

## **Aggressive Predator or Passive Investor: Multinationals in the Mining Industry - A Case Study in an Emerging Country**

*Eric Baxter and Charles McMillan*

**Abstract:** This paper is a case study of foreign direct investment in a large gold mine in a developing country, Kyrgyzstan, located in Central Asia. Using a cost-benefit economic framework, this exploratory study addresses the investment and income stream for the foreign investor, Cameco Corporation, a leading Canadian multinational enterprise, as well as the economic and financial net benefits for the host country. Related issues in the case include analysis of the Resource Curse, the limited development of institutions and property laws in the host country, and the impact of this mining project on incoming foreign direct investment in Kyrgyzstan.

**Keywords:** extractive industries, resource curse, global mining, Central Asia, institutional knowledge, cost-benefit

---

### **1. Introduction**

This paper is a case study of foreign direct investment (FDI) in a gold mine in Kyrgyzstan, a former republic in the Soviet Union, located in Central Asia. Management theorists and international business school scholars rarely deal with extractive industries, and the class of international organizations called mining firms (Kraemer & Van Tulder, 2009)<sup>1</sup>. Indeed, and more technically, firms in extractive industries, sometimes called primary industries, can be sub-divided into two types, truly exhaustible (oil and mining) and potentially renewable via sophisticated tools like sustainable yield and optimal rotation, e.g. in forestry, agriculture, or fishing (for an overview, see Bradley, 1973; Dasgupta & Heal, 1979). Resources can be supplemented by recycling, such as in aluminum, copper, iron or steel.

Historically, mineral economics dates from 18<sup>th</sup> century classical philosophers and the writings of Thomas Malthus, David Ricardo and William Jevons (author of *The Coal Question*, a study of an exhaustible resource), focusing on the long-run availability of nonrenewable commodities, the threat of supply interruptions and the economic and policy issues associated with the exploration, the production and the use of mineral commodities, at both the corporate level and for governments. Today's literature owes much to the theories of H. Hotelling's classic 1931 paper. Clearly, there are broad differences within extractive industries. Mineral ores are severed from the earth's crust and their mineralogy is of vital importance to manufacturing industries. Oil and gas, on the other hand, are extracted from the pores of reservoir rocks remaining in situ, of primary interest for the physical characteristics at depth, such as permeability but not for their mineralogy. Some minerals like antimony and zinc are elemental metals occurring in mineral ores, typically sulfides.

By applying detailed financial flows, this case study examines the costs and benefits from the perspective of the mining company, Cameco Corporation, a leading Canadian multinational, and the host nation, the Kyrgyz Republic. Using corporate data, public statistics and journalist sources, the paper addresses the issue of net benefits to a transitioning country of mining investment. Gold mining, like most mineral extracting industries, is a three-part process: exploration (prospecting for the mineral, mainly by small companies using sophisticated geological techniques), feasibility analysis (testing if the reserves are real, and the financial and economic viability of the site, including infrastructure needs, usually in remote areas) and actual gold production. In the extractive sectors, the motives for internationalization vary, depending on investments in the different stage of the value chain – resource seeking, efficiency seeking, or market- or asset-seeking (Dunning & Nurala, 2005). Over time, most mining firms finance large projects through public markets, either as IPOs, mergers with existing mine portfolios, or as stand-alone or joint ventures.

In theory, cost-benefit of foreign investment for a host country is a net sum concept. Host country benefits come from inward financial flows, including the multiplier of management skills, production expertise and technical knowhow, as well as employment creation, spin-offs from procurement and tax and royalty payments, less the depletion of exhaustible inventory of the resource (presumably fixed) and associated public costs of the mine, including environmental damages, the regulatory regime and infrastructure (Johnson, 1971). Related issues to foreign investment in exhaustible resource sectors include the political dimensions for the host state, the tax and royalty regime and the impact of the resource curse when the economy is dependent on a single industry or investment project. The traditional bargaining power model is between firm and host nation places multinationals with huge technological advantages (Vernon, 1971; Yergin, 1991). The rise of China and India and their demands for resources has shifting the bargaining strength for resources-in-the-ground commodity-rich host governments that learn to exploit their comparative advantage strengths (Ramemurti, 2001; Dunning & Narula, 2000). Emerging countries with commodity resources now receive advisory services of international agencies like the UN, the World Bank, the Asian Development Bank and powerful NGOs (McMillan, 2007), a point developed in Yergin's (1991) updated analysis of his best selling work, *The Prize*.

## **2. Theoretical issues in FDI in mining**

Today, mining is a global industry, with complex value chains. It is profoundly capital-intensive, increasingly technology-intensive and combines thousands of small firms, dominating the exploration-end (discovering ore bodies) and oligopolistic, scale-driven for production and raising capital for new projects. It also combines both big and small firms in numerous countries performing specific and specialized tasks, as suppliers, contractors, geologists, technical consultants and downstream sellers, including large retailers like Tiffany's and Wal-Mart, the largest jewelry firm in the world. Before the break-up of the Soviet Union in 1991, and market reforms in relatively closed economies like China, Vietnam, or even India, the mining players came from the advanced economies and leading extractive MNEs. Leading mining countries developed institutions and laws that had varying degrees of nationalist policies, from public ownership ownership, government regulation, tax and royalty policies and treating mineral resources as a public good. Less developed countries often exploited mineral resources, sometimes with foreign firms, by bureaucratic fiat, non-transparent connections to political elites, and domestic and foreign ownership laws and regulation favouring particular firms, or less transparent policies for all firms, regardless of actual ownership.

## A Case Study in an Emerging Country

In the recent past, this mix of laws and regulations differed dramatically from the rich, advanced countries and poorer, developing economies. Yet advanced countries also differed in significant ways, such as ownership policies, laws governing foreign investment, royalty regimes and tax policies. In Canada, for instance, the constitution means that mining laws are a provincial responsibility, so there are intra-nation differences, compared to a single national jurisdiction like Norway, Chile, or South Africa. Toronto and London are now the centers for mining finance<sup>2</sup>, Canada, Switzerland and Peru for sophisticated refining of gold bars to almost 100 per cent purity.

Historically, mainstream thinking and economic analysis about the mining sector derived from the institutional school in economics (Singer, 1950), and the staple theories of Harold Innis (1954). This large literature prescribed a long term, downward trend in commodity prices, relative to those of manufactured goods, based on high inelasticity of resources relative to income, echoing Engel's Law that higher family income leads to less spending on food (McMillan, 2007). As the wealth of a country increases, there is less demand for commodities and extractive industries face an inevitable decline in prices.

More recently, in part from neo-Malthusian worries about over-population and shortage of global resources, e.g. oil, and political activist reports like *The Limits to Growth* (Meadows & Meadows, 1962, 2005), academic interest in exhaustible resources is much more mainstream, especially in the growing field of resource economics<sup>3</sup>. This literature extends to topics like staple theories of economic development, environmental analysis, conservation, and geography and trade. Mainstream economic analysis stems from the pioneering work by Hotelling (1931), who examined the relationship between mineral companies and governments (with particular attention on land use, taxation regimes and other ways of sharing the benefits from mining), economic and financial project evaluation (now including environmental analysis) and downstream-manufacturing, market analysis (price and demand forecasts), industry structure, and monopoly and antitrust issues. Today, with the growing impact of globalization, the global division of labor and the huge commodity needs of countries like China and India, representing forty per cent of the world's population, interest in exhaustible resources is the centerpiece of mining firms, consultants and emerging countries.

Recent work on exhaustible resources comes from new conceptual frameworks and theorizing, given the global focus of mining on diverse sectors like retailing (jewelry) and electronics, impacts on emerging markets, and mill locations in sensitive ecosystems. For instance, it has been estimated that nearly a third of exploration and mining sites are situated in intact ecosystems of high conservation value (Miranda, Burris, Bingcang, Shearman, Briones, La Viña, & Menard, 2003). Furthermore, specific minerals like gold or copper are rarely found alone, so the extraction system requires a blend of chemicals (e.g. arsenic, acids) to help decomposition, with large waste pools exposed to the environment. Academic contributions to exhaustible resources stem from the theoretical analysis of Harold Hotelling (1931), whose comments 80 years ago are still valid today:

*Contemplation of the world's disappearing supplies of minerals, forests, and other exhaustible assets has led to demands for regulation of their exploitation. The feeling that these products are now too cheap for the good of future generations, that they are being selfishly exploited at too rapid a rate, that in consequences of their excessive cheapness that they are being produced and consumed wastefully, has given rise to the conservation movement.*

Robert Solow (1974), reviving interest in Hotelling's (1931) pioneering analysis of exhaustible resources, points out that a mineral deposit like a gold mine, whose value arises from the potential for extraction and sale, is a capital asset to its owner and to society at large. Indeed, exhaustible resource theory predicts that prices, in a competitive market, will rise in a predictable demand pattern due to increasing scarcity. The essence of the economics of exhaustible resource like mining is what Solow (1974) calls the Hotelling  $r$ -per cent rule. The price of an exhaustible resource (i.e. the real market value of an exhaustible resource in the ground) grows at the market rate of interest, i.e. the percentage change in net-price per unit of time equals the [discount rate](#) in order to maximize the present value of the resource capital over the extraction period.

The Hotelling  $r$  rule can be expressed by the equilibrium situation representing the optimal solution,

$$P'(t)/P(t) = \delta$$

when  $P(t)$  is the unit profit at time  $t$  and  $\delta$  is the discount rate.

The economic rent obtained is often referred to as resource rent, generated from a situation where the resource owner has open access to the resource for free. The resource rent therefore equals the shadow value of the natural resource, or natural capital; the concept of resource rent also includes biological and other renewable resources (Minnit, 2007; Stiglitz, 1976).

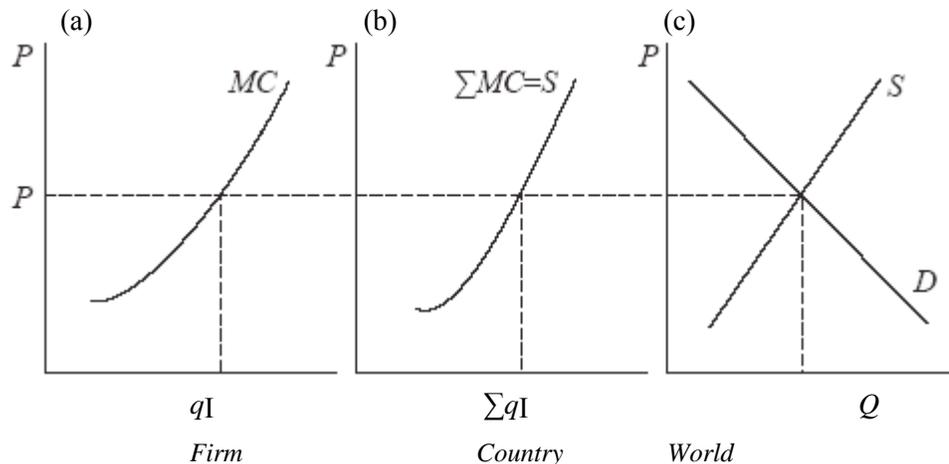
Historically, global demand for gold has two purposes: as a hedge against political uncertainty, wars, and social unrest and as an extremely malleable metal for sectors like jewelry, electronics and even dentistry (McMillan, 2007). Employed as an inflation hedge and political turmoil (recently, the Arab Spring), individual gold hoarding is correlated with general political uncertainty - Argentina in the late 1990s, Greece and the Eurozone in 2010. With globalization, very large consumer markets of China and India, with traditionally low domestic gold output, have rekindled and stimulated academic and geological interest in the optimal and sustainable exploitation of exhaustible resources. Hotelling's (1931) paper and his assumptions establishing a model for the optimal exploitation of mineral resources at the industry level and at the level of the individual mine owner show that the rate of increase in exhaustible resource prices should be equivalent to the market rate of interest. In a market with rising prices, the rate of extraction should be constant.

In markets where demand is stable, optimal exploitation requires that the rate of extraction should decline over time; in a monopoly market, the rate of extraction may be less than with competitive pricing, despite many attempts to develop quasi-monopolies and cartels (e.g. OPEC in oil) and others in uranium, tin and silver. Paradoxically, when a monopolist restricts output to take short term advantage of low price elasticity, relative to competitive prices, there is a well known adage that a 'monopolist is an environmental conservationist's best friend' (Dasgupta & Heal, 1979). In addition, the theory deals with the effects of cumulative production on costs and prices, based on past production, extraction costs and future demand, augmented by new discoveries (Devarjan & Fisher, 1981), an insight first noted by David Ricardo (1817).

The main difference is that mining resource stocks, unlike trees for pulp, for instance, are not reproducible and that the size of the existing inventory can only decrease through time. Even with the possibility of

some recycling, metal commodities would remain an exhaustible resource. According to Solow (1974, 2), the importance of Hotelling theoretical contribution is based on his assertion that ‘the only way a resource in the ground can produce a current return for its owner is by appreciating in value’. This point is illustrated in Figure 1, where the standard supply and demand curves reflect equal marginal-cost curves, and each mining firm is a price taker. In a competitive market, each firm faces the same price set internationally, so that, in theory, marginal cost equals price.

**Figure 1. Marginal cost curves for firm, country and world**



The marginal cost of the firm is shown in Panel (a) of Figure 1. Price is determined globally, by international supply and demand. Each firm faces price as given, so the individual firm’s marginal cost curves can be summed to derive a country’s supply curve in Panel (b). The supply curves in individual countries, as shown in Panel (c), are added to derive the supply curve for the world. In a price-taking world, output is produced at minimum cost.

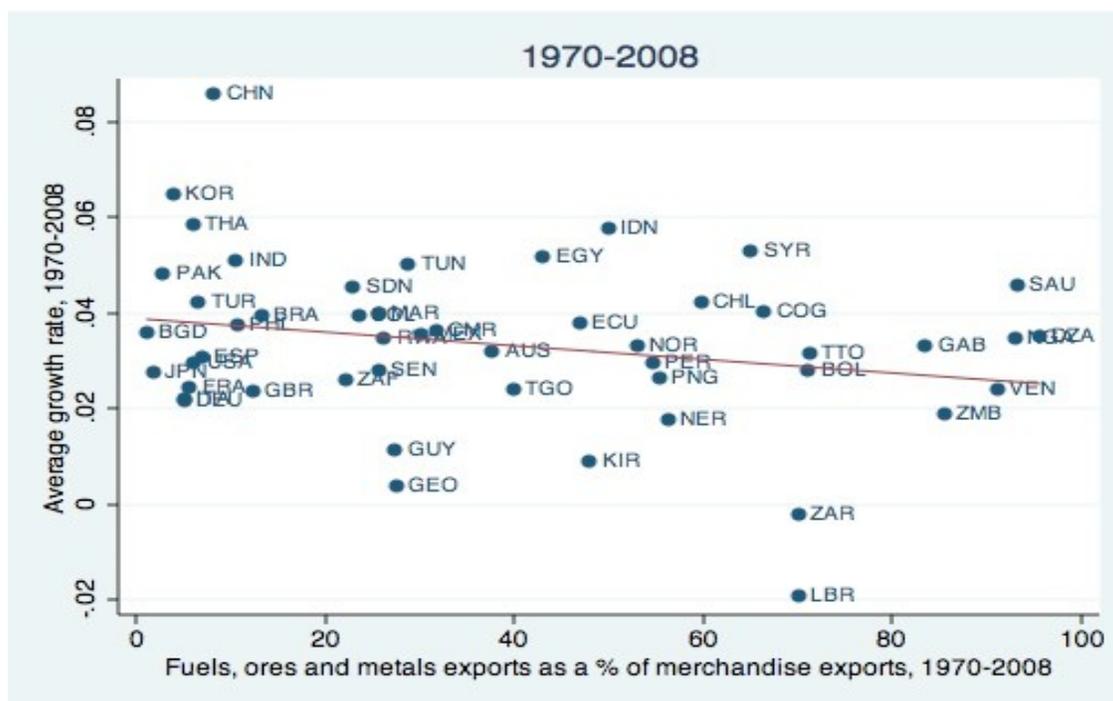
However, mining, like oil production, or other sectors of exhaustible resources, must bear in mind some of the assumptions behind the Hotelling model, i.e. there are non-perishable, non-renewable resources where deposits are fixed in total supply, and only gradually are being depleted (Devarajan & Fisher, 1981; Pindyck, 1980, 1984). Clearly, property rights, unknown in Communist systems, must be clearly spelled out in legal legislation with courts of appeal. In a capitalist system, secure property rights assures that the claims to the resource, by geologists or exploration firms, have legal protection, backed by laws, so that exploration rights and claims can be retained as private possessions or can be sold. In fact, often when the size of deposits become better known, through superior exploration or better analysis of the deposit data (from probable to proven reserves), junior exploration firms often sell to larger mining enterprises. Yet, other factors can intervene than affect the value of the resource, such as the availability of good infrastructure and water and institutional dimensions, like the political and legal system, including the potential likelihood of nationalization, expropriation, or other circumstances, such as wars, civil unrest, or even the weather (Gordon, 1954; Frankel, 2010; North, 1994).

Today, the mining sector extends ubiquitously to new resource nations (UNCTAD, 2007), where mining rights, property laws and regulatory regimes are less developed, host governments seek foreign investors

and mining technology. However, in many cases, foreign mining firms pursue a first-mover advantage, by obtaining concessions that are difficult to match for subsequent mining developers. This issue is often over-looked in the academic literature, because global markets determine prices even though the real costs are local.

More recently, as globalization has opened up new markets and extractive land sites, especially in small, low income countries, economists and political scientists have explored the impact of highly dependent countries on a narrow wealth-creating base of natural resource sectors. For instance, many countries are dependent on a single industry (e.g. bananas, coffee, oil, gold mining, sugar). How do countries build on this narrow one- commodity sector to sustain wealth creation, a theme first explored in Harold Innis' staple theory of development and influencing the work of Nobel prizewinner, Douglass C. North (1994)? What is the full impact of a single product industry on wealth-creation, both in per capital income and societies at large, which may lead to undesirable outcomes?

**Figure 2. Statistical relationship between mineral exports and economic growth**



*Source:* World Development Indicators, World Bank; Frankel (2011)

Cross-sectional data analysis by the World Bank tend to confirm that abundant natural resources (e.g. oil and minerals) show lower economic performance for the years 1970-2008 (see Figure 2) than those without, often because of varied undesirable side effects (e.g. corruption, one party state, autocracy, etc.). This phenomenon is called the Natural Resource Curse (for a recent review, see Frankel, 2011). The Resource Curse literature is contentious, in the academic journals, the media, the domain of public policy, and with specific stakeholders, from resource multinationals, investment banks, and governments to environmental groups, political activists and even NGOs.

It is also clear that some commodity-exporting countries have very high per capita incomes, (e.g. Australia, Canada and Norway) the time dimension is an important variable, e.g. it takes time to cultivate other industries, build strong institutions and learn the full impact of globalization and world market conditions. In public policy terms, highly autocratic regimes can make it easier for multinationals to exploit host country resources, because of illegitimate payments to the rulers, restrictions to the development of civil society (free elections, press and religion freedoms, and openness to foreign tourism) or even financial plundering to offshore accounts. As Zakaria records, too often, there is “mass bribery in the really rich states, and mass repression in the poorer ones. But both are courtesy in income that flows into the government’s coffers and they require very little real economic activity” (2004: 271).

## **2.1. Mining in the ex-USSR**

The Soviet Republics provide a different landscape to study foreign investment and the cost-benefit calculus for extractive multinationals and the host country receiving the foreign capital (Johnson, 1971; Manfret, 2011). In contrast to emerging markets in Africa and South America, or indeed much of the developed mining countries like Canada, Australia, or the United States, exploration in the Soviet Union republics was well advanced both prior to the Second World War and immediately afterwards. However, the USSR could not afford the financial capital and lacked the computer technology and the sophisticated software to exploit the mining resources competitively in international markets. In fact, in their march to industrialization, the Soviets used import substitution planning models to expand key sectors, and some of the biggest mining projects were former Gulag prisons, a group of 35 geographic clusters of 200 labor camps, with about six million prisoners and one million occupied in mining. Indeed, many Soviet mines, including the vast gold deposits in the Kolyma River, where temperatures dropped to  $-70^{\circ}\text{C}$ , were started in the 1930s in Stalin’s forced industrialization campaigns (for a historical overview, see Bullock, 1991). Since the 1930s, the government in the USSR placed a priority on the mining industry, not only as a core feedstock to Stalin’s forced industrialization of heavy industry, but also because certain metals were critical to the Soviet’s military prowess. But most metals are not found in isolation, so the search for copper, to cite one example, also met exploring for other metals, including antimony, mercury, silver or gold. When the Soviet Union imploded in 1991, vast territories of the republics had already been explored. Government bodies had a clear picture of the known reserves in nickel, iron ore, coal, gold, copper and antimony. Individual mining projects formed part of vast state-owned industrial conglomerates to increase local production.

Despite the vast landmass of Russia, Soviet geologists had explored for minerals from the 1920s; key properties and their drill sample results were well known within each separate republic. The Lenin-inspired 1917 communist revolution left all aspects of the 15 republics as government-controlled. All industries were 100 per cent state-owned, and economic planning was by executive decree, with virtually no use of any market mechanisms (the price system). The 15 separate republics were integrated by bureaucratic and political central planning and five year plans. Supply chains, logistics and transportation systems were centralized in Moscow, through the vast Soviet territory of client states in Eastern Europe, the 15 states of the USSR, the 76 republics within Russia and 11 time zones.

The breakup of the Soviet Union in 1991 coincided with the emergence the economic and industrial reforms in China, opened a new ‘great game’ to exploit the mineral riches of the former Soviet States. Because the Soviet economy had operated without any recourse to the price system, even though the vast

Soviet territory had been explored for minerals like gold, neither domestic conglomerates nor foreign companies possessed a clear understanding of the feasibility of actual production and financial performance of new claims with foreign mining companies. Clearly, despite high-grade reserves, foreign companies needed good information on real production costs and future performance, given uncertainties about exchange rates, gold prices, or high cost items like electricity, transportation, or labor costs. Large mining firms and even junior players quickly turned the Soviet mining sector into a key component of the global mining industry. The Kumtor gold mining project is a case study of this industry evolution.

Global banks, investment and equity firms and stock markets had a voracious demand for detailed cost breakdowns by project – taxation, process technology, annual production, labor, energy usage, royalties and transport costs. Foreign (i.e. Western) firms had the management and financial tools to undertake detailed computer-based cost models, totally unavailable in Soviet countries, of existing drill sample data, to analyze mining production (including proven reserves), potential detailed changes in assumptions, cost sensitivities, new exploration data, scenarios in operating costs and exchange rates for any producing country and freight rates.

More importantly, the rates of production output, world gold prices and operating margins offered the opportunity for mining firms to use capital markets that few experts in Soviet countries understood. In theory, in Western countries, the value of gold reserves amounted to \$20 per ounce for proven reserves of a million ounces or more, with ore grades of 1.5 (g/t) or more. Around the world, countries varied tremendously in political risk (nationalization, civil wars, taxation policies) so the \$20 per ounce could be quickly discounted for political risk in financial centers to \$10 or even \$5, this impacting the mining firms capacity to raise money for the project in question. However, foreign companies, after undertaking detailed feasibility studies of actual production reserves, using Western-trained geologists, mining engineers and technical experts, could see the value skyrocket to \$100 or \$200 per proven ounce of production, based on country location, production contracts with the government, and clear financial, economic and managerial assessments of what is required to bring the reserves into actual production. At \$400 per ounce world price for gold, and rapidly climbing well above \$1,000, gold mining was the new mother lode for investment bankers. The third leg, financing, joined gold exploration and proven reserves, plus government acquiesce and legal permits, to accelerate the advance of the global gold mining industry.

## **2.2. Extractive industries in central Asia**

All of the ex-Soviet ‘stans’ in Central Asia were dictatorships, despite naive hopes when the Soviet Union disintegrated that they would become fully transparent, elected democracies. Kyrgyzstan became the West’s favorite country, the Switzerland of Central Asia, led by the newly appointed President, Askar Akayev, in December 1990. The territory of Kyrgyzstan had been annexed by Russia in 1864, and like the other 14 Soviet states, it achieved independence. Mining became a national priority for this mountainous country, whose land mass was the size of England but a population of only 4.9 million and a per capita income in 1992 dollars of only \$1690. A mountainous country with incredible natural beauty, steeped in the history of the Silk Road, the legacies of Genghis Khan and proud nomadic traditions, Kyrgyzstan began the march to a democracy with much promise (Akayev, 1995).

## A Case Study in an Emerging Country

An educated nuclear physicist with deep knowledge of Soviet science strengths, Akayev was chosen in clan-style compromise against the well-known writer, Chingiz Aitmatov, author of a celebrated play, *The Ascent of Mount Fuji*, posing the question of who is guilty of Stalin's crimes. Akayev immediately abolished the Communist Party, cultivated Western powers, visited the two white houses (in Washington and in Moscow) and received enormous aid from Western governments, the World Bank, the Asian Development Bank and the UNDP. A reformed legislature, the *Jogorku Kenesh*, promised open elections. Akayev enacted, but only partly delivered radical reforms, like a simplified tax system (including a value added tax), removing restrictions on business start-ups and simplifying foreign visa requirements. Like all Soviet republics, Kyrgyzstan had a superbly educated workforce and the capital, Bishkek, was a designated science city, with 13 universities.

When Kyrgyzstan first became independent in 1991, many of the decisions taken by old parliament (the elections had not yet been held) faced more public debate, but the Akayev regime were also subject to public scrutiny, including deals for the giant mining project, Kumtor, soon to be managed by Canadian interests. Foreign embassies and the Organization for Security and Co-operation in Europe, tolerated a measure of corruption within the Akayev regime: foreigners also tolerated Akayev's position as a quasi-democrat when it suited their purpose and his family interests. The neighboring states of Kazakhstan and Uzbekistan, had regimes that were even more repressive, and they could squeeze Kyrgyzstan for oil and gas feedstock in this resource-poor country. Neighboring Tajikistan is much like Kyrgyzstan: mountainous, gorgeously beautiful, water-rich and even poorer. China, sharing a 100 km border, wants to expand its economy to the northwest, and looks for Central Asia's energy and mining resources, with pipelines flowing eastward across the Gobi desert.

Like most Soviet Republics, Kyrgyzstan introduced some market openings, privatized obsolete sectors and set up its own banking system and separate currency, the *som*. More recently, Kyrgyzstan's close proximity to China has accelerated friendly relations as an offset to Russia's dominant influence. Japanese multinational trading firms, the Asian Development Bank and other financial groups have supported new construction in railway, highways and pipelines from the west of Central Asia, passing through Kyrgyz territory, would bring a measure of prosperity in its wake. This would be the 21st Century version of the Silk Road, the vital trading route from Western Europe eastward through Central Asia to China (for an overview, mainly from a US perspective, see Mandlebaum (1994); see also Rumer (1996), Pomfret (2006) and Hiro (2010) on recent political developments).

The Akayev regime, desperately seeking new sources of income generation as an independent country, no longer reliant on state funding from Moscow, placed great emphasis on attracting foreign gold companies to develop Kumtor, a massive ore body first discovered in 1978. For Kyrgyzstan, lacking financial and mining expertise, political independence now afforded the opportunity to exploit its biggest asset, Kumtor gold. In retrospect, few experts in Western countries and even serious Soviet specialists, fully appreciated, with the implosion of the USSR in 1991, the total breakdown of Soviet industry supply chains across this vast territory, with resulting steep decline (almost 50 per cent) in industrial output, mass shortages of parts and components, food production, fall in employment and intra-state trade. As the new President sought out foreign mining investors, some major companies like Barrick Gold, turned down the offer as too politically risky.

Government mining experts knew that Kyrgyzstan possessed an elephant deposit, Kumtor, estimated to be one of the top 8 known deposits, well beyond conventional million ounce reserves. Indeed, Kumtor was massive: an estimated 16m ounces of proven, high-grade reserves, with another 16m of known but unproven reserves in 1991. Clearly, there was no reason to falsify these reserves – a too common practice in mining<sup>4</sup> - because the exploration and discovery was for their own country, not inflated to increase share prices on a stock exchange. Eager to be a player in the new international ‘great game,’ Kyrgystan also sought to attract foreign direct investment, to become market friendly to private firms, but not to leapfrog their resource-rich neighbours, but to seek spill-overs from new foreign interest in Central Asia<sup>5</sup>. One company that became interested, in part because Central Asia had vast deposits of uranium, was Cameco Corporation of Saskatchewan, Canada. Cameco’s initial strategic interest was that uranium and gold experienced quite different commodity business cycles, so gold mining could be a hedge against downturns in the uranium market, a real concern with the end of the Cold War after the fall of the Berlin Wall and the breakup of the USSR. Cameco, without prior experience in gold production, decided to develop this enormous gold deposit, Kumtor. However, the formal contract, signed by all members of the legislature, had financial and ownership terms that many Kyrgyz questioned, including senior politicians in the new legislature.

For Cameco Corporation, a sophisticated uranium producer in Canada, one of the leading mining countries in the world, a gold mining investment in Kyrgyzstan offered the chance to diversify from the highly-cyclical uranium business. Because uranium’s only industrial use is for electricity generation in large, nuclear power stations, the market price is predominately influenced by world GDP growth and geopolitical issues. By contrast, the spot market price of gold exhibits a currency-based price valuation than a commodity-based one, partially attributed to its historical use as an international monetary economic unit of account. In short, the fluctuating demand for uranium, based on defense procurement of nuclear weapons and nuclear power stations (both in decline globally) is counter-cyclical to the spot price of gold, which is affected by central bank purchases, anti-inflationary investments, jewellery and industrial demand and significant capital markets speculation.

**Table 1. Kumtor gold mine: initial capital expenditure**

Type of financing	Amount
Initial Contribution	\$45,000,000
Senior Debt	\$265,000,000
Subordinated Debt	\$20,000,000
Subordinated Loan	\$122,000,000
Total	\$452,000,000

*Source:* Cameco Financial Statements

Kumtor was a relatively low cost entry into the booming gold sector, as political analysts started to realize the commodity needs of the potential growth of countries like India, China and other emerging markets. The expected capital expenditure of the Kumtor investment was \$452m in total, as shown in Table 1, and Cameco was paying only 10 per cent of the total project, gaining a low-cost entry in one of the world’s

largest, known gold deposits. The Kumtor gold mine began production in 1997, and following minor increases in concession areas, the project is expected to be depleted in 2021.

### 3. Analysis of the Kumtor mining project

The Kumtor gold mine is located in the central Tien Shan Mountains (Figure 3), 350 km southeast of the Kyrgyz capital, Bishkek and approximately 60 kilometers north of the Chinese border (Figure 4). The site consists of the central pit (and Stockwork and SB zone, which are located directly underneath), as well as two satellite deposits known as the Southwest and the Sarytor deposit (see Appendix 1).

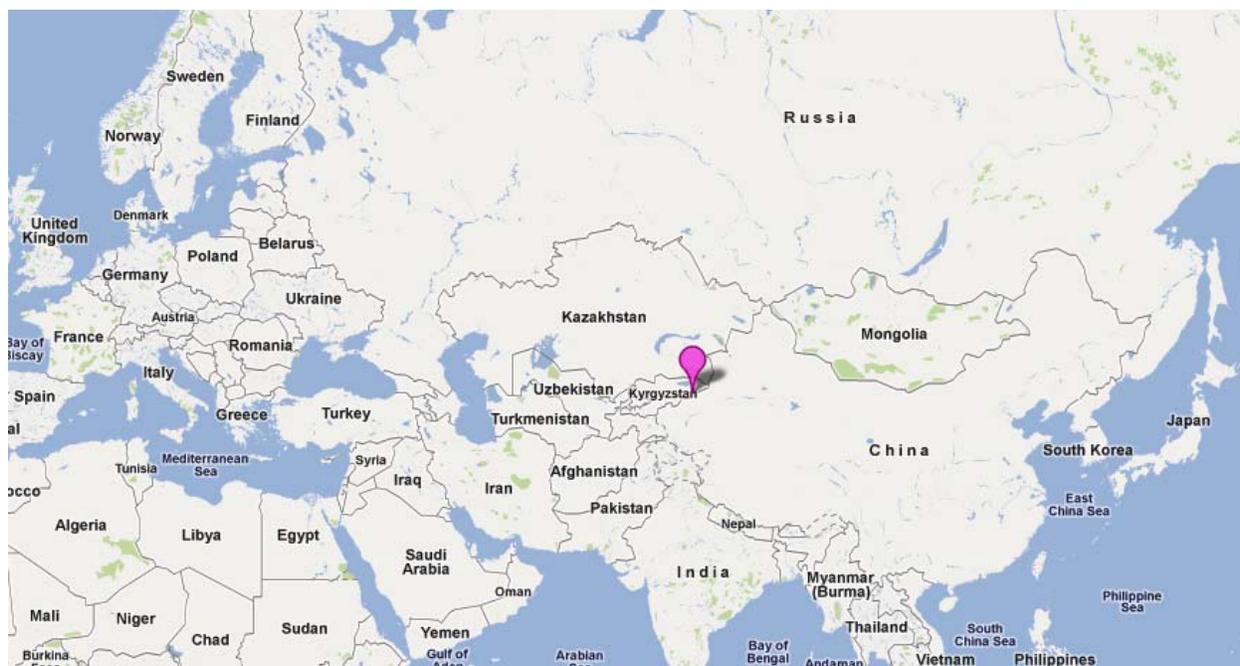
**Figure 3. Kumtor gold mine location in Kyrgyzstan**



*Source:* Google maps

The mountainous region is filled with glaciers, and the dry climate has a mean annual temperature of 8°C. The production site of the mine is 3700 m above sea level, the second highest (by altitude) mine in the world. By the standards of a new, independent country like Kyrgyzstan, Kumtor was a huge project, by any measure: financially, but also engineering, organizationally and politically, subject to constant scrutiny, by global mining analysts tracking share prices of Cameco, by local media and by the local parliament. From the start, the general public was never sure if Kyrgyz citizens would benefit directly from the revenue flows, an unease that persists even today.

**Figure 4. Kumtor gold project location in the USSR**



*Source:* Google maps

Despite several geo-technical issues complicating the mining extraction process, some not known or fully appreciated at the beginning of the project, there was further rock waste, dump creeping and glacial ice deposits, providing significant, on-going engineering challenges to efficient mining extraction processes, with potential adverse environmental impact on this very pristine landscape. Indeed, the bedrock slope stability in the central pit had twice been compromised, resulting in work stoppages in 2002 and 2006, the former as a result of the accidental death of a mining employee.

Without question, this Kumtor gold project was controversial, both before independence was achieved in late 1991, and when the new government was trying to entice foreign mining firms to accept the high political risk during the very turbulent, post-USSR environment. Many members of the Kyrgyz political and business elite, including former members of the Kyrgyz Politburo, preferred domestic ownership and control, senior production managers from Kyrgyzstan, even though Soviet experts question the project's commercial viability when world gold prices fell to below \$400 per ounce in the late 1980s, after a temporary peak to over \$800 only a few years before. Many Kyrgyz officials preferred a partnership or strategic alliance with Russian mining interests. Isolated under Communist rule, many local Kyrgyz had deep suspicions of foreigners, i.e. Westerners, mainly because few foreigners had ever visited these isolated, nomadic sheep farming villages<sup>6</sup>.

Cameco Corporation was founded in 1988, a merger of two crown corporations: Eldorado Nuclear Limited, federally-owned and Saskatchewan Mining Development Corporation, owned by the province. Initially, Cameco was 62% owned by the Saskatchewan government and the remaining 38% was owned by the Canadian federal government. The CEO was a French mining engineer, Bernard Michel, who knew the global uranium industry, the main producers, the global firms that built nuclear power plants and their major global nuclear customers, including governments and the publicly-owned electricity utilities.

## A Case Study in an Emerging Country

Cameco went public on both the Toronto and Montreal Stock exchanges in 1991, and became fully privatized, following the Saskatchewan government's sale of its remaining shares in February 2002.

As of April 2010, Cameco was the world's largest uranium producer. To smooth out earnings from the volatility of the uranium sector, Cameco, undertaking quick feasibility studies and visits to the high Kumtor mountain site, entered the gold production industry in 1992. A mining agreement was finalized with the Kyrgyzstan government in 1994, where Cameco's new subsidiary, Kumtor Mountain Corporation, acquired a one-third interest in the project owner, Kumtor Gold Company. The remaining shares were held by the Kyrgyz Government, through their company Kyrgyzaltyn JSC. The Kumtor Operating Company, wholly owned by Cameco, received a \$100m, ten year management contract to operate the Kumtor mine. Commercial production at the Kumtor mine commenced in May 1997. Even with stable world prices for gold, the Kumtor Project was a massive revenue producer for this poor, mountainous country.

The benefits received by the Kyrgyz government, through its mineral agency, Kyrgyzaltyn JSC consisted of financial payments received from the gold production in the Kumtor mine, as well as associated benefits attributed to miscellaneous payments as well as social benefits. More precisely, Kyrgyzaltyn JSC is estimated to receive \$1.4bn from their ownership interests over the Kumtor mine life, forecast from 1999-2017. Most of the Kyrgyz costs were attributable to their ownership share in the project, not direct costs borne by the government. The other main benefits, estimated at some \$543m that Kyrgyzaltyn received, are attributed mainly to the Issyk-Kul Social Development Fund, as well as corporate taxes charged to Cameco (see Table 2). These amounts are based on the ownership structure originally negotiated in the 1992-1993 period between Cameco and the Kyrgyz government. However, this amount pales in comparison to the estimated \$1.75b that Kyrgyzaltyn would have earned if the government had maintained its 2/3 ownership over the mine. During 2002-09, Kyrgyzaltyn JSC's proportionate ownership decreased from the 2/3 interest to only 16% interest, an amount that many local citizens believed put Cameco in an advantageous financial position<sup>7</sup>.

**Table 2. Profile of Kumtor's local investments**

Payment	Amount
Taxes, customs and other mandatory payments	\$328,820,000
Issyk-Kul development fund	\$5,710,000
Kumtor Operating Company employees net wages	\$203,620,000
Purchases in Kyrgyzstan, infrastructure-related payments	\$487,550,000
Revenue from the sale of Centerra Gold shares	\$86,000,000
Payments to Kyrgyzaltyn JSC, refiners	\$48,750,000
Licenses and permits, other payments to the Environmental Protection Agency	\$3,350,000
Sanatoria treatment	\$370,000
Scholarships and charities	\$9,160,000
Sustainable development program	\$1,640,000
Payments in communities	\$4,400,000
Investment in farming	\$2,190,000
<b>Total</b>	<b>\$1,181,560,000</b>

*Source:* The Times of Central Asia, 2.

For strategic reasons, Cameco decided to create Centerra Gold to consolidate the firm's gold assets. The reason was fairly simple: gold prices were climbing well above historic highs, in part from the growing demands in China and India, and rising stock indices of the mining sector were attracting capital in public markets from around the world, but especially in Toronto and London. Actual operating costs per ounce had increased at Kumtor, from well under \$400 from 1999 to 2006, but these margins were maintained, even though costs per ounce increased, by higher world prices (Appendix 2). In December 2003, Cameco, Cameco Gold Inc., Centerra Gold and Kyrgyzaltyn JSC entered into the Kumtor Restructuring Agreement. Following Centerra's initial public offering in June 2004, the respective interests of the mine became Cameco (52.7%), Kyrgyzaltyn JSC (16%), European Bank for Reconstruction and Development and International Financial Corporation (4%), with the remaining ownership being available to the public. There was little operational risk until March 2007, when the Kyrgyz Parliament accepted a preliminary draft bill challenging the legal validity of the Kumtor mine agreement.

#### **4. Cost/Benefit: analysis of findings**

The generally accepted technical framework of direct foreign investment is cost-benefit analysis. Direct foreign investment is seen as a combination of a capital asset, consisting of direct financial investment and capital flows, management skills, technology/intellectual capital and equipment as well as technical processes. The following provides a framework of analysis for considering all factors that contributed to the associated benefits and costs of the Kumtor mine project. The present analysis is structured to assess all aspects impacting the mine output, as well as to comprehend what the stakeholder players gained or lost during the 'great game.'

The costs and benefits associated with an exhaustible resource are not always realizable in a narrow accounting sense: cost-benefit can encompass intangible, as well as as the transfer of management expertise and intellectual capital of the investors, a favourable climate to attract foreign direct investment, as well as spillovers and employment for individual stakeholders, such as direct suppliers, banks and government agencies associated with the mining project. The financial analysis presented in this case study comes from data aggregated from annual reports, TMX filings, company records and government documents. The data analysis extends the direct operations attributed to the mining investment, as well as the other supplementary debits and credits associated with the Kumtor mine, including social and environmental cleanup costs incurred (Table 2). The two disruptions, in 1998 and 2002 as a result of a production accident and a sodium cyanine spill in a truck accident, forced Kumtor to reduce production output (Appendix 3) and, as a consequence, economic growth in Kyrgyzstan stalled, with steadily rising unemployment.

##### **4.1. Kyrgyzstan JSC benefits and investments returns**

The benefits received by the Kyrgyz government, through its mineral agency, *Kyrgyzaltyn*, consisted of financial investments received from the gold production in the Kumtor mine, as well as associated benefits attributed to miscellaneous subsidies such as social payments to community groups, education and environment initiatives. For example, the main item, estimated at some \$585m that *Kyrgyzaltyn* received, are attributed to the Issyk-Kul Social Developments Fund, as well as corporate taxes charged to Cameco (Table 2). As the mine increased gold production output, with resulting tax revenue, the government soon

knew how dependent it had become on the Kumtor mine production. Indeed, with rising unemployment from falling output in existing firms, and little new mining investments, the public at large and the local business community (including a small foreign cadre of investors) and a few in the government now worried about over-dependence on Kumtor as the main source of revenue receipts. Many worried as well about the shelf life of the existing proven deposit. The Resource Curse was taking hold among young people, leading to regular political protests on the streets of Bishkek.

The Cameco Board decided to create Centerra Gold, a public company listed on the Toronto Stock Exchange, not only to consolidate their gold assets, but to take advantage of huge capital pools available in the public market. The estimated total investment for Cameco/Centerra in the Kumtor mine is \$584 million. This amount is attributed to an initial contribution, as well as a subordinated loan and two debt financings – senior and subordinated debt. These loans, backed by Cameco, also required an additional \$132m capital injection during the project's life. The benefits for Centerra include \$626m directly attributed to their proportional ownership during 1999-2009. Furthermore, an aggregated \$756m was gained through their ownership transfer in 2002 and their gain on the disposal of its ownership interest in 2009.

There was little operational risk until March 2007, when the Kyrgyz parliament accepted a preliminary draft bill challenging the legal validity of the Kumtor mine agreement. The dispute eventually was resolved in April 2009, with the *Agreement of New Terms* between Cameco, Centerra Gold and the Kyrgyz Government. The Agreement restated original terms relating to concession areas, gold and silver sales, shareholders and investors. The most significant impact of the Kyrgyz Parliamentary ratification of the Kumtor mine agreement was Cameco's decision to exit the gold sector, returning to its main strategic focus, uranium mining. Cameco transferring its shares to Kyrgyzaltyn JSC, the agency of the Kyrgyz government, and disposed Centerra Gold common shares by a syndicate of underwriters in a public offering. Following the conclusion of the Agreement transactions, Centerra Gold's ownership structure is 67% publically-owned, with the remaining 33% owned by Kyrgyzaltyn.

Controversially, the Kyrgyz share was soon reduced from 66% to 33% in return for larger, direct payments into the state budget. The government then subsequently sold half its share to raise money for public expenditure on social projects, with unemployment rising in the two large cities, Bishkek and Osh, reaching 40 per cent. By this time, President Akayev had lost the respect of most citizens, and the public became concerned with nepotism, corruption and offshore payments to the President's family, not helped by rumours of his personal dealings and benefits with the lease at the Manas Airport with the US Government's war in Afghanistan. This unease grew and culminated in Kurmanbek Bakiyev's overthrow of President Akayev in the March 2005 Tulip Revolution (McMillan, 2007).

#### **4.2. Financial analysis of the Kumtor mine project**

Due to the life of mine estimate, as well as the ownership issues, the cost/benefit calculus extends into two periods, which are defined by the pre-Agreement and post-Agreement of New Terms: 1997-2009, and 2005-2021E (Table 3). For summary purposes, Table 3 provides data presented in terms of cost-benefit terms of revenue/cost, for both time periods, with the projected forecasts based on publicly-available company estimates.

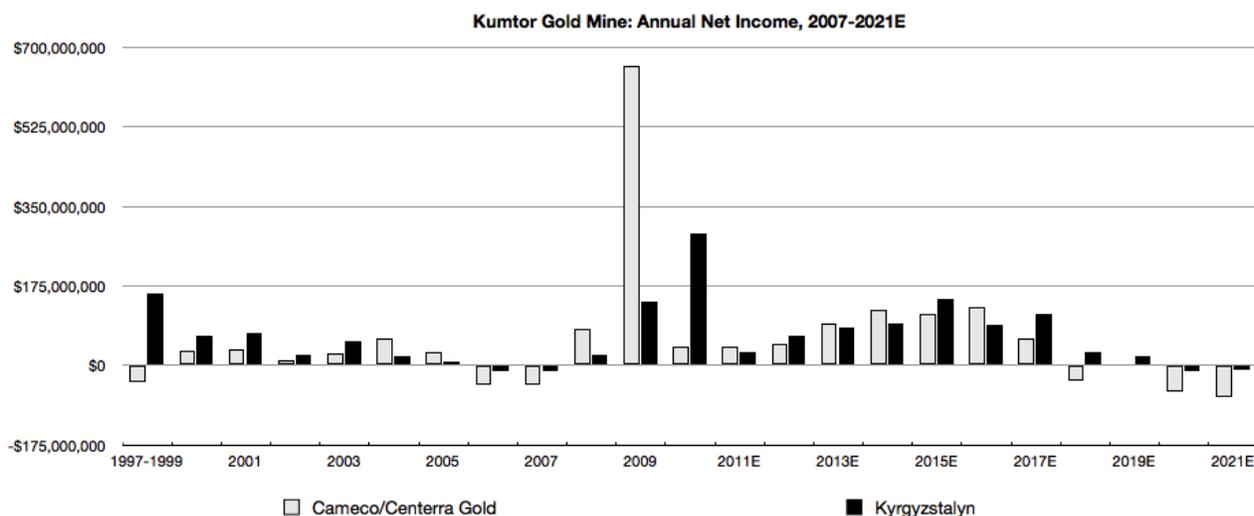
**Table 3. Kumtor gold mine: projected revenue, cost and income for company and Kyrgyzaltyn JSC**

	1997-2009		2010-2021E	
	Cameco	Kyrgyzaltyn JSC	Centerra Gold	Kyrgyzaltyn JSC
<b>Revenue</b>	\$2,132,109,000	\$1,352,102,000	\$3,798,853,000	\$2,696,551,000
<b>Costs</b>	\$1,505,971,000	\$809,261,000	\$3,175,335,000	\$1,846,459,000
<b>Income</b>	\$626,138,000	\$542,841,000	\$623,518,000	\$850,092,000

*Source:* Strathcona Mineral Services, and company public records. The 2011-2021 estimates use a USD\$1,000/oz gold price.

Clearly, the calculation of net benefits is function of variables controlled by the Kumtor project, but also by exogenous events, such as the world price of gold and political events, like the riots in 1995 and 2010 in Kyrgyzstan, that deposed two Presidents. Furthermore, as depicted in Exhibit 1, the best year for Cameco was 2009 where income was almost \$700m, a high return on its initial low capital investment, the \$100m in management fees spread over 10 years, and the management options for senior executives, amounting to about \$61m (Appendix 4). Further, as a public company, senior managers had the advantage of stock options as directors, adding to a sense that Cameco/Centerra had negotiated a sweet heart deal, especially when an accident near the mine led to a spill of cyanide, contaminating a river that attracted global media attention (CCE Bankwatch Network, 2002; MMSL, 2008)<sup>7</sup>, and led to internal management changes at Centerra, including Board members.

### Exhibit 1



*Source:* Calculated from company records, TMX filings, and annual reports.

As shown in Exhibit 1, despite unprecedented world prices for gold, the profit levels increase from 2011-2017, but trail off dramatically at the end of the decade, as the reserves become exhausted. Estimates from Centerra actually show annual estimated losses. Further, most of the profits for the government are consolidated within the state budget and used for annual consumption, not as an investment devoted to

future wealth creation, including other mining projects, hydroelectricity, or agriculture. More generally, within these resource-rich countries of Central Asia, the investment benefits of FDI were not widely shared. Foreign investors, including consulting firms, paid much higher salaries, driving up the wage rate in the cities and making local companies uncompetitive. Further, it is much more difficult to analyze the cost-benefit relative to a firm or country in the abstract, because the country may enjoy increased job growth, tax revenues, infrastructure, technologies and managerial skills, but with little spillover in other areas.

Many emerging countries, especially those that lack the particular managerial expertise and technology, seek foreign direct investment to speed up their economic transition. Due to the complexities of applying arbitrary estimates to intangible benefits, the following section analyzes the financial costs and benefits for Kyrgyzaltyn JSC's ownership of the Kumtor mine. The Kumtor project illustrates the dependence of a narrow source of income, \$543 million in the period 1997-2009, a sum greatly exceeding income from any other venture in the Republic. Indeed, the estimates for 2010-2021, \$850 million (Appendix 5), illustrate this dependence on a single large mine and the country's lack of capacity to diversify into other wealth-producing industries like agriculture, hydroelectricity, tourism and light manufacturing of food products.

### **5. Discussion and conclusion**

This paper addresses the cost-benefit of a mining investment in a developing country. The Kumtor mining project, starting construction in 1994 and gold production three years later, has produced between 300,000 and 750,000 ounces annually, a massive financial advantage to this resource poor country, about ten per cent of total GNP for the country. Today, Kumtor's ownership reflects changes in corporate strategy of the former majority owner, Cameco Corporation, which divested its entire share holding on December 30, 2009, in a public offering of 88,618,472 common shares at C\$10.25 per share of the holding company, Centerra, for net proceeds of approximately \$872 million.

What lessons can be drawn from this case study? What are the particular circumstances about foreign investment in the mining industry? Clearly, critics of foreign investment, multinational firms and the more general critiques of globalization, and there are many – for an overview, see Bhagwati (2005) – McMillan (2007) - exaggerate the net benefits to the investor and underscore the net real costs – political, social and environmental – for the host country. This paper argues otherwise. As Johnston (1970) notes, cost-benefit of foreign investment is a net impact concept, and this case study shows there were huge net benefits both to the foreign investor, Cameco, and to the host country, the Kyrgyz Republic. In terms of host partner revenues, the Kumtor mine had a huge financial impact, both in terms of revenues for the government (about 20 per cent of total revenue), and as a per cent of annual GNP for the country, between 7-10 per cent.

In theoretical terms, there can be little doubt that Cameco transferred mining expertise to Kyrgyzstan, including real capabilities in mining production, access to capital markets, access to funding from foreign banks and support from international agencies. Technology transfer, itself, is an abstract term. In real terms, it means management expertise, such as tools for complex supply chain issues and logistics, in moving people and goods, both foreign managers and local workers, into the isolated mining site of the

Kumtor mine, and providing quality food, hospital care and local housing. But critics, both in the small group of foreign mining executives seeking new projects, and local political circles, also suggest the links between Kumtor mining officials and administrative mining bureaucrats with the government were also too close, favouring the project they knew than seeking other, new investments. Indeed, the Republic faced two political rebellions and deposed two Presidents, largely because the population at large experienced low economic growth, high unemployment exceeding 40 per cent, and perceptions that the Government was far too slow in enacting a national mining law that would have given more priority both to other, known projects with high probable reserves (like Jerooy, Taldy-Bulak and Ishtamburdy) and other known deposits that needed further exploration work, and opposition to the Kumtor project remains a hot button political issue, a clear failure of Cameco and Centerra Gold to sell the project to a large audience.

Inexperience, corruption and unwillingness to listen to advice from foreign firms, consultants and international development agencies created a negative reputation for the Kyrgyz Republic, not only in the mining sector but in a series of other ventures that would have created jobs, provided transfer of Western technology, and allowed transformation of Soviet factories to become regional exporters. For instance, in the gold mining sector, the second largest gold reserves were known as Jerooy, a project sought by several foreign firms, and actually examined by Kumtor executives. Oxus, a British firm with interests in other Soviet Republics, undertook serious geological work, with ore drilling and sampling and feasibility studies before raising \$60m and substantially completed construction of a processing plant. However, the Government retracted Oxus's license and transferred it to an unknown Austrian corporation called Global Gold. Senior executives at Global Gold included the President's son, Maksim Bakiyev. Both were later driven out of the country in the summer riots in 2010, with Bakiyev's house scorched in Bishkek and a huge bounty on his head. One of Oxus' appointed advisers, Sean Daley, trying to negotiate the reinstatement of Onex's license, removed twice, was shot in the liver at his home on July 7, 2006, and seriously wounded. Oxus' financial claims were mainly settled by the sale of its interests in the project to Kazakhgold, not through a financial agreement with the Kyrgyz Government.

Many foreign investors, seeing lawlessness first hand, departed the country in frustration at government corruption, ineptness and Presidential nepotism. The International Crisis Group (2008: 11) estimated in its annual report that for the period 2006-2008, Kyrgyzstan had lost \$88-\$98 million per year in foregone revenues. At the end of 2009, the government's Kyrgyz Republic Development Fund announced that a feasibility study had been completed, Jerooy mine deposit was for sale, but no buyers came forward, despite widespread interest only five years before, a case study of the resource curse in action from a vicious spiral of political and economic circumstance.

Studies of extractive industries inevitably blend complex economic and political dimensions, the links between home country requirements (e.g. protection of property rights) of the foreign investor as a market-seeking player, and the host country requirements for jobs, taxes and technology transfer of scarce knowledge expertise. Since the Soviet Union imploded, the common pattern for international resource agreements in the former Soviet republics have been production-sharing agreements (PSAs), a standard contract negotiated by global law firms, but often these contracts have a bias for multinational firms, which can reduce resource rents by clever accounting gimmicks, including transfer pricing to offshore accounts, to increase mining costs and decrease host country profits and royalty payments. Most Soviet

## A Case Study in an Emerging Country

Republics, and developing countries, lack the expertise, both in the civil service and in local professional firms, to understand the hierarchy of liabilities and risk premiums in the event of nationalization, takeover, or default, so the result is what Pomfret (2006) calls a global institutional vacuum.

Complex projects of gold mining and others in the extractive industry require a blend of expertise, including financial analysis of forward production, royalties and all-in costs, or institutional knowledge, not widely available or known in former Soviet Republics. Multinational agencies, including development banks and the World Bank, bring legal and intellectual frameworks like PSAs that level the playing field. But it is simply naïve in the extreme to think that civil servants of developing countries and international agencies, have the financial prowess and market savvy to design ideal contracts that balance the risk needs of the investor with the royalty and tax requirements of the host country.

However, in the past ten years, the institutional knowledge symmetry has changed, from a calculus favoring multinationals and rich countries to new multinationals, many state-owned, aided by their governments, international agencies and international consultants for hire. The bargaining asymmetry of multinationals even a dozen years ago has given way to a more level playing field, where emerging countries can design new forms of ownership policies, royalty and tax regimes and other benefits that differ dramatically from one-sided deals of the past. These emerging countries have another advantage: the rich countries of Europe and North America must compete with the commodity-import strategies of the manufacturing needs of the BRIC countries.

Indeed, these countries have learned from the strategies of Japan in the 1970s and 1980s, with its voracious appetite for raw materials, mainly imported by large trading companies, building first class ships, ports and associated infrastructure and applying ABC strategies for commodities, importing from Australia, Brazil or Canada (McMillan, 1997), or other nations that were commodity-rich. Indeed, this approach is precisely the strategy of China, which roams the world doing joint ventures, direct importing, or investing in long term projects to provide commodity feedstock in extractive industries for its manufacturing sector (Luft & Korin, 2009).

This issue, as much political, military and social as economic, reflects the Resource Curse in action. Newly industrializing countries lack the expertise to maximize the advantages of local resources and indeed to become dependent on a single company for too much advice – on mining laws, on fiscal and royalty regimes with transparency and capacity to transfer exploration rights from one firm to another, on environmental protection (including water). These countries also lack the civil service expertise to understand public markets, the impact on ownership and an understanding of proper royalty regimes in the host country. These issues were misunderstood in the Kyrgyz Republic, and the need to maximize Kyrgyzstan's best interests in taking its own shares into a separate vehicle and on what ownership terms (for background, see World Bank (1994), Kraemer & Van Tulder (2010)).

Kyrgyzstan illustrates both the challenges of obtaining maximum economic rent from its resources, the need to use resource income as a payment into long term wealth-producing industries and the obligation to calculate a judicious balance between the ownership-sharing rights of the foreign investor and the annual resource rents needed for the local population. Paradoxically, Cameco, the multinational mining investor, is located in a small population province of Canada, with immense commodity resources in potash,

uranium, oil and gas and wheat, so the lessons of the Resource Curse are widely known in this immensely rich commodity province, like its neighbor to the west, Alberta, with conventional oil and gas and the immense reserves of the Oil Sands, perhaps bigger than the oil reserves of Saudi Arabia. Today, too often, the political environment trumps the economics of the extractive sector of the world's commodity-rich countries.

---

<sup>1</sup>Kraemer and Van Tulden make the following point in their recent review: “the literature on the nature, shape, and logic of internationalization of extractive industry TNCs is rather fragmented... a focal point for strong political controversy and an area for political economists than international business scholars” (2009:2).

<sup>2</sup>Richard Nesbitt, CEO, TSX Group, in a speech to the Canadian Ministers Convention, August 29, 2006, made the following claim: in 2006, sixty per cent of the world's public mining companies were listed on the Toronto Stock Exchange or the Toronto Venture Exchange and forty per cent of the money for mine finance and eighty per cent of the deals were done on these two exchanges.

<sup>3</sup>Resource economics and the economics of conservation have a long intellectual history, dating from PhD programs in mineral economics at universities like Penn State, Colorado School of Mines and the University of Arizona. In commodity-rich Canada, the pioneering theories of the staple theory of growth of Harold Innis and his disciples, often referred as the Toronto School, embraced economic historians (e.g. W.T. Easterbrooke), mainstream economists (e.g. H.G. Johnston, Albert Breton), political scientists (e.g. Donald Smiley) and cultural philosophy (e.g. Marshall McLuhan). For two pioneering studies, with huge theoretical implications today for social scientists and resource economics, see Gordon (1954) and Scott (1955).

<sup>4</sup>Mining scandals, including by Canadian firms, received global publicity from exposés of the Vancouver Stock Exchange, now closed, and the saga of Bre-X, a Canadian mining firm whose shares increased massively as new reserves were announced, at one point to 70 million ounces, four times or more the size of the reserves of Kumtor. For an overview, see Kuyek (2007).

<sup>5</sup>The storied history of the region is explored in Anthony Hopkirk's (1979) masterful opus, *The Great Game*. Political, diplomatic and economic rivalries among the powers of Europe, Russia, America, India, Iran and China over the centuries are explored in Meyer and Brysac (1999). For a cogent update, see Mandlebaum (2010).

<sup>6</sup>The Kumtor project site, on the south side of Lake Issyk-Kul, a warm, fresh water lake with the depth of Lake Ontario (640 feet), faced other political and diplomatic obstacles, because this area had served as a closed tourist resort for Moscow's Communist elite during the former USSR era, and the lake was also a test site for the military, designing and testing high-speed (200 km +) under-water missiles for potential use in Soviet submarines.

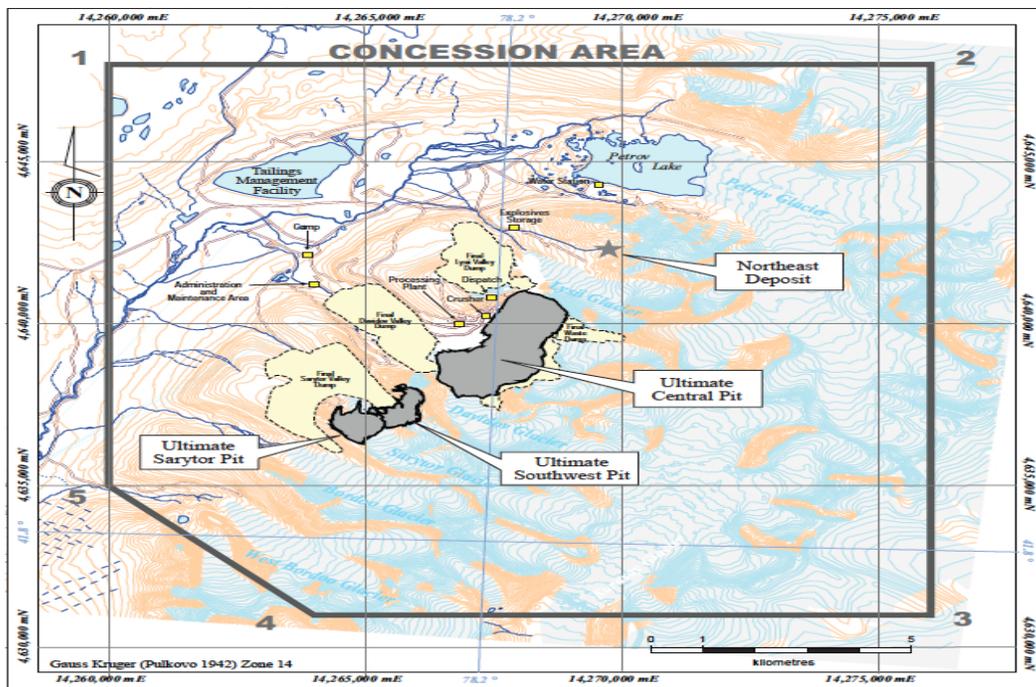
<sup>7</sup>Various proposals had been presented to the Akayev government to vend Kyrgyzstan's ownership in Kumtor into a public vehicle, with the majority of shares owned by Kyrgyzaltyn JSC, listed on a foreign

## A Case Study in an Emerging Country

stock exchange, including issuing stock to Kyrgyz citizens. Another proposal, advanced by Yorkton Securities of Toronto, was the vending in of Kyrgyzaltyn JSC's ownership shares in Kumtor as a vehicle to buy other gold assets in Central Asia, especially in Kazakhstan. Newmont Mining Corporation processed low-grade stockpiles from a huge gold mine in neighboring Uzbekistan.

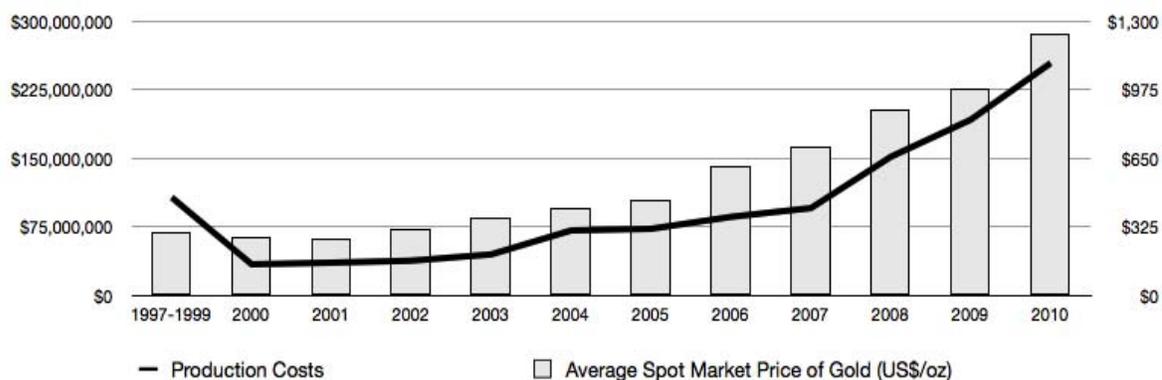
<sup>8</sup>On May 20, 1998, a convoy of five trucks carrying a load of one-ton packages of sodium cyanide from a warehouse to the Kumtor site (a distance of 246km), led to a truck accident, perhaps caused by speeding, and two containers spilled into the Barskaun River, which flows into Lake Issyk-Kul. The huge public outcry, global media reports and fears of people, livestock and even agricultural land being contaminated by cyanide, caused a national panic, including worries about the impact on drinking water and fish kills. A government commission, including international scientists, health officials and chemical experts, concluded that the damage was vastly smaller in scope and financial costs, amounting to \$4.6 million. An international arbitrator, the American Arbitration Association Tribunal, settled the final claims on January 8, 1999, seven months after the spill. For background, and some exaggerated claims, see (Ayres, 2004).

### Appendix 1. Centerra gold Kumtor mine concession area



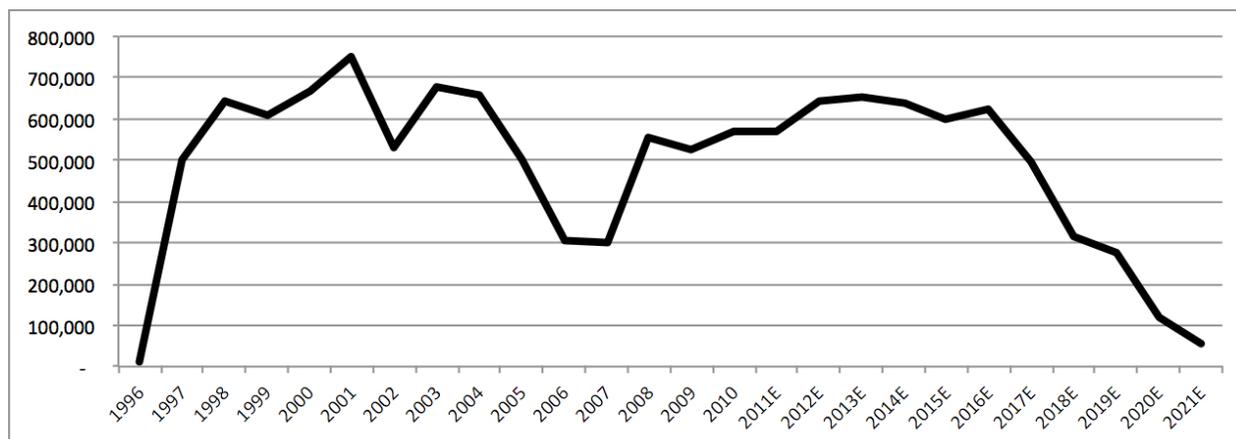
*Source:* Strathcona Mineral Services Limited

**Appendix 2. Cameco production costs and gold spot market prices**



*Source:* Kyrgyzatlyn JSC, Strathcona Mineral Services, and company public records

**Appendix 3. Kumtor mine production output: 1999-2021E**



*Source:* Centerra Gold, corporate record

**Appendix 4. Centerra gold: management options for senior executives**

Date of transaction	Date of filing	Type of security	Number acquired (disposed) of	Estimated net income
April 8, 2009	April 17, 2009	Common Shares	80,000	\$278,520
April 9, 2009	April 17, 2009	Common Shares	909,600	\$3,202,155
April 13, 2009	April 17, 2009	Common Shares	139,500	\$525,259
April 14, 2009	April 17, 2009	Common Shares	230,000	\$857,302
April 15, 2009	April 17, 2009	Common Shares	220,000	\$853,072
April 16, 2009	April 17, 2009	Common Shares	116,100	\$463,285
December 17, 2009	December 21, 2008	Common Shares	975,000	\$9,399,000
February 29, 2008	February 29, 2008	Common Shares	2,083,230	\$30,592,233
February 29, 2008	February 29, 2008	Warrants	1,041,615	\$15,145,082

## A Case Study in an Emerging Country

*Source:* Documents filed with SEDI

### Appendix 5. Kumtor gold mine: net present value adjusted annual projected income for company and Kyrgyzaltyn JSC

Proportional ownership	Total income	NPV	Kyrgyzaltyn JSC (KY)	Cameco (CCO) /Centerra Gold (CG)
KY: 2/3, CCO: 1/3	\$257,671,000	\$257,671,000	\$171,780,000	\$85,890,333
KY: 2/3, CCO: 1/3	\$97,224,000	\$92,594,286	\$61,729,524	\$30,864,762
KY: 2/3, CCO: 1/3	\$109,077,000	\$98,936,054	\$65,957,370	\$32,978,685
KY: 2/3, CCO: 1/3	\$35,826,000	\$30,947,846	\$20,631,897	\$10,315,949
KY: 2/3, CCO: 1/3	\$79,954,000	\$65,778,354	\$43,852,236	\$21,926,118
KY: 16%, CCO 52.7%	\$122,903,000	\$96,297,716	\$15,407,635	\$50,748,897
KY: 16%, CCO 52.7%	\$58,158,000	\$43,398,395	\$6,943,743	\$22,870,954
KY: 16%, CCO 52.7%	\$(80,614,000)	\$(57,290,865)	\$(9,166,538)	\$(30,192,286)
KY: 16%, CCO 52.7%	\$(77,906,000)	\$(52,729,847)	\$(8,436,776)	\$(27,788,630)
KY: 16%, CCO 52.7%	\$152,269,000	\$98,153,955	\$15,704,633	\$51,727,134
KY: 16%, CCO 52.7%	\$185,322,000	\$113,771,632	\$18,203,461	\$59,957,650
KY: 1/3, CG: 2/3	\$208,892,000	\$122,134,826	\$40,711,609	\$81,423,217
KY: 1/3, CG: 2/3	\$102,443,000	\$57,044,096	\$19,014,699	\$38,029,397
KY: 1/3, CG: 2/3	\$117,723,000	\$62,431,020	\$20,810,340	\$41,620,680
KY: 1/3, CG: 2/3	\$186,737,000	\$94,314,874	\$31,438,291	\$62,876,583
KY: 1/3, CG: 2/3	\$227,489,000	\$109,426,099	\$36,475,366	\$72,950,732
KY: 1/3, CG: 2/3	\$213,258,000	\$97,695,947	\$32,565,316	\$65,130,631
KY: 1/3, CG: 2/3	\$236,892,000	\$103,355,195	\$34,451,732	\$68,903,463
KY: 1/3, CG: 2/3	\$207,414,000	\$86,184,801	\$28,728,267	\$57,456,534
KY: 1/3, CG: 2/3	\$97,283,000	\$38,498,187	\$12,832,729	\$25,665,458
KY: 1/3, CG: 2/3	\$87,234,000	\$32,877,577	\$10,959,192	\$21,918,385
KY: 1/3, CG: 2/3	\$6,527,000	\$2,342,817	\$780,939	\$1,561,878
KY: 1/3, CG: 2/3	\$537,000	\$183,573	\$61,191	\$122,382
<b>Total</b>	<b>\$2,632,313,000</b>	<b>\$1,594,017,538</b>	<b>\$671,437,522</b>	<b>\$846,958,908</b>

*Source:* Calculated from company records, TMX filings, and annual reports. The applied discount rate is 5%.

## References

- Akayev, A. (1995). *On the way to progress and democracy*. Bishkek: Ahmet Yesevi Foundation.
- Ali, S. (2009). *Treasures of the earth: Need, greed and a sustainable future*. New Haven: Yale University Press.
- Auty, R. (1993). *Sustaining development in mineral economies: The resource curse thesis in Mining and Sustainability: the case of the Tulsequah Chief Mine 2001*. Interim Report for the Environmental Mining Council of British Columbia, Canada.
- Ayres, E. (2004). *Kumtor: The hidden shame of the global industrial economy*. Washington: Worldwatch Institute.
- Bhagwati, J. 2005. *In defense of globalization*. London: Oxford University Press.
- Bullich, A. (1991). *Hitler and Stalin: Parallel lives*. Toronto: McClelland & Stewart.
- Bulte, E., Damania, R., & Deacon, R. 2005. Resource intensity, institutions, and development. *World Development*, 33 (7): 1029–1044.
- CCE Bankwatch Network. (2002). Mountains of Gold: Kumtor Gold Mine in Kyrgyz Republic. [http://www.nodirtygold.org/pubs/200205%20CEE\\_Bankwatch\\_Report.pdf](http://www.nodirtygold.org/pubs/200205%20CEE_Bankwatch_Report.pdf). Accessed June 4, 2012.
- Dasgupta, PS & Heal, G. (1979). *Economic theory and exhaustible resources*. Cambridge: Cambridge University Press.
- Dauderstädt, M., & Schildberg, A., eds. (2006). *Dead ends of transition. Rentier economies and protectorates*. Frankfurt: Campus Verlag.
- Deshmukh, S., & Pliska, S. (1980). Optimal consumption and exploration of nonrenewable resources under uncertainty. *Econometrica*, 48(1): 177-200.
- Devarajan, S., & Fisher, A. (1981). Hotelling's 'Economics of exhaustible resources': fifty years later. *Journal of Economic Literature*, 19(1): 65-73.
- Devarajan, S., & Gilbert, R. (1979). Optimal depletion of an uncertain stock. *Review of Economic Studies*, 46(1): 47-57.
- Dunning, J, & Narula, R. (2000). Industrial development, globalization, and multinational enterprises: New realities for developing countries. *Oxford Developing Studies*, 28(2):141-167.
- Frankel, J. (2011). Natural resource curse: A survey of the literature. Washington: IMF Seminar.
- Gordon, H. (1954). The economy theory of a common-property resource: The fishery. *Journal of Political Economy*, 62(2): 124-142.
- Hino, D. (2010). *Inside Central Asia*. London: Overlook Duckworth.
- Hopkirk, P. (1990). *The great game*. London: Kodansha Globe.
- Hotelling, H. (1931). The economics of exhaustible resources. *Journal of Political Economy*, 39(2): 137-175.
- Japan International Cooperation Agency (1999). *Master plan on study on promotion of mining industry in the Kyrgyz Republic*. Bishkek: MINDECO.
- Jones, G. (2005). *Multinationals and global capitalism: From the Nineteenth to the Twenty-First Century*. Oxford: Oxford University Press.
- Kuyek, J. (2007). *Mining industries*. Vancouver. Mining Watch Canada.
- Luft, G., & Korin, A., eds. (2009). *Energy security challenges for the 21<sup>st</sup> Century*. Santa Barbara: Praeger.

## A Case Study in an Emerging Country

- McMillan, Charles (1996). *The Japanese industrial system*. New York: deGruyeter.
- McMillan, Charles, J (2007). *The strategic challenge*. Toronto: Captus Press.
- Meadows, D & Meadows, D. (2005). *The limits to growth: A report for the club of Rome's project on the predicament of mankind*. London: Earth Island.
- Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *Economic Journal*, 16(508): 1-20.
- Meyer, K., & Brysac, S. (1990). *Tournaments of shadows: The great game and the race for empire in Central Asia*. Washington: Counterpoint.
- Mining and Mineral Sciences Laboratories. (1998). The International Scientific Commission's assessment of the impact of the cyanide spill at Barskaun, Kyrgyz Republic. Report MMSL 98-039(CR).
- Minnitt, RCA. (2007). Frontiers of usefulness: The economics of exhaustible resources. *Journal of the Southern Africa Institute of Mining and Metallurgy*, 107: 530-555.
- Miranda, M., Burris, P., Bingcang, J., Shearman, P., Briones, J., La Viña, A., & Menard, S. (2003). *Mining and critical ecosystems: Mapping the risks*. Washington: World Resources Institute.
- National Energy Policy Development Group. (2001). *National energy policy: Reliable, affordable, and environmentally sound energy for America's future*. Washington.
- North, D. (1994). Economic performance through time. *American Economic Review*, 84(3): 359-368.
- Pindyck, R. (1980). Uncertainty and exhaustible resource markets. *Journal of Political Economy*, 88(6): 1203-1225.
- Pindyck, R. (1984). Uncertainty in the theory of renewable resource markets. *Review of Economic Studies*, 51(2): 289-303.
- Pomfret, R. (2011). Exploiting energy and mineral resources in Central Asia, Azerbaijan, and Mongolia. *Comparative Economic Studies*, 53(1): 5-33.
- Ramamurti, R. (2001). The obsolescing 'bargaining model'? MNC-host developing country relations revisited. *Journal of International Business Studies*, 32(1): 23-39.
- Ricardo, D. (1817). *On the principles of political economy*. London: John Murray.
- Rumer, B. (1996). *Central Asia in transition: Dilemmas of political and economic development*. London: M.E. Sharpe.
- Sachs, J., & Warner, A. (2001). The curse of natural resources. *European Economic Review*, 45(4-6): 827-838.
- Sala-I-Martin, X., & Subramanian, A. (2003). Addressing the natural resource curse: An illustration from Nigeria. *IMF Working Paper*, WP/03/139.
- Sarraf, M., & Jiwaji, M. (2001). Beating the resource curse: The case of Botswana. *Environmental Economics Series*, 83.
- Scott, AD. (1955). *Natural resources: The economics of conservation*. Toronto: University of Toronto Press.
- Singer, H. (1960). US foreign investment in underdeveloped areas: The distribution of gains between investing and borrowing countries. *American Economic Review*, 40: 473-485.
- Solow, RM. (1974). The Economics of resources or the Resources of Economics. *American Economic Review*, 64(2): 1-14.
- Stiglitz, J. (1976). Monopoly and the rate of extraction of exhaustible resources. *American Economic Review*, 66(4):55-61.

Strathcona Mineral Services Limited. (2011). *Technical report on the Kumtor gold project Kyrgyz Republic for Centerra Gold Inc.* Toronto

*The Times of Central Asia.* (2010). Profile of Kumtor local investments. July 1: 2.

UNCTAD. (2007). *World investment report 2007: TNCs from the extractive industries and development.* Geneva and New York.

Vernon, R. (1971). *Sovereignty at bay.* London: Routledge.

World Bank. (1994). Kyrgyz Republic: Mining Sector Review. Report No. 13024-KG.

Yergin, D. (1991). *The prize: The epic quest for oil, money, and power.* New York: Simon and Schuster.

Zakaria, F. (2004). *The Future of Freedom: Illiberal Democracy at Home and Abroad.* New York: W. W. Norton.

### **About the Authors**

Eric Baxter is an MBA alumnus of the Schulich School of Business. Charles McMillan is a Professor of International Business, York University, Schulich School of Business.

### **Contact Information**

Eric Baxter: ea.baxter@hotmail.com