FISCAL MANAGEMENT OF MINING AND PETROLEUM IN WEST AFRICA

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Why is it Important to Model fiscal Regimes for Extractive Industries (EI)?

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Agenda

- Why is important to evaluate and model fiscal regimes
- Stages in the life of a petroleum project
- Evaluation criteria and key metrics

WHY IS IMPORTANT TO EVALUATE AND MODEL FISCAL REGIMES

Refresher: defining the EI fiscal regime

- The **combined system of tax and non-tax instruments** to raise government revenue from natural resource extraction activity
- It **includes royalty and CIT, as well as contractual schemes** such as production-sharing or risk service contracts
- **Lump sum payments** upon granting of rights (i.e., “signature bonus”) and **production bonuses** are also common, as are instruments of **state participation**
- It also comprise **taxes, fees, levies and charges** which accrue to the state by way of additions to input costs
- The fiscal regime **may be project-specific** if set in a contract, or **sector-specific** if it applies uniformly to all extractive projects.

Why is fiscal modeling important?

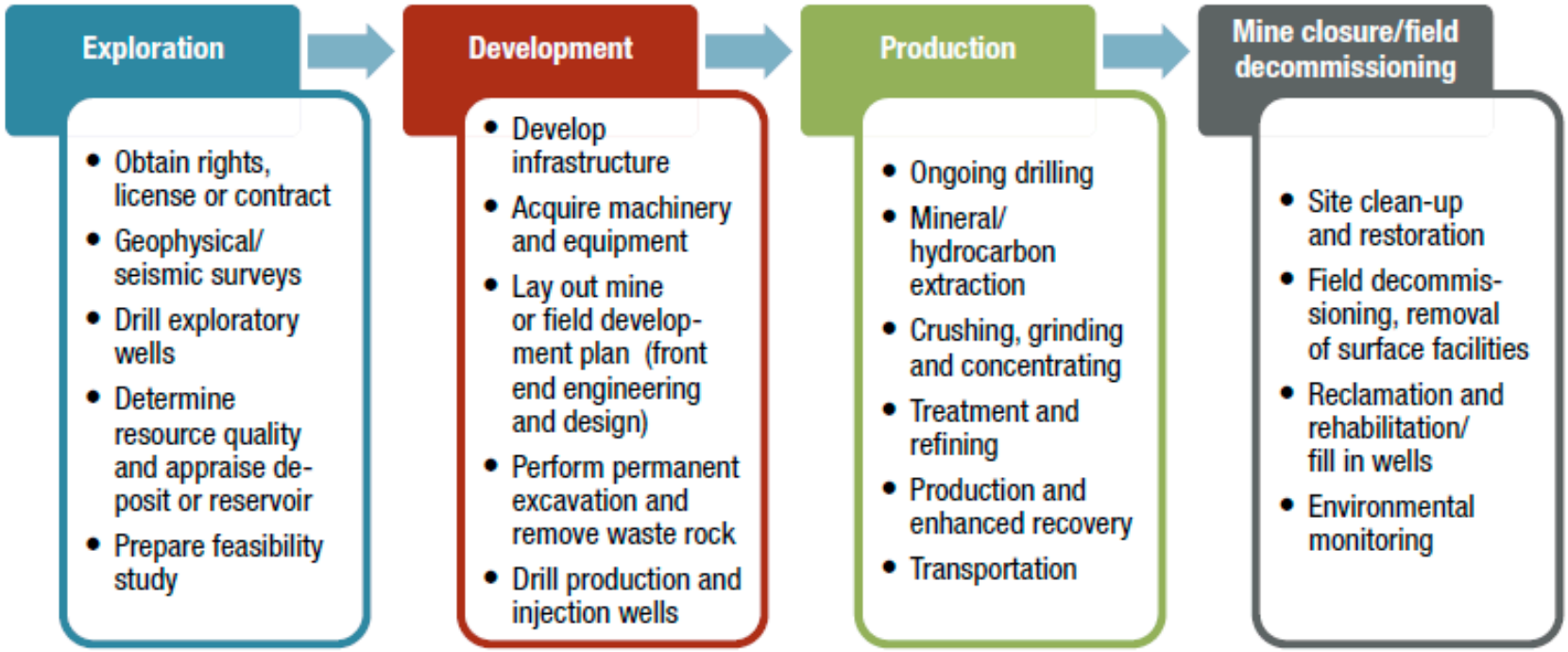
- Interaction between fiscal instruments and individual EI projects cannot be easily inferred from headline tax parameters
- Comparing fiscal instruments individually is often not sufficient: they have to be evaluated as a package
- Without some quantification, it is difficult to tell how two fiscal packages with otherwise identical terms compare with each other when all that differs is one item…
- … and these differences may be amplified or diminished by variations in the underlying project profitability in reaction to changes in prices or costs

STAGES IN THE LIFE OF AN EI PROJECT

What is an EI project?

- A project is defined as **all necessary activities to commercially develop and exploit a mineral deposit or a petroleum field**, also referred to as “upstream activities”
- These activities span from **exploration work** undertaken to identify reserves, to the **development and extraction** of resources, to **closure and rehabilitation**
- The project costs included are usually those directly related to the extraction process, but a facility to add estimated externalities, such as resource depletion or environmental costs, could be added when needed

Lifecycle of a resource project



Exploration phase

- During this phase companies aim to determine the extent and nature of the resource in place
- In petroleum, companies conduct seismic surveys to understand the geological and geophysical characteristics of the area
- It may take between four to 10 years, sometimes longer, from the time petroleum is discovered to the time commercial production begins

Development phase

- Once commercially recoverable reserves are proven, the project advances to the development phase when the companies submit a project development plan and the government awards a production license
- For petroleum projects, development comprises the drilling of production and injection wells and building surface facilities to transport, store, and measure the petroleum extracted
- The development phase is the most capital intensive and usually lasts between two to seven years

Production phase

- Production commences when the resource in the ground are extracted and processed into a commercial product on a continuous basis
- It can span well over 20 years depending on the size of the reserves
- Production may include processing, separation and transportation activities
- Regardless of the production horizon, extraction rights are generally granted for a finite period of time, albeit with extension options in some places

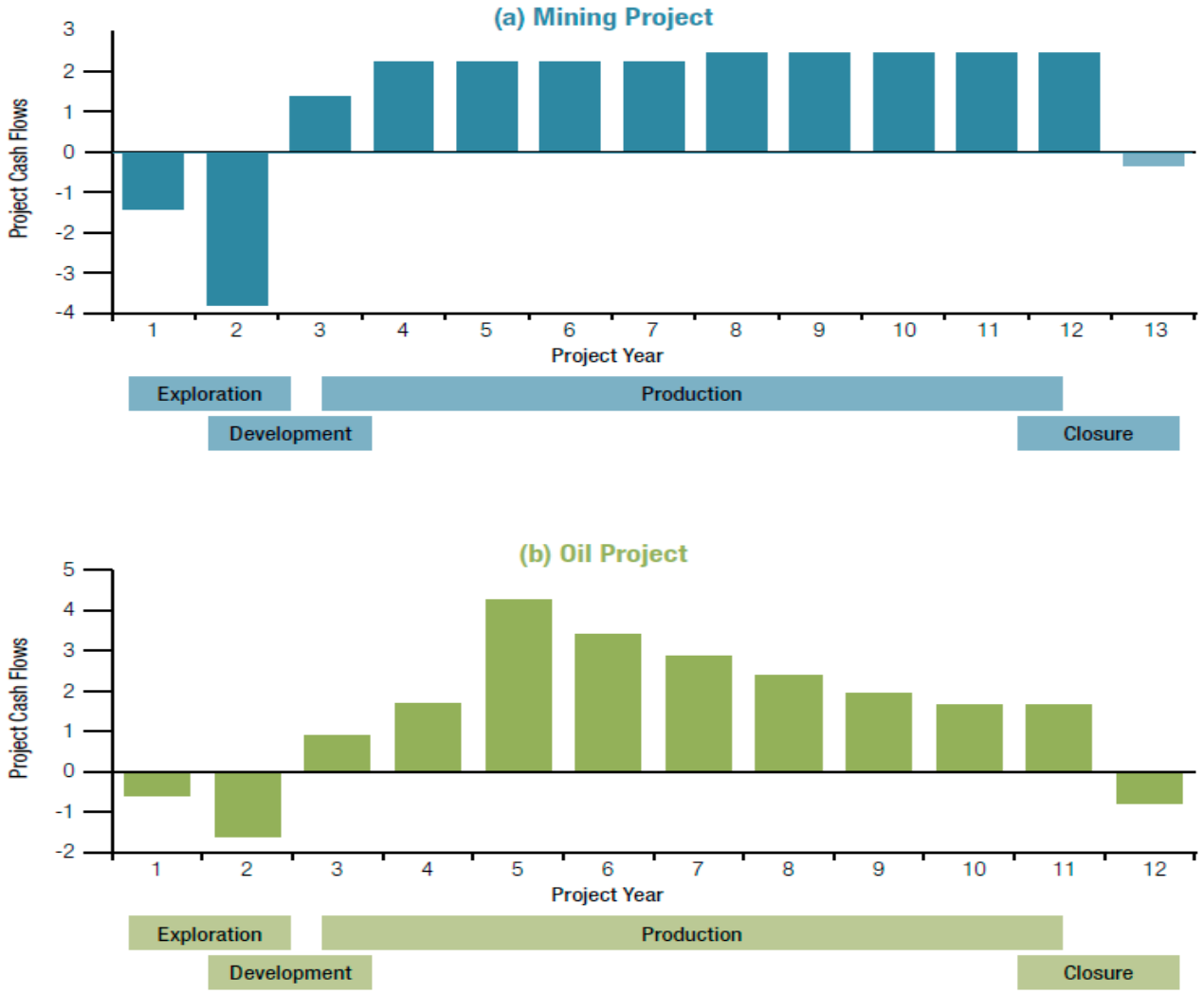
Decommissioning/closure phase

- When reserves are depleted or production is no longer profitable, petroleum fields may be decommissioned
- Depending on the legal dispositions of the jurisdiction where the project is located, companies may be required to restore the site to its original state
- This process can be very expensive, and companies sometimes start to set aside funds to cover these costs when a certain percentage of reserves has been depleted

Project pre-tax cash flows

- The cash flows of a resource project mainly reflect the costs associated with the different phases of the project and the production profile
- Oil fields tend to have a bell-shaped production profile since initial pressure sustains high production rates, but as the oil is depleted and pressure subsides, production falls quickly
- In contrast, gas projects, similar to mining, tend to reach a peak production level early in the project life, and maintain this level until the end of the project

Illustrative cash flows for EI projects



EVALUATION CRITERIA AND KEY METRICS

Neutrality

- A neutral tax does not change marginal decisions about investment or production that would have been made in the absence of the tax
- In extractive industries (EI), a neutral fiscal regime will not alter the order in which projects are undertaken, the path of extraction, decisions about re-investment or early abandonment

Revenue raising capacity

- The revenue raising capacity of a fiscal regime is illustrated by the total amount of revenues a government can expect to collect from an EI project through all the instruments that make up the fiscal regime
- In addition to the absolute value (or share), the time profile of government revenues is also important.

Adaptability and progressivity

- A progressive fiscal regime is one that responds flexibly to changes in economic circumstances
- Progressivity, however, also implies higher risk for the government…
- A progressive regime will yield a rising net present value (NPV) of government revenue as the pre-tax rate of return of a project increases… but it will also raise little or no revenue if the project profitability is low

Stability and timing of receipts

- Stability and timing of receipts are important for the design of the tax system where there is high government exposure to this volatile source of revenue
- The more a government prefers such stability, the more it will favor fiscal instruments that are related to volume or value of production, and less towards taxes based on profits or cash flow

Investor perceptions of risk

- If companies are risk-averse, they will attach greater weight to outcomes falling below the mean of a probability distribution of expected outcomes
- Therefore, reducing the risks perceived by investors may reduce their required rate of return and raise the amount of rent available for collection

Selected profitability indicators

- **The post-tax NPV** is the discounted present value of the total stream of net cash flows received by the investor over the life of the project
- The **post-tax IRR**, or the discount rate at which the NPV of the stream of cash flows is zero. The IRR in this case is the return on total funds (whatever the proportions of equity and debt)
- The **payback period** occurs when the cumulative cash inflows from production are sufficient to recover the cumulative cash outflows incurred with exploration, development, operating costs and taxes

Government indicators

Average Effective Tax Rate

- Government revenues as a share of pre-tax net cash flow
- At various discount rates

Marginal Effective Tax Rate

- Proportion of pre-tax return taken in tax, for a project which just reaches the hurdle rate post-tax

Share of Total Benefits

- Government revenues as a share of revenue minus operating cost (quasi-rents)
- Cash flows available to meet investment, return on investment, and taxes

Breakeven Price

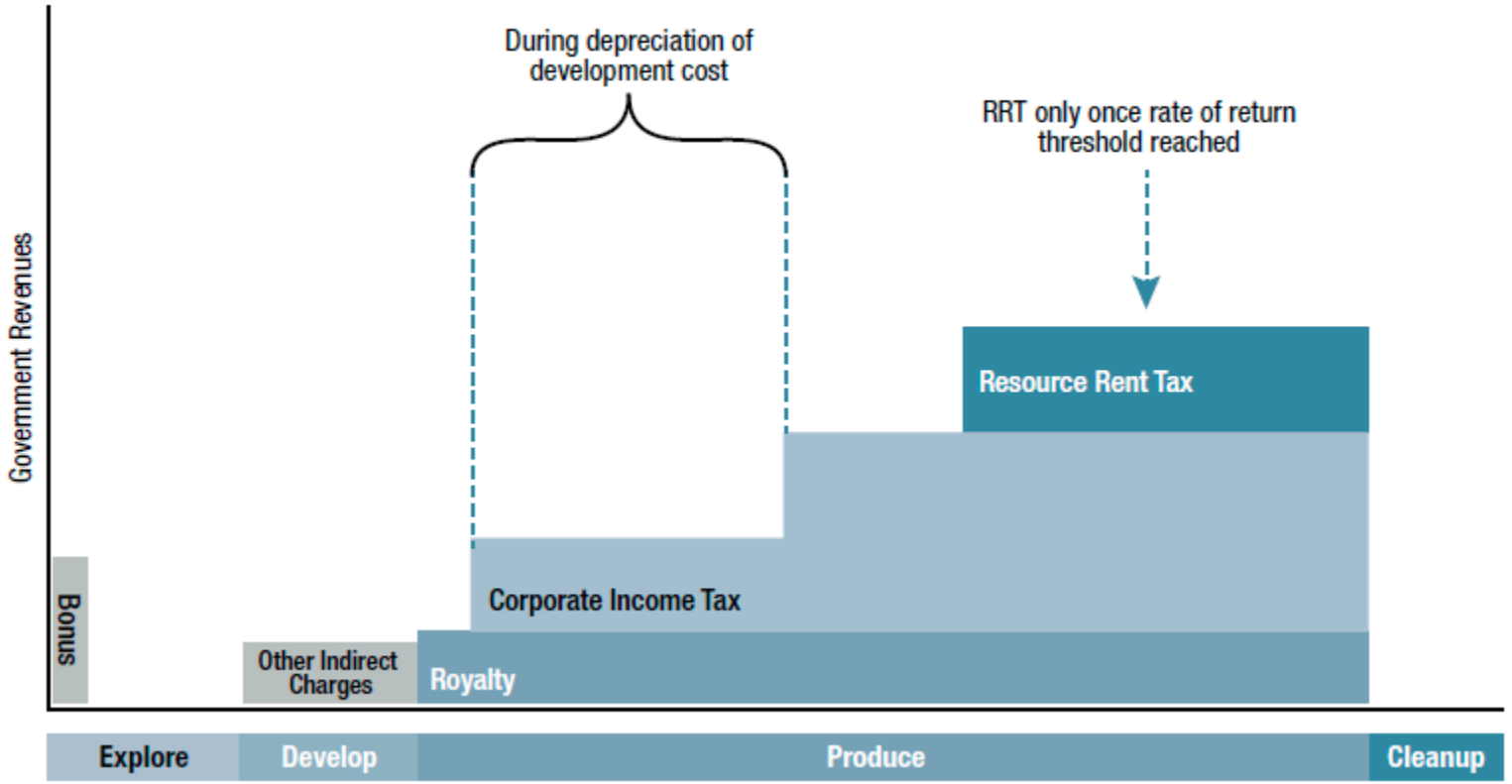
- Price required to achieve a minimum post-tax IRR required by the investor

Time profile of government revenue

- In addition to the NPV of total government revenue over the life of the project, it is also important to observe the annual revenue flows
- Different types of instruments will ensure different timing of government revenues and the choice among these instruments will determine the sharing of risk between the government and investor
- At one end of the spectrum, royalties ensure early and stable receipts to the government but they usually remain a relatively modest source of revenue particularly when the profitability of the project increases over time.
- At the other end of the spectrum, rent-related taxes or profit-based production mechanisms are triggered later in the life of the project, but are more responsive to increases in profitability

Time profile of government revenue (2)

Production and indirect taxes raise revenue early on, while profit-related instruments later in the project life.



Other indicators easily calculated

- Sensitivity analysis with respect to prices, costs, production, discount rates
- Probability distribution of NPV/IRR and variance of returns using stochastic routines
- Tax induced negative NPV

QUESTIONS?