The Distribution of Economic Benefits from Mining

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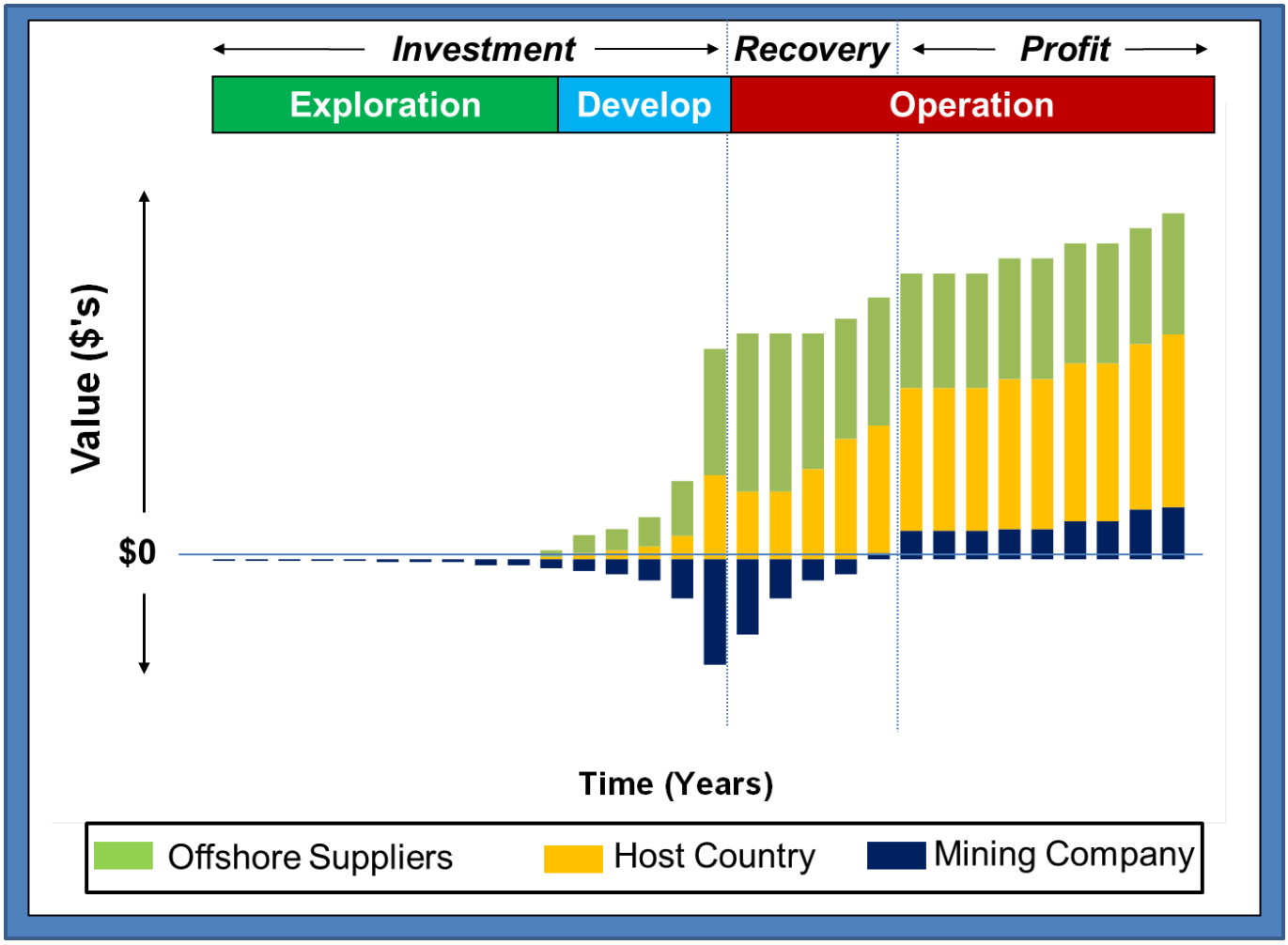
Dr. Thomas Brady (with microphone), Chief Economist at the Newmont Mining Corporation, participating in the J.P. Morgan Center for Commodities' (JPMCC's) Research Council meeting in the Center's CoBank Lecture Hall on December 4, 2015. Mr. Robert Greer, Scholar in Residence at the JPMCC, is on Dr. Brady's left.

Literature on the economic contribution of mining to host countries tends to focus on the royalties and taxes that governments levy on mineral extraction as the primary sources of benefits a country receives from a typical mining operation. Less understood, however, are the other, and significantly larger, sources of economic value including supply chain expenditures, employment and other economic benefits that host-country communities and governments receive as the result of mining activities. Governments that ignore these wider, holistic benefits are at risk of limiting the economic returns generated by mining activities within their borders.

The Mining Life Cycle

Critical to understanding the distribution of economic benefits from a mining operation are the time and capital requirements to discover, develop and profitably operate a mine. Figure 1 displays the life cycle of an example mine and associated cash flows (or economic value generated).

Figure 1
Example Mine Life Cycle and Economic Value Timing



Source: Newmont Mining, "Ghana Chamber of Mines Addendum to Response to IMF Questions," 2010.

As shown, upon receipt of necessary government approvals, the exploration phase of a potential mine begins as the mining company (blue bars) invests in drilling and other exploration activities and resource modeling to determine the economic viability of a potential mine.[1] This phase may last 10 or more years. If an opportunity is estimated to be profitable under expected metal prices, expected production, capital and operating cost and cash flow assumptions, the company may decide to advance the project to a construction and development phase, which typically requires an additional two to five years, depending on the complexity of the project. It is during this phase where a company invests significant

financial resources. For example, Newmont Mining is currently developing a gold mine in Suriname where development costs are expected to approach $1B; however, larger and more complex projects can require many multiples of this level of investment.[2]

Upon the decision to develop a mine, host countries and offshore service providers begin to receive immediate revenues (yellow and green bars.) For host countries these include not only payments to a government (in the form of import duties, employment, corporate and other taxes received from both on- and offshore service providers, contracted by the mining company.) The split of economic value retained by on- and offshore contracted suppliers reflects the reality of mining. In most host countries, a significant portion of the equipment and input commodities (steel, fuel, etc.) need to be imported to conduct construction and mining activities.[3]

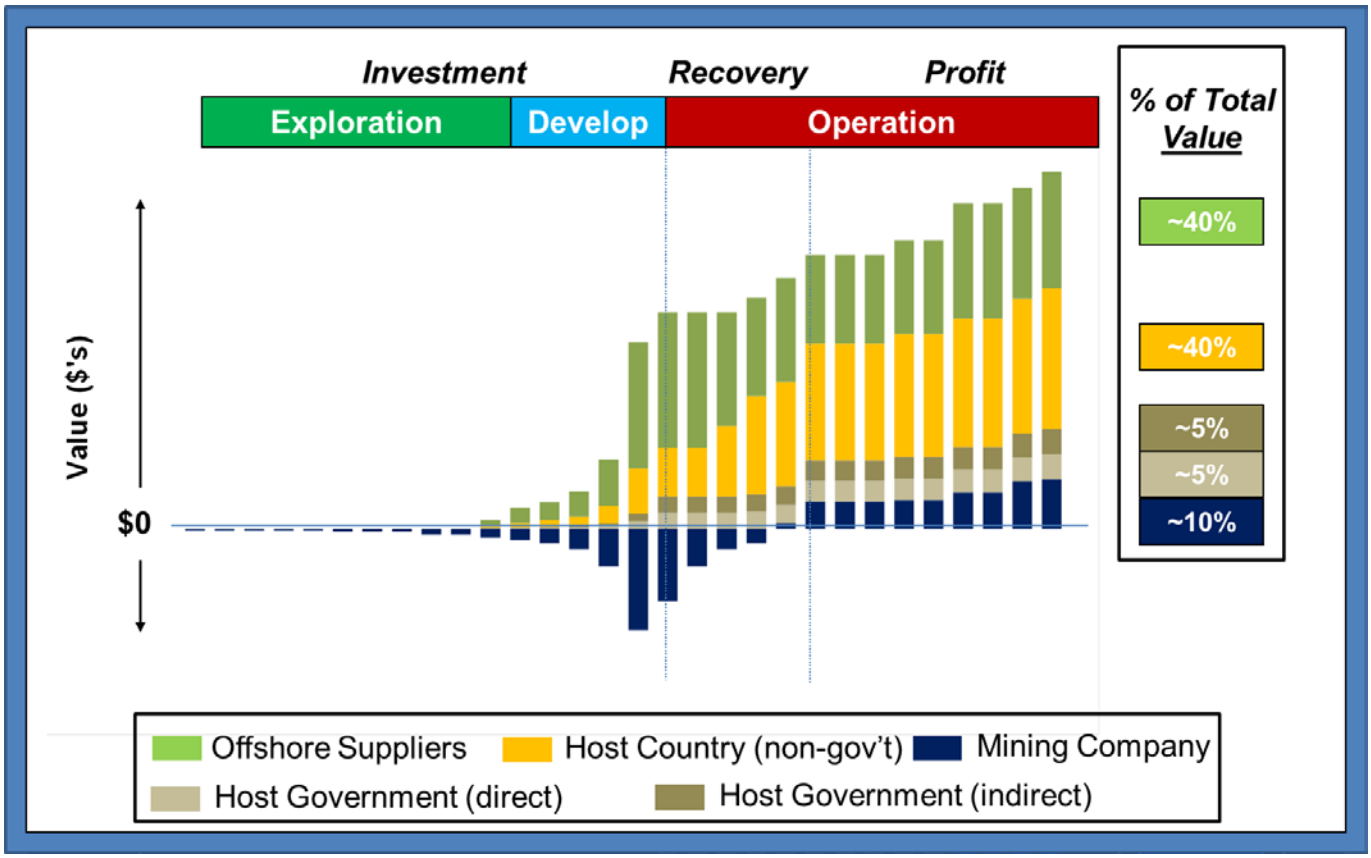
Depending on the deposit geological characteristics, the operational phase of a mine may extend for many decades (note, however, current gold mining projects typically have much shorter mine lives, averaging only 10 to 15 years.) The first revenues received by the company during the operational phase are used to recover the capital investments incurred during the exploration and development periods and/or to fund additional development of the mine if projected to be economically viable. As such it may take many years until a mining company actually makes a profit. Host countries, on the other hand, receive employment taxes as well as production taxes and royalties and other payments immediately and these payments last throughout the operational life of a mine. Importantly, the economic values generated by on- and offshore service providers also continue as replacement parts and input commodities are required (fuel, electricity, etc.) Once all economically viable ore has been extracted, a mine will enter a decommissioning and closure phase.

Distribution of Economic Benefits

Literature related to the economic value received from mining typically highlights that royalties and taxation are the principal sources for host government. However, by far, the most significant means by which value flows from mining firms to host countries is through payments to suppliers and contractors and wages paid for employees (in other words more value is generated from the activities of mining firms rather than through royalties and direct taxation). Figure 2 expands on the previous figure displaying the approximate sources of economic value over the life of a typical mine, including the breakout of direct and indirect benefits received by host country governments.

As shown, on- and offshore contracted firms of the mining company retain the vast majority of economic value (evenly split at approximately 40% each.) These firms provide the necessary capital and operating inputs required to build and operate a mine and include costs for steel and electricity required to build and operate mining and processing facilities, haul trucks and other mining equipment as well as fuel and other inputs. Direct payments to governments by mining firms, in the form of employment and corporate taxes and applicable dividend and royalty payments approach 5% of total value. Governments typically receive an additional approximate 5% of value indirectly as contracting firms pay their own employment and corporate taxes.

Figure 2
Approximate Revenue Breakdown from Gold Mines in Ghana



Source: Newport Mining, "Ghana Chamber of Mines Addendum to Response to IMF Questions," 2010 and ICMM, "Mining in Ghana – What Future Can We Expect," 2015.

Surprising to many is that profits received by mining companies typically represent only ~10% of the total value generated by a mine. As mentioned earlier, these profits are used to repay funds expended during the exploration and development phases of the mine. In addition, mining firms generally allocate nearly 1% of value to local community and social investment programs. Overall, mining companies and host-country governments tend to retain equivalent value from a mine.

Other Sources of Economic Value

Mining, unlike many manufacturing businesses, typically occurs in rural, less economically developed regions where job creation is scarce and poverty-level subsistence living is widespread. A recent study on mining in Ghana estimates that the approximately 7,000 citizens directly employed by mining companies in the country, there are nearly 110,000 additional jobs in the wider economy, including individuals employed at local firms used throughout the supply chain (approximately 70,000) as well as the induced positions resulting from re-spending of salaries (nearly 40,000). Direct, indirect and induced job creation result in an employment multiple of approximately 15 to 1.[4]

In addition to job creation, the benefits of mining include training and community development. Overall, mining companies generally allocate ~5% of payroll expenses toward training activities, targeted toward health and safety and technical skills to both direct and indirect (contractor) personnel. These skills result in increased productivity and are eventually transferable to other segments of an economy.[5] Creating and maintaining the social acceptance to operate with local communities is critical for the success of any mining operation. Community investments in education, health, housing and other infrastructure projects help address social issues in local areas. The World Gold Council estimates that on average, mining companies spend approximately 1% of total revenues on community investments. The economic value of any mining opportunity can only be realized if the social and political environments enable production.

Conclusions

Both host country governments and non-governmental organizations have tended to focus on royalties and tax payments as the primary methods of extracting economic value from mining operations. However, a more holistic perspective is required as significantly more value is generated due to expenditures by mining companies in their supply chains and on employee wages. Approximately 80% of the value generated by a mining operation flows evenly toward the on- and offshore suppliers that are contracted by the mining company. By contrast, production royalties, employment and corporate taxes and other payments to governments approach only 10% of the overall value from a typical mine. Following the exploration and development phases of a mine, the mining company eventually realizes the remaining 10% of value, from which prior investments are recovered and future investments can made.

Governments attempting to extract higher royalties and taxes are at risk of:

- Decreasing the minable reserves at existing mining operations and thus shortening the life of an existing or potential mine. This is turn, results in reduced employment and supply-chain spending, the larger sources of economic value; and

- Reducing the incentive for mining companies to invest in exploration opportunities within the country.

Overall, given the magnitude of capital investment and length of time required to explore and develop an operation, mining companies require stable legislative environments: uncertainty reduces the incentive to invest and thus halts economic values that can be realized. As a result, this article recommends a careful analysis of the holistic benefits of mining by host countries.

Endnotes

1 Estimates do vary, however, within the gold sector, in general less than 1% of prospecting exploration prospects eventually meet economic thresholds to become a viable mining operation.

2 Importantly, these investments are funded through the cash flow from a company's current operations or via the capital markets (debt, equity and/or other financings).

3 For example, it is not practical to assume that large-scale mining equipment can be purchased through local (or onshore) providers as these industries generally do not exist within a country. As a result, this equipment is purchased from large, global companies such as Caterpillar and/or Komatsu and then imported into the host country, from which governments receive duties and other payments.

4 ICMM, "Mining in Ghana – What Future Can We Expect," 2015.

5 World Gold Council, "The Social and Economic Impacts of Gold Mining," 2015.

Author Biography

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Thomas (Tom) Brady is currently the Chief Economist at Newmont Mining Corporation and is responsible for generating the company's assumptions of key metal and energy commodity, foreign exchange and cost escalation rates. Previously at Newmont, Dr. Brady led the Strategic Planning function that developed and implemented portfolio modeling analytics and also held positions in Investor Relations, Treasury and Corporate Development.

Previously Dr. Brady was a Senior Manager at Risk Capital Management, a consultancy that advised energy and natural resource companies on financial risk, valuation and commodity hedging. Dr. Brady has also worked with CQG, Inc. where he developed a suite of automated trading systems for commodity futures contracts using the company's short-term, price and volume charting methods.

He holds a Ph.D. in Mineral Economics with research emphases in commodity markets from the Colorado School of Mines. In addition, Dr. Brady holds a Master's degree in mathematics, also from the Colorado School of Mines.

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