ANALYSIS OF PROFIT SHARING IN BURKINA FASO GOLD OPERATIONS

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1. **Executive Summary**

The mining of natural resources and distribution of profits generated by this activity are central to many public debates in Burkina Faso and elsewhere in the world. The issue is not new, but has grown in recent years with metal prices escalating worldwide. Several nations have revised or considered revising their royalty and tax structures. The Burkina Faso government launched such an initiative a few months ago and is contemplating various changes to its mining code. The global dynamics of mining sector investment and cyclical nature of metal prices do, however, require weighing how any change in these structures might alter Burkina Faso’s appeal to mining investors.

This study focuses on current sharing of the wealth generated by Burkina Faso’s gold sector. The document comprises three mains sections:

1. The first discusses keys to understanding the situation and making gold sector investment decisions.
2. The second describes the geographic distribution of gold investments, as well as the absolute and relative positioning of West Africa and Burkina Faso.
3. The third covers the profitability and distribution of wealth generated by Burkina Faso’s gold mines, including comparisons with certain competing regions.

Existence of a historically positive gold cycle has contributed to the recent growth of Burkina Faso’s gold sector...

Burkina Faso’s mining (and particularly gold) sector, has assumed mounting importance within the nation’s economy over the past few years. National exploration investments have risen substantially, while the launch of production at certain Burkina Faso gold deposits has helped stimulate job creation and demand for various domestic goods and services. Burkina Faso is also relying on this sector to boost its development potential in coming years.

This expansion of the mining sector’s importance is, however, directly related to the rise in gold prices, which shot up more than 450% from 2003 to 2011, reaching $1,895/ounce last year. Declines in many nations’ equity and property markets, combined with heightened economic uncertainty, have triggered a major shift of funds to gold and record prices for this metal. Gold has stayed within the $1,550 to $1,775/ounce range for several months. Predicting gold’s future value is obviously risky in view of such volatility. But there seems to be greater likelihood it will drop rather than rise at the moment. This situation is important to potential development of Burkina Faso’s gold sector.
Development of the gold sector and the mining industry as a whole is capital intensive, bears a high chance of failure and can require many years to break even. For these reasons, this sector’s investment decisions are based on specific analytical protocols and a set of shared criteria. Such decisions depend on a particular project’s assessed likelihood of profitability (generally measured in Net Present Value or NPV) and related risks. Profitability depends on factors including expected changes in world metal prices, exchange rate developments, ore concentration, grinding and processing and the costs of power and transportation. Other elements will also influence project investment decisions, as well as the Net Present Value (NPV) required by investors. These include:

- The region’s mean-term political environment and stability.
- The fiscal environment and particularly future tax trends and developments that could affect project profitability.
- Quality of relations with local communities and expenditures that may be required throughout the project.
- Quality and sustainability of existing infrastructure (ports, rail lines, road and power grid), their funding and their maintenance.
- Access to a trained and qualified workforce.

A mining company will only decide whether to pursue a project after considering all these factors. Consequently, proper assessment of Burkina Faso’s gold potential requires an evaluation based on these criteria.

The Burkina Faso situation must also be compared with those of other gold producing nations, since profitability and risk may vary significantly from one to the next. When metal prices rise, as has been the case with gold skyrocketing in price since 2008, investment can boost tributary production capacity, generating...
benefits for many nations and regions. Such efforts speed exploration and development initiatives, existing mines are worked more intensively and new mines enter into production. Cost-effectiveness, however, varies widely among such facilities. Some are highly profitable and others marginally so because of high production costs. When this positive cycle is reversed through lower demand and prices, more expensive mining operations cut back their activities and development on less profitable and riskier deposits ceases. Sustainability of mining development should accordingly be considered with respect to a region’s absolute and relative benefits.

... Burkina Faso’s gold potential does not stand out globally

Burkina Faso remains a small producer in world terms. Its 2010 gold production was equivalent to a bit less than 1% of the world total. The nation’s industrial gold production (in contrast to small-scale gold mining) only actually began to take off in 2007. Production volumes leaped 800% from 2006 to 2010. With six mines in operation, Burkina Faso has already become the third biggest West African gold producer and could eventually be in a position to surpass Mali. Burkina Faso’s gold industry is on a fast track, particularly because of its good mine potential and supportive policies.

FIGURE 3: GLOBAL AND WESTERN AFRICAN GOLD PRODUCTION
2010, tons

The rise in exploration spending have been greater over recent years in Burkina Faso than in any other African nation, soaring from US$58 million in 2007 to US$251 million in 2011. It rose from 12th in spending among African nations (8th for gold) in 2009 to 3rd in 2011 (1st for gold). In 2012, foreign mining companies were conducting some 250 West African gold exploration or prospective excavation operations. Over one
third were located in Burkina Faso. Such activity should, however, be considered in the light of Burkina Faso’s physical, economic and socio-political situation.

First, the physical characters of Burkina Faso’s ore deposits are less than remarkable. The nation’s deposits currently in production are of average or relatively low grade, in global terms. Burkina Faso’s levels fall into the bottom global quartile and, with respect to Africa, are less than those of Mali or Ghana. The country’s prospective or developing sites will not alter this situation. While Burkina Faso offers the highest potential after Ghana for as-yet unexploited regional sites, holding some 34 million ounces, average deposit grade is a mere 1.6 g/t. The grades of some such deposits are even lower grade than those now in production.

Second, Burkina Faso’s economic conditions are not highly favourable. West African gold production is relatively expensive. Yet most mines in production there fall into the third international quartile. Burkina Faso fits this rule. The nation’s mine operating costs are typical of the rest of West Africa, which is higher than the world average. Burkina Faso is also in the first stages of its mine development and still lacks the critical mass to warrant a developed workforce, a goods and services support industry and efficient infrastructure.

Third, the nation has a fragile socio-political framework. Over the past few years, Burkina Faso has benefitted from excellent perceptions of its regulatory and tax systems. However, the country falls into the middle of the world pack for all decision-making criteria and perceptions are less positive about the trustworthiness of its legal system and its level of uncertainty.

On balance, Burkina Faso possesses real gold development potential. However, its relative and absolute advantages do not stand out on an international scale.
...And the Burkina Faso government is already receiving a large portion of wealth generated by gold production

A representative mining project was selected and its profitability calculated for prices ranging from US$1,200/ounce to US$2,200/ounce to assess the current distribution of wealth generated by Burkina Faso’s gold production. Profitability calculations were based on the representative project’s Net Present Value (NPV). Burkina Faso’s present existing “representative” mine accordingly yields a negative NPV if gold is selling for less than US$1,425/ounce. Undertaking such a project would therefore require gold prices to be no less than this level throughout the mine’s life. This situation is due to the fact that Burkina Faso’s production costs are higher than the world average. It becomes immediately clear that the nation’s production is more vulnerable to a drop in gold prices than other competing regions.

To calculate the Burkina Faso government’s total revenues for this representative mining project, the following factors have been taken into account: royalties, the surface tax, the tax on industrial and commercial profits (IBIC), the single tax on wages and benefits (IUTS), dividends paid to the government for its 10% stake in mining projects, the tax on income from securities (IRVM), customs and related duties and the added value tax (TVA) on petroleum products.

Under the current system, the Burkina Faso government receives 48% of gross profits generated throughout a mine’s life. When considering reimbursement of upfront investment funds, the share of profits paid to the government rises to 70%. In other words, the government keeps the government of the profits and the investors, 20%, although the investors shoulder risk alone.

In view of the main changes in mining taxes being considered for Burkina Faso (introduction of a 1% ad valorem tax, elimination of the reduced rate for the tax on industrial and commercial profits and elimination of the reduced rate for tax on income from securities), Burkina Faso’s gold projects would wane in appeal to investments as their break-even point rises.

The planned changes would affect a representative mine project’s NPV as follows:

- The break-even point would climb from US$1,425/ounce to US$1,465/ounce.
- Project NPV would decline. Since NPV depends on price, this reduction would range from 17% at a price of US$2,200/ounce to 56% at one of US$1,500/ounce. For the basic estimate of US$1,700/ounce, it would be down 24% (23 billion CFA francs).
These changes would also cut investor profits from 52% to 43% of the total, before reimbursement of their initial outlay. Following such reimbursement, their share would shrink from 30% to a mere 16%.

With this reform, Burkina Faso’s appeal could drop considerably. Investments in the nation would become less profitable than in neighbouring Ghana and far less than in Canada (Ontario). Only Western Australia presents lower profitability; however, its other investment criteria are more favourable.
2. INTRODUCTION

2.1. BACKGROUND

The mining of natural resources and distribution of profits generated by this activity are central to many public debates in Burkina Faso and elsewhere in the world. The issue is not new, but has grown in recent years with metal prices escalating worldwide. Several nations have revised or considered revising their royalty and tax structures. The Burkina Faso government launched such an initiative a few months ago and is contemplating various changes to its mining code. Many of these changes will affect how mining profits are redistributed and, accordingly, the relative cost-effectiveness and competitiveness that Burkina Faso affords investments in this sector. Mining sector investments are in fact particularly sensitive to profitability outlooks. It is therefore essential to consider the set of risks pertaining to these planned changes.

Authorities of many nations have recently hiked or considered significantly hiking their royalty or tax rates. They then partially or totally reversed these decisions to mitigate their adverse impact. These governments were confronted with two key mining sector realities. The market is global and territories lose investment appeal unless they maintain their absolute and relative competitiveness. The market is also one of commodities, which means it has extremely cyclical prices. Regions with higher costs or risks are hit much harder by lower metals prices. A difficult balance must accordingly be struck in sharing mining production profits between the state and investors.

The Chambre des mines du Burkina Faso sought to contribute to national debates on amending the mining code by requesting a third-party comparative and technical study. This study focuses on the gold sector. It may also be of interest to all stakeholders, including the government, citizens, mining sector players and international agencies present in Burkina Faso.

2.2. STUDY DESCRIPTION

This document begins by describing Burkina Faso’s place in the global context of gold mine operation and exploration. Over recent years, the gold sector has made major investments and Burkina Faso has benefitted from this strong interest in gold. We must, however, consider the circumstances that gave rise to the activity of recent years and define Burkina Faso’s absolute and relative performance. We shall accordingly focus on the evolution of international gold sector investments and the decisions that guide them. The positioning of West Africa in general and Burkina Faso in particular have also been considered in terms of several key factors.

This report then discusses how wealth generated by Burkina Faso’s gold sector has been distributed between investors and the government. The analysis not only pertains to the present situation, but also assesses how tax changes envisioned by the Burkina Faso authorities will affect the future profitability of gold companies and the distribution of financial wealth generated by gold mining. For this purpose, we have developed a financial model based on a representative Burkina Faso gold mine, based on the country’s specific operating
2. Introduction...

conditions.\(^1\) We applied this model in assessing repercussions of the tax changes based on various gold price scenarios. We also compared the Burkina Faso situation to those of competing geographic regions.

The document comprises three major sections:

1. The first discusses keys to understanding the situation and making gold sector investment decisions.
2. The second describes the geographic distribution of gold investments, as well as the absolute and relative positioning of West Africa and Burkina Faso.
3. The third covers the profitability and distribution of wealth generated by Burkina Faso’s gold mines, including comparisons with certain competing regions.

This report is intended for a broad audience. However, a series of appendices provide more technical information and analysis for interested readers.

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\(^1\) See Appendix 1 for more detailed information on how the model was constructed and the scenarios used for the various financial studies.
Burkina Faso’s mining (and particularly gold) sector has assumed growing importance within the nation’s economy over the past few years. National exploration investments have risen sharply, while the start of production at certain Burkina Faso gold deposits has helped stimulate job creation and demand for various domestic goods and services. Highlighting the background and basics of gold sector investment is a prerequisite to understanding the potential implications of planned fiscal changes.

3.1. THE GOLD SECTOR’S EVOLUTION

As a precious metal, gold is a highly valued, in-demand resource. Despite the aura this metal has enjoyed for thousands of years, the gold sector responds to the classical economic dynamics applicable to all metals. Supply and demand are the crucial factors in setting gold’s price and, ultimately, in making gold investment decisions.

3.1.1. GOLD DEMAND

Often called a “noble metal,” gold is valued for its different properties. These include its ductility, hardness, malleability, opacity and brilliance. It is also highly resistant to water, oxygen and most acids. Because of its excellent ability to withstand corrosion and electrical conductivity, gold has industrial applications in dentistry and electronics. Its principal use, however, is as a financial reserve, for speculation or value preservation. Gold was also one of the basic components of the first money in history and served as the sole monetary standard through much of the 20th century. Once again, gold is now a safe-haven currency.

Demand for gold, as for all metals, is fuelled by its industrial applications and its use as a reservoir of value. Industrial demand depends on general developments in the economy and in sectors that employ this metal. Its demand as a reserve is primarily associated with perceived risk and uncertainty about other safe havens.

Figure 8 presents growth in gold demand over the past decade. Total demand between 2003 and 2008 was flat and remained below 4,000 tons per year throughout the interval. The 2008 to 2010 period saw a new 4,000-ton per year level, triggered by the international financial crisis. This crisis and its impact on the value of financial and non-financial assets resulted in a vast shift of assets to gold. As we shall see, such efforts to protect against risk and financial uncertainty not only fuelled gold demand, but propelled its price to new summits. These factors in turn caused a deep-seated alteration in distribution of demand over the past few years. Demand from the monetary/safe haven component soared with the financial crisis’ onset, just as the jewellery component declined with the sharp hike in gold prices. Industrial requirements for gold, as we can see, have been less sensitive to changes in economic conditions and pricing. Gold is generally used to manufacture mission-critical equipment and represents a minuscule portion of product cost. Gold demand for technological purposes mainly concerns telecom equipment, computers, defence systems and medical and space equipment. However, it only constituted 10% of total demand from 2003 to 2011.

2 Visual Capitalist.
3. Background and Basics of Gold Sector Investments

Figure 9 reveals that certain regions of the world are chiefly responsible for the latest spike in gold demand. China and Europe have significantly increased their gold purchases in recent years. In both cases, gold served to diversify assets (distributing risk pertaining to its increased wealth in the case of China, and protecting against devaluation of the euro and other financial assets in the case of Europe). This figure also illustrates the absolute importance today of India and China in terms of world demand.

3.1.2. Gold Supply

In its natural state, gold occurs in nuggets. Such nuggets are present in veins running through ultrabasic rocks and in placers resulting from fluvial erosion of bedrock. Gold is produced not only in primary extraction, but in the recycling of gold-bearing tailings or existing products and the sale (particularly by central banks) of gold reserves.

As Figure 10 illustrates, mining is the main source for meeting annual gold demand. Since 2003, mine production has constituted over 60% of new gold on world markets. This source has grown slightly over the past decade. Change in composition of the gold supply since 2008 has certainly played a role in the weak growth of mined ore quantities.

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3. Compound annual growth rate.
4. Tracker/exchange traded fund (ETF).
5. Over the counter (OTC) transaction.
The 2008 crisis generated a significant rise in demand for gold as a reserve and safe haven, as noted above. Concomitant increases in mine production failed to meet this additional demand, driving prices up (see next section). This situation encouraged gold recycling. Recycling is a regular source of gold supply that can respond more quickly to new market conditions. Some gold holders then took advantage of these high prices to sell part of their stock. Individuals also fuelled this market change. Many gold buying shops emerged in different nations following the 2008 bank and financial crisis. These enterprises paid hard cash for gold jewellery, bars and coins. Central banks did the opposite. Throughout much of the 1990s and early 2000s, they have been net gold sellers. However, following the financial crisis, devaluation of many asset classes and currency uncertainties, they considerably reduced their gold sales and in some cases (such as countries with trade surpluses) stocked up on gold reserves. First time since 1998, central banks even became net gold buyers in 2010, due to this situation.

Figure 11 illustrates primary gold sources. Gold mining obviously depends on geological distribution (size of mineable deposits and their locations). Over 50% of the past decade’s mining occurred in six countries: South Africa, Australia, the United States, China, Peru and Russia. Each nation has maintained its share over the period, except South Africa, which has been losing ground for more than 40 years. The next chapter covers evolution of production and exploration efforts by geographic zone in greater detail.
3. Background and Basics of Gold Sector Investments…

3.1.3. **Gold Pricing**

The price of gold, like all raw materials, depends on supply and demand. Speculation has also influenced this price, given gold’s characteristics and history. The London Exchanges fixes prices on physical gold, while its New York counterpart fixes prices on futures contracts for the metal. Global gold prices are stated in US dollars per troy ounce. In addition to these organized markets, which deal with large quantities, individual, gold processing enterprises and users have access to precious metal and gold trading firms. The London Exchange price is the benchmark for all such operations.

London Bullion Market (LBM) Association members have been setting the price of 99.5% pure gold bars over two weekly telephone calls since 1914. This LBM serves as the reference for Over the Counter (OTC) transactions that determine gold’s spot and futures prices.

Figure 12 shows that gold prices soared over 450% from 2003 to 2011, to $1,895/ounce. The increase in gold prices was especially great between 2009 and 2011. It was particularly due to the major surge caused by the severe financial crisis in the fall of 2008. Tumbling equity and property markets in several nations, accompanied by deep-seated economic uncertainty, triggered a major flight of funds to gold. However, primary production and exploration efforts were stagnant at the time (and for the two previous decades, as per Figure 11). Since supply did not expand and could not expand as quickly as this swell in demand, gold prices skyrocketed. However, the price has hovered around $1,700 since 2011, 11% less than its pinnacle.

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6 Bullion Vault
Gold prices have remained within the $1,550 to $1,775/ounce range for the past several months. Futures contracts have also sold at about $1,700 for several months. Predicting the future price of such a volatile metal is quite risky. However, it seems more likely to drop than to rise in value. Downward pressures include an expected rise in primary production, reduced economic uncertainty and better returns on financial and non-financial assets. Upward influences also exist, including the risk of economic stagnation, growing wealth of emerging gold-buying nations and increased worldwide inflation. Our studies focus on a price of $1,700, but also consider the impact of slightly higher and lower rates. Before discussing these analyses, however, we must acquire a firm grasp of the decision-making process intrinsic to mining investments.

3.2. MINING INVESTMENT DECISIONS

Mine operations involve a series of successive investments staggered throughout the project’s development phases. This section will help provide a good understanding of how such decisions are made and the analytical models mining companies use to do so.
3. Background and Basics of Gold Sector Investments

3.2.1. MINING PROJECT PHASES

A mining project consists of five major phases:

- Exploration eventually leading to the discovery of an economic deposit.
- Assessment of the deposit and feasibility studies to raise money for a development project.
- Development of the mine (construction of the mining complex and related infrastructure).
- Production, which often requires additional investment to boost output or extend the mine’s life.
- Site rehabilitation or restoration once the mine is closed.

Durations, investments and risks are different for each phase.

**EXPLORATION**

Exploration is the riskiest mining phase. Exploration companies (commonly known as “juniors”) dominate in numbers the first two phases leading to the discovery and characterization of mineable deposits. Investment in these phases, although very low compared to that required to build a mining complex, is quite risky. Such companies obtain funding through sales of their “speculative shares” on the stock market. Alternately, they forge partnership deals with larger mining company. The key risk of this phase is the low likelihood of discovering a deposit that will subsequently become a mine.

Exploration is a high-risk endeavour that offers a potentially excellent return in the few cases that it yields a discovery. Such activity is usually financed through a venture capital-like model, except funding is generally

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*Not covered in Figure 7.*
raised on such specialized exchanges as Canada’s TSX Venture. To attract investment, companies describe the areas they wish to explore and reasons why in their prospectuses.

Junior companies seek potentially economic deposits so they can be bought out by a senior firm before they run short of capital. However, juniors, like SEMAFO and others, may also become medium-sized mining companies.

Capital used to finance exploration is characterised by great international mobility. Since exploration expenses, unlike those involved in creating a mining complex, do not entail installation of major fixed assets, exploration and medium-sized firms have few geographic barriers and generally operate in different nations, searching the world for promising sites. A given region could host an exploration investment boom and then be suddenly abandoned should conditions turn less favourable or potential inadequate.

**DEPOSIT ASSESSMENT**

Discovery of a potentially economic deposit is followed by the latter’s assessment. This process evaluates the deposit’s importance in terms of mineable ore quality and average grade. Such information is obtained through a standardized and rigorous process, in which the potentially mineable rock corresponds with the following definitions:

- **Resources**: mineralized tonnage of as-yet unproved economic viability. This first phase in assessing a potential deposit involves a pre-feasibility study. Resources are divided into inferred, indicated and measured categories, by order of increasing confidence in the mineralization’s geological interpretation. For example, no economic considerations can be given at the inferred resource phase.

- **Reserves**: mineralized tonnage of economic quality is demonstrated by a feasibility study that considers all factors specific to the deposit (tonnage, grade), along with external criteria (total cost to launch production, infrastructure, taxation, etc.). Reserves include probable and proven categories, established on the basis of indicated and measured resources, as noted above.

Such studies can demonstrate for any mining company that a deposit is viable and support funding necessary for production to start. Junior companies will often assign all or part of their rights to a deposit at the prefeasibility or feasibility phase. Feasibility studies should provide detailed information on:

- The deposit’s technical specifications.
- Anticipated investment for building and operating the mine.
- Forecast annual average production and estimated mine life.
- Estimated profitability, based on various operating cost and pricing scenarios for the mined ore.

Integrated mining firms with multiple mines and a portfolio of phase I and II projects conduct such studies to select those projects with the best potential.

Feasibility studies lead to final decisions on investing in the development of a mining complex. If deemed feasible and funding is available, a project can proceed to its next phase. Availability of funding for the subsequent phase heavily depends on the risk-return ratio of identified deposits. Stability is also a crucial

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8 Good financing management is crucial to junior exploration companies, since they have little or no revenue outside investor capital.
factor, since such financial outlays are much greater for development, take several years to recuperate and are linked to the presence of infrastructure in a region.

**MINING COMPLEX DEVELOPMENT (CONSTRUCTION)**

During this phase, the mine begins to take visible shape, with preparation and construction of a primary processing plant and necessary infrastructure (port, rail line, roads, etc.). Substantial investment is required, the actual amount depending on the type of ore and mine (underground or open pit), expected production volumes and locations.

The cost of building the mine and its infrastructure, which usually takes two or three years from the project’s start, constitute a large share of a project’s capital expenses. This is why many countries give favoured tax treatment, including accelerated depreciation of such costs. Faster depreciation during the first few years of operation allows mining companies to break even more quickly on huge outlays, making such investments more attractive and enabling medium-sized companies to inject them more easily.

**OPERATIONS**

A mine’s life varies not only according to deposit size, but changes in ore value. This phase, characterized by positive cash flow, ensures the viability of a project that has only previously generated disbursements. Such cash flow is not however risk free. Mining is a complicated undertaking with many surprises that can undermine feasibility study forecasts. Mining companies must also contend with constant fluctuations of prices and exchange rates, which have an impact on their revenues.

Predictions of financial flows over 5- to 15-year periods are subject to many random variables inherent to mining itself, as well as to changes in productions costs, affecting the profitability of projects that may in turn prove quite variable, whatever feasibility studies have forecast.

**MINE SITE REHABILITATION (RESTORATION)**

The project enters the final site rehabilitation phase once operations have terminated. Extraction and initial processing have a major impact on a mine site’s environment, particularly with respect to tailings pits and management facilities. Various measures must be implemented during mining to minimize this environmental footprint, especially for tailings management facilities. Today, the construction of sealed tailings storage facilities, close-circuit recovery of chemicals during initial processing and integrated water treatment systems serve to eliminate the risk of water and soil pollution outside the mine’s immediate perimeter.

Following the cessation of operations, rehabilitation restores the site to its most natural possible state. This process often involves covering the site with topsoil placed above a combination of waterproof geomembranes, geotextiles and layers of granular materials.

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9 Since major ores are quoted in US dollars, mining firms are subject to exchange rate fluctuations between the greenback and the currency of the country in which the mine is situated.
MINING INDUSTRY COSTS

There are many ways of calculating a mining project’s costs, but companies that publish production reports usually adopt the Gold Institute Production Cost Standard.10 This standard is not a GAAP,11 but does provide an indication of a mine’s profitability. These costs are generally expressed in $/ounce, to facilitate comparison among different mines.

- The first cost factor includes all elements from direct extraction through sales (direct mining operation expenses, pre-stripping and mine development adjustments, processing, refining, transportation and mine overhead/administrative costs). These key costs depend on such inputs as labour, repairs and energy and are usually called “cash operating costs” (C1).

- Royalties and production taxes make up “total cash costs” (C2). As the name suggests, these represent the cash a company disburses so it can ultimately sell the product.

- Investment elements and costs over the mine’s life consist of depreciation, site depletion and amortization, as well as closure of the mine and site rehabilitation. They are called “total production costs” (C3).

- A final category comprises other project costs, such as indirect expenses consisting of risk and financing factors, corporate overhead relating to the mine, research and exploration expenditures and exceptional costs (strike, cave-in, etc.), as well as interest to be repaid.

The mining company may pay dividends to shareholders or reinvest in mine projects using its operating revenues. The remaining funds have, accordingly, been generated by the risks a company has run in turning a profit.

10 Gold Institute.
11 Generally Accepted Accounting Principles (GAAP).
3.2.2. Mining Project Stakeholders

Various stakeholders, including shareholders, mining companies and the government, participate in the formulation of a mining project. Their roles and responsibilities are clearly identified and mining revenues and will accordingly depend on their involvement.

Shareholders (investors) own the capital stock and fund the mining company. They assess various projects among the companies they oversee and invest in those likely to provide the greatest return in terms of perceived risk. Their incomes are paid in the form of dividends by the mining company, if it earns profits. They are accordingly shouldering a major risk with the project. They provide project funding to mining companies. Mining company management teams, in turn, oversee operations and must ensure a certain minimum profitability or shareholders will sell their shares.
Mining company managers apply their mining experience and technical expertise by investing in economically viable mining projects. They evaluate one or more mining projects they own, proceed with development and ensure smooth mining operations. Multiple mining companies may participate in a particular project, each contributing different shares of the financing. Mining activities generate repayment of this financing to those companies. Mining companies are also responsible for attracting and supporting investor funding by minimizing risk. They must also stay abreast and ensure day-to-day management of mining costs.

The government, which generally owns the mineral resources, also participates in mining projects. Its role is to ensure an atmosphere conducive to project implementation in compliance with law, while overseeing the welfare of its citizens. As an owner, the government generally receives royalties on resources in exchange for their extraction, along with various taxes on the activities of mining companies and their shareholders. In various countries, such as Burkina Faso and other West African states, the government also holds a stake in mining projects. It becomes a shareholder so that it can receive a share of mining profits. The government’s risk consists of whether or not investment will be made and mining conducted on its territory. It receives no such revenue without these activities.

Combined efforts by these three stakeholders can result in a mining project. In addition to its respective roles and responsibilities, each applies a specific analytical method for assessing a project’s prospective benefits.
3.2.3. **Mining Industry Investment Decisions**

The key investments in a mine’s life cycle are made during construction. Such decisions comply with analytical protocols that are quite different from those employed in other phases and serve to assess a project’s prospective profitability and associated risks.

Determining Net Present Value (NPV) is fundamental to mining project investment decisions.\(^{12}\) NPV is calculated according to a widely used financial model, which has its own strengths and weaknesses. The main strength is its simplicity. The model generates a numerical value based on the project’s revenues, costs, investments, risk and time value of the money:

- A project’s NPV is equal to the sum of cash flow discounted over the project’s life. Cash flow is calculated after payment of mining royalties and taxes.
- The discount rate applied\(^ {13}\) is generally equal to the average cost of the capital used. In the case of internal capital, the rate includes a risk premium specific to the project and not the company’s average capital cost for its overall investment portfolio.
- A project will only receive the go-ahead if it has a positive NPV commensurate with the investment level required and the assumptions used in calculating the NPV.

The first graph in Figure 16 shows different assessment factors in a representative mine project. Analysis of this project generates an NPV of some $600 million over 19 years, for an upfront investment of $1.05 trillion (IRR\(^ {14}\) of 16%). An 8% discount rate, far lower than the IRR, was used. Under such circumstances, investments and the mining company’s financial team would be likely to believe that the project’s NPV is high enough to cover contingencies that may (and almost certainly will) arise during the project.

Such contingencies may include changes in world metals prices, changes in exchange rates (mining costs are in local currencies, while ore is priced in US dollars) and ore concentration, grinding and processing, as well as energy and transportation (particularly air) costs.\(^ {15}\) Labour expenditures are more predictable over a 5- to 15-year period. However, they do tend to move up at times of sharp price rises, now a worldwide phenomenon.

---

\(^{12}\) As with most investment decisions.

\(^{13}\) Currently, about 5% for precious metals, 8% for basic metals and 8% to 12% for other metals.

\(^{14}\) Another technical term used in financial analyses. The internal rate of return is the value needed to make NPV equal to zero.

\(^{15}\) Transportation costs depend on specific (project location) and global (freight charges for transportation by ore carrier) factors.
3. Background and Basics of Gold Sector Investments

It is accordingly possible for a mining project that started out with a positive NPV to turn unprofitable due to one of these contingencies. The second graph in Figure 16 simulates the impact of a price drop as of year 6, shrinking NPV from $598 million to -$38 million. The project that been profitable under prior assumptions, turns unprofitable with this negative NPV.

Other factors can also influence the decision of whether or not to invest in a project and will affect the NPV investors require:

- The region’s mean-term political climate and stability.
- The tax environment and more importantly, future tax trends likely to have an impact on project profitability.
- The quality of relations with local communities and related expenditures that may be needed throughout the project. The rise in many countries of claims from local communities over recent decades tends to boost mining project costs, either in terms of local royalties or community expenditures. These increases are also accompanied by additional uncertainty about such projects.
3. Background and Basics of Gold Sector Investments…

- Time needed to obtain permits and carry out the project, which may be substantially delayed by issues of social stability.
- Quality and sustainability of existing infrastructure (ports, rail lines, road and power grid), their funding and their maintenance.
- Access to a trained and qualified workforce.

These factors play separate roles, each with its own weight on the final decision. A 2005 United Nations survey among 45 mining companies (Mitchell, 2009) showed that key mining investment decision criteria are:

2. Profitability of potential operations.
4. Ability to repatriate profits.
5. Consistency of minerals policies.
6. Realistic foreign exchange controls.
7. Stability of exploration terms and conditions.
8. Ability to pre-determine environmental obligations.
9. Ability to pre-determine tax liability.
10. Stability of the tax regime.

Many other concerns also influence the perception of risks inherent to investment. The five most important risks in 2012 for mining company surveyed by Ernst & Young were, in decreasing order of importance, nationalization of resources, shortage of labour, access to infrastructure, cost inflation and delivery of capital projects.\(^\text{16}\)

\(^{16}\) Ernst & Young
3. Background and Basics of Gold Sector Investments

Figure 17 illustrates factors influencing the investment decision.

### Figure 17: Factors that Affect Investment Decision-Making on a Mining Project

<table>
<thead>
<tr>
<th>Analytical factors</th>
<th>Factors pertaining to the world environment</th>
<th>Project-specific factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential revenue</td>
<td>■ Evolution of world ore prices</td>
<td>■ Average ore volume and concentration</td>
</tr>
<tr>
<td></td>
<td>■ Evolution of exchange rates</td>
<td></td>
</tr>
<tr>
<td>Costs</td>
<td>■ Equipment (positive correlation with ore prices)</td>
<td>■ Type of mine</td>
</tr>
<tr>
<td></td>
<td>■ Energy (primarily oil)</td>
<td>■ Electricity and water</td>
</tr>
<tr>
<td></td>
<td>■ Transportation (primarily freight)</td>
<td>■ Wages</td>
</tr>
<tr>
<td>Context</td>
<td>■ Evolution of the economic context and demand</td>
<td>■ Policies</td>
</tr>
<tr>
<td></td>
<td>■ Policies of competing mining nations</td>
<td>■ Fiscality</td>
</tr>
<tr>
<td></td>
<td>■ Policies</td>
<td>■ Local communities</td>
</tr>
<tr>
<td></td>
<td>■ Infrastructure</td>
<td>■ Infrastructure</td>
</tr>
</tbody>
</table>

Factor affecting project NPV and investment decisions

Low (or 0) NPV  | **“No go”**  | Zone of uncertainty  | Average NPV  | Project feasible  | High NPV  | Project certain

Each project is individual appraised and compared with other potential projects on a world level, including certain mining companies and different ores.

Source: KPMG-SECOR analysis

A mining company will only make a decision on whether to proceed with its project after considering all these factors. Investors asked to contribute to this project may also take the same factors into account. The important upfront investments needed and their lack of mobility warrant careful decision-making, hence the great importance that the decision-making process places on stability of the political system, mining policies and tax policies.

The concept of opportunity cost must also be understood in this context. Senior mining companies, which are the primary investors in new mining projects, create a portfolio of prospective projects. It is unusual that such a mining company would only hold one investment possibility at a given time, even if it is not capable of investing simultaneously in multiple projects. This is why these different projects are placed in competition with each other. The most attractive projects in terms of the foregoing factors will be implemented and the others rejected or postponed. Figure 18 highlights the relative impact of these factors on the investment decision.
3.2.4. MINING SHUTDOWN DECISIONS

The decision to shut down a mine is generally based on a decline in its profitability. Such a decline may result from:

- Depletion of the mineable ore.
- Excessive cost of extracting remaining mineable ore.
- Forecast revenues will be lower following a worldwide drop in ore price than operating costs over an interval too long to justify consequential losses.

An Australian study recently focused on reasons for Australian mine shutdowns from 1981 to 2005. The two main causes were resource depletion (25%) and a drop in ore prices that would not warrant continued operation (23%). It mentioned a wide variety of additional reasons, each of marginal importance.

It is rare, but not impossible, for a closed mine to be reopened, often due to a surge in price of its mineable metals. However, such a process generally involves the high costs require to reassess resources, upgrade/replace infrastructure, replace equipment and bring tailings management facilities up to standards. More commonly, a deposit that was partially mined in the past will be entirely redefined, with a new mine built near the former site.

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17 Laurence, 2011
18 The consequential uncertainty of a mine’s service life (operating period) which influences assessment of the upfront investment.
3. Background and Basics of Gold Sector Investments

3.2.5. Impact of Price Cycles on Investment Levels

Because of the cyclic nature of prices, mining project profitability varies over time and accordingly plays a role in whether or not a project will go into production. If prices rise, investments to boost production become available and remain profitable until more expensive mining projects are included in the line-up and exert downward pressure on prices. More costly projects become less profitable and must eventually shut down. Investment decisions are accordingly highly dependent on price changes.

Today, the gold real price in 2011 US dollars may reach its fourth record in 2012, although the production peak dates to 2001. However, primary gold production has begun to grow. It has climbed about 6.1% annually since 2008 to benefit from price increases (see Figure 11). Exploration efforts have also expanded even more significantly and several sites are about to start production. This situation will have an impact on future gold prices and on producing sites most vulnerable to a drop in demand or price.

Figure 19 illustrates the impact of such cycles on the industry’s evolving production capacities.

The next section of this report discusses in greater detail investments in international and regional gold exploration and mining over the past few years. It also ranks the positions of West Africa and Burkina Faso, along with their pluses and minuses as seen by investors and businesses active in the gold sector.
4. DISTRIBUTION OF GOLD INVESTMENTS AND BURKINA FASO’S RANKING

Following historic peaks in gold prices, the gold sector has made major investments in recent years to find new deposits, develop new mining capacities and increase activities at existing mines. Burkina Faso has benefitted from this marked interest in gold and profited from the positive cycle to become a producing nation. Nonetheless, Burkina Faso is still a small producer on an international scale. More fundamentally, its current and future activities are in constant competition with those of other regions. This section ranks Burkina Faso on various factors crucial to the competitiveness of its gold operations.

4.1. STATUS OF PRODUCTION, EXPLORATION AND INVESTMENT

Figure 20 presents distribution of world gold production, with detailed figures for West Africa. In order of importance, the main producing nations are China, Australia, the United States, South Africa and Peru. These six countries have control over 50% of world production. West Africa’s combined production is similar to that of South Africa or Peru. West Africa’s main producer is Ghana, followed by Mali and Burkina Faso. Burkina Faso’s 2010 production was equal to about 1% of world volumes.

**FIGURE 20: GLOBAL AND WESTERN AFRICAN GOLD PRODUCTION 2010, tons**

Sources: USGS, KPMG-SECOR analysis
4. Distribution of Gold Investments and Burkina Faso’s Ranking

West Africa’s gold production has climbed approximately 3.8% annually from 2001 to 2010, a pace somewhat higher than that of the world. Ghana and Mali are the region’s two historically biggest producers. However, other West African nations, such as Burkina Faso, have boosted industrial production, particularly since 2006. In 2012, Ghana has the most (10) industrial mines in production, followed by Mali (7), Burkina Faso (6), Guinea (3), Côte d’Ivoire (3) and Senegal (1).

Burkina Faso’s industrial gold production\(^{19}\) only really took off in 2007. However, it skyrocketed 800% from 2006 to 2010. With six mines in operation, Burkina Faso has already become the third biggest West African gold producer and could eventually be in a position to surpass Mali. The nation’s gold industry is on a fast track, particularly because of its good mine potential and supportive policies (see below). In 2010, however, Burkina Faso remained a very small producer in international terms, at 25 tons of gold (compared to world production of 2,562 tons). Burkina Faso is accordingly a supplemental producing nation that is competing with the rest of the world and subject to the gold industry’s rules and uncertainties.

Distribution of world production reflects previous exploration efforts, to some extent. Mines now in operation represent the outgrowth of prior investment and work. The distribution of recent exploration investments should therefore be assessed by evaluating different regions’ relative potentials. As noted in the previous section, exploration expenses are closely tied to metal price cycles. This cycle has been very positive in recent years, resulting in great spending on exploration (see Figure 22). Such outlays multiplied some 950% from 2002 to 2011, to US$18 billion.

Figure 21: Gold Production in Western Africa 2010, tons

Sources: USGS, KPMG-SECOR analysis

\(^{19}\) Small-scale gold production has been present for many years.
Regions benefiting from nonferrous exploration include Canada (number 1), responsible for 18% of 2011 spending, followed by Australia (13%). The proportion of worldwide exploration disbursements from 2004 to 2011 has remained fairly constant except in certain nations, such as South Africa and Russia, that have dropped in importance, and others than have moved up a notch, including China, Chile, Mexico and West Africa. The latter, however, remained marginal in 2011, responsible for only 6% of the world’s exploration costs.

For some 30 years, gold has been the prime metal targeted by exploration spending, although its place has tumbled from over 60% of exploration budgets in 1997 to less than 50% in 2011. Figure 24 shows the rise in exploration spending for gold deposits, and the most popular regions for these efforts. Gold exploration expenditures from 2007 to 2011 soared from US$3.5 billion to $US7.2 billion. North and Latin America were the regions of most interest, representing over 60% of such spending on average. The biggest gains, however, were in West Africa, where these outlays rose an average annual 28%. Regional gold exploration expenses, as shown in Figure 25, shot from US$338 million to US$918 million. This surge was most significant in Burkina Faso, leaping from US$58 million in 2007 to US$251 million in 2011. The country also climbed from 12th in exploration spending among African nations (8th for gold) in 2009 to 3rd in 2011 (1st for gold). Foreign mining companies were running some 250 West African gold exploration or prospective drilling projects in 2012, one third being in Burkina Faso.

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20 Mining Journal.
21 Metals Economic Group.
22 The Mining Almanac. All mining and production companies listed on Canadian, US, UK and Australian stock exchanges.
Burkina Faso, like the rest of West Africa, is a marginal region with respect to the world as a whole in terms of production and mining exploration. However, there is a clear interest in the potential these areas represent, as demonstrated by the growth in funding for regional exploration. Meeting this potential will depend on the physical characteristics of identified deposits and the cost to mine them. The following section covers these issues.

4.2. ORES AND DEPOSITS

Discovery of gold ore (particularly large deposits) has been declining since the 1990s, despite substantial increases in exploration spending. This situation is significant, as industrially mined deposits usually present potential in excess of 1 million ounces. Those with lower potential represent less than 10% of gold deposit assessment each year. Because of the high investment required to discover and mine gold, small deposits are not economic. The size of existing and prospective deposits are key factors in different regions’ comparative attractiveness.

In 2012, 439 deposits with over 1 million ounces were present around the world, representing in excess of 3 billion ounces. Of this number, 249 deposits were not in production. West Africa does not have a significant concentration of large deposits. Of those that do exist in this region, the largest is Obuasi in Ghana, with estimated resources of more than 29 million ounces. It is also the region with the greatest number of deposits over 1 million ounces already in operation (9 in 2012). Ghana has five other deposits with identified potential in excess of 1 million ounces (14 major deposits, including those in operation). Burkina Faso only had 5 deposits over 1 million ounces in operation during 2012, but possessed 10 other identified deposits of that scale. This the largest number of deposits in excess of 1 million ounces that have been identified but not yet mined in West Africa. Mali, for example, has 5 deposits over 1 million ounces in operation, but only two identified in development. Guinea, Côte d’Ivoire and Senegal have five deposits of

23 Schodde, 2010
24 We counted 23 Burkina Faso deposits in development, but 8 of them held less than 1 million ounces.
more than 1 million ounces being mined and four others identified. While Burkina Faso does not have very large deposits, it does have some medium-sized ones of interest, not yet in operation.

While deposit size is important in calculating industrial mining potential, it cannot alone ensure profitability. Gold grade is also a factor, although it had been dropping for some years among new deposits mined. This situation is due to the fact that few new major sites have been discovered, accompanied by the “breakeven” gold price required for mining low-grade deposits.

As indicated in Figure 26, the grade of Burkina Faso deposits now being mined is on par with, or lower than, the world average. They fall into the last international quartile and are much less than those found in Mali or Ghana. This situation will not change with Burkina Faso’s prospective sites or those under development. While Burkina Faso represents the highest potential, after Ghana, for the region’s unexploited gold deposits, with some 34 million ounces, average deposit grade is only 1.6 g/t. These deposits are also smaller than those currently in production.

Burkina Faso’s mines in production thus represent small deposits of low grade. The nation’s currently identified deposits, furthermore, are smaller than those in operation and their grade similar (low). However, Burkina Faso has deposits that are still of interest for mining investors and production could rise if the risk-return ratio of its sites is appealing.

**Figure 26: Average Grade of Mining Sites and Deposits of over 1 Million Ounces per Country 2012, grams/ton**

*Sources: Natural Resource Holdings Research, KPMG-SECOR analysis*
Burkina Faso must, however, compete with other gold-bearing sites possessing more attractive geological characteristics. Potential is vast elsewhere in the world. Canada alone has some 60 not-yet mined and 20 mined deposits in excess of 1 million ounces. Sites with more than 1 million ounces hold an estimated 3 billion ounces of gold with an average ore grade of 2.8 g/t, or twice Burkina Faso’s level. Burkina Faso’s gold potential is thus marginal in world terms and it remains one of the lowest grade regions. Its deposits are far less impressive than those of North America in terms of size or South Africa in grade. Of 40 major (over $500 million) international gold mine projects, only four are in Africa, three of which are in South Africa and one in Ghana.25

25 Engineering & Mining Journal, 2012
In addition to their physical features, the appeal of various gold sites depends primarily on their anticipated profitability and, accordingly, the costs required for exploration and mining. The next section discusses these issues.

4.3. Exploration and Mining Costs

Average gold discovery cost has risen constantly since the 1950s. For example, cost in the western world climbed an average annual 6% from 1950 to 2008 (Figure 28). At the same time, average gold grade in deposits discovered dropped consistently, from 5 g/ton in 1955 to less than 1 g/ton in 2010 (Figure 29). This is partially due to the fact that it is generally easier and less expensive to discover and operate an open-pit mine than its high-grade underground counterpart. For instance, of 30 West Africa mines in operation during 2012, 27 were open pits.26

Reduced grade and increased discovery costs have, however, been offset by other factors that have lessened their impact on the profitability of gold operations. They include:

- Higher gold prices permitting mining of deposits that would previously have been unprofitable and recovering higher operating expenses.
- Improved exploration techniques, particularly thanks to computerization, along with geochemical, geophysical and remote detection methods that have shrunk discovery costs for certain types of deposits.
- Better mining technologies, such as block caving, permitting the mining of sites that were previously too difficult to exploit.

The total cost of producing one ounce of gold depends on multiple elements (Figure 15). The chief four are:

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26 Metals Economic Group.
4. Distribution of Gold Investments and Burkina Faso’s Ranking…

- All elements from direct extraction through sales (direct mining operation expenses, pre-stripping and mine development adjustments, processing, refining, transportation and mine overhead/administrative costs). These are generally called “cash operating costs” (C1) and internationally averaged $585 in 2011.

- Royalties and production taxes make up “total cash costs” (C2). As the name suggests, these represent the outlays a company makes so it can ultimately sell the product.

- Investment elements and costs over the mine’s life consist of depreciation, site depletion and amortization, as well as closure of the mine and site rehabilitation. They are called “total production costs” (C3).

- A final category comprises other project costs, such as indirect expenses consisting of risk and financing factors, corporate overhead relating to the mine, research and exploration expenditures and exceptional costs (strike, cave-in, etc.), as well as interest to be repaid.

Total costs vary from one site to another. But a gold mining project’s actual profitability can only be assessed once they have all been covered. Profits on a sale price of $1,700/ounce may be less than $200.

Average 2012 world gold mine cash operating costs (C1) were US$656/ounce, with averages ranging from less than US$316/ounce for the top quartile to US$1,107/ounce for the fourth. Cash operating costs for most mines in 2012 were, however, between US$600 and US$800/ounce.

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**FIGURE 30: AVERAGE WEIGHTED PRODUCTION COSTS WORLDWIDE AND PER QUARTILE**

*2012 up to Sept. 30, USD/ounce*

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st quartile</td>
<td>316 $</td>
</tr>
<tr>
<td>2nd quartile</td>
<td>591 $</td>
</tr>
<tr>
<td>Average</td>
<td>656 $</td>
</tr>
<tr>
<td>3rd quartile</td>
<td>777 $</td>
</tr>
<tr>
<td>4th quartile</td>
<td>1,107 $</td>
</tr>
</tbody>
</table>

**FIGURE 31: AVERAGE WEIGHTED PRODUCTION COST OF IN BURKINA FASO AND WESTERN AFRICA**

*2012 up to Sept. 30, USD/ounce*

- World average: 656 $
- Burkina Faso: 756 $
- West Africa: 760 $

*The long term costs were included in the average for mines in western Africa that are in production since 2010.
Sources: Mining company financial reports, KPMG-SECOR analysis*
Guatemala, Japan and Eritrea had the lowest average operating costs and mines, and the highest costs were found in Algeria, the Fiji Islands and Spain. West Africa is not an inexpensive region. The average weighted mine production cost for West Africa was within less than US$20 of the third quartile average (Figure 31). Burkina Faso was no exception to the rule with its costs falling within US$4 of the 2012 regional average.

Cash operating costs (C1) for most of the country’s mines are accordingly far greater (+15% or US$100/ounce) than the world average.27

High West African costs are partly due to the poor condition and scarcity of infrastructure needed for gold mining. Burkina Faso ranks lower than other West African nations in this regard because it is a landlocked, boosting shipping costs for various inputs. Energy costs are also higher. Energy is a critical factor in gold mine costs. In 2010, Burkina Faso’s electric rates were 33% greater than in Senegal and 245% higher than in Ghana, the region’s leading gold producer. Fuel in Burkina Faso was, by the same token, 43% more than in Ghana. However, it was less than in Côte d’Ivoire or Senegal (Figure 32).

Burkina Faso is accordingly a relatively high cost gold producer in world terms. Its relatively small deposits and their low grade play a role in this situation. But this cost disadvantage is also due to the country’s geographic locations, which entails additional expenses, its shortage of energy resources and the resulting very poor development of its gold producing industry. Burkina Faso is still in the first stages of its mine development and lacks the critical mass for a goods and service support industry. Time and the deployment of new projects could boost supply and make mining activities more efficient.

Costs are obviously a key factor in a region’s lure, but other issues must be considered because of their influence on investment decisions. The next section discusses these additional factors.

27 Through September 30, 2012 based on long-term costs of mines in production since 2010. Recent mines, like Essakane, which opened in 2010, have low operating costs early in production, but anticipate increases in this area, primarily due to declining ore grade.
4. Distribution of Gold Investments and Burkina Faso’s Ranking

4.4. OTHER FACTORS

Despite various factors hindering its mine development, Burkina Faso has implemented pro-investment initiatives that offset its drawbacks and are reflected by the interest mining exploration investors have expressed over recent years in this nation.

This positive appraisal is apparent in the mining investment climate results of the Fraser Institute Annual Survey of Mining Companies. The survey reveals the opinions and perceptions of key mining investors. It provides a comparison of producing nations as seen by such investors. The 2011-2012 survey ranked Burkina Faso 57th of 93 compared regions. Burkina Faso does not fall into the first or second quartile for geological characteristics or costs. However, it is slightly ahead of Ghana and Mali in these areas.

The survey also highlights Burkina Faso’s chief perceived plus and minuses with respect to the rest of the world and West Africa. Burkina Faso’s upside is primarily its regulatory and tax framework, while the downside is seen as the reliability of its legal system and access to infrastructure, as well as labour (Figure 33, below).

This situation is important, since amendments to Burkina Faso’s mining code that could alter investor appraisals of its attractiveness are now being contemplated. As Burkina Faso has few relative advantages, the financial impact of expected tax changes and their influence on the country’s appeal are important. The next section covers these issues.

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**Figure 33: Burkina Faso perception of investors compared to Western Africa and the rest of the world**

2011-2012

<table>
<thead>
<tr>
<th>West Africa’s weak international situation</th>
<th>West Africa’s strong international situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Infrastructure quality</td>
<td>• Regulations and labour disputes</td>
</tr>
<tr>
<td>• Security</td>
<td>• Duplication and inconsistencies of certain regulations</td>
</tr>
<tr>
<td>• Legal system quality</td>
<td>• Mining right claim disputes</td>
</tr>
<tr>
<td>• Stability policy</td>
<td>• Uncertainties on protection of natural areas and the creation of parks and archaeological sites</td>
</tr>
<tr>
<td>• Quality of geological data</td>
<td>• Uncertainties on the administration, interpretation and enhancement of current regulations</td>
</tr>
<tr>
<td>• Workforce availability and qualification</td>
<td>• Environmental regulations</td>
</tr>
<tr>
<td>• Corruption</td>
<td>• Mining potential based on current regulations</td>
</tr>
<tr>
<td>Burkina Faso’s weak position with respect to Ghana and Mali</td>
<td>• Tax system</td>
</tr>
<tr>
<td></td>
<td>• Uncertainty</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Burkina Faso’s strong position with respect to Ghana and Mali</th>
<th>Burkina Faso’s weak position with respect to Ghana and Mali</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Quality of geological data</td>
<td>• Corruption</td>
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<tr>
<td>• Workforce availability and qualification</td>
<td>• Duplication and inconsistencies of certain regulations</td>
</tr>
<tr>
<td>• Stability policy</td>
<td>• Uncertainties on protection of natural areas and the creation of parks and archaeological sites</td>
</tr>
<tr>
<td>• Legal system quality</td>
<td>• Environmental regulations</td>
</tr>
<tr>
<td></td>
<td>• Socioeconomic and community development agreements</td>
</tr>
</tbody>
</table>

Sources: Fraser Institute, KPMG-SECOR analysis

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28 Fraser Institute
5. DISTRIBUTION OF WEALTH GENERATED BY BURKINA FASO’S GOLD INDUSTRY

Mining is a cyclical activity, with revenues for investors and governments tracking ore prices and the mine’s life cycle. The first years of operation are, accordingly, typically more profitable for investors, with money earned paying back debts. The same rule also often applies to government, which collect taxes on higher investment depreciation at the start of the period, along with dividends from repayment of the debt. In assessing mining profit distribution, however, we should consider the mine’s entire life and not just one year. This approach was used below in evaluating the distribution of Burkina Faso’s mining wealth.

5.1. KEY FEATURES OF A REPRESENTATIVE MINE’S FINANCIAL MODEL

We have modelled this country’s “representative” gold mine to ensure an accurate and rigorous analysis of how the wealth it generates is distributed. The main features of this representative mine are listed in Figure 34.

![Figure 34: Main Characteristics of the Representative Gold Mine Modeled](source: KPMG-SECOR analysis)

<table>
<thead>
<tr>
<th>Mining Financial Model - Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deposit Specificities</strong></td>
</tr>
<tr>
<td>Average Grade</td>
</tr>
<tr>
<td>Strip Ratio</td>
</tr>
<tr>
<td>Average Recovery Ratio</td>
</tr>
<tr>
<td>Total Gold Ounces Recovered</td>
</tr>
<tr>
<td><strong>Capital Investments</strong></td>
</tr>
<tr>
<td>Exploration</td>
</tr>
<tr>
<td>Mine development</td>
</tr>
<tr>
<td>Sustaining</td>
</tr>
<tr>
<td>Rehabilitation</td>
</tr>
<tr>
<td><strong>Operating Costs</strong></td>
</tr>
<tr>
<td>Mining</td>
</tr>
<tr>
<td>Processing</td>
</tr>
<tr>
<td>General &amp; Administration</td>
</tr>
<tr>
<td>Refining &amp; Selling</td>
</tr>
<tr>
<td>Cash cost (C1)</td>
</tr>
<tr>
<td><strong>Other Assumptions</strong></td>
</tr>
<tr>
<td>Development Time</td>
</tr>
<tr>
<td>Mine Life</td>
</tr>
<tr>
<td>Exchange Rate USD:XOF</td>
</tr>
</tbody>
</table>

Source: KPMG-SECOR analysis

The representative mine model was based on data provided by mining companies now operating in Burkina Faso. It accordingly represents current operating conditions in that nation. These conditions also seem applicable to deposits being explored and are unlikely to change in the next few years, based on characteristics of projects under development.

Other models have been realized based on this representative model to compare Burkina Faso’s situation with those of other gold producing regions including:

- Surrounding nations (Ghana, Mali, Guinea and Côte d’Ivoire).
- Major gold-producing regions on other continents: Western Australia, Ontario (Canada) and Mexico.

Appendix 1 provides detailed features of this model.

---

29 Since each Australian state has its own tax system, we selected Western Australia, 2011’s main gold producer (by value).
30 Since each Canadian province has its own tax system, we selected Ontario, 2011’s main gold producer (by value).
5.2. CHANGE IN PROJECT PROFITABILITY ACCORDING TO DIFFERENT PRICE SCENARIOS

The profitability of any mining project depends on the metal price trends. Selecting various price scenarios is obviously important in assessing project profitability. The recent volatility of gold prices makes this exercise particularly difficult. It would accordingly be wise to assess project profitability for a full range of potential prices, as we have done. To do so, we used long-term\(^{31}\) low and high projections from the gold market’s leading analysts.\(^{32}\) At the time of writing this report, these scenarios were, respectively:

- US$1,700/ounce for the basic estimate.
- US$1,200/ounce for the low estimate.
- US$2,200/ounce for the high estimate.

For instance, the price on February 28, 2013 was $1,580/ounce, slightly less than the 2012 annual average of $1,669/ounce. The basic estimate is accordingly slightly higher than the current price and the prior year’s record average. The low estimate was equal to the 2010 average price and is 25% less than the current rate. The high estimate is a never-yet-attained gold price, with the highest price on record US$1,921/ounce\(^{33}\). This estimate is 40% above the February 28, 2013 price.

We have consequently calculated the profitability of a representative Burkina Faso mining price for prices ranging from $1,200 to $2,200/ounce. We based our profitability calculation on project Net Present Value (NPV). Please refer to subsection 3.2.2. for more information on this assessment method.

In this case, our NPV was based on cash flow after tax, discounted at 8%. This rate is commonly used by gold mining project investors for such developed nations as Canada. However, because of the greater risk associated with investment in Burkina Faso, mining companies are likely to use higher discount rates in calculating NPV to reflect the country risk more accurately, reducing project NPV. We then took 90% of the total obtained, excluding the government’s 10% project stake. Figure 35 presents the NPV for Burkina Faso’s representative mining project, according to various price scenarios.

\(^{31}\) More than three years.
\(^{32}\) Twenty-five analysts of the main banks covering this sector. Source: Bloomberg

\(^{33}\) As at September 6, 2011.
As we can see, Burkina Faso’s current representative mine will have a negative NPV at a gold price below $1,425/ounce, meaning that the project would probably not move forward below this level. This break-even point might seem high, since the price of gold has been above that point only since 2010. However, mines being operated in Burkina Faso and deposits being explored are more expensive than the worldwide average and also are smaller and of lower grade. Burkina Faso’s infrastructure has also been hit by the high worldwide inflation that was reflected in gold production costs over the past few years. These inflationary factors include:

- Higher prices for heating oil, an ingredient particularly important for Burkina Faso’s representative mine, responsible for some 35% of production costs.
- Increased prices and delivery times for specialized mining equipment (parts and machinery), given high current demand and a lack of local suppliers.
- Wage hikes, with greater difficulty in recruiting qualified labour.
- Lower cut-off grade, with higher production costs.
- Start of production for deposits with higher cash operating costs and capital investments that have become economic with gold’s price rise.

The representative mine project would be profitable at a basic price of $1,700/ounce, with an NPV of 94 billion CFA francs over the mine’s life. Such a mine and especially projects under development are subject to downward corrections in the price of gold.

---

34 Deposit that is economically viable.
5. Distribution of Wealth Generated by Burkina Faso’s Gold Industry…

5.3. CURRENT PROFIT SHARING BETWEEN THE GOVERNMENT AND INVESTORS

Results presented in this section are based on our estimate of the basic gold price ($1,700/ounce) unless otherwise stated. It would be worthwhile to assess total government revenues throughout a mine’s life. As mentioned above, we should not consider just a single year and particularly not just the first few years of mining. The magnitude of initial capital investments result in an often lengthy recovery process. In the case of our “representative” mine, such recovery takes four years. Consequently, some government revenues, such as dividends and taxes on income from securities will be low or nil in the first few years and will only truly be paid in the second half of the project’s life.

We have taken the following elements into account in calculating total Burkina Faso government revenues:

- Royalties of 3 to 5%, based on gold price, with the last rate change made in 2011.
- Surface tax, with this rate reassessed in 2011.
- The tax on industrial and commercial profits (IBIC), with mining companies subject to a reduced rate of 17.5% (27.5% for the full rate).
- The single tax on wages and benefits (IUTS), with mining company subject to a reduced rate of 6.25% (12.5% for the full rate).
- Dividends paid to the government for its 10% stake in mining projects.

35 “Recovery time” is the period required for total project earnings to equal upfront investments.
5. Distribution of Wealth Generated by Burkina Faso’s Gold Industry…

- The tax on dividends (IRVM).
- Customs duties.
- The statistical import charge (RS), community levy (PC) and the community solidarity levy (PCS), compiled with customs duties under the heading “customs and related duties.”

We also included the value-added tax (TVA) on petroleum products, which is no longer deductible since 2011. However, we excluded value-added tax on other items. Before May 2011, value-added tax was waived for mining companies importing products required for their activities. Since May 2011, these firms have been subject to the value-added tax. Please refer to Appendix 1 for more information on various tax rates.

Figure 38 illustrates the distribution of government revenues.

**Figure 38: Distribution of Burkina Faso State Revenue**

Over a mine’s life, four tax sources generate government earnings. They are:

- Royalties (24%).
- Dividends paid to the government and tax on income from securities (IRVM, 20%). This revenue stream is only paid late in the mine’s life.
- The tax on industrial and commercial profits (IBIC, 19%). IBIC payments are generally low in the first few years of production due to depreciation of capital investments.
- Customs and related duties (16%).

*Source: KPMG-SECOR analysis*
We then compared profits paid to the government with those paid to investors (dividends). We grouped these profits in two categories:

- Gross (paid to investors as dividends).
- Net (total dividends paid to investors minus their upfront equity investment).36

These profits make up less than half total mining project revenues, however. Total production costs (construction, exploration, maintenance and rehabilitation costs, as well as operating costs, including customs duties, single tax on wages and benefits and the valued-added tax) consume some 70% of project earnings, before deducting the upfront equity investment.

**Figure 39: Distribution of revenue by ounce of gold extracted from a representative mining project at a price of $1,700/ounce**

*Including upfront equity investment from investors

*Source: KPMG-SECOR analysis*

Figure 39 illustrates the distribution of revenues per ounce of gold extracted in the project and sold at US$1,700:

- US$217 repays the upfront investment.
- US$217 is applied to maintenance investments.
- US$643 (38%) covers operating costs.

---

36 Upfront capital investments are 50% funded by debt, repaid during the first three years of operations and 50% by equity (the upfront equity investment).
5. Distribution of Wealth Generated by Burkina Faso’s Gold Industry...

- US$113 is paid to the government as customs duties, the single tax on wages and benefits and value-added tax. Companies include these taxes in their cash costs (C1) and total $US756 if added to cash operating costs.

- Royalties, dividends, industrial and commercial profits, the tax on income from securities and the surface tax total an additional US$243 in revenues for the government.

- Repayment of the upfront equity investment totals US$120.

In other words, investors receive net profits of US$266 for an ounce of gold sold at US$1,700.

Prior to deduction of the upfront equity investment, however, investors receive slightly more revenue. Figure 40 details the distribution of revenues between the government and investors for our basic price estimate.

The Burkina Faso government receives 48% of gross profits generated over the mine’s life with the current system. Taking reimbursement of upfront equity risk into account, the government receives 70% of the profits, while investors alone shoulder the risk.

5.4. Potential Impact of Proposed Fiscal Changes

As previously noted, Burkina Faso is reviewing its taxes on mining companies, with this reform planned for 2013.

The main changes contemplated are:

- Introduction of a 1% ad valorem tax to be applied to local community development.
Elimination of the reduced rate for the tax on industrial and commercial profits, which would rise from 17.5% to 27.5%.

Elimination of the reduced tax on income from securities, which would climb from 6.25% to 12.5%.

Such a tax hike for mining companies would reduce gross and net profits for investors and boost revenues for the Burkina Faso government.

In terms of the NPV for a representative mining project, as detailed in Figure 41, these changes would have two kinds of impact:

- Raise the break-even point37 from $1,425/ounce to $1,465/ounce.
- Diminish project NPV. Since NPV depends on gold price, such shrinkage would range from 17% at a price of US$2,200/ounce to 56% for one of US$1,500/ounce. This decrease is 24% for the $1,700/ounce basic estimate, or 23 billion CFA francs.

The lower mining project profitability that would result from the planned tax changes is particularly important at average gold prices of $1,500 to $1,700/ounce—the range occurring in February 2013. This rise in the break-even point is by no means insignificant. For example, at the current price of US$1,610/ounce, we are US$185 above the break-even point. However, following the envisioned changes, we would only be $145 over the new break-even point. These modifications would also affect the distribution of revenues between investors and the government (Figure 42).

37 Gold price at which the NPV turns positive.
They would slash investor earnings from 52% to 43% of the total prior to repayment of the upfront equity investment. Following such repayment, the investor share would tumble from 30% to a bare 16%.

In all cases, these transformations would make the Burkina Faso government the main recipient of project profits, to the detriment of investors shouldering the lion’s share of project risk.

5.5. Burkina Faso Comparison with Other Gold-Producing Regions

As previously mentioned, gold mining project investment decisions are planet-wide. We must also evaluate the potential impact of the envisioned tax changes on Burkina Faso’s relative appeal. This factor is particularly important since taxation is one of Burkina Faso’s only distinctive pluses.

The government revenues calculated here are slightly different from those previously considered, so that we may compare different regions on a similar basis. Consequently, customs and related duties, valued added tax and the single tax on wages and benefits have been excluded from government revenues because of the difficulty in isolating them for all countries considered. They do, however, fall into the “production costs” category.

The only taxes considered as government revenues then are:

- The ad valorem tax.
- The tax on industrial and commercial profits.
- The tax on income from securities.
5. Distribution of Wealth Generated by Burkina Faso’s Gold Industry...

- Dividends paid to the government for its stake in mining projects.

Investor profits are analyzed in this section as “net profits” (repayment of the upfront equity investment).

As noted in Chapter 4.3, Burkina Faso’s overall cash costs are similar to those of other West African nations and particularly Mali and Ghana, the region’s other two major gold producers, as appears in Figure 42. However, when compared to other major gold-producing regions, Burkina Faso has higher average cash costs, as per Figure 43:

- Burkina Faso’s costs are far higher than average figures below US$600/ounce for the principal North and Latin American producer nations (the United States, Mexico, Chile and Peru).
- The difference is less (US$36/ounce) with respect to Canada.
- Cash costs are only higher for Australia and especially South Africa.

**FIGURE 43: WEIGHTED AVERAGE CUMULATIVE CASH COST (C1) AT Q3 2012 FOR MAJOR GOLD PRODUCING COUNTRIES**

2012, USD/ounce

![Figure 43: Weighted Average Cumulative Cash Cost (C1) at Q3 2012 for Major Gold Producing Countries](image)

Sources: financial statements from mining companies, Wood Mackenzie, KPMG-SECOR analysis

We must bear in mind that the United States, Canada and Australia are very wealthy nations, with vast infrastructure and great political, legal and fiscal stability. These factors weigh alongside their cost advantages in investment decisions. Such nations also possess lengthy expertise in the mining industry, guarantee of a well-trained workforce and an excellent reputation among leading investors.

However, production costs are not the only factor with an impact on mining project profitability. Taxes on the mining industry are another. Figure 44 highlights the key tax characteristics of the nations studied:

- Taxes applicable in West African states are using similar, with ad valorem rates from 3% to 5%, the tax on industrial and commercial profits ranging from 17.5% to 35% and overall low tax on income from
securities rates of 6.25% to 10%. These countries also receive project stakes of 10% to 20% in mining projects without making any investments.

- Western Australia, Canada (Ontario) and Mexico have similar rates (25% to 29%) for their taxes on industrial and commercial profits. The percentage is steeper in Western Australia (30%) and Ontario (25%).
- While Western Australia levies a lower ad valorem rate (2.5%), Canada and Mexico do not impose this kind of mining royalty. Ontario charges profit-based mining royalties (10%) and Mexico charges no mining royalties at the present time.

**Figure 44: Comparison of Mining Taxation in the Regions Being Compared**

2013

<table>
<thead>
<tr>
<th></th>
<th>Burkina Faso (after changes)</th>
<th>Burkina Faso (current)</th>
<th>Ghana (after changes)</th>
<th>Ghana (current)</th>
<th>Mali</th>
<th>Guinea</th>
<th>Côte d’Ivoire</th>
<th>Western Australia</th>
<th>Canada (Ontario)</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mining company ad valorem rate</strong></td>
<td>3% to 5%</td>
<td>3% to 5%</td>
<td>5%</td>
<td>5%</td>
<td>3%</td>
<td>5%</td>
<td>3%</td>
<td>2.5%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Tax on industrial and commercial profits</strong></td>
<td>27.5%</td>
<td>17.5%</td>
<td>35%</td>
<td>35%</td>
<td>35%</td>
<td>35%</td>
<td>25%</td>
<td>29%</td>
<td>29%</td>
<td>29%</td>
</tr>
<tr>
<td><strong>Government stake</strong></td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%-20%</td>
<td>15%</td>
<td>10%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Tax on dividends</strong></td>
<td>12.5%</td>
<td>6.25%</td>
<td>8%</td>
<td>8%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>30%</td>
<td>25%</td>
<td>-</td>
</tr>
<tr>
<td><strong>Other mining company taxes</strong></td>
<td>1% ad valorem for local development</td>
<td>-</td>
<td>5-year holiday on mining company tax on industrial and commercial profits</td>
<td>-</td>
<td>10% on mining profits</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Latest changes</strong></td>
<td>Under consideration for 2013</td>
<td>Initially considered for 2012 and then postponed</td>
<td>2010</td>
<td>1999</td>
<td>1995</td>
<td>Changes considered to 2012 and then dropped</td>
<td>2012</td>
<td>1990</td>
<td>2008</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Governmental sites, KPMG-SECOR analysis

We have included these different production costs and tax characteristics in our mining model.

Figure 45 shows the results, demonstrating that Burkina Faso is currently an attractive country for investors given existing tax rates. Current rates, in effect, offset its higher production costs. Mali and Mexico, however, provide higher net profits. Mexico stands out in particular, offering net investor profits almost twice those of Burkina Faso. This high investment profitability results from a combination of low production costs and low taxation.

Following implementation of the planned reform, Burkina Faso may experience a significant loss of appeal. Investments in that nation would become less profitable than in neighbouring Ghana and far less than in Canada (Ontario). Only Western Australia would offer lower profitability, its other investment criteria are quite different from and far more favourable than those of Burkina Faso.
5. Distribution of Wealth Generated by Burkina Faso’s Gold Industry...

**Figure 45: Comparison of Revenue Distribution for a Representative Mine in Some Large Gold Producing Regions**

*2013, %*

<table>
<thead>
<tr>
<th>Region</th>
<th>Sub-total - investment and operations costs</th>
<th>Sub-total - State revenues</th>
<th>Sub-total - investors’ net benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Australia</td>
<td>73%</td>
<td>18%</td>
<td>9%</td>
</tr>
<tr>
<td>Burkina Faso (after changes)</td>
<td>70%</td>
<td>12%</td>
<td>18%</td>
</tr>
<tr>
<td>Ghana</td>
<td>70%</td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td>Canada (Ontario)</td>
<td>70%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>70%</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td>Mali</td>
<td>70%</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td>Mexico</td>
<td>54%</td>
<td>33%</td>
<td>13%</td>
</tr>
</tbody>
</table>

*Source: KPMG-SECOR analysis*
6. Conclusion

The sharp spike in gold prices for almost 10 years has helped make Burkina Faso appealing to firms engaged in gold exploration and mining. This interest has resulted in a big hike in investment contributing to a much greater role for this industry in the nation’s economy.

Such investment has also been greatly encouraged by a tax system attractive to the mining industry. This system is Burkina Faso’s primary edge with respect to competing gold producing nations. In international terms, the country lacks significant advantages with respect to the physical characteristics of its deposits, the economic viability of its gold projects and socio-political perceptions. Burkina Faso’s deposits are small in size and low in gold grade. Its production costs are relatively high given the country’s landlocked status and the relative “youth” of its mining industry.

The tax changes contemplated in Burkina Faso could have several effects. The first would be to reduce project Net Present Value from 17% at a price of US$2,200/ounce to 56% at one of US$1,500/ounce. The second would be to push the break-even point up from US$1,425/ounce to US$1,465/ounce. As we know, one ounce of gold was selling for $1,580 on February 21, 2012. Burkina Faso would ultimately risk becoming less appealing to investors in terms of returns than such other African nations as Mali or Ghana, as well as major gold producing regions such as Mexico and Canada (Ontario).

These changes would certainly generate greater short-term revenue for the government. Over the mean and long terms, however, various issues could undermine Burkina Faso’s gold industry:

- Currently operating mines would become more vulnerable to any drop in gold price and some might become unprofitable.
- The country would become less attractive to investors, resulting in reduced investment in exploration as well as in future mines other than those now in production or development. For example, Ecuador’s gold production plunged 83% from 2007 to 2008 following a moratorium on mining exploration and various discussions on higher royalties (please refer to Appendix 2 for further information).

This reform could also result in a mean- and long-term shrinkage of government tax revenues generated by mining operations.
7. ABOUT THE AUTHORS

ABOUT KPMG-SECOR

Prior to its merger with KPMG, SECOR was Canada’s largest independent strategic management consulting firm, providing management teams with implementation and organizational support services for 35 years.

KPMG LLP, a Canadian limited liability partnership formed under Ontario law, is the Canadian affiliate of KPMG International, an international network of offices providing professional audit, taxation and consulting services. KPMG member offices are present in 150 nations and employ more than 138,000 professionals.

ABOUT THE STUDY’S AUTHORS

Daniel Denis joined KPMG-SECOR in 1984 after three years at a major banking institution. He has been a partner since 1989. He was also associated with the C.D. Howe Institute from 1984 to 1987. Daniel Denis is an expert in economic and financial studies, as well as in strategic planning and analysis. He holds a Masters of Economics from the Université de Montréal. Over 26 years of consulting experience, including more than 20 as a project authority, have helped him develop broad proficiency in formulating strategic organizational challenges and deploying appropriate responses. His expertise covers analysis of organizational performance, competition analysis, understanding of model organizations and public/private organization positioning strategies.

Thomas Bienfait is a consultant specializing in strategic planning, analysis and financial modelling. His experience has concentrated on the mine, energy and financial service sectors. He is a co-author of the KPMG-SECOR-FMC study, Mining Royalties in Quebec. He holds a Master in Management, Specializing in Finance from the École Supérieure de Commerce de Toulouse and has studied the impact of taxation on cross-border mergers and acquisitions.

Raphael Mongeau-Gauthier is a consultant specializing in strategic and economic analysis. With a Masters of Economics from the Université de Montréal, he has focused on US economic development in relationship to the nation’s fiscal system and public policies. He has applied his economic expertise in several sectors, such as energy, mining and public policy. He is also a co-author of the KPMG-SECOR-FMC study, Mining Royalties in Quebec.
APPENDICES
8. APPENDICES

8.1. APPENDIX 1: REPRESENTATIVE MINE MODEL ASSUMPTIONS

We built a model of a “representative” Burkina Faso gold mine to calculate the impact of fiscal changes under consideration by the country’s government. The model was based on financial models of Burkina Faso mines currently in service.

To ensure this mine is representative, project cash costs (C1) are similar to Burkina Faso’s weighted cash costs of US$756/ounce\(^{38}\) in 2012.

This mine has a total life of 12 year (2 in construction and 10 in operation).

Upfront capital investment to the project was:

- US$100 million for exploration and pre-construction.
- US$250 million for construction.

Furthermore, over its 10 years of operation, annual capital investments of US$35 million have been added to ensure the maintenance of the infrastructures. This amount also include capitalized pre-stripping costs, according to existing regulations. Additionally a US$10 million site rehabilitation cost has been included and capitalized over the 10 years of operation (US$1 million/year).

Upfront capital investments and maintenance costs for the first year of operations ($US 385 million) were financed as follows:

- 50% through capital injections by investors (shareholders).
- 50% by debt, at 8%. This senior debt was repaid by cash flow generated by the activity over its first three years of operation.

Mine characteristics are:

- Average grade of 1.9 gold g/ton.
- 8.1:1 stripping ratio (8.1 tons of waste must be removed to obtain 1 ton of ore).
- Average 85% gold recovery rate.
- A total 1.61 million ounces of gold recovered.

Government revenues are generated by various taxes:

- 5% royalties based on the value of gold sold.
- 17.5% tax on industrial and commercial profits.
- 6.25% tax on income from securities.

\(^{38}\) Cash costs (C1) of each mine operating in Burkina Faso weighted by the mine’s production volume.
8. Appendices...

- 5% customs duties; these duties are calculated on such imported products as machinery, explosives and petroleum products.
- 2.5% customs related duties, including the statistical import charge (RS), the community levy (PC) and the community solidarity levy (PCS).
- 18% value-added tax (TVA) on petroleum products.
- Annual US$1.6 million single tax on wages and benefits based on information provided by the mining company.
- US$2.6 million in surface taxes, based in information provided by the mining company.

Furthermore, with a 10% in the mining project, Burkina Faso’s government received 10% of dividends distributed. These dividends are based on cash holdings available at the project’s end.
### FIGURE 46: MINING FINANCIAL MODEL HYPOTHESIS

**Mining Financial Model - Assumptions**

<table>
<thead>
<tr>
<th>Deposit Specificities</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Grade</td>
<td>1.9</td>
<td>g/t</td>
</tr>
<tr>
<td>Strip Ratio</td>
<td>8:1:1</td>
<td></td>
</tr>
<tr>
<td>Average Recovery Ratio</td>
<td>85%</td>
<td>%</td>
</tr>
<tr>
<td>Total Gold Ounces Recovered</td>
<td>1.61</td>
<td>Million ounce</td>
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<table>
<thead>
<tr>
<th>Capital Investments</th>
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<tbody>
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<td>Exploration</td>
<td>100</td>
<td>Million USD</td>
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<tr>
<td>Mine development</td>
<td>250</td>
<td>Million USD</td>
</tr>
<tr>
<td>Sustaining</td>
<td>35</td>
<td>Million USD per year</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>10</td>
<td>Million USD</td>
</tr>
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<table>
<thead>
<tr>
<th>Operating Costs</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>1.90</td>
<td>USD per tonne mined</td>
</tr>
<tr>
<td>Processing</td>
<td>15.50</td>
<td>USD per tonne processed</td>
</tr>
<tr>
<td>General &amp; Administration</td>
<td>20.00</td>
<td>Million USD</td>
</tr>
<tr>
<td>Refining &amp; Selling</td>
<td>5.00</td>
<td>USD/ounce</td>
</tr>
<tr>
<td>Cash cost (C1)</td>
<td>756</td>
<td>USD/ounce</td>
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</table>

<table>
<thead>
<tr>
<th>Other Assumptions</th>
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<tr>
<td>Development Time</td>
<td>2</td>
<td>Years</td>
</tr>
<tr>
<td>Mine Life</td>
<td>10</td>
<td>Years</td>
</tr>
<tr>
<td>Exchange Rate USD:XOF</td>
<td>510</td>
<td>XOF</td>
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<table>
<thead>
<tr>
<th>Taxation</th>
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</thead>
<tbody>
<tr>
<td>Proportional Royalties</td>
<td>5.00%</td>
<td>%</td>
</tr>
<tr>
<td>Tax on industrial and commercial profits (IBIC)</td>
<td>17.50%</td>
<td>%</td>
</tr>
<tr>
<td>Tax on dividends</td>
<td>6.25%</td>
<td>%</td>
</tr>
<tr>
<td>Custom duties (%b of goods imported for operations)</td>
<td>5.00%</td>
<td>%</td>
</tr>
<tr>
<td>Other custom duties (RS, PC &amp; PCS)</td>
<td>2.50%</td>
<td>%</td>
</tr>
<tr>
<td>VAT on petroleum products</td>
<td>18.00%</td>
<td>%</td>
</tr>
<tr>
<td>Single tax on wages and benefits</td>
<td>1 600</td>
<td>Thousand USD</td>
</tr>
<tr>
<td>Surface tax</td>
<td>2 500</td>
<td>Thousand USD</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Financing</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Share of the project held by investors</td>
<td>90%</td>
<td>%</td>
</tr>
<tr>
<td>Share of the project held by the state</td>
<td>10%</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of initail investments financed by debt</td>
<td>50%</td>
<td>%</td>
</tr>
<tr>
<td>Debt interest rate</td>
<td>7%</td>
<td>%</td>
</tr>
<tr>
<td>Debt amount</td>
<td>192.5</td>
<td>Million USD</td>
</tr>
<tr>
<td>Percentage of initail investments financed by equity</td>
<td>50%</td>
<td>%</td>
</tr>
<tr>
<td>Equity amount</td>
<td>192.5</td>
<td>Million USD</td>
</tr>
</tbody>
</table>

*Sources: KPMG-SECOR analysis*
8.2. APPENDIX 2: ECUADOR CASE STUDY

Royalties and mining rights in Ecuador have been historically awarded through government-organized calls to tender. However, the National Assembly suspended all mining exploration activities for six months in April 2008 or until a new mining rights system was approved. This decision resulted in cancellation of 80% of the country’s mineral concessions and suspension of the others.

In November 2008, the President of Ecuador announced a new mining rights system that raised the ad valorem rate from 3% to a marginal rate of 8% (with a minimum of 5%) and added a windfall profits tax of 70%.39 This new system primarily pertained to gold mining, Ecuador’s main mineral resource. Consequently, 2008 production plunged 83% from its 2007 level and 2010 production had not recovered levels prior to royalty discussions.

These initiatives also had a major impact on investment decisions. In December 2011, Kinross signed a contract with the government giving it the right to operate its Fruta Del Norte gold mine, including the following agreements:

- At least 52% of economic benefits for the Ecuador government throughout the project.
- 5% to 8% ad valorem taxes, based on gold’s spot price.
- US$65 million in royalties paid in advance to the government.
- 22% corporate tax rate.
- 15% pre-tax profit sharing (12% for the government and 3% for workers).
- Windfall tax for the government on the different between the spot price at the time the gold ore is sold and the higher of the following two amounts: US$1,650/ounce or the spot price at the time the final operating contract is signed.

Nonetheless, the impasse between Kinross and the Ecuador government resumed a few months later and both parties returned to the bargaining table, with negotiations still underway.

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39 Tax on the difference between metal’s basic sale price and the actual sale price if the latter is higher.
FIGURE 48: IMPACT OF 2008 REFORMS ON MINING PROJECTS IN ECUADOR
2008-2013

April 2008: Suspension of mining activities for 180 days following the adoption of a resolution by the Constitutional Assembly to reform the licensing fees

December 2011: Agreement between Kinross and the government is signed for the operation of “Fruta Del norte”

February 2012: Impasse between Kinross and the Ecuadorian government because the Canadian company wants to renegotiate the contract signed 2 months previously

November 2012: IMC announces publicly that it wants to get rid of all its properties in Ecuador

June 2012: Discouraged by the slow pace of negotiations with the government regarding the operation of its Quimsauchico project, Iamgold decides to sell it for the low sum of $30 M USD

February 2013: President Correa promises to sign an agreement with Kinross in order to attract new mining companies to Ecuador

Source: Financial Post, IMC, Bloomberg, Kinross, Mining.com, USGS, KPMG-SECOR analysis
9. Bibliography


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