
**Revival of Mining Sector in India: Analysing Legislations and Royalty
Regime**

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Abstract

Impact of fiscal policy at the firm level is a rare field of research. A major lacuna to date is the paucity of studies on the impact of public policy – especially fiscal policy – on the mining firms and their competitiveness. This paper on the mining sector is an attempt to analyse the sector, in particular, at its competitiveness. Against the backdrop of the Planning Commission's High-level Committee Report on National Mineral Policy 2006, and the subsequent Mines and Minerals (Development and Regulation) Bill, 2011, this paper attempts at the legal and fiscal policy transition in the mining sector of India. The results challenge the popular view that the competitiveness of the mining industry is largely determined by the quality of mine endowments, geological characteristics and production cycle, and highlighted that fiscal policy regime – taxation and royalty regime – that affects the productivity of the mining firms more than the mine-specific factors. Recently, though the legal framework of the mining sector has incorporated the environmental and human developmental aspects in its policy, the fiscal regime related to mining is in a state of flux. Particularly, the current methodology of royalty estimation on an *ad valorem* basis on the ore, linking to London Metal Exchange (LME) reference prices, in the non-ferrous non-atomic non-fuel mining sector require a relook. From the public policy perspective, the royalty estimation should incorporate the mineral value chain and estimate royalty on the basis of concentrate, and in plausible cases, the metal at the end of the mine value chain, after the process of beneficiation and smelting process.

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Introduction

There is a growing recognition to the significance of public policies in both enhancing and undermining the competitiveness of mining sector. It is all the more relevant when the mining regulatory mechanisms and the fiscal systems – taxation and royalty regime have undergone changes in India recently. This paper on mining sector in India is attempted against the backdrop of Planning Commission's *High-level Committee Report on National Mineral Policy, 2006*, and the subsequent passage of *Mines and Minerals (Development and Regulation) Bill, 2011*. Repealing the *Mines and Minerals (Development and Regulation) Act, 1957*, the new MMDR Bill, 2011, focuses on creating an enabling legislative environment for attracting investment and technology into the mining sector.

Yet another major transition in the mining policy of India is towards recognising the negative externalities of the mining sector in India on human development and environment and measures to address these issues. The new mining policy of India has been successful to a great extent in redefining the mining code incorporating these issues. However, the methodology suggested to address these issues by generating a Development Fund through *profit sharing formula* - 26 per cent of profits from the coal miners and 100 per cent royalty equivalent money from other miners has become controversial. This point will be revisited in the paper.

The paper is divided into six sections. *Section 1* explains the mining sector of India and its contribution to GDP as well as the gross capital formation of the sector. *Section 2* deals with state-wise analysis of the mining sector to examine the contribution of mining sector to regional development in India. *Section 3* deals with the public policy transition in the mining sector of India, with regard to legislations. *Section 4* deals with the fiscal policy regime related to mining sector. *Section 5* concludes.

1. Mining Sector in India

Interestingly, the countries with larger mining sector are the ones which belong to the pre-historic land mass referred to as Godwanaland. India falls among these countries, along with Australia, South and Central Africa, and South America. The mining sector contributes to the prosperity of the nations, the finite and non-renewable resources, resulting in economic growth of the country. Mining is a significant sector of the Indian economy, endowed with metallic and non-metallic minerals. India produces 89 minerals including 4 fuel minerals, 48 non-metallic minerals, 10 metallic minerals, 3 atomic minerals, and 24 minor minerals (Government of India, 2013). However, the public expenditure on exploration in India is negligible when compared to other countries.

Table 1: Global Public Spending on Exploration: 2012

Country	% of Total World Expenditure on Exploration
Latin America	25 %
Canada	18 %
Europe/FSU/Asia	16%
Africa	15 %
Australia	13 %
United States	8 %
Pacific Islands	5 %

Source: *Metals Economics Group, 2012*

The public spending for nonferrous exploration across globe reveals that Latin America spent highest on exploration (25 %) followed by Canada (18%) (*Table 1*). However, the public spending by Asia is within 16 per cent; the reported 16 per cent is the combined figure for Asia, Europe and Former Soviet Union (FSU) (Metals Economics Group, 2012). Within Asia, India on mining exploration is less than one per cent of the total world expenditure (Planning Commission, 2005). Lack of adequate public spending on exploration may be one of many factors that affect the growth of mining sector in India.

The recent trends in index of mineral production (with base 2004-05=100) showed a negative growth rate of 5.09 per cent, to 121.91 in 2012-13 as compared to 128.45 for 2011-12. The total value of mineral production (excluding atomic minerals) during 2012-13 has been estimated at rupees 2,34,612.66 crore, which shows decrease of about 0.12 per cent over that of the 2011-12. While disaggregating the total value of mineral production into fuel minerals, metallic and non-metallic minerals, it is revealed that in 2012-13, value for fuel minerals account for 66.85 per cent of the total and the metallic and non-metallic (including minor mineral) shares are significantly lower at 18.49 per cent and 14.66 per cent respectively.

The advance estimates of GDP (at 2004-05 prices) by CSO indicated that the mining (and quarrying) sector constitute 1.86 per cent of GDP in India in the Q1 of FY 2012-13. For the same period, the mining and quarrying sector accounts for 2.6 per cent of GDP at current prices, which is estimated at Rs. 50,144 crore. The components of GDP (quarterly estimates) including the mining sector, at constant prices are given in *Table 2*. It is often observed that the crucial factors for the stagnation of mining sector to around 2 per cent of GDP are based on procedural delays, obsolete technology of mine firms, exorbitant royalty and taxation regime, and the infrastructural bottlenecks which thwarted the growth of mining industry.

Table 2: Mining and other Components of GDP: Quarterly Estimates (Q1), 2013-14
(at 2004-2005 prices)

Sector	April-June (Q1)				
	(' crore) GDP for Q1 of			Percentage change Over previous year Q1	
	2011- 12	2012- 13	2013- 14	2012- 13	2013- 14
Agriculture, forestry & fishing	13.78	13.46	13.25	2.9	2.7
Mining & quarrying	2.10	2.00	1.86	0.4	-2.8
Manufacturing	16.30	15.31	14.50	-1	-1.2
Electricity, gas & water supply	1.96	1.98	1.97	6.2	3.7
Construction	7.89	8.02	7.89	7	2.8
Trade, hotels, transport & communication	27.97	28.17	28.04	6.1	3.9
Financing, insurance, real estate & business services	18.41	19.09	19.93	9.3	8.9
Community, social & personal services	11.58	11.97	12.55	8.9	9.4
GDP at factor cost	100	100	100	5.4	4.4

Source: CSO (2013)

However, the mining sector's contribution to the GDP in India appears to be lower than selected countries with relatively significant mining sectors like Chile (6.0%), South Africa (5.3%) and Australia (5.9 %) (*Table 3*).

Table 3: Global Comparison of Size of Mine Economy
(in per cent)

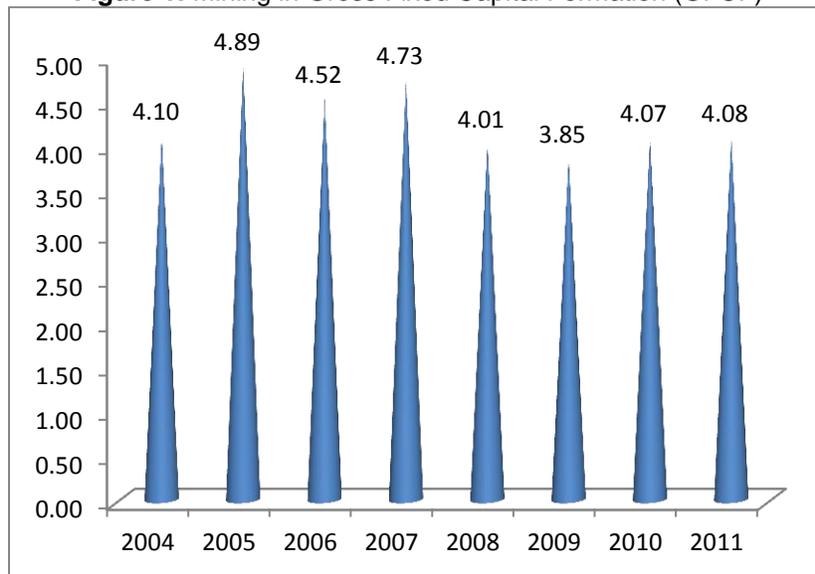
Country	Mining Sector-GDP Ratio
Chile	6.0%
South Africa	5.3 %
Australia	5.9 %
Brazil	2.0 %
India	2.6 %

Note: figures relates to 2010.

Source: Strategy Paper, Govt of India (2011)

The relative share of mining in gross fixed capital formation (GFCF) has declined over the period since 2007-08, though over the years the ratio stagnated to around 4 per cent. The latest estimate showed that mining sector constitutes 4.08 per cent of total GFCF (*Figure 1*).

Figure 1: Mining in Gross Fixed Capital Formation (GFCF)



Source: CSO (2012)

2. Mining Sector: State wise Analysis

Mining sector of India is characterised by a large number of small operational mines. In 2012-13, the number of mines which reported mineral production (excluding atomic, petroleum(crude), natural gas, and minor minerals) was 3108, out of which 573 were coal mines (including lignite), 559 were metallic, and 1976 were non-metallic mines. The statewise distribution of mines is given in *Table 4*. These 11 states together accounted for 93.92 per cent of total number of mines in India in the year 2012-13.

Table 4: State wise Distribution of Mines in India, 2012-13

States	No of Mines, 2012-13
Andhra Pradesh	583
Rajasthan	374
Gujarat	350
Madhya Pradesh	300
Tamil Nadu	281
Jharkhand	280
Odisha	175
Chhattisgarh	165
Karnataka	160
Maharashtra	139
West Bengal	121

Source: Government of India (2013)

Offshore constitutes the single most significant area in terms of value of mineral production in the country and had a share of around 21.62 per cent of total national mineral production (*Table 5*). Among the states, the mineral production in Odisha is the highest in the year 2012-13 at 11.56 per cent.

Table 5: Distribution (%) of Value of Mineral Production, 2012-13

State	2012-13
Odisha	11.56
Rajasthan	9.58
Andhra Pradesh	7.98
Jharkhand	8.88
Chhattisgarh	6.91
Gujarat	5.95
Madhya Pradesh	5.27
Assam	4.45
Goa	3.09
Uttarakhand	2.72
Offshore	21.62

Source: Government of India (2013)

With proper public policy and infrastructure, the strategy paper suggested that the contribution of mining to state GDP in mineral rich states like Chhattisgarh could rise to 20 per cent in 2025, and Jharkhand to 14.1 per cent (*Table 6*).

Table 6: Forecasts of Mining Sector to State GDP, 2025

State	2009	2025
Odisha	9	22.1
Rajasthan	2.1	3.1
Andhra Pradesh	2.9	3.8
Jharkhand	9.1	14.1
Chhattisgarh	13.1	20.0
Karnataka	1.1	2.7
Goa	9.5	14.2

Source: Government of India (2011)

The statewise forecasts reveal that Goa occupies the top position in job forecasts in the mining sector for 2025 at 16.6 per cent of total work force, followed by Jharkhand (4.6%) (*Table 7*). The strategy paper forecasts suggested that mining sector is likely to create 2 - 2.5 million direct jobs by 2025, contributing 3 per cent to total employment.

Table 7: Forecasts of Employment in Mining Sector, Selected States, 2025 (in Lakhs)

State	2009	2025	% share of Working Population
Odisha	1	2.5	1.3
Rajasthan	0.7	1.3	0.5
Andhra Pradesh	1.5	2.6	2.0
Jharkhand	3.2	5.6	4.6
Chhattisgarh	1.0	1.7	1.2
Karnataka	0.3	0.7	0.4
Goa	0.3	0.5	16.6

Source: Government of India (2011)

The strategy paper also highlighted that mining sector contributes to royalty revenue, as high as 20 per cent forecasted for Odisha by 2025, 10.9 per cent for Chattisgarh (Table 8).

Table 8: Forecasts of Royalty Revenue, Selected States, 2025

State	2009	2025	% of Current Revenue Receipts
Odisha	2.7	19.2	71.0
Rajasthan	1.5	7.1	20.6
Andhra Pradesh	2.0	9.5	15.0
Jharkhand	1.8	8.8	57.1
Chhattisgarh	2.3	10.9	49.3
Karnataka	0.5	3.7	8.2
Goa	0.3	1.5	39.3

Source: Government of India (2011)

3. India - Public Policy Transition in Mining Sector

The mining sector in India remained completely under the state ownership till nineties, with restriction on private investment. The policy determination was against the backdrop of the *Industrial Policy Resolution, 1956* (IPR). IPR assigned major minerals such as coal, lignite, mineral oils, iron ore, copper, zinc, atomic minerals, in Schedule A, which was reserved exclusively for the public sector, and minor minerals in Schedule B, in which the private sector was allowed some participation in mining activities along with the public sector.

With the advent of the liberalisation policy in early 1990s in India, a National Mineral Policy was announced in 1993. Until early 1990s, Foreign Direct Investment (FDI) was not allowed in the mining sector. Mineral concessions were restricted to firms with less than 40 per cent foreign holding, as in other sectors. With the formulation of the National Mineral

Policy in 1993, there was a minor easing up and FDI was allowed up to 50 per cent, with no limit on captive mines. Additional FDI could also be allowed on a case-by-case basis. All FDI proposals required clearance by the Foreign Investment Promotion Board (FIPB). In 1997, FDI up to 50 per cent was taken out of the purview of the FIPB and put on automatic approval route. For exploration and mining of diamonds and precious stones, 74 per cent of FDI was permitted under an automatic route in February, 2000. In February 2006, the mining sector was opened up to 100 per cent FDI. As of today, FDI upto 100 per cent is permitted in non-fuel and non-atomic minerals.

The effect of liberalisation on the mining sector can be observed from the steady rise in the share of private sector in the aggregate value of minerals produced in India. As per the Indian Bureau of Mines data, the share of public sector in the total value of mineral production has declined from 91.19 percent in 1988-89 to 74.61 percent in the year 2004-05 (Indian Bureau of Mines, 2007).

III.1: Legal Framework

The legal framework for the regulation of mines and minerals (except petroleum and natural gas) was first put up in 1957 – the Mines and Minerals (Regulation and Development) Act 1957 ('MMRD'). MMRD 1957 constituted the basic laws governing the mining sector in India including the regulations related to prospecting fee, royalties, and dead rent in respect of the prospecting and mining leases for minerals other than minor minerals, payable to the state government. The holder of the prospecting license is required to pay annually, in advance. The holder of the mining lease for minerals other than minor minerals is liable to pay a 'Dead Rent' to the state government till any mineral is removed or consumed, from which time, the holder has to pay royalty or dead rent, whichever is higher. These provisions of MMRD can only be amended by the central government through a notification in the official gazette. The royalty and the dead rent has been revised in order to make them favourable to the private sector. The dead rent for the first year of the lease has been removed for all categories. The royalty rates and the dead rent for minor minerals are fixed by the respective state governments.

Consequently, the MMDR Act, 1957 (MMDR) was amended in January 1994 and Mineral Concession Rules 1960 (MCR) and Mineral Conservation and Development Rules 1958 (MCDR) were brought into force soon after, to incorporate these changes and simplify the procedure for grant of mineral concessions to attract large private investments. The MMDR Act was further amended in December 1999 and MCR and MCDR were amended in the following year, 2000. It brought a number of changes in procedures of prospecting license, reconnaissance permits and mining leases and shifted more powers from central government to State governments. However, government control over mining sector continued through administrative pricing regime.

The MMDR Act, 1957, is the legislation governing the mining sector in India. The legislations are set for the regulation of mines and development of mineral endowments based on the MMDR Act. The legal fiat is set under the MMDR Act (such as the Mineral Concession Rules, 1960 and Mineral Conservation and Development Rules 1988) to regulate the grant of prospecting licenses and mineral licenses for minerals and also focus on conservation and systematic development of minerals.

Broadly the mining operation can be trichotomised into the following phases; (i) prospecting; (ii) development; and (iii) operation. Further the prospecting phase can be dichotomised into (a) reconnaissance, and (b) detailed exploration. There is an interface between legal and fiscal fiat at each stage of mining. For instance, specific licenses/ permits are granted to the prospector at each stage of mining and the grant of the licenses/ permits is subject to payment of royalties and fees which are intended to be used for the conservation and systematic development of mineral endowments.

Under the legal fiat based on MMDR Act, there are (i) reconnaissance permit fee, (ii) prospecting fee, (iii) dead rent, (iv) royalties and some other levies are levied at the different stages of a mining operation.

Reconnaissance Permit is required to undertake reconnaissance activity. The prospector is required to obtain it, which is granted for a period of three years. The prospector holding the Reconnaissance Permit is required to pay an annual permit fee at a rate as may be fixed by the State Government for the land allotted to him for reconnaissance activity. This is referred to as reconnaissance permit fee. The reconnaissance permit fee is Rs 5 per sq km annually. Additionally the permit holder is also required to pay a security deposit of Rs 20 per sq km of land allotted to him.

Ex-post to the reconnaissance activity, a prospector would undertake a detailed exploration of the land. For detailed exploration, a prospector is required to obtain a Prospecting License, which is granted for a period of three years, and extendable for another two years. The prospector is required to pay annually, in advance, a prospecting fee as may be fixed by the State Government for the land allotted to him for prospecting. This is termed as prospecting fee. The prospecting fee is levied at a rate of Rs 50 for the first sq. km. and Rs 10 per sq. km. for the subsequent area. Additionally, the license holder is also required to pay a security deposit of Rs 500 per sq km of land allotted to him.

Dead rent is in the nature of a minimum royalty payment and is generally payable when no production is undertaken in the mine. Thus, where a holder of a mining lease becomes liable to pay royalty, he would be liable to pay royalty, or the dead rent (in respect of that area), whichever is higher. The holder of a mining lease is required to pay to the state government an annual dead rent at the specified rates for all areas included in the mining lease. The rate varies from Rs 100/- to Rs 400/- per hectare per annum depending on the mineral produced, value of minerals and area of lease.

Royalty is the revenue required to be paid by the holder of mining lease for any mineral removed or consumed from the leased area at the rate specified in the MMDR Act. Once the regional exploration and the detailed exploration is concluded, the prospector undertakes the development and operation of the mine. For this activity, the prospector is required to obtain a mining lease which is generally granted for a period of thirty years, extendable for a further period of twenty years.

In addition to the levies under the MMDR Act, a mine operator is also required to pay other fees and levies with regard to the use of forest land for mining operations under the *Forest Conservation Act, 1980* and the *Indian Forest Act, 1927* levies are (i). Forest Tax: levied on forest produce removed from forest areas. The rate varies from state to state; (ii) Compensatory Afforestation Charges: these charges levied in order to undertake afforestation. The charges vary from state to state; and (iii) charges for clearing of jungle, development of land, replantation etc.

In the above mentioned components, royalty which is the most significant component of revenue, is required to be paid to the government when the prospector obtains the mining lease. In so far as policy changes with respect to the rates of dead rent are concerned, there had been no revision since 1987 and after a gap of about 10 years the revised rates for the same were notified on April 11, 1997.

III.2: Policy Sequencing of Mining Royalty Regime

Every three years, a Royalty Study Group is constituted by the Government of India to suggest the revisions in the rates of royalty across minerals. The upward revision in the royalty rates in India is also a matter of grave concern as it can affect the competitiveness of mine firms. Mining royalty causes controversial debates; mine firms raise concerns over the upward revisions in royalty rates as the royalty expenses constitute a significant component of the mining firms. Moreover, public policy related to the mining sector is unique as it deals with the natural resources sector.

Historical analysis suggests that till 1966, the royalty rates were modified as and when necessary for different minerals at different rates. The rates of royalty for 21 minerals were levied on the basis of unit of production (tonnage basis) and those for other minerals were levied on the basis of pit's mouth value of the mineral (*ad valorem* basis). However, even the rates for the 21 minerals, which were on tonnage basis, were subject to a ceiling of 20 per cent of the pit's mouth value. Thus the royalty rates were directly or indirectly linked to the pit's mouth value of the mineral.

Subsequently in 1966, the Government of India set up a *Study Group* for the first time to undertake a comprehensive review of the royalty rates on all minerals in view of the impact of royalty on production in mineral based industries, exports, and the inflow to the State revenues. The *Study Group* gave its report in 1968 and suggested de-linking of royalty rates from the pit's mouth value for most of the minerals and recommended royalty rates on unit of production basis (tonnage basis).

The next significant policy transition of royalty regime came up in 1992, when notified royalty rates were in most of the cases (except diamond and other precious and semi-precious stones excluding agate) set at flat rates, recommended by the Study Group by giving due weightage to the unit value of the minerals at the pit's mouth.

Prior to 1990, some of the state governments were separately levying cess on mineral production under various state acts, usually linked to royalty. However, these levies were struck down by the Supreme Court in December, 1989, and consequently; there was pressure on union government from the states to compensate them for the loss of cess/revenue from tax on mineral rights. Under the circumstances the Government of India took into account the revenue losses sustained by the states and fixed the royalty rates in February, 1992 in such a manner that the overall revenue including the amount lost due to the abolition of cess on minerals and mineral rights tax remained protected. As a result, there was, in general, a steep rise in the royalty rates in the revision effected in February, 1992.

Following the adoption of economic liberalisation and as a sequel to the international roundtable conference held in New Delhi in April, 1994, under the aegis of the UNDP and the Ministry of Mines, the Ministry of Mines constituted a *Study Group* in January, 1995, with

a view to rationalise the rates of royalty and to make them comparable with the international rates, as also to ensure rapid development of mining industry and augmentation of revenue earnings of state governments. Based on the recommendations of this *Study Group*, the total number of rates pertaining to major minerals (excluding coal, lignite, and sand for stowing) were brought down from 86 to 65 while widening, the scope of *ad valorem* system to 17 rates covering as many minerals besides the group of "all other minerals". The *Study Group* of 1995 also expressed the hope that "in future a complete switch over to *ad valorem* system will be possible". These rates were notified with effect from April 11, 1997.

Learning from its past experience, the Department of Mines, Ministry of Mines again constituted a *Study Group* in October, 1998 with the same objectives i.e. to rationalise the rates of royalty to make them comparable with international rates and for the purpose of ensuring rapid development of the mining industry and augmentation of revenue earnings of various state governments. As per the recommendations of this *Study Group*, the total number of rates pertaining to major minerals (excluding coal, lignite, and sand, for stowing) was brought down from 65 to 40 rates, while at the same time, the scope of *ad valorem* system was enlarged to 21 rates covering as many as 39 minerals along with a separate group called "other minerals" which were not earlier mentioned separately in the Second Schedule to the MMDR Act. This *Study Group* also expressed the hope that "in future a complete switch over to *ad valorem* system will be possible". These rates were notified with effect from September 12, 2000.

The *Study Group of 1998* also recommended different rates of dead rent for high value, medium value and low value, minerals, which were notified on September 11, 2000 along with the royalty rates. In accordance with Section 9(3) of the amended MMDR Act, 1957, which provided that the central government may, by notification in the official gazette, amend the Second Schedule to the Act, so as to enhance the rates of royalty payable on minerals, not more than once in three years and consistent with the past practice, the Department of Mines, Ministry of Mines constituted another *Study Group* on the Revision of Royalty on Major Minerals (other than coal, lignite, and sand, for stowing) to study the question of royalty and dead rent in all its aspects and make appropriate recommendations to the government in May, 2002. This *Study Group* suggested 39 royalty rates for major minerals (excluding coal, lignite, and sand, for stowing). These rates included 18 royalty rates on unit of production basis applicable to 21 minerals, and 21 *ad valorem* royalty rates covering 39 specified minerals and a group of unspecified minerals. These rates were notified on October 14, 2004.

While the new royalty rates were being notified in 2004, two parallel developments were taking place in the mineral sector. First, China suddenly grew up as a major consumer of iron ore requiring the ore for its steel plants, fueling a spurt in the prices of iron ore. The increased demand led to a visible growth in the profits of mining companies, particularly those engaged in export of iron ore. Secondly, there was a global increase in the prices of base metals (lead, zinc, copper and nickel) and aluminium, which combined with the industrial growth in the country to give healthy profits in mineral production. As a result, the amount of royalty accruing to the states *vis-a-vis* the margin to the miner decreased substantially per tonne of mineral produced. Thus within a year of the notification of the royalty rates on October 14, 2004, the major mineral producing states started demanding a review of the royalty rates providing for adequate compensation for the minerals mined in the state. However, since the law permits enhancement of royalty rates once in three years, any further enhancement in the royalty rates was not possible till October 13, 2007.

III.3: Policy Inputs for Mining Royalty Regime: Planning Commission High Power Committee, 2006

Although the National Mineral Policy, 1993, aimed at liberalisation of the mineral sector by encouraging flow of private investment and introduction of state-of-the-art technology in exploration and mining, the results have not been encouraging. In the Mid-Term Appraisal of the Tenth Five-Year Plan, it was observed that the main factors responsible for non-compliance were procedural delays for processing of applications for mineral concessions, and absence of adequate infrastructure in the mining areas. The Planning Commission set up a High level Committee in 2005 (Hoda Committee) to analyse the issues relating to the development of the mineral sector to pave a path for improving the investment climate; and to suggest policy recommendations for encouraging investment in public and private sector for exploration and exploitation of minerals. The main findings of the Hoda Committee are traced below:

- Mining policy would have to provide for the mining laws and practices to evolve in order to adapt to international best practices.
- *Ad valorem* is comparatively the better system of royalty as it is linked to prices viz., LME price as in the case of zinc and lead, but in case of some other minerals, it is difficult to benchmark the price.
- Each state government undertaking major mining activity should set up a Mining Development Fund (MDF) by earmarking 15 per cent of the annual royalty collection for the Fund. The GoI should also make matching contribution to the MDF of each state of an equal amount from the Plan funds, every year, for the duration of the Eleventh Plan.
- Base and rates of royalty should be revised as per the *Study Group on Royalty* set up by Ministry of Mines in October 2007. The Committee recommended that the fixation of rates of royalty should move forward decisively on the basis of *ad valorem* rates.
- In considering raising the *ad valorem* rates, the rates prevailing in Western Australia would be taken into consideration as a point of reference as the Committee felt that the rates prevailing in Western Australia are a good benchmark for determining the competitiveness of royalty rates.
- If the Western Australian rates are higher than the rates applicable in India, the royalty rates should be raised to that level, unless special factors are brought forward such as the cost of mining operations. If the *ad valorem* rates work out to higher rates than those obtaining in Western Australia, the existing rates should continue for the next three-year period as well. In such cases, a lowering of rates could be considered only in those cases in which there is evidence enough that the royalty rates are inhibiting mining operations, and mineral production is registering a downward trend.
- The rates that are already on *ad valorem* basis should also be revised on the basis of the same yardsticks —i.e. as a norm, consider raising the rates to the level in Western Australia unless there are factors justifying a lower rate in India, and leave the rates unchanged if the rates are higher than those in Western Australia unless there are indications that the existing rates are inhibiting mining operations.
- The *Study Group* advised that the royalties on base metals, noble metals, and precious stones need to be at low levels as an incentive for exploration in these minerals in which the country is grossly deficient.

- The valuation of the mineral for the purposes of royalty should be based on the transaction value and should include the profit element over and above the unit cost of production. For export consignments the system seemed appropriate as the FOB price is based on the transport cost from the pithead to the port, as well as the loading, unloading, and the port charges are deducted therefrom. For domestic sales also, the sale price rather than the pit mouth value should be taken into consideration. Thus the profit element must be added to the cost of production. The ideal would be to use the sale price to the end-user as opposed to the middleman as the basis for determining the valuation. From the sale price the element of transport, loading and unloading costs, must be deducted as in the case of FOB price for export consignments.
- In the absence of the sale price, the present system of 20 per cent mark-up on the pit mouth value could continue on an *ad hoc* basis.
- For captive mines, the reported price is suspect and should not be used as the basis for calculating the average monthly value. It should be ensured that the IBM takes into account only arm's-length transactions in recording the monthly state-wise and mineral-wise prices.
- The constitutionality of the issue of whether the states can impose a cess on any mineral for which a royalty has been prescribed is currently under judicial scrutiny. The Hoda Committee observed that in considering the imposition of such a cess in future, state governments should bear in mind the adverse impact on the investment environment in the state.
- To encourage exploration, which is a pre-mining activity, the current restriction of four years for allowing deduction of expenditure on exploration and development from the income tax should be eliminated. All expenditure on exploration and development in the preceding ten years before the commencement of commercial production should be allowed for deduction in mining operations. Further, the mining companies should be given the option to claim deduction either in the first ten years of commercial production or during the useful life of the mine.
- A conscious decision needs to be taken to encourage physical value addition which improves ore quality and usage at pit mouth such as concentration, beneficiation, calibration, blending. Wherever the miner adds value through these processes, the royalty may be charged on the ore at pit mouth on the cost of extraction before processing. Alternatively, the *ad valorem* rate for beneficiated or concentrated ore should be proportionately lower, as in the case of beneficiated iron ore in Western Australia.
- The penalty for non-payment of royalty is cancellation of the concession. A moratorium or a suitable structure for deferment of royalty payment to support investment in deserving cases, to be spelt out clearly in the MCR, could also be permitted in deserving cases.
- Rates of dead rent should be rationalised so that they act as an effective deterrent against a mine owner who does not undertake mining as per the approved mining plan and prefers to keep large areas idle and keeps the mineral resources undeveloped. In other words, an escalating scale of dead rent should be worked out. This should be stringently applied to captive miners and PSUs as well.
- The state governments would get revenues from the disposal of the ore bodies that have been explored earlier at public expense by an open tender/auction system.

- Transfer fees should be levied on PLs and MLs sought to be transferred. The unbundling of prospecting from mining is likely to bring in investment in the form of FDI into prospecting along with advanced technology. When the PL or ML of a prospected area is transferred for a premium by a prospecting firm in favour of a mining firm or if the firm itself is taken over or acquired by a mining firm for a consideration, a transfer fee as a percentage of the premium or consideration may be levied. Such a step would be in line with international practice.

III. 4: Policy Inputs for Rates of Royalty: Recommendations of ‘The Study Group on Royalty Rates’, 2008

The Ministry of Mines constituted a Study Group on Royalty Rates on August 24, 2006 to review the existing rates of royalty on minerals (other than coal, lignite, and sand, for stowing) given in Second Schedule to the MMDR Act, 1957 and to recommend revision of rates in view of the recommendations of the High Level (Hoda) Committee set up in the Planning Commission.

The objective of the study group was to move decisively towards method of fixation of rates of royalty on the basis of *ad valorem* rates based on the prevailing best practices of international royalty rates, especially those in Western Australia. The *Study Group* was framed to review the guidelines for calculation of *ad valorem* rates of royalty on the basis of experience for administering the same vide

- (i) Valuation of mineral for the purpose of royalty on the basis of transaction value/sale price, including the profit element over and above the unit cost of production and deducting transportation and handling charges.
- (ii) FOB price of minerals for export deducting transportation and handling charges.

The *Study Group* was also required to suggest incentivised royalty rates on *ad valorem* basis for beneficiated or concentrated ore. In addition to these tasks, the *Study Group* was asked to review and suggest penal action for failure to pay royalty on minerals extracted with special exceptions for allowing moratorium or suitable structure for deferment of royalty payment to support investment in deserving cases. Appropriate revision in the existing rates of dead rent on an escalating scale was also the task of the *Study Group*, taking into consideration measures for effective deterrence against idle mines.

The approach of the *Study Group* was more in favour of *ad valorem* system of royalty than the tonnage system, as the former takes into account the dynamics of markets and provides buoyancy in revenues without interference from the government. With respect of lead and zinc, the *Study Group* considered the request of the Zn-Pb firms to provide for levy of royalty on metal in concentrate. The *Study Group* observed that in so far as beneficiation of ore takes place in the leasehold area, there is a case for levy of royalty on concentrate since concentrate, like ore, is a form of mineral. Further, the *Study Group* noted that as per the provisions of Rule 64 B of MCR, 1960, if the run-of mine mineral is processed within the lease area, then the royalty shall be chargeable on the processed mineral (here it would be concentrate).

III.5: New Mines and Minerals (Development and Regulation) Act, 2011.

The Cabinet approved the *Mines and Minerals (Development and Regulation) Bill, 2011*, prepared by the Ministry to replace the existing MMDR Act, 1957 and the Bill was introduced in Lok Sabha on December 12, 2011. The Bill aims at reforming the mining sector towards sustainable mining and local area development, and benefit sharing mechanism for the people affected by the mining operations. The Bill, also, aims to ensure transparency, equity, elimination of discretions, effective redressal and regulatory mechanisms along with incentives encouraging good mining practices, which will in turn lead to technology absorption, and exploitation of deep seated minerals (Ministry of Mines, Government of India, 2011-2012).

The MMDR 2011 also proposed “a sum equal to the amount of royalty paid to the State Government in the preceding year. The amount shall be payable by the lessee annually to the State Mineral Foundation (SMF) that shall be used for payment of timely benefits as compensation to the affected people of different categories. This apart, lessee of mines are required to submit progressive mine closure plan, final closure plan, and also to specify the steps lessee proposes to take to mitigate the sufferings of the people directly affected by the mining operation. A corporate social responsibility scheme (CSR) is also to be submitted by the lessees to the State Government. State can impose cess on minerals not exceeding 10 per cent of the royalty payment as may be notified by it from time to time”. However, as the royalty rates are disproportionately high in India when compared to *ad valorem* royalty rates across globe, imposing cess on minerals could further affect the competitiveness of mine firms.

Imposing central cess and state cess, in addition to royalty could affect the new investments by the mine firms. As per MMDR 2011, the purpose of cess is set up of mineral funds at national and state level for capacity creation and also for the purpose of sharing the benefits of mining with persons or families having occupation, usufruct or traditional rights in mining areas, and for local area infrastructure. The MMDR Bill, 2011 has also proposed creation of an amount equal to royalty in case of mineral other than coal, and 26 per cent of net profits, in the case of coal, each year to district Level Mineral Foundation, which would further impinge on the competitiveness of the firm.

4. Fiscal Regime: Mining Taxation/Royalty

Economic rent is the basic rationale for mineral royalties across globe. In other words, worldwide the most common form of economic rent is in the form of a royalty. Broadly speaking, systems of royalty can be categorised under three heads:

- (i) **Gross royalty**, where the royalty is determined with reference to the volume of production, or is determined with reference to gross revenues. It is also referred to as tonnage-based royalty or unit-based royalty.
- (ii) **Ad valorem royalty**, where the royalty is calculated by applying a percentage rate to the gross sale value. It is also referred to as value-based royalty. This is

usually 'ex- mine' or pithead value (sale realisation) less allowable expenditure². **Net smelter return (NSR) royalty** is one of the most recurrent systems of *ad valorem* royalty, where the royalty is expressed as a percentage of the enterprise's NSR. NSR is generally defined to be gross revenues, minus shipping, smelting, refining, and marketing costs.

- (iii) **Profit-based royalty**, where the royalty is calculated as a percentage of gross/net profit. It can be calculated in two ways, as shown in *Table 9*. Profit-based royalty is also referred to as net profit royalty, net proceeds royalty, and so forth.

Table 9: Types of *Ad valorem* Royalty: Various Royalty Bases

Royalty Tax Basis	
1	<i>Ad valorem</i> –NSR times percentage
2	<i>Ad valorem</i> – metal contained in ore at mine mouth, valued at international price times percentage
3	<i>Ad valorem</i> – metal contained in concentrate at the mill, valued at international reference price times percentage.
4	<i>Ad valorem</i> - metal contained in smelter product, valued at international reference times percentage.
5	<i>Ad valorem</i> – gross sales, less transportation, handling, and freight, times percentage
6	<i>Ad valorem</i> – sliding scale percentages of NSR

Source: World Bank (2006), Stermole Franke and John Stermole (2006).

Harries (1996) noted that net profit royalty is complex and often difficult to understand or confirm, requiring a lot of information and often the services of an accounting professional to calculate and confirm it; it is also open to abuse and is often best avoided.

Table 10: Types of Profit-based Royalty: Various Royalty Bases

Royalty Tax Basis	
1	Profit-based – percentage of gross sales, less operating costs, transportation, handling and freight
2	Profit-based – percentage of gross sales, less capitalised costs, operating costs, transportation, handling and freight

Source: World Bank (2006), Stermole Franke and John Stermole (2006)

Government and investors have conflicting objectives. While government prefers the methods of mining royalty that are stable, transparent, equitable, and generate revenue in continuum, easy to administer; mining firms prefer the royalty approaches which are stable and predictable and are based on the ability to pay, respond to downturns in price cycles, do not distort production decisions such as cut-off grade or mine life and do not add significantly to operating costs.

² Ex-mine or pit head value is mineral value once mined and brought to the surface minus treatment costs.

From a government perspective, unit-based and *ad valorem* type royalties are preferred as they can satisfy the objective of revenue in continuum, while profit based royalties are paid only in years with profits in favour of the firm. However, private sector mining prefer zero royalty regime, and if imposed, having it based on profit or *ad valorem*. Two important options in the design of a profit based royalty are as follows: (i) Brown Tax; and (ii) Resource Rent Tax.

- (i) **Brown Tax:** The government collects a constant percentage of a project's net cash flow in years in which profits are earned and provides cash rebates to private investors in years of negative net cash flow.
- (ii) **Resource Rent Tax:** A profit-based royalty that provides governments with an approximation to the Brown tax but avoids cash rebates in years in which losses are incurred. Under a resource rent tax, the government collects a constant percentage of a project's net cash flow where losses (negative net cash flow) are accumulated at a threshold rate and offset against future profit.

However, these two options are not relevant in the context of developing countries like India, as no country in Asia Pacific has profit-based mining royalty taxation regime.

IV.1: Global Mining Regime

Broadly, the global mining royalty arrangements may be trichotamised into profit based, *ad-valorem* based or unit based.

- (i) **profit based royalty** is levied on the net cash flow or some measure of the profit of a mining project.
- (ii) ***ad valorem* royalty** is an output based royalty that is levied as a percentage of the value of production of a mining project.
- (iii) **unit based royalty** is an output based royalty that is levied as a set charge per physical unit of production of a mining project (gross royalty).

Mining royalty regime varies widely between countries and minerals. Minerals include coal, metallic minerals and non-metallic minerals. Globally, specific royalties tend to apply to low value high volume non-metallic minerals. In the context of developed countries like Australia, Canada, and USA, mining royalty regime are mainly profit based or *ad valorem* royalties — however, the most consistent application of profit-based royalties are in Canada. In the context of countries in Africa, Latin America, and Asia Pacific, mining royalty regime are not profit-based. On the contrary, the royalty regime is mainly *ad valorem* in Africa and Latin America, while some combination of unit-based and *ad valorem* royalties is seen in Asia and Pacific countries. None of countries in Asia Pacific, Africa and Latin America has adopted a profit-based royalty to date.

It is also interesting to note that there is a correlation between the royalty rate and the system of royalty. Gross royalty rates (unit-based royalty rates) tend to be in the 2 per cent to 5 per cent range, while *ad valorem* royalty rates tend to be somewhat higher, and the profit-based royalty rates are higher still. The logical reason for it may be as follows. In the case of the profit-based royalty, the government is less certain of collecting a royalty, because the royalty base (profit) is less predictable. The government will seek a higher royalty rate to compensate for this risk. On the other extreme, in the case of a gross royalty, the government is at a lesser risk, because the costs of mining, milling, smelting, and refining do not affect the royalty base (revenues or production). Therefore, the government

will seek a reduced royalty rate. *Ad valorem*, particularly Net Smelter Return (NSR) royalties fall between gross royalties and profit-based royalties on the risk and rate scale.

In the regime of profit-based royalties, the measures of profit vary, the royalty rate is sometimes applied as a sliding scale and, in some cases no tax applies if the income from mines falls below some threshold level. In the royalty regime of *ad valorem*, the basis of mineral valuation may be market price based or some specified reference priced.

Within African countries, only South Africa is moving towards profit-based royalty regime. Indonesia, China, The Philippines, and India are examples of prevalence of specific unit-based royalties and *ad valorem* royalties. Argentina offers an example of an NSR royalty, and a number of Canadian provinces offer examples of profit-based royalties. The royalty systems in some jurisdictions are hybrid in nature. In Canada, for example, the annual royalty paid in the Province of New Brunswick is the greater of 2 per cent of NSR and 16 per cent of net profit. As a policy matter, the purpose of the 2 per cent NSR is to ensure that a royalty is paid by the mining enterprise in years when there is no profit. Not every country imposes a mineral royalty or collects an economic rent. Mining operations in Mexico and Chile, for example, are not subject to such charges.

For instance, an unprofitable mine in the Canada would not have to pay provincial mining tax/ royalty, because that specific jurisdiction's economic rent/royalty is computed on the basis of profit of the firms. On the other hand, the unprofitable mines in Brazil or Argentina would have to pay an economic rent/royalty, because royalty in these countries are not based on profit. Brazil imposes royalty based on gross revenues, while Argentina royalty charge is *ad valorem*, based on net smelter return. In Australia, each of the seven states has its own royalty rates, which was highlighted by the High-level Committee (Hoda Committee) terming that Western Australia has internationally competitive royalty rates, and therefore one of its policy recommendations was to use Western Australia royalty rates as a benchmark for royalty rates in India.

The province wise analysis showed that most of the provinces in Australia follow *ad valorem* royalty system. It is also to be noted that *ad valorem* royalty rate differs across minerals and within minerals, across types of mines. The analysis of mineral wise royalty rates for Western Australia revealed that *ad valorem* royalty rates for minerals ranged from 1.25 per cent to 7.5 per cent. The minerals with royalty rates at the lower end of the spectrum are cobalt, copper, platinoids, silver, tin metal, zinc and lead (metallic) at 2.5 per cent. On the contrary, the *ad valorem* royalty on minerals like bauxite, coal (export), diamond, gems and precious stones, iron ore, manganese, semi-precious stones are levied at 7.5 per cent. The point to be noted is that the range of royalty rates in Western Australia are much lower than of the rates in India, which range between 0.4-20.0 per cent. The remaining minerals are either levied at 5 per cent rate of royalty or negotiated and formula-linked.

Table 11: An Illustration of Hike in Royalty Rates: Three Distinct Phases of Mining Royalty Regime in India (Zn-Pb)

Period	Royalty Base	Zn Royalty Rates (Period)	Pb Royalty rates (Period)
1949-1968	PIT MOUTH VALUE: Royalty calculated as the per cent of the sale price at pit mouth.	5 % (1949-1963) 7 % (1963-1968)	6.25 % (1949-1963) 7.00% (1963-1968)
1968-1997	UNIT-BASED: Royalty calculated as amount per unit of metal per tonne of ore and on pro-rata basis.	Rs 1 per unit (1969-1975) Rs 3 per unit (1975-1981) Rs 4 per unit (1981-1987) Rs 6 per unit (1987-1992) Rs 16 per unit (1992-1997)	Rs 0.75 per unit (1969-1975) Rs 1.50 per unit (1975-1981) Rs 3.00 per unit (1981-1987) Rs 3.00 per unit (1987-1992) Rs 8.00 per unit (1992-1997)
1997-2009	AD-VALOREM: Royalty calculated as percent of LME metal price on <i>ad valorem</i> basis chargeable on contained metal in ore produced/concentrate produced.	3.5% of LME (1997-2000) 6.6% of LME (2000-2009)	4.7% of LME (1997-2000) 5% of LME (2000-2009)
2009-2011	AD-VALOREM	8 % of LME on ore (2009 -2011) 8.4 % of LME on concentrate (2009 -2011)	7 % of LME on ore (2009 Aug -) 12.7 % of LME on concentrate (2009-2011)
2012 – present (recommended)	AD_VALOREM	9.5 % of LME on ore (2012 May-) 10% of LME on concentrate (2012 May-)	8.5 % of LME on ore (2012 May-) 14.5 % of LME on concentrate (2012 May-)

Source: Collated from the policy documents of the Study Groups on Royalty Rates, Ministry of Mines, Government of India (various years) and IBM Publications (various years).

The royalty rates as per the recent notification on August 13, 2009 denotes a dual rate system, which levy royalty for ore as well as royalty for concentrates at different rates for most of the minerals, with rates for the latter at relatively higher than the former. Though the transition of system of royalty from unit-based to *ad valorem* based is better as the latter system is not price neutral, the burgeoning of royalty rates from 3.5 per cent of LME to 10 per cent in case of zinc (concentrate) and 4.7 per cent to 14.5 per cent in case of lead (concentrate) is a matter of concern. The analysis of base and rates of royalty with regard to zinc and lead would be taken up in the subsequent chapters. Broadly these three phases of mining royalty regimes are closely correlated to the formulation of various *Study Groups* on royalty rates and their recommendations.

IV.2: Factors Affecting Mining Competitiveness

Despite the growing recognition of competitiveness of mining sector on economic growth of a country, the literature on the topic is scarce. A few related studies could be identified for Australia, US, and Canada, where the mining sector is relatively significant.

Since competitiveness is closely linked with productivity, factors which affect the productivity will also affect the competitiveness. Mining is prone to experience diminishing returns and increasing cost conditions. For example, the cost of production increases substantially as the depth of mines increases. Similarly, geological characteristics play an important role in determining the productivity of mining. Therefore, the traditional view was that the productivity in the mining industry is largely determined by the quality of mine endowments, geological characteristics and production cycle. However, a plethora of studies have countered this view and emphasised the role of public policy as well as technology and innovation, for attaining higher productivity. In the context of Canada, the study by the Centre for the Study of Living Standards (2009) found that the factors responsible for falling mining productivity growth in Canada were its declining capital intensity, high prices towards energy and minerals, deterioration of the average quality of the workforce and greater environment regulation.

The Committee on Competitiveness in US minerals and metals industry (1990) found that technology is the major determinant of long term competitiveness in the US. The Report of Australian Academy of Technological Science and Engineering (1997) identifies the following factors, which affect the competitiveness in the mineral industry — labour, energy, power and fuel, transportation, shipping, communications, total infrastructure, availability of technology, environmental matters, regulatory issues, taxation and tariffs, availability of capital. A technology-based strategy can improve the long-term competitiveness of the minerals and metals industry. Technology can contribute to competitiveness by increasing productivity or product quality, by addressing circumstances unique to a process, company or country, or by assisting producers to adapt to changing consumer demand.

Studies on competitiveness of minerals and mining industry in the context of India are almost *nil*. A few studies could be identified where competitiveness of small scale industries and sector-specific competitiveness of automobile industry were analysed. While analysing the determinants of competitiveness in small scale industries, studies focused the importance of infrastructure facilities and business environment for competitiveness. Using the data on small scale industries from the Department of Industries and Commerce and primary data, studies found that poor quality and high cost infrastructure in regard to transport, power, road, credit, and telecom, affected competitiveness. Delay in getting credit sanctioned from banks, tax and duty-drawbacks, temporary and permanent registration, clearances for exports, permission for expansion and diversification, power and water connections, and clearance from pollution control boards reduce the competitiveness and add to costs. Using Feasible Generalised Least Squares (FGLS) for panel data, with heteroskedastic panels, Narayana and Vashisht (2008) revealed that the major determinants of the competitiveness in automobile industries in India were share of emoluments and taxes in total costs, maintenance cost share, inventory cost share, borrowing investment ratio, and interest payment share in total cost, share of imported know - how expenses. Out of these, all except maintenance cost share and share of imported know - how expenses have negative impact on the competitiveness.

There are various factors which can affect the competitiveness of mining industries. These can be firm or industry specific. This section and the subsequent section are drawn from a report prepared by the author on the determinants of competitiveness and the role of mining royalty at NIPFP. The significant determinants of competitiveness, drawn from theoretical and empirical literature are fivefold: (i) Government policy (taxation and royalty); (ii) Cost of production (such as infrastructure costs and raw material costs); (iii) Firm

financing (debt financing); (iv) Capacity utilisation; and (v) Market uncertainty (sales realisation). An illustrative analysis for the Zn-Pb sector revealed that government policy, especially royalty regime affects competitiveness more than firm related variables. Analysis regarding the determinants of the competitiveness in mining industries and the role of public policies is an impending area of research.

IV.5: Existing Mining Royalty Methodology: An Illustration

The existing methodology of calculating royalty is the product of the total contained metal in the ore produced (as reported in the statutory returns under Mineral Conservation and Development Rules, 1988 or recorded in the books of mine owners), multiplied by the average metal prices in the London Metal Exchange (LME Price), further multiplied by the prevailing rate of royalty for non-ferrous non-atomic non-fuel category³.

Symbolically,

$$R = [\lambda \text{ ROM}] * [\epsilon * P_{\text{LME}}] * Y$$

Where

R	= royalty revenue
λ	= grade percent of metal in the ore
ROM	= run of mine (ROM) ore treated
ϵ	= exchange rate
P_{LME}	= London Metal Exchange Price
Y	= prevailing royalty rate

Since August 13, 2009, the Government of India has notified dual royalty rates for ROM (ore) and concentrates respectively. The methodology remained the same, only the differentials appeared in terms of the 'Y' and the base of calculating royalty is disaggregated into ROM and concentrates, which could be symbolically as follows.

$$R_{\text{ROM}} = [\lambda \text{ ROM}] * [\epsilon * P_{\text{LME}}] * Y_{\text{ore}}$$

$$R_{\text{CONC}} = [\lambda \text{ CONC}] * [\epsilon * P_{\text{LME}}] * Y_{\text{conc}}$$

where

R_{ROM}	= royalty revenue from metal contained in the ore
R_{CONC}	= royalty revenue from metal contained in the concentrate
λ	= grade percent of metal in the ore
ROM	= run of mine (ROM) ore treated
CONC	= concentrate
Y_{ore}	= prevailing royalty rate on the ore
Y_{conc}	= prevailing royalty rate on the concentrate
P_{LME}	= London Metal Exchange Price

IV.5.1: Estimating Royalty within Mine Value Chain Analysis: The Approach

The royalty estimation at ore, as practised in India when the realm was switched over to *ad valorem* needs to be discontinued. Instead, the royalty estimation should take

³ These sections are drawn from a report prepared by the author on the determinants of competitiveness: role of royalty regime" at NIPFP.

care of value chain and estimate royalty on the basis of concentrate, and in plausible cases on metal at the end of the value chain. A value chain can be illustrated as follows.

Porter's (1995) value chain is broadly utilised as a method to construct value to improve competitiveness of the firm and in turn to improve the overall profitability of the firm. Competitiveness of the firm improves either through cost deduction or through increase in its market share. Competitiveness is based on the global and local environment in which a firm operates and identifies the possible challenges and opportunities involved in improving its profitability. Within the Porter framework, government policy is identified as one of the elements of entry barriers, along with cost disadvantages and other financial and market uncertainties. If we integrate the mine value chain in the calculation of royalty, we need to alter the methodology in two ways. One, royalty should be calculating only at concentrate (or on metal, wherever plausible) and not on ores. Two, the base of royalty computation should deduct the treatment costs. In India, the current estimation of royalty has not considered the mine value chain in the estimation as we continue to impart royalty on the ore along with concentrate as per the current methodology; and the assessable value of royalty is not based on deducting the treatment costs or the percentage loss at the tailings.

The calculation of royalty by deducting the treatment cost is derived as follows. The assessable value is derived by deducting the treatment charges per dry metric tonne on the concentrate from the metal contained in the concentrate adjusted for the grade metal content, multiplied by the London Metal Price (LME) at the appropriate exchange rates. The treatment charges applied are also mine specific.

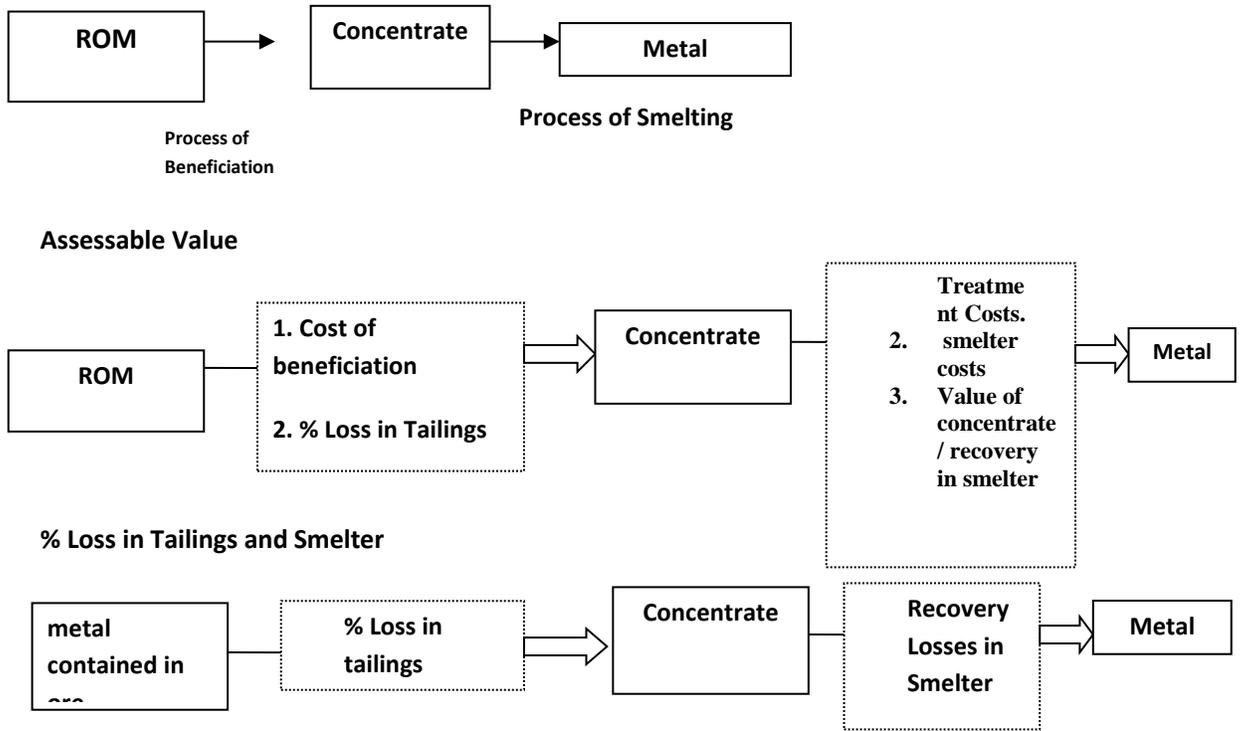
symbolically,

$$AV = [\{ (\lambda \text{ CONC} * P_{LME}) - (\lambda \text{ CONC} * TC) \} * Y_{\text{conc}}] * \epsilon$$

where

AV	= the assessable value
λ	= grade percent of metal in the concentrate
CONC	= concentrate
Y_{conc}	= prevailing royalty rate on the concentrate
P_{LME}	= London Metal Exchange Price
TC	= treatment costs
ϵ	= exchange rate

Figure 2: An Illustration of Royalty Estimation within the Mine Value Chain



IV.6: Buoyancy Estimates for Royalty

Buoyancy of revenue refers to the responsiveness of revenue to a change in GDP/GSDP. Technically, intertemporal revenue buoyancy estimates are obtained by regressing the log of revenue on the log of GDP/GSDP. The coefficient on the log of the GDP/GSDP is a measure of the revenue buoyancy. It can be shown as follows in the equation form.

$$L(r) = \alpha + \beta L(g) + \mu$$

where L(r) = log of revenue
 L(g) = log of GSDP
 α = intercept
 β = buoyancy estimate
 μ = surrogate of omitted explanatory variables.

The buoyancy rates of revenue receipts and expenditure, of all states in India for the entire period (*Table 12*), revealed that like the State of Rajasthan, the other mineral rich states, viz., Andhra Pradesh, Chattisgarh, Odisha, Karnataka and Maharashtra also have the buoyancy of revenue receipts greater than that of revenue expenditure, though marginally in some of these states. However, the buoyancy estimates of other mineral rich states such as Jharkhand and Madhya Pradesh revealed an unsustainable trend of buoyancy of expenditure greater than that of revenue receipts (*Table 12*). It is to be noted that buoyancy estimates for own revenue receipts and expenditure are equal to or above unity in case of all the eight mineral rich states.

Table 12: Aggregate Buoyancy of Revenue and Expenditure: Statewise Analysis

	Own Revenue Receipts		Revenue Expenditure	
	β coefficient	t stats	β coefficient	t stats
Andhra Pradesh	1.08	11.76	0.98	46.92
Chattisgarh	1.86	4.80	1.62	3.22
Goa	1.04	5.50	0.05	0.10
Jharkhand	1.49	3.48	2.12	2.65
Karnataka	1.03	13.01	0.99	57.72
Kerala	0.95	74.17	0.98	46.31
Madhya Pradesh	1.09	24.36	1.18	27.59
Maharashtra	0.97	26.12	0.95	12.25
Odisha	1.07	12.95	1.01	38.14
Rajasthan	1.02	31.25	1.06	22.19
Uttarakhand	2.46	4.86	2.12	3.48

Source: (basic data), Finance Accounts, (Various issues).

Table 13: Disaggregate Buoyancy Estimates for Own Tax and Non Tax Revenue: Statewise Analysis

	Own Tax Revenue		Own non-Tax Revenue	
	β coefficient	t stats	β coefficient	t stats
Andhra Pradesh	1.10	9.41	0.90	10.00
Chattisgarh	1.93	4.45	1.56	3.41
Jharkhand	1.63	4.00	1.23	2.29
Karnataka	1.06	18.24	0.99	6.10
Kerala	0.99	62.35	0.68	11.36
Madhya Pradesh	1.23	12.63	0.77	7.88
Maharashtra	1.01	23.10	0.67	14.15
Odisha	1.10	13.87	1.03	6.57
Punjab	0.97	14.09	1.54	10.53
Rajasthan	1.14	21.14	0.73	4.82
Uttar Pradesh	1.16	27.99	0.89	2.65

Source: (basic data), Finance Accounts, all States (Various issues).

Table 14: Buoyancy Estimates of Royalty: Statewise Analysis

States	β coefficient	t stats
Andhra Pradesh	1.43	3.36
Karnataka	1.59	11.35
Kerala	1.29	10.44
Maharashtra	1.78	4.86
Punjab	1.82	6.63
Rajasthan	1.41	10.21
Uttar Pradesh	0.69	0.89

Source: (basic data), Finance Accounts, all States (Various issues).

The buoyancy of both own tax and non-tax remained above unity only for a few States like Chattisgarh, Jharkhand, Odisha and Uttarakhand. The aggregate buoyancy of own non tax revenue revealed that β coefficient is above unity only for Chattisgarh, Jharkhand, and Odisha (*Table 13*). At the disaggregated levels, the buoyancy for royalty charges within non-tax revenue revealed that almost all states have above unity buoyancy except for Uttar Pradesh (*Table 14*). However, high buoyancy for royalty is noted for mineral rich states.

5. Conclusion

The impact of public policy — especially fiscal — on the mining firms and its competitiveness is a rare gamut of study. Against the backdrop of Planning Commission's High-level Committee Report on *National Mineral Policy 2006*, and the subsequent *Mines and Minerals (Development and Regulation) Bill, 2011*, the paper analysed the legal and fiscal policy transition in the mining sector of India. Though the legal framework of mining sector has incorporated the environmental and human developmental aspects in its recent policy, the fiscal regime related to mining is in a state of flux. An illustrative analysis of the

mining regime of non-ferrous non-atomic minerals, revealed that royalty regime is onerous in India and needs revisions in its methodology, in view of the value chain. As the profit sharing formula suggested by MMDR 2011 is based on royalty, a relook into the royalty methodology is imminent in the context of India.

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