

# CHAPTER 3 – [www.eisourcebook.org](http://www.eisourcebook.org)

## 3.1 Common Features

**Long, Risky, and Costly Exploration and Development Periods** Each of the EI sectors is characterized to a greater or lesser degree by long, risky and, in the case of oil and gas, costly and exceptionally capital-intensive exploration and development periods<sup>1</sup>. For a state that wishes to go it alone in the EI sector, these features mandate significant financial resources, and an economy with sufficient diversity to allay concerns about EI sector investment risk.<sup>2</sup> For states that, more typically, choose to attract and rely upon international investment, these features underscore the importance of having in place a legal, contractual, and fiscal regime that investors are able to understand and trust. These states must also satisfy a political track record that can provide investors with reasonable assurances against adverse changes in terms if a major discovery has been made and/or exploitation is underway (see **Chapter 4**).

*The challenge here is that the conditions and assumptions that exist at the beginning of a project, at the time when laws are to be drafted and contracts awarded, are almost certain to change in the course of the length of the project investment. When they are made, there will usually be great uncertainty about the sector's potential, based on what is known about the geology at the time of exploration and also about the economics, markets, risks and politics. The incentive for a state to revisit the terms of the initial bargain struck is increased by the shift in bargaining power that occurs in the event of a commercial discovery and a substantial investment by the foreign investor.*

**Sophisticated Management and Specialized Technology** A second common feature is the dependence of the EI sectors on sophisticated management and specialized technology<sup>3</sup>. This dependence has a bearing on the development of host state institutional capacity. States developing their EI sector must have sufficient institutional capacity to adequately oversee sector operations, but also for adopting the competitive licensing, contractual, and fiscal regimes that are required to attract needed skills and technology (see **Chapter 5** and **Chapter 7**).

---

<sup>1</sup> For large mining projects, this distinction will be less apparent.

<sup>2</sup> See Boadway, R., and Keen, M. (2010). Theoretical Perspectives on Resource Taxation Design. In: Daniel, P., Keen, M. and McPherson, C. (eds.). *The Taxation of Petroleum and Minerals: Principles, Problems, and Practice*. London: Routledge.

<sup>3</sup> This clearly does not include the ASM sector but it is nonetheless an integral part of EI generally.

*Looking beyond the short term, the challenge here lies in finding ways of enabling a transfer of expertise and sourcing of business to local firms so as to ensure a long-term benefit to the domestic economy.*

**Asymmetric Access to Information** Partly due to the complex management skills and technology that characterize the EI sectors, a third feature common to EI sectors in developing states is the informational disadvantage that governments have vis-à-vis international investors and operators.<sup>4</sup> The government is likely to be better informed as to its own future fiscal intentions but the private investor undertaking exploring and development will probably be better informed on technical and commercial aspects of a project. This has important implications for the design of license or contract award procedures, fiscal design, and fiscal administration as well as the engagement of outside technical assistance. It can also be the root of subsequent dissatisfaction by a government about the terms negotiated with investors by its predecessor(s) and trigger demands for a review of those terms.

With increasing sources of competition in the EI sector, and the role of national resource companies, this is less of a problem than it once was. *This remains a challenge however for many governments in resource-rich economies and is compounded by a tendency of some of them to be overly secretive about such information once it has been obtained.*

**Price Volatility** A fourth feature common to both the petroleum and mining sectors is the volatility of prices, costs, and rents. The extreme volatility of prices not only poses macroeconomic management challenges, but also raises issues with respect to the design of fiscal terms. A fundamental policy issue with which governments must constantly grapple is the question of who should bear the risk of price and revenue volatility: the investor or the government?

The volatility or variability of costs receives much less attention, but deserves more. EI costs vary widely across time, and especially across projects, creating significant issues for both the design of fiscal regimes and their administration. When costs soar for investors, as can happen in both mining and hydrocarbons sectors, tensions with governments are likely to result from the necessary remedial actions. Rents (discussed below) are also volatile as a result of dramatic fluctuations in price (see **Figure 2.1** on oil prices in **Chapter 2** above).

---

<sup>4</sup> On the asymmetric information and principal-agent problem, see Stiglitz, J. (1989). Principal and Agent. In: Eatwell, J., Milgate, M., and Newman, P. (eds.). *The New Palgrave. Allocation, Information and Markets*. New York: W. W. Norton; see also Nutavoot, P. (2004). *Partnerships in Oil and Gas Production-Sharing Contracts*. *International Journal of Public Sector Management*, Vol. 17, Issue 5, pp. 431-442.

*The challenge lies less in the wide variability of prices than in the difficulty in predicting them. Most forecasts about pricing turn out to be wrong<sup>5</sup>. And the consequences can be severe: apart from the impacts of variation on the size of resource rents, long-term price trends can make reserves uneconomic for investors to extract, even if technology has improved, and can leave assets stranded.*

**Substantial Rents** Both the petroleum and mining sectors are capable of generating very substantial economic rents. By 'rent' is meant the excess of revenues over all costs of production, including those of discovery and development, as well as the normal return to capital. The cost of extraction can be significantly less than the price that the resource can obtain on the market, not least when there is an important oligopolistic element in world markets as is the case with oil and some minerals. These rents can be a very attractive tax base for governments on both efficiency and equity grounds<sup>6</sup>. Rent capture for the state without prejudice to investment requires care in design of the fiscal regime, particularly since rent revenues can be highly volatile. By way of illustration, the average profit measured in per cent of revenues among EI companies was between 25-30 percent in 2006. This compares with less than 20 percent for the pharmaceutical industry and with a mere five per cent for the EI sector in 2002<sup>7</sup>.

*The challenge for some states will lie in the volumes of resource wealth, which will strain the capacity of the existing state system, aggravate capacity problems and create tensions in its relations with investors in turn.*

**Adverse Environmental and Social Impacts** The EI sectors can have major adverse environmental and social impacts. In the past, these issues have not always been well-recognized or addressed by governments, but good practice has improved greatly over the past two decades. Avoiding or mitigating these impacts depends on appropriate legislation or regulation, enforcement capacity, and fiscal regimes that incentivize good behaviour by the investor, while recognizing the costs involved and the need to internalize those costs.

*As more and more EI companies sign up to international standards or implement their own in these areas, the challenge for many governments is to ensure that local communities, indigenous peoples and other affected citizens are able to participate in decisions relating to the exploitation of the resource and benefit from the development of the resource.*

---

<sup>5</sup> IMF (2012) 10.

<sup>6</sup> IMF (2012) 10.

<sup>7</sup> Ericsson, M., *Mining Industry Corporate Actors Analysis* (2012), p. 1.

**Resource Exhaustion** By their nature, oil, gas, and mining resources are non-renewable<sup>8</sup>. They will eventually be exhausted. This critical feature distinguishes these industries from most, perhaps all others, and presents policy makers with a number of important issues, ranging from decisions on optimal rates of exploration, development, and exploitation (through fiscal regime design) to appropriate frameworks for macroeconomic planning. It can act positively to encourage fiscal discipline and long-term planning about how much of the resource wealth to consume and how much to save<sup>9</sup>.

*The challenge for governments is rather to take the finiteness of presently identified resources into account in their domestic planning and in their dealings with foreign investors, rather than to prepare for some kind of unlikely ‘resource apocalypse’ when exhaustion occurs.*

**Prominent Political Profile** Long viewed as strategic because of their pervasive influence on the economy and the scale of the revenues they generate, the petroleum and mining sectors have always attracted political attention. In certain circumstances, this attention can frustrate, or at least increase, the difficulty of introducing good sector management practices.<sup>10</sup> Every effort should be made to minimize this.

*Transparency may present challenges to both governments and investors but helps to diminish the risk of rumour and speculation among citizens about resource wealth management.*

**Enclave Status** The production of minerals and hydrocarbons is often done in economic areas that are small in scale, and geographically limited, with relatively few linkages to the rest of the economy. For offshore petroleum (both oil and gas), the remoteness from centres of population is even more evident.

*There is generally agreement now that the challenge for governments and investors is to ensure that such investments are designed or shaped so as to trigger wider developmental impacts.*

**Lack of location mobility** In contrast to many other economic sectors, the extractives industries are less mobile about location decisions. They have to locate where the resource is, increasing the prospects for conflict.

---

<sup>8</sup> Note however that metals can be recycled to reduce the demand for virgin sites.

<sup>9</sup> “The importance of the finiteness of petroleum and mineral deposits to long-term economic performance and commodity price developments is questionable”: IMF (2012), p.12. Proven oil reserves, for example, have continued to rise in spite of increasing consumption levels.

<sup>10</sup> Van der Ploeg, F., and Venables, A. (2009). *Harnessing Windfall Revenues: Optimal Policies for Resource-Rich Developing Economies*. Conference on Public Sector Economics, April 24-29, Munich, Germany. Available at: [http://www.cesifo-group.de/portal/page/portal/CFP\\_CONF/CFP\\_CONF\\_2009/Conf-pse09-vanderPloeg/Conf-pse09-papers/pse09\\_van%20der%20Ploeg.pdf](http://www.cesifo-group.de/portal/page/portal/CFP_CONF/CFP_CONF_2009/Conf-pse09-vanderPloeg/Conf-pse09-papers/pse09_van%20der%20Ploeg.pdf) (last accessed 22 May 2012).

*This feature underlines the importance of community and local engagement if a project is to enjoy a sustainable relationship in the long term.*

**Innovation** Both hydrocarbons and mining industries are characterized by a high degree of innovation. In the former, for example, the introduction of hydraulic fracturing or ‘fracking’ on a commercial scale has made their extraction more similar to conventional mining. In copper mining, the introduction of new techniques has increased processing efficiency significantly and as a result production has continued to increase in spite of a decline in the quality of grades of ore mined.

*The greatest challenge to governments in producing countries lies in the unexpected implications of innovation for policy design: for example, unconventional oil and gas discoveries on a large scale in the USA have implications for coal use in Asia and for the prospects for new gas discoveries in East Africa.*

**CEPMLP**

**Centre for Energy, Petroleum and Mineral Law and Policy**