

161.   **The resulting regulatory uncertainty may have adverse effects on the international competitiveness of the South African minerals industry**. It would probably increase borrowing costs for mining projects because of the financial risk that minerals could not be freely sold. This deteriorating risk profile could adversely impact on the credit rating of listed mining companies.

Diamond export duty

162.   **The Diamond Export Levy Act, 2007 imposes a 5 percent diamond export levy on the value of a diamond whenever a person exports a rough or unpolished diamond**—which has not been offered on a local diamond exchange for purposes of selling it to a domestic beneficiator. For the period 2009/10 to 2013/14, the diamond export duty's average annual collection was R63.8 million—increasing from R35.8 million in 2009/10 (the year of implementation) to R93.4 million in 2013/14. A person is entitled to receive a credit for imported rough diamonds that are offered to local polishers and cutters. Temporary exports of diamonds for purposes of getting an expert opinion on the value of the diamond or for exhibition purposes are also permitted. Numerous producer export duty relief measures exist: (1) Large producers are exempt from the export duty on their annual production if gross sales exceed R3 billion and if 40 percent of their production has been offered for sale to local beneficiators; (2) Medium producers with sales not exceeding R3 billion must provide at least 15 percent of their production to domestic cutters and polishers. All unsold unpolished diamonds are then exempt from export duty; and (3) In the case of small miners gross sales not exceeding R20 million are duty exempt on all of their unsold diamonds when they ultimately export them.

163.   **The diamond export duty offers built-in relief measures that erode collections and offer no price discount vis-à-vis foreign competitors**. Evidence presented suggests that the volume of locally cut and polished diamonds has declined from 600,000 carats in 2013 to 200,000 carats in 2014 and over the years the number of cutters and polishers has shrunk from

approximately 3,000 to about 800. This decline of the downstream diamond industry is not mirrored in Botswana and Namibia where it is expanding.

164.   **Review of global experiences suggests that only countries with market power can impose export taxes with some marginal benefit**. (See, for example, World Bank (1996).[21] In contrast, export taxes' effectiveness is not guaranteed where the country is a small supplier (no market or pricing power—currently the case in South Africa as to mining of diamonds). In such instance, taxing exports to make a domestically produced commodity available to local beneficiators diminishes exports and foreign exchange earnings. The revenue effect of the diamond levy so far appears to be negligible. The export tax was not intended as a revenue instrument but as beneficiation stimulus measure.

Recommendations

- Introduce a scheme permitting contract mining to benefit from diesel levy rebates.

- Assess the potential impact of the proposed carbon tax on the costs of mining and consider mitigating measures where needed.

- Reconsider the structure and imposition of the diamond export levy.

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[21] Devarajan, S., D. Go, M. Schiff and S. Suthiwart-Narueput, 1996, "The Whys and Why Nots of Export Taxation," *Policy Research Working Paper* 1684 (Washington: The World Bank).

IV. UPSTREAM PETROLEUM FISCAL REGIME

A. Allocation of Petroleum Rights

Sector legislation: the MPRDA

165.   **Prior to the MPRDA of 2002 rights were granted under the "old order" mining legislation**. Licenses to prospect or produce under pre-2002 legislation were granted with conditions attached, sometime including fiscal terms. The only discoveries of note were those leading to production of gas at Mossel Bay by the predecessors of PetroSA, the state-owned company that now holds these rights. The gas continues in production for feed to a gas-to-liquids plant supplying the local market. The 2002 Act required the gradual conversion of "old order" rights (sometimes called "OP 26" leases) to exploration rights under the new legislation. The income tax provisions made for the Mossel Bay projects were essentially inherited, but simplified, and substantially incorporated in Schedule 10 of the Income Tax Act dealing with petroleum income.

166.   **The MPRDA of 2002 continued a "first-in-first-assessed" (FIFA) system for allocation of exploration rights**. This variation of the familiar "first-come-first-served" system for prospecting rights over minerals means that companies may apply as and when they wish, and the first applicant for a block will be assessed according to the criteria of the act and regulations but has no automatic right to grant of a license. The regulatory authority, currently the Petroleum Agency of South Africa (PASA),[22] has promoted South Africa to petroleum companies but not through formal licensing rounds, nor has it restricted access to particular blocks or areas. As a result, rising interest over the past decade led to allocation of virtually all prospective areas under exploration licenses.

167.   **Proposed Amendments to MPRDA would alter the allocation to a system of "invitation".** The regulatory agency would change from PASA back to the Department of Mineral Resources (DMR). These amendments, although passed by Parliament, were referred back to Parliament by the President at the end of January 2015 for reconsideration, so the framework currently remains as under the MPRDA of 2002. The proposed system of "invitation" could be read as simple discretionary allocation. The DMR, however, advised the mission that a more likely framework (incorporated in as yet unpublished draft regulations) would open selected blocks for proposals for a defined time period. Selection criteria, both petroleum-related and for issues such as BEE and SLP, would be gazetted in advance. Proposals would be evaluated against these criteria and the results published.

168.   **With substantially all offshore acreage licensed new licenses depend on relinquishment by holders of existing rights**. The exploration right falls into three periods in the common international pattern of 3, 2 and 2 years, with partial relinquishment obligations at

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[22] PASA would be replaced by DMR if the proposed MPRDA amendment bill is enacted.

each transition between periods. There will eventually be significant acreage available, but promotion of groups of blocks for bidding is not likely to be feasible in the near term.

169.   **With no new discoveries as yet the scope for bonus bidding is limited**. Despite strong interest in apparently large potential offshore prospects the past licensing practice means little opportunity for competitive bidding over prospects that might bring immediate revenue in the form of bonuses. An exception would occur if a prospect is relinquished after significant exploratory work—though such rights are more likely to be sold if DMR permits the transfer of interest. The existing licensing practice, however, has clearly brought in significant IOC interest and has probably greatly improved the knowledge base on potential petroleum resources. The challenge for the government is to obtain the best value from that in the event of a commercial discovery.

B. Petroleum Fiscal Regime – General

170.   **The existing tax and royalty regime would be generous to petroleum companies with successful discoveries**. The regime in Schedule 10 of the ITA is inherited from old order rights, with some modification, and supplemented by the royalty legislation of 2008 (applied since 2010). Box 3 summarizes the terms: if applied without more the regime implies a low royalty and exceptionally generous tax terms by international standards (comparative analysis below). Offshore exploration conditions lie at the extreme end of difficulty with respect to water depth, weather and current conditions, and perhaps geological difficulty. The mission's own analysis of exploration risk, at current and prospective oil prices, shows the estimated exploration "plays" to be marginal with the existing fiscal regime. These circumstances have justified the maintenance of these fiscal terms while most of the exploration acreage has been allocated.

171.   **In the event of a commercial discovery, however, these terms alone would probably be difficult to sustain in the face of comparison and political opposition**. The returns in a success case, perhaps in a future environment of higher prices, would appear great and past exploration risk might be forgotten. The MPRDA Amendment Bill suggests that thinking in parts of government has already been moving in this direction—though before the spectacular fall in oil prices in the second half of 2014.

Box 3. Basic Petroleum Terms

Royalty applies according to the mining formula with a minimum rate of 0.5 percent and a maximum rate of 5 percent, since crude oil and natural gas are both treated as "refined" products for royalty purposes—a treatment that does not accord with common industry usage.

Corporate income tax applies at the standard business rate of 28 percent.

Prospecting and development capital expenditure qualify for 100 percent capital allowance deductions, though (with one exception) only against petroleum income of the taxpayer.

Petroleum income and deductions are ring-fenced but around the taxpayer's combined interests, not license by license (as is the case for mining).

Ten percent of unused capital losses may be carried across the ring-fence for deduction against other income of the taxpayer.

Additional capital allowances (uplifts) apply at rates of 100 percent for exploration expenditure and 50 percent for development capital expenditure (termed "non-exploration" capital expenditure in the ITA). It appears to be permissible to use excess uplift deductions within the 10 percent deductible against non-petroleum income.

Zero rates of withholding taxes on dividends and interest are mandated in Schedule 10.

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172.   **The potential fiscal regime is not confined to tax but has three main elements: royalty, income tax and state participation**. These elements make up the "direct" fiscal regime of impositions on production and profits. State participation does not at present apply. Other elements bear on costs, and have been extensively discussed for the case of mining; those potentially affect upstream petroleum much less.

173.   **Concessional forms of state participation have direct fiscal effect**. Even if the motivation for state participation is not primarily fiscal, various forms of state participation have their fiscal equivalents in tax instruments. For example: (i) a 10 percent free equity share in a company, or interest in an unincorporated joint venture (UJV) is equivalent to a 10 percent tax on all dividends distributed or on the equity cash flow available; (ii) a carried interest repayable with a specified rate of interest is equivalent to a resource rent tax, where the tax rate is the same as the proportionate share of participation and the interest rate is the same as the annual uplift granted before the tax is payable; (iii) forms of production sharing can, and have been, designed to replicate the effect of a tax on profits or cash flow; and (iv) a non-concessional working interest has the character of an R-Based Cash Flow Tax (or Brown Tax) under which the state shares proportionately in both positive cash flows and, by direct contribution, in negative cash flows. The MPRDA amendment proposals for state participation therefore amount to a direct fiscal imposition, but of uncertain size and rules.

174. **BEE participation requirements for upstream petroleum are set at 10 percent**. The impact is therefore less than for mining (at 26 percent) but in petroleum falls almost entirely on new foreign investment and influences expected returns from exploration outlays. This participation thus has an element of redistribution from both the state and non-BEE private investors.

175. **Regulatory and fiscal uncertainty now leads some petroleum companies to seek a contractual framework assuring stability of all potential fiscal impositions**. Such a contract would have similarities with production sharing contracts (PSCs) prevalent in Africa and in parts of Asia, and recently introduced in Brazil for its large pre-salt discoveries. Use of a PSC or similar contractual scheme would represent a major departure from practice in South Africa. It also opens the way to a greater extent of case-by-case negotiations. Its advantage is familiarity to the petroleum companies, the stability assurance that can easily be built in, and sometimes the tolerance of companies for relatively higher levels of state share under these schemes—provided that they continue to have a decision-making majority to control the conduct of operations by having one of the private partners as "Operator".

C. Petroleum Royalty

176. **The same royalty scheme applies as for mining**. Under the Act of 2008, a royalty on gross sales is applied according to a scale of the EBIT formula. Production of crude oil and natural gas is treated for royalty purpose as "refined". However curious this may seem in conventional petroleum industry usage (since crude oil and natural gas are considered unrefined) it has the effect of limiting the maximum rate of royalty to five per cent.

177. **This scheme is unusual for a petroleum royalty and produces a low minimum take by comparison with jurisdictions outside the OECD (and some inside)**. Most royalty or production sharing schemes in emerging market or developing countries provide for a significantly higher minimum share of gross proceeds to go to the state. Countries such as the UK, Norway or Australia, which no longer impose royalty on offshore production, had minimum royalties in effect during the first decade or more of petroleum production.

178. **Offshore field discovery targets are large and probably capable of a minimum payment whenever petroleum is extracted**. The mission's simulations show any success case moving up to the five per cent rate very soon after the start of production. The formula royalty is an unnecessary complication and should be replaced (if production-sharing is not used instead) with a flat rate royalty on the gross value of production at the delivery point from offshore field facilities of at least five percent.

D. CIT on Petroleum Companies

179. **Schedule 10 of ITA creates tax rules different from both mining and the general corporate regime.** The mine-by-mine ring-fence applicable in mining does not apply, though in the absence of group taxation in South Africa separation of taxpayers probably means it matters

little.[23] A ring-fence is imposed around oil and gas activities, but up to 10 percent of remaining assessed losses may be deducted against other (non-oil and gas) income. The tax rate is 28 percent (the regular CIT rate). Oil and gas companies have 0 percent rates of dividend and interest withholding tax. "Refining of gas" is included in oil and gas income, presumably as a carry-over from the terms for Mossel Bay GTLs. A fiscal stability agreement is available for Schedule 10 provisions.

180. **Acquisition costs of a petroleum right are generally not deductible except against capital gain on disposal of the right**, for which in any case a rollover provision is available. One exception is (by election) where an interest in a petroleum right is sold in "participation" mode, which appears to mean a farm-in/farm-out. The extent of permissible capital expenditure deductions, however, probably means that the farmer, or seller, will bear little or no tax on the transaction (unless there is a large discovery), while the farm-in party (purchaser) can deduct the acquisition cost and so achieve major deductions against current oil and gas income. This report proposes revision of these arrangements so that, with appropriate safeguards, acquisition costs become available for amortization.

181. **All other capital expenditure (with minor exceptions) qualifies for 100 percent deduction**. Additional uplift of 100 percent of exploration capital expenditure and 50 percent of "post-exploration" (development and production) capital expenditure is also granted. The uplifts appear to contribute to assessed losses that, up to 10 percent of remaining assessed losses, may be deducted against other (non-oil and gas) income. Despite these generous provisions, it is possible for exploration expenditure to become "stranded" in the sense that unsuccessful exploration expenditure may find no other taxable income against which it can be deducted.

E. MPRDA Amendment Proposals

182. **The MPRDA Amendment Bill now referred back to Parliament contains new state participation provisions**. The wording is unclear but states at least: (i) 20 percent "free carry" with no financial obligation for the State; and (ii) further participation at an agreed price, or "production sharing agreements".

'*Free carried interest*' means interest allocated to the State in exploration or production operations without any financial obligation on the State; '*production sharing agreement*' means an agreement between the State and the petroleum company on how the extracted resource will be shared between the State and the petroleum company. (See Box 4)

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[23] By contrast, for example, with Australia where group taxation is permitted and thus the ring-fencing rules assume greater importance.

Box 4. State Participation Provisions of the MPRDA Amendment Bill 2014

'State participation' means the right of the State to participate in petroleum development at exploration and production operations, including, inter alia:

(a) free carried interest and may include production sharing agreements in production operations; and

(b) representation at the joint project committee of the exploration or Production operation;''

''**State participation on exploration and production rights**

86A. (1) The State has, through the designated organ of state, a right to a 20 percent free carried interest in all new exploration and production rights, from the effective date of such rights.

(2) In addition to the free carried interest contemplated in subsection (1), the State is, in the prescribed manner, entitled to a further participation interest in the form of—*(a) acquisition at an agreed price; or (b) production sharing agreements.*

(3) The State shall upon acquiring interest in terms of subsections (1) and (2) enter into a joint operating agreement with the operating petroleum company.

(4) The State is entitled to a corresponding percentage of voting rights to the interest held in such joint operating agreements.

(5) The Minister must, acting on behalf of the State, appoint two representatives to the joint project committee of the exploration or production operation to represent the interest of the State.''.

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183.   **The key problem is the uncertainty that has been introduced**. The terms of acquisition of state participation are unclear and the uncertainty is prolonged by the reference back to Parliament of the Bill. The combination of this situation with the sharp fall in oil prices over the last half of 2014 has already caused hold up in exploration programs.

184.   **Petroleum companies usually expect settlement of terms before exploration begins**. In mining, by contrast, companies in South Africa have historically relied on general fiscal legislation while, elsewhere (take Botswana for example) they have been willing to wait until negotiations occur over a commercial development. Although views on relative exploration risk in the two EI sectors may differ, petroleum exploration in deep water compresses very large amounts of expenditure into short periods of time at high risk. Companies exploring in South Africa have yet to begin drilling campaigns, where very high expenditures per well (in excess of US$100 million at current prices) will be incurred. The lack of clarity on state participation means that companies are unable to calculate the full effect of the fiscal regime on their anticipated returns from a successful discovery. The exploration expenditure is thus less likely to be undertaken in the first place.

F. Petroleum: Issues

185. **Current royalty and CIT regime alone would probably be unstable in the event of a significant discovery**. That likelihood has to be balanced against the reasonable expectations of companies when they committed to exploration programs. The MPRDA amendment proposals, however, leave existing holders of exploration rights unclear about their obligations for state participation if they apply for a production right. The uncertainty increases the propensity of companies to seek a stability assurance encompassing all the obligations and rights—not just tax and royalty. Any measures to bring the overall fiscal regime closer to those of neighboring countries and other comparators would probably require a trade-off through a stronger stability assurance.

186. **The approach taken also affects public financial management of petroleum revenues**. Tax or royalty receipts flow straightforwardly to the public treasury; they will be integrated with other sources of public revenue even if separately identified or saved. The flow of revenues from state participation shares, by contrast, will depend on rules governing the state entity holding the participating interest. It may not be obliged to pass the net revenues back to consolidated revenue, in which case state revenues will depend on the tax and dividend policies established for the state entity. Under production sharing contracts an agency of the state has to be assigned to receive the production shares or proceeds and, again, the same problem arises. At least with production sharing the state shares of production are an obvious proxy for a tax instrument, so legislation to ensure that these flow to consolidated revenue should be more easily achieved.

187. **The current uplift scheme favors highly profitable projects rather than marginal ones**. Because the uplift is applied all at one time it is of greater value when recovered in full at the first opportunity (possible under 100 percent expensing) than when carried forward as a loss and partially recovered over a number of years. This effect could be removed and uplift made neutral by converting uplift into an ACC applied to unredeemed capital expenditure in equal amounts over a number of years. In the example used below, it is applied as a single uplift but spread at a rate of 10 percent for each year the expenditure remains unredeemed.

188. **The current uplift scheme is still accompanied by deduction of interest on loans**. This, in effect, means a double uplift in respect of capital expenditure financed by debt. The ACC scheme applies to both equity and debt-financed capital. It stands in place of separate deduction of interest.

189. **Accounting for petroleum taxation takes place in local currency rather than the functional currency of the petroleum industry**. The petroleum industry conventionally maintains accounts in US$ and thus must perform conversions according to prescribed rules to maintain separate tax accounts in Rand. Accounts could be maintained in US$ with tax due converted to Rand when paid. The ITA already provides for alternative functional currencies.

Shale Gas

190.   **Shale gas exploration blocks have not yet been awarded**. Five blocks in the Karoo Basin have been sought by three consortia of companies. The potential economics of shale gas in South Africa are discussed in the Analysis Supplement. While the present petroleum fiscal regime for the deep offshore may not be relevant to onshore shale gas, there is an opportunity to encompass terms for shale gas in any reformed fiscal regime for petroleum—rather than introduce a distinct fiscal regime for shale gas. This report takes that approach.

191.   **The domestic price for shale gas will be a more important determinant of project feasibility than the fiscal regime**. The principal use is likely, initially, to be for power generation and the price in that use will probably be regulated. Opportunities will exist for additional sales of gas for industrial use at commercially negotiated prices.

Petroleum: Three options

192.   **Option One: Delete the state participation provisions altogether in revision of the MPRDA Amendment Bill**. The state, through a commercially-constituted corporation would still be free to negotiate participation as a commercial transaction, but as a matter distinct from legislated fiscal terms. Additional tax could be introduced in Schedule 10 but applicable only to those without stability agreements (or newcomers), unless by mutual agreement.

193.   **Option Two: Comprehensive shift to a production sharing contract (PSC) system**. Many precedents exist in nearby countries including; the rate of return sharing system for offshore petroleum that has allowed many new fields to be discovered and developed in Angola; or the R-Factor (payback ratio) system that has underpinned successful exploration and now progress towards offshore gas development for LNG in Mozambique.

194.   **Option Three: Define the state participation option precisely and publish a model participation agreement that companies with exploration rights could sign**. The definition would apply to the terms of the maximum 20 percent carried participation. It could include the participation terms common elsewhere—a carry for the state participant through exploration with a paid interest at the development stage, albeit one which the private parties could finance, and be rewarded with a commercial interest rate plus a premium. A non-reimbursable carried interest through exploration is already a very substantial concession to the state, especially where (as in deep water) the exploration costs are likely to be high.

195.   **Each of these cases could be made equivalent in their effect on fiscal take**. Nevertheless, the legal frameworks would differ. The MPRDA Amendment Bill proposes the right of the state to appoint two representatives to the operating committee of such ventures. There is no need for a state participating interest in the venture to achieve this objective; it could simply be a condition of the production license.

196.   **All three options merit serious consideration.** The mission favors option one, or option one in combination with option three if non-fiscal considerations favor state participation. Option two, production sharing, however, will make it easier to offer comprehensive fiscal stability in the contract, and higher state shares might be the reward for that**.**

197.   **If properly structured, the fiscal effect of one of these options should not deter exploration and subsequent development.** In fact, the opposite may be true if a revised scheme provides greater certainty to investors, combined with greater assurance to South Africa of significant participation in strong revenues from a profitable discovery. International oil companies are familiar with terms that take higher shares for the state than the present South African regime, provided that they are offered stability, control (in consultation) of operations, and the chances of both rapid payback and rising returns in profitable cases.

198.   **Additional fiscal devices should be so structured that they minimize risk of loss of investment when production starts.** This requires recognition of any delay in achieving returns by some sort of uplift (or interest on a carry) that is received before significant additional sharing with the state takes place. With that in place, by way of example, a cash flow tax at 30 percent, or equivalent participation or production share on incremental cash flows produces a top marginal rate of 52.5 percent on an additional dollar of revenue (still low by regional standards and Australia has 58 percent).

199.   **In all cases, the royalty and CIT regime for petroleum needs revision**. Much of the revision consists of simplification. It also consists of removing elements of discrimination against exploration expenditure. The incentives currently provided, principally as uplift and capital allowances, require modification while other allowances are introduced.

G.   Economic Assessment of Petroleum Fiscal Regimes

Deepwater Offshore Oil

200.   **Economic modeling was undertaken on stylized deepwater offshore oil fields of 500 million and 1000 million barrels (MMBbl).**[24] Since SA waters are a 'frontier' area in deepwater oil exploration, it is difficult to predict accurately the cost structures and project economics that are likely to materialize as exploration progresses. Many variables would be subject to change, and the analysis considers a number of possible variations in price and cost which would alter the ultimate project economics.

201.   **A key variable underpinning the project economics is the oil price.** As a base case assumption, the analysis assumes the oil price projections of the IMF World Economic Outlook (WEO) until 2020 beyond which the price projection is kept constant in real terms and inflated at

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[24] The full project examples, simulations and results are presented in the separate Analysis Supplement, Chapter III. The Supplement also includes an analysis of shale gas economics.

a rate of 2 percent per annum. Under this price assumption, the 500MMBbl field yields a pre-tax IRR of 26 percent in real terms, while the 1000MMBbl field has a pre-tax IRR of 34 percent.

202. **The current fiscal terms were evaluated for revenue generating capacity using the AETR or "government take".** The current regime generates an AETR of between 20 and 30 percent, which is very low by international standards. Simulations previously undertaken by FAD suggest that in the petroleum sector governments retain government shares of between 65 and 85 percent. Figure 4 illustrates the profile of government revenues relative to pre-tax project cash flows over the life of the 500MMBbl project. The analysis also suggests that the variable rate royalty is largely ineffective, with the royalty rate even in marginal scenarios quickly reaching the highest rate.

Figure 4. Government Revenue Profile – Current Regime (500MMBbl)
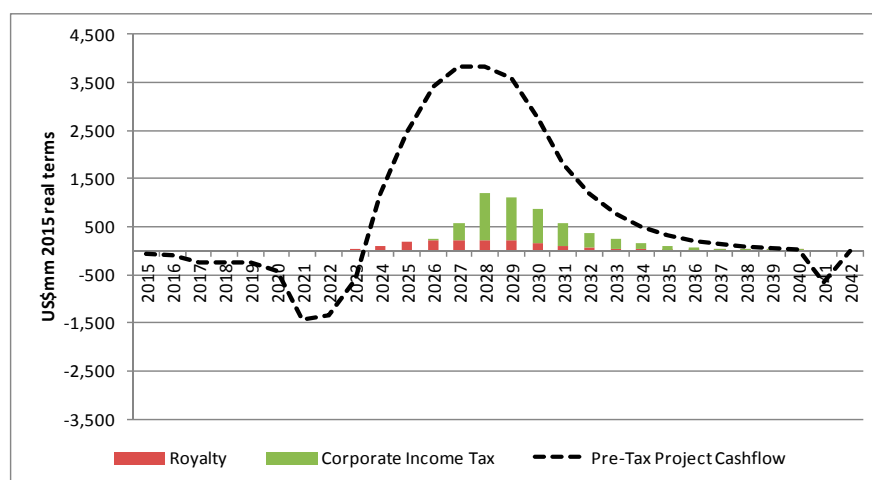
203. **Examples of each of the proposed reform alternatives to the current SA regime are evaluated**. Table 6 presents the key terms of each of the scenarios. All the scenarios include modifications to the CIT calculation involving 5 year depreciation using the straight line method along with a 10 percent ACC (disallowing deductibility of interest). Scenarios 1 and 3 also introduce a 5 percent flat rate royalty, reflecting the necessary reforms outlined in Section E. Scenario 1 (a) and (b) add an additional cash flow surcharge at 20 and 30 percent respectively, with ten percent uplift on capital expenditure in the year that it is incurred. Scenario 3 reflects a possible reform envisaged under the MPRDA Bill, introducing a 20 percent state participation, carried from development and repaid with interest. Under Scenario 2, a simple illustrative R-Factor based production sharing scenario is introduced. The current regime and proposed alternatives are evaluated against the key fiscal objectives of revenue-raising capacity, neutrality and progressivity, and placed in international context of other petroleum-producing countries.

Table 6. Reform Scenarios

Fiscal provision	Current Regime	Scenario 1 (a)	Scenario 1 (b)	Scenario 2	Scenario 3
Royalty	0.5 + [earnings before interest and taxes/(gross sales in respect of refined mineral resources x 12.5)] x 100. Max 5%	5% Flat Rate	5% Flat Rate		5% Flat Rate
Income tax	28%	28%	28%	28%	28%
Depreciation	Immediate Expensing of all Capital Expenditure	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1
Uplift/Allowance for Corporate Capital	100% uplift on exploration expenditure; 50% uplift on development expenditure	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital
Loss carry-forward	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Additional Tax		Cash flow Surcharge at 20% with uplift on capital expenditure at 10%	Cash flow Surcharge at 30% with uplift on capital expenditure at 10%		
Production Sharing				70% Cost Recovery Limit 0<R<1 — 15% 1<R<2 — 20% 2<R — 25%	
State Participation					20% State Participation. Carry through to production with repayment of development costs from participation cashflows at interest rate of 7%
HDSA Requirements	10% Local Ownership	10% Local Ownership	10% Local Ownership	10% Local Ownership	10% Local Ownership

204.   **Evaluating first the revenue raising potential, results illustrate that the range of reform scenarios allow for an AETR as high as 50 percent in both field scenarios.** Figures 5 and 6 illustrate the profile and composition of government revenues under each reform scenario. The revenue pattern over the cycle of the projects mainly reflects the production profile of the project. The effect of the 5 year depreciation and allowance for corporate capital is to alter the timing of corporate tax payments in the initial years of production. The cash flow surcharge and state participation have the effect of generating significant additional revenue when the project is generating sufficient positive cash flow.

Figure 5. Total Government Revenue under Current and Reform Scenarios (WEO Prices)
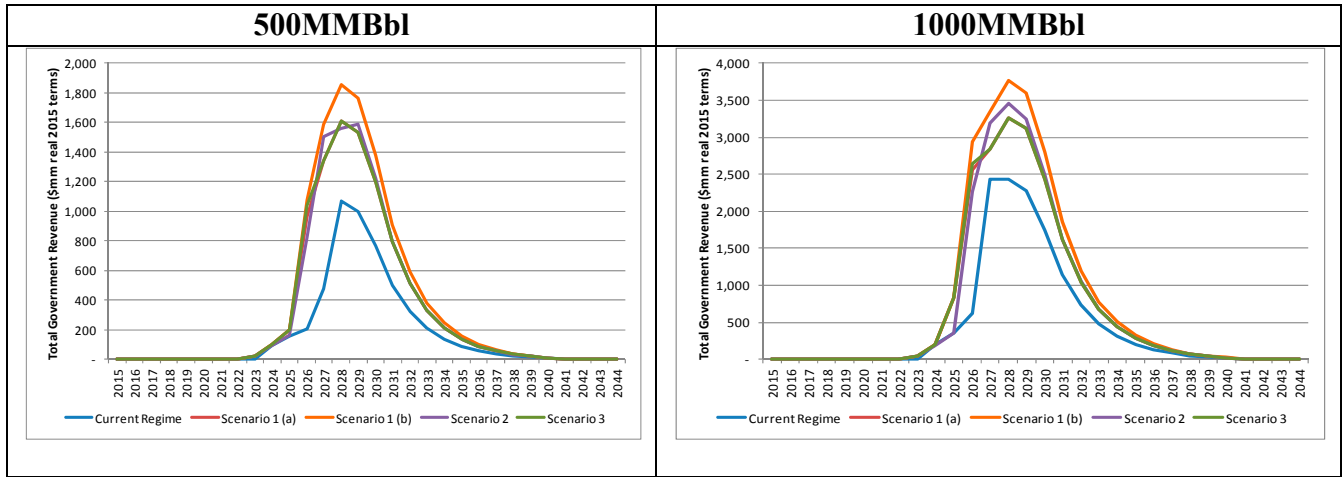
Figure 6. Profile of Government Revenues – Reform Scenarios (500 MMBbl field, WEO Prices)
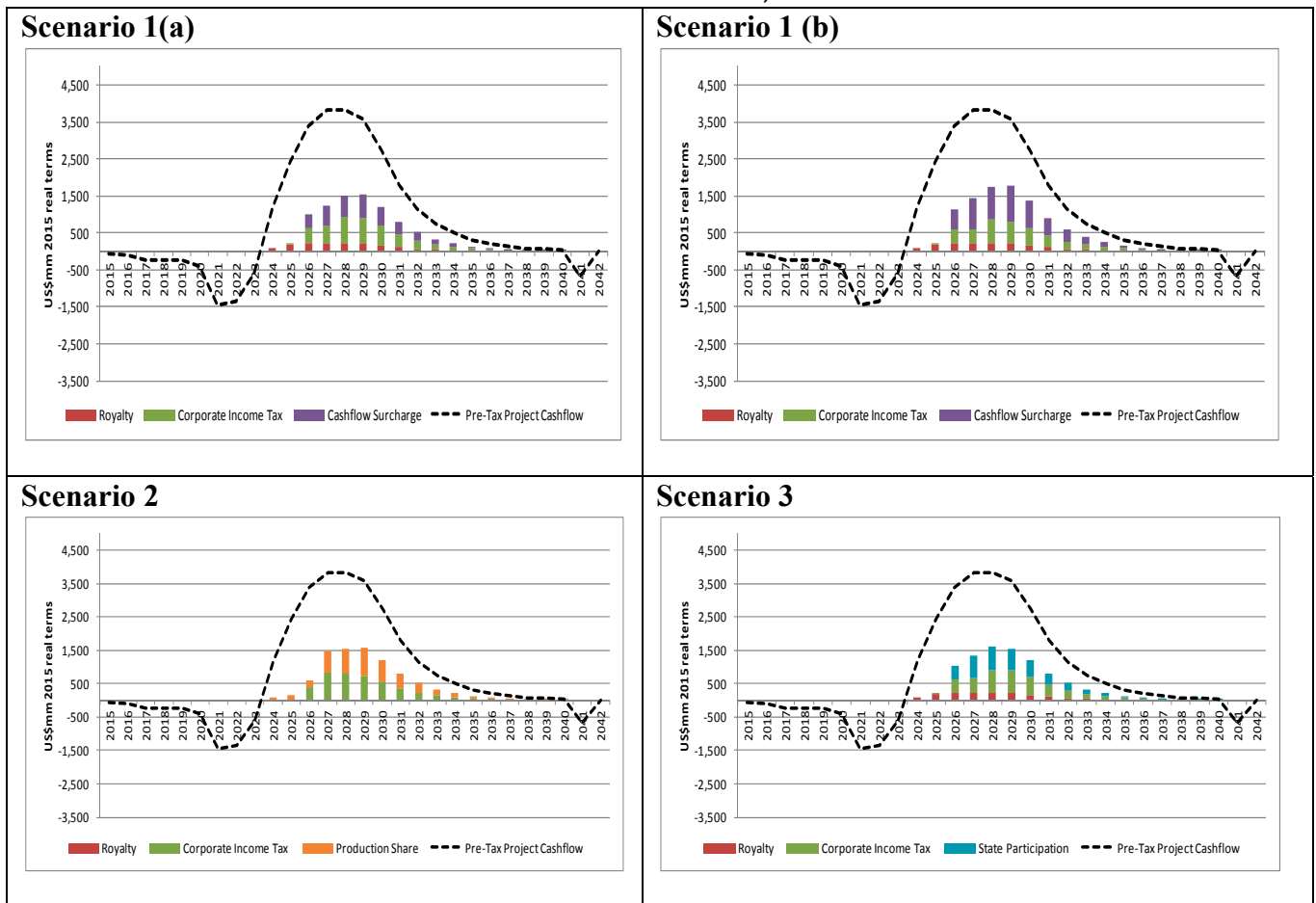
205.   **The AETR, METR and breakeven prices for the current South African regime are low by international standards.** The existing fiscal arrangements in South Africa and the alternative proposed reform scenarios were compared with fiscal regimes applicable in other petroleum producing countries from the region and elsewhere (Figure 7 and 8).[25] Some of the comparators included in the sample are regimes for other "frontier areas" (such as the Ghanaian regime before the 2008 Jubilee discovery); some are terms of established producers (Angola, Ghana post-Jubilee); and some have significant petroleum discoveries (Mozambique, Tanzania). The reform scenarios proposed place South Africa better in line with the sample of comparators. Under the field scenarios assumed, the Angolan, Brazilian and Tanzanian regimes generate marginal or unviable outcomes, placing high burdens on a marginal project relative to the rest of the comparators. For these regimes, breakeven prices are significantly higher than the WEO forecast, suggesting that more favorable project economics have facilitated viable projects in these areas. While these comparators are included for contextual purposes, the more appropriate comparators for South Africa would be those yielding average effective tax rates in the range of 60 to 80 percent.

Figure 7. Average Effective Tax Rate (500 MmBbl, WEO price forecast)
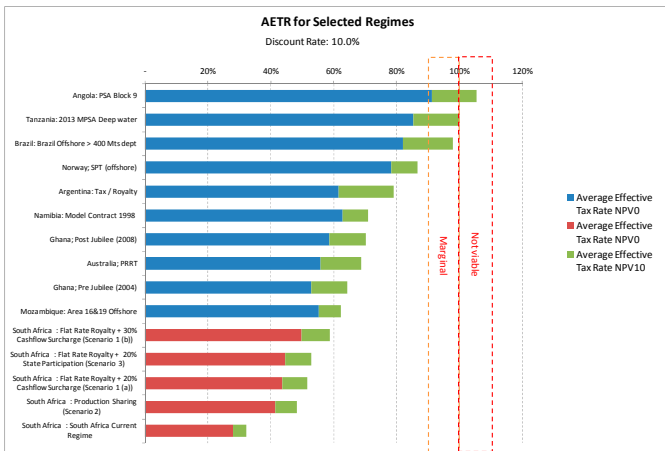
Figure 8. METR and Breakeven Price (500MmBbl)
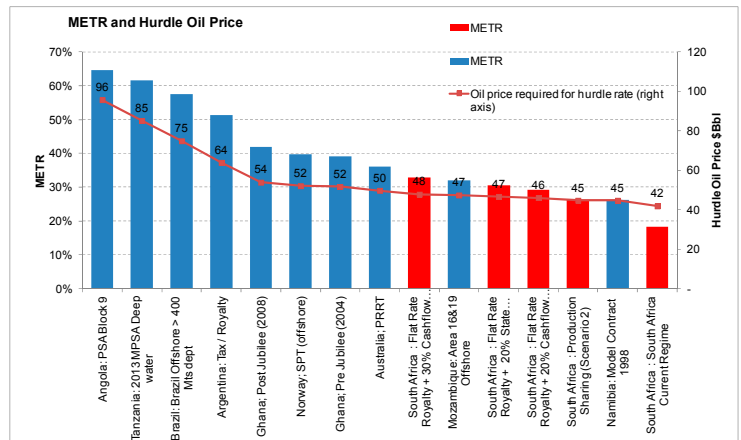
206.   **The impact of oil price uncertainty on project outcomes was evaluated using stochastic price analysis.** Monte Carlo simulations were used to account for price uncertainty, by assuming that oil prices follow a stochastic stationary first-order autoregressive AR(1) process. The results were then used to measure the dispersion of possible outcomes, and to infer

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[25] This analysis focuses on the design of the fiscal regime, comparing the South African regime with that of other petroleum-rich countries, using the 500MMBbl project example. Other factors which are equally relevant for the investment decision and outcome, such as geological prospectivity, proximity to markets, quality of infrastructure, business climate, property rights, and political stability, are assumed constant.

the implied risk to the investor and the government under the current regime and reform scenarios.[26]

207.   **Investor perception of risk is evaluated by analyzing the mean expected post-tax IRR to the investor and the coefficient of variation (CV) of investor returns**. Figure 9 shows the mean expected post-tax IRR and the CV of post-tax IRR for each regime tested. These results further demonstrate the generosity of the South African regime when compared internationally. Relative to the sample, the current and proposed regimes generate the highest mean post-tax IRRs, and do not appear to significantly increase the risk to the investor.

208.   **The progressivity of the current and proposed fiscal regimes was evaluated by estimating the government share of total benefits over a range of project results.** "Progressivity" here means the capacity of the fiscal regime to ensure that government receives a rising share of project cash flows as the intrinsic profitability of the project increases (up to a realistic maximum share). The variation in project NPV (reflecting project profitability) was generated by adjusting oil prices in constant real terms. At low profitability levels, all the scenarios place a lower burden on projects with lower pre-tax profitability. Figure 8 shows that with the additional progressive fiscal elements, Scenarios 2 to 4 clearly yield a higher share of total benefits for the government as the profitability of the project increases.

Figure 9. Measures of Investor Risk (500MmBbl)
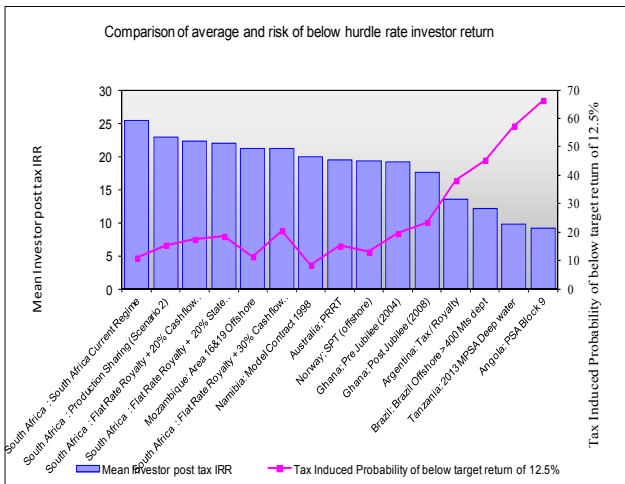
Figure 10. Government Share of Total Benefits (500MmBbl)

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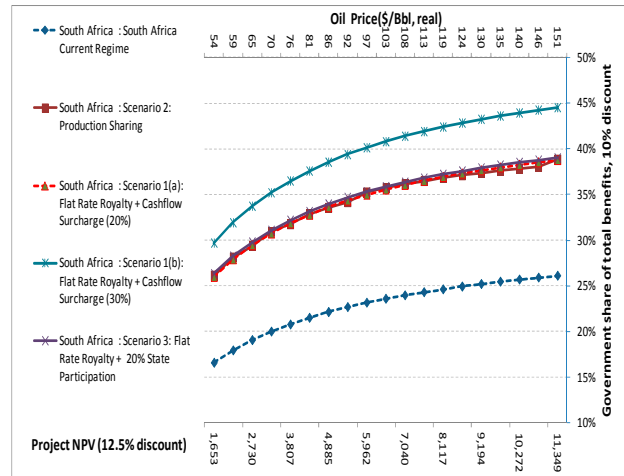
[26] Details of the estimation of the parameters of this process are described in the Analysis Supplement.

Recommendations

- Set the *royalty* at a flat rate on gross proceeds at delivery point determined in field development plan – probably at 5 percent.

- Maintain a *ring-fence for CIT* around oil and gas activities; limit deduction of 10 percent of assessed losses against non-oil and gas income to actual expenditures not including uplift.

- Unify treatment of *exploration and development capital expenditure* with write-off over five or six years, commencing in the year of commencement of commercial production.

- Review the treatment of *unsuccessful exploration expenditure*.

- Introduce *amortization of the cost of acquisition of petroleum rights* (over the same period or life of asset).

- Replace *current uplifts* on exploration and development expenditure with *allowance for corporate capital (ACC)* on unredeemed capital expenditure balances at annual rate.

- Eliminate *deduction of interest* – ACC stands in lieu.

- Consider use of US Dollar as *functional currency* for upstream petroleum activities.

- Define any *state participation* precisely, if included in the regime, and limit carried participation to a maximum of 20 percent.

- Use, in preference, the *cash flow surcharge* scheme at a 20 percent rate.

V. INTERNATIONAL TAX ISSUES FOR EI

209.   **SA has a sophisticated approach to international tax issues.** Through its membership of the G-20 and observer status at the OECD, SA is taking a leading role in addressing international tax avoidance (including base erosion and profit shifting, "BEPS"). This is, particularly important in an African context where many countries, especially neighbors, watch with interest SA tax developments. Nevertheless, as a sophisticated economy with a complex tax law, large treaty network and backlog of historical issues demanding continued social change, SA faces issues in a different context and subject to different restrictions than other African countries.

210.   **The main feature of SA's legal framework for international tax is its large tax treaty network.** SA has more than seventy double tax treaties, the largest treaty network in Africa. This network contains a range of treaties; some very old —Grenada and Zambia— many very new, some with developed countries, developing countries and countries that might be labeled financial centers (such as Cyprus, Malta and Mauritius) and others with countries that do not have an income tax or at least not a comprehensive one. These treaties are far from uniform (e.g., interest withholding tax ranging from nil to 25 percent) and so SA faces very different tax outcomes depending on which treaty is applicable. SA also has nearly 20 agreements for administrative assistance and growing, many of which are with typical tax havens. SA has an active program for revising treaties and so its tax treaty network will continue to develop.

211.   **In December 2014, the Davis Committee released its interim report on BEPS, which analyses a raft of reports issued by the OECD during 2014 from an SA perspective**. The recommendations seem considered and balanced, but a number are non-committal or will need refinement as things develop at the OECD. The interim recommendations lack a certain sense of coordination and cohesion and final recommendations would benefit from careful integration as between the recommended BEPS responses (consistency) and the general (domestic) recommendations that the Committee may make. For example, should a recommendation be made that the ITA be rewritten, that process will require great care in structuring the rewrite especially in the context of international factors including BEPS issues. In recent decades a number of rewrite programs elsewhere have been less than a complete success.

212.   **Domestic international tax rules and tax treaties rarely make comprehensive special provision for the activities of the EI, and so those activities are typically regulated by generally applicable international tax rules**. Even though a number of SA based EI companies have establishments in a number of other jurisdictions, SA's greatest interest is in local EI activities, and this is the focus of the present discussion. In this context, the issues faced by SA are typical of those faced by source countries and transfer pricing, thin capitalization, withholding taxes, upstream sales, and treaty shopping generally, are high on the list.

213.   **SA has a sophisticated approach to transfer pricing and generally follows the accepted international standards in the form of the OECD Transfer Pricing Guidelines**.

Since a review of the transfer pricing rules in 2013, arm's length pricing for tax purposes applies automatically and is not dependent on action by SARS—the new approach is self-assessment (s. 31 of the ITA). There is a level of uncertainty in this area at the moment, as SARS is yet to update its guidance on transfer pricing consequent upon the 2013 amendments and has not withdrawn its old guidance. While many challenges remain in developing transfer pricing practice in SA, the legislative framework seems stable and those developments are likely to take the form of lower tier rules. Further, SA should be more than capable of keeping abreast of current issues though its memberships mentioned above.

214. **SA may face greater legislative challenges with respect to domestic transfer pricing issues than it does with respect to international ones**. International tax rules effectively draw a ring-fence around the domestic tax base and the integrity of this ring-fence is protected by international transfer pricing rules. Of course, there are issues with arm's length base eroding payments, and these are discussed further below. If the domestic (rather than the international) tax rules draw a ring-fence around activities, such as EI activities, than the ring-fence will be open to abuse and avoidance unless it is protected by domestic (intra-country) transfer pricing rules.

215. **S. 31 of the ITA does not apply to purely domestic transactions and this leaves the ring-fences drawn in the EI open to erosion through transfer pricing practices**. For example, a petroleum right holder may have an incentive to inflate the price paid to a local related party for equipment that qualifies for an uplift under the Tenth Schedule; at least once the right holder has income. This might also be a way of in effect moving losses from one related party to another, despite the lack of a group relief regime. The ITA appears to have little in the way of domestic rules to deal with this type of manipulation, at least outside of application of the general anti-avoidance rule (s. 80A to s. 80L). One possibility is that excessive expenditure might not be considered as incurred in the production of income (the general s. 11 test), but that approach is very limited and it is not clear how far it would apply to many of the specialized EI provisions. The "effective value" requirement in s. 37 (discussed above) may have some impact on the amount of capital expenditure deductible by a mining operation under s. 15(a), but it only applies where the mining right is transferred at the same time.

216. **Primarily, thin capitalization is now governed by the general transfer pricing rules in s. 31 of the ITA and so limits on excessive debt financing also only apply in an international setting**. This is true both as regards the volume of debt incurred as well as the rate at which interest is charged. Again, SARS is yet to release new guidelines on the application of the new transfer pricing regime in a thin capitalization context. The existing guidance (based on the old transfer pricing rules) provided a non-binding safe harbor in the form of a debt to equity ratio of 3:1. This also appeared in legislative form for petroleum in the Tenth Schedule, but paragraph 6 was replaced in 2014 and now the usual transfer pricing rules apply to debt in the petroleum industry (except where the old paragraph 6 is protected by a fiscal stability agreement).

217.   **SA proposes to further tighten the deduction of interest with an earning stripping rule, scheduled to become effective at the start of 2016**. The change is appropriate but a clarification is needed for some circumstances. S. 23M of the ITA will limit the amount of interest that can be deducted to 40 percent of "adjusted taxable income" (effectively taxable income without accounting for interest received or paid or capital allowances). This provision only applies to interest paid between related parties (including third party loans supported by a guarantee) where the interest is not "subject to" SA tax. Interest for which a deduction is denied may be carried forward and treated as incurred in future years subject to the same limitation. Like the transfer pricing rules, this earning stripping rule is primarily targeted at interest paid offshore. Due to this targeted nature, it is not clear whether this rule will apply in a tax treaty scenario if the loan and interest are otherwise at arm's length.

218.   **SA has made recent amendments to the ITA to provide a full range of withholding taxes at a consistent rate of 15 percent.** The dividend withholding tax became effective in 2012 (replacing the secondary tax on companies), but the increase in royalty withholding tax and the introduction of interest withholding tax are only effective from the start of 2015. Of particular interest is the proposed withholding tax on service fees, which is slated for introduction at the start of 2016 (Part IVC of the ITA).

219.   **The withholding taxes on royalties, interest and service fees have substantial potential to reduce the base eroding effects of granting a deduction for such payments**. Many countries impose withholding taxes based on whether the payment is made by a resident person (other than through a foreign PE) or a local permanent establishment (PE). SA imposes these taxes depending on whether the payments have a "source within" SA. There are explicit source rules for royalties and interest, which are broadly consistent with international practice (s. 9 of the ITA). By contrast, the source of service fees seems to depend on case law, which is likely to give particular importance to the physical place where the services are performed, i.e., fees for services physically performed in SA are likely to have a SA source.

220.   **The service fee withholding tax appears to incorporate some limitations that may retard its utility as a protection against base erosion.** First, it is only imposed on fees for "technical services, managerial services and consultancy services". There is no definition of these terms, which give rise to notorious difficulties of identification. Secondly, a limitation to only cover services physically performed in SA means that there will be no withholding tax on fees for services where those services are performed outside SA but for the benefit of a person in SA. Given electronic means of communication and providing services, this is a substantial issue and the fees paid offshore for such services will commonly be deductible in calculating the domestic tax base. Consideration might be given to including such fees within the scope of the withholding tax or denying a deduction for such fees.

221.   **Another area where SA might consider extending its withholding taxes is in the context of rent paid for the use of tangible assets, which can also act as base eroding payments**. This can have particular relevance in the EI where payments of rent and for services

are common and are often made to entities established in tax havens. A full suite of withholding taxes will encompass amounts paid for the use of capital (debt and equity), amounts paid for the use of tangible and intangible assets (rent and royalties) and amounts paid for services. In passing it is noted that the definition of "royalty" in s. 49A is substantially narrower than a payment for the use of intangible property. Given SA's broad tax treaty network, withholding taxes on many of these types of payments will be suppressed by treaty, especially those on rent and services. However, many of these eroding payments go directly to tax havens and thereby distort the form of transactions and competition.

222.   **Even in a tax treaty context, SA is justified in imposing a broad range of withholding tax and requiring the recipient taxpayer to come forward and justify their entitlement to tax treaty benefits.** Once treaty entitlement is proved, many countries then use a certificate procedure to ensure exemption from withholding tax on future payments. Another consideration in this area is the ongoing OECD work on limitation of treaty benefits and treaty shopping in the context of the BEPS program.

223.   **Like many other countries with EI opportunities, SA faces issues as to direct and indirect disposals of EI rights.** The issues essentially pertain to the separate legal identity that is the corporation or company that typically holds those rights. The artificiality of this separate identity means that the *real* investors have a number of options when seeking to transfer rights in SA natural resources. The investor can transfer the actual rights, i.e., a direct disposal. The investor might also transfer the shares in the corporation that holds the rights, i.e., an indirect disposal. Commonly, the shares in the corporation holding the rights may be held by other intermediate holding companies between the right holding company and the ultimate investor. Here the investor also has the choice to dispose of shares in any of the intermediate companies to cause an indirect transfer of the rights to SA natural resources.

224.   **If these various types of transfers of EI rights that effect similar economic outcomes are not taxed similarly, tax planning will result**. Most countries tax a sale of assets differently from a sale of shares in a corporation that holds the assets. Many countries also tax sales of shares by one corporation in another corporation differently from the sale of shares in corporations by other entities. SA is no different in this regard. The tax consequences of a direct sale of an EI right were considered above. There is no special exemption for the sales of shares by one company in another company (no participation exemption) and so gains on such sales in a purely domestic context typically give rise to taxation (with one third of the gain excluded from the tax base).

225.   **These are conceptual issues that are not limited to the sale of EI rights by multinational corporations.** They can arise in a purely domestic setting, but they are particularly problematic when they arise across borders. This is because in an international setting SA's jurisdiction to tax is limited. Through the use of intermediate companies in overseas countries, the jurisdiction to tax what is effectively a disposal of rights in SA may be taken beyond SA's scope to tax. This is not an issue limited to natural resources. It is a general issue

that is particularly acute wherever substantial rights pertaining to a particular country are increasing in value.

226.   **SA may tax the indirect disposal of an EI right through the sale of shares in an intermediate holding company located in a foreign jurisdiction**. These upstream sales are notorious difficult to tax and the SA provision is not immune from these difficulties. Paragraph 2(2) of the Eighth Schedule of the ITA treats as immovable property situated in SA (and so subject to tax on disposal) shares held in a company where 80 percent or more of the value of the shares "is attributable directly or indirectly to immovable property" situated in SA and the holder of the shares has at least a 20 percent interest in the company. An interest in an EI right can trigger this rule because such a right is immovable property (s. 5 of the MPRDA). Whether or not that right will constitute 80 percent of the value of an EI operator will depend on the facts. This threshold seems quite high and there may be cases in which movable assets held by the operator are more than 20 percent of the market value of that operator (in which case the rule will not apply).

227.   **This right to tax upstream sales may be limited by tax treaties (depending on their terms), but in any case are difficult to administer**. In particular, determining the cost base of the offshore shares trying to be taxed will be difficult, as will determining consideration received for the disposal. Care must be taken to ensure that these factors, especially the cost base, have not been artificially manipulated.

228.   **As with domestic sales of shares in EI operators, this taxation of upstream sales may give rise to a form of economic double taxation**. This is the same issue as discussed above in the context of direct sales of EI rights. The gain on the disposal of shares reflects the value of the minerals in the ground, which SA will tax when they are extracted. It is possible to exempt these upstream sales and use a system that deems the EI right to be disposed of and reacquired at market value (mark-to-market) when there is a change of ownership in the entity holding the right. Most commonly, this would cause the tax effects of the disposal to arise in a local entity. If coupled with a system for depreciation of EI rights, this can relieve the double taxation and potentially avoid tax treaty issues.

Recommendations

- Continue to monitor international developments and methods of addressing tax avoidance, particularly through South Africa's observer status at the OECD and membership of the G-20

- Proceed with broadening of withholding taxes on base eroding payments and consider further broadening the withholding tax on royalties and service fees, and the possibility of a withholding tax on rent from tangible assets used in SA.

- Consider requiring non-residents to prove entitlement to exemption or reduction of withholding taxes under treaty (with a clearance and certificate approach for future payments to entities that have proved entitlement).

- Evaluate whether it is possible (constitutionally) to introduce a limitation of benefits provision for treaties into domestic law and monitor developments at the OECD in this regard.

- Consider whether the 80 percent test of value in the shares attributable to SA immovable property is too high, in the context of offshore indirect disposals of SA EI rights.

- Consider, as a possible alternative to taxing offshore disposals, a proportionate deemed disposal of an EI right held by a local entity where that entity suffers a direct or indirect change of ownership of 20 percent or more (mark-to-market approach).

INTERNATIONAL MONETARY FUND

Fiscal Affairs Department

SOUTH AFRICA

FISCAL REGIMES FOR MINING AND PETROLEUM : OPPORTUNITIES AND CHALLENGES

Analysis Supplement

Prepared for

The South African Tax Review Committee

(Chair, Judge Dennis Davis)

Philip Daniel, Martin Grote, Peter Harris, and Alpa Shah

April 2015

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Figures

I. MINING AND MINERALS IN THE SOUTH AFRICAN ECONOMY

The supplementary tables and figures presented here support the analysis of Chapters III and IV and V in the main report.

Figure A1. Mineral Sector Contribution to Exports

Source: Department of Minerals & Energy (Refer to Table A1)
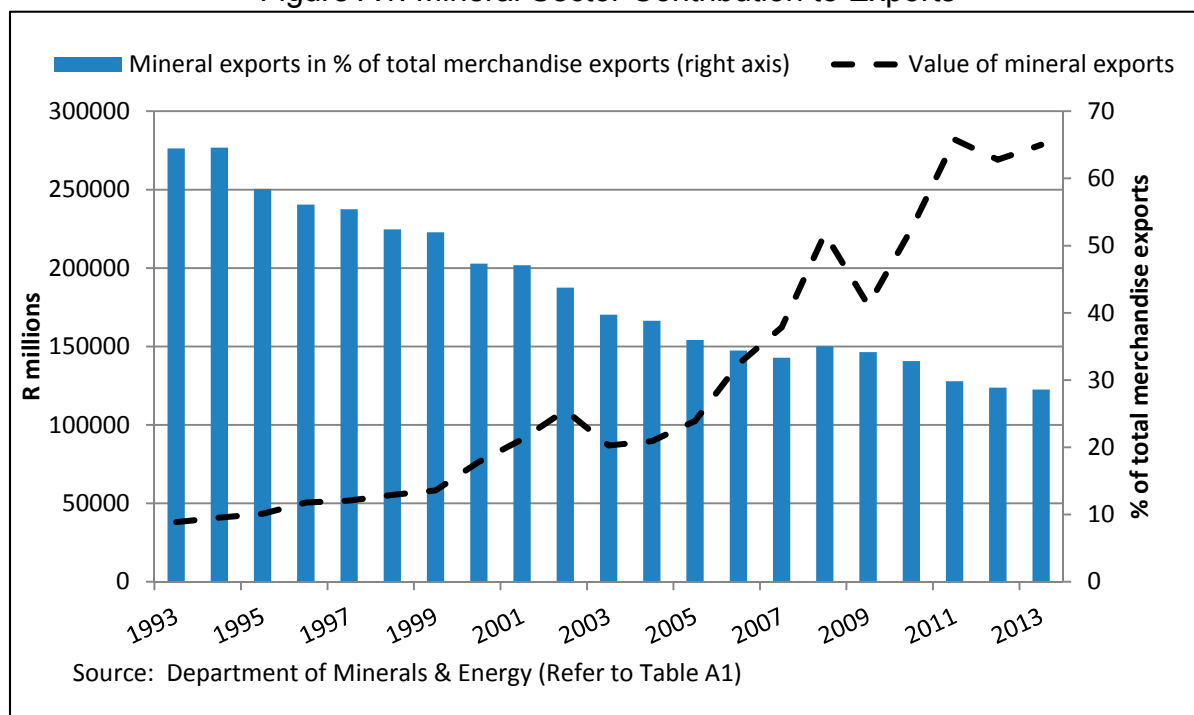
Table A1. Mineral Sector Contribution to Exports

Year	Value of mineral exports	Total value of South Africa's merchandise exports	Mineral exports in % of total merchandise exports
	R million	R million	Percent
2003	86,910	291,434	29.8
2004	89,673	310,525	28.9
2005	102,487	358,361	28.6
2006	138,879	447,690	31.0
2007	162,203	537,516	30.2
2008	221,926	704,293	31.5
2009	176,390	556,432	31.7
2010	224,956	656,597	34.3
2011	282,013	789,764	35.7
2012	269,120	814,861	33.0
2013	278,658	917,602	30.4

Source: Department of Minerals & Energy (now Department of Mineral Resources)

Figure A2. Mining and Quarrying Sector Contribution to Total Government Revenue

Diamonds export levy
CIT
Mineral and Petroleum Resource Royalties
Total contributions as a % of government revenue (right axis)

Sources: Tax Statistics 2014, National Treasury & South African Revenue Service.
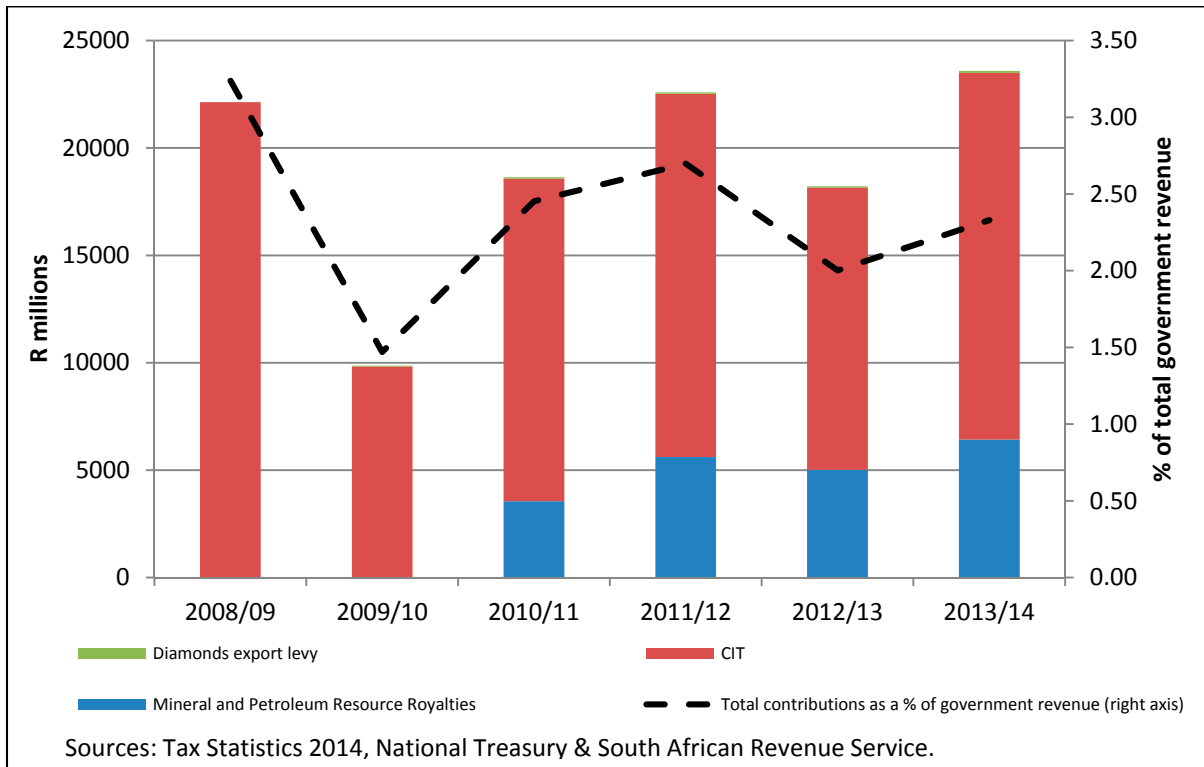
Figure A3. Employment by Sector

Community, social and personal servcies
Wholesale, retail and motor trade; hotels and restaurants
Transport, storage and communication
Manufacturing
Financial intermediation, insurance, real estate and business services
Electricity, gas and water supply
Mining and quarrying
Construction

Source: Quarterly Employment Statistics & Stats SA (Refer to Table A2)

Table A2. Employment Sector (in percent)

Year	Construction	Mining and quarrying	Mining and quarrying of which:		Electricity, gas and water supply	Financial intermediation, insurance, real estate	Manufacturing	Transport, storage and communication	Wholesale, retail and motor trade;	Community, social and personal
			Gold	Non-gold						
2009	5.1	6.0	2.0	4.0	0.7	22.0	14.5	4.4	20.4	26.9
2010	4.8	6.1	1.9	4.3	0.7	22.0	14.1	4.4	20.4	27.5
2011	5.1	6.2	1.7	4.5	0.7	21.9	13.8	4.4	20.3	27.7
2012	5.0	6.1	1.7	4.4	0.7	21.8	13.6	4.5	20.2	28.0
2013	4.9	5.9	1.5	4.4	0.7	21.7	13.5	4.4	20.4	28.4
Source: Quarterly Employment Statistics & Stats SA										

Figure A4. Mining Sector Return on Capital Employed (ROCE)
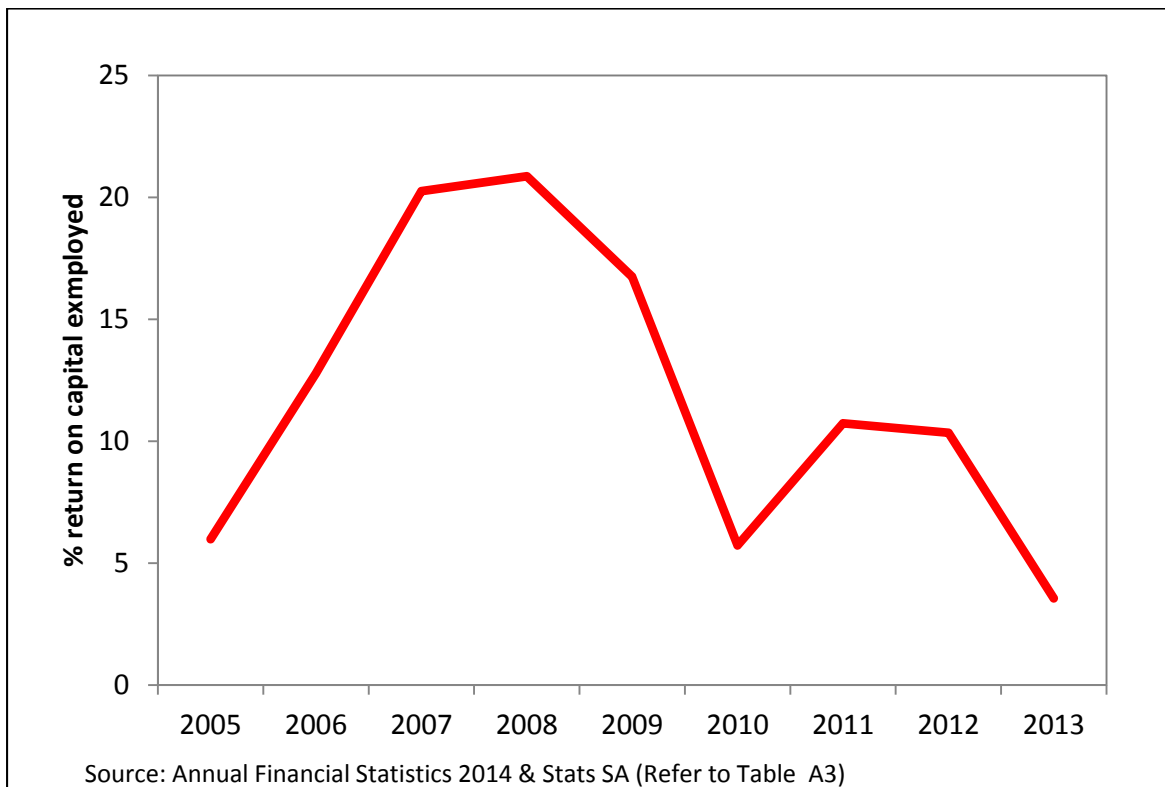
Source: Annual Financial Statistics 2014 & Stats SA (Refer to Table A3)

Table A3. Mining Sector Return on Capital Employed (ROCE)

		2005	2006	2007	2008	2009	2010	2011	2012	2013
Net profit before company tax and dividends	R million	17,829	41,184	85,972	109,567	108,866	40,623	85,793	97,328	37,309
Total equity and liabilities	R million	298,068	322,249	424,547	525,183	650,314	709,320	799,623	940,981	1,049,159
ROCE	%	6.0	12.8	20.3	20.9	16.7	5.7	10.7	10.3	3.6
Source: Annual Financial Statistics 2014, Stats SA											

Figure A5. Weighted Average Annual Growth Rate of Unit Labor Costs 2000-2013

Source: Department of Labour & Stats SA (Refer to Table A4)
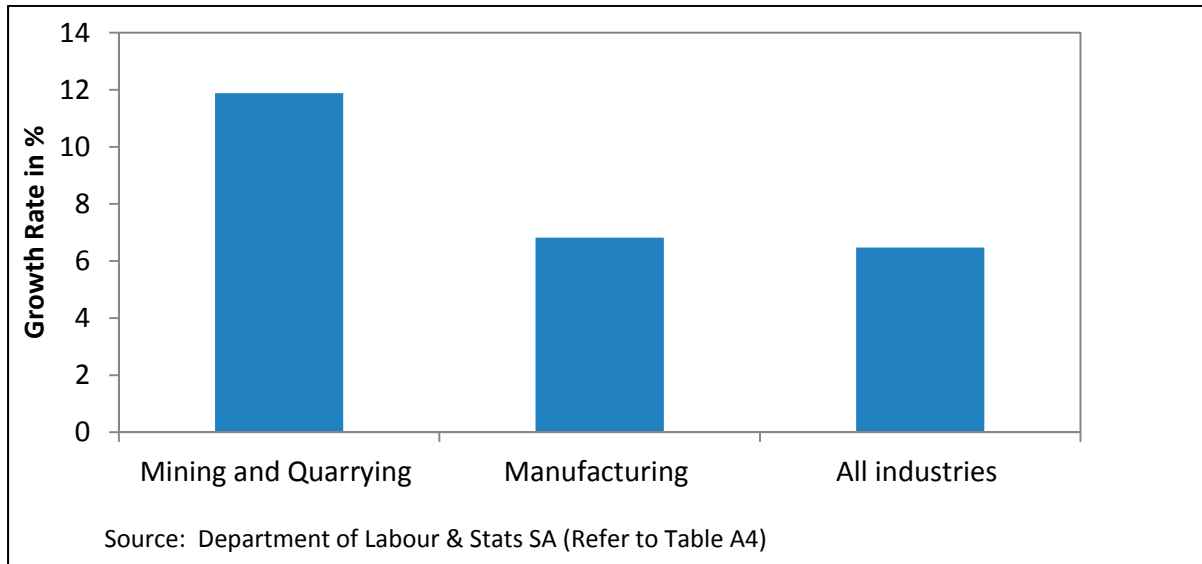
Table A4. Unit Labor Costs by Industry

Year	Mining and Quarrying Index 2005=100	Manufacturing Index 2005=100	All industries Index 2005=100
2000	76.24	84.26	80.62
2001	84.23	85.14	82.34
2002	91.85	90.19	86.48
2003	90.05	94.68	91.32
2004	94.53	96.89	96.00
2005	100.00	100.00	100.00
2006	118.25	103.16	103.57
2007	139.14	116.49	112.74
2008	176.57	125.96	121.60
2009	201.90	142.14	133.10
2010	213.99	152.40	143.44
2011	240.63	163.39	154.70
2012	274.69	176.60	165.37
2013	297.36	190.20	176.11
Weighted average annual growth rate (%)			
2000-2013	11.88	6.82	6.47

Source: Department of Labour and Stats SA

Figure A6. Approved Electricity Price Increases in Percent

Source: Eskom (Refer to Table A5)
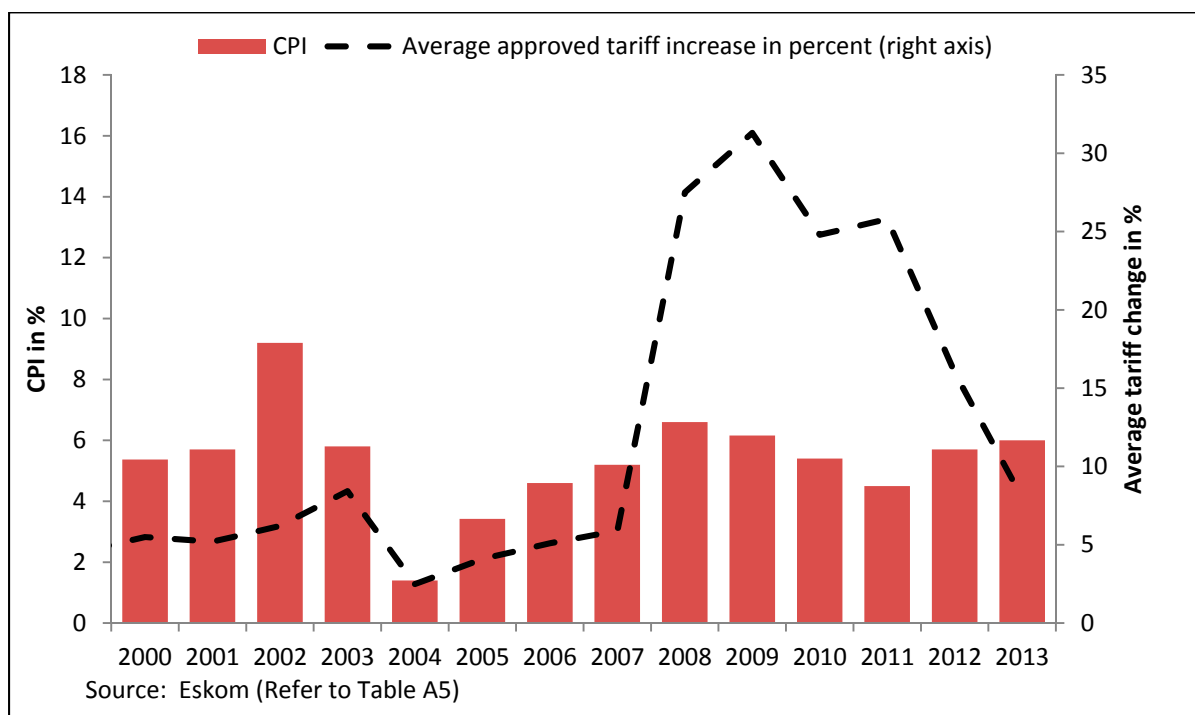
Table A5. Average Approved Electricity Tariff Increase in Percent vs. SA Headline Inflation (Consumer Price Index)

Year	Average approved tariff increase %	CPI %
1988	10	12.89
1989	10	14.51
1990	14	14.29
1991	8	15.57
1992	9	13.67
1993	8	9.87
1994	7	8.82
1995	4	8.71
1996	4	7.32
1997	5	8.62
1998	5	6.87
1999	4.5	5.21
2000	5.5	5.37
2001	5.2	5.7
2002	6.2	9.2
2003	8.43	5.8
2004	2.5	1.4
2005	4.1	3.42
2006	5.1	4.6
2007	5.9	5.2
2008	27.5	6.6
2009	31.3	6.16
2010	24.8	5.4
2011	25.8	4.5
2012	16	5.7
2013	8	6
Source: Eskom		

Table A6. Foreign Investment in SA's Mining and Quarrying Industry (R millions)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total direct investment	R millions	91540	124063	n.a.	103093	111639	168271	250361	332254	195365	289836	388772	n.a.
	% of GDP	9.7	11.9	n.a.	7.8	7.6	10.3	13.6	15.8	8.2	11.6	14.1	n.a.
Total portfolio investment	R millions	72083	67604	n.a.	94871	61983	98880	122233	186093	160623	165539	288055	n.a.
	% of GDP	7.6	6.5	n.a.	7.2	4.2	6.0	6.6	8.8	6.8	6.6	10.5	n.a.
Total other investment	R millions	4718	7258	n.a.	4270	4679	5240	4746	4738	5546	5357	5347	n.a.
	% of GDP	0.5	0.7	n.a.	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	n.a.
Total foreign liabilities	R millions	168341	198925	n.a.	202234	178301	272391	377340	523085	361534	460732	682174	n.a.
	% of GDP	17.8	19.0	n.a.	15.3	12.1	16.6	20.5	24.8	15.3	18.4	24.8	n.a.

Source: Quaterly Bulletin, South African Reserve Bank (SARB)
Note: n.a. indicates missing data

Figure A7. South Africa: Indices of Mineral Production (volume) by Commodity, 1990=100

Source: Department of Mineral Resources (DMR)
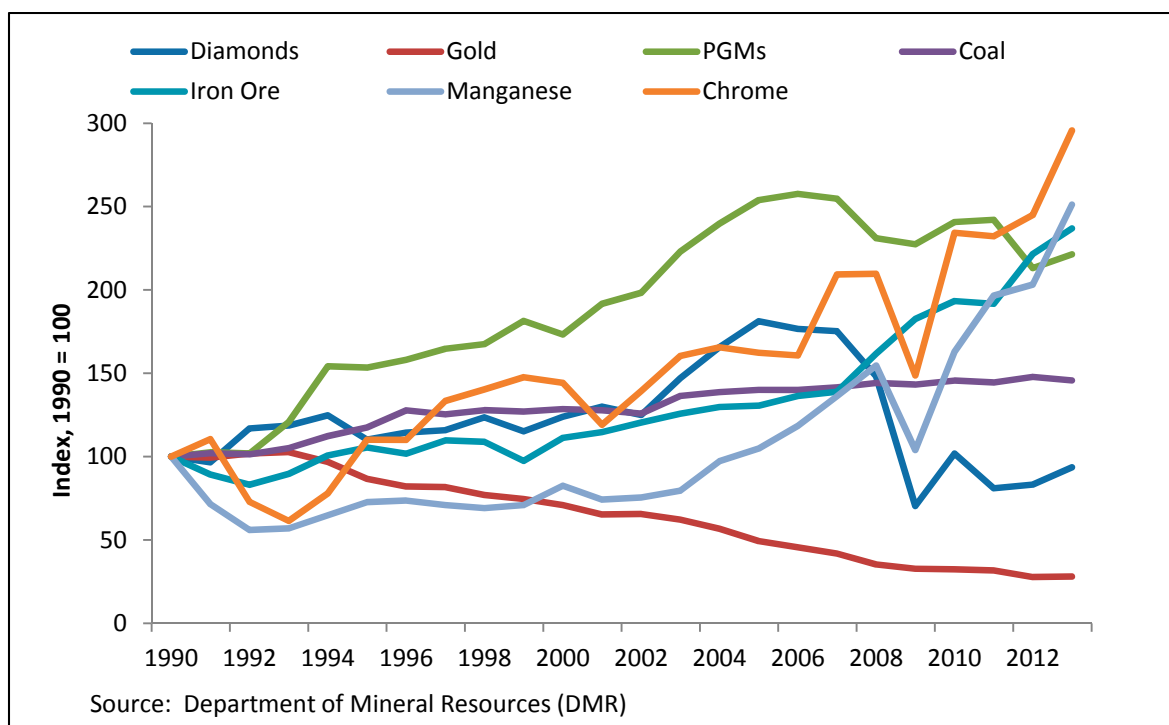
Figure A8. Mineral Sales Composition (Selected Minerals' Contribution to Total Mineral Sales in 2013)
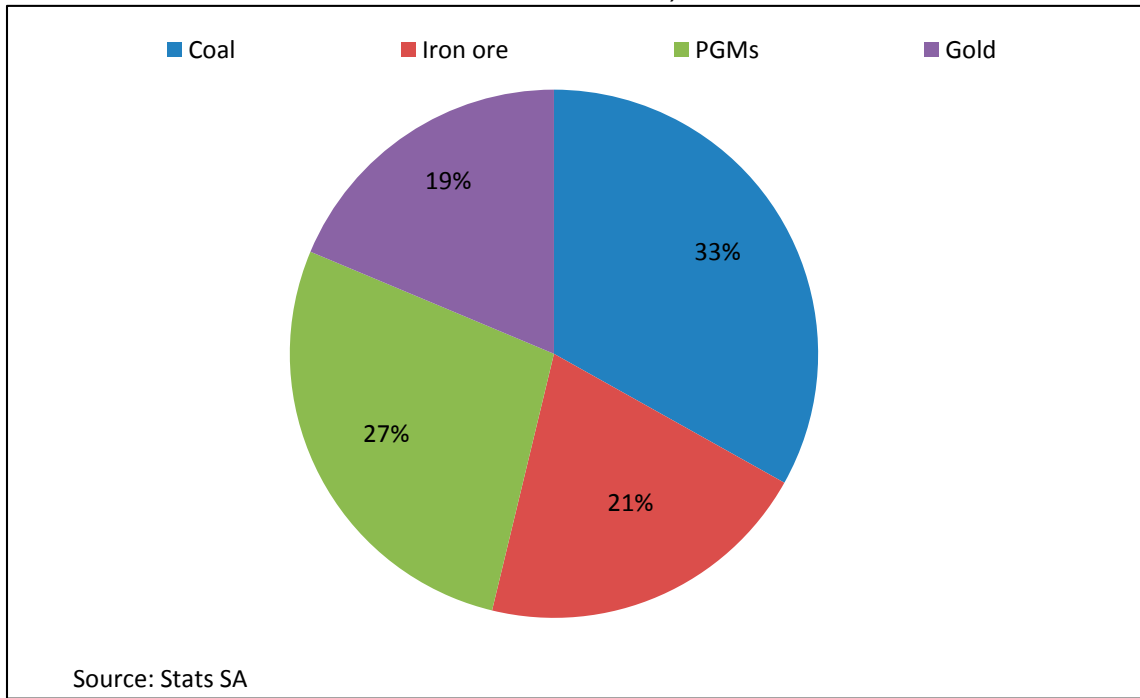
Source: Stats SA

Figure A9. Composition of Mineral Sales, 1980-2013
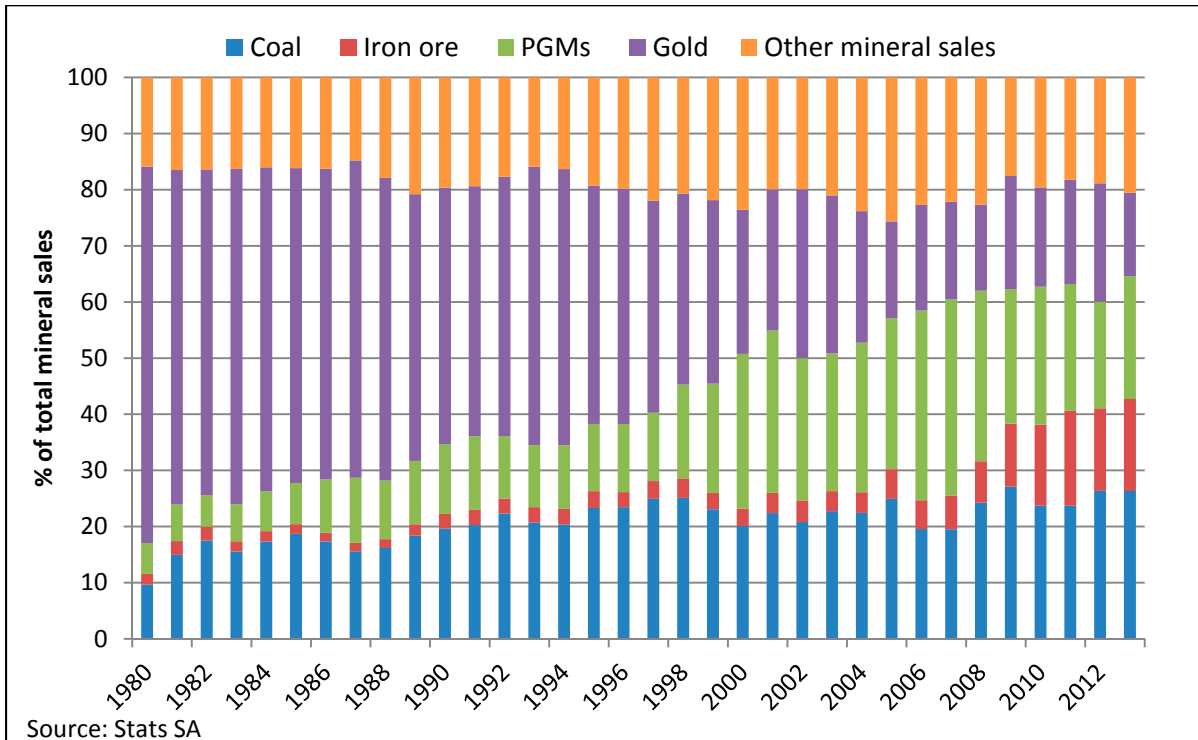
Source: Stats SA

Figure A10. Contribution of Mining Sector to Total GDP, 1993-2013

Source: Stats SA
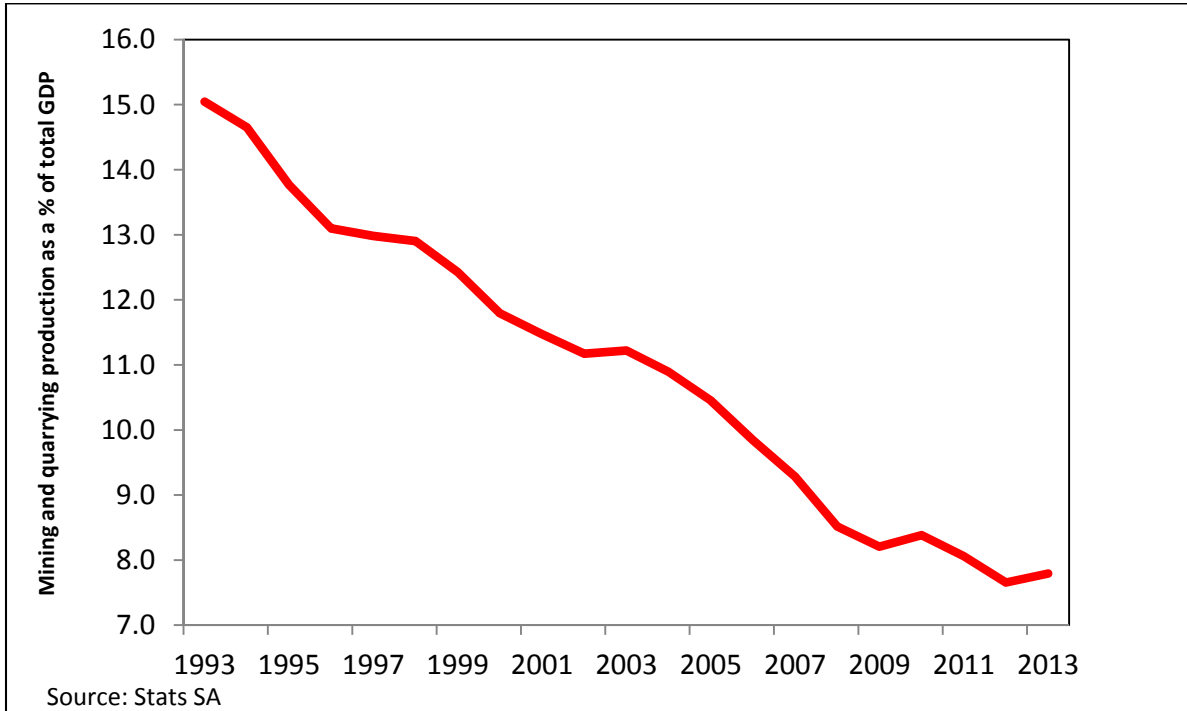
Figure A11. South Africa: Mining's Contribution to Employment and Wages (%), 2002-2012

Source: Stats SA & Department of Mineral Resources (DMR)
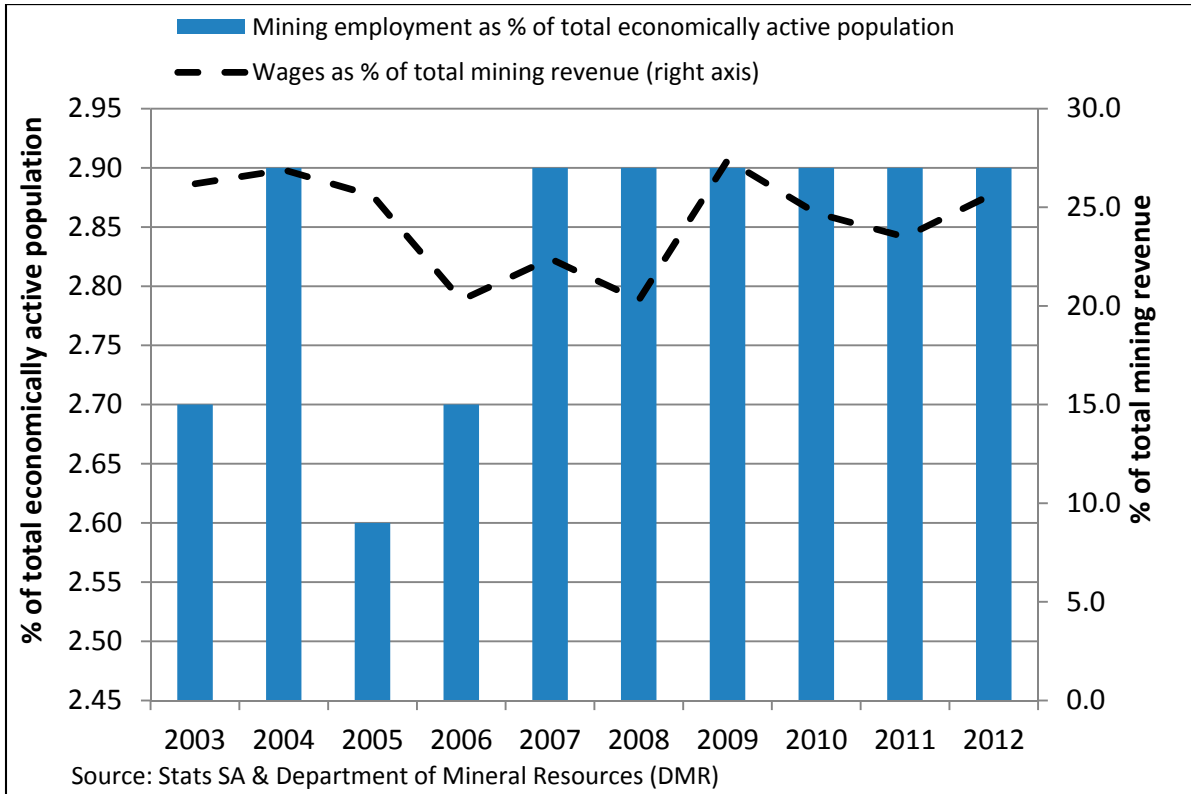
Economic Significance of Mining

1.   **South Africa has exploited its mineral riches for more than a century.** Large volumes of gold, diamonds, coal and platinum-group metals (PGMs) have been extracted and the sector has contributed significantly to the development of the SA economy. The mineral extraction industry is mature, with some sectors in decline (gold and diamonds), but the sector remains resilient as its domestic suppliers of goods and services are technical, highly capable and resourceful. The well-established domestic technical backward linkages have inherent growth potential if their services were to be exported—constituting a similar value addition as is pursued under the beneficiation program. In addition, South Africa's deep capital markets co-finance the development of new mines.

2.   **The country is a dominant world supplier for a range of minerals at consistently high quality.** These include chrome, platinum group metals (PGMs), manganese, vanadium, ilmenite, rutile and zirconium. It is the world's third largest coal exporter. In 2014, some 55 different minerals and aggregates were extracted by approximately 1,700 mines, of which 54 produced gold, 54 produced platinum-group metals and other byproducts, 146 produced coal (anthracite and bituminous), 390 produced diamonds in mines and alluvial diggings, and 14 extracted iron ore. South Africa holds the world's largest reserves of PGMs (over 80 percent of world known reserves), manganese (80 percent), chromium (72 percent), gold (40 percent), and alumino-silicates plus significant reserves of titanium, vanadium, zirconium, vermiculite and fluorspar.[1] Gold mining production is on a declining trend since 2000 (Figure A7 shows historical trends in mineral production). In 2013, the country's mineral sales (Figures A8 and A9) were dominated by coal (R101.6 billion); PGMs (R83.9 billion); iron ore (R63.7 billion) and gold (R58.2 billion).

3.   **Mining's contribution to the economy is significant (see Figures A1, A10 and A11):** in 2013, it accounted for 1.35 million jobs or 5.9 percent of formal sector jobs (520,000 direct and perhaps 830,000 indirect), and for about 18 percent of GDP, 7.8 percent direct and 10 percent indirect, but still revealing a long-term decline (Figure A10). Mining is an important employer by spending R93.6 billion on wages and salaries (Figure A11). Remarkably, mining employment as a percent of the total economically active population has been constant at an average of 2.8 percent for the period 2003-2013 (Figure A11). Moreover, mine wages as a percent of total mining revenue has been relatively stable over the identical period, averaging 24.3 percent per year. Minerals are responsible for more than 30 percent of foreign exchange earnings through exports; mining is a significant procurer of local goods and services (R389 billion); capital formation by mining remains robust as it shifts towards increasing mechanization with total fixed investment remaining above 11 percent of GDP since 2009.

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[1] US Geological Service, 2012, Republic of South Africa: Department of Mineral Resources.

Revenue importance

4.   **For the period 2008 to 2013 the ratio of total tax and non-tax revenue from mining (CIT and since 2010 mineral royalties) to total mineral sales averaged 5.8 percent**. For the period 1990 to 1997, the ratio of mining taxes to mineral sales averaged nearly 4 percent. This ratio increased to 5.6 percent over the period of 2000 to 2005. The latter period was characterized by robust commodity prices, a marked decline in gross fixed capital formation by the mining industry in 2004 to 2005, and a one percent reduction of the corporate income tax rate to 29 percent in 2005. The CIT rate was further reduced to 28 percent in 2008.[2] For the period 2010-14 annual dividend distributions from mining exceeded CIT-royalty payments in 3 out of 5 years (Table A7).

Table A7. South Africa: Mining Companies' Value Distribution, 2010-2014

Value Distributed in Percent	2014	2013	2012	2011	2010
Funds reinvested	34	41	27	32	43
Employees	38	38	27	30	36
Shareholder dividends	11	19	20	11	12
Total CIT + royalty	13	14	13	12	10
Direct taxes	9	10	10	11	9
Employee taxes	7	7	6	6	6
Mining royalties	4	4	3	1	1
Borrowings	4	3	2	3	5
Community investments	1	1	1	n/a	n/a
Funds (utilised)/ retained	-8.00	-23	4	6	-12
Total value created	**100**	**100**	**100**	**100**	**100**

*Comparatives were taken from PWC 2013 publication to illustrate the cycle impact
Source: PwC analysis

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[2] The period 1990 to 2008 experienced significant statutory reductions in the corporate income tax (CIT) rate: 1990 to 1991 (CIT rate of 50%); 1992 to 1993 (48%); 1994 (40%); 1995 to 1998 (35%); 1999 to 2004 (30%); 2005 to 2007 (29%); and from 2008 to present (28%).

II. ECONOMIC ASSESSMENT OF MINING FISCAL REGIMES

5.   **Economic modeling was undertaken on stylized platinum, iron ore and coal projects representing the most active precious metals and bulk mineral segments of the current South African mining sector**. Boxes A2, A3 and A4 present the underlying project economics of the mine examples used. These are stylized full-cycle projects intended to be representative of a 'typical' South African mine in each mineral group. All simulations in this section are performed using FAD's Fiscal Analysis of Resource Industries (FARI) modeling framework.

6.   **South Africa's current regime and two possible alternative fiscal regime scenarios were evaluated.** Table A8 presents the key terms of each of the scenarios. Scenario 1 presents the complete reform of the major elements of the fiscal regime, introducing a flat-rate royalty, reforms to the corporate income tax system involving a 10 percent ACC and 5 year depreciation period using the straight line method, as well as an additional cash flow surcharge. Under Scenario 1(a) the royalty is creditable against the cash flow surcharge, while in Scenario 1(b) it is not. Scenario 2 presents the proposed marginal reform, largely maintaining the status quo and simply applying the ACC while disallowing deductibility of interest expenses.

Table A8. Mining - Current Fiscal Regime and Possible Reform Scenarios

Fiscal provision	Current Regime	Scenario 1 (a)	Scenario 1 (b)	Scenario 2
Royalty				
Refined Minerals	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 12.5)] x 100. Maximum rate of 5%	2% Flat Rate, creditable against Cashflow Surcharge paid in a given year	2% Flat Rate	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 12.5)] x 100. Maximum rate of 5%
Unrefined Minerals	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 9)] x 100 . Maximum rate of 7%	2% Flat Rate, creditable against Cashflow Surcharge paid in a given year	2% Flat Rate	0.5 + [EBIT/(gross sales in respect of refined mineral resources x 9)] x 100 . Maximum rate of 7%
Royalty Base	Gross Sales	Gross Sales	Gross Sales	Net Smelter Return
Income tax	28%	28%	28%	28%
Depreciation	Immediate Expensing of all Capital Expenditure	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1	Immediate Expensing of all Capital Expenditure
Allowance for Corporate Capital		10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital
Loss carry-forward	Unlimited	Unlimited	Unlimited	Unlimited
Additional Tax		Cashflow Surcharge at 20% with uplift on capital expenditure at 15%	Cashflow Surcharge at 20% with uplift on capital expenditure at 15%	
HDSA Requirements	26% Local Ownership	26% Local Ownership	26% Local Ownership	26% Local Ownership
Withholding Taxes:				
Dividends	15% (reduced to 5% in treaties)	15% (reduced to 5% in treaties)	15% (reduced to 5% in treaties)	15% (reduced to 5% in treaties)
Interest	15% (reduced to 0% in treaties)	15% (reduced to 0% in treaties)	15% (reduced to 0% in treaties)	15% (reduced to 0% in treaties)

Box A1. Cash flow Surcharge and ACC

Allowance for Corporate Capital (ACC) surcharge scheme. The ACC permits an annual uplift on the balance of undepreciated capital assets. Actual interest paid is not deductible. The ACC, therefore, creates neutrality between debt and equity financing, and should make the investor indifferent as to the rate of tax depreciation (since faster depreciation diminishes the amount of ACC deductible).

Tax surcharge on cash flow. An adjustment is made to taxable income by adding back depreciation and interest, and deducting any capital expenditure in full. This yields a base of net cash flow for each year. A simple uplift (investment allowance) is added to capital costs at the start. The surcharge is then deductible from taxable income in the computation of corporate income tax.

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7.   **The current and proposed regimes were assessed under a number of simplifying assumptions.** It is assumed in each case that the HDSA ownership requirements of the Mining Charter are fulfilled through a 26 percent unpaid equity shareholding in the company. Dividends payable to shareholders of the local HDSA entity are not subject to withholding tax, as per Section 64(f) of the Income Tax Act. For the primary investor, a dividend withholding tax of 5 percent is applied and interest withholding tax is assumed to be 0 percent, as reduced by a large number of South Africa's existing tax treaties. To cover decommissioning and rehabilitation costs at the end of the project life, it is assumed that the joint venture makes tax-deductible contributions to a decommissioning fund once 50 percent of the projected reserves have been depleted. It is assumed that 75 percent of development costs are financed using debt, at an interest rate of LIBOR + 3 percent.

Evaluation of Results

8.   **The current regime and proposed alternatives were evaluated against the key fiscal objectives of revenue-raising capacity, neutrality and progressivity, and placed in international context of other mineral-producing countries**[3]. Results of the analysis for the platinum, iron ore and coal projects are presented in Boxes A2, A3 and A4. Simulation results assume full and immediate distribution of dividends as profits are made; in reality, the company might decide to distribute only part of the profits obtained in a year or delay the payment to a future date. Moreover, the simulation results may overstate effective tax rates as not all sources of revenue erosion are captured (e.g., through weak administration). The fiscal terms of comparator countries are included in Tables A36, A37 and A38 of this supplement.

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[3] This analysis focuses on the design of the fiscal regime, comparing the South African regime with that of other platinum, iron ore and coal mining countries, using the same mine project examples described in Box A2, A3 -- A4. Other factors which are equally relevant for the investment decision and outcome, such as geological prospectivity, proximity to markets, quality of infrastructure, business climate, property rights, and political stability, are assumed constant.

9.   **The current fiscal terms and reform scenarios were evaluated for revenue generating capacity using the Average Effective Tax Rate (AETR) or "government take".** The AETR is calculated over project life as the ratio of the present value of government revenue from a profitable project to the present value of the pre-tax net cash flow stream it generates. The AETR can be expressed both in undiscounted and discounted values, the latter to account for the time value of money. Table A12, A16 and A20 illustrate that the current regime generates an undiscounted AETR of between 36 and 40 percent for each of the projects while Figures A17, A27 and A38 show the profile of revenues relative to the pre-tax project cash flow over the project life. While the concessional financing of the BEE entity is assumed not to form part of the direct government take, it is clear that the HDSA local ownership requirements has an impact on the non-BEE investor's cashflow and return. If this is reflected as a contribution to government take, the AETR increases to between 55 and 57 percent under the current regime.

10.   **The complete reform scenarios (Scenario 1(a) and 1(b)) improve the take of the regime through the introduction of the cash flow surcharge.** A range of cost and price assumptions were used to understand the responsiveness of the AETR and investor IRR to these parameters, as well as to assess the range of scenarios which would be economically viable under the current and proposed reform scenario (Figures A14, A24 and A35). The reform scenarios also place South Africa well in the range of international comparators (Figures A15, A25, and A36).

11.   **The revenue pattern over the cycle of the project under each scenario mainly reflects the production profile**. The cash flow surcharge has the effect of generating significant additional revenue once the project is generating sufficient positive cash flow, the effect of which is slightly reduced when the royalty is creditable against the surcharge. The 5 year depreciation profile has the effect of altering the timing of corporate tax payments in the early years of production (Figure A43). The marginal reform scenario has little impact on government revenue, with the ACC providing some additional relief to the investor in the initial years of production when capital depreciation deductions are made in determining the corporate income tax payable. Disallowing interest deductions under this scenario has the effect of slightly increasing the overall AETR.

12.   **A key indicator of the effect on a marginal project is the "breakeven price" or the minimum primary mineral price required by the investor to meet its hurdle rate.** The price is expressed in constant values and the hurdle rate is assumed in the analysis at 12.5 percent in post-tax real terms. An alternative indicator to measure the burden on a marginal investment is the Marginal Effective Tax Rate (METR). The METR illustrates the relative fiscal wedge taken from the project by the fiscal regime at the margin of project viability. The reform scenarios score well for investment incentive when placed in international perspective. Under the current regime the METR is slightly lower than under the reform scenarios; however, given the similarity in break-even prices (Figures A19, A30 and A41), the difference in the METR among these regimes is not significant.

13.   **The progressivity of the fiscal regimes was evaluated by estimating the government share of total benefits**[4] **over a range of project results**. "Progressivity" here means the capacity of the fiscal regime to ensure that government receives a rising share of project cash flows as the intrinsic profitability of the project increases (up to a realistic maximum share) while bearing part of the downside when projects are less profitable. It shows how the government can approach higher taxation of realized rents, even if taxing all of them is not possible. Variation in project net present value (reflecting project profitability) was generated by adjusting the price of the primary commodity (platinum, export coal and iron ore) in constant real terms. At low profitability levels, all the scenarios place a lower burden on projects with lower pre-tax profitability. With the additional progressive fiscal elements, the recommended scenarios yield a higher share of total benefits for the government as the profitability of the project increases (Figures A20, A29 and A40).

14.   **The impact of commodity price uncertainty on project outcomes was evaluated using stochastic price analysis.** Monte Carlo simulations were used to account for uncertainty surrounding future mineral prices by assuming that prices follow a stochastic stationary first-order autoregressive (AR(1)) process. The results were then used to measure the dispersion of possible outcomes, and infer the implied risk to the investor and the government under the current regime and reform scenarios. Details of the estimation of the parameters of this process are described in Box A5.

15.   **Investor and government risk is evaluated by analyzing the mean and coefficient of variation (CV) of investor returns and government revenue.** Figures A21, A31 and A42 show the mean expected post-tax IRR and the CV of post-tax IRR for each regime tested. These results further demonstrate that the recommended scenarios place South Africa well when compared internationally. Relative to the sample, the proposed regimes generate high mean post-tax IRRs, and do not appear to significantly increase the risk to the investor or government.

16.   **The revenue benefit from the full reform program (Option 1) is likely to be greater than simulated here.** The modeling assumes an accurate interpretation of the current regime, and full collection under it. In view of the complexities and distortions that prevail, full collection under a cleaned-up legal framework should already be greater. The combination of reform and a simplified legal framework has a high chance of bringing revenue increases in the medium term.

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[4] Total benefits mean revenue minus operating costs and replacement capital investment (the "cake" from which taxes are paid, debt is serviced, and equity providers are rewarded).

Box A2. Stylized Platinum Project

Platinum mines in South Africa have a range of varied scale, depth, labor-capital intensity and 'prill split' of the different platinum group metals contained in the ore, each of which would have an impact on project economics. The mine presented here has been stylized to reflect a moderately capital intensive mine with a relatively favorable mineral split, and to capture the high operating costs in the platinum sector driven by increasing labor and electricity costs.

Table A9. Project Parameters

Data in $mm 2015 terms		
Project Indicator	**Unit**	
Production	Years	19
Platinum	000 oz	1,754
Palladium	000 oz	1,087
Rhodium	000 oz	272
Gold	000 oz	28
Capital Costs	$ million	481
Sustaining Capital	$ million	180
Operating Costs - Mining	$ million	1,414
Operating Costs - Processing	$ million	565
Decommissioning	$ million	60
Unit Capex	$/oz	229
Unit Opex	$/oz	630
Total Unit Cost	$/oz	859

Source: IMF Staff Estimates

Figure A12. Project Net Cash Flow
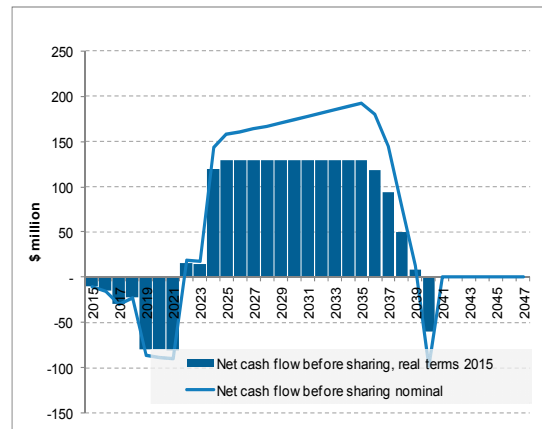
Figure A13. Historical Trends of PGM and Gold Prices ($/oz)
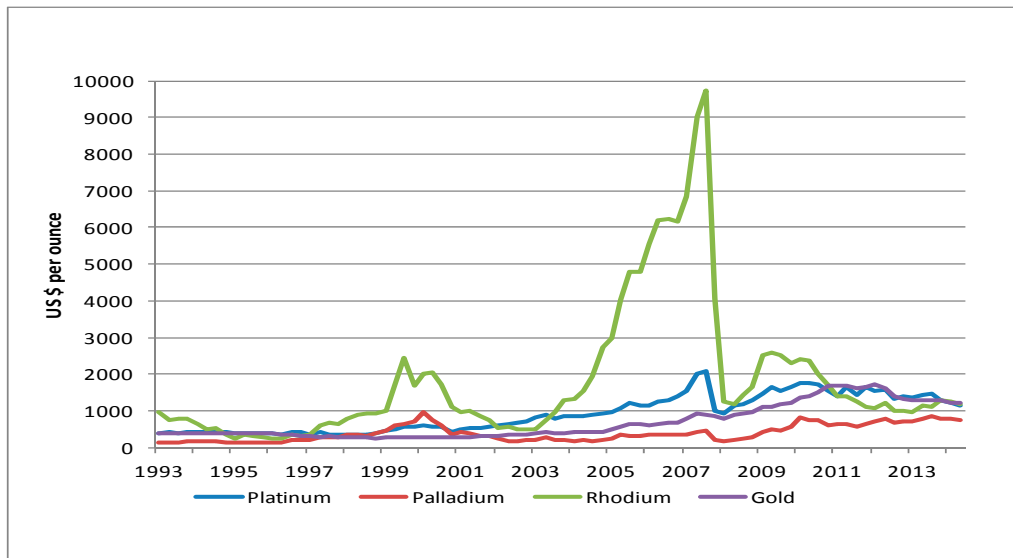
Source: IMF WEO and Bloomberg

Recent declines in the prices of platinum group minerals have contributed to lower profitability in the mining sector (Figure A13). However, while near-term downside risk is high, the long term industry price outlooks for PGM and gold prices appears to be positive. Long-term industry price outlooks shared with the mission reach levels as high $1700/oz for platinum, $870/oz for palladium, $2400 for rhodium and $1300/oz in the case of gold over the long-term (real terms).

Box A2. Stylized Platinum Project (Cont'd)

Table A10. PGM and Gold Price Forecasts

					Forecast		
		Spot 5/	2015	2016	2017	2018	2019
Bloomberg 1/							
Platinum	US$/oz	1159	1288	1445	1538	1612	1640
Palladium	US$/oz	767	834	884	910	917	895
Rhodium 2/	US$/oz	1150	1458	1676	n.a	n.a	n.a
Gold	US$/oz	1198	1211	1192	1238	1289	1342
WEO							
Gold (real terms) 3/	US$/oz	1198	1180	1172	1187	1206	1229
Gold (nominal terms) 4/	US$/oz	1198	1180	1192	1238	1289	1342

1/ Nominal terms; average of 22 to 27 financial analysts (Jan-Apr 2015) forecasts for all but Rhodium.
2/ Rhodium forecast as reported by Bloomberg, individual analysts forecasts not available
3/ Last updated on March 19, 2015.
4/ Nominal terms, adjusted using WEO inflation projections; last updated on March 19, 2015.
5/As on April 14, 2015

The base case price assumptions used in the analysis reflect a more conservative interpretation of these long term price outlooks, in line with medium-term IMF WEO and Bloomberg forecasts (Table A11). Given these assumptions, the project generates a pre-tax project rate of return of 19 percent in 2015 real terms.

In addition, the analysis includes sensitivity testing on a range of constant real terms price assumptions, as well a stochastic price paths generated based on trends from historical price data.

Table A11. Price Assumptions and Project Economics

Price Assumptions *(2015 real terms)*		
Platinum	$/oz	1,600
Palladium	$/oz	850
Rhodium	$/oz	1,600
Gold	$/oz	1,200

Project Economics *(2015 real terms)*		
Project NCF (NPV0)	$ million	1,500
Pre-Tax Project IRR	%	19%

Table A12. Simulation Results

Project Fiscal Results (in US$ million real or %)	Current Regime	Scenario 1 (a): Flat Rate Royalty, ACC and Cashflow Surcharge (Creditable Royalty)	Scenario 1 (b): Flat Rate Royalty, ACC and Cashflow Surcharge	Scenario 2: Variable Royalty and ACC
Pre-tax project IRR	19.5%	19.5%	19.5%	19.5%
Post-tax IRR on total funds	15.6%	14.9%	14.512%	15.4%
Post-tax IRR on equity	22.7%	21.6%	21.0%	22.3%
Post-tax IRR on equity (non-BEE)	18.1%	16.9%	16.3%	17.7%
Pre-tax NCF undiscounted	1,500	1,500	1,500	1,500
Post-tax investor NCF undiscounted	862	768	723	848
o/w Post-tax BEE NCF undiscounted	277	252	240	273
Government revenue undiscounted	549	644	689	564
AETR undiscounted	36.6%	42.9%	45.9%	37.6%
AETR including BEE NCF	55.1%	59.8%	62.0%	55.8%
Pre-tax NCF 10% discount	246	246	246	246
Post-tax investor NCF 10% discount	146	126	117	141
o/w BEE investor NCF 10% discount	65	61	58	64
Government revenue 10% discount	121	141	151	126
AETR 10% discount	49.3%	57.4%	61.4%	51.4%
AETR including BEE NCF	75.9%	82.0%	84.9%	77.4%

Box A2. Stylized Platinum Project (Cont'd)
Figure A14. Government Take and Investor IRR

Post Tax IRR on Total Funds

Current Regime

Platinum Price ($/oz)	Cost/Price Variation	Unit Cost ($/oz)				
		1203 140%	1031 120%	859 100%	688 80%	516 60%
960	60%	0.0%	0.0%	0.0%	5.9%	15.6%
1,120	70%	0.0%	0.0%	3.2%	11.5%	20.4%
1,280	80%	0.0%	0.8%	8.3%	15.6%	24.5%
1,440	90%	0.0%	5.9%	12.5%	19.3%	28.1%
1,600	100%	4.0%	9.8%	15.6%	22.5%	31.2%
1,760	110%	7.7%	12.8%	18.6%	25.5%	34.1%
1,920	120%	10.8%	15.6%	21.3%	28.1%	36.6%
2,080	130%	13.2%	18.1%	23.7%	30.5%	39.0%
2,240	140%	15.6%	20.4%	26.0%	32.7%	41.2%

Reform Scenario 1(a)

Platinum Price ($/oz)	Cost/Price Variation	Unit Cost ($/oz)				
		1203 140%	1031 120%	859 100%	688 80%	516 60%
960	60%	0.0%	0.0%	0.0%	5.3%	14.9%
1,120	70%	0.0%	0.0%	2.6%	10.7%	19.5%
1,280	80%	0.0%	0.6%	7.6%	14.9%	23.3%
1,440	90%	0.0%	5.3%	11.5%	18.5%	26.6%
1,600	100%	3.5%	9.0%	14.9%	21.5%	29.4%
1,760	110%	7.0%	12.1%	17.8%	24.2%	32.1%
1,920	120%	10.0%	14.9%	20.3%	26.6%	34.4%
2,080	130%	12.6%	17.4%	22.6%	28.8%	36.5%
2,240	140%	14.9%	19.5%	24.7%	30.8%	38.6%

AETR (undiscounted)

Current Regime

Platinum Price ($/oz)	Cost/Price Variation	Unit Cost ($/oz)				
		1203 140%	1031 120%	859 100%	688 80%	516 60%
960	60%	-1.0%	-1.7%	-19.1%	34.4%	36.6%
1,120	70%	-1.7%	-11.7%	35.6%	34.6%	36.5%
1,280	80%	-8.5%	55.9%	34.4%	36.6%	36.1%
1,440	90%	-28957.5%	34.4%	34.7%	36.6%	35.8%
1,600	100%	34.6%	34.5%	36.6%	36.4%	35.5%
1,760	110%	34.4%	36.5%	36.6%	36.0%	35.3%
1,920	120%	34.6%	36.6%	36.5%	35.8%	35.2%
2,080	130%	36.7%	36.6%	36.2%	35.6%	35.1%
2,240	140%	36.6%	36.5%	36.0%	35.4%	35.0%

Reform Scenario 1(a)

Platinum Price ($/oz)	Cost/Price Variation	Unit Cost ($/oz)				
		1203 140%	1031 120%	859 100%	688 80%	516 60%
960	60%	-4.0%	-7.0%	-28.0%	43.9%	42.9%
1,120	70%	-7.0%	-19.6%	48.2%	42.8%	43.2%
1,280	80%	-16.0%	67.3%	42.8%	42.9%	43.3%
1,440	90%	-33178.8%	43.9%	43.0%	43.1%	43.5%
1,600	100%	45.7%	43.0%	42.9%	43.3%	43.6%
1,760	110%	43.3%	43.0%	43.0%	43.3%	43.6%
1,920	120%	42.7%	42.9%	43.2%	43.5%	43.7%
2,080	130%	42.7%	43.0%	43.2%	43.6%	43.7%
2,240	140%	42.9%	43.2%	43.4%	43.5%	43.8%

AETR (discounted at 10%)

Current Regime

Platinum Price ($/oz)	Cost/Price Variation	Unit Cost ($/oz)				
		1203 140%	1031 120%	859 100%	688 80%	516 60%
960	60%	-0.6%	-0.9%	-4.4%	-87.2%	49.3%
1,120	70%	-0.9%	-3.5%	-20.9%	66.5%	42.8%
1,280	80%	-2.9%	-11.0%	227.6%	49.3%	39.9%
1,440	90%	-8.0%	-87.2%	58.8%	43.8%	38.4%
1,600	100%	-29.4%	97.3%	49.3%	41.1%	37.5%
1,760	110%	1026.2%	58.9%	44.5%	39.4%	36.9%
1,920	120%	75.4%	49.3%	42.1%	38.4%	36.6%
2,080	130%	57.4%	45.1%	40.4%	37.7%	36.3%
2,240	140%	49.3%	42.8%	39.2%	37.2%	36.0%

Reform Scenario 1(a)

Platinum Price ($/oz)	Cost/Price Variation	Unit Cost ($/oz)				
		1203 140%	1031 120%	859 100%	688 80%	516 60%
960	60%	-2.4%	-3.5%	-6.6%	-109.2%	57.4%
1,120	70%	-3.5%	-5.9%	-26.2%	83.0%	50.2%
1,280	80%	-5.4%	-12.7%	282.1%	57.4%	47.8%
1,440	90%	-9.3%	-109.2%	73.7%	51.2%	46.8%
1,600	100%	-36.7%	121.9%	57.4%	48.9%	46.3%
1,760	110%	1285.8%	69.3%	51.9%	47.5%	45.7%
1,920	120%	93.7%	57.4%	49.6%	46.8%	45.5%
2,080	130%	65.9%	52.4%	48.1%	46.4%	45.4%
2,240	140%	57.4%	50.2%	47.3%	45.9%	45.2%

Price variations were applied to all commodity prices; the platinum price is presented here for illustration purposes. Red areas depict unviable project outcomes (for the post-tax IRR this assumes an investor hurdle rate of return of 12.5 percent (post-tax real)).

Box A2. Stylized Platinum Project (Cont'd)

Figure A15. Average Effective Tax Rate

Figure A16. Government Revenue Profile
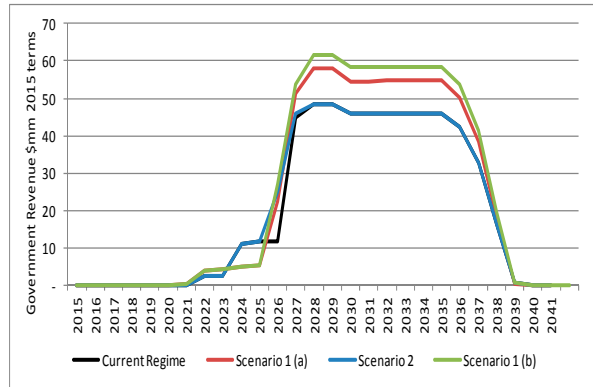
Figure A17. Revenue Profile: Current Regime
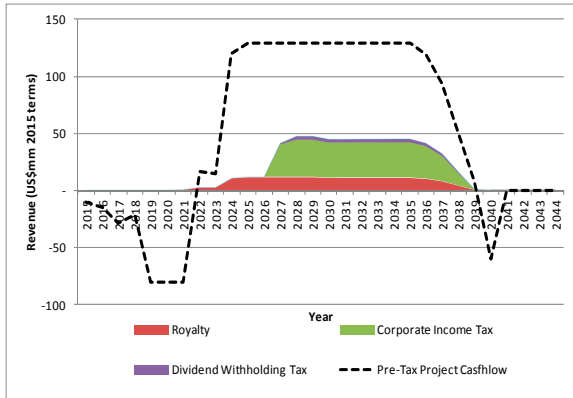
Figure A18. Revenue Profile: Scenario 1 (a)
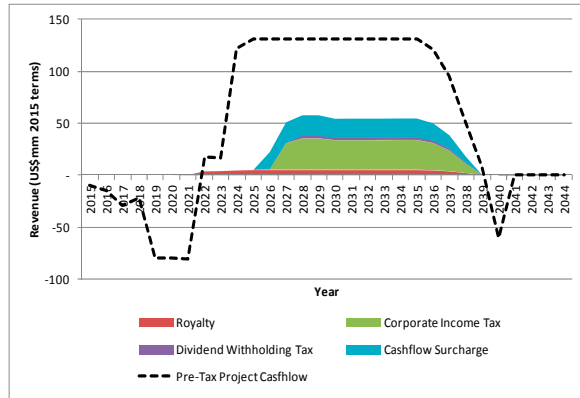
Figure A19. METR and Breakeven Price
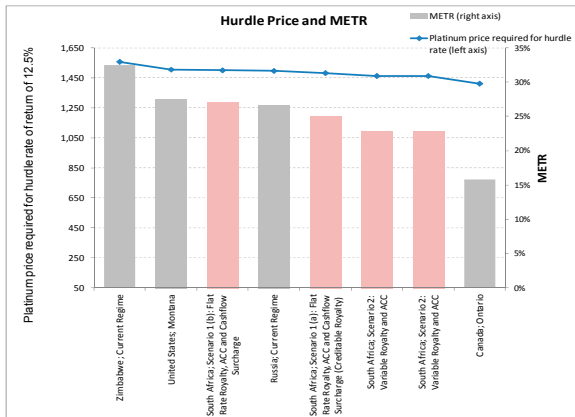
Figure A20. Government Share of Benefits
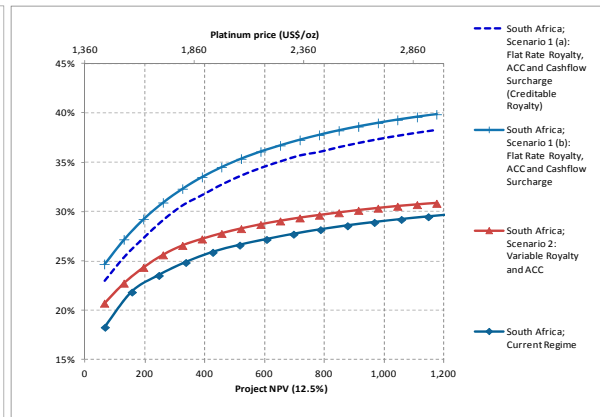
Box A2. Stylized Platinum Project (Cont'd)

In undertaking stochastic price analysis, Monte Carlo simulations were used to account for uncertainty surrounding future prices by assuming that prices follow a stochastic stationary first-order autoregressive (AR(1)) process. The results were then used to measure the dispersion of possible outcomes, and infer the implied risk to the investor and the government under the current regime and reform scenarios.

The implicit long-term average prices implied by the autoregressive function (see Box A5 below for estimation methodology) for the PGMs are significantly lower than current levels in the case of platinum, palladium and gold, and than those used in the base case analysis in Table A9. These AR(1) price functions and associated long term prices therefore yield unviable outcomes under the cost circumstances as assumed in the base case example. To illustrate the impact of the regimes on investor uncertainty on a viable project, the costs assumed for the stochastic analysis were reduced by 25 percent, amounting to a unit cost of $630/oz.

Table A13. Stochastic Analysis Results

	Mean Investor post tax IRR	Coefficient of variation of IRR	Tax Induced Probability of below target return of 12.5%	Mean Government NPV10	Coefficient of variation of government
	%	%	%	$mm	%
Project before tax	18.8	35.1	n/a	n/a	n/a
After tax:					
Canada; Ontario	15.6	36.1	16.10	70	56
South Africa; Current Regime	14.9	38.3	15.20	80	54
South Africa; Scenario 2	14.6	39.7	17.50	85	51
South Africa; Scenario 1 (a)	14.3	38.1	16.80	91	57
South Africa; Scenario 1 (b)	13.6	39.9	21.60	102	54
Russia; Current Regime	13.5	46.1	31.30	101	39
United States; Montana	13.1	40.8	28.30	107	48
Zimbabwe ; Current Regime	11.3	48.1	41.50	136	50

Figure A21. Mean Investor IRR and Risk of below Hurdle Rate Investor Return
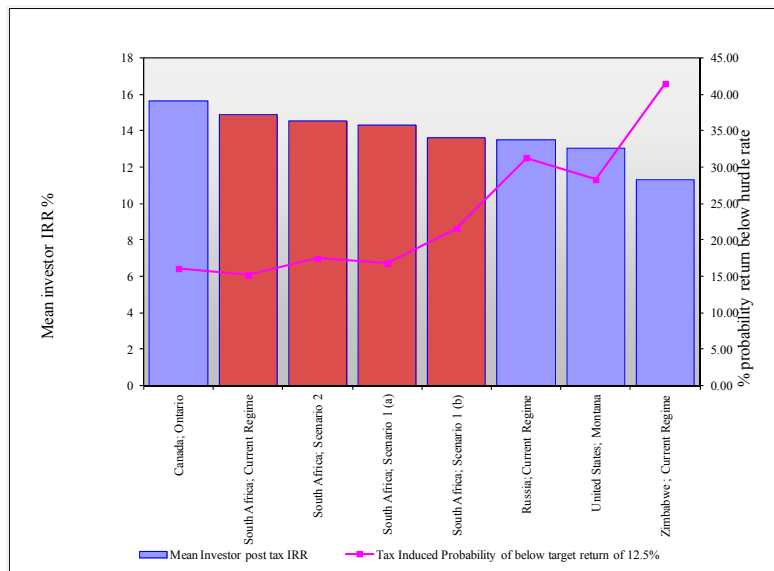
Box A3. Stylized Coal Project

The mine presented here has been stylized to reflect a medium-sized coal mine producing 7-8 mtpa of saleable product, reflective of the typical scale and cost structure of coal projects in South Africa.

A key factor determining project economics will be the government's policy on coal as a strategic mineral, and the extent and pricing of domestic supply requirements. Reflective of a number of current projects, it is assumed that 50% of coal is sold to Eskom, the primary buyer of domestic coal, for power generation at $25 per tonne. It is understood that these prices are negotiated with Eskom in the form of medium to long-term fixed price contracts for domestic supply. The remaining 50% of coal production is assumed to be washed, processed and sold for export at international market prices, transported by the existing rail and port infrastructure.

Table A14. Project Parameters

Data in $mm 2015 terms

Project Indicator	Unit	
Production	Years	21
Coal Domestic	000 tonnes	73,074
Coal Export	000 tonnes	73,074
Capital Costs	$ million	207
Sustaining Capital	$ million	230
Operating Costs - Mining	$ million	4,165
Operating Costs - Processing	$ million	219
Decommissioning	$ million	39
Unit Capex	$/tonne	3
Unit Opex	$/tonne	30
Total Unit Cost	$/tonne	33
Price Assumptions (2015 real terms)		
Coal Export	$/tonne	57
Coal Domestic	$/tonne	25
Project Economics (2015 real terms)		
Project NCF (NPV0)	$ million	911
Pre-Tax Project IRR	%	21%

Source: IMF staff estimates

Figure A22. Project Net Cash Flow

Legend: Net cash flow before sharing, real terms 2015; Net cash flow before sharing nominal
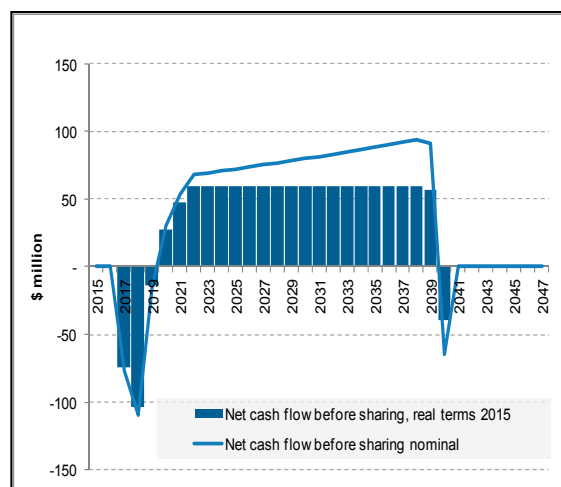
Recent declines in coal export prices have contributed to lower profitability in the sector (Figure A23). An export price of $57/ton in 2015 terms is assumed and kept constant in real terms throughout the project cycle. This price represents the current medium-term forecast of the IMF WEO for South African export coal, reflective of current and further anticipated slowdown in world coal demand, particularly in South Africa's main markets of India and China. Given these assumptions, the project generates a pre-tax project rate of return of 21% in 2015 real terms. Project cost parameters have been calibrated to reflect the South African cost environment, but also to reflect the cost levels which would be necessary for a commercially viable project under the current international and domestic price constraints.

Recognizing inherent uncertainty regarding the future coal price and extraction cost environment, the analysis also includes sensitivity testing on a range of constant real terms price and unit cost assumptions, as well stochastic price paths generated based on trends from historical coal price data.

Table A15. South African Coal Export Price Forecasts

					Forecast		
South African coal export price		Spot 4/	2015	2016	2017	2018	2019
Bloomberg 1/	US$/tonne	58.90	63.38	65.45	67.45	77.76	75.20
WEO (real terms) 2/	US$/tonne	58.90	59.24	57.08	57.08	57.08	57.08
WEO (nominal terms) 3/	US$/tonne	58.90	59.24	58.06	59.55	60.97	62.36

1/ Average of 4 financial analysts forecasts (Dec 2014-Apr 2015)
2/ Last updated on March 19, 2015.
3/ Nominal terms, adjusted using WEO inflation projections; last updated on March 19, 2015.
4/ As on April 14, 2015

Box A3 (cont'd). Stylized Coal Project

Figure A23. Historical and Forecast South African Coal Export Price
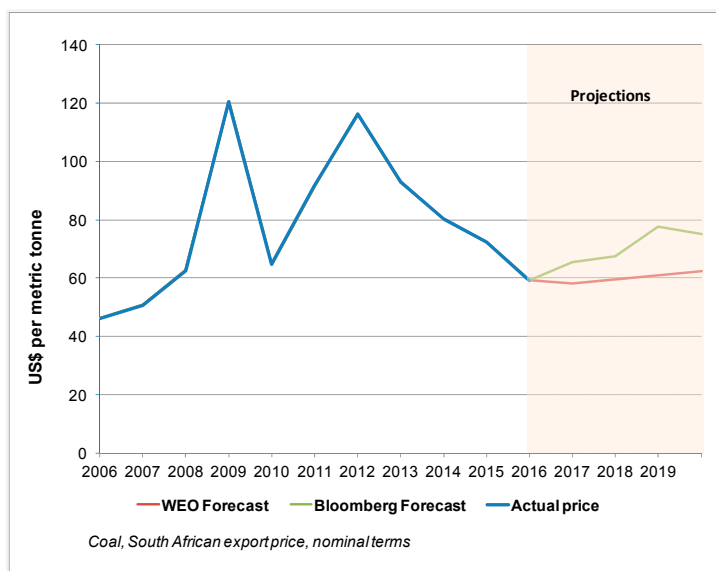
Source: IMF WEO and Bloomberg

Table A16. Simulation Results

Project Fiscal Results (in US$ million real or %)	Current Regime	Scenario 1 (a): Flat Rate Royalty, ACC and Cashflow Surcharge (Creditable Royalty)	Scenario 1 (b): Flat Rate Royalty, ACC and Cashflow Surcharge	Scenario 2: Variable Royalty and ACC
Pre-tax project IRR	20.6%	20.6%	20.6%	20.6%
Post-tax IRR on total funds	15.7%	15.4%	14.4%	15.6%
Post-tax IRR on equity	23.2%	22.8%	21.1%	23.0%
Post-tax IRR on equity (non-BEE)	18.7%	18.3%	16.7%	18.5%
Pre-tax NCF undiscounted	911	911	911	911
Post-tax investor NCF undiscounted	491	471	403	490
o/w Post-tax BEE NCF undiscounted	150	144	126	149
Government revenue undiscounted	370	390	458	372
AETR undiscounted	40.6%	42.8%	50.3%	40.8%
AETR including BEE NCF	57.1%	58.6%	64.1%	57.2%
Pre-tax NCF 10% discount	167	167	167	167
Post-tax investor NCF 10% discount	89	84	68	88
o/w BEE investor NCF 10% discount	37	35	31	37
Government revenue 10% discount	90	95	111	91
AETR 10% discount	53.9%	57.1%	66.4%	54.8%
AETR including BEE NCF	76.1%	78.3%	85.2%	76.7%

Under the current regime and Scenarios 1(a) and (b), the royalty rate is applied to gross sales, without deduction of transport or refining costs between the mine and the point of transfer. Under Scenario 3, the net smelter return principle is used, allowing transport and refining costs to be deducted from the royalty base.

Box A3 (cont'd). Stylized Coal Project

Figure A24. Government Take and Investor IRR

Post Tax IRR on total funds

Current Regime

		Unit Cost ($/tonne)				
Cost/Price		47	40	33	27	20
Variation		140%	120%	100%	80%	60%
46	80%	0.0%	0.0%	0.0%	15.7%	35.4%
51	90%	0.0%	0.0%	6.2%	24.3%	43.0%
57	100%	0.0%	0.0%	15.7%	31.2%	49.8%
63	110%	0.0%	8.1%	22.7%	37.4%	56.2%
68	120%	-0.1%	15.7%	28.5%	43.0%	62.1%
74	130%	9.4%	21.7%	33.7%	48.2%	67.8%
80	140%	15.7%	26.8%	38.5%	53.1%	73.2%
86	150%	20.9%	31.2%	43.0%	57.7%	78.3%
91	160%	25.4%	35.4%	47.2%	62.1%	83.2%

Coal ExportPrice ($/tonne)

Reform Scenario 1(a)

		Unit Cost ($/tonne)				
Cost/Price		47	40	33	27	20
Variation		140%	120%	100%	80%	60%
46	80%	0.0%	0.0%	0.0%	15.4%	34.5%
51	90%	0.0%	0.0%	4.8%	23.8%	41.5%
57	100%	0.0%	0.0%	15.4%	30.4%	47.8%
63	110%	0.0%	6.8%	22.2%	36.4%	53.5%
68	120%	0.0%	15.4%	27.9%	41.5%	58.9%
74	130%	8.4%	21.2%	32.8%	46.2%	63.8%
80	140%	15.4%	26.1%	37.4%	50.7%	68.4%
86	150%	20.4%	30.4%	41.5%	55.1%	72.9%
91	160%	24.8%	34.5%	45.3%	58.9%	77.1%

Coal ExportPrice ($/tonne)

AETR (undiscounted)

Current Regime

		Unit Cost ($/tonne)				
Cost/Price		47	40	33	27	20
Variation		140%	120%	100%	80%	60%
46	80%	-1.0%	-1.8%	-8.4%	40.6%	39.3%
51	90%	-1.6%	-3.8%	45.6%	39.6%	39.1%
57	100%	-2.7%	-43.1%	40.6%	39.5%	39.0%
63	110%	-6.3%	43.7%	39.8%	39.3%	39.0%
68	120%	97.2%	40.6%	39.6%	39.1%	38.8%
74	130%	42.8%	39.8%	39.4%	39.1%	38.4%
80	140%	40.6%	39.5%	39.2%	39.0%	38.0%
86	150%	39.9%	39.5%	39.1%	38.9%	37.8%
91	160%	39.6%	39.3%	39.1%	38.8%	37.6%

Coal ExportPrice ($/tonne)

Reform Scenario 1(a)

		Unit Cost ($/tonne)				
Cost/Price		47	40	33	27	20
Variation		140%	120%	100%	80%	60%
46	80%	-4.1%	-7.4%	-33.4%	42.8%	43.2%
51	90%	-6.3%	-15.3%	60.6%	42.9%	43.5%
57	100%	-10.7%	-114.5%	42.8%	43.2%	43.7%
63	110%	-25.3%	56.7%	43.1%	43.3%	43.8%
68	120%	185.2%	42.8%	43.0%	43.5%	43.8%
74	130%	52.5%	43.0%	43.3%	43.6%	43.8%
80	140%	42.8%	43.1%	43.3%	43.7%	43.9%
86	150%	42.9%	43.2%	43.5%	43.7%	43.9%
91	160%	43.0%	43.2%	43.6%	43.8%	44.0%

Coal ExportPrice ($/tonne)

AETR (10% discount)

Current Regime

		Unit Cost ($/tonne)				
Cost/Price		47	40	33	27	20
Variation		140%	120%	100%	80%	60%
46	80%	-0.9%	-1.4%	-3.9%	53.9%	41.3%
51	90%	-1.2%	-2.5%	-884.5%	44.2%	40.4%
57	100%	-1.9%	-9.5%	53.9%	42.1%	39.9%
63	110%	-3.4%	170.3%	45.1%	41.0%	39.6%
68	120%	-20.5%	53.9%	42.9%	40.4%	39.3%
74	130%	107.7%	45.8%	41.6%	40.0%	38.7%
80	140%	53.9%	43.1%	40.8%	39.7%	38.3%
86	150%	46.4%	42.1%	40.4%	39.5%	38.0%
91	160%	43.6%	41.3%	40.1%	39.3%	37.7%

Coal ExportPrice ($/tonne)

Reform Scenario 1(a)

		Unit Cost ($/tonne)				
Cost/Price		47	40	33	27	20
Variation		140%	120%	100%	80%	60%
46	80%	-3.5%	-5.7%	-15.7%	57.1%	45.2%
51	90%	-5.0%	-9.9%	-1191.5%	47.7%	44.9%
57	100%	-7.6%	-24.2%	57.1%	45.9%	44.7%
63	110%	-13.5%	221.7%	48.9%	45.1%	44.6%
68	120%	-38.0%	57.1%	46.3%	44.9%	44.4%
74	130%	130.5%	49.4%	45.7%	44.7%	44.4%
80	140%	57.1%	47.0%	45.0%	44.6%	44.4%
86	150%	49.9%	45.9%	44.9%	44.5%	44.4%
91	160%	47.3%	45.2%	44.8%	44.4%	44.4%

Coal ExportPrice ($/tonne)

Price variations were applied to both the domestic and export coal prices; the export price is presented here for illustration purposes. Red areas depict unviable project outcomes (for the post-tax IRR this assumes an investor hurdle rate of return of 12.5 percent (post-tax real)).

Box A3 (cont'd). Stylized Coal Project

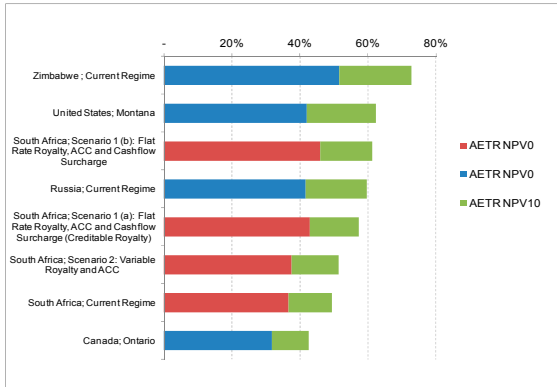### Figure A25. Average Effective Tax Rate

Figure A26. Government Revenue

Figure A27. Revenue Profile Current Regime

Figure A28. Revenue Profile Reform Scenario 1(a)
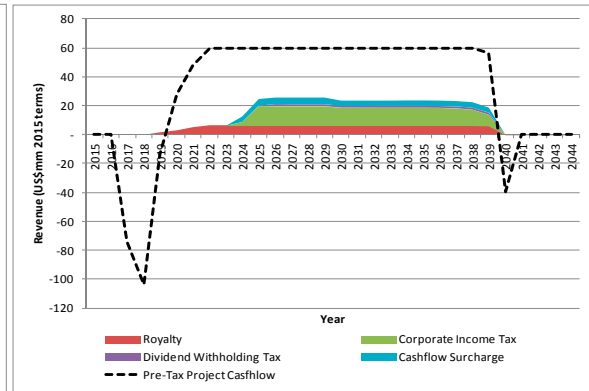
Figure A29. Government Share of Benefits

Figure A30. METR and Hurdle Price
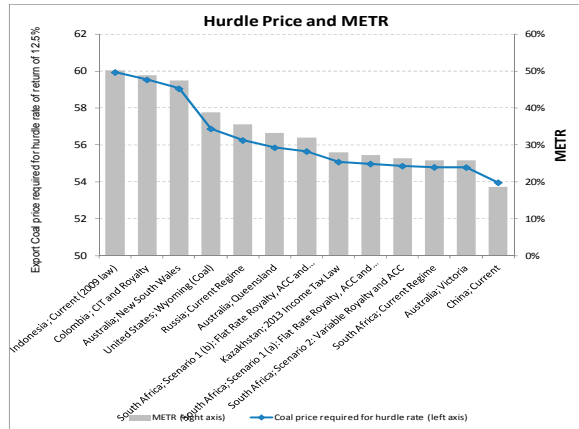
Note: Figure A24 shows that for the current project example and associated profitability levels would be commercially unviable under certain international regimes (Indonesia, Colombia, and Australia (New South Wales)).

Box A3 (cont'd). Stylized Coal Project

Table A17. Stochastic Analysis Results

	Mean Investor post tax IRR	Coefficient of variation of IRR	Tax Induced Probability of below target return of 12.5%	Mean Government NPVI0	Coefficient of variation government
	%	%	$mm	%	%
Project before tax	21.3	64	20%	n/a	n/a
After tax:					
China; Current	16.3	70	18	80	79
South Africa; Current Regime	15.1	77	23	96	75
South Africa; Scenario 2	15.0	78	23	97	75
Australia; Victoria	14.7	79	24	93	63
South Africa; Scenario 1 (a)	14.0	82	27	110	71
South Africa; Scenario 1 (b)	13.3	84	30	120	71
Kazakhstan; 2013 Income Tax Law	13.1	76	29	118	81
Australia; Queensland	12.8	83	31	119	68
Russia; Current Regime	12.4	98	35	130	44
United States; Wyoming (Coal)	11.6	104	37	147	43
Australia; New South Wales	8.2	130	51	188	35
Colombia ; CIT and Royalty	7.8	137	52	200	35
Indonesia ; Current (2009 law)	7.1	142	54	208	38

Figure A31. Mean Investor IRR and Risk of below Hurdle Rate Return
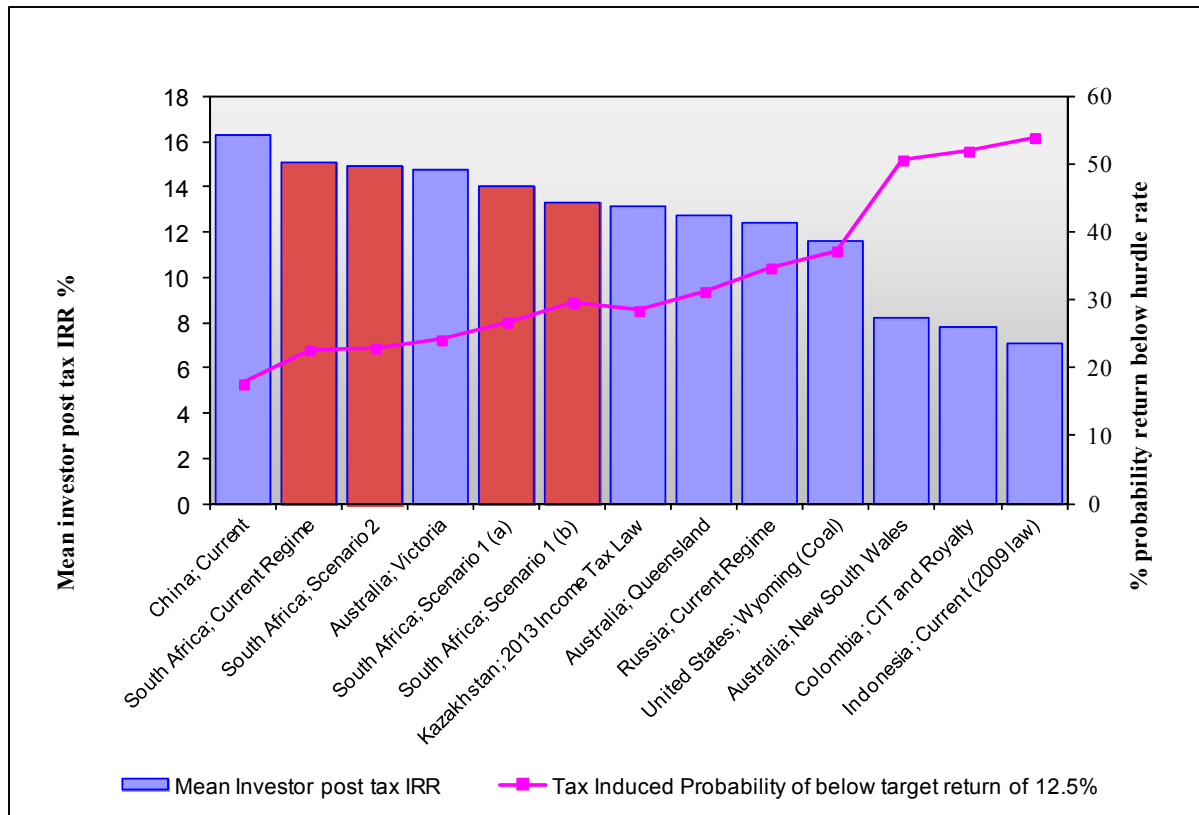
Note: Stochastic price analysis was carried out on export coal prices; domestic coal prices were held constant in real terms at $25/tonne.

Box A4. Stylized Iron Ore Project

The South African iron ore sector is dominated by the 37 mtpa Sishen iron ore mine, the largest mining asset of the Kumba Iron Ore project. A number of smaller mines brought the total South African iron ore production to approximately 72 mtpa per annum in 2013.

The full-cycle project presented here has been stylized to reflect the scale of the Sishen iron ore mine, based on its current estimated 18-19 year remaining mine life. The mine produces 37 mtpa of 64-66% Fe iron ore in the form of both lump and fines. Although in practice a small proportion of South African iron ore is sold domestically, it is assumed in this example that iron ore is produced entirely for export. Any domestic supply obligations and the associated prices would of course have an impact on project profitability.

It is assumed that the iron ore is washed, crushed and processed before being transported using existing rail and port infrastructure. The costs assumed are informed by industry reports, and have also been calibrated to reflect the costs levels which would be necessary for a project to be commercially viable in the current price environment.

Table A18. Project Parameters

Project Indicator	Unit	
Production Period	Years	18
Production - Iron Ore	000 tonnes	569,000
Capital Costs	$ million	3,294
Sustaining Capital	$ million	4,206
Operating Costs - Mining	$ million	7,682
Operating Costs - Transport/Processing	$ million	5,377
Decommissioning	$ million	329
Unit Capex	$/tonne	13
Unit Opex	$/tonne	24
Total Unit Cost	$/tonne	37

Figure A32. Project Net Cash flow
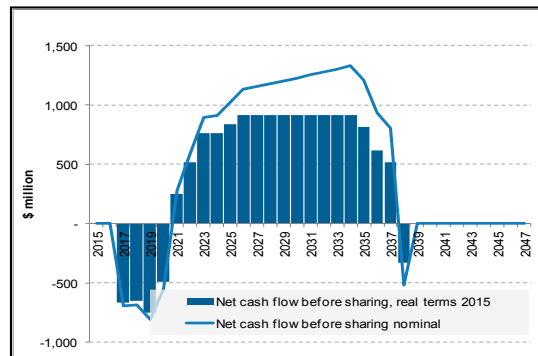
Source: IMF staff estimates

Price Assumptions

Recent declines in the iron ore have contributed to lower profitability in the sector, with outlooks for iron ore prices relatively pessimistic (Table A19). Figure A33 shows the historical price of China CFR 62% Fe fines. The determination of the actual sales price of South African ore would include a deduction for freight costs to the reference price location. Trends in shipping costs have been downwards with recent rates for shipping iron ore from Richards Bay to China at $7/ metric ton (Figure A34).

Table A19. Iron Ore Export Price Forecasts

				Forecast		
China CFR Fines 62% Fe	Spot 4/	2015	2016	2017	2018	2019
Bloomberg (Average Forecast) 1/ US$/tonne	50.80	67.71	71.61	72.32	75.53	78.34
WEO (real terms) 2/ US$/tonne	50.80	62.71	60.85	60.85	60.85	60.85
WEO (nominal terms) 3/ US$/tonne	50.80	62.71	61.90	63.49	65.01	66.48

1/ Average of 17 financial analysts forecasts (Jan-Apr 2015)
2/ Last updated on March 19, 2015.
3/ Nominal terms, adjusted using WEO inflation projections; last updated on March 19, 2015.
4/ As on April 14, 2015

Box A4 (cont'd). Stylized Iron Ore Project

Figure A33. Historical Price and Forecasts

Iron Ore, China import Iron Ore Fines 62% FE spot (CFR Tianjin port) US$ per metric ton.
Past prices in nominal dollars and projections in real 2015 dollars.
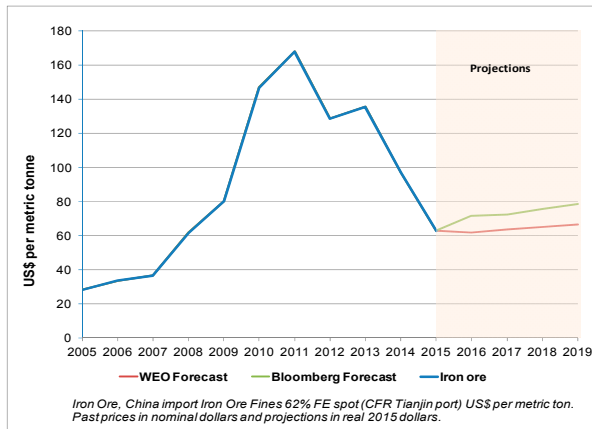
Source: WEO and Bloomberg

Figure A34. Iron Ore Freight Rates
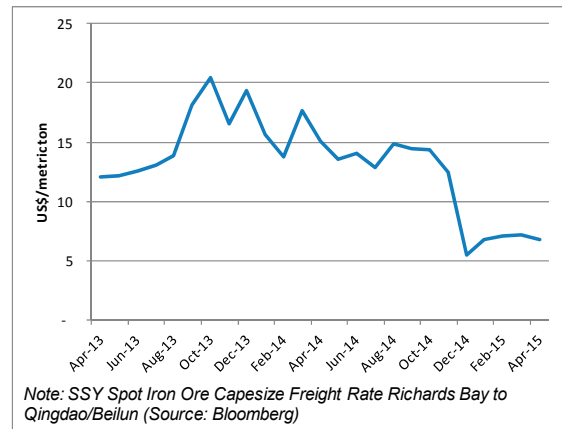
Note: SSY Spot Iron Ore Capesize Freight Rate Richards Bay to Qingdao/Beilun (Source: Bloomberg)

Source: Bloomberg

The analysis assumes an iron ore price of $55/ton in constant real terns 2015, reflecting a freight cost deduction from the WEO forecast of $60, but also an upwards adjustment to reflect the higher Fe content of iron ore from the Sishen mine. Given these assumptions, the project generates a pre-tax project rate of return of 19% in 2015 real terms.

Table A20. Simulation Results

Project Fiscal Results (in US$ million real or %)	Current Regime	Scenario 1 (a): Flat Rate Royalty, ACC and Cashflow Surcharge (Creditable Royalty)	Scenario 1 (b): Flat Rate Royalty, ACC and Cashflow Surcharge	Scenario 2: Variable Royalty and ACC
Pre-tax project IRR	19.2%	19.2%	19.2%	19.2%
Post-tax IRR on total funds	14.8%	14.5%	14.1%	14.6%
Post-tax IRR on equity	22.0%	21.8%	21.1%	21.6%
Post-tax IRR on equity (non-BEE)	17.9%	17.7%	17.0%	18.1%
Pre-tax NCF undiscounted	10,407	10,407	10,407	10,407
Post-tax investor NCF undiscounted	5,619	5,331	4,991	5,498
o/w Post-tax BEE NCF undiscounted	1,750	1,663	1,571	1,717
Government revenue undiscounted	4,100	4,388	4,728	4,222
AETR undiscounted	39.4%	42.2%	45.4%	40.6%
AETR including BEE NCF	56.2%	58.1%	60.5%	57.1%
Pre-tax NCF 10% discount	1,812	1,812	1,812	1,812
Post-tax investor NCF 10% discount	1,001	937	856	957
o/w BEE investor NCF 10% discount	429	407	385	418
Government revenue 10% discount	1,004	1,067	1,148	1,047
AETR 10% discount	55.4%	58.9%	63.4%	57.8%
AETR including BEE NCF	79.1%	81.4%	84.7%	80.8%

Under the current regime and Scenarios 1(a) and (b), the royalty rate is applied to gross sales, without deduction of transport or refining costs between the mine and the point of transfer. Under Scenario 3, the net smelter return principle is used, allowing transport and refining costs to be deducted from the royalty base.

Box A4 (cont'd). Stylized Iron Ore Project
Figure A35. Government Take and Investor IRR

Post Tax IRR on Total Funds

Current Regime

Cost/Price Variation		Unit Cost ($/tonne)				
		51 140%	44 120%	37 100%	29 80%	22 60%
44	80%	0.0%	0.0%	0.0%	4.4%	14.8%
50	90%	0.0%	0.0%	1.4%	10.1%	20.0%
44	80%	0.0%	0.0%	6.9%	14.8%	24.3%
50	90%	0.0%	4.4%	11.2%	18.7%	28.3%
55	100%	2.3%	8.4%	14.8%	22.2%	31.9%
61	110%	6.2%	11.8%	18.0%	25.4%	35.2%
66	120%	9.4%	14.8%	20.9%	28.3%	38.2%
72	130%	12.2%	17.5%	23.5%	31.0%	41.0%
77	140%	14.8%	20.0%	26.0%	33.6%	43.7%

(Iron Ore Price ($/tonne) on vertical axis)

Reform Scenario 1(a)

Cost/Price Variation		Unit Cost ($/tonne)				
		51 140%	44 120%	37 100%	29 80%	22 60%
44	80%	0.0%	0.0%	0.0%	4.2%	14.5%
50	90%	0.0%	0.0%	1.2%	10.0%	19.5%
44	80%	0.0%	0.0%	6.7%	14.5%	23.6%
50	90%	0.0%	4.2%	11.0%	18.3%	27.2%
55	100%	2.2%	8.2%	14.5%	21.7%	30.5%
61	110%	6.1%	11.6%	17.6%	24.5%	33.4%
66	120%	9.3%	14.5%	20.3%	27.2%	36.2%
72	130%	12.0%	17.2%	22.8%	29.8%	38.7%
77	140%	14.5%	19.5%	25.1%	32.0%	41.2%

AETR (undiscounted)

Current Regime

Cost/Price Variation		Unit Cost ($/tonne)				
		51 140%	44 120%	37 100%	29 80%	22 60%
44	80%	-0.9%	-1.5%	-9.6%	41.5%	39.4%
50	90%	-1.5%	-5.7%	52.9%	40.1%	39.1%
44	80%	-3.8%	-1698.3%	39.8%	39.4%	38.9%
50	90%	-44.6%	41.5%	39.9%	39.1%	38.4%
55	100%	46.7%	40.7%	39.4%	39.0%	37.9%
61	110%	40.1%	39.8%	39.2%	38.8%	37.6%
66	120%	40.3%	39.4%	39.0%	38.4%	37.3%
72	130%	39.7%	39.2%	38.9%	38.0%	37.1%
77	140%	39.4%	39.1%	38.7%	37.7%	37.0%

Reform Scenario 1(a)

Cost/Price Variation		Unit Cost ($/tonne)				
		51 140%	44 120%	37 100%	29 80%	22 60%
44	80%	-3.6%	-6.0%	-6.0%	-6.0%	42.2%
50	90%	-6.0%	-13.9%	61.1%	41.5%	42.7%
44	80%	-11.9%	-1744.9%	42.8%	42.2%	43.0%
50	90%	-52.3%	44.6%	41.7%	42.5%	43.2%
55	100%	50.5%	42.5%	42.2%	42.8%	43.3%
61	110%	42.8%	41.8%	42.4%	43.0%	43.4%
66	120%	41.7%	42.2%	42.8%	43.2%	43.5%
72	130%	41.9%	42.4%	42.9%	43.3%	43.6%
77	140%	42.2%	42.7%	43.1%	43.4%	43.7%

AETR (10% discount)

Current Regime

Cost/Price Variation		Unit Cost ($/tonne)				
		51 140%	44 120%	37 100%	29 80%	22 60%
44	80%	-1.7%	-9.4%	-1599.3%	55.4%	43.4%
50	90%	-6.6%	-52.0%	76.9%	47.8%	41.5%
44	80%	-1.7%	-9.4%	-1599.3%	55.4%	43.4%
50	90%	-6.6%	-52.0%	76.9%	47.8%	41.5%
55	100%	-21.5%	172.7%	55.4%	44.7%	40.3%
61	110%	-219.6%	70.6%	48.7%	42.9%	39.4%
66	120%	111.5%	55.4%	45.6%	41.5%	38.9%
72	130%	67.2%	49.5%	43.9%	40.5%	38.4%
77	140%	55.4%	46.4%	42.5%	39.8%	38.0%

Reform Scenario 1(a)

Cost/Price Variation		Unit Cost ($/tonne)				
		51 140%	44 120%	37 100%	29 80%	22 60%
44	80%	-4.9%	-10.0%	-1708.7%	58.9%	48.1%
50	90%	-8.1%	-54.7%	79.8%	51.7%	47.0%
44	80%	-4.9%	-10.0%	-1708.7%	58.9%	48.1%
50	90%	-8.1%	-54.7%	79.8%	51.7%	47.0%
55	100%	-22.3%	179.1%	58.9%	48.9%	46.2%
61	110%	-231.6%	73.8%	52.6%	47.8%	45.9%
66	120%	114.5%	58.9%	50.0%	47.0%	45.6%
72	130%	70.5%	53.2%	48.4%	46.3%	45.5%
77	140%	58.9%	50.7%	47.6%	46.0%	45.3%

Red areas depict unviable project outcomes, assuming an investor hurdle rate of return of 12.5 percent (post-tax real).

Box A4 (cont'd). Stylized Iron Ore Project

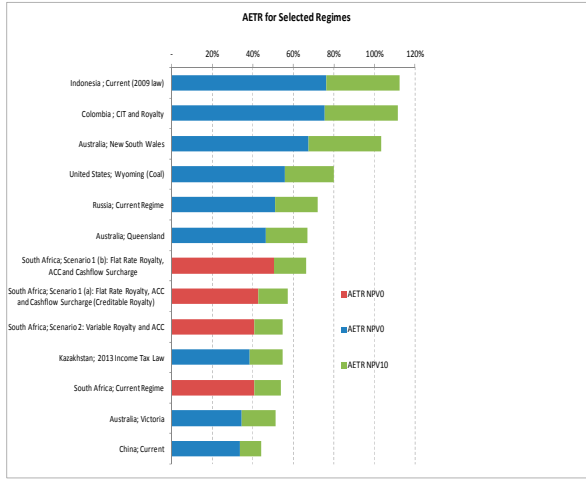Figure A36. Average Effective Tax Rate
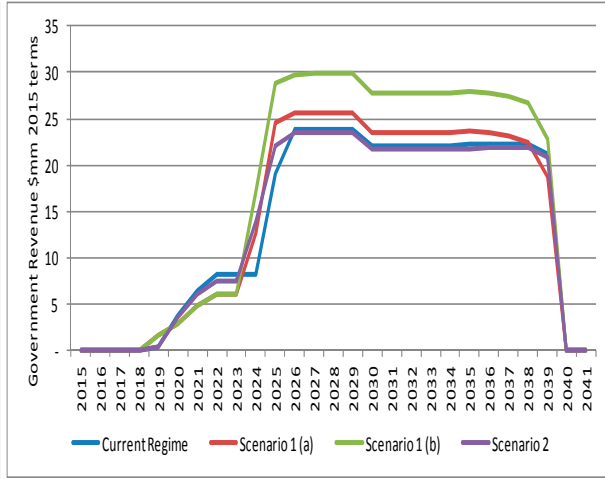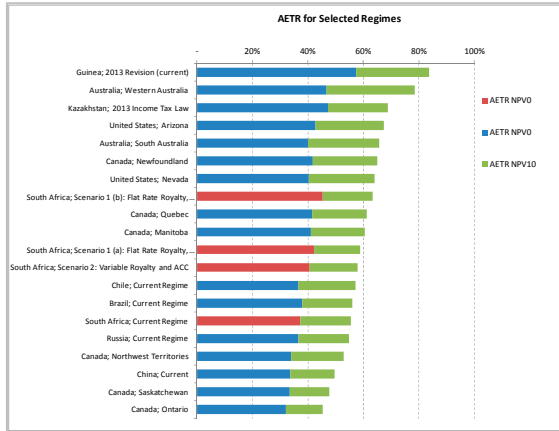

Figure A37. Government Revenue
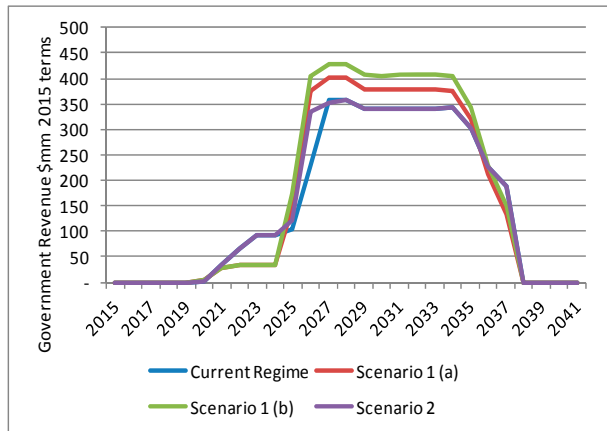
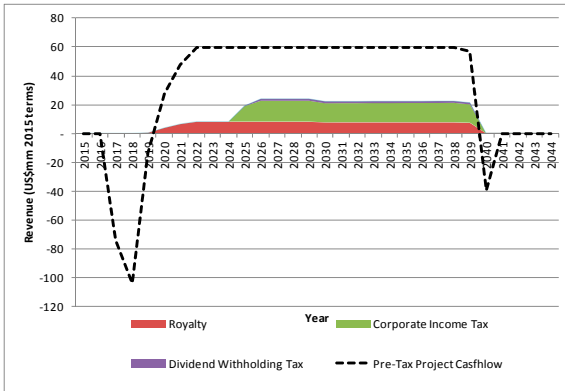Figure A38. Revenue Profile Current Regime
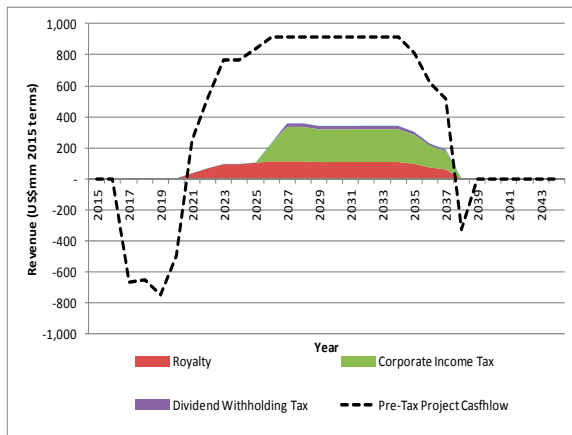

Figure A39. Revenue Profile Reform Scenario 1(a)
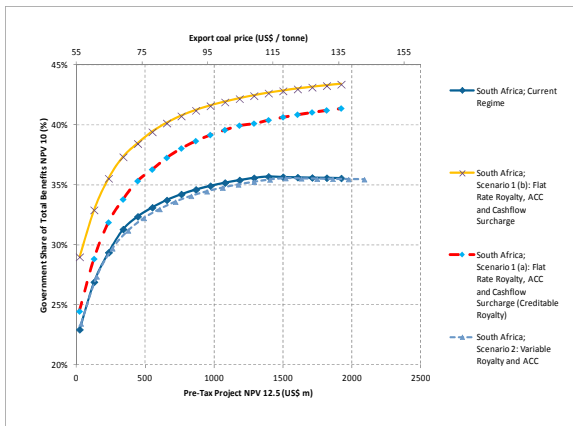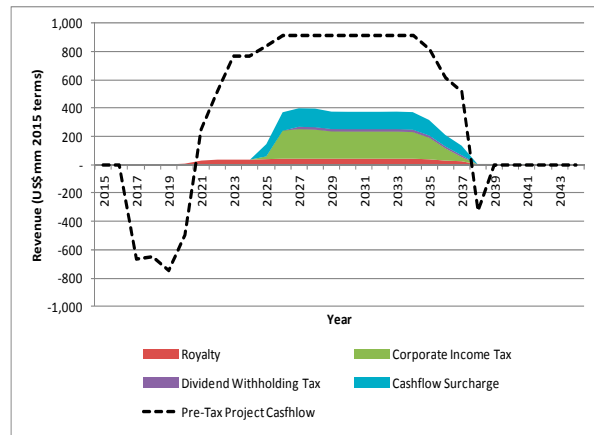

Figure A40. Government Share of Benefits
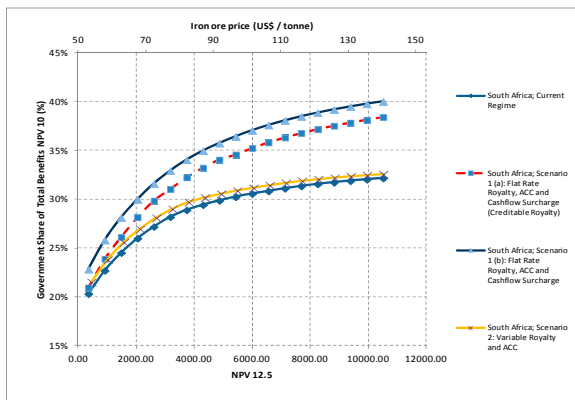
Figure A41. METR and Hurdle Price
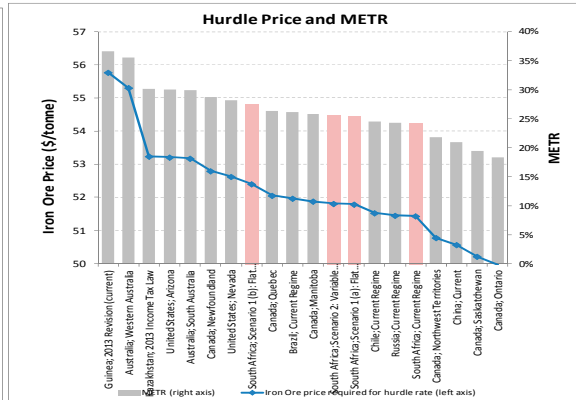
Box A4 (cont'd). Stylized Iron Ore Project

Table A21. Stochastic Analysis Results

	Mean Investor post tax IRR	Coefficient of variation of IRR	Tax Induced Probability of below target return of 12.5%	Government NPV10	Government revenue coefficient of variation
	%	%	%	$mm	%
Project before tax	37.3	41.4	n/a	n/a	n/a
After tax:					
Canada; Ontario	15.9	42.4	3.4	2417	54.3
Canada; Saskatchewan	15.7	42.6	3.5	2511	54.1
China; Current	15.4	42.8	3.6	2545	53.4
Canada; Northwest Territories	15.2	42.7	4.0	2788	54.2
Russia; Current Regime	15.0	44.0	4.7	2556	50.7
South Africa; Current Regime	14.8	43.4	4.5	2815	53.7
Chile; Current Regime	14.6	43.4	5.4	2871	52.3
South Africa; Scenario 2	14.6	43.8	5.1	2869	52.9
South Africa; Scenario 1 (a)	14.5	42.8	5.2	3276	55.2
Brazil; Current Regime	14.5	44.9	5.8	2372	47.0
Canada; Manitoba	14.4	43.5	5.8	3089	53.1
Canada; Quebec	14.3	43.6	6.0	3295	53.5
South Africa; Scenario 1 (b)	14.1	43.2	5.8	3440	54.7
United States; Nevada	13.9	44.4	6.6	3225	51.6
Canada; Newfoundland	13.8	44.2	6.4	3211	51.9
Australia; South Australia	13.6	46.1	6.6	2866	48.1
United States; Arizona	13.5	44.9	6.9	3296	51.0
Kazakhstan; 2013 Income Tax Law	13.4	40.2	6.3	4508	58.8
Australia; Western Australia	12.3	47.5	8.2	3241	45.8
Guinea; 2013 Revision (current)	12.0	46.1	7.7	4014	51.6

Figure A42. Mean Investor IRR and Risk of below Hurdle Rate Return
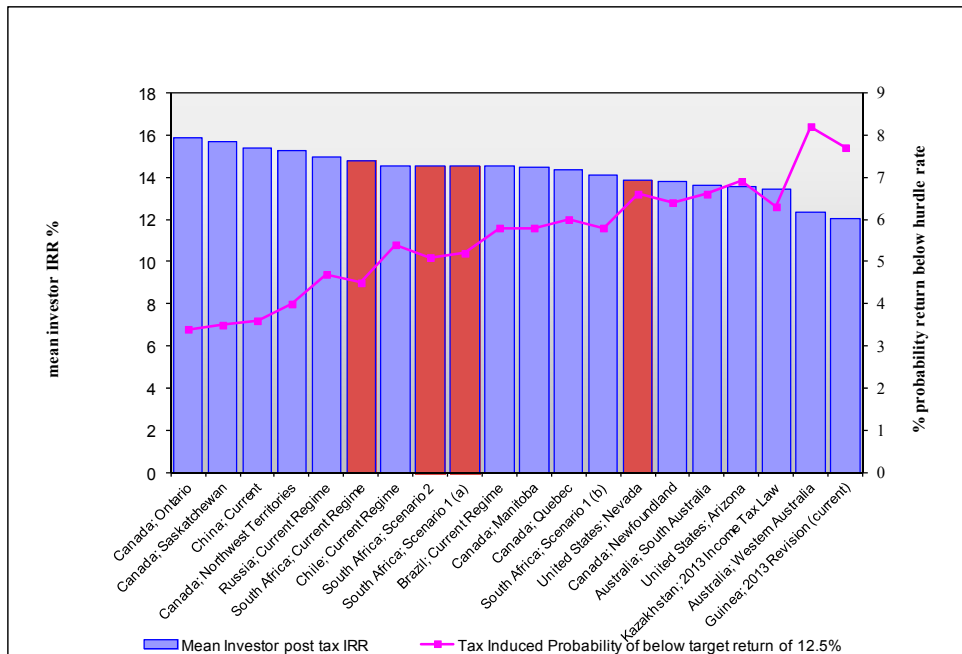
Note: A $10 discount was applied to the stochastic price to reflect the transportation costs from South Africa to the reference market.

Box A5. Stochastic Price Simulations

This box explains the autoregressive model (i.e. the price today helps predict the price tomorrow) used to generate the stochastic mineral price simulations used in this section.

Table A22. Data for Stochastic Analysis

Mineral	Data Source	Time Period
Platinum	Bloomberg: Platinum Spot Price in USD per troy ounce, in plate or ingot form, with a minimum purity of 99.95%	*1987-2014*
Palladium	Bloomberg: Platinum Spot Price in USD per troy ounce, in plate or ingot form, with a minimum purity of 99.95%	*1993-2014*
Rhodium	Bloomberg: Rhodium Spot Price in USD per troy ounce, in plate or ingot form, with a minimum purity of 99.95%	*1987-2014*
Gold	WEO: Gold, Fixing Committee of the London Bullion Market Association, London 3 PM fixed price, US$ per troy ounce	*1969-2014*
Coal	WEO: Coal, South African export price, US$ per metric tonne	*1990-2014*
Iron Ore	WEO: Iron Ore, China import Iron Ore Fines 62% FE spot (CFR Tianjin port) US$ per metric ton	*1975-2014*

These prices were adjusted annually for US inflation, using 2014 as the base year, and then normalized by taking natural logarithms.

Autoregressive (AR) model
It is assumed that real commodity prices follow an autoregressive process given by:
$$y_t = \alpha + \beta y_{t-1} + e_t \text{ where } e_t - N(0, \sigma^2)$$

where y_t is the commodity price in real terms defined above, α and β are parameters relating the current price to its past value, and e_t is a stochastic error term distributed normally with zero mean and variance σ^2. Parameters of the model are estimated by OLS, yielding the parameters detailed in Table A23.

Table A23. Parameters for Stochastic Analysis

Mineral	Constant (α)	Coefficient (β)	Standard Deviation of Residuals (σ²)	Implied Long Term Average Price (US$)	Starting Price assumed in analysis (US$)
Platinum	0.38	0.95	0.15	1,051	1,600
Palladium	1.43	0.77	0.32	519	850
Rhodium	1.88	0.76	0.54	1,690	1,600
Gold	0.72	0.89	0.20	920	1,200
Coal	0.99	0.76	0.25	60	57
Iron Ore	0.05	0.99	0.19	148	55

Stochastic simulations
In stochastic simulations, future prices are generated recursively using this equation. Starting prices were assumed as detailed in Table A23, and with error terms randomly generated (using a normal distribution with parameters reported in Table A23). Additionally, lower and upper bounds on prices are imposed to avoid extreme values. This exercise is repeated multiple times to construct a range of possible outcomes for future price paths.

Source: Philip Daniel, Michael Keen, and Charles McPherson, 2010, *The Taxation of Petroleum and Minerals: Principles, Problems and Practice,* (Abingdon: Routledge).

Effect of Proposed Changes to Depreciation

17. **The treatment of capital depreciation under the current and proposed regimes was further analyzed.** A comparison was made between the treatment of depreciation under the current regime, proposed reform scenario, and the system of general business taxation in South Africa. The general taxation scenario assumes that the statutory 28 percent rate is applied to the platinum project, allowing deductions for economic depreciation of capital calculated using a declining balance of 40 percent.

Figure A43. Comparing Depreciation Methods
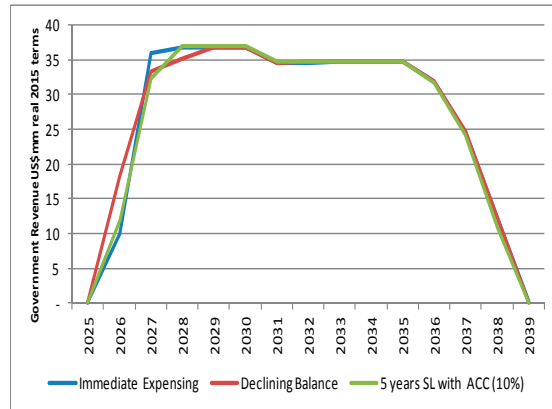
18. **The recommended reform scenarios shift tax depreciation under the current regime back towards economic depreciation (Figure A43).** The proposed treatment slows down the depreciation of assets as compared with the current regime, and while it disallows interest deductions, it compensates the investor with the deduction of an uplift on unredeemed capital designed to provide tax relief for both debt and equity financing. The reform scenario thus generates a CIT profile which is closer to that achieved under economic depreciation, while still maintaining relief to the investor for the risks involved in mineral extraction.

Impact of the Creditability of the Royalty

19. **The creditability of the royalty against the cashflow surcharge provides some relief to the investor once the surcharge is triggered**. However, this has the effect of decreasing government revenue (compared with Scenario 1(b)) at a time when the project has reached the specified threshold rate of return. The reduction in government revenue through the creditability of royalty liabilities is partially offset by lower surcharge deductions in the computation of corporate income tax.

Figure A44. Impact of Creditable Royalty
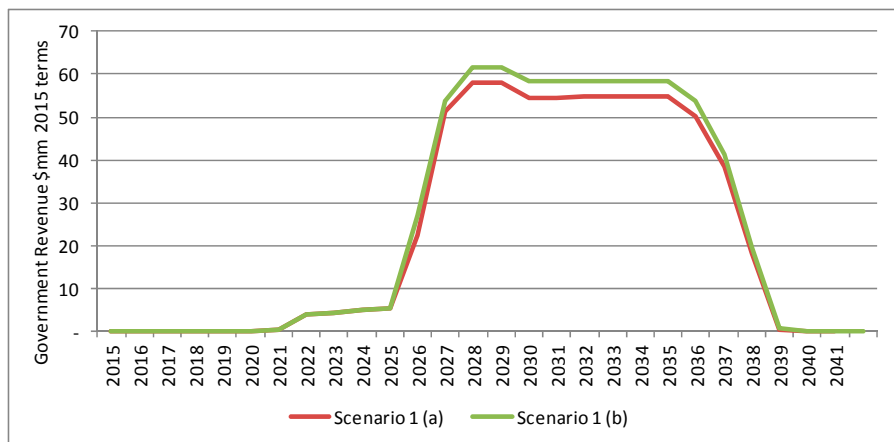
III. ECONOMIC ASSESSMENT OF PETROLEUM FISCAL REGIMES

Deepwater Offshore Oil

20.	**Economic modeling was undertaken on stylized deepwater offshore oil fields of 500 million and 1000 million barrels (MMBbl).** Figure A46 presents the underlying project economics of the oil field examples used[5]. Since South African waters are a 'frontier' area in deepwater oil exploration, it is difficult to predict accurately the cost structures and project economics that are likely to materialize as exploration progresses. Many variables would be subject to change, and the analysis which follows considers a number of possible variations in price and cost which would alter the ultimate project economics[6]. Two field sizes were chosen to examine the economics of both a medium-sized and large discovery under the South African and alternative fiscal regimes. All simulations in this section are performed using FAD's FARI modeling framework.

Figure A45. Oil Price Assumptions

Actual and WEO forecast of Crude Oil (petroleum), simple average of three spot prices; Dated Brent, West Texas Intermediate, and the Dubai Fateh, US$ per barrel

—— WEO Forecast   – – Constant Real ($80)   – – Constant Real ($50)
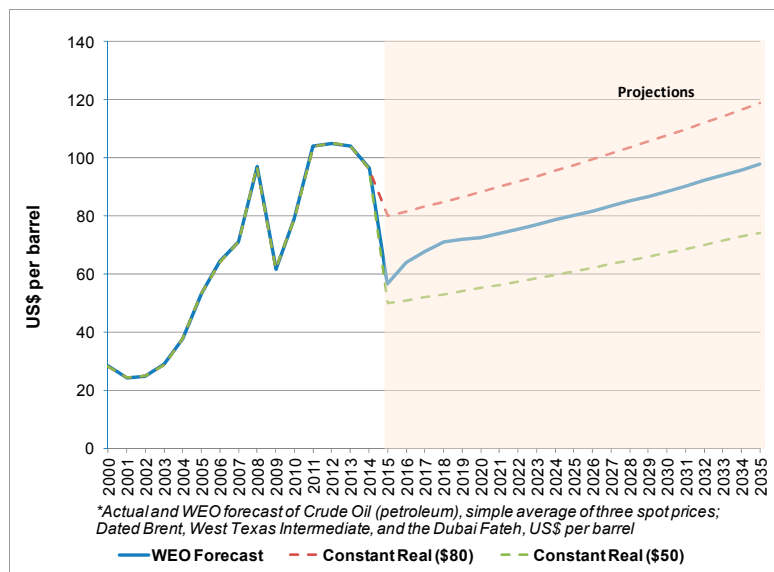
21.	**A key variable underpinning the project economics is the oil price.** As a base case assumption, the analysis assumes the oil price projections of the IMF World Economic Outlook

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[5] Examples are based on an initial exploration period of 5 years during which 3 to 4 of exploration and appraisal wells are drilled. The project is then developed using floating production storage and offloading (FPSO) infrastructure over the subsequent 7 years, involving purchase of the capital equipment and drilling expenditure for production and water injection wells, the number of which would vary with the field size. Oil production commences in year 9 of the project, and after a production period of 18 years, the field is decommissioned (incurring additional expenditure).

[6] In addition, discoveries of associated gas could be evacuated onshore for domestic use in power plants, providing a potential upside to project economics.

(Figure A45) until 2020 beyond which the price projection is kept constant in real terms and inflated at a rate of 2 percent per annum. However, recognizing the unpredictable nature of oil price trends, the analysis which follows is undertaken on a range of prices, initially taking low and high case scenarios of $50 and $80/bbl in 2015 real terms, and inflated by 2 percent as shown in Figure A45[7].

Figure A46. Project Economics of Stylized Deepwater Offshore Oil Fields

500 MmBbl Field

Oil Production	500	MMbbl
Years	18	
constant 2015 dollars	$ million	$/Bbl
Exploration costs	980	2.0
Development costs	2,777	5.6
Development drilling	2,859	5.7
Operating costs	4,898	9.8
Decommissioning	662	1.3
	12,176	24.4

1000 MmBbl Field

Oil Production	1,000	MMbbl
Years	18	
constant 2015 dollars	$ million	$/Bbl
Exploration costs	980	1.0
Development costs	3,888	3.9
Development drilling	6,434	6.4
Operating costs	8,995	9.0
Decommissioning	1,130	1.1
	21,427	21.4

22.   **The current regime was assessed under a number of simplifying assumptions.** The key terms of the current regime are reflected in Table A24. The analysis assumes that 70 percent

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[7] In reality, transport and refining costs between the fiscalization point and the reference market would imply a discount to the reference price. Since these prices are simply used for illustrative purposes and little is known about the size of such a future discount, no such deductions have been made from the headline price assumption.

of development costs are financed by debt, at an interest rate of LIBOR +3.5 percent. For rehabilitation purposes, it is assumed that the joint venture makes tax-deductible contributions to a decommissioning fund once 50 percent of the projected reserves have been depleted. It is assumed in each case that the HDSA ownership requirements of the Mining Charter are fulfilled by the presence of a BEE entity as a partner in the collective joint venture. Exploration costs are not paid by the BEE entity, but after the exploration period, the entity contributes its share to development and subsequent expenditures as a normal working partner in the venture, as well as separately meeting income tax liabilities.

Table A24. South Africa's Current Petroleum Fiscal Regime

Fiscal Provision	
Royalties	**Current regime**
Variable Royalty	0.5 + [earnings before interest and taxes/(gross sales in respect of refined mineral resources x 12.5)]. Max rate 5%.
Income Tax	
Rate	28%
Depreciation:	
Investment Allowance/Accelerated Depreciation	100% immediate expensing
Uplift on Exploration Costs	100%
Uplift on Post-Exploration Costs	50%
Loss Carry Forward	Unlimited
Withholding Taxes	
Dividends	0%
Interest	0%
Participation Requirements	
Local Participation	10% HDSA Ownership

23.   **The current fiscal terms were evaluated for revenue generating capacity using the Average Effective Tax Rate (AETR) or "government take".** Tables A25 and A26 illustrate that the current regime generates an AETR of between 20 and 30 percent while Figures A47 and A48 show the profile of revenues relative to the pre-tax project cash flow over the project life. While the BEE entity is assumed not to form part of the government take, this requirement has an impact on the investor's return, as illustrated in Tables A25 and A26. When reflected as a contribution to government take, the AETR increases to between 30 and 35 percent. International comparative analysis is presented later in this section; simulations previously undertaken by FAD suggest that in the petroleum sector governments retain government shares of between 65 and 85 percent.[8]

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[8] International Monetary Fund, 2012, Fiscal Regimes for Extractive Industries: Design and Implementation, Fiscal Affairs Department Paper (Washington).

Figure A47. Evaluation of the Current Regime – 500MmBbl Field
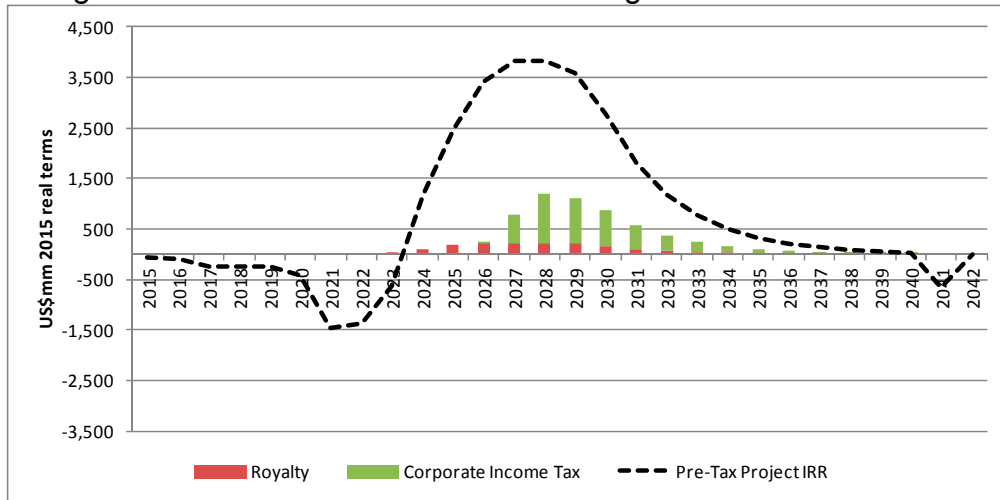
Figure A48. Evaluation of the Current Regime – 1000MmBbl Field
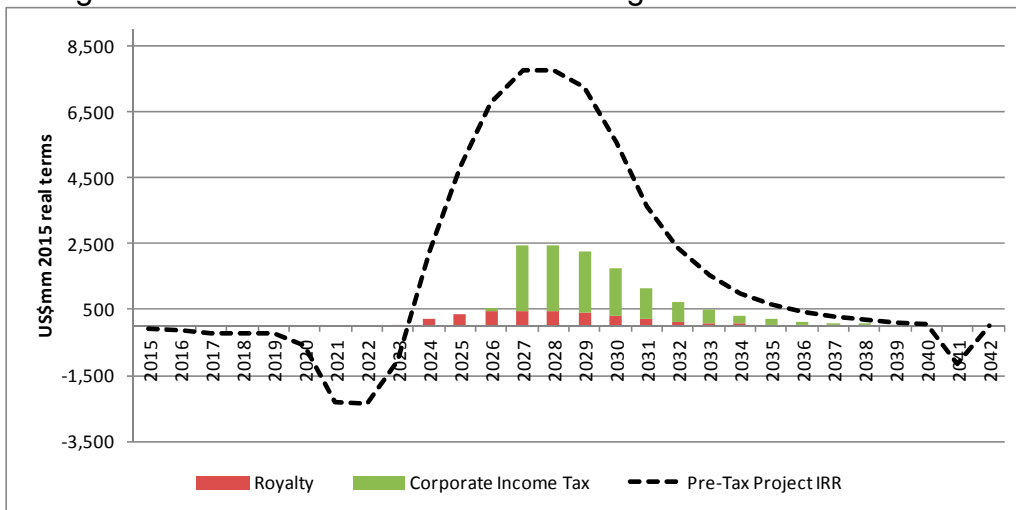
24.   **The regime is tested under a range of cost and price assumptions.** Under the base case 500MBbl field scenario using WEO prices, the project generates a post-tax rate of return of 12.7 percent in real terms, demonstrating the marginality of the project. Recognizing that these results are contingent on a number of price and cost assumptions, Figure A49 illustrates that even in low cost, high price scenarios the current regime is still only capable of generating government take figures in the 20 to 30 percent range. It also demonstrates the range of assumptions under which the investor generates a return beyond a hurdle rate, assumed here to be 12.5 percent. A return on a $60-70/bbl oil price and a unit cost of $35/bbl would leave the investor in a profitable position.

Table A25. Simulation Results - 500MmBbl Field

Project Fiscal Results (in US$ million real or %)	Oil Price Assumption		
	$50/bbl (2015 Real Terms)	WEO Price Projections	$80/Bbl (2015 Real Terms)
Pre-tax project IRR	19.7%	26.4%	31.0%
Post-tax IRR on total funds	16.5%	22.5%	26.8%
Post-tax IRR on equity	19.6%	26.7%	31.5%
IOC IRR	19.2%	26.2%	30.9%
BEE Entity IRR	23.7%	32.7%	39.5%
Pre-tax NCF undiscounted	12,824	20,721	27,824
Post-tax investor NCF undiscounted	8,594	14,029	18,911
o/w IOC	7,634	12,526	16,921
o/w BEE Entity	960	1,502	1,990
Government revenue undiscounted	3,348	5,811	8,032
AETR undiscounted	26.1%	28.0%	28.9%
AETR (including BEE)	33.6%	35.3%	36.0%
Pre-tax NCF 10% discount	2,367	4,707	6,811
Post-tax investor NCF 10% discount	1,566	3,235	4,719
o/w IOC	1,372	2,877	4,214
o/w BEE Entity	194	358	504
Government revenue 10% discount	846	1,516	2,136
AETR 10% discount	35.7%	32.2%	31.4%
AETR 10% discount (including BEE)	43.9%	39.8%	38.8%

Table A26. Simulation Results - 1000MmBbl Field

Project Fiscal Results (in US$ million real or %)	Oil Price Assumption		
	$50/bbl (2015 Real Terms)	WEO Price Projections	$80/Bbl (2015 Real Terms)
Pre-tax project IRR	26.0%	33.6%	38.9%
Post-tax IRR on total funds	22.1%	29.1%	34.0%
Post-tax IRR on equity	27.4%	35.5%	40.9%
IOC IRR	27.3%	35.3%	40.6%
BEE Entity IRR	28.2%	37.9%	45.3%
Pre-tax NCF undiscounted	28,573	44,367	58,573
Post-tax investor NCF undiscounted	19,247	30,092	39,842
o/w IOC	17,191	26,953	35,728
o/w BEE Entity	2,056	3,139	4,113
Government revenue undiscounted	7,854	12,804	17,260
AETR undiscounted	27.5%	28.9%	29.5%
AETR (including BEE)	34.7%	35.9%	36.5%
Pre-tax NCF 10% discount	6,324	11,003	15,211
Post-tax investor NCF 10% discount	4,369	7,670	10,608
o/w IOC	3,913	6,887	9,532
o/w BEE Entity	456	783	1,075
Government revenue 10% discount	2,017	3,395	4,666
AETR 10% discount	31.9%	30.9%	30.7%
AETR 10% discount (including BEE)	39.1%	38.0%	37.7%

Figure A49. Government Take and Investor IRR

Post Tax IRR on Total Funds

500 MmBbl Field

		Cost per Barrel					
Price per barrel		50	44	38	33	27	21	15
40	0.0%	0.0%	-0.3%	4.5%	9.5%	15.0%	22.3%
49	0.0%	1.5%	5.5%	9.7%	14.1%	19.5%	26.8%
58	2.9%	6.3%	9.8%	13.4%	17.8%	23.3%	30.5%
67	6.9%	9.8%	13.0%	16.7%	21.0%	26.5%	33.6%
76	9.9%	12.7%	15.8%	19.5%	23.8%	29.2%	36.4%
85	12.4%	15.2%	18.3%	21.9%	26.3%	31.7%	38.9%
95	14.7%	17.4%	20.5%	24.2%	28.5%	33.9%	41.0%
104	16.7%	19.4%	22.6%	26.2%	30.5%	35.9%	43.0%
113	18.5%	21.3%	24.4%	28.0%	32.3%	37.8%	44.9%
122	20.3%	23.0%	26.1%	29.7%	34.0%	39.4%	46.6%
131	21.9%	24.6%	27.7%	31.3%	35.6%	40.9%	48.2%
140	23.3%	26.1%	29.1%	32.7%	37.1%	42.4%	49.7%

1000 MmBbl Field

		Cost per Barrel					
Price per barrel		50	44	38	33	27	21	15
40	0.0%	0.0%	0.0%	5.2%	10.8%	17.1%	25.5%
49	0.0%	1.8%	6.4%	11.0%	16.0%	22.3%	30.7%
58	3.3%	7.3%	11.1%	15.3%	20.4%	26.6%	35.0%
67	7.9%	11.2%	14.8%	19.0%	24.1%	30.4%	38.6%
76	11.3%	14.4%	18.1%	22.3%	27.3%	33.5%	41.9%
85	14.1%	17.3%	20.9%	25.1%	30.2%	36.4%	44.6%
95	16.7%	19.9%	23.5%	27.7%	32.7%	38.9%	47.1%
104	19.1%	22.2%	25.8%	30.0%	35.0%	41.3%	49.4%
113	21.2%	24.4%	28.0%	32.1%	37.1%	43.4%	51.6%
122	23.2%	26.3%	29.9%	34.1%	39.1%	45.3%	53.5%
131	25.0%	28.2%	31.8%	35.9%	40.9%	47.0%	55.4%
140	26.7%	29.9%	33.4%	37.6%	42.6%	48.7%	57.1%

AETR (undiscounted)

500 MmBbl Field

		Cost per Barrel					
Price per barrel		50	44	38	33	27	21	15
40	-11.3%	-32.7%	95.8%	24.7%	20.9%	25.4%	28.0%
49	-202.4%	42.4%	21.8%	21.1%	24.9%	27.2%	28.9%
58	31.3%	20.3%	21.2%	24.5%	26.7%	28.2%	29.4%
67	19.3%	21.3%	24.2%	26.2%	27.7%	28.8%	29.7%
76	21.4%	24.0%	25.8%	27.2%	28.3%	29.2%	30.0%
85	23.8%	25.5%	26.8%	27.9%	28.8%	29.5%	30.2%
95	25.2%	26.5%	27.5%	28.4%	29.1%	29.8%	30.5%
104	26.2%	27.2%	28.0%	28.8%	29.4%	29.9%	30.6%
113	26.9%	27.7%	28.4%	29.1%	29.6%	30.1%	30.7%
122	27.5%	28.1%	28.7%	29.3%	29.8%	30.4%	30.7%
131	27.9%	28.5%	29.0%	29.5%	29.9%	30.5%	30.8%
140	28.2%	28.7%	29.2%	29.6%	30.0%	30.5%	30.8%

1000 MmBbl Field

		Cost per Barrel					
Price per barrel		50	44	38	33	27	21	15
40	-10.3%	-29.8%	89.6%	23.0%	21.4%	25.8%	28.3%
49	-187.5%	39.7%	20.4%	21.6%	25.3%	27.6%	29.1%
58	29.4%	19.0%	21.7%	24.9%	27.0%	28.5%	29.6%
67	18.2%	21.8%	24.6%	26.6%	28.0%	29.0%	29.9%
76	21.9%	24.4%	26.2%	27.5%	28.6%	29.4%	30.1%
85	24.2%	25.9%	27.2%	28.2%	29.0%	29.7%	30.3%
95	25.6%	26.9%	27.8%	28.7%	29.3%	29.9%	30.6%
104	26.6%	27.5%	28.3%	29.0%	29.6%	30.1%	30.7%
113	27.3%	28.0%	28.7%	29.3%	29.8%	30.2%	30.7%
122	27.8%	28.4%	29.0%	29.5%	29.9%	30.3%	30.8%
131	28.2%	28.7%	29.2%	29.7%	30.1%	30.6%	30.9%
140	28.5%	29.0%	29.4%	29.8%	30.2%	30.6%	30.9%

AETR (10% discount)

500 MmBbl Field

		Cost per Barrel					
Price per barrel		50	44	38	33	27	21	15
40	-2.8%	-4.5%	-7.9%	-17.4%	-235.9%	49.8%	35.1%
49	-6.2%	-10.4%	-22.3%	-337.3%	56.0%	37.8%	33.0%
58	-12.9%	-27.4%	-473.0%	62.1%	40.5%	34.5%	32.2%
67	-32.6%	-663.4%	68.0%	43.2%	36.1%	33.1%	31.8%
76	-949.9%	73.8%	46.0%	37.8%	34.2%	32.4%	31.5%
85	79.5%	48.9%	39.6%	35.4%	33.2%	32.0%	31.4%
95	51.8%	41.4%	36.5%	34.1%	32.6%	31.8%	31.6%
104	43.1%	37.9%	34.9%	33.2%	32.2%	31.6%	31.5%
113	39.2%	35.8%	33.9%	32.7%	32.0%	31.5%	31.5%
122	36.8%	34.7%	33.2%	32.3%	31.8%	31.6%	31.4%
131	35.4%	33.9%	32.7%	32.1%	31.6%	31.6%	31.4%
140	34.5%	33.2%	32.4%	31.9%	31.5%	31.5%	31.4%

1000 MmBbl Field

		Cost per Barrel					
Price per barrel		50	44	38	33	27	21	15
40	-2.8%	-4.6%	-8.7%	-22.0%	184.0%	41.3%	33.2%
49	-6.6%	-12.0%	-30.6%	154.8%	44.4%	34.6%	31.8%
58	-15.4%	-41.0%	140.0%	47.1%	36.3%	32.8%	31.4%
67	-53.9%	131.1%	49.5%	37.9%	33.7%	31.9%	31.2%
76	125.2%	51.7%	39.4%	34.7%	32.6%	31.5%	31.0%
85	53.7%	40.8%	35.8%	33.3%	31.9%	31.3%	31.2%
95	42.3%	36.8%	34.0%	32.5%	31.6%	31.1%	31.2%
104	37.8%	34.7%	33.0%	31.9%	31.4%	31.0%	31.2%
113	35.5%	33.6%	32.4%	31.6%	31.2%	31.0%	31.2%
122	34.1%	32.9%	31.9%	31.5%	31.1%	31.0%	31.2%
131	33.3%	32.4%	31.7%	31.3%	31.0%	31.2%	31.2%
140	32.8%	32.0%	31.5%	31.2%	31.0%	31.2%	31.2%

25.   **The analysis suggests that the variable rate royalty is largely ineffective, with the royalty rate even in marginal scenarios quickly reaching the highest rate (Figure A50).** A flat rate royalty would have largely the same effect in the majority of scenarios which investors would be likely to undertake in the South African environment.

Figure A50. Royalty Rate over Project Life-cycle
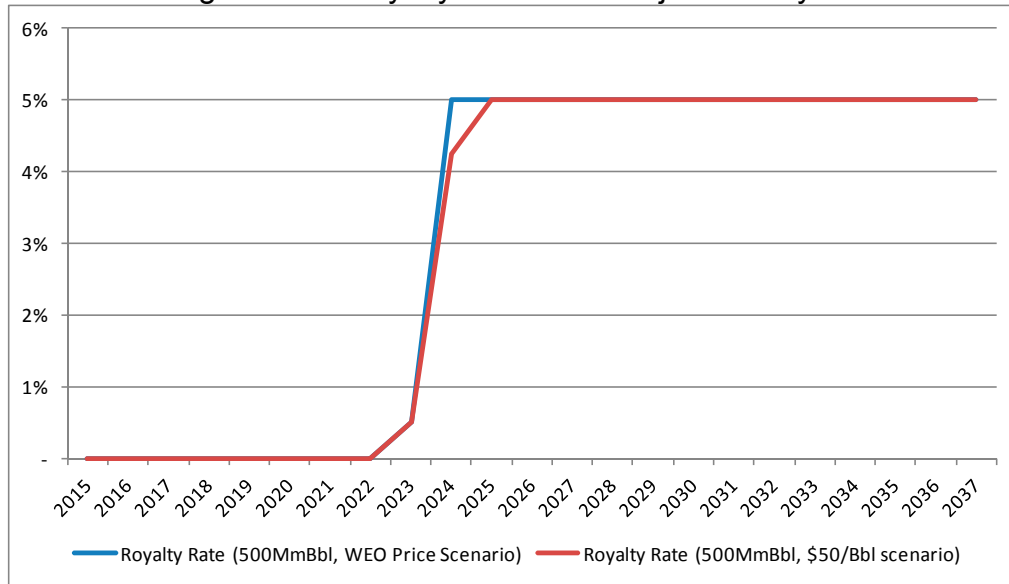
26.   **The analysis also incorporates exploration uncertainty to assess the investor's perceived return on a risked, after tax basis.** This is expressed as the expected NPV per dollar of expenditure or the expected monetary value (EMV) which equals the sum of the probability of unsuccessful exploration multiplied by expected after tax NPV loss from failed exploration costs, and the probability of each type of successful discovery multiplied by the expected after tax positive NPV from successful projects. Based on discussions with the authorities and with industry, the mission assumes a 12.5 percent chance of discovery. If a discovery is made, it is assumed that the probability of discovering a 500MmBbl field is 25 percent, while that of a 1000MmBbl field discovery is 75 percent.

27.   **At the current WEO forecast prices, the EMV of undertaking exploration is negative at a 5 and 10 percent discount rate.** A positive EMV would necessitate higher price and/or lower cost outcomes. For example, raising the oil price assumption to $90/bbl yields a positive EMV. This suggests that while the current price environment has a clear negative impact on investor returns, those continuing with exploration activity are potentially anticipating higher price, lower cost assumptions, higher field size or a high chance of discovery, and consequentially a higher EMV than modeled here. In the analysis which follows, costs are maintained as established in Figure A46, but two oil price paths are modeled, WEO prices and constant real $90/bbl to demonstrate the impact of the fiscal regime under a higher profitability outcome.

Box A6. Expected Monetary Value Analysis

Figure A51. EMV
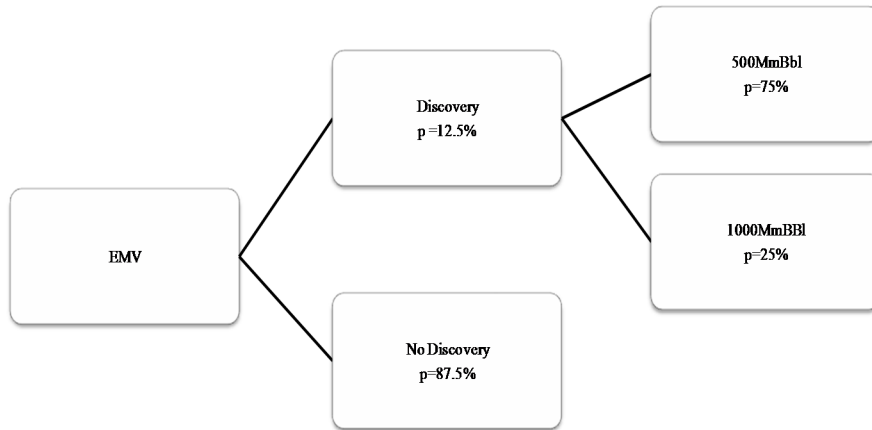
Table A27. EMV Results

Price Assumption: WEO Forecast		Discount Rate			
		0.0%	5.0%	10.0%	12.5%
NPV Exploration Costs		-980	-858	-760	-717
Probability of Discovery		12.5%	12.5%	12.5%	12.5%
Investor NPV	Probability				
500MMBbl	9.38%	14,029	6,750	3,235	2,207
1000MMBbl	3.13%	30,092	15,020	7,670	5,498
EMV		1,398	351	-122	-249
Price Assumption: $90/Bbl					
NPV Exploration Costs		-980	-858	-760	-717
Probability of Discovery		12.5%	12.5%	12.5%	12.5%
Investor NPV	Probability				
500MMBbl	9.38%	22,342	11,218	5,751	4,126
1000MMBbl	3.13%	46,701	23,919	12,667	9,302
EMV		2,696	1,048	270	50
Cost Assumption: -30%					
NPV Exploration Costs		-686	-601	-532	-502
Probability of Discovery		12.5%	12.5%	12.5%	12.5%
Investor NPV	Probability				
500MMBbl	9.38%	16,598	8,365	4,314	3,107
1000MMBbl	3.13%	34,607	17,769	9,442	6,949
EMV		2,037	814	234	69
Price Assumption: $80/Bbl, Higher Chance of Discovery					
NPV Exploration Costs		-980	-858	-760	-717
Probability of Discovery		15.0%	15.0%	15.0%	15.0%
Investor NPV	Probability				
500MMBbl	11.25%	18,911	9,379	4,719	3,340
1000MMBbl	3.75%	39,842	20,248	10,608	7,735
EMV		2,789	1,085	283	56

28. **Examples of each of the proposed reform alternatives to the current South African regime are evaluated**. Table A28 presents the key terms of each of the scenarios. Scenarios 1

and 3 introduce a 5 percent flat rate royalty as well as reforms to the corporate income tax calculation involving a 10 percent allowance for corporate equity and 5 year depreciation using the straight line method reflecting the necessary reforms outlined in the main report. Scenario 1 (a) and (b) adds an additional cash flow surcharge at 20 and 30 percent respectively with a 10 percent uplift on capital expenditure in the year that it is incurred. Scenario 3 reflects a possible reform envisaged under the MPRDA Bill, introducing a 20 percent state participation, carried from development and repaid with interest**.** Under Scenario 2, a simple illustrative R-Factor production sharing scenario is introduced. The current regime and proposed alternatives are evaluated against the key fiscal objectives of revenue-raising capacity, neutrality and progressivity, and placed in international context of other petroleum-producing countries.

Table A28. Reform Scenarios

Fiscal provision	Current Regime	Scenario 1 (a)	Scenario 1 (b)	Scenario 2	Scenario 3
Royalty	0.5 + [earnings before interest and taxes/(gross sales in respect of refined mineral resources x 12.5)] x 100. Max 5%	5% Flat Rate	5% Flat Rate		5% Flat Rate
Income tax	28%	28%	28%	28%	28%
Depreciation	Immediate Expensing of all Capital Expenditure	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1	Straight Line Depreciation over 5 years from Production Year 1
Uplift/Allowance for Corporate Capital	100% uplift on exploration expenditure; 50% uplift on development expenditure	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital	10% uplift on balance of unredeemed capital
Loss carry-forward	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Additional Tax		Cashflow Surcharge at 20% with uplift on capital expenditure at 10%	Cashflow Surcharge at 30% with uplift on capital expenditure at 10%		
Production Sharing				70% Cost Recovery Limit 0<R<1 — 15% 1<R<2 — 20% 2<R — 25%	
State Participation					20% State Participation. Carry through to production with repayment of development costs from participation cashflows at interest rate of 7%
HDSA Requirements	10% Local Ownership	10% Local Ownership	10% Local Ownership	10% Local Ownership	10% Local Ownership

29.	**Evaluating first the revenue raising potential, results illustrate that the range of reform scenarios allow for an AETR as high as 50 percent even under the WEO price assumptions (Table A29).** The revenue pattern over the cycle of the projects mainly reflects the production profile of the project. The effect of the 5 year depreciation and allowance for corporate capital has the effect of altering the timing and size of corporate tax payments, while the cash flow surcharge and state participation have the effect of generating significant additional revenue when the project is generating sufficient positive cash flow. It should be noted that the 20 percent state participation and the 20 percent cash flow surcharge generate almost equivalent effects (Figures A52 and A53).

Figure A52. Total Government Revenue under Current and Reform Scenarios (WEO Prices)
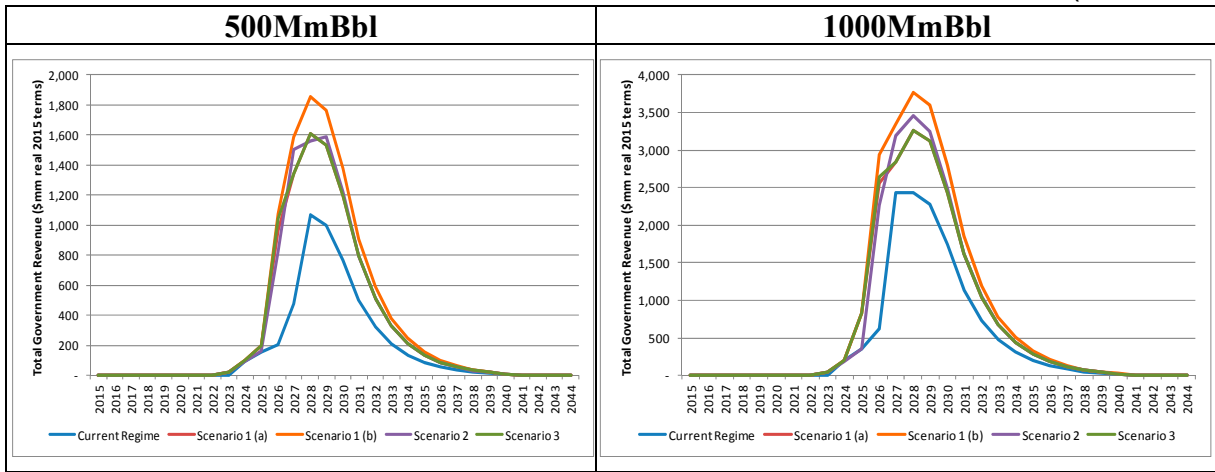
Figure A53. Profile of Government Revenues – Reform Scenarios (500 MMBbl field, WEO Prices)
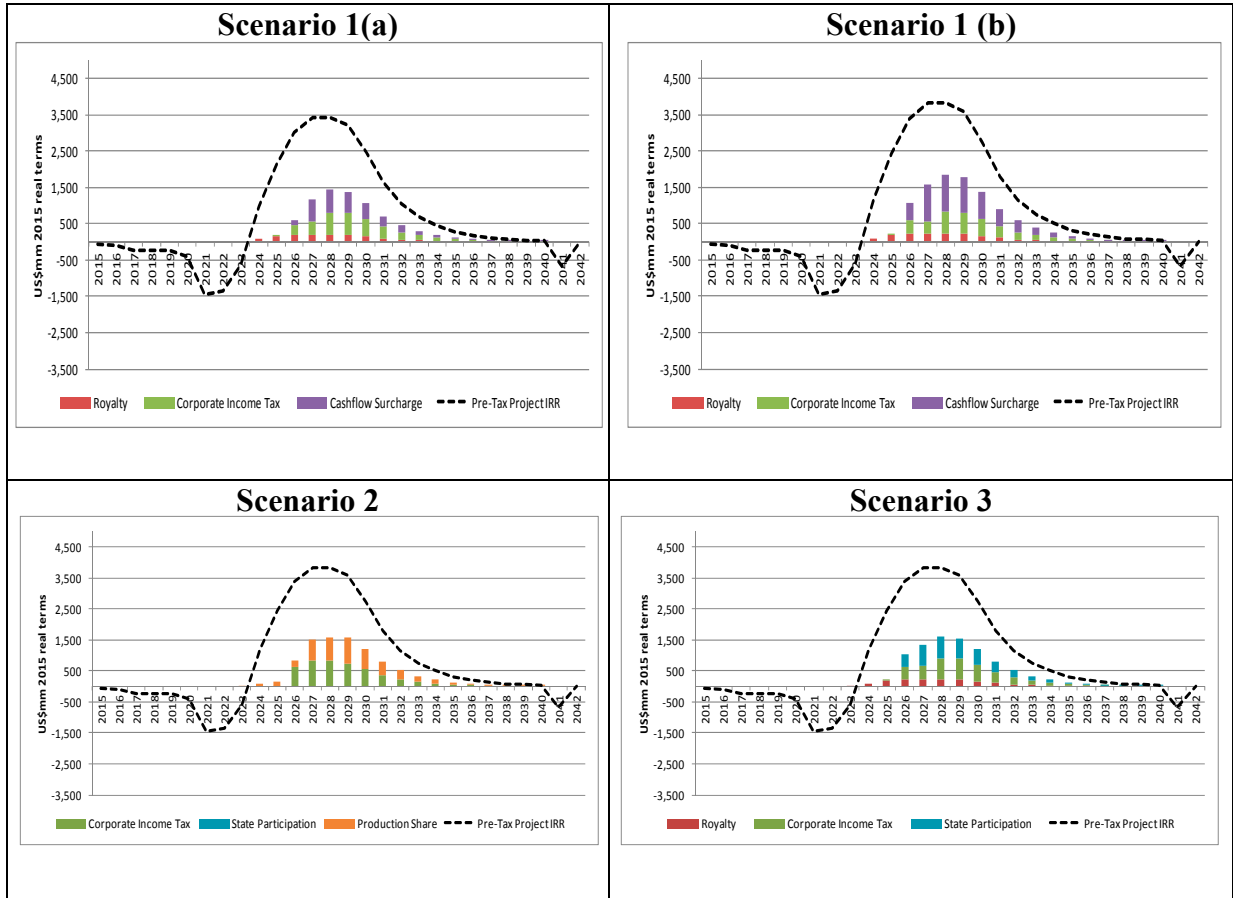
Table A29. Simulation Results

500MmBbl Field – WEO Prices

Project Fiscal Results (in US$ million real or %)	South Africa Current Regime	Scenario 1 (a): Cashflow Surcharge (20%)	Scenario 1 (b): Cashflow Surcharge (30%)	Scenario 2: Production Sharing	Scenario 3: State Participation
Pre-tax project IRR	26.4%	26.4%	26.4%	26.4%	26.4%
Post-tax IRR on total funds	22.5%	19.7%	18.6%	20.3%	19.5%
Post-tax IRR on equity	26.7%	23.5%	22.3%	24.2%	23.3%
IOC IRR	26.2%	23.1%	21.9%	23.4%	22.5%
BEE Entity IRR	32.7%	28.9%	27.5%	33.2%	31.6%
Pre-tax NCF undiscounted	20,721	20,721	20,721	20,721	20,721
Post-tax investor NCF undiscounted	14,029	10,811	9,530	11,255	10,602
o/w IOC	12,526	9,599	8,446	9,669	9,134
o/w BEE Entity	1,502	1,212	1,084	1,586	1,468
Government revenue undiscounted	5,811	9,029	10,310	8,585	9,238
AETR undiscounted	28.0%	43.6%	49.8%	41.4%	44.6%
AETR (including BEE)	*35.3%*	*49.4%*	*55.0%*	*49.1%*	*51.7%*
Pre-tax NCF 10% discount	4,707	4,707	4,707	4,707	4,707
Post-tax investor NCF 10% discount	3,235	2,323	1,986	2,475	2,258
o/w IOC	2,877	2,048	1,744	2,097	1,915
o/w BEE Entity	358	275	241	378	343
Government revenue 10% discount	1,516	2,428	2,765	2,276	2,493
AETR 10% discount	32.2%	51.6%	58.7%	48.4%	53.0%
AETR 10% discount (including BEE)	*39.8%*	*57.4%*	*63.9%*	*56.4%*	*60.2%*

500MmBbl Field – $80/bbl

Project Fiscal Results (in US$ million real or %)	South Africa Current Regime	Scenario 1 (a): Cashflow Surcharge (20%)	Scenario 1 (b): Cashflow Surcharge (30%)	Scenario 2: Production Sharing	Scenario 3: State Participation
Pre-tax project IRR	31.0%	31.0%	31.0%	31.0%	31.0%
Post-tax IRR on total funds	26.8%	23.6%	22.3%	24.1%	23.4%
Post-tax IRR on equity	31.5%	28.0%	26.6%	28.5%	27.8%
IOC IRR	30.9%	27.5%	26.1%	27.6%	27.0%
BEE Entity IRR	39.5%	34.9%	33.1%	39.9%	38.1%
Pre-tax NCF undiscounted	27,824	27,824	27,824	27,824	27,824
Post-tax investor NCF undiscounted	18,911	14,706	12,941	15,051	14,482
o/w IOC	16,921	13,105	11,517	12,953	12,528
o/w BEE Entity	1,990	1,601	1,424	2,098	1,954
Government revenue undiscounted	8,032	12,237	14,001	11,892	12,460
AETR undiscounted	28.9%	44.0%	50.3%	42.7%	44.8%
AETR (including BEE)	*36.0%*	*49.7%*	*55.4%*	*50.3%*	*51.8%*
Pre-tax NCF 10% discount	6,811	6,811	6,811	6,811	6,811
Post-tax investor NCF 10% discount	4,719	3,495	3,018	3,627	3,426
o/w IOC	4,214	3,103	2,673	3,096	2,939
o/w BEE Entity	504	392	344	530	487
Government revenue 10% discount	2,136	3,360	3,837	3,228	3,429
AETR 10% discount	31.4%	49.3%	56.3%	47.4%	50.3%
AETR 10% discount (including BEE)	*38.8%*	*55.1%*	*61.4%*	*55.2%*	*57.5%*

Table A29 (cont'd). Simulation Results

1000MmBbl Field – WEO Prices

Project Fiscal Results (in US$ million real or %)	South Africa Current Regime	Scenario 1 (a): Cashflow Surcharge (20%)	Scenario 1 (b): Cashflow Surcharge (30%)	Scenario 2: Production Sharing	Scenario 3: State Participation
Pre-tax project IRR	33.6%	33.6%	33.6%	33.6%	33.6%
Post-tax IRR on total funds	29.1%	25.4%	24.1%	26.1%	25.3%
Post-tax IRR on equity	35.5%	31.5%	30.0%	32.3%	31.4%
IOC IRR	35.3%	31.4%	29.9%	31.7%	30.9%
BEE Entity IRR	37.9%	33.3%	31.5%	38.3%	36.4%
Pre-tax NCF undiscounted	44,367	44,367	44,367	44,367	44,367
Post-tax investor NCF undiscounted	30,092	23,341	20,549	24,054	23,051
o/w IOC	26,953	20,828	18,316	20,746	19,980
o/w BEE Entity	3,139	2,513	2,233	3,308	3,071
Government revenue undiscounted	12,804	19,555	22,347	18,842	19,845
AETR undiscounted	28.9%	44.1%	50.4%	42.5%	44.7%
AETR (including BEE)	35.9%	49.7%	55.4%	49.9%	51.7%
Pre-tax NCF 10% discount	11,003	11,003	11,003	11,003	11,003
Post-tax investor NCF 10% discount	7,670	5,702	4,952	5,966	5,617
o/w IOC	6,887	5,101	4,426	5,145	4,866
o/w BEE Entity	783	601	526	822	751
Government revenue 10% discount	3,395	5,363	6,113	5,099	5,448
AETR 10% discount	30.9%	48.7%	55.6%	46.3%	49.5%
AETR 10% discount (including BEE)	38.0%	54.2%	60.3%	53.8%	56.3%

1000MmBbl Field – $80/bbl

Project Fiscal Results (in US$ million real or %)	South Africa Current Regime	Scenario 1 (a): Cashflow Surcharge (20%)	Scenario 1 (b): Cashflow Surcharge (30%)	Scenario 2: Production Sharing	Scenario 3: State Participation
Pre-tax project IRR	38.9%	38.9%	38.9%	38.9%	38.9%
Post-tax IRR on total funds	34.0%	30.0%	28.4%	30.6%	29.8%
Post-tax IRR on equity	40.9%	36.6%	34.9%	37.4%	36.5%
IOC IRR	40.6%	36.4%	34.7%	36.7%	35.9%
BEE Entity IRR	45.3%	39.7%	37.6%	45.4%	43.5%
Pre-tax NCF undiscounted	58,573	58,573	58,573	58,573	58,573
Post-tax investor NCF undiscounted	39,842	31,124	27,363	31,863	30,818
o/w IOC	35,728	27,834	24,448	27,532	26,775
o/w BEE Entity	4,113	3,291	2,915	4,331	4,043
Government revenue undiscounted	17,260	25,977	29,739	25,238	26,284
AETR undiscounted	29.5%	44.4%	50.8%	43.1%	44.9%
AETR (including BEE)	36.5%	50.0%	55.7%	50.5%	51.8%
Pre-tax NCF 10% discount	15,211	15,211	15,211	15,211	15,211
Post-tax investor NCF 10% discount	10,608	8,029	6,995	8,319	7,940
o/w IOC	9,532	7,196	6,265	7,194	6,900
o/w BEE Entity	1,075	833	730	1,125	1,040
Government revenue 10% discount	4,666	7,244	8,278	6,954	7,333
AETR 10% discount	30.7%	47.6%	54.4%	45.7%	48.2%
AETR 10% discount (including BEE)	37.7%	53.1%	59.2%	53.1%	55.0%

30. **The proposed treatment of capital depreciation has the effect of altering the timing and size of corporate tax payments.** Figure A54 analyses the impact of varying depreciation

treatments under a hypothetical scenario where corporate income tax is the only charge on the 500MmBbl project**.** The current immediate expensing of expenditure with uplifts is compared with the proposed treatment as well as the profile of corporate income tax which would be seen if economic depreciation were approximated using a declining balance factor of 40 percent. The proposed treatment recognizes the potential need for accelerated depreciation in the petroleum sector on grounds of risk reduction, but generates a CIT profile which is closer to that achieved under economic depreciation compared with the generous immediate expensing allowance of the current regime.

Figure A54. Corporate Income Tax Profiles
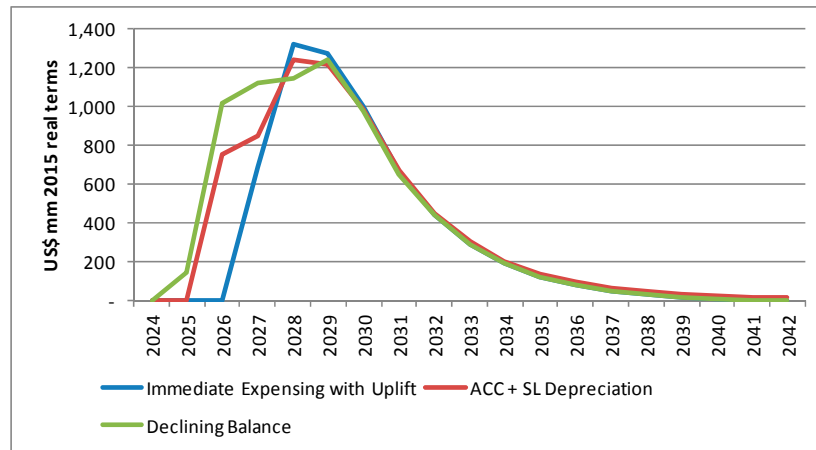
31.   **The AETR, METR and breakeven prices for the current South African regime are low by international standards.** The existing fiscal arrangements in South Africa and the alternative proposed reform scenarios were compared with fiscal regimes applicable in other petroleum producing countries from the region and elsewhere (Figure A55 and A56). [9] Some of the comparators included in the sample are regimes for other "frontier areas" (such as the Ghanaian regime before the 2008 Jubilee discovery); some are terms of established producers (Angola, Ghana post-Jubilee); and some have significant petroleum discoveries (Mozambique, Tanzania). The reform scenarios proposed place South Africa better in line with the sample of comparators. Under the field scenarios assumed, the Angola, Brazilian and Tanzanian regimes lead to marginal or unviable outcomes, placing high burdens on a marginal project relative to the rest of the comparators. Breakeven prices are significantly higher than the WEO forecast, suggesting that more favorable project economics have facilitated viable projects in these areas. While these comparators are useful for contextual purposes, the more appropriate comparators for South Africa would be those yielding average effective tax rates in the range of 60 to 80 percent. The fiscal terms of comparator countries are included in Table A39 of this supplement.

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[9] This analysis focuses on the design of the fiscal regime, comparing the South African regime with that of other petroleum-rich countries, using the 500MmBbl project example. Other factors which are equally relevant for the investment decision and outcome, such as geological prospectivity, proximity to markets, quality of infrastructure, business climate, property rights, and political stability, are assumed constant.

Figure A55. Average Effective Tax Rate
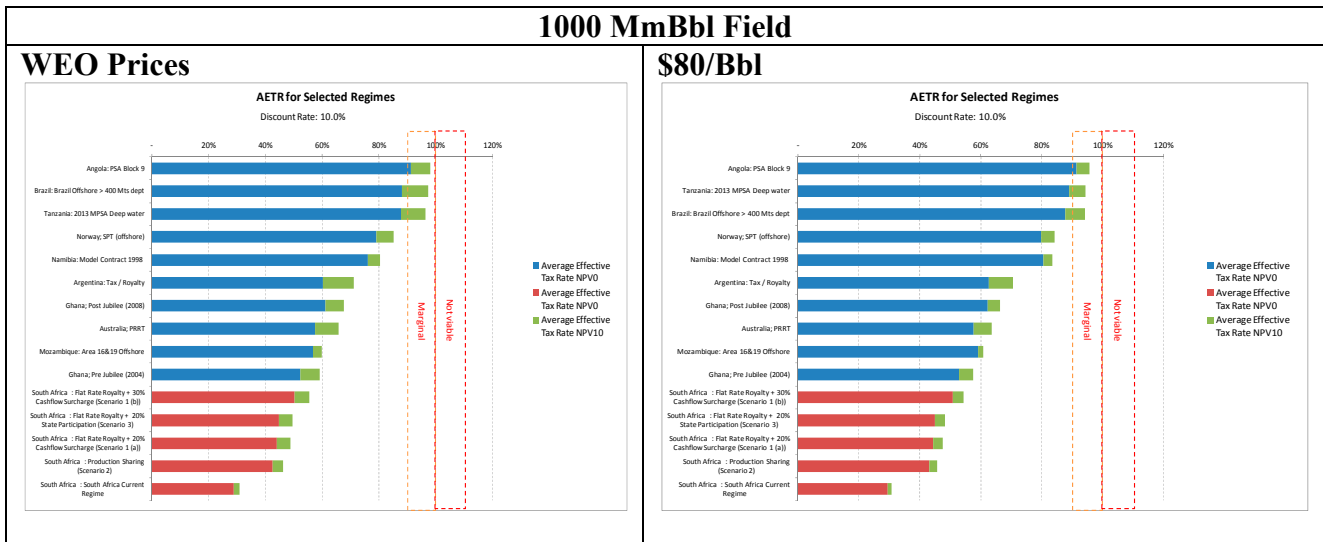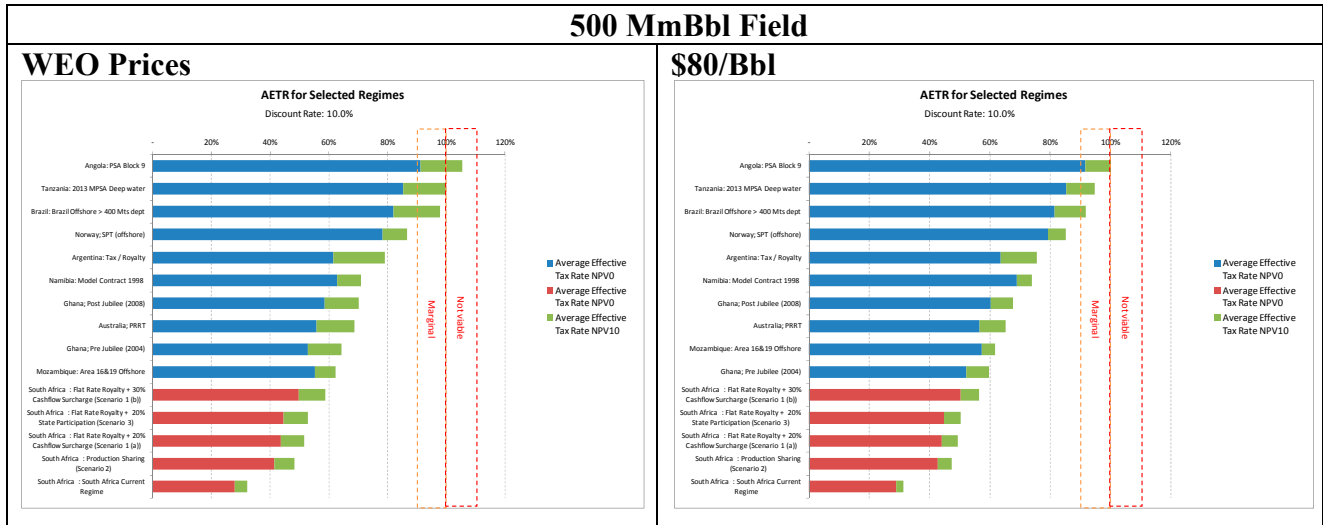
Figure A56. METR and Breakeven Oil Price
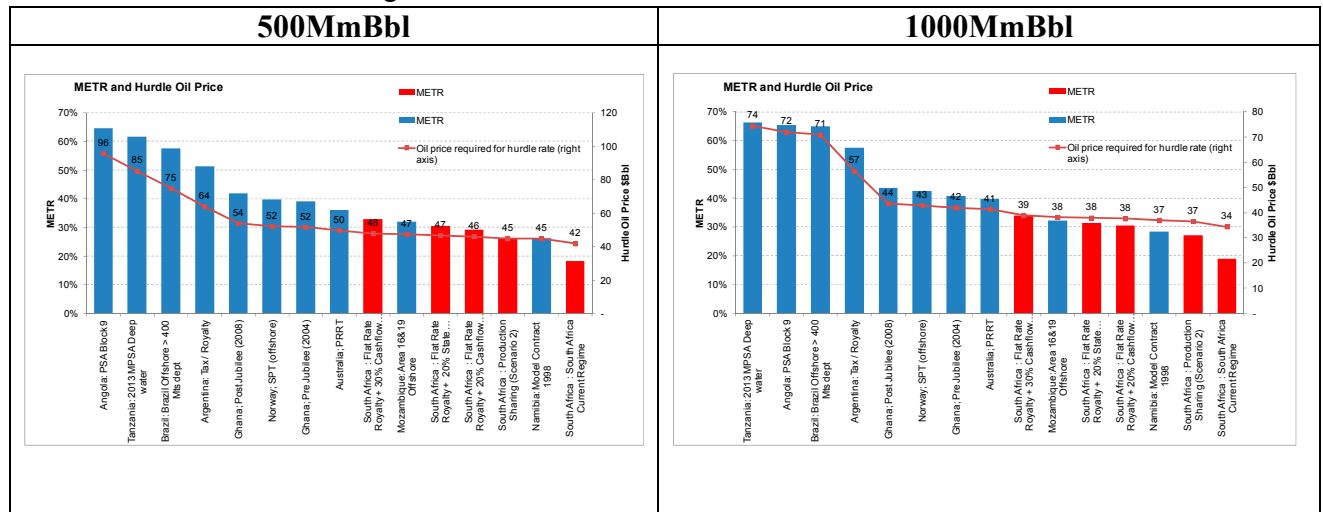
32.   **Recognizing the important impact of oil price volatility on investor perceptions of risk, particularly in a frontier exploration area, the mission undertook stochastic analysis to analyze the impact oil price uncertainty on government and investor outcomes.** Monte Carlo simulations were used to account for uncertainty surrounding future oil prices by assuming that oil prices follow a stochastic stationary first-order autoregressive (AR(1)) process. The results were then used to measure the dispersion of possible outcomes, and infer the implied risk to the investor and the government under the current regime and reform scenarios. Details of the estimation of the parameters of this process are described in Box A7.

33.   **Investor perception of risk is evaluated by analyzing the mean expected post-tax IRR to the investor and the coefficient of variation (CV) of investor returns**. Table A30 and Figure A57 shows the mean expected post-tax IRR and the CV of post-tax IRR for each regime tested for the 500MmBbl field. These results further demonstrate the generosity of the South African regime when compared internationally. Relative to the sample, the current and proposed regimes generate the highest mean post-tax IRRs, and do not appear to significantly increase the risk to the investor.

Box A7. Oil Price Simulation

This box explains the autoregressive model (i.e. the price today helps predict the price tomorrow) used to generate the stochastic oil price simulations used in this section.

Data used
The data used are the annual simple average of three oil spot prices: Dated Brent, West Texas Intermediate, and the Dubai Fateh published in the WEO between 1970 and 2014. These prices were adjusted annually for US inflation, using 2014 as the base year, and then normalized by taking natural logarithms.

Autoregressive (AR) model
It is assumed that real oil prices follow an autoregressive process given by:
$$y_t = \alpha + \beta y_{t-1} + e_t \qquad (1)$$

where y_t is the oil price in real terms defined above, α and β are parameters relating the current price to its past value, and e_t is a stochastic error term distributed normally with zero mean and variance σ^2. Parameters of the model are estimated by OLS, yielding the following estimated equation:

$$y_t = 0.65 + 0.84 y_{t-1} + e_t \text{ where } e_t - N(0, 0.28) \qquad (2)$$

Stochastic simulations
In stochastic simulations, future oil prices are generated recursively using this equation. A starting price of $80/barrel was used to reflect a realistic expected oil price for 2015, and with error terms randomly generated (using a normal distribution with parameters reported in (2)). Additionally, lower (US$20/bbl) and upper (US$200/bbl) bounds on oil prices are imposed to avoid extreme values. This exercise is repeated multiple times to construct a range of possible outcomes for future oil prices.

Source: Philip Daniel, Michael Keen, and Charles McPherson, 2010, *The Taxation of Petroleum and Minerals: Principles, Problems and Practice,* (Abingdon: Routledge).

34.	**Risk to government revenue can be considered through analysis of the coefficient of variation of the present value of government revenue.** Under this analysis, the variance of government revenue is also at the lower end of the international sample under both the current regime and the reform scenarios.

Table A30. Stochastic Analysis Results: Investor and Government Risk

Offshore_South Africa_500MM	Mean Investor post tax IRR	Coefficient of variation of IRR	Tax Induced Probability of below target return of 12.5%	Mean Government NPV	Coefficient of variation of Government Revenue
	%	%	%	$mm	%
Project before tax	33	33	0	n/a	-
After tax:					
Angola: PSA Block 9	14	43	36	11,463	71.4
Tanzania: 2013 MPSA Deep water	12	57	46	11,385	68.1
Brazil: Brazil Offshore > 400 Mts dept	14	53	41	11,288	64.5
Norway; SPT (offshore)	24	32	6	9,858	64.4
Namibia: Model Contract 1998	25	24	3	9,448	63.4
Argentina: Tax / Royalty	20	53	25	9,273	63.1
Ghana; Post Jubilee (2008)	24	39	10	8,105	61.8
Australia; PRRT	25	36	6	7,596	61.2
Mozambique: Area 16&19 Offshore	29	34	4	7,236	61.1
Ghana; Pre Jubilee (2004)	26	38	8	7,054	60.7
South Africa : Flat Rate Royalty + 30% Cashflow Surcharge (Scenario 1 (b))	28	35	8	6,455	60.1
South Africa : Flat Rate Royalty + 20% State Participation (Scenario 3)	30	35	7	5,736	59.7
South Africa : Flat Rate Royalty + 20% Cashflow Surcharge (Scenario 1 (a))	30	35	6	5,658	59.2
South Africa : Production Sharing (Scenario 2)	31	34	6	5,413	58.9
South Africa : South Africa Current Regime	34	33	4	3,615	52.9

Figure A57. Mean Investor IRR and Risk
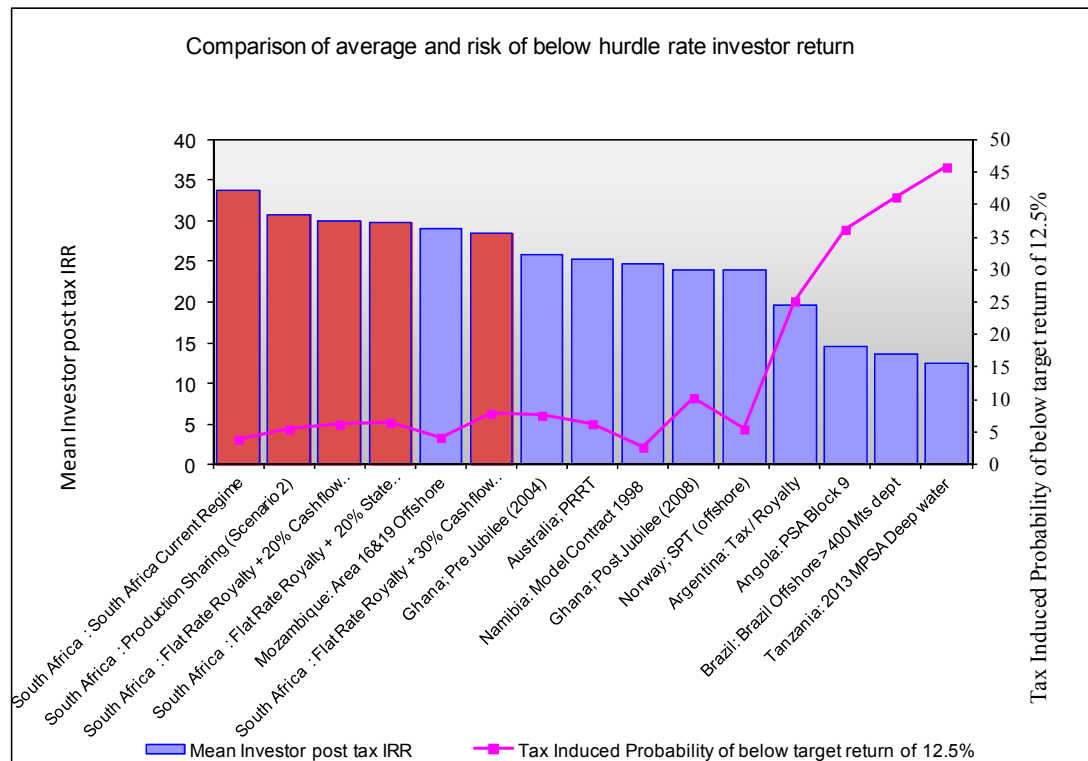
35.   **The progressivity of the current and proposed fiscal regimes was evaluated by estimating the government share of total benefits[10] over a range of project results.** Figures A58 shows how the government take varies over a range of project net present value. The variation in project NPV (reflective of project profitability) was generated by adjusting oil prices in constant real terms. At low profitability levels, all the scenarios place a lower burden on projects with lower pre-tax profitability. With the additional progressive fiscal elements, Scenarios 2 to 4 clearly yield a higher share of total benefits for the government as the profitability of the project increases.

Figure A58. Progressivity of Reform Scenarios
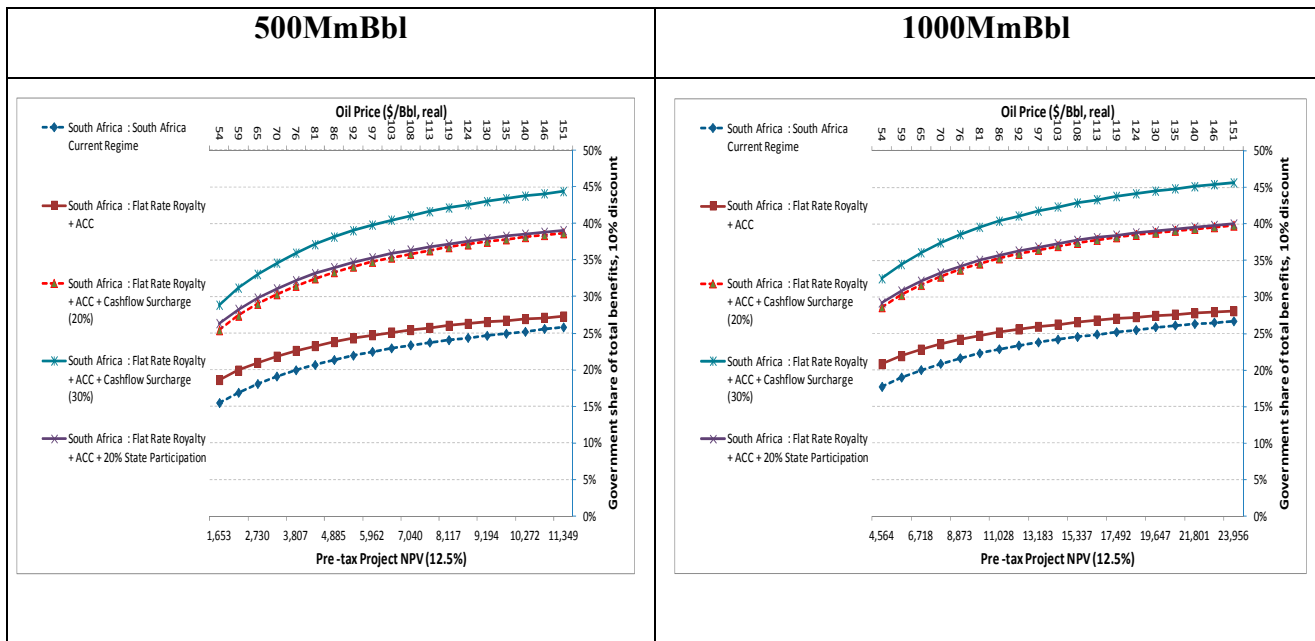
Onshore Shale Gas

36.   **Analysis was also applied to a stylized 1.9 Tcf onshore shale gas project.** The stylized scenario is purely hypothetical, constructed based on economic literature on shale gas extraction, industry knowledge of the South African context and comparable data from other countries. The example assumes that 742 wells are drilled over a 43 year project period with an expected ultimate recovery (EUR) of 2.7Bcf per well. Key project parameters are outlined in Figure A59, along with the production profile of each well and the project as a whole.

37.   **The current petroleum fiscal regime and proposed reform alternatives were applied to the shale gas project.** The analysis was constructed to generate a gas price which would allow such a project to generate a hurdle rate of return of 12.5 percent post-tax real IRR to the investor. Figure A60 shows the gas price that would be warranted in each scenario, as well as the

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[10] Total benefits mean revenue minus operating costs and replacement capital investment (the "cake" from which taxes are paid, debt is serviced, and equity providers are rewarded).

burden of the fiscal regime on the project at these price levels, as indicated by the METR. The underlying project economics assumed require significantly higher than current market gas prices for a viable project. However, it is clear from Figure A60 that the effects of the reform scenarios have the same relative impacts as in the deepwater offshore oil scenarios.

Figure A59. Shale Gas Project Parameters

Cumulative gas production (reserves)	Tcf	2,466
Average reserves per well	Bcf	2.70
Average reserves per well	MMm3	76.50
Total wells drilled	wells	742
Life of project years	years	43
Exploration costs	US$ million	106
Development costs, excl. development drilling	US$ million	584
Development drilling	US$ million	5,417
Drilling costs per well	US$ million	7
Operating costs over the project	US$ million	1,475
Operating costs per Mcf	US$/Mcf	1.0
Decommissioning costs	US$ million	98
Total Project Costs	US$ million	9,455
Average unit cost	US$/Mcf	3.83
Monetary amounts in 2015 real terms		

Figure A60. Breakeven Gas Price
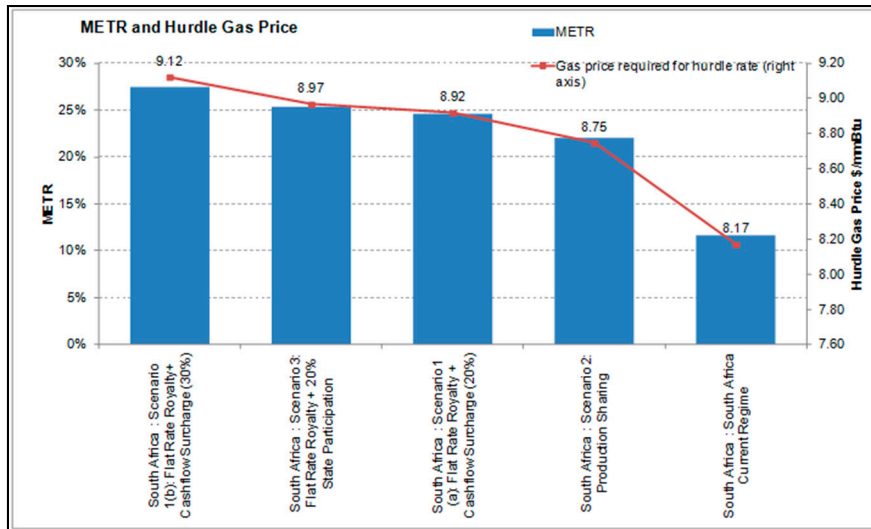
Figure A61. Profile of Government Revenues – Current Regime and Reform Scenarios
(Breakeven Prices)
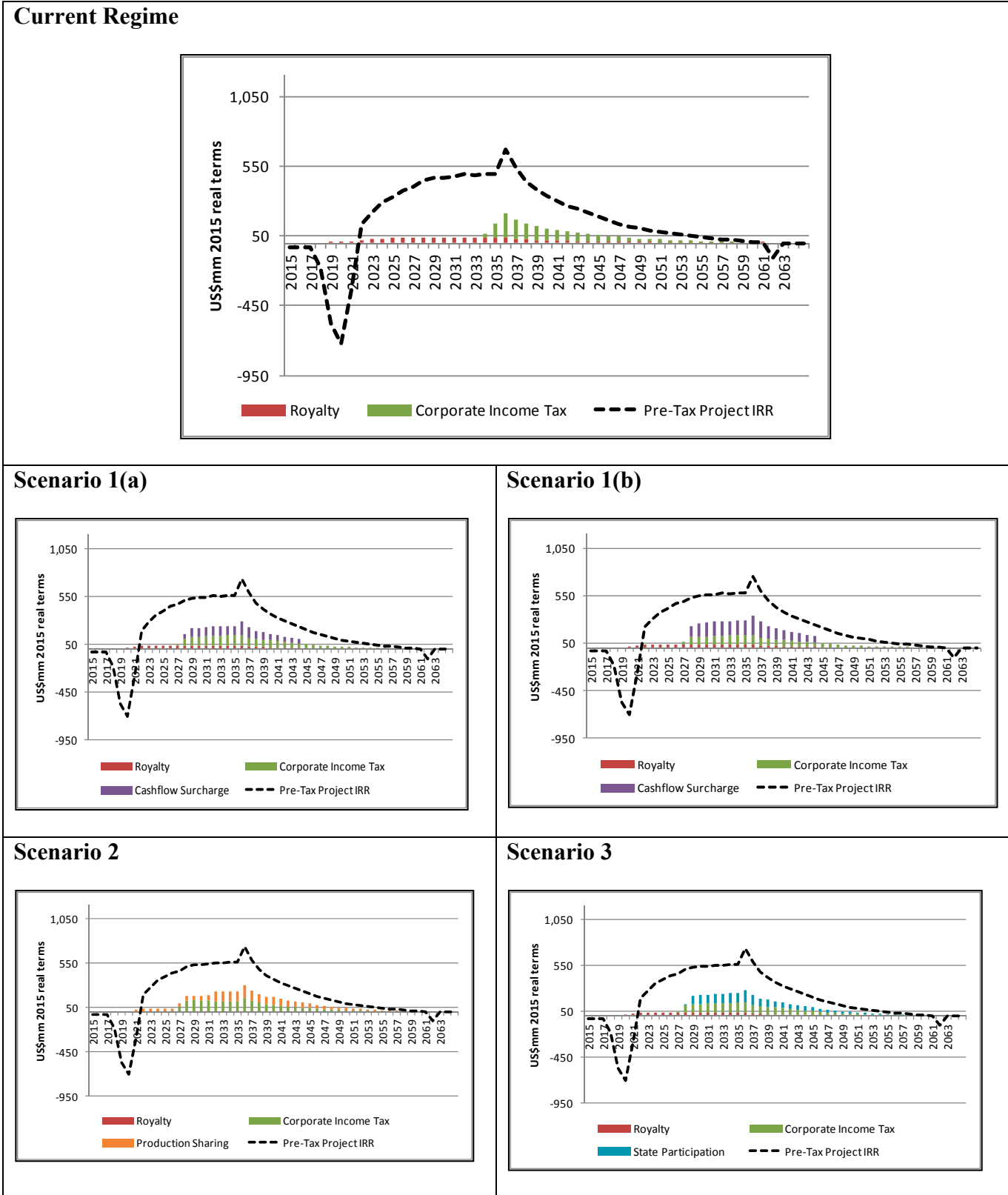
Figure A62. Profile of Government Revenues – Current Regime and Reform Scenarios (Breakeven Prices)
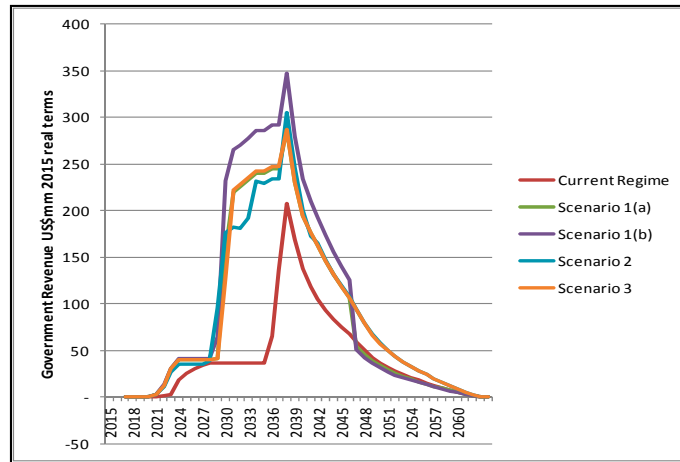
38.   **The mission undertook sensitivity analysis to assess the impact of varying project parameters on the breakeven gas price as well as the progressivity of proposed reforms.** Figure A64 shows that variations in well productivity and project costs have a significant impact on the minimum required gas price, and given an indication of the variation in project parameters which might be necessary to yield a breakeven price closer to current domestic gas price levels[11]. Figure A63 shows that as the profitability of the project increases (generated by varying the gas price), the regimes display the expected progressivity trends. Regimes containing additional progressive fiscal elements, yield a higher share of total benefits for the government as the profitability of the project increases.

Figure A63. Progressivity of Reform Scenarios

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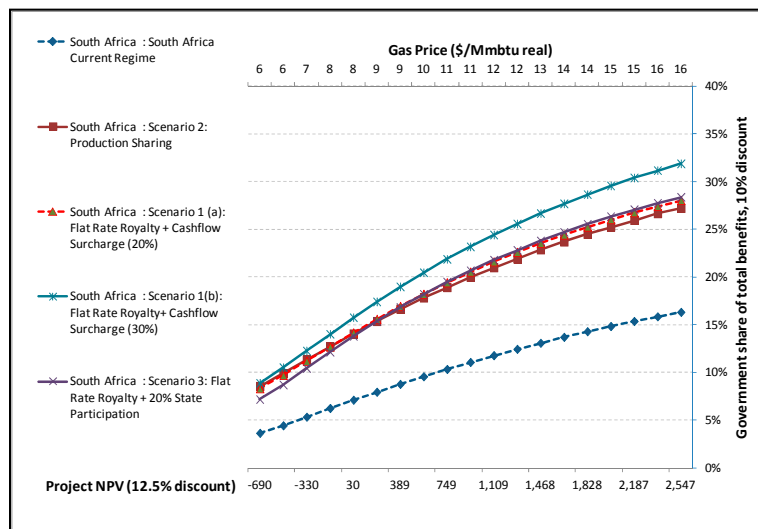
[11] Current LNG import prices to South Africa is at Low Oil index pricing (12% x Brent - $0.50)/mmbtu in current market conditions.

Figure A64. Sensitivity Analysis – Shale Gas

Cost Increase + 30%

Cost Decrease – 30%

Well Productivity Decrease (EUR = 2Bcf)

Well Productivity Increase (EUR = 4 Bcf)

Well Productivity Decrease (EUR = 2.25 Bcf), Cost Increase +10%

Well Productivity Increase (EUR = 3.5 Bcf), Cost Decrease -10%
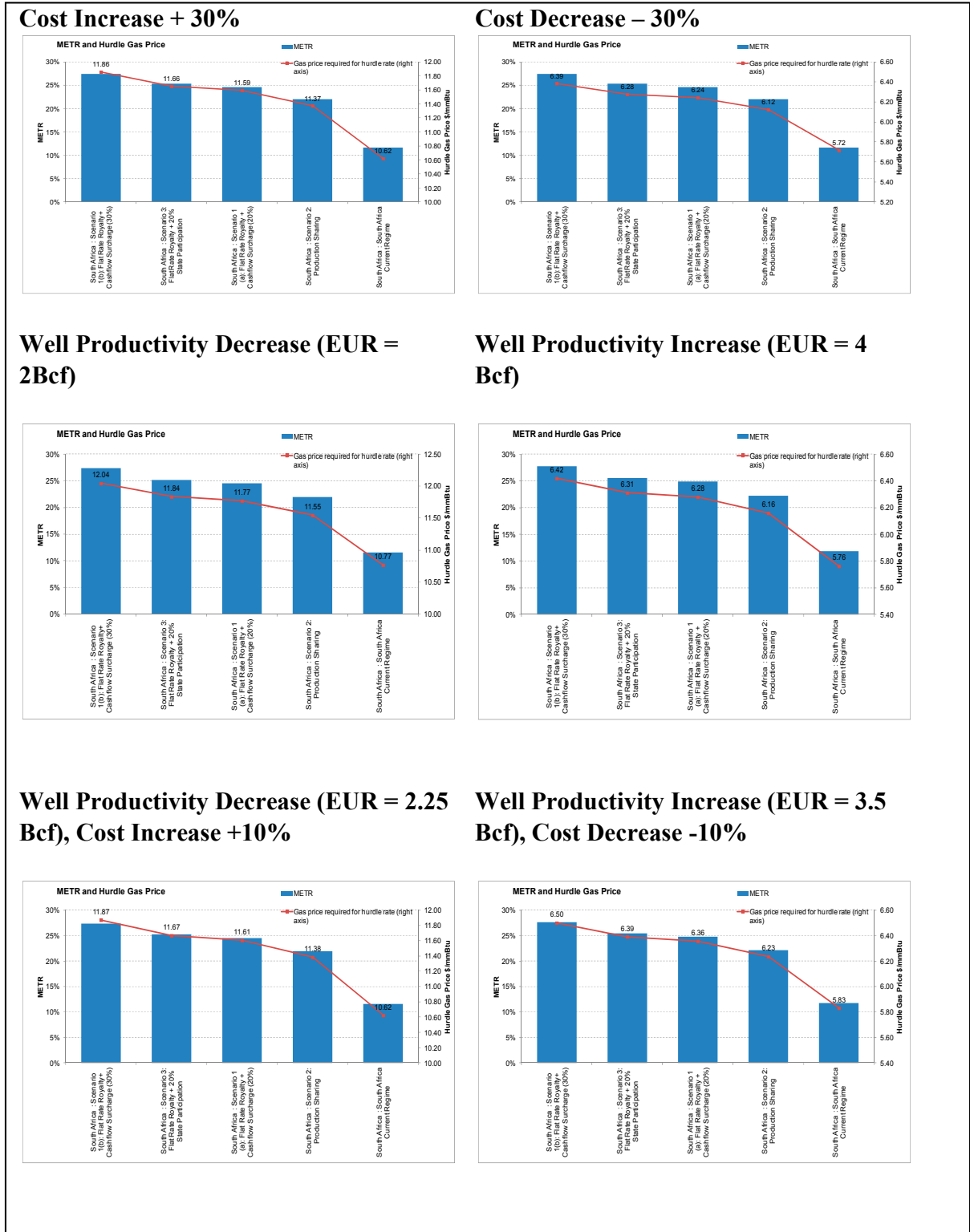
IV. POTENTIAL REVENUE FROM THE SOUTH AFRICAN MINING SECTOR

39.   **The mission constructed an approximation of the revenue potential of the South African mining sector.** The approximation is a medium term forecast for the key minerals in the sector: iron ore, coal, PGMs, gold, diamonds, and copper. These minerals have historically made up 80-85 percent of total mineral sales and exports (Figure A9). Smaller mineral groups are not modeled, and industrial minerals, aggregate and sand are excluded from the analysis. Further work could be done to add estimates for other significant minerals in the sector which may grow in relevance, for example, chrome. The analysis is also focused on forecasting two key revenue streams in the mining sector –the mineral and petroleum resource royalty (MPRR) and corporate income tax (CIT).

40.   **The analysis was undertaken in two stages, combining project level forecasting for eight major South African mines with an aggregated approximation for the rest of the sector.** The project-level analysis uses FAD methodology to model and approximate revenue potential from eight mines for which sufficient data was available. The sector-wide approximation uses available data on historical production, tax collection levels and costs to make a range of possible revenue projections.

A. Project Level Analysis

Methodology and Challenges

41.   **Data provided to the mission by the authorities showed that a large portion of tax revenue received from the mining sector has historically been paid by a small number of entities.** The data provided showed that 20 legal entities contributed 60-80 percent of royalty revenue and 40 to 70 percent of CIT revenue, varying by year over the period 2009-2014 (Table A31). The mission's research suggests that these entities each in turn operate over 100 mines across a range of mineral groups, most notably iron ore, coal, diamonds, gold and copper.

42.   **The FAD mine-level modeling methodology uses a discounted cash flow model to simulate future tax revenue from 8 large mines.** For each project modeled, historical figures of mineral production, sales, capital and operating costs are first used to compute tax liabilities, which are in turn verified against historical tax payment data. Projections of production, price and cost variables are then made for each mine in order to generate a forecast of future tax collections.

Table A31. Taxpayer Contributions in the Mining Sector [12]

Fiscal Year	2009/10	2010/11	2011/12	2012/13	2013/14
Amounts in Rand (million)					
Total Contributions					
MPRR	n.a.	3,555	5,612	5,015	6,420
MPRR % of government revenue	n.a.	0.46%	0.66%	0.55%	0.63%
MPRR % of GDP	n.a.	0.13%	0.19%	0.16%	0.19%
CIT	14,167	17,390	18,320	n.a	n.a.
CIT % of government revenue	2.45%	2.27%	2.17%	n.a	n.a.
CIT % of GDP	0.58%	0.63%	0.61%	n.a	n.a.
MPRR					
Top 20 taxpaying entities	n.a.	2,724	4,026	3,331	4,800
% of all MPRR	n.a.	77%	72%	66%	75%
% of government revenue	n.a.	0.36%	0.48%	0.37%	0.47%
% of GDP	n.a.	0.10%	0.14%	0.10%	0.14%
Top 10 taxpaying entities	n.a.	2,574	3,802	2,941	4,431
% of all MPRR	n.a.	72%	68%	59%	69%
% of government revenue	n.a.	0.34%	0.45%	0.32%	0.44%
% of GDP	n.a.	0.09%	0.13%	0.09%	0.13%
Top 4 entities	n.a.	1,960	2,652	2,464	3,777
% of all MPRR	n.a.	55%	47%	49%	59%
% of government revenue	n.a.	0.26%	0.31%	0.27%	0.37%
% of GDP	n.a.	0.07%	0.09%	0.08%	0.11%
CIT					
Top 20 taxpaying entities	9,998	14,122	8,388	n.a	n.a.
% of all mining sector CIT	71%	81%	46%	n.a	n.a.
% of government revenue	1.73%	1.85%	0.99%	n.a	n.a.
% of GDP	0.41%	0.51%	0.28%	n.a	n.a.
Top 10 taxpaying entities	9,286	13,443	7,486	n.a	n.a.
% of all mining sector CIT	66%	77%	41%	n.a	n.a.
% of government revenue	0.38%	0.49%	0.25%	n.a	n.a.
% of GDP	0.38%	0.49%	0.25%	n.a	n.a.
Top 4 entities	5,712	7,388	8,119	n.a	n.a.
% of all mining sector CIT	40%	42%	44%	n.a	n.a.
% of government revenue	0.23%	0.27%	0.27%	n.a	n.a.
% of GDP	0.23%	0.27%	0.27%	n.a	n.a.

MPRR = Mineral and Petroleum Resource Royalty
CIT = Corporate Income Tax

Source: Mining sector tax data provided by National Treasury and SARS. Total Government Revenue and GDP figures are from the World Economic Outlook database.

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[12] The 8 mines which were modeled are operated by the 4 entities reflected in Table 1 (see also paragraph 8). The significant decrease in CIT payments in 2011/12 is attributable to the major coal, platinum, diamond and copper mining entities in the group, only one of which forms part of the 4 modeled entities. Further information would be necessary to understand the causes behind such a drop in CIT levels. Large amounts of missing CIT data entries for tax year 2013 meant that this data was not analyzed.

43.   **In the case of South Africa, a number of challenges limited the use of this project-level methodology.** These challenges included: (1) Lack of available historical production, cost and price data at the mine level, (2) Limited data provided on historical tax collections at a mine level in order to verify the methodology; (3) Complex and varied ring-fencing treatments.

44.   **The majority of entities operated a large number of mines, and lack of data at the mine level was a significant challenge to the mine-level forecasting exercise**. Data challenges were the most significant in the coal, platinum and diamond sectors, where in many case taxpaying entities each operated over 10 mines. Without production and cost data for individual mines, these sectors could only be approximated using a more aggregate methodology (Section B).

45.   **The complex ring fencing treatment in South Africa posed significant challenges to this methodology.** Some limited data was provided to the mission detailing the computation of taxable income for each entity. Some entities were subject to mine-level ring-fencing, while others appeared to be taxed on a consolidated basis, and some even included non-mining income in the tax computations. Limited historical data on tax payments in previous years posed a challenge in understanding the exact ring fencing arrangements of each entity, as well as in verifying the modeling methodology through comparison of model output with taxpayer records.

46.   **The challenges of the South African context led to the narrowed focus of the analysis to 8 mines operated by 4 significant taxpaying entities for which sufficient data were available**. Three gold mines were modeled, along with a copper mine and two iron ore mining entities. The first of these iron ore mining entities operates three mines but is understood to be a ring fenced as a single entity for tax purposes and therefore was modeled as such. The second entity operates a number of mines, but only the largest of its operations (an iron ore mine) was modeled. These four entities contributed on average 50 percent of royalty revenue and 40 percent of CIT revenue, varying by year over the period 2009-2014 (Table A31).

47.   **Projections of production, price and cost data were made in order to generate a forecast**. This again proved to be a challenge, as companies often had not published mine-level production and cost projections. Where unavailable, an attempt was made to discern a forecast based on future plans described in investor presentations for the mine under analysis. If unavailable, historical trends as well as information on market outlooks were used to generate forecasting assumptions. The base case assumes that prices stay constant in real terms at the average 2015 price as of March 2015, as reported by IMF WEO.

48.   **For each of the production, cost and price variables, 'high case', 'base case' and 'low case' assumptions were made to provide a reasonable range for the forecast.** Price forecasts took into account the industry outlook for each sector with a more modest 2 percent

deviation around the base case in the gold sector as compared with the iron ore and copper sector, where there appears to be a wider range of expected prices. Capital expenditure is assumed constant for all three cases, while an assumption is made about the growth rate of unit operating costs in the sector. The low case sees growth in the real value of unit costs, while the high case sees the alleviation of constraints such as infrastructure, power, water and labor costs reflected in a decline in real unit operating costs. The scope for such a reduction in unit operating costs is assumed to be bigger in the bulk commodity sectors than for gold. Low and high case production scenarios simply assume a deviation of 5 percentage points from the base case, with the exception of the copper mine which is understood to be considering ceasing production in 2015. This outcome is reflected in the low case, while in the base and high case it assumed that the mine undertakes capital expansion to extend the life of the mine. These assumptions are detailed in Table A32.

Table A32. Project Level Assumptions

	Low Case	Base Case	High Case
Production (% deviation from base case)			
Gold	-5.0%	0.0%	5.0%
Iron Ore	-5.0%	0.0%	5.0%
Copper	-5.0%	0.0%	5.0%
Unit Costs (growth rate p.a.)			
Gold	1.50%	0.75%	0.00%
Iron Ore	2.0%	0.0%	-2.0%
Copper	2.0%	0.0%	-2.0%
Unit Price (% deviation from 2015 price)*			
Gold	-2.0%	0.0%	2.0%
Iron Ore	-20.0%	0.0%	20.0%
Copper	-5.0%	0.0%	5.0%

assumed constant in real terms from 2015 onwards.

Figure A65. Project-Level Forecast: Total Mining Revenue
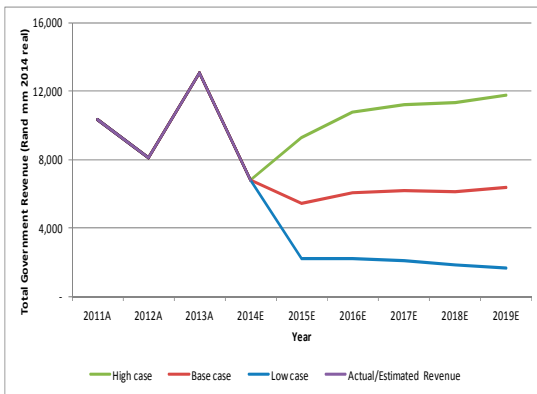
Figure A66. Project-Level Forecast: Mining Revenue by Revenue Stream (Base Case)
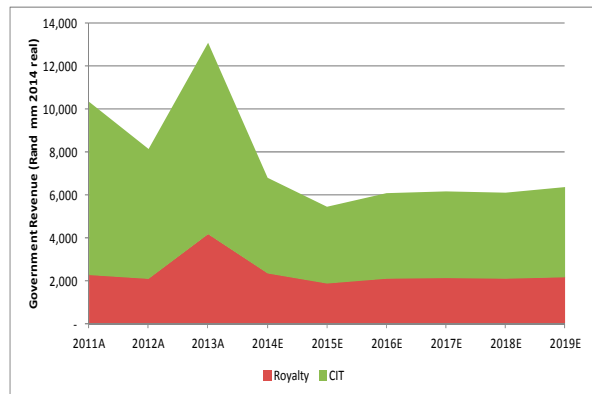
Table A33. Total Royalty and CIT by Scenario[13]

A=Actual; E=Estimate									
Rand millions 2014 Real Terms									
Low case									
Royalty	2011A	2012A	2013A	2014E	2015E	2016E	2017E	2018E	2019E
Gold					398.6	398.6	370.8	333.8	300.7
Iron Ore					431.1	443.1	436.5	402.9	368.6
Copper					-	-	-	-	-
CIT									
Gold					762.6	762.6	709.2	631.1	561.7
Iron Ore					597.0	584.6	563.4	488.1	411.3
Copper					-	-	-	-	-
Base case									
Royalty	2011A	2012A	2013A	2014E	2015E	2016E	2017E	2018E	2019E
Gold	290.0	282.0	414.0	382.2	475.0	484.3	459.4	422.3	388.4
Iron Ore	1,900.9	1,757.5	3,708.7	1,932.7	1,370.2	1,559.4	1,603.5	1,603.5	1,603.5
Copper	79.0	48.0	36.0	27.9	26.5	52.8	61.2	69.5	171.3
CIT									
Gold	766.0	428.0	770.0	750.4	999.2	1,035.2	996.7	922.9	855.0
Iron Ore	6,642.1	5,557.0	7,696.7	3,696.7	2,571.5	2,943.8	3,034.2	3,034.2	3,034.2
Copper	638.0	50.0	434.0	-	-	-	-	41.7	300.3
High case									
Royalty	2011A	2012A	2013A	2014E	2015E	2016E	2017E	2018E	2019E
Gold					556.1	575.6	553.7	516.3	481.4
Iron Ore					2,484.6	2,888.3	2,999.3	3,044.7	3,089.1
Copper					69.2	112.1	129.2	145.5	275.8
CIT									
Gold					1,252.1	1,327.2	1,304.7	1,235.0	1,167.7
Iron Ore					4,940.6	5,774.1	6,012.2	6,113.8	6,213.4
Copper					-	110.6	215.8	252.4	525.9
Total revenue	2011A	2012A	2013A	2014E	2015E	2016E	2017E	2018E	2019E
Actual									
Low case					2189.3	2188.9	2079.9	1856.0	1642.5
Base case	10315.9	8122.5	13059.4	6789.9	5442.3	6075.5	6155.1	6094.2	6352.8
High case					9302.5	10787.9	11214.8	11307.7	11753.3
Total forecasted revenue as a share of GDP	2011A	2012A	2013A	2014E	2015E	2016E	2017E	2018E	2019E
Low case					0.06%	0.05%	0.04%	0.04%	0.03%
Base case	0.35%	0.26%	0.39%	0.19%	0.14%	0.14%	0.13%	0.12%	0.12%
High case					0.24%	0.25%	0.24%	0.23%	0.22%
Total forecasted revenue as a share of total government revenue	2011A	2012A	2013A	2014E	2015E	2016E	2017E	2018E	2019E
Low case					0.19%	0.18%	0.16%	0.13%	0.10%
Base case	1.26%	0.91%	1.34%	0.65%	0.48%	0.49%	0.46%	0.42%	0.41%
High case					0.82%	0.87%	0.84%	0.78%	0.75%

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[13]Where actual tax payment data is presented, this is intended to reflect tax paid on mining income. Adjustments have been made for the gold mining operations where sufficient data was available to isolate taxes payable on mining income. Calendar year adjustments have been made where necessary, along with assumptions to extrapolate trends where mine level data points were missing, most notably in the case of the second iron ore mine.

B. Sector-wide Forecast

49. **To approximate the tax contribution and revenue raising potential of the rest of the sector, the mission undertook a simple calculation for the major mineral groups, using publicly available data.** It should be noted that this is a high-level approximation of tax revenue contributions from the sector, and it is not intended as an accurate forecasting instrument. Further refinements could be made to the methodology to include new mineral types or to add further detail to revenue and cost elements of the calculation.

50. **Data published by the Department of Mineral Resources[14] on historical production volumes and value by mineral group provided the most comprehensive available database.** Since the dataset was only available until 2012, indications of recent trends for production and value in the mining sector were used on a conservative basis to approximate figures up to 2014. The portion of the sector which is modeled on a mine-level as described in Section A was then 'netted out' of the sectoral calculation. Since the mine-level calculations undertaken for large iron ore and copper mines in Section A constituted the majority if not all of the mineral production for that group, these were not approximated again.

51. **Historical tax data were used to discern the likely reported costs for the sector.** This included MPRR collections as published in the Treasury[15], and estimates of historical CIT data provided to the mission by the authorities disaggregated by mineral group. Some discrepancies emerged which necessitated adjustments for the forecast. For example, in the coal sector, data suggest that the effective royalty rate since the inception of the MPRR has been approximately 0.3 percent, which is below the minimum rate and below the rate which would be inferred from the profitability levels suggested by CIT collections during the same period. Similarly for platinum, data suggest an effective royalty rate of 0.8 percent, lower than would be expected from CIT data. In these cases, to allow for a more realistic forecast, projections were made on the likely effective royalty rate over the medium term.

52. **Assumptions were then made in order to generate revenue projections.** Once again for each of the production, cost and price variables a range of 'high case', 'base case' and 'low case' assumptions were made to provide a reasonable range for the forecast (Table A34). As with the price and cost assumptions under the project-level analysis, these projections were based on an assessment of the key risks and upside potentials facing each mineral group. For example, in the gold sector, it is evident that production from South African mines is on a downward trend and therefore scenarios consider a varying rate of decline of overall gold production. For the remaining mineral groups, discussions with both industry groups and the authorities suggested that the risks to production and costs could be categorized into three main areas: rising input costs (labor, power and water), regulatory

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[14] Department of Mineral Economics Statistical Tables, available at http://www.dmr.gov.za/publications.html
[15] SA Treasury Tax Statistics 2014, available at http://www.treasury.gov.za/publications/tax%20statistics/

the mineral type, a combination of production and cost growth factors were used to generate the forecast.

53.   **Price forecasts took into account the industry outlook for each sector.** For example, in the platinum sector, the mission learned from discussions with industry that the expected price trends were significantly higher over the medium term, and therefore the range of price projections used were varying degrees of price increases from the estimated 2014 unit mineral values. Coal projections used more conservative price decline scenario for the low case scenario.

Table A34. Sector-level Forecast Assumption

	Low Case	Base Case	High Case
Production (growth rate p.a.)			
PGMs	2%	4%	6%
Gold	-6%	-4%	-2%
Coal	1%	3%	6%
Diamonds	1%	0%	-1%
Unit Costs (growth rate p.a.)			
PGMs	1%	0%	-2%
Gold	1.50%	0.75%	0%
Coal	2%	0%	-2%
Diamonds	1%	0%	-1%
Unit Price (% deviation from 2014 price)*			
PGMs	1%	3%	5%
Gold	-2%	0%	2%
Coal	-5%	0%	5%
Diamonds	0%	1%	4%
Effective Royalty Rate			
PGMs	0.8%	0.8-1%	0.8-1.2%
Coal	0.4%	0.4-0.7%	0.4-1%

assumed constant in real terms from 2015 onwards

Figure A67. Sector-level Forecast Results: Government Revenue
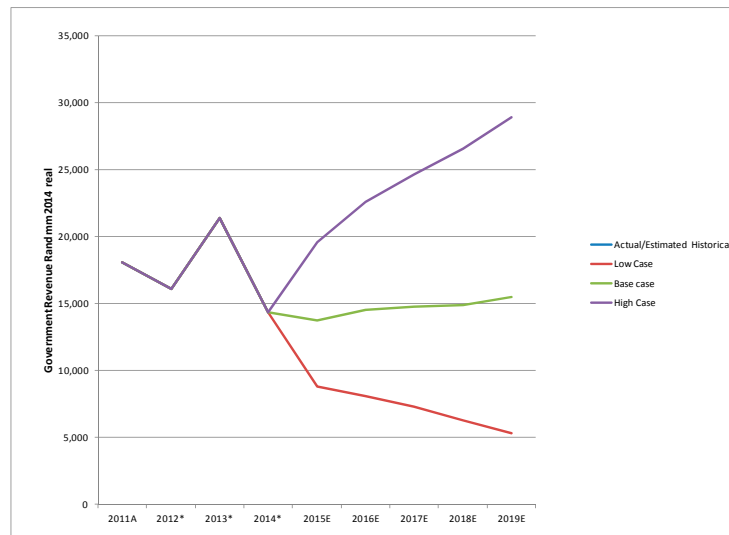
54.   **Projections can be put into the context of the proposed recommendations.**
To provide an example, one can first assume that the growth in production projected
under the base case for the platinum sector between 2015 and 2019 is entirely
attributable to new greenfield mines similar to those modeled in the Analysis
Supplement. Such an increase in production this would amount to approximately 4 of
the projects seen in Box A2 in the initial years of the project life as production ramps up
to peak levels. Applying the proposed reform scenario 1(b) to the stylized platinum
project resulted in an increase approximately R1, 605 m (2015 real terms) over the 19
year project production period[16]. Under the assumption that all production growth results
from greenfield projects, a switch to the proposed reform scenario for such projects
would result in an increase of R6.4bn over 19 years, or approximately R340 m per year.
A similar exercise attributing the base case growth in coal production to new mines
would amount to between 4 and 5 new coal mines akin to the project in Box A3, each
ramping up production between 2015 and 2019. A switch to reform scenario 1(b) would
imply an increase in revenue of approximately R4.5bn over the 21 year production
period, or R220m per year.

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[16] This assumes a constant Rand/US$ exchange rate over the project life of 11.5Rand/US$.

Table A35. Sector-level Forecast Results

2014 real terms (Rand mm)									
Low Case									
Royalty					**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Gold					810.7	736.9	642.0	544.1	479.5
Iron Ore					431.1	443.1	436.5	402.9	368.6
Coal					401.2	405.2	409.2	413.3	417.5
PGM					512.3	522.6	533.0	543.7	554.6
Diamonds					224.3	216.1	208.0	200.0	192.1
Copper					-	-	-	-	-
CIT					**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Gold					762.6	762.6	709.2	631.1	561.7
Iron Ore					597.0	584.6	563.4	488.1	411.3
Coal					2,296.0	1,799.1	1,281.5	742.5	181.4
PGM					2,228.3	2,113.4	1,991.4	1,861.9	1,724.8
Diamonds					552.5	527.9	503.5	479.3	455.4
Copper					-	-	-	-	-
Base Case									
Royalty	**2011A**	**2012A**	**2013A**	**2014***	**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Gold	741.6	1,050.8	910.3	959.8	1,003.2	966.0	897.3	818.9	746.2
Iron Ore	1,900.9	1,757.5	3,708.7	1,932.7	1,370.2	1,559.4	1,603.5	1,603.5	1,603.5
Coal	287.4	401.1	401.5	397.2	511.4	526.7	651.1	670.6	805.8
PGM	759.6	558.6	540.6	497.3	599.3	692.5	720.3	749.1	779.0
Diamonds	245.0	203.5	124.1	232.6	234.9	237.2	239.6	242.0	244.4
Copper	79.0	48.0	36.0	27.9	26.5	52.8	61.2	69.5	171.3
CIT	**2011A**	**2012***	**2013***	**2014***	**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Gold	709.3	694.4	1,708.3	1,107.9	1,239.7	1,166.7	1,027.0	922.9	855.0
Iron Ore	6,642.1	5,557.0	7,696.7	3,696.7	2,571.5	2,943.8	3,034.2	3,034.2	3,034.2
Coal	2,767.8	2,740.8	2,778.8	2,772.9	2,827.5	2,912.3	2,969.3	3,058.4	3,117.9
PGM	2,571.4	2,422.2	2,477.6	2,163.8	2,770.4	2,861.8	2,976.3	3,095.3	3,219.2
Diamonds	718.7	624.6	568.7	577.4	583.2	589.0	594.9	600.9	606.9
Copper	638.0	50.0	434.0	-	-	-	-	41.7	300.3
High Case									
Royalty					**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Gold					1,204.9	1,211.5	1,176.9	1,127.0	1,079.9
Iron Ore					2,484.6	2,888.3	2,999.3	3,044.7	3,089.1
Coal					526.3	669.4	827.9	1,002.9	1,196.0
PGM					622.7	733.4	855.2	988.9	1,048.2
Diamonds					245.7	259.4	273.6	288.4	303.7
Copper					69.2	112.1	129.2	145.5	275.8
CIT					**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Gold					1,888.9	1,951.2	1,916.2	1,834.3	1,755.1
Iron Ore					4,940.6	5,774.1	6,012.2	6,113.8	6,213.4
Coal					3,438.2	4,162.0	4,948.7	5,802.7	6,728.9
PGM					3,509.5	4,032.2	4,597.9	5,209.6	5,895.0
Diamonds					614.6	653.4	693.7	735.6	779.2
Copper					-	110.6	215.8	252.4	525.9
	2011A	**2012***	**2013***	**2014***	**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Low Case					8,816	8,111	7,278	6,307	5,347
Base case	18,061	16,109	21,385	14,366	13,738	14,509	14,775	14,907	15,484
High Case					19,545	22,558	24,646	26,546	28,890
% of GDP	**2011A**	**2012***	**2013***	**2014***	**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Low Case					0.22%	0.19%	0.16%	0.13%	0.10%
Base case	2.21%	0.51%	0.63%	0.39%	0.35%	0.34%	0.32%	0.30%	0.28%
High Case					0.49%	0.53%	0.53%	0.53%	0.53%
% of government revenue	**2011A**	**2012***	**2013***	**2014***	**2015E**	**2016E**	**2017E**	**2018E**	**2019E**
Low Case					0.78%	0.66%	0.54%	0.44%	0.34%
Base case	0.62%	1.81%	2.20%	1.37%	1.21%	1.17%	1.10%	1.03%	0.99%
High Case					1.72%	1.83%	1.84%	1.83%	1.84%

A= Actual; *=Model output, actual figures not available.

Actual royalty figures from 2014 Treasury Tax Statistics, CIT figures from Treasury data, with calendar year adjustment

Figure A68. Sector-Level Forecast Results

Table A36. International Comparators – Platinum Fiscal Regimes

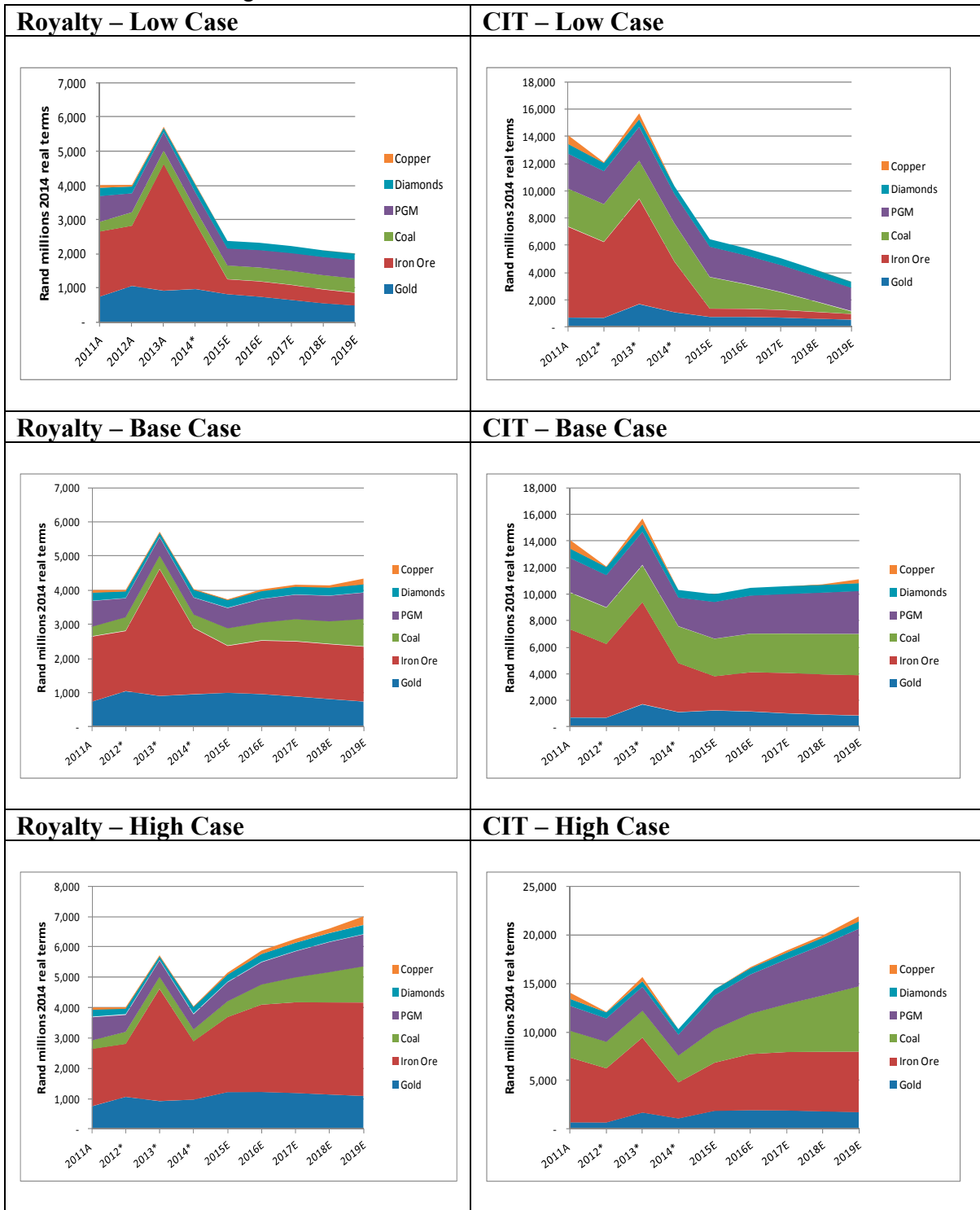| Country	Royalty rate	Royalty base	Corporate Income Tax	Loss carry forward	Depreciation rule	Export Tax	Additional Profit Tax	Dividend Withholding Tax	Interest Withholding Tax
Canada - Ontario	5-10% mining tax based on location	Net profits	15% federal + 10% provincial; 5% provincial tax credit	Indefinite for capital loss or 20 years for noncapital losses	100% exploration cost (will be fully treated like development by 2018); 30% DB development cost [federal]	None	None	25%; 0% for resident companies	25%; 0% for resident companies
Russia	6% [gold] 6.5% [platinum, copper] 8% [nickel]	Volume x sales price less freight and refining cost	20%; reduction possible	10 years	Ten groups of assets with different depreciation rates; SL or DB; 1-2 years for extraction equipment	6.5% [diamonds] 6.5% [coke/semi-coke from coal, lignite or peat]	None	15%; reduced to 10% in treaties	20%; reduced to 5-10% in treaties
United States - Montana	1.81% [gold, nickel, copper and platinum]	Market value less transportation and refining costs	15%-35% [federal]	20 years	70% in first year on exploration and development cost, balance on SL over 5 years; other methods possible	None		0%-30%; reduced to 10% in treaties	0%-30%; reduced to 15% in treaties
Zimbabwe	7% [gold] 10% [platinum] 2% [nickel, copper]	Gross Value	25% 15% for Special Mining License	Indefinite	100% on all capital expenditure	20% on export value of unprocessed chrome	27-31% based on real IRR	15%	0%

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Table A37. International Comparators – Coal Fiscal Regimes

Country	Royalty rate	Royalty base	Corporate Income Tax	Loss carry forward	Depreciation rule	Export Tax	Additional Profit Tax	Dividend Withholding Tax	Interest Withholding Tax
Australia - New South Wales	6.2%-8.2% [coal]	Ex-mine	30%	Indefinite	100% exploration; 15 and 10 years prime cost method for capex and replacement (effective lives determined by govt)	None [assumed]	None	30% [unfranked dividends]; 0% [assuming all franked credits are used]	10%
Australia - Queensland	7%-15% [coal]	Gross value less marine cost, transportation costs are deducted for coal	30%	Indefinite	100% exploration; 15 and 10 years prime cost method for capex and replacement (effective lives determined by govt)	None [assumed]	None	30% [unfranked dividends]; 0% [assuming all franked credits are used]	10%
Australia - Victoria	AUS$0.0588/GJ [brown coal]	Energy contant for coal, gross value for ad valorem	30%	Indefinite	100% exploration; 15 and 10 years prime cost method for capex and replacement (effective lives determined by govt)	None [assumed]	None	30% [unfranked dividends]; 0% [assuming all franked credits are used]	10%
China	CNY 0.3-20/ton [coal]	Volume	25.0%	5 years	100% on exploration; 10% SL on deveopment; 25% SL on replacement [assumed]	None [assumed]	None	10%	10%; reduced to 5% in treaties
Colombia	5% [coal when production <3 mil tons/year] 10% [coal when production >3 mil tons/year]	Gross values of production	25%	Indefinite	20% exploration cost; 20% machinery, equipment and other fixed assets	None [assumed]	9% additional tax on equity; 8% from 2016	33% [non-residents]; reduced to 15% in treaties	14%-33% depending on nature and terms of loan; reduced to 7-15% in treaties
India	14% [coal]	LME/sale prices * volume	30%+ 3%-13% surcharge if above thresholds	8 years	20% for other capex; 15% DB for plant and machinery	10% [iron and chromium ores and concentrates, coal]	None	16.22%; reduced to 10% in treaties	21.01%; reduced to 5% in treaties
Indonesia	10%-13% [coal]	Net sales	25%	5 years	100% exploration; 20% intangibles; 6.25% tangibles; 25% [assumed] replacement	Exempt	None	20% [non-residents]; reduced to 10% in treaties	20% [non-residents]; reduced to 10% in treaties
Kazakhstan	0% [coal]	Gross revenues	20.0%	10 years	Rates chosen by companies with max. of 25% per year	None in general; 2.1% for coal	0%-60% excess profit tax, based on ratio of income to deductions	15%; reduced to 10% in treaties	15%; reduced to 10% in treaties
Russia	RUB 57/ton [coke] 4% [peat, lignite, anthracite and shale oil, apatite-nipheline, apatite ores]	Volume x sales price less freight and refining cost	20%; reduction possible	10 years	Ten groups of assets with different depreciation rates; SL or DB; 1-2 years for extraction equipment	6.5% [diamonds] 6.5% [coke/semi-coke from coal, lignite or peat]	None	15%; reduced to 10% in treaties	15%; reduced to 5-10% in treaties
United States - Wyoming	7% [Surface Coal] 3.75% [Underground Coal]	Value at the minegate	15%-35% [federal]	20 years	70% in first year on exploration and development cost, balance on SL over 5 years; other methods possible	None		0%-30%; reduced to 10% in treaties	0%-30%; reduced to 15% in treaties

Table A38. International Comparators – Base Metals Fiscal Regimes

Country	Royalty rate	Royalty base	Corporate Income Tax	Loss carry forward	Depreciation rule	Export Tax	Additional Profit Tax	Dividend Withholding Tax	Interest Withholding Tax	Equity
Australia - Western Australia	5-7.5% [iron ore] 5% [cobalt concentrate]; 2.5% [cobalt in metallic form and nickel by product] 5% [copper concentrate]; 2.5% [copper in metallic form]	Gross invoice value of the mineral less any allowable deductions for the mineral such as transport and packaging	30%	Indefinite	100% exploration; 15 and 10 years prime cost method for capex and replacement (effective lives determined by govt)	None [assumed]	None	30% [unfranked dividends]; 0% [assuming all franked credits are used]	10%	…
Australia - South Australia	3.5% [refined mineral products and industrial minerals] All reduced to 2% for first 5 years of production	Market value less transportation, insurance, packaging, storage.	30%	Indefinite	100% exploration; 15 and 10 years prime cost method for capex and replacement (effective lives determined by govt)	None [assumed]	None	30% [unfranked dividends]; 0% [assuming all franked credits are used]	10%	…
Brazil	2% [iron ore, copper, other mineral substances]	Net revenue, i.e., the mineral sales revenue less taxes levied on revenue, insurance and freight costs.	34%	Indefinite w/ 30% limit on taxable income to offset loss carried forward	100% for exploration and development costs; SL 10 years for equipment and machinery and buildings	Exempt	3.65% social contribution (cumulative regime)	0%	15%; reduced to 10% in treaties	…
Canada - Ontario	5-10% mining tax based on location	Net profits	15% federal + 10% provincial; 5% provincial tax credit	Indefinite for capital loss or 20 years for noncapital losses	100% exploration cost (will be fully treated like development by 2018); 30% DB development cost [federal]	None	None	25%; 0% for resident companies	25%; 0% for resident companies	…
Canada - Quebec	1%-4% min mining tax + 16%-28% profit-based mining tax	Gross value; net profits	15% federal + 11.9% provincial; 25% exploration cost tax credit	Indefinite for capital loss or 20 years for noncapital losses	100% exploration cost (will be fully treated like development by 2018); 30% DB development cost [federal]	None	None	25%; 0% for resident companies	25%; 0% for resident companies	…
Canada - Manitoba	10-17% based on profit	Net profits	15% federal + 12% provincial	Indefinite for capital loss or 20 years for noncapital losses	100% exploration cost (will be fully treated like development by 2018); 30% DB development cost [federal]	None	None	25%; 0% for resident companies	25%; 0% for resident companies	…
Canada - Newfoundland	20%	Net profit	15% federal + 14% provincial	Indefinite for capital loss or 20 years for noncapital losses	100% exploration cost (will be fully treated like development by 2018); 30% DB development cost [federal]	None	None	25%; 0% for resident companies	25%; 0% for resident companies	…
Chile	0%-14% based on production level and operating margin	CIT base with some adjustments	23%; 42% if the company opted for the tax invariability regime	Indefinite	100% exploration; 100% intagible development; 11.11% tangible development and replacement	None	None	35%; reduced to 7% in treaties; CIT is creditable depending on the regime	4%	…
China	CNY 0.4-30/ton [non-ferrous metal ores] CNY 2-30/ton [ferrous metal ores]	Volume	25.0%	5 years	100% on exploration; 10% SL on deveopment; 25% SL on replacement [assumed]	None [assumed]	None	10%	10%; reduced to 7% in treaties	…
Guinea	3% [iron ore] 3% [copper, tin, nickel, zinc] Note: export taxes applicable	Vary by types	30%	3 years	33.3% on startup cost; 20% on machiery and equipment; DB available		2%	None	10%	10%	Max. 15% initial free equity; supplemental equity of up to 35%
Kazakhstan	5.7% [copper] 8% [lead] 7% [zinc] 2.8% [iron ore]	Gross revenues	20.0%	10 years	Rates chosen by companies with max. of 25% per year	None in general; 2.1% for coal	0%-60% excess profit tax, based on ratio of income to deductions	15%; reduced to 10% in treaties	15%; reduced to 10% in treaties	…
Russia	8% [conditioned non-ferrous metal ores]	Volume x sales price less freight and refining cost	20%; reduction possible	10 years	Ten groups of assets with different depreciation rates; SL or DB; 1-2 years for extraction equipment	6.5% [diamonds] 6.5% [coke/semi-coke from coal, lignite or peat]	None	15%; reduced to 10% in treaties	20%; reduced to 5-10% in treaties	…
United States - Arizona	2.50%	50% of the difference between the gross value of production and the production costs	15%-35% [federal]; 6.468% in 2014 to be reduced by 0.5 percentage points a year until 2017[Arizona]	20 years	70% in first year on exploration and development cost, balance on SL over 5 years; other methods possible	None	None	0%-30%; reduced to 10% in treaties	0%-30%; reduced to 15% in treaties	…
United States - Nevada	Sliding scale based on profitability (ratio of net proceeds to gross yield); max 5%	Net Proceeds	15%-35% [federal]; 0% [Nevada]	20 years	70% in first year on exploration and development cost, balance on SL over 5 years; other methods possible	None	None	0%-30%; reduced to 10% in treaties	0%-30%; reduced to 15% in treaties	…

Table A39. International Comparators – Petroleum Fiscal Regimes

Country	Regime	Royalty rate	Cost recovery limit	State share	Corporate income tax	Depreciation rule	Loss carry forward	Supplementary profit tax	Dividend withholding tax	Interest withholding tax	State participation
Angola	PSC	0% for PSC, 10% for marginal/hard to access fields, 20% for service contracts & partnerships	50%	30%-90%; IRR (offshore), Cumulative production (onshore)	50% for PSA, 65.75% for service contracts & partnerships	25% development, 16.6% for all others	Indefinite	NA	10% (2007 bid round); Oil and gas companies currently exempt	10% (2007 Bid Round)	15%-65% carried to discovery
Argentina	Tax/ Royalty	12%; may be reduced for marginal fields	NA	NA	35%	Wells, machinery, equipment, productive assets & intangible assets are basesd on units of production; Others are based on straight-line	5 years		10%	15%; reduced to 10% in treaties	Varies
Australia	PRRT	NA	NA	NA	30%	100% exploration, 11 years development at SL or DB, 5 years replacement capital [government determines the effective life of assets]	Indefinite	40% PRRT after uplift of LTBR + 15% for exploration and LTBR + 5% for general expenditure	0% (franked dividends); 30%;	30% (nonresidents only)	NA
Brazil	PSC/Concession Contract	10% for CC (may be reduced for marginal fields); negotiable for PSC			34%	10% machinery and equipment; 20%vehicles; SL	Indefinite	10%-40% special participation fee based volume and/or profitability	0%	15%; reduced to 10% with treaties	Max 30% for concession and min 30% for PSC
Ghana (pre-Jubilee)	Tax/Royalty	Oil: 5% Gas: 5%	NA	NA	35%	20%	Indefinite	7.5%-25% Additional Oil Entitlement	8%	10%	2.5% from development + 10% at production
Ghana (post-Jubilee 2008)	Tax/Royalty	Oil: 10% Gas: 5%	NA	NA	35%	20%	Indefinite	12%-28% Additional Oil Entitlement	0%	10%	10% from development + 10% at production
Mozambique	PSC	Oil: 3%-10% Gas: 2%-6%	65%-85% depending on depth	5%-50%; R-Factor	32%	100% exploration cost; 25% other capital cost	5 years	NA	10%	0%	10% carried to discovery
Namibia	Tax/Royalty	5%	NA	NA	35%	100% exploration; 3 years development; SL	Indefinite	IRR-based Additional Petroleum Tax (APT); 0% if IRR<15%, 25% if IRR at 15%, 35% if IRR at 20%, 50% if IRR at 25%; subsequent APT rates negotiable	0%	0%	NA
Norway	CIT	NA	NA	NA	27%	6 years SL (offshore); 30% DB machinary first year, 20% DB after (onshore)	Indefinite with uplift of 1.5% each year	51% SPT, with 5.5% uplift for 4 years	0%	0%	20% SDFI
Peru	Tax/Royalty	0%-40%; R-Factor/DROP/Price	NA	NA	30%	20% exploration and development; SL	4 years or indefinite if limited to 50% per year	NA	4.1%	4.99%	NA
Tanzania (MPSA 2013)	PSC	12.5% onshore, 7.5% offshore; discharged by the state oil company	50%	Oil 65%-90% Gas: 60%-85%	30%	25% SL on capital cost	Indefinite	25% FANCP+35% SANCP; Real ROR	10%	10%	25% min. carried to development