Universidad de SanAndrés

GRADUATION THESIS

DEGREE IN BUSINESS ADMINISTRATION

AN EVALUATION OF THE NON-FERROUS METAL MARKET OPPORTUNITIES AND THE RISKS OF OPERATING MINES IN ARGENTINA

AUTHOR: **MADELAINE GRANT**

STUDENT NUMBER 13255

MENTOR: ENRIQUE HOFMAN

BUENOS AIRES, ARGENTINA

JUNE 2009

An evaluation of the non-ferrous metal market opportunities and the risks of operating mines in Argentina

by

Madelaine Grant

Business Administration

ABSTRACT

Globalization is creating tremendous opportunities and challenges for mining companies today: borders are coming down and new opportunities are opening up, commodity demand is rising, markets are expanding and metal prices are increasing.

The failure of exploration to turn up with new world-class deposits are driving traditional mining companies, mainly from Canada and Australia, to new locations with high geological potential, but where projects have greater associated risks.

Latin America has been the favorite destination since 1944, with special interest in Mexico, Peru, Chile, Brazil and Argentina. Much of this shift has been triggered by a new generation of more favorable globally competitive regulatory, taxation and investment policies. Argentina, the silver land, has proved fantastic geological potential and poor governance.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

AU	*Gold*
AG	*Silver*
CU	*Copper*
MB	*Molybdenum*
BRIC	*Brazil, Russia, India & China*
OECD	*Organization of Economic Cooperation & Development. Mainly refers to high-income countries of North America, Europe, Australasia and Japan.*
RESOURCE BASE	*All of a mineral commodity contained in the earth crust. Subdivided in order of increasing geological confidence.*
IDENTIFIED RESOURCES	*Refered to minerals whose location, grade, quality, and quantity are known or estimated from specific geologic evidence.*
RESERVE BASE	*The part of the identified resources that meet specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth.*
BROWNFIELD EXPLORATION	*Around mine or near-mine exploration. Refered to the discovery of resources close to existing operations.*
GREENFIELD EXPLORATION	*It refers to the exploration of an entirely new or previously unrecognised mineral deposit.*
BROWNFIELD INVESTMENT	*A foreign investor taking over existing operations in a country.*
GREENFIELD INVESTMENT	*Refesr to the creation of a new operation in a country by foreign investor.*

MOTIVATION AND METHODOLOGY

This investigation was undertaken as a way to define personal professional interests within the mining industry. The little knowledge regarding the Argentine mining activities and its global standing was a good motive to put together this paper.

The author has identified a need to gather data and information to understand the dynamics for metal consumption, the industry's direction and the Argentine destination through a variety of sources, to combine it in this paper using both a quantitative and qualitative approach.

In doing so, the author has researched through a variety of methods including literature (publications, press releases, magazines, newspapers, internet); email & telephone conversations; and attendance to industry events.

Major Data Sources:

• Organizations: United States Geological Survey, British Geological Survey, World Gold Council, Silver Institute, International Copper Study Group, Metals Economic Group, UN, CIA Factbook, World Bank, Fraser Institute, Transparency International, CEPAL, CAEM, Secretaria de Mineria, SEGEMAR, Austrade.
• Consultants: Earnst & Young, Baker & McKenzie, PriceWaterCooper, Goldman Sachs, Deloitte.
• Media: Forbes, Fortune, BN America, Mining Journal, Mining Weekly, Infomine, The Economist, Buenos Aires Herald, Panorama Minero, Mining news, Diario La Nacion.
• Companies: Annual report & press releases.
• Industry Events: ArMinera 2009.

INTRODUCTION

Major mining companies continue investing in global operations to secure production for a growing demand. Argentina, with over 100 foreign companies exploring for minerals and a dozen exploiting them, remains risky as far as miners concern. *An evaluation of the world metal market and the risks of operating a mine in Argentina* will give us an insight regarding these matters. A thorough examination of the world metal market and the Argentine mining scenario will determine the specific metal opportunities and the associated risks for extracting them in Argentina. In doing so, the paper will be divided into four sections.

The Mining Fundamentals section will be included as to get a general understanding of the industry. It will make reference to the importance of metals in our lives and its relation with human activities through history; the mining cycle which leads the booms and bursts of the metal markets; the project pipeline strategy, implemented by miners to secure supply engaging the sequencing of different operative phases; and the industry challenges of forecasting, investing and operating mines.

The Metal Demand section will determine the strength of future non-ferrous metal demand. The author will study gold, silver and copper dynamics including the uses of each metal, major markets, prices and trends; the world economy prospects, including OECD economies that represent hi-income countries which govern mining finances and management today, and BRIC economies that represent major metal consumers.

The Metal Supply section, will examine the world mining situation today and its direction. For this, the author will investigate main sources of finance, the industry's market capitalization growth, and its most competitive players. Major mining companies will be introduced with special emphasis on their sources of competitive advantage. This section will also include gold, silver and copper top producing countries, an examination on global non-ferrous exploration trends and miners' particular interest in Latin America.

The Mining in Argentina section, will study the resource potential of the Andean deposits, the specific mineralization areas and probable reserves of gold, silver and copper within the Argentina; the current non-ferrous metal mining operations, projects and explorations; the development of the national mining industry in context with politics and economics, including issues regarding public opposition and media; and surveys to mining professionals concerning risks, taxes, and bribery; and supporting infrastructure in Argentina.

In the Conclusion, the rundown of factors that represent the world demand for metals, the world mining industry and the mining sector in Argentina will be condensed and by tying such elements together the author intends to get an approximate reading of the current and future situation of the world mining situation and the Argentine destination, answering the question of whether the metal market opportunity is worth the risks of operating a mine in Argentina.

1. MINING FUNDAMENTALS

1.1 METALS IN OUR LIVES

I couldn't have written this report without depending on metal. The paper, which is processed wood in a paper mill (Iron, Copper, Steel), transported in trucks, trains and ships (Iron, Copper, Zinc); the computer (Copper and Aluminum), which depends on a reliable electric network (Copper and Silver); the research through a world wide web (Copper); and the printer (Copper and Aluminum) have been essential for you to be reading this.

Metals have been essential for man as far back as we know. It unquestionably commenced as a source for weapons and tools in the early ages of man and has evolved to supply major industries including electronics, vehicles, construction and even simple house items as a fork or a water tap.

Mining parallels the history of civilization with many important cultural eras associated with the minerals man used: the Stone Age (prior to 4000 B.C.), the Bronze Age (4000 to 5000 B.C.), the Iron Age (1500 B.C. to 1780), the Steel Age (1780 to 1945), and the Nuclear Age (1945 to the present). Marco Polo's journey to China, Vasco da Gama's voyages to Africa and India, Columbus's discovery of the America, and the modern gold rushes that led to the settlement of California, South Africa, Australia, Canada and even the misleading silver promise from the Rio de la Plata were achieved with minerals providing a major incentive.

The first metals that were used by humans were gold and copper. This is understandable, as both are easy to see and both are easy to work using simple tools. Because of its softness, gold, was used for ornamental purposes while copper, a more durable metal was used for spearheads, knives, pins, combs, and other useful items.

Ancient mine discoveries such as Bomvu Ridge in Swaziland (approximately 40 000 years old) or Mina Primavera in Peru (approximately 2000 years old) together with archeological findings of early spearheads, jewelry and coins are proof of the early mining trade. Initially metals were used in their native form. In the Stone Age, crude tools made of bone, wood, and stone were no match for the harder rock. It was in the Bronze Age when prehistoric man discovered that by wedging rocks with crevices or cracks they could be opened to separate the harder parts, and that by heating and submerging these stones in water the soft minerals would come off and the harder metals would blend to form a much harder substance. This was an early advancement in the purification or smelting process.

The Industrial Revolution in the eighteenth century has had a serious impact on mineral use. Along with an ongoing demand for metals and fuels, the mechanization and industrialization of processes had made a great improvement in the industry. The invention of dynamite soon after had revolutionized extraction techniques and increased mineral supply dramatically.

1.2 The Mining Cycle

Mineral trade has been incremental throughout history, parallel to population growth and gross domestic product evolution. Along a 35-year period examined by USGS (United States Geological Service) from 1970 to 2004, world population has increased by 72% and GDP by 225%. Simultaneously, the global metal extraction grew by 75%.

Figure 1.1 World Metal Consumption

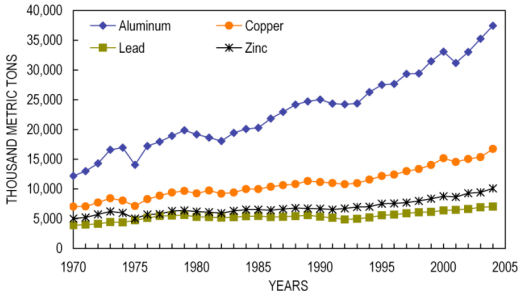
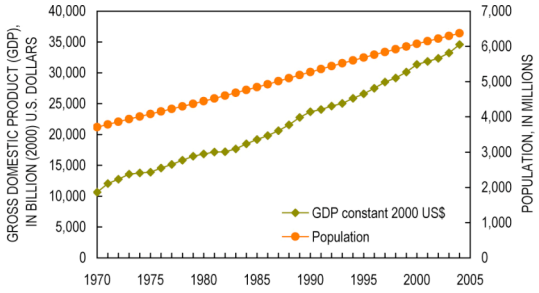


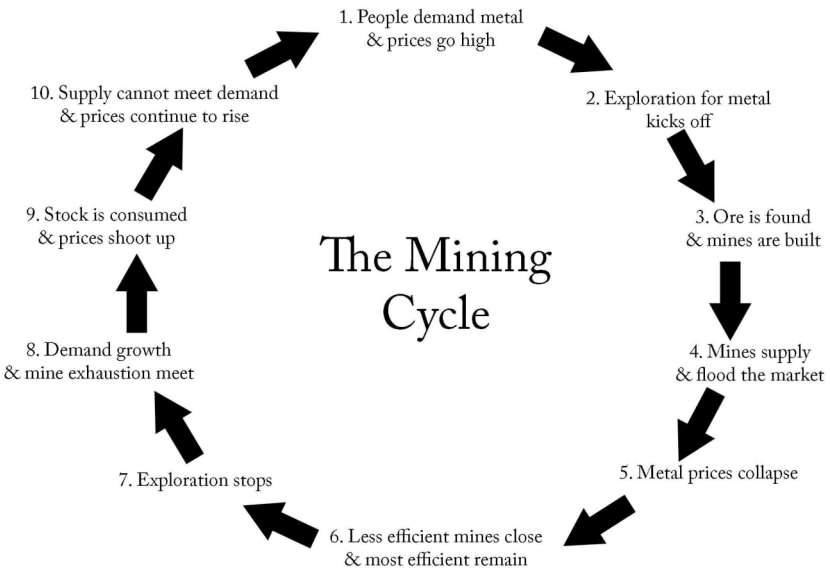
Figure 1.2 World GDP & Population Growth



Source: USGS

Volumes and prices do not increment evenly. In fact, supply and demand swings in a 15-year cycle. Traditionally, in the mining cycle miners respond to high metal prices with high production. Over production exceeds demand and prices drop. With low prices smaller miners are forced to shut down and only the bigger ones survive. This leads to supply shortage and a return to high prices.

Figure 1.3 The Mining Cycle



Source: Author

Most miners struggle to endure this cycle. The first problem sits in point 3, when too many mines are built. The panorama attracts many opportunists and the market is overflowed without scheme. This results in natural regularization by cutting down

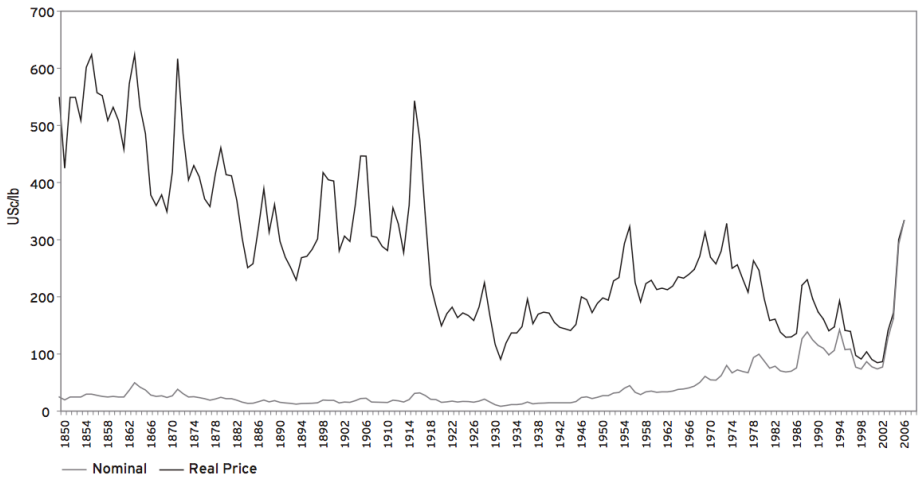
production or as Darwin would say 'survival of the fittest'. The second problem sits in point 7, when exploration stops. The few standing mines that are able to service the world with low cost metal at full-operation, have no incentive to go out and explore and, furthermore, shareholders grow bitter to the idea of reinvesting even when prices start to increment. New projects only start when the opportunity exceeds the bad reminiscences.

Building a mine can take up to 5 years and responding to metal demand is a slow process. Mineral deposits are located in a variety of jurisdictions where laws, infrastructure and general environment differ. Deposits are to be found and success is not always guaranteed. In average out of 300 hundred projects that find ore, 1 succeeds to produce.

Forecasting at least 5 years ahead is critical for miners to estimate production and an understanding of the cycle is key to anticipate the coming demand. This historical cycle is however not isolated from external factors. It is heavily influenced by world economy. Wars and recessions coincide with metal consumption changes. In fact, the number of variables that affect such industry are complex and rarely well interpreted.

In Figure 1.4 you may appreciate how copper's progression matches particular strong economic events: the high demand in WWI in 1914, the lows in the 1929 recession, the collapse of the Soviet Union in the 1990s and the rise of industrial China in the 21st century.

Figure 1.4 Copper Price Evolution



Source: US Federal of Reserve Bank of Minneapolis.

Many economic variables are beyond the control of the industry. Nevertheless, miners are seeking ways to defy the cycle and master it. For such purpose bigger mining companies are implementing the Project Pipeline Strategy.

1.3 PROJECT PIPELINE STRATEGY

Long lead times force miners to develop a thorough supply system in order to deliver the future metal market. Subsistence of these long-term businesses lays on the ability to endure the mining cycle and the economy variables.

The concept of the Project Pipeline Strategy is to secure a supply for the present and future demands. It involves a clear understanding of upcoming demands and reserving strategic raw materials for future supply. The strategy consists of sequencing a number of projects to allow a constant supply, which can be incremental or declining, to match the demand of the future. It is simple in theory and complex in practice.

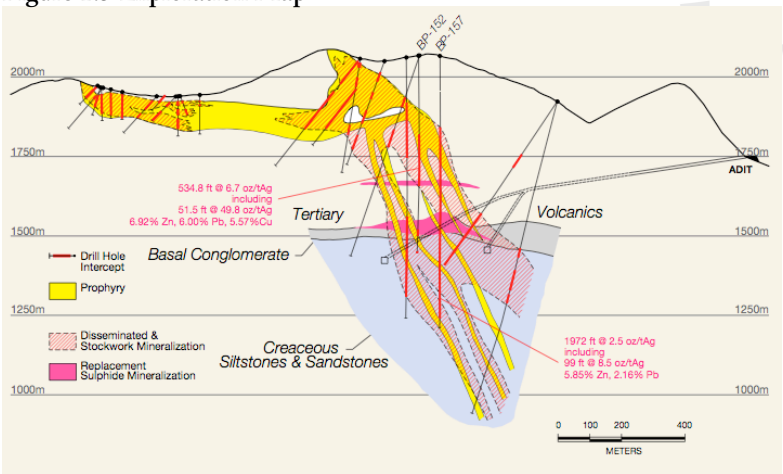
To get a better understanding of the strategy it is vital to explain the different operative phases: exploration, feasibility, permitting, construction and production.

EXPLORATION

The first stage of the mining practice is the discovery of ore, the mass of mixed minerals. In order to do so, geologists explore by performing a series of drill tests in different potential mine locations to undertake technical analysis. Ore contents (percentage of each mineral) and deposit size will dictate the success of the project to the next stage. Low value minerals and/or small deposits are not attractive.

The exploration study should generate enough data for an evaluation to produce realistic estimates on technical performance, capital and operating costs, manning requirements, price and marketability, environmental and social impact, project profitability and risks.

Figure 1.5 Exploration Map



Source: Silver Standard

FEASIBILITY

The feasibility study is a thorough evaluation of each exploration's potential and risk to decide whether or not to start a mine operation. It evaluates the existing infrastructure, the available supplies, the political scenario, the economics and the safety of the operation. This study should not take more than 12 months.

Not all projects will progress through all phases. In fact, majority will be discarded. Rio Tinto's statistics show that an average of only 1 in 350 prospects that are drilled will yield a mine for the group (Rio Tinto Exploration Report 2008, Page 3).

An assessment on supporting infrastructure such as roads, trains, ports will determine how the ore will be transported and will calculate the transportation costs. In Africa, miners are finding it difficult to produce due to the obsolete transportation systems and outdated ports, forcing them to find alternate systems, hence higher costs resulting in a less attractive destination. (World Bank Conference, London)

The economic and political forecast of the mine's jurisdiction is assessed and a contingency is assigned for the odds. According to the World Bank statistics, private businesses prefer stable economic-political environments.

At this point every potential mine's operation plan is complete. The mineral resource value, the operational costs, supplies costs, taxes and a contingency for inaccuracies all add up for a financial estimation. Once a project is fully calculated, a financial proposal is presented to financial institutions and other potential investors to acquire funds for its realization.

PERMITTING

Once the projects have been approved internally and most financing becomes available, the project seeks approval from the local government. Project acceptance is influenced by local political tendency towards mining and community reactions (as well as foreign acceptance).

"The development of a new mine requires successful permitting and government relations, community dialogue and engagement, and significant financial and human capital."

Annual Report 2007, Barrick, 2007, page 33.

Developed countries have clear rules and stable politics towards mining although stiff regulations while developing countries are politically changing with flexible regulations.

Environmentalists occasionally present protests to stop mining. Bigger companies are anticipating local grievance by interacting with communities in educational and training programs as well as fundraising communal actions (BHP Billiton Community Report). However, it seems that the more isolated the better.
The permitting length may vary along with bureaucracy and degrees of corruption. It is estimated between 6 and 24 months. For this reason many companies chose to purchase operating mines, which have already gone through all the process.

CONSTRUCTION

Since mines are often in remote locations, an entire infrastructure including roads, administrative offices, equipment storage areas, even towns, schools and medical facilities must be built. This phase may take between 12 to 24 months. Service contracts are defined; human resourcing initiates while the remaining minor licenses come through.

"In addition to the processing plant, a mine equipment repair shop, warehouse, laboratory, and power plant are being constructed. The power plant will be fueled by natural gas supplied by a 37 kilometer-long (23 mile) natural gas pipeline which is being installed from the mine to an existing Trans-Andean, Argentina/Chile pipeline. At full production, the mine will operate continuously throughout the year and employ approximately 400 people. There is currently housing for 450 workers on site, which will be expanded to accommodate 650. Many employees will commute from local communities while others will be boarded on site. In conjunction with the provincial government and equipment vendors, a training program has been developed to assure that the members of the local communities possess the required skills to assure a successful mining operation."

Piquitas, Silver Standard, http://www.silverstandard.com/projects/pirquitas/mining.cfm, March, 2009.

This is the moment of highest financial risk, mainly in developing countries, as millions or even billions of dollars are spend in creating an enterprise that has not yet produced an ounce of metal. Investors are quite exposed to factors beyond their control.

PRODUCTION

Operation is referred to the extraction of ore. The purpose of this phase is to maintain highly efficient operations making incremental adjustments to optimize performance. In order to do so, great importance is assigned to a practical management system.

Successful management involves good planning, leading, directing and controlling. Management styles may vary for each mine as it involves working with different cultures. Simple procedures and clear goals seem to go universally well for miners.

Timing is key to regulate supply of minerals according to the demand of the moment. However, metal deposits may not always be found in the most convenient layouts.

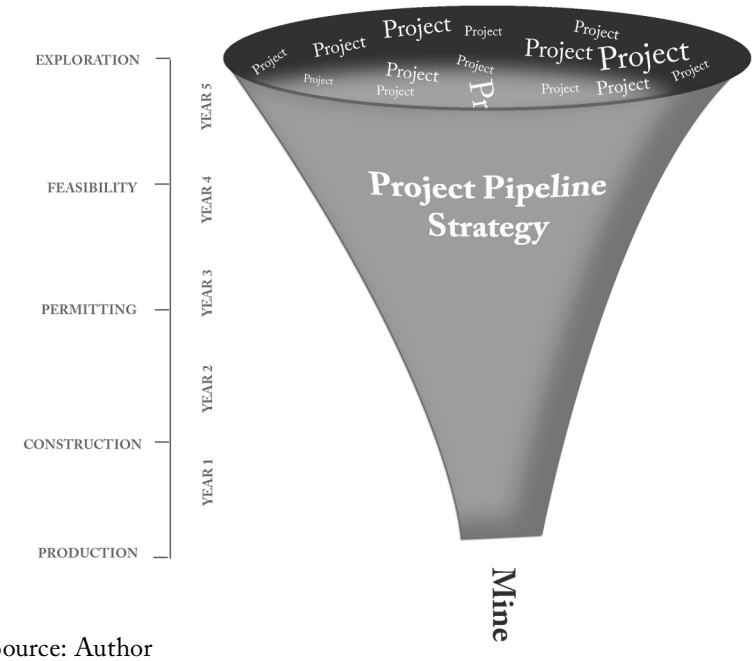
"Veladero in Argentina completed a successful second full year of operations, although sequencing required a high waste-stripping phase in order to access Filo Federico, the second pit at this operation. We expect improved performance in 2008,as we are now accessing the Amable pit and the higher-grade areas of the Federico pit."

Annual Report 2007, Barrick, page 18.

TIMING

Large producers, such as Barrick Gold, are sequencing over 300 projects at a time, out of which only few succeed for eventual production. The approach is to define the desired number of producing projects in a timeline and work it backwards. If in five years we need gold, explorations should be taking place now.

FIGURE 1.6 The Pipeline Project Strategy



Source: Author

The remaining life of the producing mines, the future demand and the industry's wellbeing will incentive new explorations for sustainability. Producing projects will finance explorations.

The success of this strategy should result in a constant and even supply governing the mining cycle, allowing miners to become price setters rather than takers. Results are yet to be seen and discussions will be raised as the new implications appear. Meticulous planning is the secret.

1.4 CHALLENGES

EFFECTIVE FORECASTING

Forecasting is essential for miners to make the critical decision of starting new mines or, alternatively purchasing existing ones. Such predictions are in the interest of economists, investment groups and market analysts too. Following we will review the challenges of forecasting supply, demand and pricing.

Predictors should be acquainted with supply matters including the current operating mines, their performance, and reserve life; the new ore discoveries and their chances to eventually produce; the extractive technology improvements, which may maximize production; the availability and costs of transportation and operating supplies.

Following, they must understand market demand for metals taking account of the economy and its cycles; each individual metal behavior in terms of uses and price, and new technologies that may affect metal uses. For instance, the development of mobile phones is replacing fix phones, therefore less cabling is required and copper demand diminishes.

The price mechanism in the trade markets, the impact of the speculative investors, the knowledge of declared stocks and an insight of hidden stocks are important issues to be analyzed.

Despite of the excellent expertise in the area economists have a terrible record in delivering a fair prediction. For this reason it is hard to find promising long-term forecasts, which is precisely what miners need.

CLEVER INVESTING

The mining industry is extreme in capital requirements and in risk, leaving a small window for only the clever and courageous investors. It has never been an investment-friendly business. The reasons are evident in that it is a cyclical industry, miners are price takers rather than makers, cash flows are unpredictable, the geographical regions of operation may be risky, and the lack of possible investment exits.

The cycle is the economic imbalance of demand and supply. Even though this may be seen as an opportunity, considering the difficulty in forecasting its moves, it represents a challenge at the time of investing. Understanding the emerging markets is essential but the question comes when these markets are not the traditional predictable neat systems. Supplying is often out of control and seems to be governed by impulse rather than by thorough study. Exploration only happens when capital is available and prices look good. This frequently results in oversupplying and not necessarily at the required times.

Historically, the industry has accepted market prices and played around the cycle, suffering the lows and enjoying the highs. The trend is merging or acquisition of smaller companies to govern production and eventually set prices. However, the worldwide playground of operations always leaves place for new producers.

Mineral deposits occur in a variety of locations out of which a large percentage takes place in developing countries. Investing in mining operations may represent putting money in places where things may go beyond mining companies' control.

In the past, miners financing was basic with little or no available exists. Today, with the existence of international trade centers, mining professionals are becoming familiarized with the sophisticated trading world and are realizing that by changing their financial platform, their ventures may become more appealing for non traditional mining investors.

The investment decision compromises such diverse variables of different natures that in the end, it only offers a place for risk takers.

EFFICIENT OPERATION

A mining project comes across a variety of challenges throughout its life, from seeking ore to extracting and delivering it. Operating efficiently involves having an understanding of the possible inaccuracies to overcome.

Chances of finding a feasible mineral deposit are remote in nature. Occasionally, miners purchase old mines to avoid misfortune and gain time. However, these are limited and not always appealing. During the exploration phase, geologists must take samples and draw the findings for future evaluation. Mineral resource assessments are undertaken with modern technology to evaluate ore grade (percentage of mineral contents), deposit size, depth of deposit, and ease of extraction. However, results have not shown to be accurate at all. According to Burmeister (*From Resource to Reality: A Critical Review of the Achievements of New Australian Gold Mining Projects*) only 2 out of 35 surveyed gold mines in Australia have produced what they had stipulated in the first year. Majority of the mines have been producing more tones (+15%) but less grade (-55%).

Mining is different to other industries because the knowledge of the product is based in estimates, which naturally includes a degree of uncertainty. A reliable estimation of resources is key for the feasibility study and the daily mining operations. Errors generated in the feasibility stage will still be present in the mine operation and difficulties will rise when reconciling ore reserves with mine production. McCarthy (*Managing technical risks for mine feasibility studies, 2003. p. 21-27.)* reported that most common errors happen in mine design and schedule (32%), reserve estimation (17%), metallurgical testing (15%) and geo-technics (9%).

Tight schedules and economic pressures from management or other external situations may be reflected in a shortage of exploration data following on to poor feasibility resolutions and consequently operative inaccuracies.

Getting government permits represents an important degree of uncertainty in costs and time. Depending on the jurisdiction of the project, dealing methods vary greatly. The components normally involve a clear business proposal, social and environmental contributions, and political negotiations.

Interaction with local communities is important for acceptance both politically and resourcefully. It involves understanding codes and values and a smooth integration, through education and other suitable contributions. Issues rise when foreign acceptance lacks or company fails to social acceptance affecting operation performance and even closure.

"Better known for wines than mines, the province of Mendoza passed a law yesterday aiming to block an exploration project by Canada's Tenke Mining Corp on environmental grounds. And in a separate move, the provincial government announced it will halt mining exploration for 90 days while it fine-tunes regulations, requiring public hearings in the project approval process. Protesters from west-central Mendoza cheered the measures because they fear mining would pollute their water, specifically with cyanide, and threaten the farm sector."

Tenke prospecting project blocked, Buenos Aires Herald, Feb 21, 2009.

Bribery in the mining sector can take two forms: high rank political negotiations, and public official negotiations "to speed things up". Considering that many mine operations take place in corrupt countries now a days, such dealings are becoming common in the industry. Problems rise when, after negotiating in the dark, terms are not respected plus all the ethical issues involved. Forecasting these costs is a difficult task.

The financial system of the area may affect the project momentum and its finances as it depends upon the local workforce, supplies and outsourced activities. Understanding both local and world economy evolution is critical for budgeting properly. Power supply is indispensable and it affects directly on operating costs.

The geographical location of porphyry deposit mine is normally in a convergent zone, where tectonic plates run into each other. Earthquakes, avalanches, bitter cold, high altitudes, deserts, and lack of infrastructure are normal elements for miners. Collapsing walls and roads can represent delays and costs. Extreme cold can burst pipelines, holdup extraction. Isolation represents having to be self-sufficient, having a longer and more expensive construction phase; flying employees in and out; and transportation costs.

The many challenges the mining industry has to face make it a risky venture, difficult to assess, requiring a high amount of capital and patience.

2. METAL DEMAND

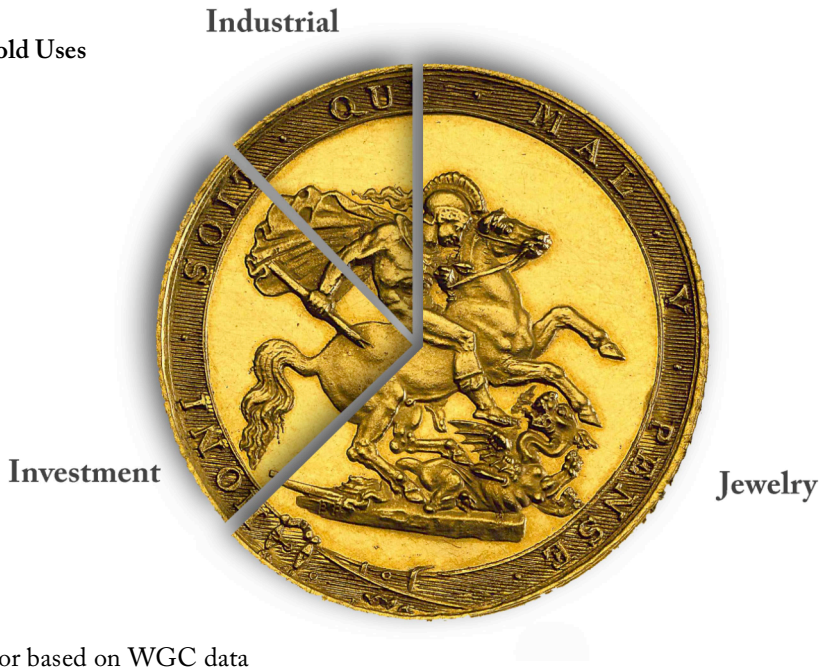
2.1 Metal Dynamics

Metal demand is dynamic in that it not only responds to the mining cycle but also to the changing economies, shifting applications and innovative materials. World production and world population are broad indicators of the metal demand, however, an examination of the emerging economies and specific metals will provide a more defined forecast of the coming demand.

Gold (Au)

Gold is a particular metal in that it is a commodity as well as an asset. Since it is found in pure form it has historically been used as value of exchange, easy to transport, and has also been shaped into jewelry. Today, gold demand falls into three main categories: jewelry, accounting for the majority; industrial, including electronics and dentistry; and investments.

Figure 2.1 Gold Uses



Source: Author based on WGC data

Jewels are decorative, fashionable items, which maintain a perpetual value. Gold is a predominant element for its fabrication. They are deeply established in our societies relating to births, weddings and religious celebrations. It is then not surprising to find India ranked as the largest gold consumer.

Since gold is not a liability of any government or corporation, it does not run any risk of becoming worthless through the default of the issuer. Banks and financial institutions diversify their capital and incorporate gold in their portfolio to guarantee a degree of safety.

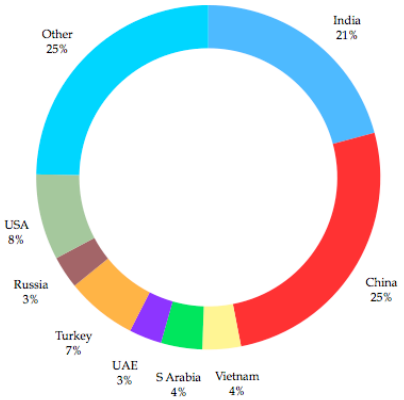
The biocompatibility of gold, its resistance to bacteria and to corrosion and its malleability make it ideal for its use within the human body. Biomedical applications include gold wires in heart transplants and gold-platted stents. However, it is better accepted in dental medicine.

Table 2.1 Identifiable Gold Demand in Tons

Gold Demand	*2006*	*2007*	*2008*
Jewelry Consumption	2284.8	2400.6	2137.5
Industrial Consumption	459.4	461.2	430.4
Electronics	307.9	310.6	289.7
Dentistry	60.7	57.8	54
Other	90.8	92.8	86.7
Indentifiable Investment	664.9	663.6	1090.6
Bar Hoarding	235.4	236.3	378.2
Official Coins	128.9	137	197.7
Medals & imitation Coins	59.4	72.6	60.5
Other	-19	-35.6	132.8
EFTs & Similar	260.2	253.3	321.4
Total Demand	**3409.1**	**3525.4**	**3658.5**
Gold Supply	*2006*	*2007*	*2008*
Mine Production	2486	2473	2407
Hedging	-410	-447	-363
Official Sector Sales	370	485	279
Recycling	1129	977	1146
Total Supply	**3575**	**3488**	**3469**
Price	*2006*	*2007*	*2008*
U$/Ounce	*$603.77*	*$695.39*	*$871.96*

Source: Author based on WGC.

Figure 2.2 Gold Demand by Country



World gold price has rocketed in the last 3 years, while mine production maintained equal performance 2006. This phenomenon reflects the long lead times the mining companies have to extract gold and place it in the market. The low income gold offered in the 1990s resulted in low investments in the sector. Adversely, the current wellbeing of gold miners is being reflected with new explorations to guarantee production in the coming 5 to 10 years.

Recent instability in 2008 is having its effect in gold demand in terms of investment. According WGC, the Identifiable Investment has increased in quantity from 663.7 tons in 2007 to 1090.7 tons in 2008. This is natural as people seek for more tangible goods in times of uncertainty. As recession progresses, gold demand for investment will increase.

Jewelry consumption has not suffered much from the 44 % price increment in gold in the last 3 years. It is interesting to observe the loyalty of the major buyer India, considering that jewels are not essential in our lives.

SILVER (AG)

Silver has also been adopted as an asset from the early days. Abraham paid Ephron four hundred silver shekels for a piece of land (Genesis 23:15-16). Today, the demand of silver is mainly distributed in industrial, photography, jewelry, silverware and coins & medal uses.

Figure 2.3 Silver Uses

Source: Author based on The Silver Institute

World's industry depends upon electric power; its distribution and administration is governed by silver contacts in switches and circuit breakers. From ordinary house switches to electrical appliances such as irons and refrigerators, use silver. It is the metal of choice for contacts because it does not corrode, which would result in overheating, posting a fire hazard. Long lasting batteries used in mobile appliances such as video cameras, watches and calculators are built with silver-zinc compounds.

Silver emulsions have governed the photography world until recent years. Digital cameras are taking over the market for its practical features, leaving a shrinking market for silver based photography.

Sterling silver has always been traditional tableware because of its sparkling reflectivity, its artistic heritage, and its bactericidal properties. Similarly, silver jewelry owes its long popularity to its reflective beauty and it workability into creative shapes.

Its unique properties including strength, malleability and ductility, its electrical and thermal conductivity, its sensitivity to and high reflectance of light and the ability to endure extreme temperature ranges restrict its substitution in most applications.

Table 2.2: Identifiable Silver Demand in millions of ounces

Silver Demand	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Industrial	316.3	339	374.3	335.2	339.2	349.8	367.3	405.3	424.8	455.3
Photography	225.4	227.9	218.3	213.1	204.3	192.9	178.8	160.3	144	128.3
Jewelry	140.6	159.8	170.6	174.3	168.9	179.2	174.9	173.8	166.3	163.4
Silverware	114.2	108.6	96.4	106.1	83.5	83.9	67.3	67.8	61.2	58.8
Coins & Medals	27.8	29.1	32.1	30.5	31.6	35.7	42.4	40	39.8	37.8
De Hedging		16	27.4		24.8	20.9			6.8	25
Investment				11.2		10.5	44	77.6	70.8	25.8
Total Demand	**824.3**	**880.4**	**919.1**	**870.4**	**852.3**	**872.9**	**874.7**	**924.8**	**913.7**	**894.4**
Silver Supply	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Mine Production	542.2	556.9	591	606.2	593.6	600.6	621.1	643.8	647.4	670.6
Hedging	6.5			18.9			9.6	27.6		
Official Sector Sales	**33.5**	**97.2**	**60.3**	**62.6**	**60.3**	**88.4**	**60.2**	**67.5**	**78.2**	**42.3**
Recycling	193.9	181.6	180.7	182.7	187.5	184	183.7	186	188	181.6
Implied Net Disinvestment	48.2	44.8	87.2		10.8					
Total Supply	824.3	880.5	919.2	870.4	852.2	873	874.6	924.9	913.6	894.5
Price										
US/Ounce	*$5.54*	*$5.22*	*$4.95*	*$4.37*	*$4.60*	*$4.88*	*$6.66*	*$7.31*	*$11.55*	*$13.38*

Source: Author based on World Silver Survey 2008, Silver Institute.

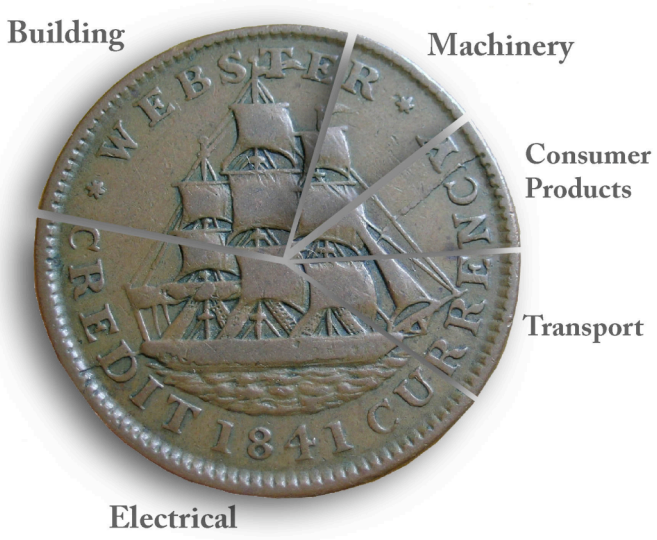
The slow increase in supply compared to the rapid price increment is due, in the same way as gold, to the long lead times. The demand for industrial applications has increased by a 44% from 1998 to 2007 while photographic demand has fallen by 43%.

COPPER (CU)

Since Copper is one of the few metals to naturally occur as an un-compounded mineral, it has a long trace in our history. In the Roman era, copper was principally mined on Cyprus, hence the origin of the name of the metal as Cyprium, "metal of Cyprus". Following gold and silver, it has been used as a monetary asset for many years. You may find copper coins in most currencies today.

An interesting characteristic about copper is that it can be easily made into alloy, a blend of metals, producing brass or bronze, which are harder, stronger and more corrosion resistant. Such versatile metal has been found to be suitable for many applications including building, electronic, transportation, agriculture, and industrial and machinery applications.

Figure 2.4 Copper Uses



Source: Author based on Standard Bank data.

According to the European Copper Institute, 60% of copper is used for wire, cables, transformers and motor windings. Most semiconductor chips found in electronic appliances such as mobile phones, dishwashers or computers are made with copper. It has long been an essential element for communications, enjoying steady growth throughout the last 50 years. Changes in data transmission through the emergence of wireless and fibreoptic communications affect the current demand but on the other hand these new technologies consume more copper for their fabrication.

Cars and trucks rely on copper for wiring, radiator, connectors, brakes and electric motors. An average car contains about 22.5 kg of copper out of which 18 kg correspond to wiring and the rest to electronic chips and mechanical units. Airplanes are composed of a 2% of copper over the total weight.

Due to its durability, strength and ease to work with high precision, copper alloys are employed in many mechanical items such as gears, bearings, turbine blades, screwdrivers,

hammers and many other mechanical tools. The corrosion resistant properties make it suitable for valves, pumps, radiators and many heat exchangers.

Water piping, taps and showers, roofs and gutters, heating systems, door knobs and other architectural fixtures are basic elements of a building. Even though copper can be replaced by plastic in many applications, copper is the product of choice in that it does not burn, melt or release toxic gases in the event of fire, its biostatic properties prevent bacteria and microbes in water applications.

Copper sulphate is widely used for pest control, fungus diseases, soil enrichment and fertilizing. Because of its bactericidal properties, it is being employed as a disinfectant in farms.

Table 2.3: Copper in thousand tons.

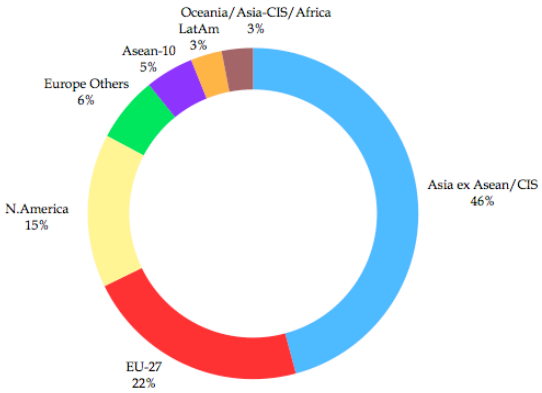
	1998	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
Total Usage	13511	14294	15138	14946	15231	15716	16840	16665	17027	17722
Mine Production	12248	12775	13203	13757	13577	13633	14594	14921	14983	15441
Price U$/ounce	*$5.54*	*$5.22*	*$4.95*	*$4.37*	*$4.60*	*$4.88*	*$6.66*	*$7.31*	*$11.55*	*$13.38*

Source: Author based on ICSG data.

Since copper is mostly used in industrial applications (cables, pipes and sheets), it is quite exposed replacement by new materials such as plastics or aluminum. Even so, the evolution of electronics, machinery and communications suggest a promising future.

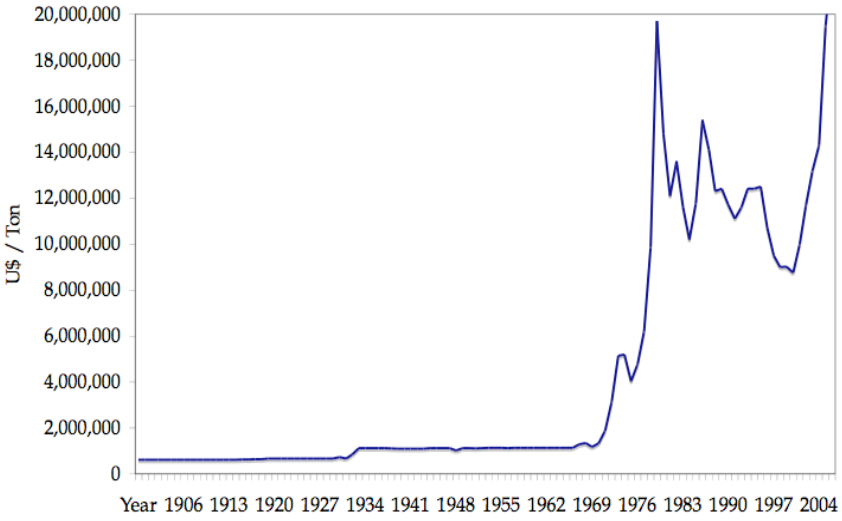
All the produced copper has been consumed in the last decade. In fact, all mined and recycled copper was used even with the rising prices. The industrialization of China and India represent almost half of the copper demand.

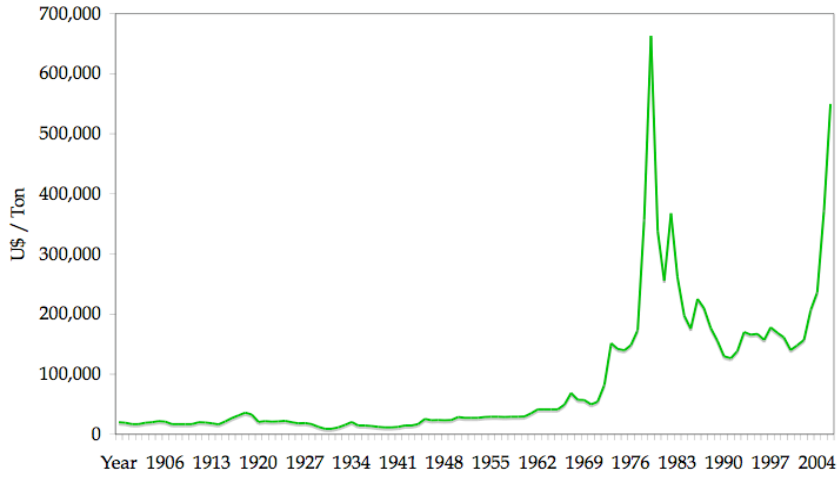
Figure 2.5 Copper Demand by Country

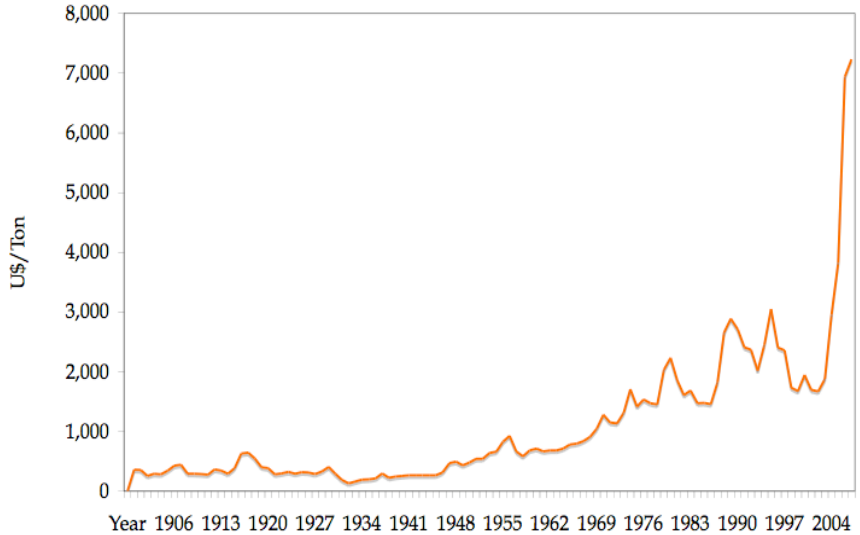


Source: ICSG data.

Figure 2.6 Gold, Silver & Copper Prices (u$)







Source: Author based on WGC, SI and ICSG data.

2.2 World Economy Prospects

Economists state that metal demand is in the peak of the cycle. Coincidentally US crisis will bring the world economy to recession and in the meantime the emerging economies of Brazil, Russia, India and China are taking off with large industrialization.

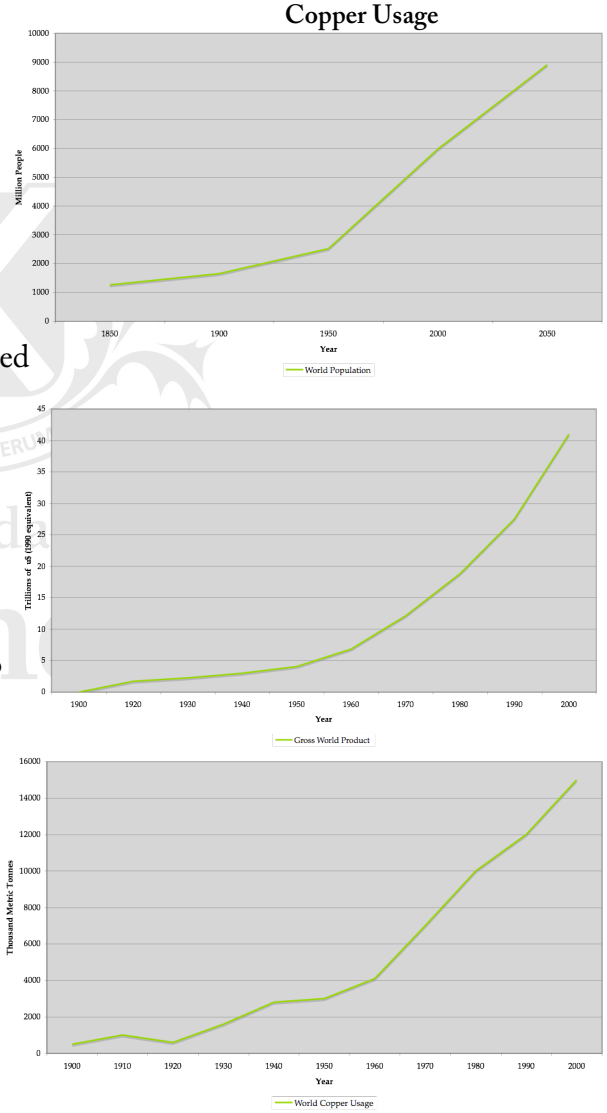
Population Growth & GWP

Metal consumption has evolved together with GDP and population growth. The relation is evident as every person consumes metal: the more people, the more metal is consumed and the richer people become the more metal they acquire. In fact, metal evolution is an indicator of GDP growth (World Bank).

According to USGS the world population has been increasing by a 72% from 1970 to 2004. Simultaneously, world mining grew by 75%. Copper consumption doubled while Aluminum tripled. UN forecasts 9.1 billion people by 2050, a 40% population growth, out of which majority is happening in developing countries where infrastructure is yet to be developed. Gross world production has increased by 225% from 1970 to 2004 achieving u$10,500 per capita, totaling u$ 78.36 trillion for the world (CIA World Factbook).

As long as the GDP and population keep increasing, metal consumption will continue. This data offers us a broad spectrum of the future economy, however, it is indispensable to study the emerging economies that will eventually control the global scene to understand more precisely the demand fluctuations for the future. Long-term predictions naturally increase in uncertainty, but it is necessary to use them as a foundation. Corrections will need to take place along the way and predictions will change.

Figure 2.7 World Population, GWP & World Copper Usage



Source: Author (World Bank, ICSG)

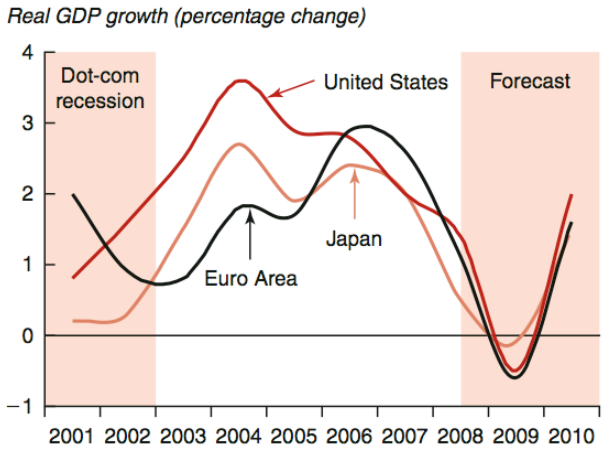
OECD Economies

The OECD (Organization of Economic Cooperation & Development) high-income member countries represent today the main finance for mining, mainly from Canada, UK, USA and Australia. Any variations in these economies are reflected directly on mining activities around the world.

The current US crisis, which is affecting the world economy, has paused most world exploration activities and mines in construction phase. The 2nd quarter of 2008 was the initiation of the recession with the GDP growth dropping to 0.7%. Overall industrial production has decreased along the OECD countries to negative grounds reaching an average of 3.2 % decline in 2nd quarter of 2008.

OECD countries are all mature economies, where growth is coming to or has come to an end. The aging demographics will soon represent costs rather than money lending, and in the long term their economies are likely to fall in a fight for survival. It should then not be surprising to go through a series a recessions in the coming decades.

Figure 2.8 GDP decline across the OECD



Source: National Statistical agencies, World Bank

BRIC Economies

Even though we ignore whether Brazil, Russia, India and China's growth was intentional or coincidental, this group is gaining the power to lead the world economy today. Jim O'Neill of Goldman Sachs has been quite assertive when he initially forecasted these emerging economies in 2001.

China and India are the largest suppliers of manufactured goods while Brazil and Russia are becoming the largest suppliers of raw materials. Brazil is dominant in soy and iron and Russia in oil and gas. Each of these countries is in a developing stage in which metal consumption is essential for their maturity. 221 cities are estimated to host more than 1 million people in China by 2050, having to build 50 000 tower blocks and associated infrastructure.

After the Cold War, these countries have increased their productivity for subsistence by ensuring education, promoting foreign investment, encouraging domestic consumption and entrepreneurship.

During the second review (2007) of the initial BRIC projection, Brazil has failed to progress as estimated. Even though, Lula was reelected, he has not achieved to maintain the production pace. Reasons include the lack of savings culture resulting in low reinvestments, repaying international debt, not open enough for trade and need for better education. According to Goldman Sachs, Brazil will under produce for the next 4 years but will maintain its long term potential.

Whether Putin's economy results were due to his successful governance or simply mediocre governance but better than Yeltsin's, Russia has come back to life with a 6.8% GDP growth for every Putin's year. Now, assuming that Medvedev is following his steps (by whichever means), Russia has good potential although a lot to improve. Rory MacFarquhar for Goldman Sachs states that Russia is well above average the emerging markets in education, external debt and is barely above average in trade openness and life expectancy. On the other hand, it scores high in bureaucracy and corruption. Krudin, Finance Minister, by trying to tidy the economy up with the support of the promises of a somewhat stable future for economic growth loosening dependability on high oil prices. We should not forget that Russia is the biggest country (in area) and carries an interesting portfolio of raw materials.

India has performed better than expected with an 8% GDP growth rather than the 5.7% forecasted. Assuming the government will maintain growth supportive policies, they will sustain this rhythm until 2020. In fact, India is esteemed to surpass the US before 2050 becoming the 2nd strongest economy. Indians will consume 5 times more cars, and 3 times more oil. The opening of trade in 1991 with lowering export taxes to 15% (from 200%) and privatization reforms has presented a positive scenario for development. Growth rates are extreme, accompanied by infrastructure development. The Golden Quadrilateral has been the largest infrastructure project since the British railways. In the last 50 years, India's government has been building over 500 kilometers of 4 lane roads preparing the country for expansion. The aim is to build up to 5000 km of 4 and 6 lane highways connecting all the major cities allowing a smooth trade flow. The financial sector has been developing and credits are growing up to a 32% for domestic investment. However, this sector is still very small compared to the economy. The large migration to urban areas is affecting the industrial sector positively while agriculture is declining dramatically.

China's growth has broken all records since 1970 with an average GDP growth of 9.6%. Economists believe that it should keep expanding steadily until the 2030s. However, China will need to face two demographic issues concerning the longer longevity and the effects of the one child policy. The working age group will be reduced as the birth rate has diminished (from 21% to 14%) and the aging workers will be retired, eventually representing a cost. Goldman Sachs suggests that China will become an aged society by 2027, once fully developed but not yet rich. Despite the labour force reduction, the future workers will be better educated conforming a more sophisticated China. The agriculture sector is reducing while the industrial sector expands, having rural migration to urban areas.

Table 2.4 World Ranking of BRIC countries

	Brazil	Russia	India	China
Area	5th	1st	7th	3rd
Population	5th	9th	2nd	1st
GDP (nominal)	10th	8th	12th	3rd
Exports	21st	11th	23rd	2nd
Electricity Consumption	10th	3rd	7th	2nd

Source: Author based on The Economist data.

It is clear that the evolution of BRIC will not be smooth and a series of issues will appear along the track. Clear indicators show that China and India will need immediate infrastructure, as will Brazil in a longer term and demand for industrial metals will certainly increase.

END OF THE COMMODITY CYCLE?

Economists have been forecasting that 2008 would be the end of the commodity cycle with prices dropping drastically. Prices have dropped for industrial metals mainly, but nowhere near to the end of the cycle. Copper has suffered most as it is extremely exposed to industrial activity. Silver, which is not so dependent on industrial applications has suffered less and, gold, which has no industrial applications has not suffered much at all.

Figure 2.9 Gold, Silver and Copper & Prices 2004-2008

Source: Infomine

What comes to our minds is whether the cycle is stretching or if things are simply changing. Mining companies are merging to become sole suppliers in order to be price makers rather than takes. The question that is raised is when will the price change hands.

3. METAL SUPPLY

3.1 FINANCING THE INDUSTRY

Shareholders and financial institutions, including banks and insurance companies have direct interest in the economic success of a mining venture. Finance channels vary according to the scale of the enterprise. Mineral producing companies or companies with an advanced project with demonstrated ore reserves, can access debt finance (i.e. borrowing cash), but early-stage developers and explorers have narrower and shallower channels of funding and must raise money through equity finance (i.e. offering shares).

Commercial banks are the main providers of debt finance. The multilateral financial institutions such as World Bank, African Development Bank, European Bank for Reconstruction and Development, Asian Development Bank, Inter-American Development Bank and Caribbean Development Bank and the regional development banks, although with a broader mandate than providing finance, are good sources of funds when commercial financial institutions are unwilling or unable to lend. This funding can also be very important in raising the level of confidence and can attract other sources of finance, especially because of the political risk insurance they provide. The World Bank, with its set of environmental and social conditions is another interesting source of funding and insurance, offered through the Multilateral Investment Guarantee Agency (MIGA).Today the stock exchanges in Johannesburg, London, New York, Paris, Sydney, Toronto and Vancouver represent important sources of finance.

Figure 3.1 Sources of equity financing 2005-2007

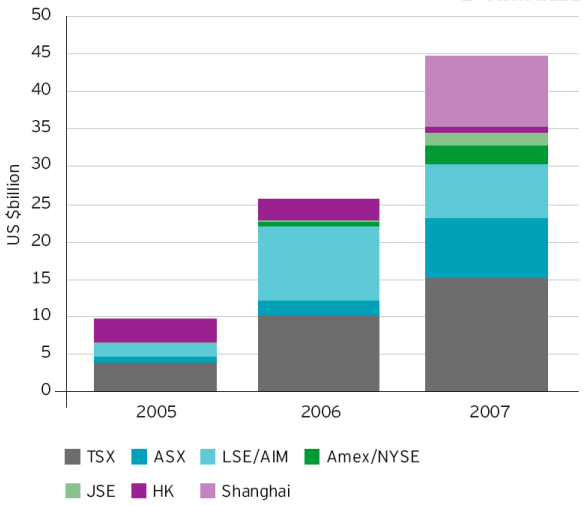
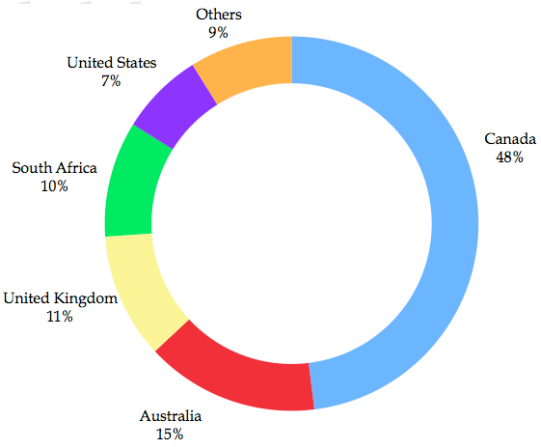


Figure 3.2 Sources of equity financing for world mineral exploration and development, 2004



Source: Gamah International Ltd. & company reports.

The UK, where hardly any mining operations take place, has become the favourite destination for big players to raise capital and maintain stock market listings. Capital for high-risk operations concerning smaller developers or junior exploration companies is more likely to be raised privately or from Canadian or Australian stock exchanges, home for the bulk of juniors. The rush of mining in China has substantially increased the amount of mining capital raised in Hong Kong and more recently in Shanghai.

Mining in new countries has created new levels and kinds of risks for institutions that provide capital to the minerals sector. There have been some major losses for equity investors, lenders, and insurers alike. Financial institutions became the preferential place for mining protestors from communities with no developed environmental laws or reliable court systems, achieving effective media attention. Not all financial institutions feel comfortable with putting their reputations at risk over issues related with their clients. Such trend has led a number of financial institutions to ignore the mining sector.

As a result of consolidation, the largest mining companies are now moving into an era where they are not be depending so much on project finance as on corporate finance. In other words, they are seeking loans directly to the company on the strength of its balance sheet rather than on specific projects. This may mean a lower level of outside scrutiny on whether to embark on specific projects. As it is now, a bank (or other investor) must be convinced of the merits and viability of the project. This is not possible if funds provided are not earmarked for a particular project. Second, it could take the loan decision out of the political realm: since the loan will not be linked to a specific project, it will be much harder to build NGO campaigns against the loan. This again means less outside scrutiny of project decisions.

There will be a growing distance between the companies big enough to avail themselves of the corporate finance alternative and those that are not. This could accelerate the trend to concentration in the industry. Nevertheless, project finance will continue to be used by medium-sized players and by the large companies to manage country/political risk.

3.2 COMPETITIVE PLAYERS

COMPANIES

Mining companies range from giants such as BHP Billiton and Rio Tinto to the smallest companies who have the dream of finding a major ore deposit. Many fail to discover or launch a successful mine. When they do, it often does not have a long life. Many others, however, grow to become important in their industry or region.

The mining industry has traditionally been characterized by a distinctive company categorization: *The majors*, the well known and huge, often transnational, mineral producing companies; *The mid-tier producers*, generally striving for scale or niche; *The development stage companies*, that have only one or two demonstrated deposits and are working on feasibility studies, raising capital, or building the operations; and *The juniors*, who are bravely exploring, or perhaps just trying to show that they have rights to properties that make them attractive acquisitions. However, in this paper the author will refer to the major, including the mid-tier producers, and the junior, including the development stage companies, firms only.

Few major companies dominate the mining industry globally. The table below shows the top mining companies according to The Forbes global 2000, which lists public companies with the top composite scores based on their rankings for sales, profits, assets and market value. To qualify as a Forbes Global High Performer, a company must stand out from its industry peers in growth, return to investors and future prospects. Most of the high performers have been expanding their earnings at 25% a year or better, easy for a startup, hard for a blue chip. These companies are shown in grey.

Table 3.1 World Mining Companies Ranking (us dollars)

Company	Country	Sales ($bil)	Rk.	Profits ($bil)	Rk.	Assets ($bil)	Rk.	Market Value ($bil	Rk.
Vale	Brazil	33.23	2	10.26	2	74.7	2	161.39	3
Rio Tinto	UK/Australia	29.7	4	7.31	3	100.81	1	165.48	2
BHP Billiton	Australia/UK	39.5	1	13.42	1	53.36	3	190.62	1
Xstrata	Switzerland	28.21	5	5.5	5	52.24	4	77.01	5
Anglo American	UK	25.47	6	5.29	6	44.29	5	85.05	4
Alcoa	US	30.75	3	2.56	8	38.8	7	30.25	10
Freeport Copper	US	16.94	7	2.98	7	40.04	6	38.52	9
MMC Norilsk Nickel	Russia	11.93	8	6.19	4	16.28	9	51.45	6
Barrick Gold	Canada	6.78	11	1.2	12	21.95	8	45.51	8
Aluminum Corp of China	China	7.93	9	1.5	11	9.94	12	51.08	7
Grupo Mexico	Mexico	7.28	10	1.68	9	12.15	11	17.95	11
Teck Cominco	Canada	6.42	12	1.58	10	13.61	10	17.72	12

Source: Forbes Global 2000.

Figure 3.3 Major Mining companies' areas of operation

Source: Author

COMPANIES SOURCES OF COMPETITIVE ADVANTAGE

The mining industry in 2009 is sure to be competitive. In face of this, all successful mining companies need to ensure that they are competitively advantaged. The following factors, common to top companies in the industry, can be expected to be critical in creating competitive advantage.

• ***Size:*** Size itself does not create competitive advantage. However, large mining companies have been able to become competitive by using the opportunity to minimize costs by fully exploiting economies of scale. Size has enabled companies to, disseminate best technological and environmental practice across a wide range of operations, standardize equipment across company's operations and benefit from a central procurement, better coordinate shipping and marketing activities, exploit geographical diversification, and share back office services amongst several operations. In addition, size has enabled miners to better deal with suppliers and even governments.

"Miners with economies of scale will be better placed to weather the storm both in terms of controlling costs as well as having greater product and geographic diversification. There is no doubt that these are very challenging times and uncertainty in the short-term outlook remains"
BHP Billiton Spokesperson, *All changefor miners prospects 2009*, Mining Technology.com.

• *Financial strength:* Financial strength tends to be accompanied by size. This gives companies the ability to lead and fund very large projects. Diverse funding sources become available for well-established sustainable corporations, with diversified operations and strong balanced sheets.

"We have a solid 'A' credit rating, which balances financial flexibility with the cost of finance."
Annual Report 2005, Barrick.

• *Technology:* The mining industry is a high tech industry. It relies upon improved technology for resource estimation, mineral extraction, health and safety. The ability to access and innovate in the application of the world's leading technologies is particularly critical.

"Rio Tinto is well positioned to play its part due to its depth of technology and management skills (…) The combination of Rio Tinto and Alcan creates an excellent opportunity to exercise undisputed industry leadership in technology. RTA is focused on step changes in energy consumption, environmental impact and full economic cost, in order to maintain and extend RT's position as industry technology leader, thereby supporting a key corporate objective of sustainable growth."
Annual Report 2007, Rio Tinto.

• *Organization:* The most competitive companies have the best corporate organizations. Such organizations are flexible and open, lack complexity, are network oriented and are able to stimulate innovation. There is no single model. Although, each successful company has its unique culture, they are all alike in being nimble and innovative.

"From the beginning, we have run our company as an entrepreneurial enterprise that just happened to be in the business of gold mining. We have remained nimble and innovative. We

have honed in on, even obsessed over, shareholder returns. We believed that if we managed Barrick as if we owned it personally (and to a large degree, in the early years, we did) our shares would beat our competitors' shares (and they did)." *Annual Report 2007*, Barrick.

• *People:* The best companies employ the best people. They provide them with stimulating career opportunities and invest in their training and development.

"We are embracing our role as the gold industry leader with a strategy to make Barrick the employer of choice. In the same way we are competing for assets and capital, we are competing for the most qualified, experienced professionals in the business. In 2007, we continued our focus on achieving a zero-incident safety culture with innovative enhancements to our safety and health systems. We offered leadership training to employees around the world and we made plans to enhance our development programs for recent graduates." *Annual Report 2007*, Barrick.

• *Partnerships:* No mining company is able to operate in isolation. Partnerships prevail across the operating spectrum. The best companies are the best partners; the companies that others wish to do business with.

"We will grow and manage a diversified portfolio of metals and mining businesses with the single aim of delivering industry-leading returns for our shareholders. We can achieve this only through genuine partnerships with employees, customers, shareholders, local communities and other stakeholders, which are based on integrity, co-operation, transparency and mutual value-creation." *Annual Report 2007*, Xstrata, page 2.

• *Reputation:* The mining industry has been subject to increasing attention for its sustainability performance from broad range of stakeholders, including shareholders, employees, NGO's, financial institutions, and both local and international communities. These stakeholders influence the performance of mining companies by affecting aspects like licenses to operate, productivity, reputation, capital and operational expenditure, and increasingly access to capital. Focusing on health, safety, environment, and on host communities, and developing a consistently strong corporate reputation and brand has proved to be a clear advantage for some.

"By earning a good reputation for our care of the environment and contribution to social improvement and the economic conditions of local communities within a strong governance structure, we gain improved access to land, people and capital, the three critical resources on which our business success is built." *Annual Report 2007*, Rio Tinto, page 83.

• *Risk Management:* Mining companies operate in uncertain and volatile commodity markets. They also invest and operate in a wide range of new countries where operating conditions are different and often not well understood. As a result, companies diversify their activities geographically and by commodity to reduce country and commodity risk. A well-balanced portfolio of operations allows companies to absorb disruptions, and deliver on overall expectations. Some companies have been looking to further expand their activities by incorporating supporting operations such as freight, energy generation, and metal processing, not having to depend on third party operations, hence lower costs and risks. Effective risk management is a key source of competitive advantage.

"Xstrata benefits from a very significant growth pipeline across a number of commodities, allowing the strategic sequencing of projects and deployment of capital from which significant volume growth and superior returns can be achieved.(…) Diversification also engenders healthy competition for capital between Xstrata's commodity businesses, ensuring only the most attractive projects or acquisitions are approved." *Annual Report 2007*, Xstrata, pages 17 and 18.

"*Rio Tinto Marine leverages the Group's substantial cargo base to obtain a low cost mix of short, medium and long term freight cover. It seeks to create value by improving the competitive position of the Group's products through freight optimization, and does not seek to trade freight as a stand alone activity."* *Annual Report 2007*, Rio Tinto, page 47.

• *Vision:* It is the intangible essential ingredient to corporate success. Without it no company can make it to the top. Having a shared vision is what enables a company's employees to move mountains.

"Our vision is to become the largest mining company in the world and to surpass current standards of excellence in research, development, project implementation and business operations." *Annual Report 2007*, Vale, page 15.

• *Project Pipeline:* Since there have been few major metal discoveries over the last decade, a deep inventory of world-class projects (high-quality, long-life and high-margin) is a competitive advantage. These assets provide the cash flows that are required to build new projects, to contribute to the economies of the countries in which they operate, to meet obligations with employees, suppliers and partners, and ultimately pay dividends to shareholders.

"We expect that our next generation of mines, including Buzwagi, Cortez Hills, Pueblo Viejo and Pascua-Lama, should operate at lower average total cash costs than the average total cash costs of our current portfolio of operating mines." *Annual Report 2007*, Barrick, page 27.

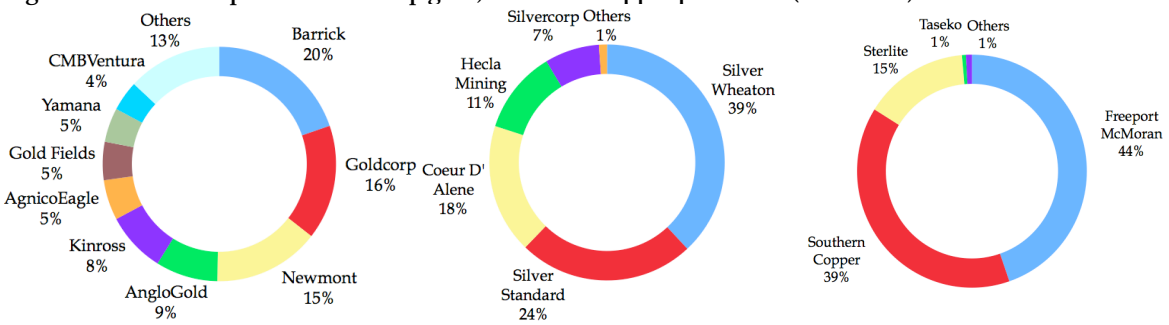
• *Growth options:* Making use of exploration, technology and global presence, competitive companies look beyond their current pipeline to secure future reserves. Replacement even during years of low metal prices, when most of the industry retrenches, has shown to be a critical component of sustainable success. Companies pursue growth options, from extending existing operations, to new projects, through exploration, and merger and acquisition activities.

"As at the end of December 2007, AngloGold Ashanti, a leading global producer of gold, had 20 operations on four continents, a substantial project pipeline and an extensive, worldwide exploration programme." *Annual Report 2007*, AngloGold Ashanti, page 54.

INDUSTRY MARKET CAPITALIZATION

When it comes to the particular metals studied in this paper, gold leads in market capitalization, accounting for 128 u$ billion, compared to silver 5 u$ billion and copper 41 u$ billion. (Source: Yahoo Finance 9 May 2009). The companies with top market capitalization in each of these sectors are shown in Figure 3.4.

Figure 3.4 Market capitalization of top gold, silver and copper producers (u$ Billion)

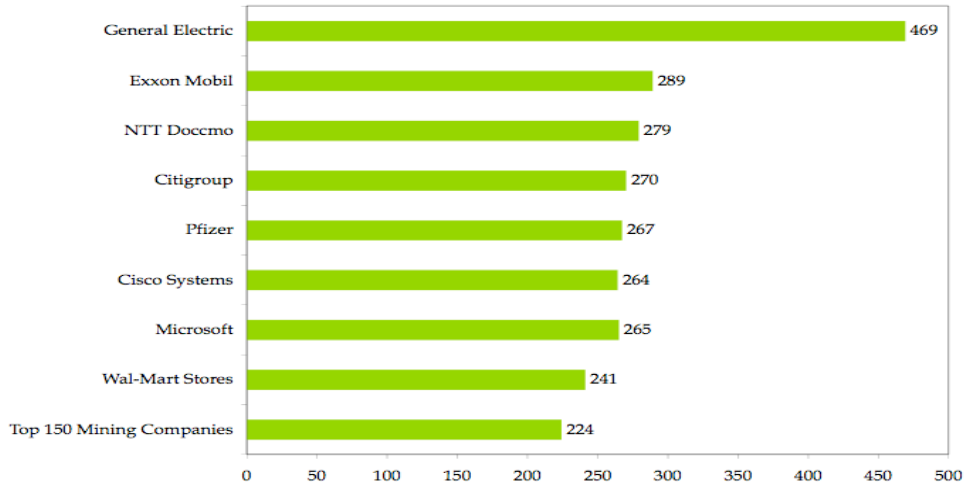


Source: Author based on Yahoo Finance May 2009

In spite of the huge investment required and its financial risk, the mining industry is very small compared to oil and gas industries and to other industries that depend upon the metal. Although there is a number of very profitable mines, successful mining companies, and periods of high metal prices, the industry as a whole has not been doing very well. The mining industry shows volatile returns and over the past twenty-five years has failed to produce long-term returns to meet its cost of capital.

In 2001, the top 150 minerals companies had a combined market capitalization of only u$224 billion, smaller than companies such as General Electric and Exxon Mobil.

Figure 3.5 Mining Sector Mining Capitalization versus Other Sectors, 2001 (u$ billion)

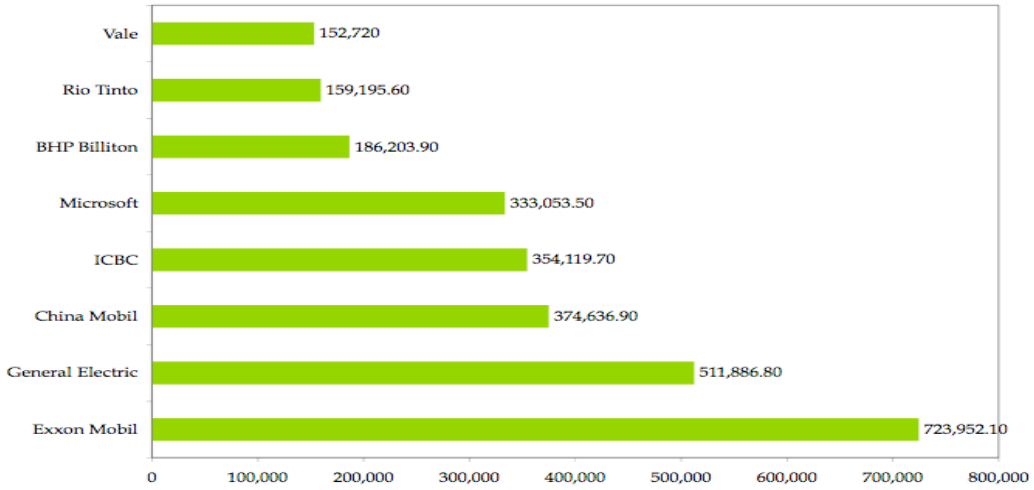


Source: Author based on World Bank

While the mining industry may have underperformed the markets during the technology-led boom of the 1990s, it began its current trend of impressive growth in early 2003 when strong demand, primarily from emerging markets, helped push commodity prices higher.

After several harsh years, 2003 and 2004 were good years for the mining industry: net operating cash flows and profits doubled and returns on equity tripled, enabling mining companies to strengthen their balance sheets. Beginning in late 2005, mining stocks have enjoyed returns that clearly outperformed the S&P 500 and Dow Jones indices, and shareholders harvested the benefits of their good performance.The total market capitalization of the global mining industry showed extraordinary growth rates, with particular growth of companies from emerging markets.

Figure 3.6 Mining Sector Mining Capitalization versus Other Sectors, 2007 (u$ billion)



Source: Author based on Financial Times Global 500, 2007.

According to Price Waterhouse Coopers' report *As good as it gets?*, revenues of the top 40 mining companies grew by 32 % in 2007. Strong commodity prices were the predominant driver of the revenue growth. However, operating costs also increased by 38 %, thereby reducing margins. Such raise was driven by higher energy, labor, materials, transportation, and contractor costs resulting from the overall surge in the industry.

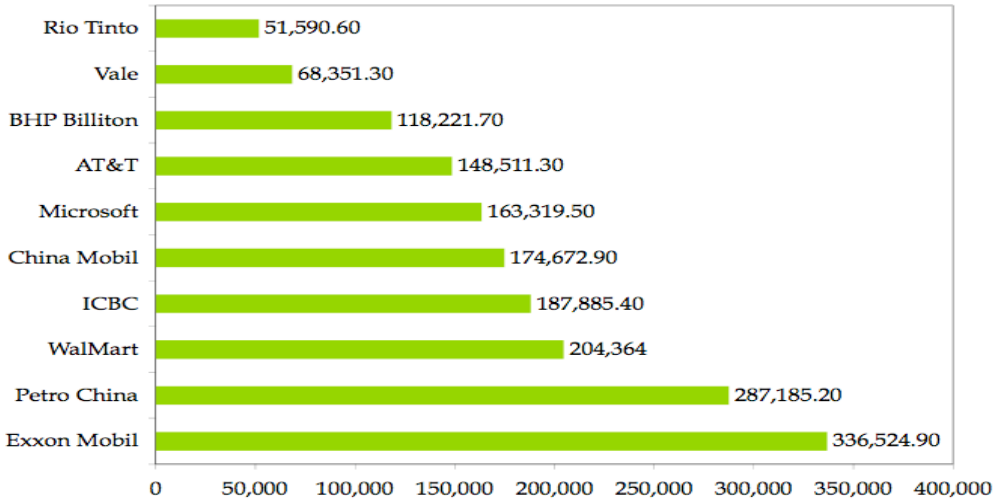
2007 was great for the global mining industry; record commodity prices and continued growth in emerging economies have let the top mining companies avoid the slow downs other sectors experienced. However, 2008's credit crunch is affecting companies' market valuations.

"Mining companies will have to control climbing costs to maintain the growth rates we've seen up to this point."

Ralbovsky, S., *As good as it gets?*, Pricewaterhouse Coopers, 2007.

While metal prices increased dramatically between 2003 and 2007, metal prices (except gold) fell sharply in 2008. During this period average grades fell, development costs skyrocketed, as have operating costs, which doubled. The market capitalizations of many mining and metal companies in 2008 were considerably lower than at the end of 2007.

Figure 3.7 Mining Sector Mining Capitalization versus Other Sectors, 2009 (U$ billion)



Source: Author based on Financial Times Global 500, 2009.

Conditions in the mineral commodity markets have changed dramatically since the last drop in prices. The emergence of China has changed the supply and demand equation creating a much more durable commodity market less exposed to sudden downturns. Pressures on supply suggest that the world crisis would have to be very harsh to bring metal prices down for a long time. Major mining companies that have cash from record prices of the last years, will survive the sudden fall in prices.

Without doubt there will be turbulence but the prospects look good. In fact, many metal prices are already rising, as for the beginning of 2009.

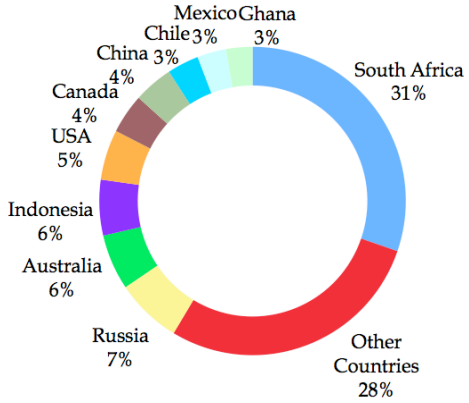
3.3 Producing Countries

The British Geological Survey publication World Mineral Production covers the majority of economically important mineral commodities.

Gold

Gold production is recorded in more than 80 countries, and several countries produce substantial quantities of gold from small operations which are not recorded in official statistics. Based on BGS data, eight countries: China, South Africa, United States Australia, Peru, Russia, Indonesia and Canada in descending order of production, produce more than a 100,000 kilograms (metal content) of gold annually, or 67 % of the world mine production.

Figure 3.8 Top Gold Producing Countries



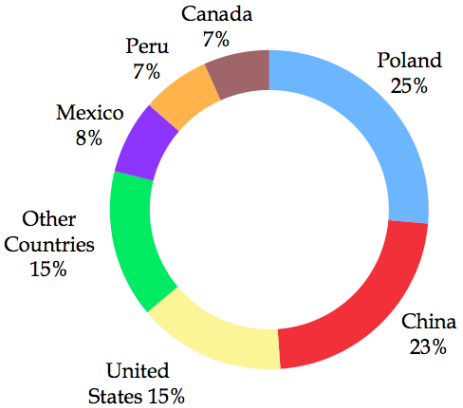
Source: Author based on BGS 2007 data.

South Africa has dominated world gold production for many decades and in 1970 was producing over 1000 tons annually, equating to 60 % of world production. South African output has since been declining whilst many other countries have expanded production. Other traditionally dominant gold producers, including Australia, United States and Canada, are also loosing ground to new producers who have become increasingly important in recent years.

Silver

Silver production is recorded in nearly sixty countries. Based on BGS data, eight countries: Peru, Mexico, China, Chile, Australia, Poland, Russia and United States in descending order of production, produce more than 1,000 tons of silver annually, or 80% of the world silver mine production. Most silver emerges as a by-product of the mining of other metals. Only around a 30% output comes from so-called primary silver mines, where silver is the main source of revenue.

Figure 3.9 Top Silver Producing Countries



Source: Author based on BGS 2007 data.

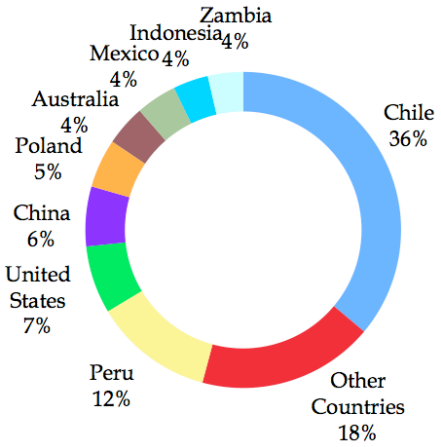
Global silver mine production rose 4 % in 2007. Geographically, just over half of the silver comes from the American Continent. Output in Latin America, the world's biggest silver producing region, expanded 9% pushed by the growth in Chile. Peru was the world's biggest silver mining country accounting for 17% of all production, followed by Mexico with 15%.

COPPER

Copper is produced in about fifty countries. Nine countries based on BGS data: Chile, Peru, United States, China, Australia, Indonesia, Russia, Canada, and Zambia in descending order of production, account for about 80 % of world copper mine production. Each of these mine countries produces over 500,000 tons of copper per year.

In the last 20 years, copper production has almost doubled from 8.8 million tons in 1988 to more than 15 million tons in 2007.

Figure 3.10 Top Copper Producing Countries



Source: Author based on BGS 2007 data.

This sustained rise can be attributed to the steady increase in copper demand from growing economies around the world. The proportion of copper mined in South America has increased from about one quarter to nearly one half of total world production. This is largely due to an increase in production in Chile, from 17 % of world production in 1988 to 36 % in 2007. The contribution from Asia has been increasing and Africa's copper production has also risen in recent years driven by Zambia and the Democratic Republic of Congo.

Rising demand for copper has meant that many mines are now operating at almost full capacity. Refinery capacities are becoming a bottleneck to production. This coupled with limited expansion potential and diminishing ore reserves of existing mines, means that production is likely to level off unless the record high copper prices of recent years are reinvested into exploration and future production infrastructure. Copper mine production depends on a relatively small number of large producers. It is therefore vulnerable to disruptions caused by strikes, natural disasters and concerns over supplies of energy.

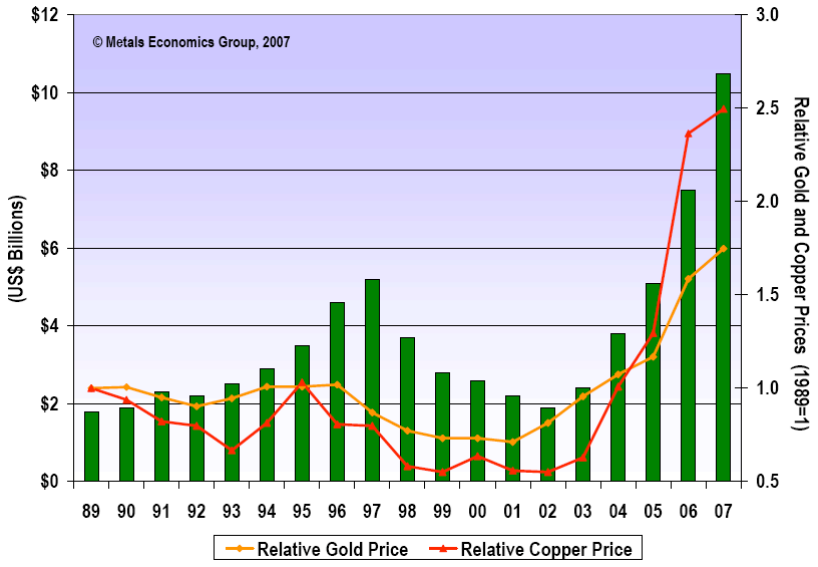
Improved mining and extraction techniques now allow copper from low-grade ores that were previously considered a waste, to be extracted using chemical techniques. However, such process may be measured in years, delaying the final copper delivery.

3.4 EXPLORATION

Exploration and reserve replacement is a critical component of mining companies' sustainable success. Well-chosen investments will work to sustain positioning. Building a strong foundation for the future requires innovation and consistent investment in companies' portfolio of mines, project pipeline, and exploration.

Prior to the recent surge in prices, a lack of investment in exploration and the development of new mines during the last cycle low (1996-2001), has led to a continued downward pressure on supply.

Figure 3.11 Estimated global non-ferrous exploration budgets and relative metals prices, 1989-2007 (U$)



Source: Metals Economics Group, Press Release 2007.

During the last down part of the metal cycle (1996-2001), little effort was devoted to exploration and when prices recovered (2002-2008), little developments were left in the pipeline. In order to increase production, mining companies found it cheaper and faster to acquire operating or even closed mines rather than to explore and develop new ones. During these last years mining companies have invested largely but production has not yet increased. Such a trend is however unsustainable in the long-term.

As miners are running out of assets, there is an ongoing need for mine expansion and/or development to meet demand. A new investment cycle began. Mineral companies started scrambling to either start new mines, reactivate abandoned projects, or purchase junior companies with mineral assets. Producers realize that cuts in exploration investment in the downturns contribute to future supply disparities, resulting in a shortage of projects in the pipeline. As a result, many producers have worked to foster a culture of exploration into their growth strategies.

Producers have publicly stated the importance of maintaining a consistent exploration effort throughout the cycles in order to better position themselves and take advantage of the eventual rebound. This clearly did not happen in the exploration downturn of the late 1990s, and we will soon see if these companies are able to 'stick to their plan' as they withstand the next downturn.

EXPLORATION TODAY

Exploration during 2008 reached unprecedented levels, with more companies spending more money than ever in the search for minerals. But, with the coming of the global downturn and precipitous falls in commodity prices, however, belts have been tightened, budgets cut, and for many explorers the good times are postponed until the next cycle of the industry. Much of the money spent during the last year was used in resource generation and near-mine exploration. The hope is that these deposits will form the basis of a new wave of mines to satisfy demand during the next upturn. Based on Metals Economic Group's (MEG) study, worldwide nonferrous metal exploration budgets rose steadily through the early 1990s to crest at US$5.2 billion in 1997, before falling for five straight years to a low of US$1.9 billion in 2002. Since then, the total exploration budget rose for six straight years to reach US$13.2 billion in 2008. This represents a 26% rise from the 2007 budget, and has more than doubled the estimated US$5.2 billion at the height of the last exploration cycle. Although cuts to exploration plans during the last part of 2008 were likely to have been quite severe for many companies, particularly junior explorers, MEG still expects total 2008 spending reached an all-time high.

New explorations in regions traditionally perceived to have higher political risk have been the hallmark of the last exploration cycle. New countries are being mentioned as possible investment destinations that would not have been considered even a few years ago. This shift is partly due to the belief that traditionally lower-risk countries are already well explored, and partly because of the growing perception that the discovery of large-scale deposits will be more likely in higher-risk areas. More attractive opportunities are arising in greenfield investments (creating of new operations), and less brownfield assets (existing operations) are being acquired, as a result of the high market valuations and shareholders demand of huge premiums.

"One thing that we must take account of in applying our strategy going forward is that the world is rapidly changing and we have to change with it. The world's best ore bodies include many beyond our Australia and North America heartlands, so we cannot afford to ignore more challenging parts of the world. While being top sensitive to government and stakeholder expectations, we have to be capable of operating where the world's leading ore bodies are located."

Annual Report 2007, Rio Tinto, page 6.

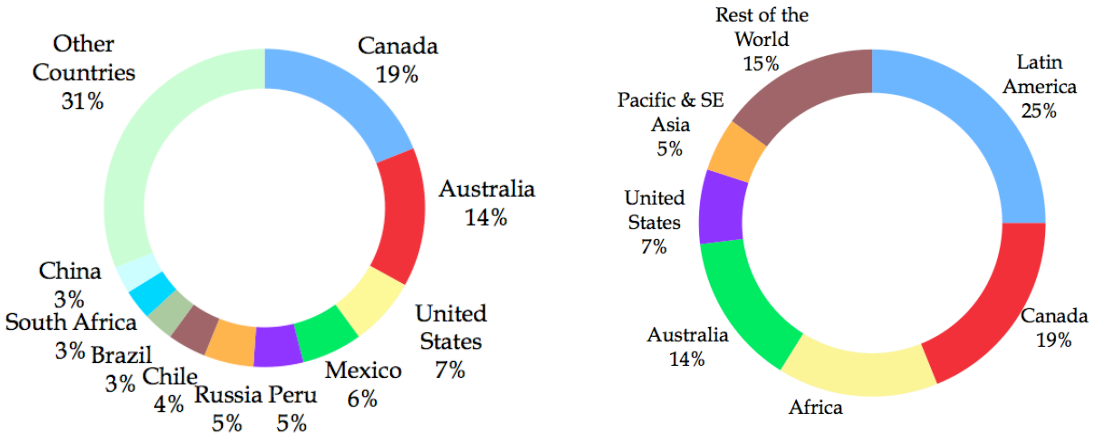
"In their rush to bring new projects on line, mining companies have forayed into regions they may not have considered even a decade ago. Politically volatile nations and higher risk countries became fair game for an industry actively pursuing synergies and expanded production profiles."

2009-The top Tracking the trends 10 global mining issues, Deloitte, 2008, page 9.

GEOGRAPHICAL DISTRIBUTION

The top ten countries explored in 2008, account for 69% of the world exploration budget. Although their positions have shifted, these remain the same as in 2007. The traditional big three, Canada, Australia and the US, head the list. Mexico and Peru moved ahead of Russia to take the fourth and fifth spots respectively. Chile retained seventh place, while Brazil jumped ahead of South Africa and China.

Figure 3.12 Non-ferrous Exploration Budgets for Top Ten Countries & Exploration Budgets by region

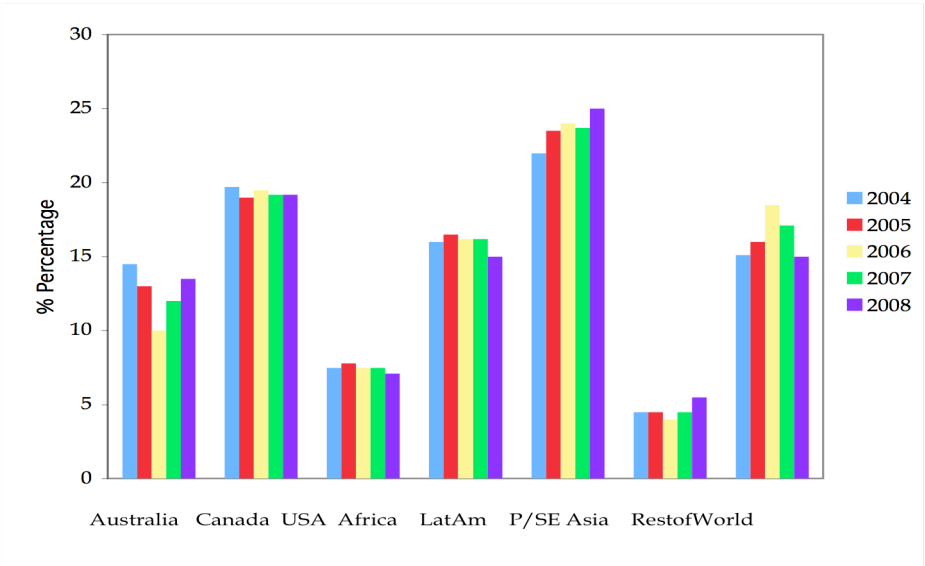


Source: Author based on Metals Economics Group, 2009

The regional distribution of planned 2008 exploration budgets remained similar to recent years. MEG's exploration analysis is grouped into the following regions: Africa, Australia, Canada, US, Pacific/South East Asia, Latin America and Rest of World (which includes Russia, China, Mongolia and 37 other countries in Europe, Asia and the Middle East).

Latin America has been the most popular exploration destination since 1994, and increased its lead slightly over Canada in 2008, giving it a quarter of the year's global exploration budgets. Canada has held second place since overtaking Australia in 2002 and represents about 19% of world spending in 2008. Investment plans in Rest of world region grew by less than 10% in 2008, allowing Africa to climb into third place by a small margin. Although in fifth place for the fifth consecutive year, Australia recorded the second largest year increase, by 44%, raising its share of worldwide budgets from 12% to 14%. The US continued in sixth place, with the same 7-8% of worldwide budgets that it has held for the past eight years. In the Pacific/Southeast Asia region, planned 2008 exploration allocations increased by 60% from 2007, with Papua New Guinea, the Philippines and Indonesia collectively contributing almost three-quarters of the total. Nevertheless, the region's 5% of the worldwide total, ranked it last among all regions.

Figure 3.13 Non-ferrous Exploration Budgets by region, 2004-2008



Source: Author based on Metals Economics Group, 2009

3.5 LATIN AMERICA

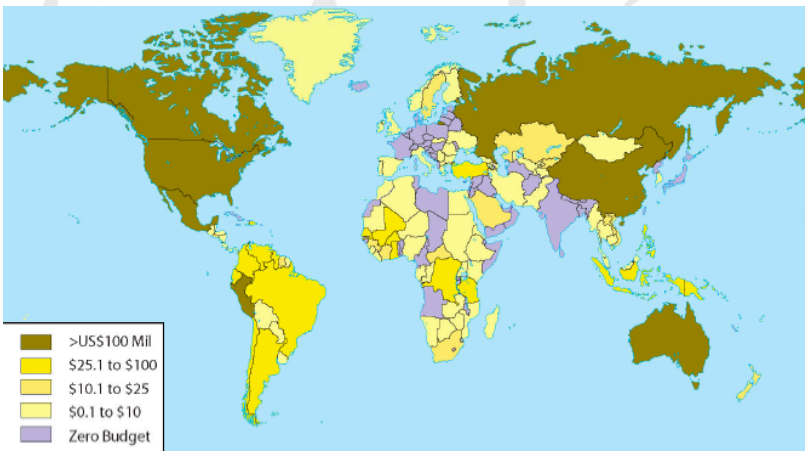
The mining sector flourished in Latin America as part of the industry's transformation. Companies are seeking to increase the scale of their operations in order to tackle the growing consolidation of the industry and are ensuring their access to the next world-class deposits. Latin America, who has long been recognized for its abundant geological wealth and potential of its abundant unexplored areas, has been a favorite destination for investments in the mining industry, both in the form of acquisitions, and investments in exploration and production activities. According to MEG, about 83% of 2008's exploration allocation to Latin America was directed to the traditional five countries: Mexico, Peru, Chile, Brazil and Argentina.

Foreign mining companies have come to control many of the best mining projects in the region. Investments come mainly from Canada, United States, the United Kingdom and Australia, and not only from large companies but, more than ever, from junior companies, particularly exploration companies. In addition, new players like China and older players like Japan are showing up.

Several major mining companies are already well positioned including Vale, BHP Billiton, Rio Tinto, Barrick , Xstrata, Grupo Mexico, Silver Standard, Coeur, Silver Wheaton, Goldcorp, Newmont, Yamana, Barrick, AngloGold, Kinross, Freeport McMoRan, Buena Ventura, Anglo American, Teck and Goldfields among others.

As an indicator of the increased interest, Latin America has been the prime destination for exploration expenditures since 1994, hosting a majority of Canadian companies with a share of 35 % in 2002, increasing to 50 % by 2007.

Figure 3.14 Gold Exploration by Location, 2008



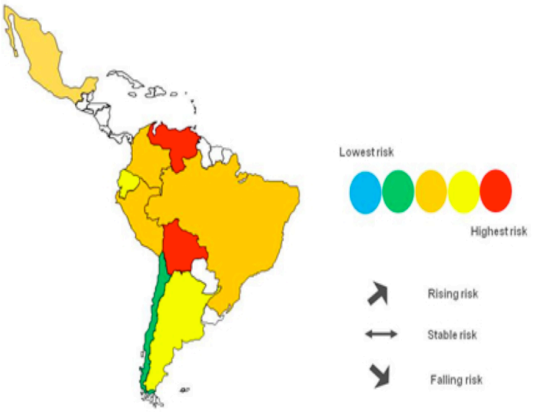
Source: Metal Economics Group 2008

Ventures in the region were facilitated by the mineral regulatory and fiscal systems reforms across Latin America in the late 80s. The constant failure of state mining enterprises and the attractiveness of foreign investment promoted changes in laws and other policies that enhanced the mine development climate in many countries that had been previously hostile to private ventures. Reduction of tax burdens and deregulation of land possession systems

have been important components for foreign miners attraction.

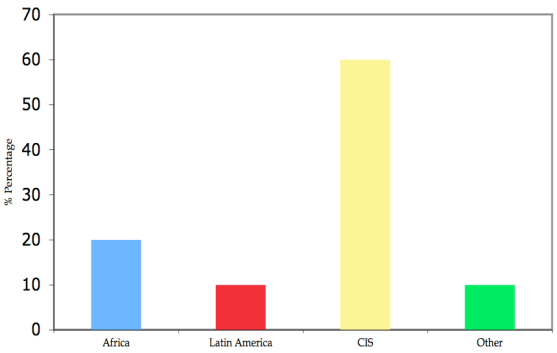
Political instability and legal uncertainty, especially regarding taxation remain inevitably as major challenges. Other obstacles include, handling local communities, energy, human resources, and infrastructure. However, it is important to notice that Latin America is heterogeneous, and the risks differ by country. Kroll, a risk consulting company, published a ranking classifying risk as very low in Chile; low in Peru, Brazil, Colombia; intermediate in Argentina and Ecuador; and high in Bolivia and Venezuela.

Figure 3.15 Latin American Mining Risk



Source: Kroll Risk Consulting Company

Figure 3.16 Risk Regions for Mining



Source: Author based on Deloitte

Many of the best geological yields are found increasingly in nations and geographies that are subject to considerable risk, which have in the past been avoided. And even if some Latin American countries are considered of high risk, the region as a whole is considered to pose less risk for mining companies compared to other unexploited and rich regions around the world.

Mining is in several countries a major economic activity with a significant contribution to exports. Some economies depends almost exclusively on mining. Latin America, with the Andes is a very important base for the world supply of metals and a substantial global mineral reserve. When it comes to the metals studied in this paper, according to the British Geological Survey (BGS), Latin America's production includes 18 per cent of all gold, 45 per cent of all silver, and 48 per cent of all copper. In 2007, Peru was by far the largest gold producer in Latin America accounting for 170 tons (41%), followed by Brazil (12%), Argentina (10%), Chile (10%), Mexico (9%) and Colombia (4%). Peru was also the leading producer of silver accounting for 3493 tons (36%), followed close by Mexico with 3135 tons (33%). Chile, Bolivia and Argentina follow with 21%, 6% and 3% respectively. In copper production Chile dominated by far accounting for 5 557 000 tons (74%). Peru (16%), Mexico (5%), Brazil (3%) and Argentina (2%) followed.

Planned investments in new mining projects will likely allow Latin America to improve its position as a metals producer. MEG expects that from 2003 to 2012 nearly 28% of global investments during this period will be spent on new mines and major expansions there, more than in any other region of the world.

Figure 3.17 Latin America's share in Gold, Silver and Copper World production

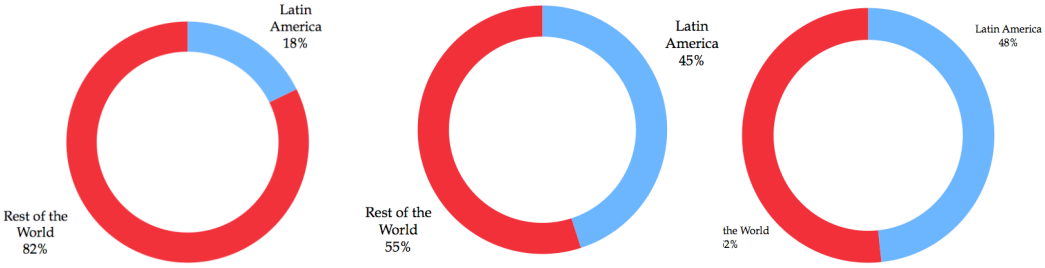
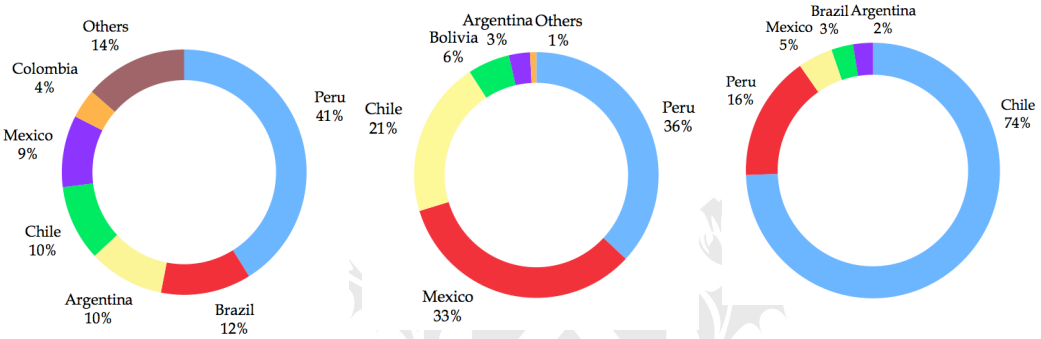


Figure 3.18 Countries share in Gold, Silver and Copper Latin American production



Source: Author based on BGS data.

4. Mining in Argentina

4.1 Resource Potential

The Andes

The Cordillera de los Andes is a result of a Paleozoic-Mesozoic (540-65 millions years) subduction of the South American plate over the Carribean, Nazca and Antartic plates. It extends west of South America approximately 8500km in a North to South orientation from Guajira Peninsula (Colombia) to Cape Horn (Argentina).

It is one of the richest orogenic belts in terms of metallic ores and several of the countries are among the top ten of the world, either in production or in geological reserves with over 300 world class copper porphyry deposits, and gold/silver epithermal veins. (Petersen 1977).

Four north-south belts compose the Andes: iron belt along the Pacific coast, copper belt, pollymetallic belt and tin belt (500 km east from the Pacific.
Source: USGS.

Figure 4.1 South America Geological Formations

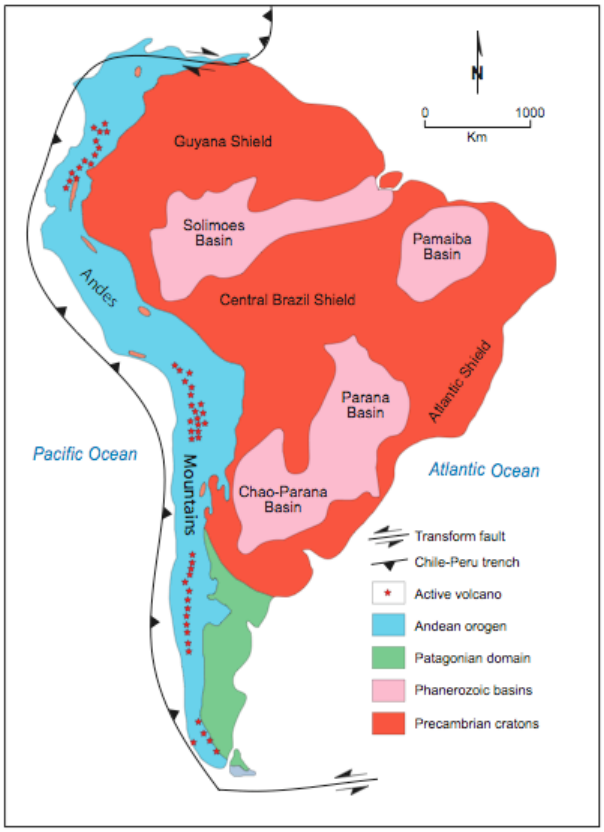
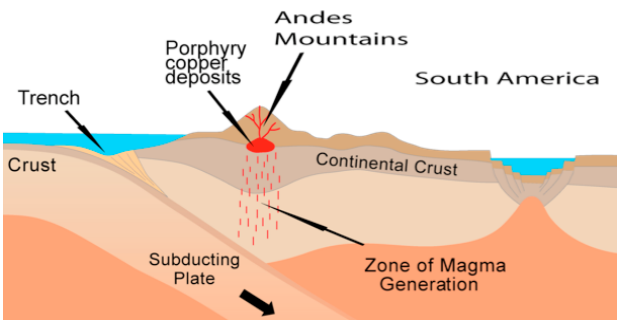


Figure 4.2 South American Subduction

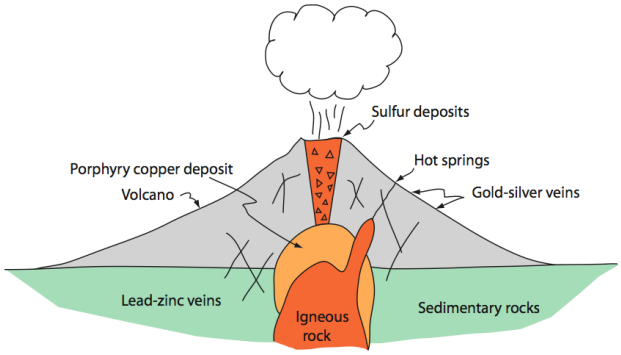


Copper porphyry deposits are usually present under strato-volcanoes in or close to large fault zones along the whole Andean belt where they are well reputed for the tonnage and high grade, accounting for over a third of world copper reserves. Epithermal veins carrying gold and silver are found at high altitudes however, washed minerals may be found in placer deposits in the plains away from the Cordillera, as seen in Patagonia.

Source: USGS.

According to *Quantitative Mineral Resource Assessment of Copper, Molybdenum, Gold, and Silver in Undiscovered Porphyry Copper Deposits in the Andes Mountains of South America* by USGS, there are 69 known copper deposits while 145 remain undiscovered. The associated potential minerals include an equivalent to 80% of world copper reserve base, 105% molybdenum (20,000,000 tones), 14% Gold (13 tones) and 44% Silver (250,000 tones).

Figure 4.3 Porphyry Copper Deposits

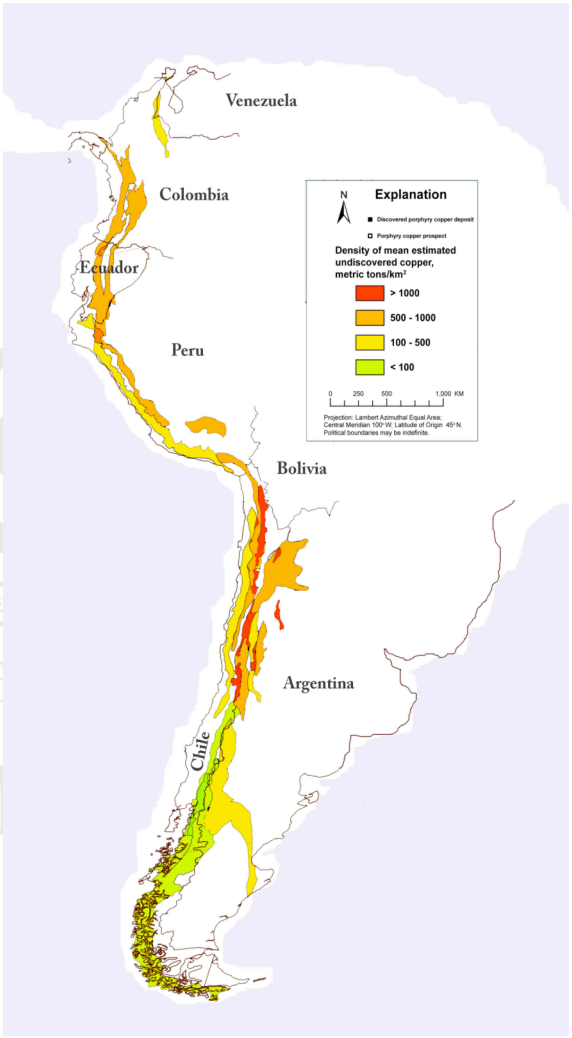


Source: USGS

High concentrations of both discovered and undiscovered (knowledge of) porphyry deposits are found in central to northern Chile, occasionally in the Argentine side and in northern Peru and Ecuador.

Scientist believe that twelve giant porphyry deposits in the Chilean region hold approximately 68% of the undiscovered minerals (400 million tons) while the remaining 32% (190 million tons) lay in standard size deposits along the Andes. The Chilean Chuquicamata, the largest open pit mine in the world, and El Teniente, the largest underground copper mine in the world, are examples of the two discovered giant copper deposits, both operated by the Chilean Codelco.

Figure 4.4 Andean Porphyry Cu Concentrations



Source: Author based on USGS, SEGEMAR

PORPHYRY DEPOSITS IN ARGENTINA

While the Andean belt of Chile contains porphyry copper deposits of considerable economic importance, only one major and several minor deposits of this type have been discovered in neighboring Argentina. There are no obvious geologic reasons for the country's apparent scarcity of important porphyry copper deposits. Instead, a lack of exploration because of poor accessibility and past inadequate mining legislation may partly account for this situation. Western Argentina has porphyry copper prospects ranging in age from late Paleozoic to Pliocene.

The recent study of undiscovered deposits Prepared by USGS with the assistance of SEGEMAR and other government institutions reveal some of the country's geological potential.There are 13 discovered deposits along the Argentine Cordillera while approximately 45 remain hidden. Assuming that this data is precise, it reveals that only a 22% of the porphyry deposits have been discovered.

Northwestern Argentina (SA13aPC) is know to hold high volumes of Copper, Molybdenum, Gold and Silver, however, it is surprising to find concentrations of mineral in unfamiliar regions such as the Patagonian plains (SA19PC) or in the highest Andes (SA13PC).

Figure 4.5 Regions of Assessment

. Source: USGS, SEGEMAR

Table 4.1 Argentine Porphyry Deposit Results

Argentina Porphyry Deposit Assesment						
Tract No.	Discovered deposits	Undiscovered deposit	Total deposits	Estimated Copper (Tons)	Estimated Gold (Tons)	Estimated Silver (Tons)
SA11PC	1	1.3	2.3	4,200,000	100	1,400
SA13aPC	1	11	12	38,000,000	910	13,000
SA13bPC	2	6.4	8.4	22,000,000	520	7,000
SA13cPC	0	2	2	7,700,00	190	2500
SA14aPC	2	6	8	21000000	480	6500
SA14cPC	3	5	8	17000000	390	5400
SA14dPC	1	4	5	12000000	290	4100
SA15PC	1	4.3	5.3	15,000,000	340	4,700
SA16a,bPC	2	3.5	5.5	12,000,000	280	3,800
SA19PC	0	1.6	1.6	5,900,000	140	2,100
Total	**13**	**44.9**	**57.9**	**147,100,000**	**3,640**	**50,500**

Source: Author based on USGS. Quantitative Mineral Resource Assessment of Copper, Molybdenum, Gold, and Silver in Undiscovered Porphyry Copper Deposits in the Andes Mountains of South America. Date: 2004.

4.2 Mining Operations

Argentina is a mining hotspot for the world today as it has large concentration of minerals, of high grade, with high value contents such as copper, silver and gold, and it is yet undeveloped in mining terms. Small explorers are attracted by opportunities of finding valuable deposits while large miners are drawn by the possibility of establishing considerable extraction operations of more than 20 years.

Mining in Argentina began with the Incas, followed by Spanish and British, until the industry became nationalized and run by inexpert governments to discontinue. It was in 1993 that national administration opened the doors for foreign investment in the sector. Today, companies from Australia, Canada, South Africa and Switzerland are running the major non-ferrous mining activity in Argentina.

The southeastern Andes have been kept unexplored during the last century, offering today, under the new scheme, an ideal playground for small exploration groups. Since 2003 mineral exploration has taken off, benefiting from the high metal prices, and capital availability, providing a new prospect of the country's available resources. Success in mineral findings has been bringing the attention of large miners. Argentina, the seventh in exploration budget, has over 90 gold projects (see Appendix). However, the late 2008 metal price drop sent many explorers back home showing the vulnerability of such activity.

La Alumbrera, the first major gold mine, has demonstrated the potential for mineral extraction in Argentina, with high concentrations of gold at low costs and a mine life of over 25 years. Some private companies such as SilverStandard have been reactivating old mines like Pirquitas (1930), while others started new mines like Barrick with Veladero, which was initiated in 1997 and started to produce in 2005.

Pioneer companies in the country are benefiting from the highest concentrations of gold, silver and copper and are securing extractions from 10 to 25 years investing from u$ 220,000 million (Pirquitas) to u$3,000 million (Agua Rica). Dozens of small exploration companies have been drilling mainly in Santa Cruz, San Juan, Catamarca and Jujuy to find *El Dorado* with the hope of selling the findings to the highest bidders. Some succeeded while other cashed out. Viceroy Exploration Co. is an example of a treasure finder who, by having discovered the Gualcamayo property, has been bought out by Yamana Gold.

Figure 4.6 San Jose Drill

Source: Xstrata

PRODUCING MINES[*]

Cerro Vanguardia: AngloGold Ashanti Ltd's 92.5%-owned Cerro Vanguardia mine in Santa Cruz province has been operating since 1998 and mines high-grade silver and gold from a number of separate open-pit cuts on narrow epithermal quartz veins. As the mine passes its tenth year, significant changes are ahead. End-2007 ore reserves were approximately 9Mt at a grade of 6.5g/t Au and 107g/t Ag. Future resources at Cerro Vanguardia are considerably lower grade. Provincial mining company Fomicruz SE has a 7.5% free carried interest, and Cerro Vanguardia pays a mine-mouth (after-cost) royalty to Santa Cruz province of 1% of the value of mine production.

Bajo de la Alumbrera: This is the last year of high-grade production from the Bajo de la Alumbrera open pit in Catamarca province. The mine has been producing about 190,000t/y of copper and over 500,000oz/y gold. From 2010 onwards, Alumbrera is projected to produce 145,000t/y copper and 370,000oz/y gold for at least another five years. Xstrata manages and has a 50% controlling interest in Minera Alumbrera, while Goldcorp Inc and Yamana Gold Inc own the remaining 37.5% and 12.5%, respectively. Minera Alumbrera has the right to mine under a joint venture with government corporation Yacimientos Mineros de Aguas de Dionisio (YMAD), which holds the title to the deposit and receives 20% of Minera Alumbrera's net proceeds. The mine also pays a 3% mine-mouth (after-cost) royalty due the province under federal guidelines.

Veladero: Barrick's US$540 million open-pit Veladero gold mine in San Juan Province began commercial production in October 2005 and is producing in excess of 550,000oz/year. Veladero's proven and probable reserves at the end of 2007 were 338Mt at a grade of 1.03g/t Au and 16g/t Ag. Mining rights to the Veladero deposit are owned by the San Juan provincial mining company Instituto Provincial de Exploración y Explotación Minero (IPEEM), which receives a royalty equivalent to 0.75% net sales revenue in addition to the 3% mine-mouth (after-cost) royalty due the province under federal guidelines.

Gualcamayo: Yamana Gold began construction of its US$150 million Gualcamayo project in San Juan province in March 2008, and has already started producing gold. Measured resources are 23.2Mt at 1.7g/t Au. Gualcamayo is targeted to produce over 240,000oz/y and has plans to incorporate underground mining in the future. The mine will pay a 3% mine-mouth (after-cost) royalty to San Juan province and an additional 1% mine mouth royalty for infrastructure and sustainable development projects in the region, which will increase to 1.5% in the third year.

San José - Huevos Verdes: The US$61.2 million San José project in Santa Cruz province, a joint venture between Hochschild Mining plc (51%) and Minera Andes Inc (49%), was commissioned during the third quarter of 2007, and is now producing 3.1Moz/y of silver and 61,000oz/y of gold. Resources are approximately 2.4Mt, grading 7g/t Au and 430g/t Ag. The joint venture plans on drilling 20,000m to explore other epithermal quartz vein systems. The San José mine pays a mine-mouth (after-cost) royalty to Santa Cruz province of 1% of the value of mine production.

[*] Based on Mining Journal data.

Martha Mine: In March, Coeur d'Alene Mines Corp inaugurated a US$15 million processing mill at Mina Martha in Santa Cruz province. End-2007 proven reserves were 140,000t at 1,851g/t Ag and 2.4g/t Au. Coeur has budgeted US$6.8 million for exploring Santa Cruz province this year. Mina Martha's mine-mouth royalty payable to the province dropped from 3% to 1% when the plant began operation.

Manantial Espejo: Pan American Silver Corp's US$196 million Manantial Espejo combined open pit and underground silver gold vein project in Santa Cruz province has finally started production. Proven probable reserves are 7.19Mt at a grade of 166g/t Ag and 2.3g/t Au. Manantial Espejo is expected to produce 4.1Moz/y of silver and 60,000oz/y gold over eight years from epithermal silver-gold quartz veins. The project will owe a mine-mouth royalty to Santa Cruz Province of 1% of the value of mine production.

Farrallón Negro: YMAD's small, state-owned Farallón Negro mine in Catamarca province has been producing gold-silver from low sulphidation epithermal veins since 1978, mostly at a loss, and no ore reserves or production figures are made public.

Mina Aguilar: Mina Aguilar, Argentina's oldest continuously-working mine, is located in the Altiplano of Jujuy, and is owned by Glencore International AG. Ore reserves are approximately 6Mt grading 3.4% Pb, 70g/t Ag and 6.8% Zn plus the adjacent Esperanza orebody with about 1Mt of reserves grading 2.8% Pb, 50g/t Ag and 7.8% Zn. Increased exploration in recent years has maintained reserves of about ten years and Glencore hopes to double this to 20 years. Jujuy province supports this process by allowing an exploration expense deduction of up to 1% of the 3% mine-mouth royalty.

Pirquitas: Silver Standard Resources Inc has began operations of its US$266 million Pirquitas open-pit silver-tin mine in Jujuy province early this 2009. Current reserves are 10.7Mt at 194g/t Ag and 0.7% Zn, plus 19.3Mt at 201g/t Ag and 0.9% Zn, and 45.2Mt at 152g/t Ag, 0.17% Sn and 0.78% Zn. Production is subject to the 3% mine-mouth royalty due to Jujuy province.

DEVELOPING MINES[*]

Pascua Lama: Barrick Gold's giant Pascua-Lama project in San Juan province (adjacent to the Veladero mine and straddling the Chile-Argentina border) has been delayed another year. Cross-border regulatory and fiscal tax and royalty issues have not been resolved between the governments. Barrick had already spent US$609 million in capitalised mine-development costs and mineral property acquisition as of the end of fiscal 2008. The estimated capital cost for the Pascua-Lama project was given as US$2.4 billion last year but is now projected to be 15% higher. Ore reserves have increased to 18Moz of gold, 689Moz of silver and 565Mlb of copper. At end-2007 Pascua-Lama had proven plus probable reserves of 444.6Mt at grades of 1.37g/t Au, 58g/t Ag and 0.07% Cu.

Navidad: Aquiline Resources Inc's Navidad silver project in Chubut province has a measured resource of 15.6Mt grading 152g/t Ag, an indicated resource of 106.2Mt

[*] Based on Mining Journal data

grading 109g/t Ag. The provincial government requested Aquiline to provide a preliminary economic analysis for the starter pit and plant, now estimated to cost US$272 million, and Aquiline announced a slowdown of Navidad's development. The provincial government has given clear signals that it wants Navidad to become a mine, but legislation to reverse the current open-pit mining ban has not yet been proposed.

San Jorge: The only mining project advancing in Mendoza province is Coro Mining Corp's San Jorge copper-gold project optioned from Global Copper Corp. In order to comply with Mendoza's law prohibiting the use of certain chemical substances, Coro Mining is now focused on developing new chemical procedures that will not require the use of contaminants. Mineral resources stand at 151Mt at 0.48% Cu and 0.2g/t Au.

León: Alexander Mining plc has completely stopped development of its León project in the Juramento district near Metán in Salta province, citing the new federal government's export tax and the provincial government's lack of progress in issuing permits after spending over US$19 million since 2005 on a processing plant. Léon has resources of 6.43Mt at a grade of 0.64% Cu and 17.86g/t Ag.

Agua Rica: Yamana Gold Inc is holding off on making a decision about whether to exploit the resource at its 100%- owned Agua Rica deposit, located 34km east of Bajo de la Alumbrera in Catamarca province, and which is now projected to cost US$3 billion. Yamana submitted its environmental and social impact assessment to provincial authorities in July 2007, and the provincial Direction of Mines is soliciting community input. Discussions with Minera Alumbrera about project integration are ongoing and undoubtedly will become more focused as Alumbrera's ore grades and production declines. Ore reserves are 731Mt at 0.5% Cu, 0.033% Mo and 0.21g/t Au.

El Pachón: Xstrata has delayed the decision to proceed with development of its US$1.8 billion El Pachón porphyry copper project in San Juan province. The property is immediately adjacent to the Los Pelambres mine across the border in Chile.

Cerro Casposo: Intrepid Mines Ltd announced its decision to postpone development of the US$70 million combined open pit and underground Cerro Casposo gold-silver project in the Precordillera of San Juan province. Casposo has a global indicated resource of 2.2Mt at 4.4g/t Au and 116g/t Ag.

EXPLORATION[*]

Minera Andes Inc has consolidated its **Los Azules** property in the high cordillera of San Juan province. Los Azules is one of Argentina's most promising deposits with of 922Mt grading 0.55% Cu. TNR Gold Corp is the underlying claim owner of the Xstrata portion of Los Azules and has initiated legal proceedings against Xstrata claiming breach of the original exploration and option agreement.

Suramina Resources Inc's **Vicuña** project encompasses a cluster of 12 porphyry copper-gold targets in the high cordillera of San Juan province straddling the Chilean border

[*] Based on Mining Journal data.

including the Josemaria and Filo Del Sol prospects, and the new Los Helados area where recent drilling has returned broad intercepts of gold-copper mineralisation. Suramina has entered into a definitive joint exploration agreement with Japan Oil, Gas and Metals National Corp (JOGMEC) to form a 60:40 Suramina-JOGMEC joint venture. Resources on the Josemaria deposit are of 460Mt at 0.39% Cu and 0.30g/t Au.

Austral Gold Ltd acquired Guanaco Capital Holding Argentina, and with it a 50% earn-in agreement with Argentina Minera SA on four properties in San Juan province including IPEEM reserve areas **Calderón-Calderoncito** and **Rincones de Araya**. Guanaco has also staked a large land position in Santa Cruz province.

Antares Minerals Inc recently completed the required expenditures and payments to acquire its 50% interest in the **Río Grande** copper gold project in the Puna region of Salta province from Mansfield Minerals Inc. Mansfield will keep its 100% owned **Lindero** project where a resource estimate is of 70.3Mt at a grade of 0.72g/t Au.

Soltera Mining Corp is exploring the **El Torno** gold vein in Jujuy province, initially drilled by Puma Minerals Corp and Industrias Peñoles in the 1990s, and the **Eureka** copper-gold property nearby.

TNR Gold Corp reports encouraging results from drilling at its **El Tapau** gold property in San Juan.

Castillian Resources Corp flew a 3,500 line-kilometre airborne geophysical survey and drilled the **Las Aguilas** copper-nickel-platinum properties in San Luis province under option from Marifil Mines Ltd, but has suspended all work following passage of a provincial anti mining law in September.

Latin American Minerals has earned-in to the **La Carolina** gold prospect in San Luis province but has also stopped working there.

Andean Resources Ltd has just completed a feasibility study at its **Cerro Negro** high-grade silver-gold vein project in Santa Cruz province.

Exeter announced a strategic letter of intent agreement with the Santa Cruz provincial government company Fomicruz SE for a 5% partnership in the future development of Cerro Moro and access to adjacent Fomicruz exploration properties.

Patagonia Gold has also entered into a strategic partnership with Fomicruz whereby the latter will contribute properties adjacent to Patagonia Gold's main gold-silver projects in return for work commitments and a 10% interest in the new joint venture company. A resource calculation is under way at the **Cap Oeste** property and a scoping study is being done on the **Lomada de Leiva** property.

Golden Peaks Resources Ltd has initiated a resource calculation based on 244 holes drilled since 2004 at its **Fortuna** property in Chubut province where significant areas of low-grade, disseminated gold mineralisation have been discovered.

Mirasol Resources Ltd continues to be successful at grass roots exploration for epithermal precious metal bearing quartz veins in Santa Cruz province. Hochschild Mining Ltd is in the second round of drilling on Mirasol Resources Ltd's **Claudia property** and Coeur d'Alene Mines Inc is drilling on **Mirasol's Joaquin** property.

Mariana Resources Ltd is exploring the **Sierra Blanca** and **Cañadon Largo** prospects optioned from Iamgold Corp in Santa Cruz province. HuntMountain Resources Ltd is drilling the **La Josefina** property owned by Fomicruz.

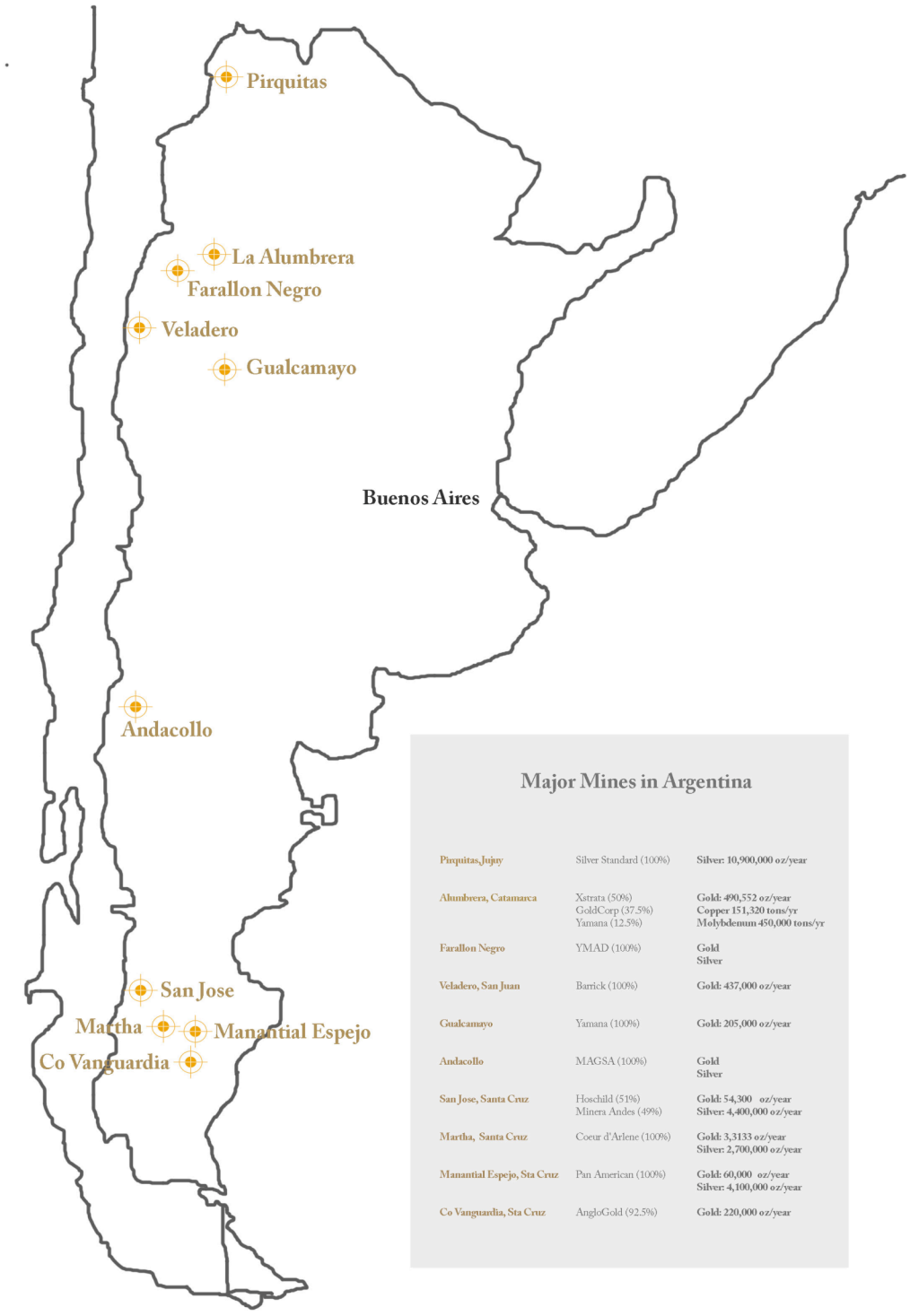
Argentex Mining Corp drilled over 20,000m on its **Pinguino** gold, silver and base metal property in Santa Cruz province. Mineralisation in vein and breccia structures is polymetallic in nature and consists of zinc, lead, copper and indium, in addition to epithermal silver and gold veins.

Hidefield Gold plc has found encouraging gold-silver values in drilling on **Don Nicolas (La Paloma)**, **Martinetas (Coyote)** and **Microondas** prospects in Santa Cruz province.

Marifil Mines Ltd carried out surface exploration during 2008 on silver-rich polymetallic base metal targets on the **Toruel** and **San Roque** properties in the Los Menucos district in Río Negro.

Jackson Global Ltd is exploring a belt of uranium mineralisation with associated silver-copper in Catamarca and La Rioja provinces.

Figure 4.7 Major Operating Mines in Argentina



Major Mines in Argentina

Pirquitas, Jujuy	Silver Standard (100%)	Silver: 10,900,000 oz/year
Alumbrera, Catamarca	Xstrata (50%) GoldCorp (37.5%) Yamana (12.5%)	Gold: 490,552 oz/year Copper 151,320 tons/yr Molybdenum 450,000 tons/yr
Farallon Negro	YMAD (100%)	Gold Silver
Veladero, San Juan	Barrick (100%)	Gold: 437,000 oz/year
Gualcamayo	Yamana (100%)	Gold: 205,000 oz/year
Andacollo	MAGSA (100%)	Gold Silver
San Jose, Santa Cruz	Hoschild (51%) Minera Andes (49%)	Gold: 54,300 oz/year Silver: 4,400,000 oz/year
Martha, Santa Cruz	Coeur d'Arlene (100%)	Gold: 3,3133 oz/year Silver: 2,700,000 oz/year
Manantial Espejo, Sta Cruz	Pan American (100%)	Gold: 60,000 oz/year Silver: 4,100,000 oz/year
Co Vanguardia, Sta Cruz	AngloGold (92.5%)	Gold: 220,000 oz/year

Source: Author based on private companies annual reports and press releases

Table 4.2 Major Mining Companies in Argentina

Major Mines in Argentina											
Mine	Location	Company	Origin	Estimated Production/Yr				Mine	Production	Initial	Start Date
				Au (Oz)	Ag (Oz)	Cu (Tons)	Mb (Tons)	Life	Cost (Au)	Invstmt (mn u$)	
In Operation											
Cerro Vanguardia	Santa Cru	AngloGold (92.5%	South Afric	220,000	420,000			15 years	329$/oz	$250	2005
La Alumbrera	Catamarca	Xstrata (50%)	Switzerland	490,552		151,320	450,000	20 years	449 $/oz	$1,200	1998
		GoldCorp (37.5%)	Canada								
		Yamana (12.5%)	Canada								
Veladero	San Juan	Barrick	Canada	536,000				16 years	496 $/oz	$540	2005
San Jose	Santa Cru	Hoschild (51%)	Peru	54,300	4,400,000			5 years	235$/oz	$61	2007
		Minera Andes (49%	Canada								
Gualcamayo	San Juan	Yamana	Canada	202,500				10 years	-	$56	2008
Pirquitas	Jujuy	Silver Standard	Canada		10,900,000			15 years	-	$225	2008
Martha	Santa Cru	Coeur d'Arlene	USA	3,313	2,700,000			-	550$/oz	$2.5 *	2002
Manantial Espejo	Santa Cru	Pan American	Canada	60,000	4,100,000			10 years		$224	2008
Farallon Negro	Catamarca	YMAD	Argentina	-	-	-	-	-	-	-	-
Andacollo	Neuquen	MAGSA	Chile	-	-	-	-	-	-	-	-
In Construction											
Pascua Lama	San Juan	Barrick	Canada	800,000	35,000,000			25years	225$/oz	$2,900	2013
Diablillos	Salta	Silver Standard	Canada	70,000	7,000,000						
El Pachon	San Juan	Xstrata	Switzerland			200,000		20years			2012
Agua Rica	Catamarca	Yamana	Canada	135,000		165,000	6,804	23 years			
Casposo	San Juan	Troy Resources	Australia					6years			

*Purchased from Yamana for u$2.5 million plus u$6 million in royaltion between 2006 and 2008

Source: Author based on private companies annual reports and press releases.

4.3 INDUSTRY EVOLUTION

ECONOMIC AND POLITICAL BACKGROUND

Drastic economic changes have been occurring in Argentina since the mid 20th century. Argentines have lived through all sorts of environments, enduring depressions and benefiting from the booms, developing an ability to adapt to whatever fate brings before them.

"In 1998, after years of fiscal profligacy, Argentina's economy slid into a deep recession, which led in 2001 to the largest sovereign debt default in history and the devaluation of the peso. But since mid- 2002, when Argentina began its recovery, it has seemed to defy economic gravity. The country's left- wing government has violated many standard economic prescriptions: it has shunned the IMF and shafted private bondholders; kicked out foreign companies and set up new state-owned ones; imposed price controls; and even doctored the inflation figure. Yet over the past six years, Argentina's economy has grown at a faster rate than any other big economy except China.

At last a turning point seems to have been reached. A slowdown, long predicted by the government's opponents, is at hand. Argentina has got away with sacrificing price stability in favour of growth. But eventually the amount and productivity of its investment will determine economic performance. And with inflation rising ever higher, that investment will prove hard to come by."

Argentina's economy, The Economist Backgrounders, 2009.

During 1990's, in Menem's liberal administration, the economy grew rapidly with changes such as the privatization of most public institutions and the opening of industries as mining. Failing to complete a structural reform in his second term, Menem left the country vulnerable to external factors, resulting in a serious collapse in the hands of the next president in row Fernando de la Rua in late 2001. A year of violent economic and political chaos faded into the administration of Nestor Kirchner, who passed on the presidency to his wife Cristina Fernandez de Kirchner, who rules today. The Kirchners are likely to lose power in the elections of late 2009, due to a combination of issues including conflicts raised with farmers and the economic downturn, and the Kirchner administration will possibly end by 2011, in the next presidential election.

Argentina's rapid growth is coming to an abrupt end, with falling commodity prices and global recession. Real GDP will shrink in 2009 and slowly recover in late 2010, together with the world economy. With the pension funds under national control, risk of a new debt default is minimized in the short term. Nevertheless, financial structural problems will remain pending. Pressure on currency will complicate exchange rate management and retouching numbers will not be able to distort depreciation any longer. Tax systems flaws will leave the financial system exposed to the discrepancy of commodity prices.

Table 4.3 Argentina Economic Indicators

Economic Indicators	2008	2009	2010	2011	2012	2013
Real GDP growth (%)	7	-2.8	1.5	3.7	4	4
Consumer Price Inflation (av,%)	8.6	6.4	7.1	6.6	6.3	6
Budget Balance (% of GDP)	1.5	-0.8	-1.2	-0.7	-0.1	0.4
Lending Rate (av, %)	19.4	18	14	12.5	10	10
Exchange Rate Ps: u$ (av)	3.1	3.8	4.3	4.6	4.8	4.9

Source: Author based on EIU

1990 Turning Point

The 1990's signaled a turning point in the history of mining in Argentina. Prior to 1993, the production value of the mining sector was around u$150 million mainly from the exploitation of industrial minerals and ornamental rocks with less than 20% coming from metals. In 1994 mining of metallic and industrial minerals in Argentina accounted for less than 0.1% of GDP and exports. Including construction materials total mining production value reached u$480 million. The country had little exploration and the environmental legislation was virtually non-existent by global standards.

Table 4.4: Mineral production of selected Latin American countries, 1994 (U$ million)

Country Comparison	Argentina	Brazil	Chile	Peru	Mexico
Value of Mineral Production 1994 (U$ million)	150	6000	5600	2120	2800
Share of Mining in the 1994 GDP (%)	< 1	1-5	10-25	5-10	< 1
Share of Mining in 1994 Exports (%)	< 1	5-10	25-50	25-50	1-5

Source: Mining Annual Review and World Bank Estimates

Significant amendments to the economic framework and mining policy during the mid-to-late 1990s changed the face of mining investment in Argentina, providing foreign companies with improved legal security, fiscal stability, modern environmental regulations, and mineral concession access. If Argentina was to prosper, welcoming foreign investment was the solution, and providing its mineral wealth mining would be an ideal vehicle for progress.

The basic statute that governs mining in Argentina is the *Mining Code*, which was enacted in 1886. The core pieces of the renewed framework are the *Mining Investment Law* (1993), which establish a mining incentive scheme and tax benefits, and the *Federal Mining Covenant* (1993), which defines uniform policies between federal and provincial authorities. The amendments guaranteed equal rules for foreign parties and opened up more areas for mining.

The need to set out rules for environmental protection has been a second driver of law and policy reform in the sector. The *Law of Environmental Protection* (1995), incorporated in

the Mining Code, defines the minimum environmental standards applicable nationwide, however, provinces have retain the power to regulate general environmental matters within their own jurisdictions.

In addition, with most mineral deposits located along the Andes mountains range, Argentina signed in 1999 a *Mining Integration Treaty* with neighbouring Chile, for the purpose of promoting mining integration and investments between both countries. This treaty is the first of this kind in the world and is hoping to simplify tax, customs, social security, labour, and environmental procedures.

Argentina has entered into *Bilateral Treaties* with 59 countries in order to protect foreign investments and avoid double taxation, and has also adhered to the *Multilateral Investment Guarantee Agency* (World Bank group), by which investments in Argentina have become eligible for insurance against political risks.

Increased competition among countries for mining investment has led to the reduction of taxes and the increase of incentives in the mineral sector. Under the current legislation, some of the main incentives the argentine law provides are:

i) a 30-year tax stability with regard to taxes in force at the time the feasibility report is submitted;

ii) the possibility to deduct from the income tax statement 100% of the amounts invested in prospecting, exploration and any other expenses necessary for determining the feasibility of the project;

iii) the possibility to depreciate over 3 years investments made in respect of housing, transportation, construction of plant, acquisition of machinery, vehicles and equipment necessary for the mining activity;

iv) income derived from the mines and mining rights, which are used as payment for the subscription of shares of registered beneficiary companies is exempt from income tax;

v) all import duties and other charges in relation to the import of capital goods for mining are exempt and companies that render certain services to the mining industry are also exempt;

vi) some provinces have eliminated the stamp tax on agreements concerning the following stages of a mining project: prospecting, exploration and development; and

vii) a federal law establishes a cap of 3% of the value of the extracted mineral, for provincial royalty fees.

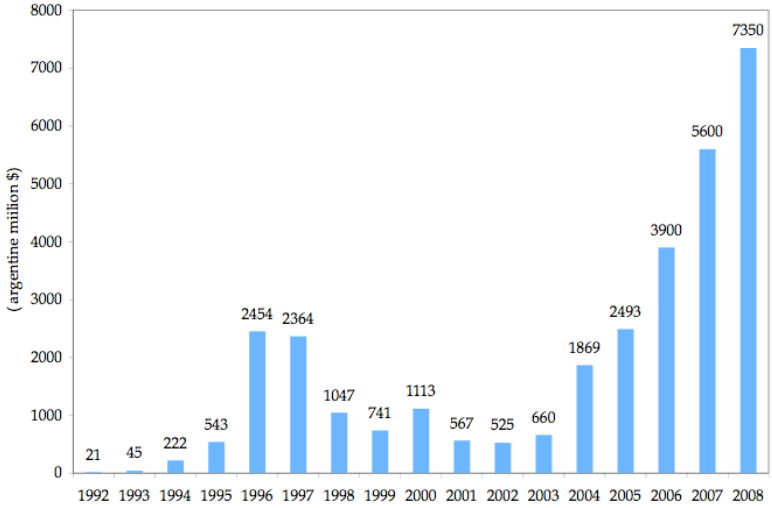
1990-2000 FIRST MINING IMPULSE

Since the implementation of the new set of regulations and incentives, Argentina, a traditionally non-mining country, started experiencing tremendous expansions in exploration and mining, fuelling the industry's growth.

Mining exploration and production investments rocketed from $21 million in 1992 to $2454 million in 1996, related to La Alumbrera's start-up. Since 1997 the country's production increased progressively.

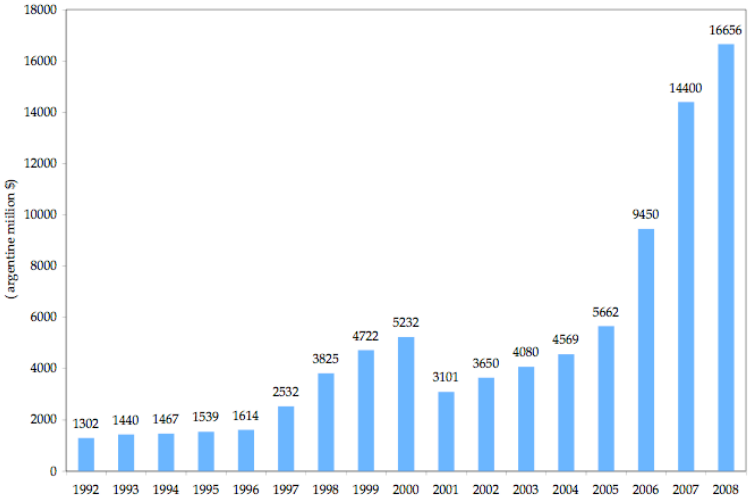
Changes in the industry were becoming evident, as the value of mining production grew from $1467 million in 1994 to $5232 million in 2000, with metals representing more than 57% of total mineral production.

Figure 4.8 Mining investments 1992 -2008



Source: Secretaria de Mineria

Figure 4.9 Mining production value 1990-2008



Source: Author based on Secretaria de Mineria data.

2000-2002 Crisis

Between 2000 and 2002, mining activities slowed down coinciding with the world metal market instability, the devaluation of the argentine currency and the economic crisis in 2001.

Furthermore, the *Emergency Law No. 25561* enacted in January 2002, established that all mining projects approved after this law were subject to 5% export taxes and exchange control regulations. Exporters had to bring into Argentina the proceeds of their exports, net of financing made abroad, and sell the currency (usually US dollars) in the Sole Free Exchange Market through the Argentine banks or authorized exchange. Projects approved before the enactment of the *Emergency Law* and who had been granted tax stability were exempt of export taxes and exchange controls. However, in June 2004, this exemption was extended to all projects that obtained the tax stability before then (per Executive Order 753/2004).

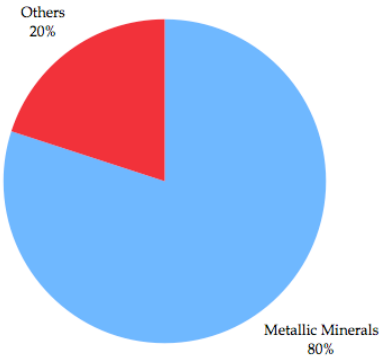
Even though the original mining law remained untouched, the introduction and maneuvering of bylaws increased the level of uncertainty, opposite to mining policies for stability, putting the mining investments at risk.

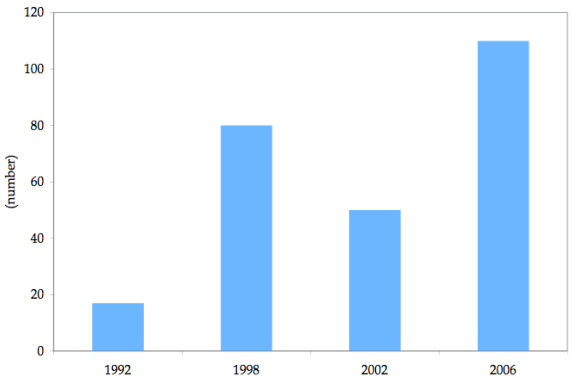
2003-2007 Second Mining Impulse

Since 2003, Argentina has undergone an outstanding surge in mining activity, helped by a strong increase in investments pushed by the huge rise in international prices for metals originated in 2002. Coincidentally, the devaluated peso made Argentina an attractive low cost destination (energy, labour, services in general) resulting very competitive compared to other Latin American mining countries.

Global players mostly Australian, Brazilian, Canadian, Swiss, South African, Peruvian, Chinese and from the United States, made large investments in the mining industry, with the great majority being carried out within the metallic minerals segment. The number of foreign mining companies jumped from 17 in 1992, to 50 in 2004 and 110 in 2006.

Figure 4.10 Metallic Mineral Production ($) 2006 **Figure 4.11 Number of foreign mining companies 1992-2006**





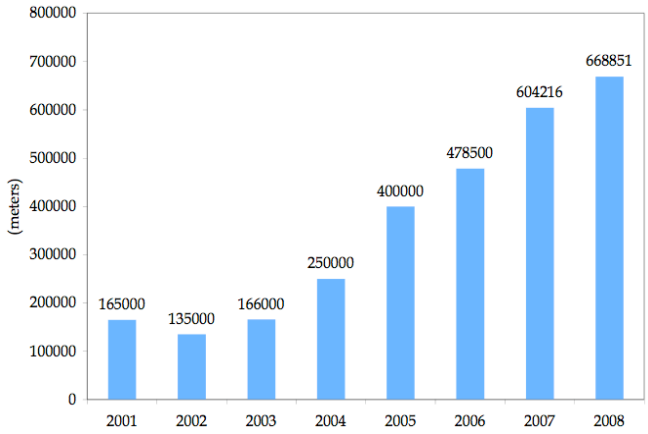
Source: Author based on Secretaria de Mineria

Mining investments showed an average 79% yearly cumulative growth, from 2003 with investment of $660 million to 2007 with investment of $5600 million. Major mines were

constructed including Veladero (u$ 540 million), San Jose (u$ 61 million), Martha mine (15 million), Manantial Espejo (u$ 196 million), and Gualcamayo (u$150 million). Mining production value experienced an average 39% yearly cumulative growth, from $4080 million in 2003 to $14400 million in 2007. And exports showed and average 38% yearly cumulative growth, from a low of $3300 million in 2003 to $12375 million in 2007, associated with large projects that started operations and that are export oriented.

Sustained growth of exploration activities enabled to significantly increase the volume of mineral reserves and add new assets in the whole country. Exploration drillings incremented from 166000 meters in 2003 to 604216 meters in 2007, showing an average 39% yearly cumulative growth between 2003 and 2007.

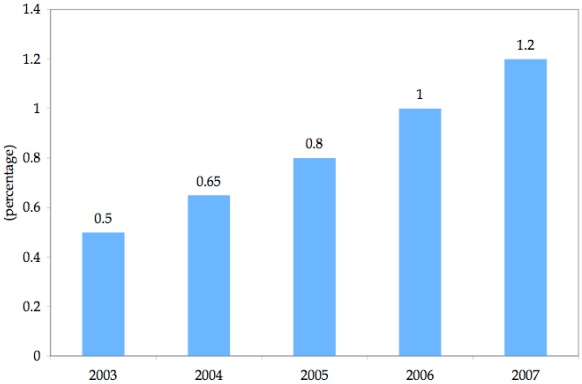
Figure 4.12 Exploration drillings 2001-2008



Source: Author based on Secretaria de Mineria

Growth was also expressed through a rise in the mining sector percent of GNP, climbing from 0.5% in 2003 to 1.2% in 2007.

Figure 4.13 Mining Sector Percent of GNP 2003-2007



Source: Author based on Secretaria de Mineria

By the end of 2007, principal metal production by volume was composed 43% by silver, 31% by copper, 10% by iron, 7% by gold, 5% by zinc, 3% by lead and 1% by lithium. The provinces that accounted for most production were Catamarca with 64%, San Juan with 20%, Santa Cruz with 12%, Jujuy with 3%, and Neuquen, Rio Negro and La Rioja all together with 1% of total production.

Figure 4.14 Metal production 2007

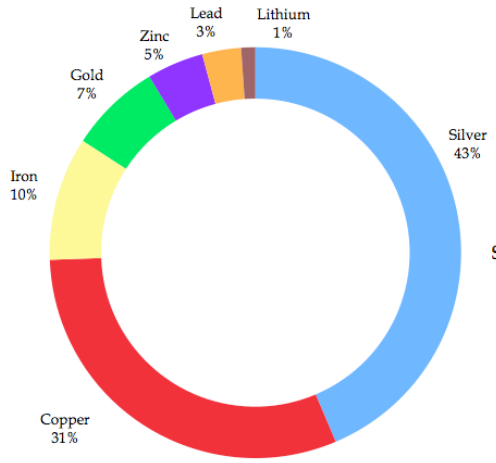
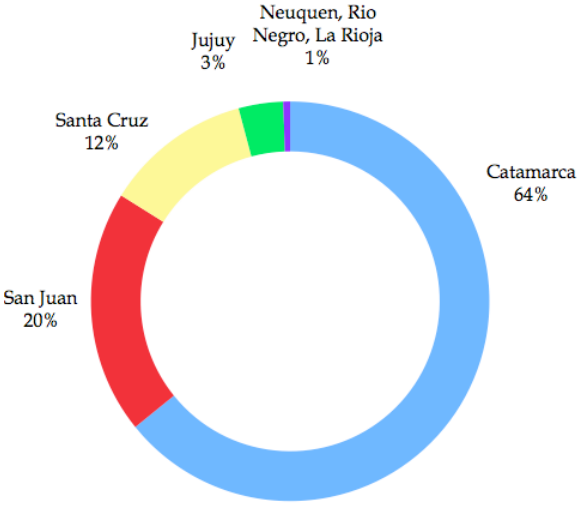


Figure 4.15 Metal production by Province 2007



Source: Secretaria de Mineria

2007 – 2008 CHANGING RULES

Argentina's mining industry was dormant during most of the 20th century, partly because provinces were able to arbitrarily increase taxes on mines until 1989, when central government limited provinces to a 3% royalty top and established a 30-year tax stability for mining projects.

With high commodity prices and a boom in mining investments, President Nestor Kirchner benefited from the mining boom and handed the government to his wife Senator Cristina Fernandez who won an easy victory in the late October 2007 presidential election. Mining was contributing significantly to the GDP and with the high metal prices the government did not hesitate to implement additional exports taxes, as did for the rest of the country's exports.

Since 2002 new mines had been paying an *Emergency Law* 5% export tax, which in late 2007 jumped to 10%. The problem this time was that the announcement affected mines that had been granted 30 years of tax stability, by which the industry had began to flourish. This measure, definitely contributed to further erode the country's competitive position.

While federal government raised export taxes, provinces, which had been limited to 3% royalties, came up with new environmental fees. Added to this, several provinces adopted anti mining laws to prohibit open pit mining and the use of cyanide, starting with Chubut followed by Rio Negro, Tucuman, La Rioja, Mendoza and La Pampa. However, pro-mining provinces such as San Juan, Catamarca, Santa Cruz, Salta and Jujuy, seem unlikely to make drastic changes.

As a consequence, mining is being confronted on environmental, fiscal and social grounds. An anti mining sentiment is being spread all over the country and mining permitted areas are diminishing. Even though the provinces have gathered up to sign the *Federal Mining Agreement*, with the purpose of unifying policies, it is showing its flaws on environmental policies.

With the mining code prohibiting direct state participation in mining activities, a series of companies have been emerging, largely owned by provincial governments, which hold most rights of land. Some lease them out while others participate in mine operations. In a way, IPEEM (San Juan), FORMICRUZ (Santa Cruz), HIPARSA (Rio Negro), YAMIRI (La Rioja), YMAD (Catamarca), and CORMINE (Neuquen) act as controllers of their regions with preferential status to minerals. The unavoidable relation between the private companies and the satellite state companies raises a series of questions.

The disagreement with Chile over taxes on the Pascua Lama project is also adding to the overall uncertainty. Even though the protocol addressing Barrick's Pascua Lama project was signed in 2004, it is still waiting for approval, delayed by more than 5 years. The final results, of Pascua Lama project, will provide a case study for future mining projects across the borders. And delays in its resolution will represent the postponement of other considerable cross-border projects waiting in the line, such as Vicuna (Rio Tinto), Amos-Andres (Rio Tinto), Las Flechas (Suramina), El Pachon (Xstrata), which represent an investment of over u$ 10 000 million.

2009-TODAY

The global economic downturn and the lack of financing are affecting the country's exploration sector. Argentina's projected mining growth rate has been slowing concurring with the country's uncertain tax regime, permit delays, and provincial laws that ban open-pit mining or limit the use of certain chemicals for mineral processing.

The increase in export taxes and violation of the tax stability law has alerted investors. Added to this, the unpredictable government actions, such as the nationalization of the pension funds, reveal the magnitude of political risk.

4.4 MINING SURVEYS

POLICY CLIMATE ASSESSMENT – FRASER INSTITUTE

The *Policy Potential index* of the *Fraser Institute Annual Survey of Mining Companies 2008-2009*, serves as a report card on how attractive government policies are from the point of view of a mining manager. The policy potential index measures the effects of government policies including uncertainty concerning existing regulations; environmental regulations; regulatory duplication and inconsistencies; taxation; uncertainty concerning native land and protected areas; infrastructure; socioeconomic agreements; political stability; labour issues; geological database; and security. The top ten scorers were Quebec (score 96.6), Wyoming, Nevada, Alberta, Newfoundland & Labrador, New Brunswick, Manitoba, Chile, Saskatchewan, and Ontario. Argentina's ranked 56 out of 71 jurisdictions. Unfortunately, the worst performers follow close to Argentina: New Mexico, Philippines, Wisconsin, Papua New Guinea, Indonesia, Democratic Republic of the Congo, Zimbabwe, Kyrgyzstan, Bolivia, India, Honduras, Guatemala, Ecuador and last Venezuela.

Other revealing category of this survey is Argentina's 16/71 rank in *Room to Improve,* which measures the amount of respondents who changed their view of Argentina mineral potential from favourable to negative under current regulatory environment. Added to this, the country ranks among the bottom twenty in: *Mineral Potential (assuming current regulations), Uncertainty concerning existing regulations, Environmental Regulations, Tax Regime, Uncertainty over areas to be converted as parks, Socioeconomic Agreements and Community conditions, Political Stability, Quality of Geological Database, Availability of Labour and Skills and Labour Regulations.*These 2008 results are upsetting given the good results Argentina had obtained in several categories in the 2005 survey when mining growth rates in the country was dazzling.

Table 4.5 Fraser Institute Annual Survey of Mining Companies 2008-2009 Categories

ARGENTINA 2008/09	1	2	3	4	5	2008	2005
POLICY POTENTIAL INDEX						56/71	24/64
Room to improve						16/71	36/64
Mineral potential, assuming current regulation/land use restrictions	28%	30%	21%	18%	3%	52/71	16/64
Policy/mineral potential, assuming no land use restrictions in place & assuming industry best practices	56%	37%	6%	2%	0%	27/71	27/64
Uncertainty concerning administration, interpretation and enforcement of existing regulations	10%	27%	33%	20%	10%	51/71	14/64
Environmental regulations	8%	27%	32%	24%	9%	62/71	18/64
Regulatory duplication and inconsistencies (federal/provincial/municipal overlap)	8%	19%	25%	33%	15%	58/71	27/64
Tax regime (includes personal, corporate, capital and other taxes, and complexity of tax compliance)	7%	22%	30%	25%	16%	62/71	16/64
Uncertainty concerning native/aboriginal land claims	12%	52%	21%	10%	5%	33/71	22/64
Uncertainty over which areas will be protected as wilderness or parks	3%	37%	34%	24%	2%	56/71	4/64
Quality of infrastructure (includes acces to roads, power availability, etc)	10%	35%	42%	10%	4%	45/71	24/64
Socioeconomic agreements/community development conditions (includes local purchasing, processing requirements, or supplying social infrastructure such as schools or hospitals, etc.)	4%	40%	36%	13%	6%	51/71	33/64
Political Stability	4%	18%	46%	20%	11%	60/71	44/64
Quality of geological database (includes quality and scale of maps, ease of acccess to information, etc)	11%	33%	48%	3%	5%	58/71	46/64
Security situation (includes physical security due to the threat of terrorists, criminals, guerrilla, etc)	16%	48%	27%	3%	6%	46/51	44/64
Availability of labor and skills	17%	33%	42%	6%	2%	53/71	
Labor regulations/employment agreements	10%	34%	36%	17%	2%	63/71	6/64

1 Encourages Investment, 2 Not a deterrent to Investment, 3 Mild deterrent, 4 Strong deterrent, 5 Would not invest due to this

Source: Fraser Institute Annual Survey of Mining Companies 2008-2009 and 2005-2006.

POLITICAL RISK ASSESSMENT

Since 1999, Behre Dolbear Group of Companies has compiled a political risk assessment of countries of import to the mining industry: *"2009 Ranking of countries for mining investment – where not to invest"*. They believe mining industry is vital to the creation of wealth and prosperity in any country and countries that stifle it with detrimental political, economic, and financial policies, should be challenged to make changes more accommodative to its success. The rankings in their survey are based research from various public and confidential sources and on opinions gathered from their professionals who have travelled widely and are based out in 11 offices.

Twenty-five countries, which are host to major exploration or mineral development efforts and/or mining operations, have been ranked on seven criteria.The five highest scoring countries were Australia, Canada, Chile, United States and Mexico, in descending order. While the lowest ranking countries were Papua New Guinea, Indonesia, Russia, Bolivia and D.R. Congo.

Argentina ranks 12 out of the 25 countries, but according to Behre the country was the worst performer in this 2008 year's survey. This was due to the populist policies of the government, the seizure of pension funds, and the expectation that things will get much worse in 2009 than they were in 2008. Their advise is that Argentina needs to be viewed with caution and could deteriorate quickly.

Table 4.6 2009 Ranking of Countries for Mining Investment

2009 RANKING OF COUNTRIES

RANK	COUNTRY	ECONOMIC SYSTEM	POLITICAL SYSTEM	SOCIAL ISSUES	PERMITTING DELAYS	CORRUPTION	CURRENCY STABILITY	TAX REGIME	TOTAL POINTS	CHANGE VS 2008
1	AUSTRALIA	10	9	8	8	10	8	7	60	-1
2	CANADA	10	10	6	5	10	8	7	56	-1
3	CHILE	9	8	7	7	8	7	4	50	0
4	UNITED STATES	10	9	4	2	10	8	5	48	0
5	MEXICO	8	8	2	7	7	5	8	46	-4
6	BRAZIL	7	7	6	5	5	6	6	42	+1
7	GHANA	6	6	3	7	4	6	6	38	0
8	COLOMBIA	6	6	6	6	4	5	4	37	0
9	BOTSWANA	6	5	5	5	4	5	6	36	0
10 TIE	CHINA	8	2	4	5	2	8	5	34	-1
10 TIE	NAMIBIA	5	6	3	5	4	5	6	34	0
12	ARGENTINA	4	5	6	6	4	4	4	33	-4
13 TIE	MONGOLIA	6	4	5	6	3	6	2	32	0
13 TIE	TANZANIA	5	5	3	7	3	4	5	32	0
15	PERU	6	3	2	3	4	7	5	30	+1
16	INDIA	6	6	2	3	3	5	4	29	0
17	PHILIPPINES	5	5	3	5	2	4	4	28	0
18	ZAMBIA	5	4	2	5	3	2	4	25	+1
19	KAZAKHSTAN	4	4	4	3	1	4	4	24	0
20	SOUTH AFRICA	3	3	1	5	2	6	2	22	-2
21	PAPUA NEW GUINEA	4	4	1	2	2	4	5	22	0
22	INDONESIA	3	5	3	3	1	1	3	19	+2
23 TIE	RUSSIA	2	1	3	3	1	2	6	18	-2
23 TIE	BOLIVIA	2	1	1	4	3	4	3	18	0
25	D.R. CONGO	2	3	3	3	1	1	4	17	+1

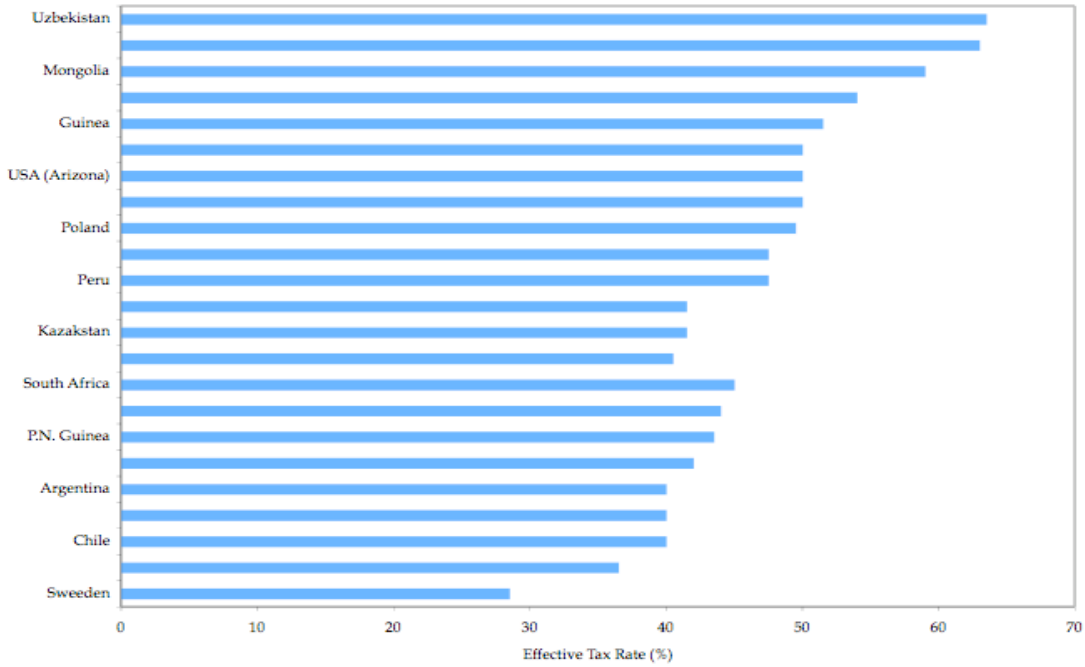
Source: Behre Dolbear Group Inc, Minerals Industry Advisors, 2009

TAX ASSESSMENT – OTTO, CORDES AND BATARESH

In today's global economy, multinational companies have many countries to choose from, and when deciding where to invest hundreds of millions of dollars or even billions, they are largely influenced by the expected return after taxes and the stability of the legal and fiscal regime. As a way to analyze mining countries' fiscal competitive position, Otto, Cordes, and Batarseh (2000), determined the effective tax rate (ETR) based on all major taxes and fees paid to government, for gold and copper mine models in 24 jurisdictions. (It is important to note, that even though their model is used widely to compare different countries tax burden, the ETR assessment is a static picture of a highly dynamic policy environment.)

From a fiscal standpoint, and as a result of the mining incentives, Argentina's ETR in the year 2000 was standing in a competitive position not only among its Latin American partners but also among world mining leaders such as Western Australia and Chile. According to Prof Otto's study most developing countries impose an ETR of between 30 to 60%, and Argentina is ranked among the five most tax friendly.

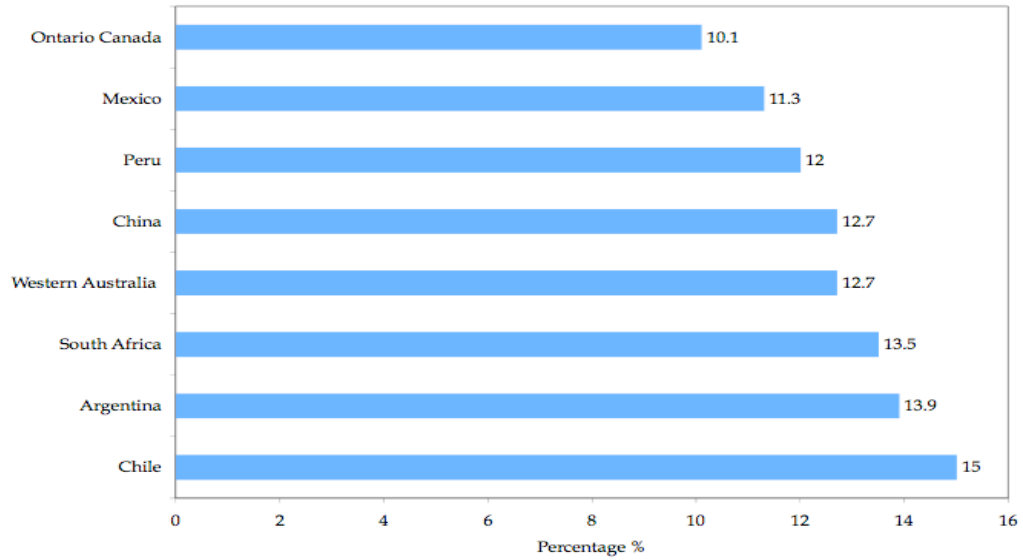
Figure 4.16 Copper Mine Comparative Effective Tax Rates



Source: derived from J. Otto et al, Global Mining Taxation Comparative Study (2nd edition), Colorado School of Mines, Golden: 2000.

Mineral sector investors will be concerned about the overall level of taxation, that is, the ETR, but will give more importance to the rate of return of mine investments after taxes. Otto's survey shows that the rate of return in the year 2000, of the investment in a copper mine in Argentina is the second of the highest in the world following Chile, home to most of the world's copper mines developed over the past two decades.

Figure 4.17 Rate of Return of Copper Mine Investment after tax



Source: derived from J. Otto et al, Global Mining Taxation Comparative Study (2nd edition), Colorado School of Mines, Golden: 2000.

RISK ASSESSMENT – KROLL CONSULTING COMPANY

Kroll's a world leading risk consulting company report *"Foreign Investment in Mining Sector in Latin America: A risk Assessment"* published in 2009 by John Price, documents four types of risk facing miners in Latin America's nine most popular mining investment destination countries. The conversation about risk always turns controversial when trying to grade or quantify risk. In this report, the authors utilize five grades of risk: Low, low-medium, medium, high and very high.

Specifically, *Political Risk* (risk of loss when investing in a given country caused by changes in a country's political structure or policies as well as the adversarial actions of politicized groups such as labor, NGOs, etc) was qualified as *High and Rising* in Argentina. *Regulatory Risk* (risk associated with the potential for laws related to a given industry, country, to change and impact relevant investments and the risk that legal system will fall to safeguard investment) was also qualified as *High and Rising*. *Security Risk* (risks of a physical environment insufficiently secure that pose a threat to property or the conduct of business) and *Reputational Risk* (risk of the potential that negative publicity regarding an institution's business practices, whether true or not, will cause a decline in the customer base, costly litigation, or revenue reductions) were both qualified as *Medium and Rising*. In a rank of five, which spans from the lowest risk to the highest, Venezuela and Bolivia rank 5, Argentina ranks 4 together with Ecuador. Other countries such as Brazil, Peru, Colombia and Mexico were ranked 3 and Chile was ranked 2. This reflects the fact that Argentina's mining competitive position in Latin America is weakening.

BRIBE PAYERS INDEX – TRANSPARENCY INTERNATIONAL

Since corrupt dealings are difficult to study a contingency should be assigned to obscure negotiations. Transparency International has undertaken a series of interviews to business executives in order to gather data relating to bribery. In Argentina it has two forms: high-rank political and low-level public officials to 'speed things up'. Both are mostly done as face to face deals.

According to the survey (Table 4.7), Mining ranks 5th in world industry corruption with high levels of bribery (6/10) after Public Works, Real Estate, Oil & Gas and Heavy Manufacturing. Since mining operations happen worldwide these results are directly applicable to Argentina in the same manner that would be applicable in Kenya, as it represents that miners would most probably bribe if required.

Corruption contaminated institutions affect operations in that miners need to get permits, licenses, export minerals through customs, and the darker the process gets the more uncertain it becomes exposing the vulnerability of the venture.

Table 4.7 World Bribery by Sector

Brivery of Public Officials by Sector

Industry	Score	Standard Deviation
Public Work	5.20	3.29
Real Estate	5.70	3.08
Oil & Gas	5.90	3.18
Heavy Manufacturing	6.00	2.83
Mining	6.00	3.13
Pharmaceutical & Medical	6.20	3.16
Utilities	6.30	3.06
Aerospace	6.40	3.13
Power Generation	6.40	3.03
Forestry	6.50	3.19
Telecommunications	6.60	2.74
Transportation & Storage	6.60	2.91
Arms & Defence	6.70	3.31
Hotels & Restaurants	6.70	2.85
Agriculture	6.90	2.91
Light Manufacturing	6.90	2.69
Information Technology	7.00	2.75
Banking & Finance	7.10	2.77
Fisheries	7.10	3.07

Possible Score Ranges from 0 to 10.
0=Brives are almost always paid & 10=Brives are never payed

Table 4.8 Corrupted Institutions

Affected Insttitutions by Corruption

	World	Argentina
Political Parties	3.8	**4.1**
Legislative	3.4	**3.9**
Business	2.9	2.7
Media	3	**3.2**
Military	2.5	2.5
NGO	2.5	1.8
Religion	2.4	1.8
Education	2.8	2.3
Judiciary	3.1	**3.7**
Medicine	2.9	2.7
Police	3.5	**3.9**
Registry & Permits	3.4	3.3
Utilities	2.6	2.6
Tax Authorities	2.8	2.6
Customs	3.1	**3.6**

1=Not at all corrupt 5=Extremely corrupt

Source: Transparency International

Argentina has high levels of corruption in politics (82%), law making (78%), law judging (74%), customs (72%), police (78%), registry & permits (66%) and media (64%). Establishing operations in the country requires a solid contingency and a good negotiator who understands the codes in order to succeed. As a strategy, mining companies are recruiting local managers, who are familiar and know the way around things to help settle

operations in the country. Even so, it is a challenge to forecast and budget precisely. Experience determines that miners have underestimated these factors. Pascua-Lama project was due to start in 2007 and was delayed to 2011. Pirquitas budget was u$205 million to settle and has spent over u$225 million before even starting.

Argentina is probably not an ideal place for the innocent soft hearted. Most established companies have other operations in risky countries and know how to deal with such societies. Barrick has operations in Peru, Chile, Tanzania; AngloGold in Brazil, Colombia, Ghana, Namibia, Mali, Guinea; SilverStandard in Mexico, Peru; Xstrata in Brazil, Peru, Colombia; Coeur in Bolivia; PanAmerican in Mexico, Peru, Bolivia; and Hoschild in Mexico, Peru and Chile.

Even though brives can speed things up and give preferential access, it destroys the industry's integrity. Instead of trading minerals with a community, it happens solely with a small corrupt party. The result is a highly benefited minority and a large unhappy society growing with resentment towards mineral extraction, which one could say it is the Argentine case.

4.5 BARRICK GOLD CASE STUDY

This study is intended to reveal Argentina's competitiveness as a mining destination. In doing so, Barrick's Veladero mine and Pascua Lama project were put side by side with the rest of the company's operations using a comparative method. Barrick represents a good model as it mainly mines for gold, which is the predominant target in Argentina; is headquartered in Canada, a mining traditional country; and has an array of operations worldwide.

COMPANY OVERVIEW

Barrick has grown to become the world's preeminent gold producer (50% more than the next largest producer) and has the largest proven and probable reserves in the industry (60% higher than the next competitior). Silver and copper are recovered as secondary products at some operations. Over the years, the company's market value has grown exponentially, from u$69 million to u$45 billion in early 2008.

In the 1980s and 1990s Barrick moved quickly assembling a portfolio of mines, but 2005 was a transformative year for Barrick, which was made possible by the success of a comprehensive business plan initiated in 2003. Barrick's mine building and technical expertise has successfully delivered six new mines in the last five years on time and near budget, a strong record of execution in a period of increased challenges for the mining industry.

Barrick ended 2008 in excellent financial shape despite the market turbulencce. With the higher gold prices seen in 2008 and the largest production, Barrick generated the highest operating cash flow in the industry of u$2.2 billion, more than any other gold producer. Dividends also increased by 33% reflecting Barrick's ability to return additional value to shareholders while still investing in advanced projects.

Barrick's capability to execute their financial and operational strategy comes from the strength of their experienced management team, skilled workforce and organizational structure, a strong inventory of projects that facilitates the long-term sustainability of their business, their strong research and development group, their strong financial position and their commitment to achieving high standards in terms of environmental, health and safety performance.

The outlook for the gold industry looks positive, and as the gold industry leader, Barrick has much to gain as a result. As price of gold rises, Barrick's earnings and cash flows are expected to benefit.

OPERATIONS & PROJECTS

The company has 25 operating gold mines, located in some of the world's most prospective gold districts in North America (9), South America (3), Australia Pacific (9) and Africa (4).

"Barrick's 2008 production of 7.7 million ounces emanated from a diversified global portfolio of

operations strongly anchored in mining friendly jurisdictions in the U.S., Canada and Australia"
Annual Report 2008, Barrick, page 12.

North America is Barrick's largest producing region (40%), followed by South America (28%), Australia Pacific (25%) and Africa (7%). North America contains the largest company's proven and provable gold reserves (37%), followed close by South America (36%), and then by Australia Pacific (14%) and Africa (13%).

Their next generation of projects is now ramping up and the company expects to have a new mine entering production in each of the next three years, Buzwagi in 2009, Cortez Hills in 2010 and PuebloViejo (60% owned) in 2011.

In addition to these three projects, Barrick has an extensive suite of large, earlier stage projects, including Pascua-Lama, Cerro Casale, Donlin Creek and Reko Diq, which provide the company with a number of future development options. The most advanced of these is the large Pascua Lama gold-silver project in Chile and Argentina. The company expect that this next generation of mines, should operate at lower average total cash costs than the average total cash costs of their current portfolio of operating mines.

BARRICK'S GOLD FRONTERA DISTRICT

The highly prospective Frontera District along the Chile-Argentina border is home to Veladero mine and Pascua Lama project. Barrick's nearly 3000 km2 land position in this district has over 30 million ounces of gold reserves and 880 million ounces of silver. The company is strategically positioned to further explore this region for new gold deposits.

Veladero mine

Veladero is a gold and silver deposit located in San Juan Province, Argentina. The site's terrain is arid and rocky with elevations of between 4,000 and 4,850 meters above sea level. Veladero was discovered in 1997, however, the development of the mine started in 2002 and production began in the fourth quarter of 2005. This start-up marked Barrick's first production from the highly prospective Frontera District.

The mine was built as an open-pit mine, with gold and silver bearing ores extracted from two pits (Filo Federico and Amable). Veladero utilizes 36m3 class hydraulic shovels, 240-tonne class trucks, and 45,000-90,000 pound class drills. The ore is crushed to 32mm by a two-stage crushing process, and then transported via trucks to a valley-fill heap leach pad, and the waste is transported by trucks to a storage area designed specifically for this purpose. Gold is recovered using conventional methods of heap leaching with dilute sodium cyanide solution. Veladero uses a Merrill-Crowe process plant to recover the gold and silver from the pregnant leach solution. Recovered gold is smelted into dore (unrefined bulllion) on site and shipped to an outside refinery for processsing into buillion (pure).

The auxiliary facilities required for the mining operation include administration offices and buildings, laboratories, warehouses, maintenance shops, emergency facilities, electric power

distribution, water supply, roads, fuel and reagent storage tanks, drainage structures, and explosive storage areas. A two-megawatt wind turbine was completed in 2007 near Veladero, the only turbine in the world operating at more than 4,000 meters above sea level had to be customized to adapt the region's extreme climate conditions of cold and severe winds, and is the prototype for the 18 turbines to be installed at Barrick's Punta Colorada farm project near Pascua-Lama.

The Veladero mine supports sustainable development programs for regional and local communities, with an emphasis on health care and educational opportunities, as well as economic development assistance. In the past few years Barrick has provided assistance for small business development projects, construction of a pediatrics facility, development of well-baby programs, dental health care programs, a woman's breast and uterine cancer program, and road and water system development. Added to this, Barrick's local suppliers program is building the capacity of small business to provide goods and services not only to their operations, but also to other markets which will continue to be available after the mine closes. The company has also invited community representatives to participate in mine water monitoring activities, allowing them to see for themselves how the mine is protecting the environment. Veladero achieved ISO 14001 certification the recognized international standard for sound environmental management and has been audited and certified as compliant under the International Cyanide Management Code.

Pascua Lama Project

The Pascua-Lama gold silver and copper open pit mine project is unique in that it is a binational project with a mineral deposit that spans the border between Argentina and Chile. Approximately 75% of the ore body located on the Chilean side of the border and 25% in Argentina. It is located in the Frontera district within approximately 10 kilometers of Veladero mine and 156 kilometers from the closest settlement in Argentina. The project is at an elevation of 3,800 to 5,200 meters.

A Mining Integration Treaty signed between Chile and Argentina, the first of its kind worldwide, states the principles that will govern cross-border mining activity, effectively resulting in no double taxation and clarifing how transborder service (loading and hauling) taxes are to be applied. The bilateral agreement defines procedures for customs, immigration, labor, health and security matters; and will ensure operational flexibility.

"We are building Pascua Lama; one of the world's best undeveloped gold mining projects.(…)With a 2,600 square kilometer land position that would be difficult to assemble today, Barrick is strategically positioned to further explore this region for new gold deposits. The successful application of the Mining Integration Treaty and associated protocols between the two countries that has enabled Pascua-Lama to proceed will greatly enhance the attractiveness of future discoveries. We will now apply and demonstrate Barrick's expertise, particularly leveraging our Veladero experience in the Frontera district, in developing this large, low cost mine. It is projected to significantly lower our overall total cash costs and make a substantial contribution to our production for decades."

Aaron Regent, President and Chief Executive Officer, *Barrick Press Release* May 7, 2009.

Barrick has been planning the project for several years. It performed its first studies of the glaciers in 1991, and on May 7, 2009, Barrick announced that the Pascua-Lama project is proceeding to construction.The Company has received environmental impact approvals from both countries, has finalized the project's economic parameters, received key construction permits, satisfactorily resolved key outstanding fiscal matters with the governments of Chile and Argentina, and is engaged in discussions with export credit agencies and global financial institutions, targeting u$1 billion in project financing. Barrick will immediately begin to award contracts, mobilize for infrastructure such as roads, power line, camps and basic services, hiring of a workforce, etc., and ramp-up construction by September or earlier, weather conditions permitting. Commissioning is expected in late 2012, and first gold expected early 2013.

Both countries have welcomed the investment and the jobs that this project will create. As a result, this large, long-life mine should not only contribute low cost ounces to Company production, it should also contribute to community development in the region for many years. In spite of this the project has caused controversy and public protest in both Argentina and Chile, including demonstrations and blockades. Argentine opponents, argue that Pasuca Lama's water requirements will affect water supply of local communities and that the San Juan side will be left with the waste rubble, which would be permanently contaminated with cyanide from the ore processing, affecting water resources. Those protesting the project also contend that it will affect glaciers causing serious environmental harm. Nevertheless, the Environmetal Impact Assessment (EIA) approvals in both Chile and Argentina specifically aimed to prevent this from happening; and Barrick has confirmed that the project's water needs were not found to be significant, that the process is not expected to adversely affect water quality and that they have no plans to move any ice or glaciers. In addition, the company has agreed to assist local water users (agriculture and potable) to improve seasonal storage, conveyance and irrigation systems such that more water will be conserved than would be diverted by the mining operation.

"This is far and away the safest and most environmentally sensitive project I've ever built in 40 years in this business."

Ron Kettles, Pascua-Lama project director, *Pascua Lama Fact sheet*, Barrick, 2009, page 4.

ANALYSIS

Company's Total Cash Costs

Barrick's 2008 total cash costs for gold, u$443 per ounce, are competitively positioned, providing strong cash margins of u$427 per ounce. Cash margin per ounce represents realized price per ounce (u$870) less total cash costs per ounce. Applying full credit for non-gold sales, its cash costs for 2008 were u$337 per ounce. South America is clearly the most profitable region with 3 mines (out of 25), which produce 28% of Barrick's total production.

Table 4.9 Barrick Income Statement 2008

2008	$ per ounce
Realized Gold Price	870
Total Cash Costs	-443
Cash Margin	427

Table 4.10 Gold Cost by Region

Region	$ per ounce
Africa	560
Australia	550
North America	493
South America	251

Source: Barrick Gold Annual Report 2008

Mine contingency rates

The contingency rates used for each mine are based upon the risks associated with the geographic location. These adjustments are resultant of observed historical country risk premiums and the average credit default swap spreads. In 2008, the company used the following contingency rates for their gold mines:

Table 4.11 Contingency Rates by Country

Country	2008	2007
USA	2.68%-4.03%	3.97%
Canada	3.29%	4.54%
Australia	3.66%-4.29%	4.98%
Argentina	13.74%	9.18%
Tanzania	8.49%-9.84%	7.01%
P. New Guinea	9.84%	7.86%
Peru	6.33%-6.96%	5.40%

Source: Barrick Gold Annual Report 2008

The increase in discount rates compared to the prior year primarily reflects higher equity premiums over the risk-free borrowing rate, and an increase in country risk premiums due to rising credit spreads and increased political risk in certain jurisdictions. Argentina is not only the riskier destination but also the one that experienced the largest growth since 2007, doubling the average discount rates of Barrick's global operations.

First recorded mine production, Mine Construction Costs and Mine Life

Veladero mine was initiated in 2005 and Pascua Lama project is expected to start production in 2013. Pre-production capital construction costs for Veladero mine were u$547 million, and Pascua-Lama's pre-production construction costs estimate is u$2.8-u$3.0 billion. Veladero has an estimated mine life of about 16 plus years, while Pascua Lama's mine life estimation is of about 25 plus years.

Table 4.12 Mine Startup

Barrick's mines first recorded production (not necessarily by the company)			
Kargoorlie 50%	1893	Darlot	1996
Turquoise Ridge 75%	1938	Henty	1996
Cortez	1968	Ruby Hill	1998
Goldstrike Property	1976	Pierina	1998
Round Mountain 50%	1977	Bulyanhulu	2001
Golden Sunlight	1982	North Mara	2003
Bald Mountain	1983	Tulawaka 70%	2005
Hemlo 50%	1985	Veladero	2005
Lawlers	1986	Cowal	2006
Marigold 33%	1989	Lagunas Norte	2006
Porgera 95%	1990	Buzwagi	2009*
Plutonic	1990	Cortez Hills	2010*
Kanowna	1993	Pueblo Viejo 60%	2011*
Osborne	1994	Pascua Lama	2013*

Source: Barrick Gold

Table 4.13 Mines Construction Costs and Mine Life Expectancy

Location	Mines	First Production	Construction Costs	Mine Life Expectancy
Argentina	Veladero	2005	547 mill	16+
Australia	Cowal	2006	270 mill	20+
Peru	Lagunas Norte	2006	340 mill	11+
Tanzania	Buzwagi	2009*	400 mill	10+
USA	Cortez Hills	2010*	500 mill	10+
Dom. Rep.	Pueblo Viejo 60%	2011*	2.7 bill	25+
Chile-Arg.	Pascua Lama	2013*	2.8-3 bill	25+

Source: Barrick Gold

Argentina's Veladero mine and especially Pascua Lama project are part of Barrick's new generation porfolio, characterized by low operative costs, long life, large production and large investment projects.

Mine Reserves, Production and Cash Costs

Veladero's proven and probable mineral reserves as at 2008 were estimated at 12 233 000 ounces of gold at a grade of 0.025 ounce per ton. The deposit also contains within gold reserves, 226 190 000 ounces of silver at a grade of 0.46 ounce per ton, with a process recovery of 6.4%. Pascua-Lama reserves were estimated at 17 806 000 ounces of gold at a grade of 0.04 ounce per ton. The deposit also contains within the gold reserves, 717 624 000 ounces of silver at a grade of 1.63 oz/ton with a process recovery of 78.5%; and 649 500 000 pounds of copper at a grade of 0.074 lbs/ton with a process recovery of 57.6%.

Veladero's reserves represent almost 9% of Barrick's overal gold reserves (138.5 million ounces), and Pascua Lama's represent almost 13%.

Out of Barrick's 25 operating gold mines, Veladero ranks 3rd in proven and probable gold reserves, following Cortez and Golden Strike mines. If producing today Pascua Lama would rank first in proven and probable gold reserves.

Table 4.14 Operating Mines Production, Cash Costs and Reserves

Location	Barrick Gold 0perations	Metal	Production		Cash costs		Proven and Probable Reserves						
			oz	rk	per oz	rk	tons	rk	grade(oz/ton)	rk	au&ag oz, cu lbs	rk	recovery
USA	Bald Mountain	gold	105000	19	638	20	157675000	4	0.018	21	2846000	10	
	Cortez	gold	428000	5	589	14	222125000	3	0.06	12	13384000	1	
	Golden Sunlight	gold	120000	18	392	5	8665000	16	0.062	11	540000	19	
	Goldstrike Property	gold	1710000	1	452	7	93177000	5	0.138	7	12839000	2	
	Marigold 33%	gold	48000	22	584	13	25462000	13	0.02	20	511000	20	
	Round Mountain 50%	gold	234000	10	593	15	92581000	6	0.018	21	1621000	12	
	Ruby Hill	gold	98000	20	373	4	18844000	14	0.044	14	831000	16	
	Turquoise Ridge 75%	gold	124000	17	515	9	7961000	17	0.501	1	3985000	8	
Canada	Hemlo 50%	gold	130000	15	630	19	7075000	18	0.08	10	564000	18	
Peru	Lagunas Norte	gold	1200000	2	125	1	230635000	2	0.039	15	8949000	5	
		silver							0.11		24327000		20.3%
	Pierina	gold	400000	6	284	3	29182000	12	0.023	18	683000	17	
		silver							0.23		6652000		43.9%
Argentina	Veladero	gold	536000	4	496	8	491316000	1	0.025	17	12233000	3	
		silver							0.46		226190000		6.4%
Australia	Cowal	gold	191000	13	673	21	79500000	7	0.035	16	2795000	11	
	Henty	gold	61000	21	534	12	402000	23	0.229	3	92000	21	
	Kargoorlie 50%	gold	303000	8	614	17	77516000	9	0.056	13	4360000	7	
	Kanowna	gold	267000	9	529	10	6294000	19	0.2	4	1256000	14	
	Osborne	gold	33000	23	531	11	2174000	21	0.021	19	45000	23	
		copper							2.254		98000000		
	Plutonic	gold	127000	16	753	22	5828000	20	0.179	5	1042000	15	
	Yilgarn South	gold	325000	7	611	16	10498000	15	0.135	8	1401000	13	
P.N.Guinea	Porgera 95%	gold	627000	3	417	6	78975000	8	0.099	9	7828000	6	
Tanzania	Bulyanhulu	gold	200000	11	620	18	37728000	10	0.317	2	11977000	4	
		silver							0.25		9463000		65%
		copper							0.589		444300000		84.9%
	North Mara	gold	197000	12	757	23	30505000	11	0.099	9	3031000	9	
	Tulawaka 70%	gold	148000	14	212	2	514000	22	0.156	6	80000	22	

Table 4.15 Project Mines Production, Cash Costs and Reserves

Location	Barrick Gold Projects	Metal	Production		Cash costs		Proven and Probable Reserves						
			oz	rk	per oz	rk	tons	rk	grade(oz/ton)	rk	au&ag oz, cu lb	rk	recovery
Tanzania	Buzwagi 2009	gold	190000-210000		320-335		65088000		0.05		3284000		
		copper							0.136		176600000		76.40%
USA	Cortez Hills 2010	gold	1000000		350-400						2000000		
Dom. Rep	Pueblo Viejo 60% 20	gold	600000-650000		275-300		147946000		0.091		13440000		
		silver					147946000		0.53		78785000		87.10%
		copper							0.092		273000000		79.50%
Chile-Arg	Pascua Lama 2013	gold	750000-800000		20-50		440226000		0.04		17806000		
		silver							1.63		717624000		78.50%
		copper							0.074		649500000		57.60%
Chile	Cerro Casale 51%	gold					612273000		0.018		10831000		
		silver							0.05		30112000		46%
		copper							0.221		2707200000		83%
USA	Donlin Creek 50%	gold											
Pakistan	Reko Diq 37,5%	gold											

Source: Barrick Gold Annual Report 2008.

In 2008, Veladero produced 536 000 ounces of gold and Pascua Lama is expected average annual production of about 750 000-800 000 ounces of gold and 35 million ounces of silver in the first five years. Veladero's production represent almost 7% of Barrick's overall gold reserves, and if producing today Pascua Lama's would represent almost 11%. Out of Barrick's 25 operating gold mines, Veladero ranks 4th in gold production, following Goldstrike, Lagunas Norte and Porgera. If producing today, Pascua Lama would rank 3rd.

In 2008, Veladero's gold total cash costs were u$496 per ounce, slightly over the u$443 average. Pascua Lama's anticipated gold total cash costs in the first five years are u$20-u$50 per ounce, making it one of the lowest cost gold producing mines in the world. Out of Barrick's 25 mines, Veladero ranked 8th in total cash costs per ounce, and Pascua Lama would rank 1st by far reducing Barrick's overall cash costs by about u$40 per ounce.

CONCLUSION

Argentina clearly enters into Barrick's new operative strategy of extreme size, long life and high quality deposits. Yet, it remains the highest risk destination today with an assigned contingency rate that doubles the average.

With proven and probable reserves of over 25 years and the rights for further mining in the Frontera district, the Argentine destination holds a solid stockpile (22%) of the world's largest gold producer.

Barrick's Veladero pilot operation is proving great potential with declining costs that are reaching the company's average after only 4 years of operation. Consequently, the investment of the 6 times larger Pascua Lama, discloses the interest of Barrick in the Frontera district as one of its most attractive destinations, estimating to be one of the lowest production cost sites of the world.

5. Conclusion

On evaluating this study, a series of factors that represent the world demand for metals, the mining industry and the mining sector in Argentina were examined. By tying such elements together we should deduce an approximate reading of the current and future situation, answering the question of whether the metal market opportunity is worth the risks of operating a mine in Argentina.

DEMAND

Metals are definitely essential in our lives and are closely linked to GDP and population growth. Projections are in favor of higher consumption with the world increasing in population and the improving its standard of living. From 1970, GWP has been growing by 225 %, world population by 72 % and mining production by 75 %. Population is expected to grown another 40% by 2050.

Today, BRIC economies, which represent the largest population and world production, are in developing stage, requiring metals for their growth, especially in the form of infrastructure. China & India, the largest suppliers of manufactured goods, are expected to push metal demand up. However, BRIC'S evolution will not necessarily be smooth and the economic variations of OECD countries, which today finance the world mining industry, will be reflected in mining capital availability.

Half of the world's gold demand, mainly as jewelry (70%) and investment asset (26%), is consumed by India and China. With such low volatile price properties, it should remain steady along the bumpy Asian economic growth, leaving a solid platform for gold miners to work on.

Since silver demand is governed by industrial consumption (55%) its price should be slightly more volatile than gold. Its unique properties in most industrial applications (electric contactors), which restrict its substitution, should however mean a relatively stable evolution.

Copper, governed by electric (60%), building (28%), transport (12%), and machinery (9%) consumption will remain highly susceptible to economic variations due to its industrial dependability and ease of substitution (aluminum and plastics). With Asia representing 46 % of its demand, copper prices will remain volatile.

SUPPLY

Globalization is creating tremendous opportunities and challenges for mining companies today: borders are coming down and new opportunities are opening up, metal demand is rising, prices are increasing, and new deposits are harder to discover and in more complex locations.

Over the past 15 years, a significant and ever-increasing number of mining companies have been involved in mergers & acquisitions, purchasing competitors or establishing joint ventures. Mid sized companies are being inevitably absorbed by the majors. Exploration companies, start-ups and niche producers remain alive, occupying the smaller end of the industry, while the majors are playing a central role in the industry's transformation into a

global industry.

As a result of the tendencies for larger and fewer, giants will soon be able to become price makers rather than price takers, diminishing their reliance on metal economic forecasts, which have been failing to anticipate accurately, and changing the form of the industry similar to that of petroleum. Price cycles will disappear changing the miner's response towards production, rebalancing supply and demand.

With the competition for acquisition, players are looking for long-life, high-quality, low-cost, world-class deposits enabling them to generate continuous flows of supply, more stable cash flows and deliver superior returns. Traditional mining countries, such as Canada and Australia who dominate the mining scene and who have given birth to some of the most competitive mining companies, are being confronted by emerging companies from non-traditional mining countries adding players to the world-class deposit search.

The belief that the next world-class deposits lay in less explored regions has taken companies towards non-traditional mining countries with high geological potential, but where projects have greater associated risks. Leader companies, however, have demonstrated the advantage of leaving a foot in well established mining countries that not only guarantee stable operations, but access to finance and superior equipment and services sector.

Latin America, the favorite exploration destination since 1944, remains risky but nowhere near Africa, which doubles the risk, nor CIS states, which are six times riskier according to Deloitte's survey of mining executives and analysts.

"Quality assets are getting harder to find. In their rush to bring new projects on line, mining companies have forayed into regions they may not have considered even a decade ago. Politically volatile nations and higher risk countries became fair game for an industry actively pursuing synergies and expanded production profiles."

Tracking the Trends 2009- The top 10 mining global issues, Deloitte, 2008, page 9.

ARGENTINA

Argentina is benefited by its geographical location among the richest areas of the Andes. With 58 copper porphyry deposits; accounting for 3640 tons of gold, 50500 tons of silver and
147 million tons of copper; the country's resource equals 238 years of gold extraction, 148 years of silver, 980 years of copper at La Alumbrera and Pirquitas production rates. However, 78 % of these deposits remain undiscovered, characterized by high concentrations of high value metals and in significant sizes, which is what contemporary miners are after.

Argentina's mineral wealth was only included in the miner's scope after the legal system was modified to offer foreign companies with improved legal security, fiscal stability and new environmental regulations in 1993. Since then, Argentina started experiencing tremendous expansions. In addition, the remarkable rise of metal prices originated in 2002 combined with the devaluated Argentine peso, accelerated foreign investment.

Today, the 10 operating mines and 7 developing projects represent a foreign investment of over u$10,000 million from major companies, such as Barrick, Xstrata, AngloGold, and SilverStandard, introducing Argentina to the future supply team. Over 90 exploration companies, mainly Canadian, are drilling samples along the country to provide a sustainable mining growth for the future.

The wellbeing of the industry and its growing contribution to the nation's economy brought a series of government interventions, which are questioning Argentina's mining integrity. Although the official mining code is visibly pro mining and foreign investment, the ever changing tax regime, inconsistency of mining policies, unpredictable environmental rules, bureaucracy and a complex concession system frequently subject to political interference, are all contributing to erode the country's mining competitive position.

The Argentine government has a record of violating many standard economic prescriptions and constitutional laws, like the nationalization of pension funds. Such unpredictable actions reveal the magnitude of political risk.

FINAL WORDS

As a mining destination Argentina is nowhere close to Canada, Australia, or Chile, but when evaluating other options such as Ghana, Peru, Indonesia, Namibia, Guinea, alternatives for miners come down to a dozen locations. The fact that 7 major mining companies are already operating in Argentina is enough proof of the attractiveness of the destination.

If the reward is there, no social, environmental or political barriers are too great. That is the bottom line as far as most companies are concerned in regards to all issues of risk from politics and economics. It is a balancing act between risk and reward.

When one considers the progress Argentina has made in the past decade, the low costs of its operations*, and couples that with its under-explored mineral potential it is no wonder an increasing number of foreign companies are deciding the benefits of operating in the country far out weight the pitfalls.

Companies are renowned for taking risks. This means that the final word goes to the more risk conscious financial institutions that are handing out corporate loans based on the strength of balance sheets and not so much linked to a specific project. In such capital intensive industry, only large players will consider gambling one or two operations, but Argentina is definitely not a place where to risk it all.

In the same way that a change in the mining code attracted over 100 mining companies, new legal modifications can directly affect the evolution of the industry. Considering that

* Gold price remains high at u$ 911.55/oz* and operations in Argentina represent low costs (u$496/oz Veladero, u$449/oz Co. Vanguardia and expected u$20-u$50/oz Pascua Lama).

such authority lies on the hands of incompetent governments, it leaves the industry in a delicate, highly vulnerable position.

"…[Argentina] is not for the faint- hearted ... they must adapt to the changes quickly, and look forward to getting serious returns for their investments."

Carlocchia, Head of AngloGold Ashanti, *Business Day*, 2008.

What Miners Say

"Argentina (has) a transparent legal system, fair tax laws, a great mining law."
Exploration Company, President, *Annual Survey of Mining Companies*, Fraser Institute, 2008.

"Argentina. Death by a thousand cuts. They don't come out and take from you, they just slowly suck the life out of your enterprise, with petty dishonesty, gradual duplicity, and willful incompetence."
Exploration Company, President, *Annual Survey of Mining Companies*, Fraser Institute, 2008.

"Argentina: I woke up one morning to an email where my in-country consulting geologists and lawyer have signed an agreement on the company's behalf, without authority, agreeing to excise part of our tenements and create a national park, because 20 or so protesters did a sit-in at the Mining Secretary's office."
Exploration Company, President, *Annual Survey of Mining Companies*, Fraser Institute, 2008.

"The bi-lateral commerce treaties between Canada and Argentina are not enforced. This is hurting us Canadian companies here in Argentina a lot."
Exploration Company, President, *Annual Survey of Mining Companies*, Fraser Institute, 2008.

"In Argentina we are two years into a 90-day process for drill permits, with the latest impasse total legal nonsense."
Exploration Company, President, *Annual Survey of Mining Companies*, Fraser Institute, 2008.

"In Argentina, various provinces actively promote and encourage investment and ensure fast track for development. Regulations are enforced but not used as tool to stop development."
Mining Company, President, *Annual Survey of Mining Companies*, Fraser Institute, 2008.

"Although closed for routine financing transactions in Argentina, Ex-Im Bank is open to consider specially structured deals like veladero that externalize the risk and provide reasonable assurance of repayment. It is Ex-Im Bank's first project financing in the mining sector since 1997"
Export-Import Bank (Ex-Im Bank), which provided $80 million of the Veladero financing, *Financial Strategy*, Barrick, 2004, page 19.

WORKS CITED

- AngloAmerican. http://www.angloamerican.co.uk/ (accessed March 2009)
- AngloGold Ashanti. http://www.anglogold.com/ (accessed March 2009)
- Barrick Gold. http://www.barrick.com/ (accessed March 2009)
- BHP Billiton. http://www.bhpbilliton.com/bb/home.jsp (accessed March 2009)
- Book of Genesis. Holly Bible.
- Brown T., et al. *World Mineral Production 2003-2007*. British Geological Survey. Nottingham: 2009. ISBN 9780852726389.
- Burmeister B B. *From resource to reality: a critical review of the achievements of new australian gold mining projects during the period January 1983 to September 1987*. Macquarie University, 1988.
- Coeur d'Arlene. http://www.coeur.com/ (accessed April 2009)
- Columbia & Yale University. *Environmental Performance Index*. 2008 http://epi.yale.edu/Home (accessed April 2009)
- Comision Nacional de Regulacion del Transporte. http://www.cnrt.gov.ar (accessed April 2009)
- Companhia Vale do Rio Sul. http://www.vale.com/ (accessed March 2009)
- Cunningham, C. et al. *Quantitative Mineral Resource Assessment of Copper, Molybdenum, Gold, and Silver in Undiscovered Porphyry Copper Deposits in the Andes Mountains of South America*, United States Geological Survey, 2008
- De Carlo, S. *The Forbes Global 2000 Index*. Forbes. http://www.forbes.com/2005/03/30/05f2000land.html (accessed April 2009)
- Deloitte, *Tracking the Trends: The top ten global mining issues*.2009. http://www.deloitte.com/dtt/cda/doc/content/ca_en_Tracking%20the%20trends%202009.pdf (accessed March 2009).
- Direccion Nacional de Vialidad. http://vialidad.gov.ar/ (accessed April 2009)
- Dominy, S. and Noppe, M. *Errors and Uncertainty in Mineral Resource and Ore Reserve Estimation: The Importance of Getting it Right*. Exploration and Mining Geology; v. 11; January 2002.
- Ernst & Young. http://www.ey.com/ (accessed March 2009)

- GoldCorp Inc. http://www.goldcorp.com/ (accessed March 2009)
- Hearn, K. "Ancient Iron Ore Mine Discovered in Peruvian Andes", National Geographic, Feb 2008. http://news.nationalgeographic.com/news/bigphotos/54021853.html (accessed May 2009)
- Infomine. http://www.infomine.com/ (accessed April 2009)
- International Copper Study Group. http://www.icsg.org/ (accessed March 2009)
- London Metal Exchange. http://www.lme.co.uk/ (accessed March 2009)
- McCarthy, P. "Managing technical risks for mine feasibility studies", Proceedings Mining Risk Management Conference. The Australasian Institute of Mining and Metallurgy. Melbourne: 2003
- McLemore *V, Introduction to Geology of Industrial Minerals*. New Mexico Tech. Spring: 2005. http://media.wiley.com/product_data/excerpt/11/04713485/0471348511.pdf (accessed March 2009)
- McMahon, F. and Cervantes, M. *Survey of Mining Companies 2008-2009.* Fraser Institute. 2009. http://www.fraserinstitute.org/commerce.web/product_files/MiningSurvey20082009_Cdn.pdf (accessed April 2009)
- McMahon, F. and Vidler, C. *Survey of Mining Companies 2007-2008*, Fraser Institute. 2008 http://www.fraserinstitute.org/commerce.web/product_files/SurveyofMiningCompanies2007.pdf (accessed April 2009)
- Metals Economics Group. http://www.metalseconomics.com/default.htm (accessed March 2009)
- Ministerio de Planificacion Federal, Inversion Publica y Servicios. http://energia3.mecon.gov.ar/home/ (accessed April 2009)
- O'Neill J. *BRICS and Beyond*. Goldman Sachs. 2007 http://www2.goldmansachs.com/ideas/brics/book/BRIC-Full.pdf (accessed April 2009)
- Otto, J. *Global Mining Taxation Comparative Study,* Colorado School of Mines, Golden, 2nd edition, 2000.
- PanAmerican Silver. http://www.panamericansilver.com/ (accessed April 2009)
- Panorama Minero, *Why invest in Argentina.* http://www.panoramaminero.com.ar/

(accessed March 2009)

- Price, J. *Foreign Investment in the Latin America Mining Sector – A Risk Assessment*, Kroll Risk Consulting Company, 2009
- Riaño J. and Hodess R. "Bribe Payers Index", Transparency International, 2008
- Rio Tinto. http://www.riotinto.com/ (accessed March 2009)
- Rippy J., Casson, M. *British Investments in Latin America, 1822-1949: Evolution of International Business 1800-1945,* Published by Routledge, 2000
- Secretaria de Mineria de la Nacion. *Codigo de Mineria.* http://www.mineria.gov.ar/codigominero.htm (accessed April 2009)
- Silver Institute. http://www.silverinstitute.org/ (accessed March 2009)
- SilverStandard. http://www.silverstandard.com/ (accessed March 2009)
- Teck Cominco. http://www.teck.com/ (accessed March 2009)
- The Economist. "In a deep hole", 19 February 2009 http://www.economist.com/people/displaystory.cfm?story_id=13144192 (accessed May 2009)
- The Economist. http://www.economist.com/countries/Argentina/ (accessed April 2009)
- United Nations, http://www.un.org/ (accessed March 2009)
- US Central Intelligence Agency. "The World Factbook". 2008. https://www.cia.gov/library/publications/the-world-factbook/ (accessed March 2009)
- World Bank. *World Trade Indicators 2008.* *http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/TRADE/0,,contentMDK:21393040~pagePK:210058~piPK:210062~theSitePK:239071,00.html* (accessed March 2009)
- World Gold Council. http://www.gold.org/ (accessed March 2009)
- Xstrata. http://www.xstrata.com/ (accessed March 2009)
- Yahoo! Finance. http://finance.yahoo.com/ (accessed May 2009)
- Yamana Gold Inc. http://www.yamana.com/ (accessed March 2009)

APPENDIX

INFRASTRUCTURE

Mine operators rely heavily on infrastructure to respond to market demands. Inefficiencies clog the supply system affecting both the producer and the customer who is expecting the shipment.

In Argentina, the physical infrastructure is decent, with a solid transportation and energy system. However, poor administration or government intervention under times of crisis, which are recurrent, often result in energy cut downs, road closures, or strikes, impacting on the production flow.

TRANSPORTATION

PORTS

Production can be delivered either by the Atlantic or alternatively by the Pacific via Chile. Considering that most operations take place along the Andes, the Pacific alternative can at times be more convenient since it is closer than the Atlantic.
However, the limited number of Andes crossings, which normally are of over 4000 mts above sea level, occasionally become impassable during the winter months due to snow and ice.

Argentina has 40 ports out of which 9 are used for Linear Service and Chile counts with 29 ports of which 10 used for linear service. Southern mines enjoy easy access to ports with no congestion. Northern mines need to deliver production long distances by ground transport having to either cross the Andes or to traverse the congested areas of Santa Fe and Buenos Aires.

La Alumbrera mine has been using Rosario's port via train (Tucuman-Rosario), Pirquitas has press realeased that they will deliver by truck to Antofagasta port in Chile. Cerro Vanguardia mine has been using Santa Cruz port and San Jose mine has been using Comodoro Rivadavia port.

Buenos Aires has a history of conflicts regarding port taxes, benefiting from the rest of the country's production and imports. Miners seem to prefer to avoid dealing with the *portenos* (Buenos Aires *port-fellows*).

ARGENTINA PORTS

Arroyo Seco
Bahia Blanca
Barranqueras
Buenos Aires
Caleta Cordova
Caleta Olivares
Caleta Olivia
Caletra Paula
Camarones
Campana
Comodoro Rivadavia
Concepcion del Uruguay
Corrientes
Cullen
Diamante
Dock Sud
Formosa
Ibicuy
La Plata
Madryn
Mar del Plata
Necochea
Posadas
Puerto Deseado
Terminales Rio de la Plata
Punta Quilla
Ramallo
Rawson
Rio Gallegos
Rio Grande
Rosales
Rosario (ENAPRO)
San Antonio Oeste
San Julian
San Lorenzo
San Nicolas
San Pedro
San Sebastian
Santa Fe
Ushuaia
Zarate

CHILE PORTS

Antofagasta
Arica
Castro
Chanaral
Coquimbo
Coronel
Easter Island
Gregorio
Guayacan
Huasco
Iquique
Lirquen
Mejillones
Patillos Cove
Port Williams
Puerto Chacabuco
Puerto Montt
Puerto Natales
Puerto Ventanas
Punta Arenas
Quellon
Quemchi
Quintero
San Antonio
San Vicente
Talcahuano
Taltal
Tocopilla
Valdivia
Valparaiso

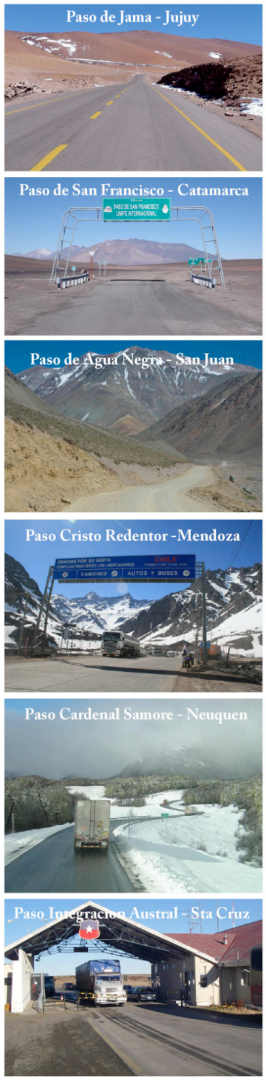
Source: World Port Source

TRAINS

The Argentine train network is old but very well laid connecting the whole country with major cities and ports. The system was installed and operated by the British since 1857. When Peron took over the administration of the country in 1946 all the railway network became nationalized. Incompetent management resulted in section closures dividing of the network up and forcing production to be delivered by alternate means, generally trucks. Between 1989 and 1995, the train network was privatized and is today run by mainly six companies.

Companies - Railway Lines	*Operating*	*Total*
America Latina Mesopotamica (ALL) Buenos Aires - Misiones.	(2351km	2704km)
Belgrano Cargas: Buenos Aires – Mendoza – Salta – Formosa	(5069km	7347km)
Ferro Expreso Pampeano (FEPSA): Rosario - Bahia Blanca	(2792km	5094km)
Ferrosur Roca: Buenos Aires – Neuquen	(2836km	3377km)
Nuevo Central Argentino (NCA): Buenos Aires – Salta	(3990km	4752km)

Figure 4.18 Border Crossings



Truck union pressure and government regulations are pushing the railway system to collapse and be re-nationalized. Belgrano Cargas is the first example, which has been taken over by the national administration in February 2009.

La Alumbrera uses NCA services to deliver minerals from Tucuman to Rosario. Due to the lack of track maintenance the cargo is frequently derailed in Santiago del Estero. No other mine uses train services.

ROADS

The Argentine road system is good offering plenty alternatives to reach ports. Most Argentine production is transported by truck and most roads are prepared for appropriate use.

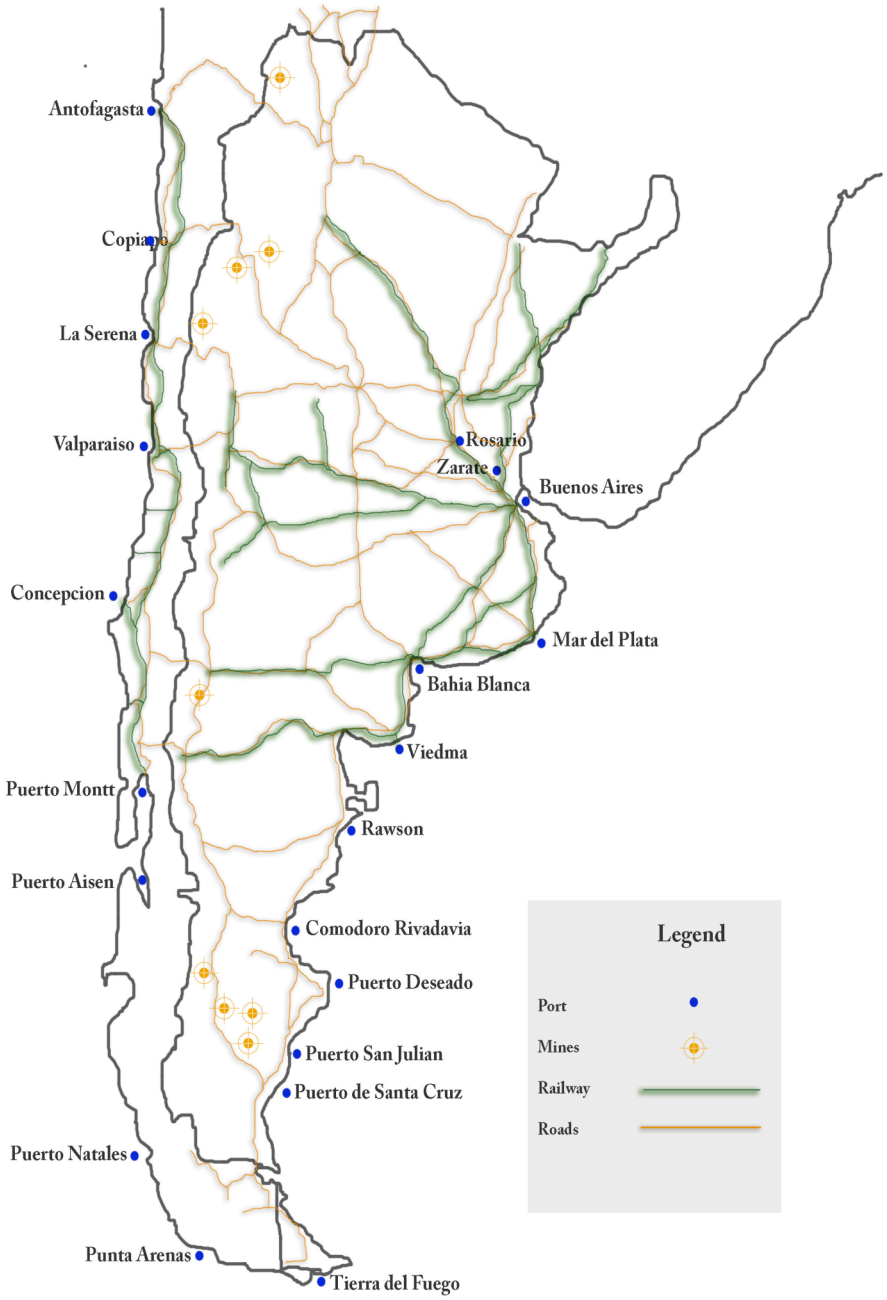
Rute 40 runs north to south parallel to the Andes connecting all Chilean crossings. Out of the eleven crossing, only few are in conditions for truck traffic.

Paso de Jama is probably the best crossing today since it is new, suffers little winter conditions and has little traffic. Paso Cristo Redentor is normally congested as it connects Santigo with Mendoza. It closes down during winter storms, however it is kept open condition permitting. Paso Cardenal is a good crossing, dealing with lower heights but colder climate. The remaining crossings are remote and basic.

There are a number of road alternatives to Buenos Aires, Santa Fe and southern ports. Most are public with the exception of few private highways. Prosegur services most mines

delivering semi-processed ores (normally 91% silver, 9% gold) from mines to ports.

Figure 4.19 Main Roads, Ports and Railways of Argentina and Chile



Source: Author based on World Port Source, Vialidad Nacional, Comision Nacional de Regulacion del Transporte

ENERGY

ELECTRICITY

Argentina is third largest producer of energy in Latin America. It relies mostly on gas (54%) and hydroelectric (41%). It has an important potential to increase supply in hydroelectric power, however, thermal generation is becoming limited in the coming decade.

Although 75% of electricity generation is private and deregulated, its distribution is regulated by federal government. Delivery quality with 5.15 interruptions per year of 5.15 hours duration is below the Latin American average. Since electricity and gas are deregulated, private parties are entitled to buy energy directly from provider, paying or arranging the associated delivery charges.

During the economic crisis of 2001, electricity prices were frozen while the peso devaluated dramatically. The generation sector (75% private) suffered dramatically resulting in severe underinvestment not responding to the increasing demand. Government placed priority consumption for domestic use at subsidized low costs, counterbalancing the industrial sector with a 50% tariff increase (in real terms). Even so, electricity prices for industries in Argentina at u$0.0386 per kW-h, (World Bank) are well below the rest of Latin American countries at u$ 0.107 per kW-h, (World Bank)

Even with all the electricity advantages Argentina offers, new miners seem to prefer independence from regulated distribution.

La Alumbrera mine depends on the national electric network, with a line from Tucuman. Barrick's Veladero, as well as AngloGold's Co Vanguardia, generates electricity by burning gas, diesel and gasoline. In addition it has installed a 2-megawatt wind turbine in its Veladero property and 10 more in the Pascua-Lama project. Pirquitas mine has built a 37km gas pipeline to the site, establishing a contract with NorAndino Gas to supply liquid gas for the whole activity (with the exception of vehicles). Coer's Martha mine as well Hoschild's San Jose mine are fuelled 100% by diesel generators.

PETROLEUM

Argentina is the 24th largest producer of petroleum, producing 675,000 barrels/day and consuming 564,000 barrels/day. It has proved reserves of over 2600 million barrels.

Shell Oil Company of Argentina supplies diesel fuel to Pirquitas (U$ 1.25/lt) and La Alumbrera mine (~5 million liters per month) delivered to site. YPF supplies diesel to Gualcamayo (~700,000 lts/month), Manantial Espejo (~700,000 lts/month), Veladero (~5 million lts/month) and Pirquitas as well (~700,000 lts/month). Esso Chile supplies diesel to Co. Vanguardia (~700,000 lts/month).

MINING PROJECTS IN ARGENTINA IN 2008

Company Name	Project	Name Project	Location
ATW Venture Corp	Exploration	Amarillo Property	San Juan Argentina
Amera Resources Corporation	Exploration	Mogote Project	San Juan Argentina
Andean Resources Limited	Exploration	Cerro Negro Project	Santa Cruz Argentina
Andean Resources Limited	Exploration	La Esperanza Property	Santa Cruz Argentina
Andean Resources Limited	Exploration	Las Mellizas Property	Santa Cruz Argentina
Andean Resources Limited	Exploration	San Augustin Property	Santa Cruz Argentina
AngloGold Ashanti Limited	Producing Mine	Cerro Vanguardia Mine	Santa Cruz Argentina
Antares Minerals Inc	Exploration	Rio Grande Project	Salta Argentina
Apex Silver Mines Limited	Exploration	La Frontera Property	Catamarca Argentina
Aquiline Resources Inc Advanced	Exploration	Calcatreu Project	Argentina
Aquiline Resources Inc	Exploration	Flamingo Project	Argentina
Argentex Mining Corporation	Exploration	El Condor Property	Santa Cruz Argentina
Argentex Mining Corporation	Exploration	Pinguino Property	Santa Cruz Argentina
Argentex Mining Corporation	Exploration	Rio Negro Properties	Rio Negro Argentina
Barrick Gold Corporation	Exploration	Famatina Property	La Rioja Argentina
Barrick Gold Corporation	Mine Development	Pascua-Lama Project	San Juan Argentina
Barrick Gold Corporation	Producing Mine	Veladero Mine	San Juan Argentina
Cardero Resource Corp	Exploration	Huachi Property	Argentina
Cardero Resource Corp	Exploration	Incahuasi Property	Catamarca Argentina
Cardero Resource Corp	Exploration	Los Manantiales Property	Argentina
Coeur d'Alene Mines Corp	Exploration	Joaquin Property	Santa Cruz Argentina
Coeur d'Alene Mines Corp	Producing Mine	Martha Mine	Santa Cruz Argentina
Coeur d'Alene Mines Corp	Exploration	Sascha Property	Santa Cruz Argentina
Committee Bay Resources Ltd	Exploration	Can o n Oculto Project	San Juan Argentina
Committee Bay Resources Ltd	Exploration	Cordo n El Pen on	San Juan Argentina
Committee Bay Resources Ltd	Exploration	Ri o Bonete Project	La Rioja Argentina
Condor Resources Inc	Exploration	El Dorado Property	Salta Argentina
Condor Resources Inc	Exploration	Milagrito Property	Argentina
Exeter Resource Corporation	Exploration	CVSA Properties	Argentina
Exeter Resource Corporation	Exploration	Don Sixto Project	Mendoza Argentina
Exeter Resource Corporation	Exploration	Estelar Properties	Argentina
Exeter Resource Corporation	Exploration	MRP Properties	Argentina
Global Copper Corp	Exploration	San Jorge Property	Argentina
Global Copper Corp	Exploration	Taca Taca Property	Salta Argentina
Goldcorp Inc	Producing Mine	Alumbrera Mine	Catamarca, Argentina
Golden Arrow Resources Corp	Exploration	Chubut Project	Chubut Argentina
Golden Arrow Resources Corp	Exploration	Gualcamayo Project	San Juan Argentina
Golden Arrow Resources Corp	Exploration	Jujuy Concessions	Jujuy Argentina
Golden Arrow Resources Corp	Exploration	Mogote Project	San Juan Argentina
Golden Arrow Resources Corp	Exploration	Pen ascudo Project	Chubut Argentina
Golden Arrow Resources Corp	Exploration	Valle del Cura Properties	Argentina
Golden Peaks Resources Ltd	Exploration	Golden Project	Chubut Argentina
Golden Peaks Resources Ltd	Exploration	La Fortuna Property	Chubut Argentina
Golden Peaks Resources Ltd	Exploration	Lonco Project	Neuquen Argentina
Golden Peaks Resources Ltd	Exploration	Nik Property	La Rioja Argentina
Golden Peaks Resources Ltd	Exploration	Oro Project	Neuquen Argentina
HuntMountain Resources	Exploration	Argentina Props	Santa Cruz Argentina
Intrepid Mines Limited	Exploration	Casposo Project	San Juan Argentina
La Plata Gold Corporation	Exploration	Sierra de las Minas	Argentina
Latin American Minerals Inc	Exploration	Cerro Amarillo Property	Argentina
Latin American Minerals Inc	Exploration	La Carolina Property	Argentina
Mansfield Minerals Inc	Exploration	Aguas Calientes Project	Jujuy Argentina
Mansfield Minerals Inc	Exploration	Arizaro Property	Salta Argentina
Mansfield Minerals Inc	Exploration	Campo Casa Blanca	Salta Argentina

Mansfield Minerals Inc	Exploration	Desierto Property	Salta Argentina
Mansfield Minerals Inc	Exploration	El Camino Property	Salta Argentina
Mansfield Minerals Inc	Exploration	La Frontera Property	Catamarca Argentina
Mansfield Minerals Inc	Exploration	Lagunas los Patos Project	Catamarca Argentina
Mansfield Minerals Inc	Exploration	Lindero Property	Salta Argentina
Mansfield Minerals Inc	Exploration	Rio Grande Project	Salta Argentina
Marifil Mines Ltd	Exploration	Amarillo Property	San Juan Argentina
Minera Andes Inc	Producing Mine	San Jose Mine	Santa Cruz Argentina
Mirasol Resources Ltd	Exploration	Claudia Property	Santa Cruz Argentina
Mirasol Resources Ltd	Exploration	Espejo Project	Argentina
Mirasol Resources Ltd	Exploration	Joaquin Property	Santa Cruz Argentina
Mirasol Resources Ltd	Exploration	Libanesa Project	Santa Cruz Argentina
Mirasol Resources Ltd	Exploration	Nico Property	Santa Cruz Argentina
Mirasol Resources Ltd	Exploration	Santa Rita Property	Santa Cruz Argentina
Mirasol Resources Ltd	Exploration	Sascha Property	Santa Cruz Argentina
New Dimension Resources Ltd	Exploration	Magma Property	Chubut Argentina
Norsemont Mining Inc	Exploration	Chubut Project	Chubut Argentina
Pacific Rim Mining Corp	Exploration	Rosalito Project	Argentina
Palladon Ventures Ltd	Exploration	Gran Bajo Property	Argentina
Palladon Ventures Ltd	Exploration	Lago Cholila Property	Argentina
Palladon Ventures Ltd	Exploration	Laguna Guadalosa	Argentina
Palladon Ventures Ltd	Exploration	Rio Desado Property	Argentina
Palladon Ventures Ltd	Exploration	Tres Hermanas Project	Argentina
Pan American Silver Corp	Mine Development	Manantial Espejo Project	Santa Cruz Argentina
Portal Resources Ltd	Exploration	Arroyo Verde Project	Chubut Argentina
Portal Resources Ltd	Exploration	San Raphael Project	Mendoza Argentina
Rome Resources Ltd	Exploration	Varvarco Project	Neuquen Argentina
Silver Standard Resources Inc	Advnd Exploration	Diablillos Project	Salta Argentina
Soltera Mining Corp	Exploration	El Torno Property	Jujuy Argentina
Soltera Mining Corp	Exploration	Eureka Property	Jujuy Argentina
Suramina Resources Inc	Exploration	Batidero Project	San Juan Argentina
Suramina Resources Inc	Exploration	El Potro (Sillimanita)	La Rioja Argentina
Suramina Resources Inc	Exploration	Josemaria Project	San Juan Argentina
Suramina Resources Inc	Exploration	Las Flechas Project	San Juan Argentina
Suramina Resources Inc	Exploration	Mendoza Concina	Argentina
Suramina Resources Inc	Exploration	Vicuna Project	San Juan Argentina
TNR Gold Corp	Exploration	Argentina Property	Argentina
TNR Gold Corp	Exploration	Batidero Project	San Juan Argentina
TNR Gold Corp	Exploration	Eureka Property	Jujuy Argentina
Vale	Exploration	Las Flechas Project	San Juan Argentina
Vega Gold Ltd	Exploration	Nik Property	La Rioja Argentina
Xstrata plc	Producing Mine	Alumbrera Mine	Catamarca Argentina
Yamana Gold Inc	Advnd Exploration	Agua Rica Project	Catamarca Argentina
Yamana Gold Inc	Producing Mine	Alumbrera Mine	Argentina
Yamana Gold Inc	Exploration	Esquel Project	Argentina
Yamana Gold Inc	Exploration	Evelina Property	San Juan Argentina
Yamana Gold Inc	Mine Development	Gualcamayo Project	San Juan Argentina
Yamana Gold Inc	Exploration	Las Carachas-La Brea	San Juan Argentina
Yamana Gold Inc	Exploration	Las Flechas Project	San Juan Argentina
Yamana Gold Inc	Exploration	Salamanca Property	San Juan Argentina
Yamiri Gold and Energy Inc	Exploration	Corona Bonete Property	La Rioja Argentina
Yamiri Gold and Energy Inc	Exploration	Corona del Inca Property	La Rioja Argentina
Yamiri Gold and Energy Inc	Exploration	El Potro Property	La Rioja Argentina
Yamiri Gold and Energy Inc	Exploration	Famatina Property	La Rioja Argentina
Yamiri Gold and Energy Inc	Exploration	Helvecia Property	La Rioja Argentina
Yamiri Gold and Energy Inc	Exploration	Mina El Oro Property	La Rioja Argentina
Yamiri Gold and Energy Inc	Exploration	Pen a Negra Property	La Rioja Argentina
Zaruma Resources Inc	Exploration	El Foco-Alcaravan	Sgo del Estero,

COUNTRIES SOURCES OF COMPETITIVE ADVANTAGE

Traditional mining countries such as Australia and Canada dominate the global mining scene. These countries, with abundant and rich mineral resources, have become leaders in mining, exploration methods and technology. The *2009 Ranking of Countries for Mining Investment* published by Behre Dolbear Group Inc, puts Australia and Canada in first and second place respectively taking into account: Economic System, Political System, Social Issues, Permitting Delays, Corruption, Currency Stability and Tax Regime.

Four factors have basically given them their standing as two of the world's major mineral producers and have made them leaders in the global mining community.

1. Rich in mineral resources

Canada and Australia each produce more than 60 mineral commodities including metals and minerals. They are two of the most diversified mineral regions in the world. Both have large deposits of gold, silver, copper and aluminum, at good concentrations and at economically feasible sites. They are among the world largest countries and population is below 20 million people, resulting in larger amounts of metal per capita than most countries.

2. Attractive and Stable Business Environment

Canada and Australia have enviable strong economies and are two of the world's wealthiest nations.

These countries governments have had a critical role in creating a better environment for global competitiveness. They have pursued courageous and innovative strategies to provide a favorable environment for their mining industry to excel. And have made it possible for all citizens to enjoy the benefits of a robust and globally competitive mining industry. According to the Fraser Institute 2008-2009 Survey of Mining Companies, majority of respondents indicated Canada and Australia were the countries with most favorable policies towards mining.

Canada and Australia's regulatory environment was a key factor in creating a business climate, attracting investments, and facilitating global trade. The minerals and metals industry is heavily dependent upon trade, foreign investment and open markets. Both countries were able to use their efficient regulatory systems to maximize environmental and social benefits, while enhancing the conditions for a competitive and innovative economy, creating an investment advantage.

Even though Canada and Australia are not necessarily low tax countries for mining and their regimes are quite complex, across a number of jurisdictions, they remain stable and competitive. Both countries were able to recognize that not all businesses operate in the same environment and that business cycles affect profitability. As a result, their tax regimes were tailored to the unique risks in the mining industry and several tax incentives were introduced throughout the entire mining life cycle. Special emphasis was put in the introduction of tax incentives on research and development, and exploration. Added to this

their regimes were designed to attract capital and encourage international trade. They have established tax treaties with numerous other nations, covering a range of tax issues and often containing provisions for bilateral foreign tax credits on foreign source income. Many of Canada and Australia's approaches to realize taxation objectives are now well known and in widespread use.

Their mining industries have placed a high priority on enhancing environmental performance, improving occupational health and safety and responding to social issues within a sustainable development framework. And while it is true that their environmental assessment systems are strict, they are not prohibitive. In 2008 Yale University and Columbia University released the 2008 Environmental Performance Index and placed Canada and Australia among the highest scorers. The environmental experts at both universities concluded, "analysis of the drivers underlying the 2008 rankings suggests that wealth is a major determinant of environmental success".

3. *Mining and mineral processing tradition and expertise*

According to the World Mineral Production 2003-2007 published by the British Geological Survey, both countries ranked first and second in a number of mineral and metal commodities. Australia mined the most bauxite and zirconium minerals, and was the second largest producer of alumina, lead, uranium, titanium and zinc. It was also the third producer of iron ore and manganese ore. Canada, on the other hand, was the world's largest producer of potash, uranium and titanium minerals, and the second largest producer of nickel, slab zinc, nepheline syenite and primary magnesium metal.

The development of mining clusters in both countries has fueled their mining industry's growth. Interrelated industries and institutions have mutually reinforced and enhanced competitive advantage, by acting as each other's consumers, competitors, partners, suppliers and sources of research and development. These clusters include exploration companies, major mine operators, service and equipment suppliers, labor, training and education institutions, legal, consulting, accounting, and financing companies, government research associations and other allied entities. Clusters have driven innovation, economic growth and development. Businesses share infrastructure, energy, transportation, research and development, and health and safety standards. Major multinationals transfer cluster's benefits of innovation to their foreign subsidiaries. Suppliers understand and anticipate the needs of major mine operators, and can provide equipment and services locally and then become globally competitive. Academic and vocational training institutions understand industry needs and develop courses and training programs that meet industry's current and future workforce requirements. Research institutes gain better insights of industry needs. Cluster power the industry.

The current high level of competitiveness of Canada and Australia can be directly traced to their investments in research and development over the past century and the daily interface with the competition for global markets. Both countries have flourished because of their high priority on education and research institutions. Their commitment to funding research and their university and college mining programs are the envy of many other countries. Furthermore, mining companies collaborate with universities and colleges, government laboratories and research institutions to conduct a wide-range of research.

Government science and technology institutions have also become valued partners of the industry especially in regard to areas of research such as geoscience. Heavy investments in government-sponsored research and data collecting have contributed to the discovery and development of these countries natural resources. To achieve record productions, Australia and Canada have been at the forefront of advanced technologies. Their persistent innovation and engineering experience has produced some of the world's best mining components and equipments. And has also developed unique exploration and mining methods, along with a risk-taking and aggressive prospecting attitude. Examples include: airborne geophysics, global positioning systems, computer modeling and simulation techniques, mine design and entire automated mining systems, in-mine crushing, automated material handling, material characterization and liberation analysis, environmental monitoring, rehabilitation design, waste disposal design, etc. Their industries have been rewarded with improved mine safety, enhanced environmental systems, and increased productivity, allowing mining companies to explore deeper, richer ore bodies, control costs and maintain their industry's competitive position in international markets.

Australia, Canada have been blessed not only with natural resources but also with the availability of investment capital. They are both global destinations for financing of mineral exploration and mine development worldwide. As a result, a number of foreign companies have taken notice and listed on their stock exchanges to take advantage of their financing opportunities. The giants of global finance also relocated to Canada and Australia to be closer to the action. Harmonization of the securities regulatory system across their countries was always a key priority for their mining industries, providing a well functioning and efficient capital markets and ensuring sufficient investor protection and transparency of market activities.

4. *International presence*

Canada and Australia's mining industries, supported by a strong domestic base, have had the strength and fortitude of mind, willing to take the risk to go international.

Canada and Australia have played a very important and lengthy role in global exploration. Their access to capital has given rise to a huge amount of exploration companies operating in their home countries and around the world. Natural Resources Canada says that in 2007 there were 9000 global projects undertaken by Canadian companies in over 100 countries around the world. However, their home countries remain the most active in mineral exploration. According to Metals Economics Group, Canada and Australia head the 2008 list in worldwide exploration budgets by region.

Their international presence is not just limited to exploration properties. Canadian and Australian companies have been producing operations throughout the world. Many of these projects have been carried out in cooperation with third country companies. The international presence of exploration and mining companies means that Canadian and Australian companies are involved in most of the world's major discoveries. This has lowered production costs and benefited investors through higher earnings. Because their companies are almost everywhere, they are the beneficiaries of both commodity and country risk diversification. Both countries are home to some of the biggest names in the

global mining industry. Seven of the top ten mining companies are operating in both the Australian and Canadian mining industry. These include: Vale (Brazil), Rio Tinto (Australia/UK), BHP Billiton (Australia/UK), Xstrata (Switzerland), Anglo American (UK), Alcoa (US) and Barrick (Canada).

PUBLIC OPPOSITION

Considering that mining has never been a strong industry in Argentina not much is known apart from media opinions. Decades of government corruption caused suspicion on foreign deals and promises of progress and growth are no longer convincing. The public is not aware of the capital earnings the country receives for selling the minerals.

Mass media rarely features positive news regarding mining and newspapers, internet sites or magazines occasionally refer to the industry as a raid undertaken by foreigners taking advantage of the political and economical situation. Consequently, environmentalists find easy support to fight against mine development, which at the same time attracts media coverage. In the end, the mining column mostly features articles about the environmentalists' actions against mines or other related dramas.

Miners face the challenge of having to promote the mining industry in an unwelcoming environment. The result is positive in the mine's immediate area, which normally involves small communities that will eventually service the mine. Areas with more population density are less mining friendly and many times force miners out. In Mendoza, Chubut, and La Rioja, mining activity has been literally vanished.

Anti-mining websites

www.nomasorosucio.org
www.nodirtygold.org
www.noalamina.org
www.mineria.ecoportal.net
www.protestbarrick.net
www.biodiversidadla.org
www.ciudadanosporlavida.com.ar
www.greenpeace.org.ar
www.minesandcommunities.org
www.upsidedownworld.org
www.elgrito.radioteca.net
www.enlaluchaporlatierra.blogspot.com
www.noapascualama.blogspot.com
www.alternativaecosocialista.blogspot.com
www.movilizacionantiminera.blogspot.com
www.alternativaecosocialista.blogspot.com
www.movidaambientaltermas.blogspot.com
www.comonoscontaminan.blogspot.com
www.cieloabierto-famatina.blogspot.com
www.sanluislibresdelsur.blogspot.com

Politicians' interests are divided. When necessary, the governing power manipulates public by opposing mineral extraction as a trade for votes and support, and adversely, when needed they seek economic wellbeing through encouraging mineral extraction. In the end these ventures are merely used as a tool for public governance and quick silver.

Neighbours perceive that foreign investment represents foreign earning, leaving little benefits for the residing communities. In fact most taxation is federal and the few provincial royalties are never to be seen by the inhabitants. Miners are required to get involved with the communities by supporting schools, assisting in the development of infrastructure as an alternate way of acceptance.

It is essential to point out that the Argentine culture is not aggressive and manifestation participants react with limited knowledge, being manipulated by ideologists and politicians mostly.