

The Investment Case for Junior Gold Miners

Executive Summary

Throughout history, people have paid for goods and services using everything from shells to salt to paper to various metals. However, the one thing that has held its value through time is gold. Today, gold still serves as a physical store of value, particularly appealing in times of heightened financial market volatility, low-to-negative interest rates and price inflation. Despite rising demand for physical gold, there are concerns that the yellow metal has hit “peak gold” as the rate of gold-mine discoveries has declined over the last three decades. While miners have been investing in new exploration, some of the largest and most prolific reserves have already been found and gold miners have struggled in the absence of new finds to grow reserves and meet production demand. In addition, the average grade of new deposits, the amount of gold that can be extracted per tonne, appears to be in decline, falling from over 10 grams per tonne in the early 1970s to approximately 1.4 grams per tonne today.¹ The lack of new supply amid rising demand is expected to drive more capital investment into the mining space. This creates investment opportunities for companies involved in exploratory and junior gold mining, specifically those with operations leveraged to the supply-demand imbalance in gold. Given the length of time required to explore, delineate, permit, finance and build new mines, this also creates competitive moats and favors mergers and acquisitions (M&A) and industry consolidation as a faster way to replenish dwindling reserves.²

Until recently, low gold prices were to blame for the lack of capital investment into gold exploration. However, with current prices hitting historic high levels approaching \$2,000 an ounce, levels not seen since the 2011 to 2012 peaks, new investment in gold exploration makes increasing sense from a return-on-investment (ROI) standpoint. While countries like China, Russia and Australia currently lead in gold production output, new exploration will likely take place in emerging market regions such as Latin America and Africa as developed market mines become depleted. Today, while much of the gold supply has been supplemented by recycling, that alone is not a long-term solution to meet rising demand. Investment in **Exploratory Gold Producers**, which we define as companies in pre-production, not yet producing gold, and **Junior Gold Producers**, defined as companies producing less than 1 million troy ounces per year or the royalty equivalent, provides an attractive opportunity given the favorable supply-demand dynamics associated with rising gold prices. Indeed historically, in previous bull cycles, junior gold mining stocks have outperformed the physical metal. By targeting metrics such as gold revenue percentage and production levels, the EQM Pure Junior Gold Mining Index seeks to provide investors with “pure play” access to this important subset of the global gold mining industry.

¹ *Is the world running out of gold?* Deutsche Welle, 2020, <https://www.dw.com/en/is-the-world-running-out-of-gold/a-47974833>

² Hanley, Ryan. Analyst, Laurentian Bank Securities.

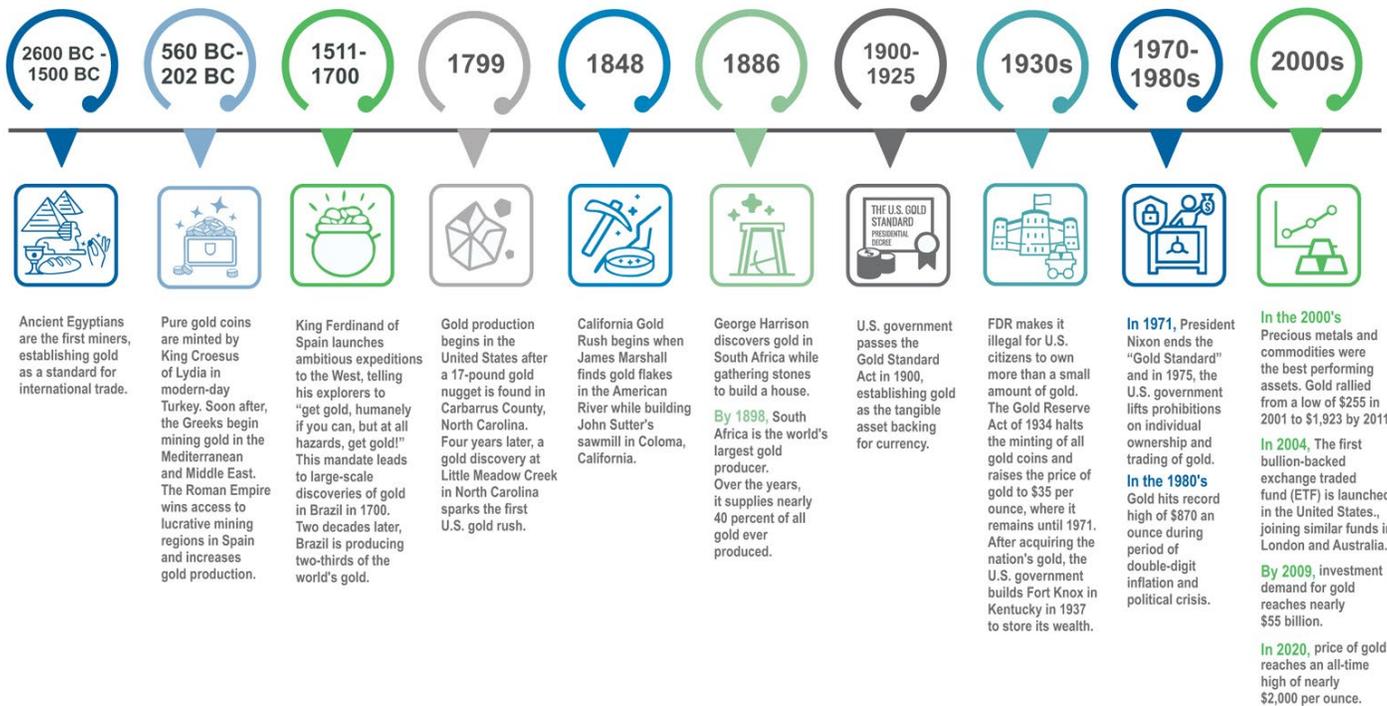
History of Gold

Civilization’s relationship with gold and the process of gold mining continues to evolve. The Ancient Egyptians were the first gold miners, establishing “the yellow metal” as a standard for international trade. Later, pure gold coins were minted, in what is now modern-day Turkey. The Ancient Greeks began mining gold in the Mediterranean and Middle East and later the Roman Empire won access to lucrative mining regions in Spain, further increasing gold production. The Spanish Conquistadors searched for gold in the New World, leading them to claim large-scale discoveries in Brazil in 1700. In 1799, gold was discovered in the United States when Conrad Reed found a 17-pound gold nugget in the stream of his family farm.

In 1848, the California Gold Rush began when James Marshall found gold flakes in the American River while building John Sutter’s sawmill in Coloma, California. In 1886, George Harrison discovered gold in South Africa while gathering stones to build a house. By 1898, South Africa quickly became the world’s largest gold producer.

THE GOLDEN AGES

Civilization’s relationship with the yellow metal continues to evolve. Due in part to macro uncertainty and supply dislocations created by the global virus pandemic, the price of gold in 2020 has surpassed its previous all-time price high of nearly \$2,000 an ounce, hitting the highest level since September of 2011.



Source: EQM Indexes, Business Insider, Geology.com

In 1900, the U.S. government passed the Gold Standard, establishing gold as the tangible backing for U.S. currency. President Franklin D. Roosevelt made it illegal for U.S. citizens to own more than small amounts of gold. The Gold Reserve Act of 1934 halted the minting of all gold coins and raised the price of gold to \$35 per ounce, where it remained until 1971. After acquiring the nation's gold, the U.S. government builds Fort Knox in Kentucky in 1937 to store its wealth.

In 1971, President Richard Nixon ended the Gold Standard and in 1975, the U.S. government lifted the prohibition on gold ownership and the trading of gold. Gold hit a record high of \$870 an ounce during a period of double-digit inflation and political crisis but sold off in the 1990s. In the 2000s, precious metals and commodities were the best-performing asset classes, with gold rallying from a low of \$255 in 2001 to \$1,923 an ounce by 2011.

The first bullion-backed ETF launched in 2004 and by 2009, investment demand for gold reached nearly \$55 billion. In 2020, the gold price surpassed its previous all-time high of nearly \$2,000 an ounce, reaching its highest level since September 2011.

How to Mine for Gold

Today, there are four primary methods used for gold mining: placer mining, hard rock mining, by-product mining, and gold ore processing.³

1. Placer Mining

The technique of extracting gold accumulated in a placer deposit. Placer deposits are composed of relatively loose material that makes it difficult to tunnel, so most extraction methods involve either water or dredging.

Panning – Gold panning is mainly a manual gold separation technique from other materials. Large, shallow pans are filled with gold-containing sand and gravel. The pan is submerged and shaken in water, sorting the gravel from the gold and other material. Gold settles down to the bottom of the pan as it is much denser than rock.

Sluicing – It has long been a common practice for prospecting and small-scale mining to use a **sluice box** to extract gold from placer deposits. Essentially, a sluice box is a man-made channel with riffles at the bottom. Gold-bearing material is placed at the top of the box. The material is then transported by the water current through the volt where behind the riffles catch gold and other dense material. Less dense material flows out of the box.

³ Mining: What is Gold Mining? How is Gold Mined? April 16, 2019, <http://www.geologypage.com>

Dredging – While this method has been largely replaced by modern methods, small-scale miners use suction dredges. One or two people operate small machines that float on the water. A suction dredge consists of a pontoon-supported sluice box attached to a suction hose controlled by an underwater miner. State dredging permits specify a seasonal period and area closures in many of the U.S. gold dredging areas to avoid conflicts between dredgers and fish populations spawning time. Some states, like Montana, need a comprehensive licensing procedure, including U.S. permits.

Rocker box – Also called a cradle, uses riffles to trap gold similar to the sluice box. A rocker box uses less water than a sluice box and is suitable for areas with limited water. A rocking motion provides the movement of water needed to separate gold in placer material using gravity.

2. Hard Rock Mining

Hard rock gold mining extracts gold in rock instead of fragments in loose sediment, producing most of the gold in the world. Barrick Gold Corporation has one of the largest open-pit gold mines in North America located on its Goldstrike mine property in northeastern Nevada. Other gold mines use underground mining methods, using tunnels or shafts to extract ore. South Africa has up to 3,900 meters (12,800 feet) underground of the deepest hard rock gold mine in the world.

3. By-Product Gold Mining

Gold is produced by mining where it is not the main product. Large copper mines, such as the Bingham Canyon mine in Utah, often recover gold together with copper and other metals. Some sand and gravel pits, such as those around Denver, Colorado, recover small amounts of gold in their washing operations. The largest producing gold mine in the world, the Grasberg mine in Papua, Indonesia, is actually a copper mine.

4. Gold Ore Processing

Cyanide process

By the end of the 1800s, the process of extracting gold went from an incredibly physically taxing process to something slightly less labor intensive when, in 1891, the Mercury Mine in Mercur, Utah became the first U.S mine to use a process called “Gold Cyanidation⁴” to leach gold out of crushed gold-bearing rock, ushering in a new era of mining.

Cyanide extraction of gold is used in areas where fine gold-bearing rocks are found. A sodium cyanide solution is mixed with finely ground rock that has been proven to contain gold or silver. It is then separated from ground rock as a gold cyanide or silver cyanide solution.

In recent years, the technique of alkaline cyanide dissolution has been highly developed. It is especially suitable for processing low-grade gold and silver ore (e.g., less than 5 parts per million gold), but its use is not limited to such ores. This extraction method is environmentally hazardous due to the acute toxicity of the cyanide compounds used.

Mercury process

Historically, mercury has been widely used in placer gold mining to form mercury-gold amalgam with smaller gold particles to increase the rate of gold recovery. In the 1960s, large-scale mercury use stopped. In artisanal and small-scale gold mining (ASGM), mercury is still used clandestinely. It is estimated that 45,000 metric tons of mercury used in California for placer mining still has not been recovered.

After decades of panning and mining, geologists have come to better understand what formations and geological activity might lead to gold deposits. The first step is to survey and assess the area. This is done by drilling and processing core samples to create a three-dimensional map of the geology of the target area.

⁴ Michaud, LD, *Cyanide Leaching Chemistry & Gold Cyanidation*, February 6, 2015, <https://www.911metallurgist.com/blog/cyanide-leaching-chemistry-gold-cyanidation>

As the process of mapping occurs, rules have been established by the Canadian Institute of Mining Metallurgy and Petroleum (CIM). The “Definition Standards for Mineral Resources and Mineral Reserves” provides a guide for miners’ disclosures that uses the following framework:

1. Mineral Resources:

Inferred Mineral Resources: This is part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

Indicated Mineral Resources: Mineralization may be classified as an Indicated Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralization.

Measured Mineral Resources: Mineralization or other natural material of economic interest may be classified as a Measured Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such that the tonnage and grade or quality of the mineralization can be estimated to within close limits and that variation from the estimate would not significantly affect the deposit’s potential economic viability. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit.

2. Mineral Reserves:

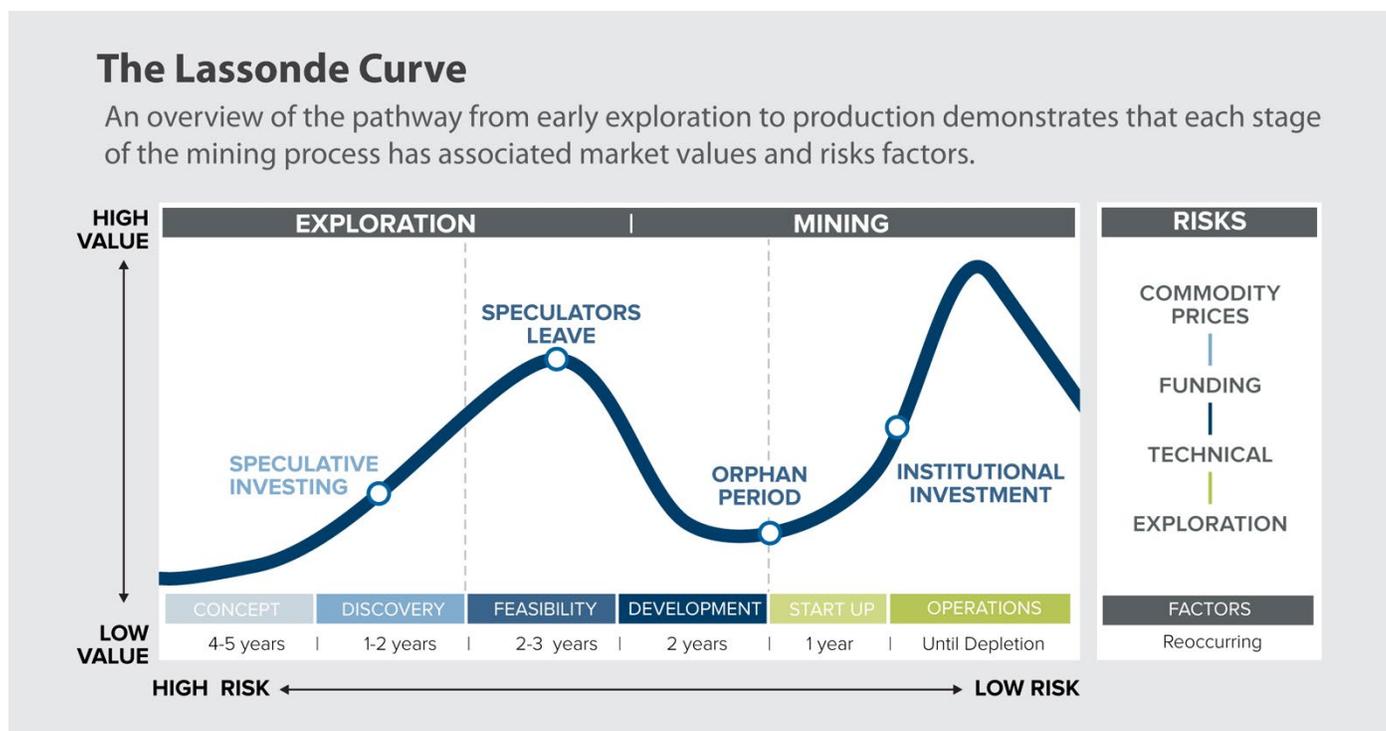
Probable Mineral Reserves: Mineral Reserves are those parts of Mineral Resources which, after the application of all mining factors, result in an estimated tonnage and grade which, in the opinion of the Qualified Person(s) making the estimates, is the basis of an economically viable project after taking account of all relevant Modifying Factors. Modifying factors include consideration of mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social and governmental factors.

Proven Mineral Reserves: Application of the Proven Mineral Reserve category implies that the Qualified Person has the highest degree of confidence in the estimate with the consequent expectation in the minds of the readers of the report. The term should be restricted to that part of the deposit where production planning takes place and for which any variation in the estimate would not significantly affect the potential economic viability of the deposit.

Once an area has been determined to have sufficient gold resources to support an economically viable mine and all the previously mentioned “Modifying Factors” have been considered, the exploration phase gives way to the development phase and the process of building out a mine begins.

The Lasso Curve

The Lasso Curve⁵ provides a visual illustration of the life cycle of gold discovery, highlighting the risk and potential along the pathway from early exploration to depletion. The curve draws from Canadian mining engineer and businessman Pierre Lasso's decades of experience in the mining industry.



Source: EQM Indexes, Pierre Lasso

In the life cycle of a mineral deposit, there are seven stages that each offer specific risks and rewards. As the company proves there is a mineable deposit in the ground, more value is created for shareholders along the way.

1. Concept

This stage carries the most risk, which accounts for its low value. In the beginning, there is little knowledge of what actually lies beneath the Earth's surface.

At this stage, geologists put to test a theory about where metal deposits are located. They survey the land using geochemical and sampling techniques to improve the confidence of this theory. Once this is complete, they can move onto more extensive exploration.

⁵ LePan, Nicholas. *Visualizing the Life Cycle of a Mineral Discovery*, VisualCapitalist.com, <https://www.visualcapitalist.com/visualizing-the-life-cycle-of-a-mineral-discovery/>

2. Pre-Discovery

There is still plenty of risk, but this is where speculation hype begins. As the drill bit meets the ground, mineral exploration geologists develop their knowledge of what lies beneath the Earth's crust to assess mineral potential.

Mineral exploration involves retrieving a cross-section (drill core) of the crust, and then analyzing it for mineral content. A drill core containing sufficient amounts of metals can encourage further exploration, which may lead to the discovery of a mineable deposit.

3. Discovery

Discovery is the reward stage for early speculators. Exploration has revealed that there is a significant amount of material to be mined, and it warrants further study to prove that mining would be feasible. Most speculators exit here, as the next stage creates a new set of risks, such as profitability, construction and financing.

4. Feasibility

This is an important milestone for a mineral discovery. Studies conducted during this stage may demonstrate the deposit's potential to become a profitable mine. Institutional and strategic investors can then use these studies to evaluate whether they want to advance this project. Speculators often invest during this time, known as the "Orphan Period," while uncertainty about the project lingers.

5. Development

Development is a rare moment, and most mineral deposits never make it to this stage. At this point, the company puts together a production plan for the mine. First, they must secure funding and build an operational team. If a company can secure funding for development, investors can see the potential of revenue from mining. However, risks still persist in the form of construction, budget and timelines.

6. Startup/Production

Investors who have held their investment until this point can pat themselves on the back—this is a rare moment for a mineral discovery. The company is now processing ore and generating revenue. Investment analysts will re-rate this deposit to help attract more attention from institutional investors and the general public. Meanwhile, existing investors can choose to exit here or wait for potential increases in revenues and dividends.

7. Depletion

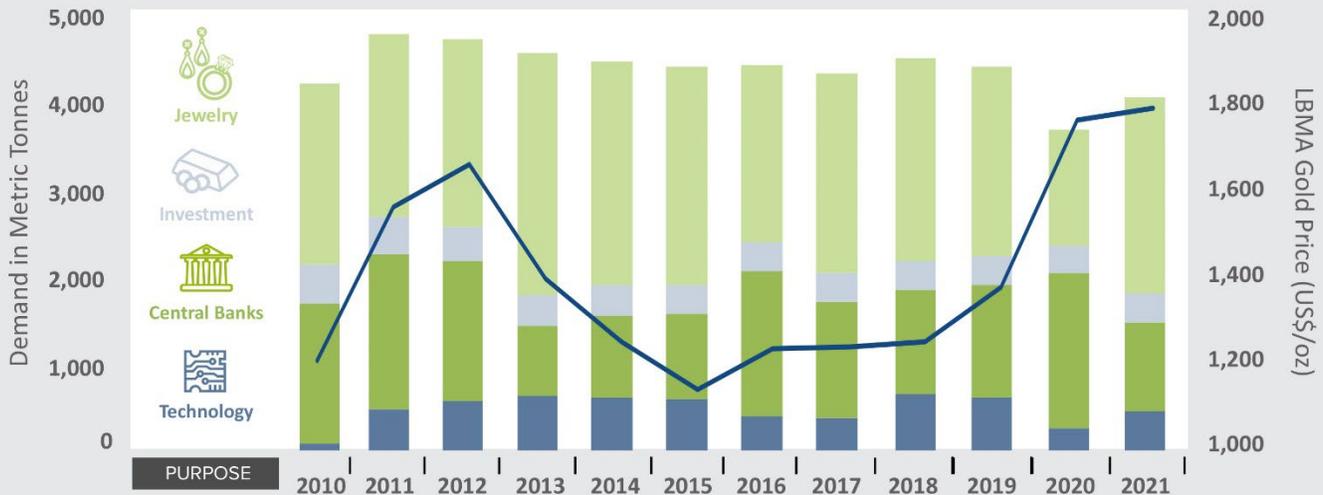
Nothing lasts forever, especially scarce mineral resources. Unless there are more deposits nearby, most mines are eventually depleted and so does the value of the mining company. Investors should be looking for an exit as operations wind down.

Demand Dynamics

Gold is a high-value commodity for many reasons. Throughout history, gold has served many purposes. It has emotional, cultural and financial value for people across the globe for different reasons. Gold’s diverse uses from jewelry, technology, industrial and dental applications to central banks and investors, means different sectors of the gold market experience rising demand at varying times in the economic cycle.⁶

Sources of Demand for Gold is Diversified

Annually from 2010 to 2021

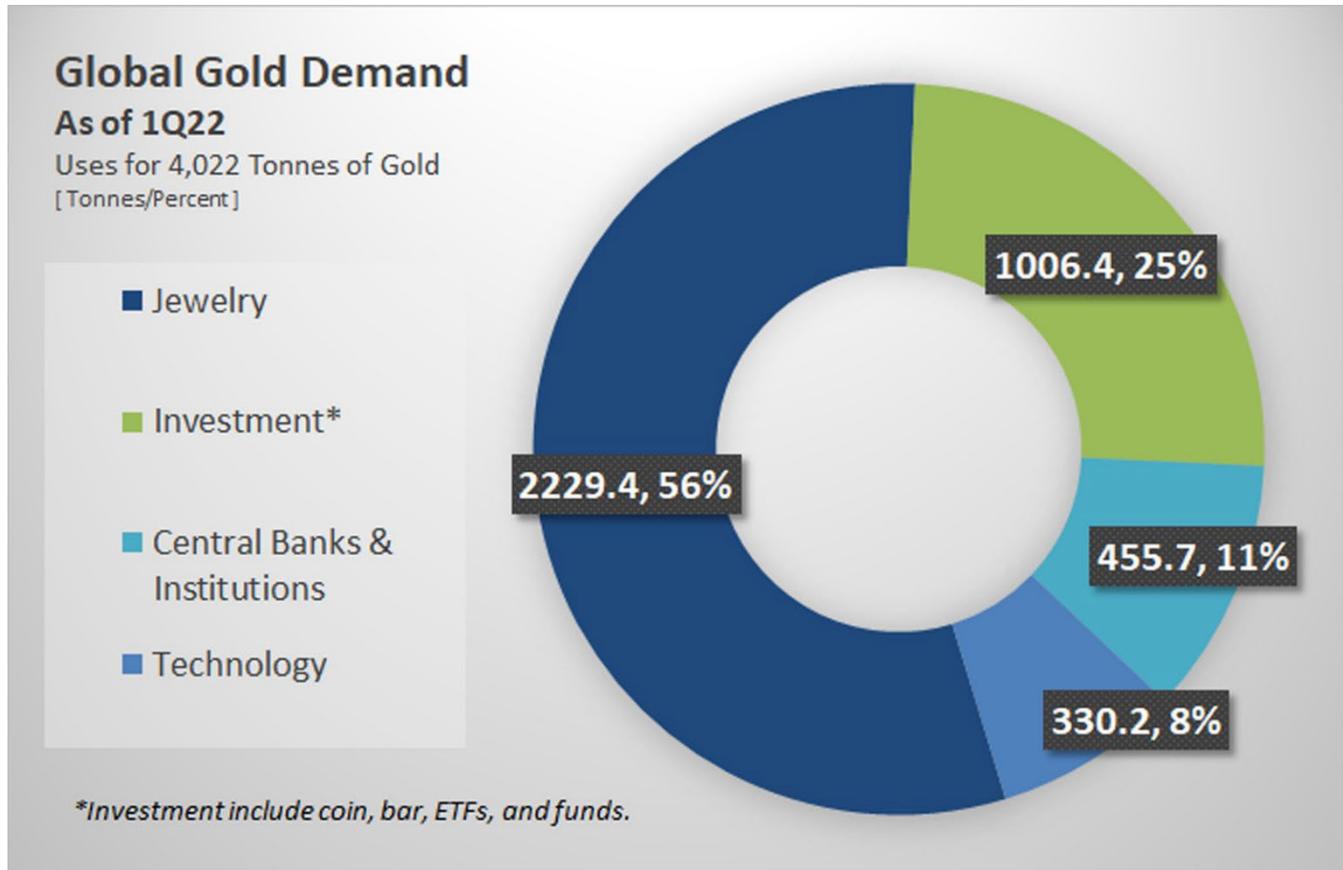


Gold is a high value commodity for many reasons - Throughout history, gold has served many purposes. From gold jewelry, investment, central bank balance sheets, and its many technological uses, the sources of demand vary through time.

Source: World Gold Council

⁶ World Gold Council, <https://www.gold.org/about-gold/gold-demand>

Of the 4,355 tonnes total global gold demand in 2019, nearly half (48.4%) was for jewelry. This demand, fueled by discretionary spending, tends to be the most cyclical over time.



Source: World Gold Council

Breaking out gold’s many technological uses, gold wires are the backbone of the internet and layers of gold help protect astronauts and space equipment from radiation and heat. The auto industry uses gold in catalytic converters. Additionally, gold’s unique chemical properties are used for a wide range of medical, environmental, aerospace and engineering, as well as nano particle technologies.⁷

Geographically, much of the global demand for gold has moved to Asia and the Middle East, driven by wealth creation and income growth in emerging economies.

⁷ World Gold Council, <https://www.gold.org/about-gold/gold-demand/sectors-of-demand/uses-of-gold>

Top Gold Consuming Countries⁸

China

China consumes roughly 984 tonnes of gold per year, importing about two-thirds of the gold it uses. Culturally, it is often gifted to younger members of the family for special occasions and there is a tradition of giving gold to newborn babies in the form of tiny necklaces or gold bracelets. Gold also plays a special role during Chinese New Year when ornate pieces of gold jewelry, often featuring zodiac signs, are purchased for their beauty and value.

India

India is one the largest markets for gold, consuming approximately 849 tonnes of gold per year. Gold plays a central role in the country's culture, as it is considered a store of value, symbol of wealth and status, and a fundamental part of many rituals. Hindus consider the festivals of Dhanteras and Diwali as auspicious occasions for buying gold. Each year, jewelers and companies in India stock up on gold for these occasions.

United States

The U.S. consumes around 103 tonnes of gold per year, mixed between industrial, investment and jewelry use. Weddings are the biggest driver of jewelry demand.

Germany

Consumes close to 124 tonnes of gold per year, mostly for industrial use.

Thailand

Consumes around 90 tonnes per year, mostly for jewelry. Gold jewelry in the form of gold chains and other gold ornaments are sold in shops throughout the country. The price of gold is openly displayed on shop fronts. It is priced in the form of a "baht" of gold, which is about 15 grams.

Saudi Arabia

Consumes an estimated 85 metric tons of gold per year. Saudi Arabian gold jewelry is famous for its quality throughout Asia and represents the largest portion of its consumption.

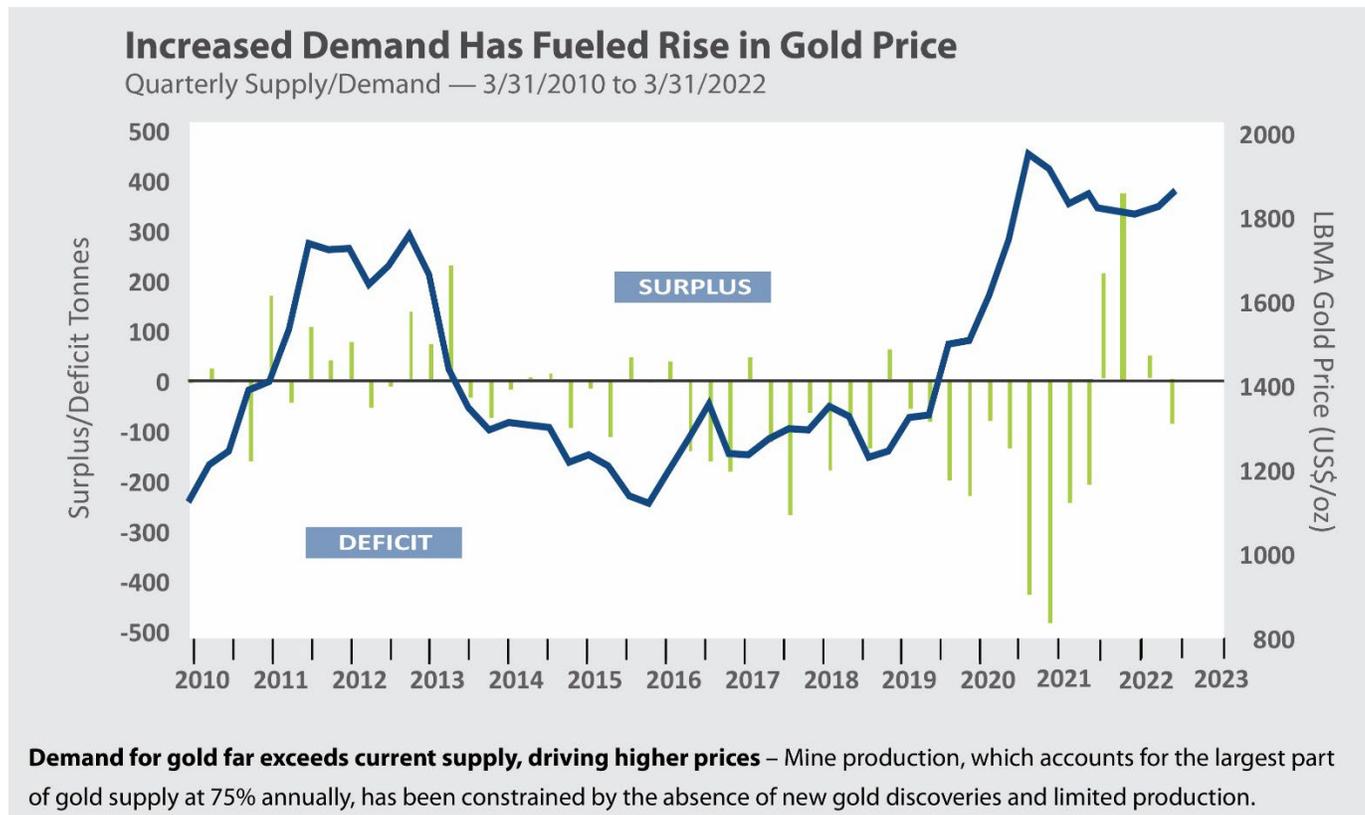
Turkey

Consumes around 72 tonnes annually. Turkey illustrates the broad role gold can play in modern society. Gold is embedded in Turkish culture. Turkish merchants pioneered the use of gold coins in ancient Lydia. Today, gold plays an important and innovative role in Turkey's economy.

⁸ Provident Metals, *Top 10 Gold Consuming Countries*, 2020. <https://www.providentmetals.com/knowledge-center/precious-metals-resources/world-gold-production-consumption.html>

Supply Dynamics – “Peak Gold”

Currently, demand for gold far exceeds supply, driving higher prices. Mine production, which accounts for the largest part of gold supply at 75% annually, has been constrained by the absence of new gold discoveries and limited production.



Source: EQM Indexes, World Gold Council

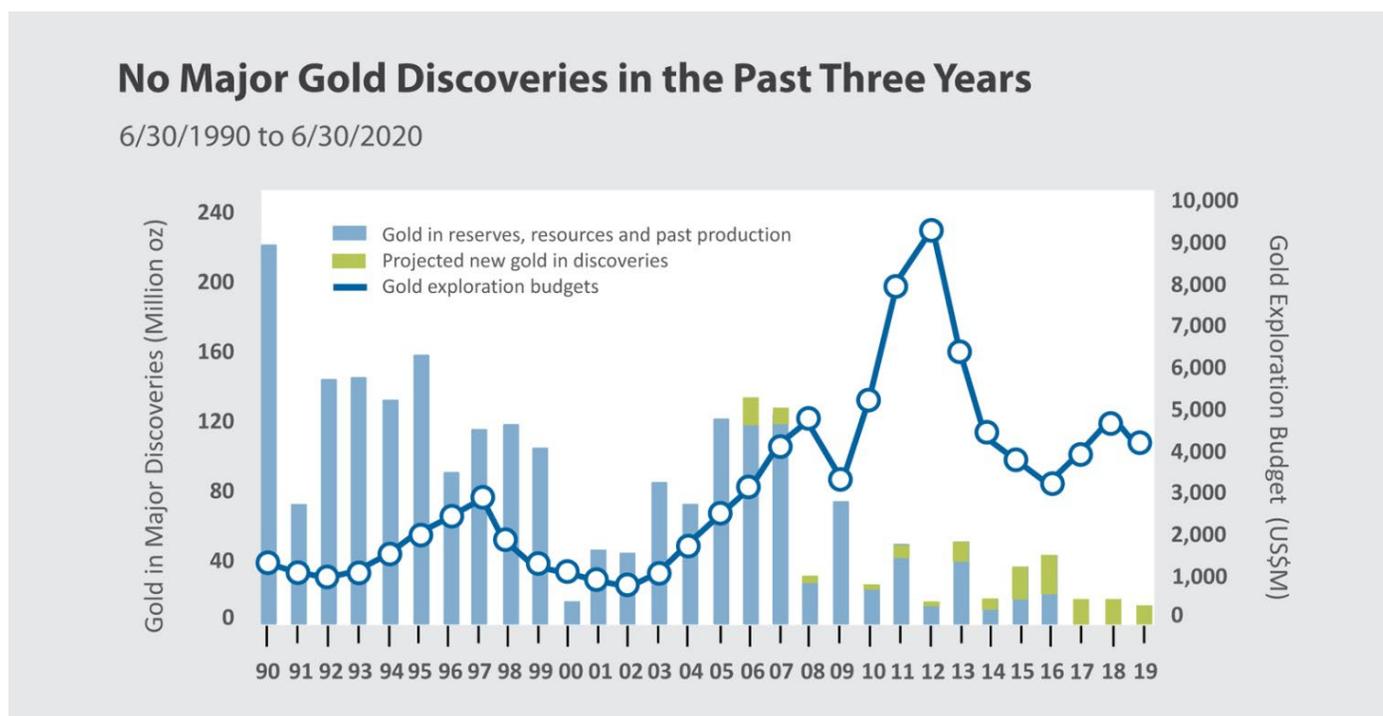
While gold supply is currently supplemented by recycling, with recycled gold representing 27% of total annual gold supply, that alone is not a long-term solution to meet rising demand. The global coronavirus pandemic has placed additional pressures on the industry, disrupting supply chains as mines were forced to shut down at a time when demand for gold was high.

There are concerns that the yellow metal has hit “**peak gold**” as the rate of gold-mine discoveries has declined over the last three decades. Peak gold is the point at which gold discoveries start to decline in the absence of new-found resources. Many scientists predict that “peak gold” could be reached in the next few years.⁹

⁹ Martin, George. *The world is running out of GOLD: Mining experts warn discoveries are shrinking*. Daily Mail, July 13, 2018, <https://www.msn.com/en-in/money/news/the-world-is-running-out-of-gold-mining-experts-warn-discoveries-are-shrinking/ar-AAA0b4m>

While miners have been investing in new exploration, some of the largest and most prolific reserves have already been found and gold miners struggle in the absence of new finds to grow reserves and meet production demand.

Mining companies have been focused on advanced-stage assets and known deposits rather than searching for new discoveries. This has resulted in a decades-long decline in new discoveries with basically no new major finds in the past three years. Only 25 deposits were discovered over the last decade, containing only 154.3 million ounces, or 7% of all gold discovered during the period.¹⁰



Source: S&P Global Market Intelligence, data as of 5/1/2020

The share of gold exploration budgets focused on “grassroots” exploration has fallen by half since the 1990s. Both pure explorers and producers had shifted their spending, with juniors increasingly focused on known deposits while senior producers have just focused on exploring their existing operations.

In addition, the average grade of new deposits, the amount of gold that can be extracted per tonne, appears to be in decline, falling from over 10 grams per tonne in the early 1970s to approximately 1.4 grams per tonne today.¹¹ New grassroots exploration is needed to ensure the supply pipeline has enough “quality assets” to replace aging mines.

¹⁰ S&P Global Market Intelligence, *A Decade of Underperformance for Gold Discoveries*, June 4, 2020, <https://www.spglobal.com/marketintelligence/en/news-insights/blog/a-decade-of-underperformance-for-gold-discoveries>

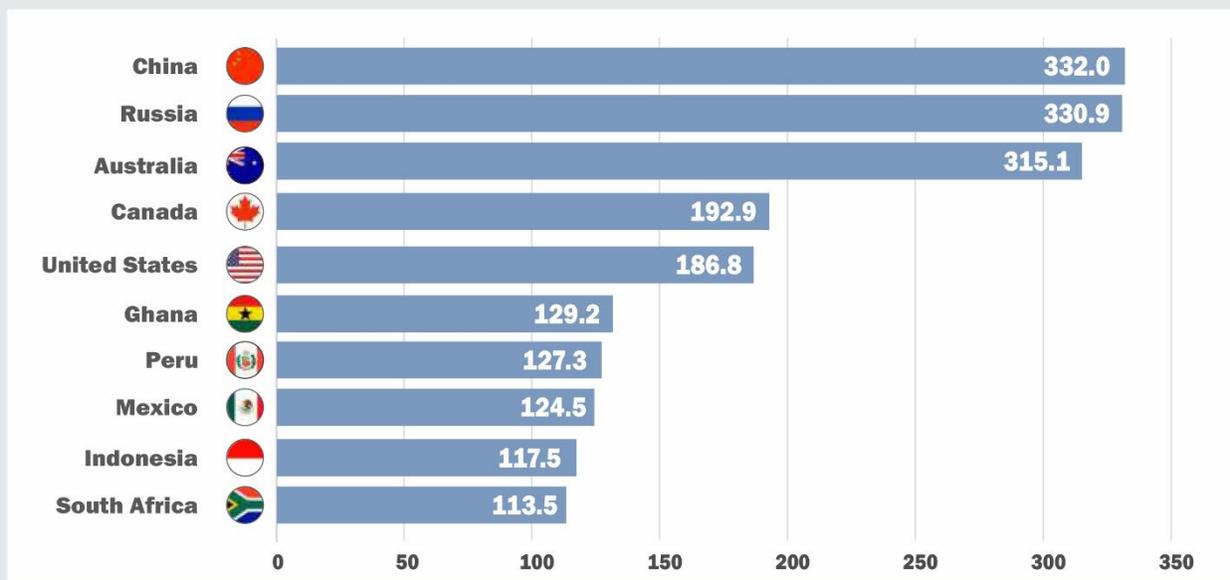
¹¹ *Is the world running out of gold?*, Deutsche Welle, 2020, <https://www.dw.com/en/is-the-world-running-out-of-gold/a-47974833>

The lack of new supply in the face of rising demand is expected to drive more capital investment into the mining space, in particular toward exploratory and junior gold miners. This creates investment opportunities for companies involved in the exploratory and junior gold mining space, whose operations are leveraged to the supply-demand imbalance in gold. Given the length of time required to explore, delineate, permit, finance and build new mines, this also creates competitive moats and favors M&A and industry consolidation as a faster way to replenish dwindling reserves.¹²

Until recently, low gold prices were to blame for the lack of capital investment into gold exploration. However, with current prices hitting historic high levels approaching \$2,000 an ounce, levels not seen since the 2011 to 2012 peaks, new investment in gold exploration makes increasing sense from an ROI standpoint. While countries like China, Russia and Australia currently lead in gold production output, new exploration will likely take place in emerging market regions such as Latin America and Africa as developed-market mines become depleted.

Top 10 Gold Producing Countries in 2021

Annual Gold Output in Tonnes



Gold is one of the rarest elements in the world – In 2021, global gold mine production was reported at 3,581 tonnes.

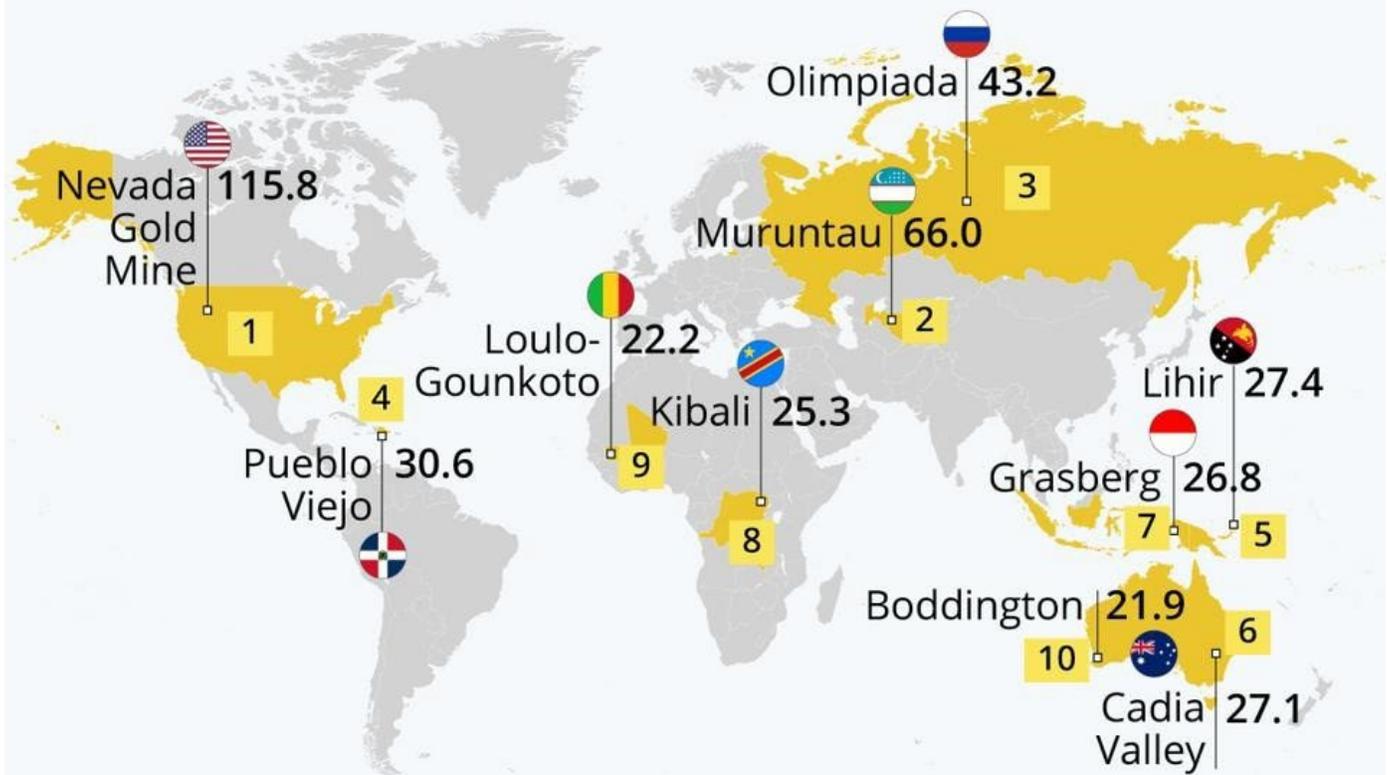
Source: EQM Indexes, World Gold Council

¹² Hanley, Ryan. Analyst, Laurentian Bank Securities.

Where are the world's largest gold mines by tonnes of annual production?

The World's Biggest Gold Mines

Top gold mines by tonnes of gold produced annually*



* Latest available data as of September 2020

Source: World Gold Council via BBC

Source: World Gold Council via BBC

According to the World Gold Council, Nevada gold mines in the United States produce 115.8 tonnes of gold per year, the highest amount on the planet by a significant measure. The Muruntau Gold Mine in Uzbekistan's Qizilqum Desert is the world's largest open-pit gold mine and it comes second in annual production with 66 tonnes. Russia's Olimpiada gold deposit was discovered in the Severo-Yeniseysky District in 1975 and the mining operation there is the third largest globally by volume with 43.2 tonnes mined per year.

Investment Case for Physical Gold

Safe Haven During Times of Market Volatility

In the current market environment, the investment case for physical gold ownership seems particularly appealing. Historically, gold has been a safe haven asset benefiting from the flight to quality. During the 2008 global financial crisis, gold was one of the few asset classes to deliver positive returns, up 5.8% compared to the stock market's (as measured by the S&P 500 Index's/MSCI World Index's) near-40% decline. Indeed in 2022, gold prices have held up well relative to equities during the global pandemic, Russian invasion of Ukraine and rising rate environment, down only 1.508.49% YTD (as of 9/31/2020)¹³ versus the S&P 500 PR Index's loss of -5.75% over the same time period. Gold is an attractive alternative during times of market volatility, providing an uncorrelated source of portfolio diversification relative to other asset classes.

Store of Value in Low to Negative Interest-Rate Environment

In recent years, an increasing number of central banks have resorted to low interest-rate policies. Several, including the European Central Bank and the central banks of Denmark, Japan, Sweden and Switzerland, have started experimenting with negative interest rates—essentially making banks pay to park their excess cash at the central bank. This situation has been further exacerbated by monetary stimulus measures to stave off a global pandemic-induced recession. The eroding value of cash deposits paying zero to negative interest rates makes gold an attractive cash alternative. Indeed, even in the absence of a gold standard, the world's central banks have been a key source of gold demand since 2010, holding more than 35,000 tonnes of gold reserves.¹⁴

Currency and Inflation Hedge

Another factor supportive of owning gold in the current market environment is as a store of value. Gold acts as a hedge in the event of currency devaluation and/or during periods of inflation. One of the macroeconomic side effects of central bank efforts to avoid an economic recession has been currency debasement, as massive liquidity has been pumped into the financial system. While current inflation expectations are very low, at some point, the past years' unprecedented economic stimulus and liquidity injections are likely to become inflationary.

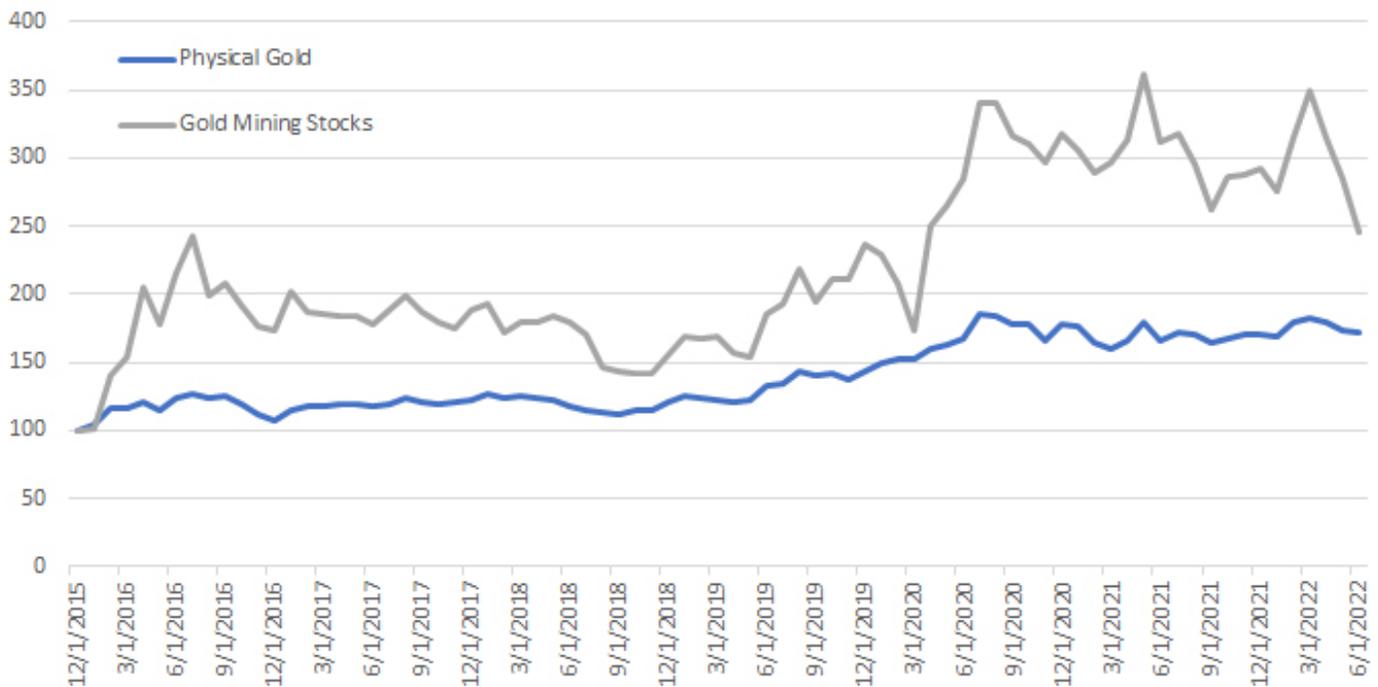
¹³ LBMA Gold Price AM YTD return, as of 9/30/2020, per Bloomberg.

¹⁴ *Latest World Official Gold Reserves*, IMF data and World Gold Council, October 2020, <https://www.gold.org/goldhub/data/monthly-central-bank-statistics>

Investment Case for Owning Gold Equities

The factors making physical gold an attractive investment are also positives for gold mining stocks. Mining stocks have earnings and operating leverage potential tied to rising gold prices. Since gold's decade-low price of \$1,051 per ounce on 12/17/2015, the performance of gold and precious metal equities have outpaced that of physical gold, except for a brief risk-off convergence during the initial pandemic shutdown in March 2020.

Gold Mining Stocks Have Outpaced Physical Gold



Source: Bloomberg; Physical Gold (LBMA Gold Price AM), Gold Mining Stocks (NYSE ARCA Gold Miners TR Index) as of 6/30/2022

In addition, during this current bull cycle, balance sheets look much stronger as most miners have generated cash, and management teams have stayed more disciplined about leverage, capital expenditures and acquisitions. Given the current low production-cost inflation environment, coupled with favorable gold prices, efficient operators have been rewarded with margin expansion.

Blended Exposure: Gold and Gold Mining Stocks

A strong case can be made for blended positions in physical gold and gold mining equities. In periods of rising gold prices, gold mining stocks have historically outpaced the upside performance of the physical metal, benefiting from operating leverage and the amplification of earnings. At the portfolio level, the defensive characteristics of gold blend well with the upside optionality of gold mining stocks. As demonstrated in the correlation matrix, both gold and gold miners have a low correlation to stocks and bonds and gold stocks have a lower correlation to bonds than gold itself. In addition, owning gold mining stocks provides other benefits of stock ownership such as dividend income and corporate actions, which are not available to investors in gold bullion.

Monthly Return Asset Correlations

	Gold Equities	Gold	Bonds	Stocks
Gold Equities	1.00	0.79	0.32	0.19
Gold	0.79	1.00	0.38	0.06
Bonds	0.32	0.38	1.00	.12
Stocks	0.19	0.06	.12	1.00

Source: Bloomberg, 5/31/2012 – 5/31/2022¹⁵

The Investment Case for Owning Junior Mining Stocks

In a rising gold-price environment, coupled with rising demand and constrained supply, the investment case for owning exploratory and junior miners is even more compelling as they have the most operating leverage and earnings upside to rising gold prices. Furthermore, as capital investment moves into the mining space in support of new exploration during “peak gold” conditions, this also favors the exploratory and junior producers. These companies are also the most likely to be acquisition targets as it is much easier for senior producers to buy capacity given the length of time required to explore, delineate, permit, finance and build new mines. Additionally, this creates competitive moats for exploratory and junior producers.

Investment in **Exploratory Gold Producers**, which we define as companies in pre-production, not yet producing gold, and **Junior Gold Producers**, defined as companies producing less than 1 million troy ounces per year or the royalty equivalent, provides an attractive opportunity given the favorable supply-demand dynamics associated with rising gold prices. Indeed historically, in previous bull cycles, junior gold mining stocks have outperformed the physical metal. By targeting metrics such as gold revenue percentage and production levels, the EQM Pure Junior Gold Mining Index seeks to provide investors with “pure play” access to this important subset of the global gold mining industry.

¹⁵ Gold Equities = NYSE Arca Gold Miners TR Index, Gold = LBMA Gold Price AM, Bonds = Barclays Aggregate Bond, Stocks = S&P 500 Index.

What Is a Junior Miner?

Equity investors have long categorized stocks by their market capitalization. Currently, there are products that focus on large-, mid and small, not to mention mega and micro- capitalization ranges.

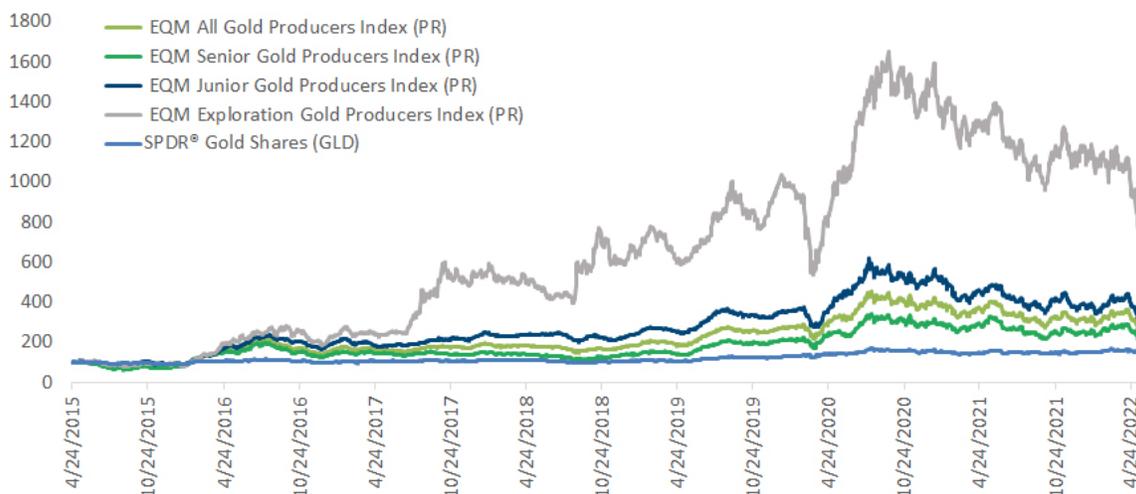
While there may be some disagreement over the delineations among these categories, there is a general consensus as to what belongs in each bucket. When talking about gold mining stocks, the market-capitalization conventions become problematic as there are those that still try and equate market capitalization with a gold miners “size.”

Generally speaking, there are three classification types of gold miners, although some equity research firms may get more granular in their definitions: Exploration, Junior and Senior Miners.

Exploration companies are companies that are doing just that, exploring for gold using some of the techniques and processes we outlined earlier. It is not until a miner has established operations and has had its “first pour”¹⁶ that it ceases to be classified as an exploration company and officially becomes a miner.

The process of graduating from being an exploration company to a junior miner can take years and millions in operating capital. Needless to say, exploration companies are extremely risky ventures. This and other observations are explained in the results of a recently conducted study.

Where it begins to get interesting from a classification perspective is when investors try to draw the line and differentiate between “Junior” and “Senior” producers. In our study of the 96 companies in those categories we found¹⁷, 11 miners produced over 1,000,000 ounces of gold annually (Senior Producers) over the period, 73 produced less than 1,000,000 ounces (Junior Producers) and 12 were still in the exploration (Exploration Producers) stage of development. **We created dollar equal-weighted time series for each of these groups and observed the following:**



¹⁶ *Detour Gold First Gold Pour*, March 4, 2013. <https://www.youtube.com/watch?v=-tAqoAaytzE>

¹⁷ We collected and aggregated the holdings of all US listed gold mining ETFs as of 5/31/2022 in order to establish a base universe to conduct the study.

Annualized Returns <i>As of 5/31/2022</i>	1 Year	3 year	5 year	Since Inception
Gold Spot Price (AM)	-3.22%	12.37%	7.79%	6.29%
All Gold Producers Index (PR)	-30.31%	11.96%	11.88%	15.58%
Senior Gold Producers Index (PR)	-30.08%	14.08%	9.35%	12.07%
Junior Gold Producers Index (PR)	-29.28%	9.14%	13.06%	18.88%
Exploration Gold Producers Index (PR)	-41.78%	7.66%	26.75%	34.27%

We then compared those returns to gold spot returns and found that the three classifications not only produced markedly different absolute return streams but that they also provided for some interesting observations on a risk-adjusted basis as well.

In as much as there is an intuitive sense that junior miners present less risk than exploration companies and more opportunity for growth than senior miners, that intuition has been proven correct. We found that on a risk-adjusted basis, the grouping of miners producing between 0 and 1,000,000 ounces provided for the best Sharpe ratios.

	Annualized Return (12/31/2015 – 5/31/2022)	Standard Deviation	US Generic 3-Month Yield	Sharpe Ratio
Gold Spot Price (AM)	8.92%	16.90%	1.07%	0.46
All Gold Producers Index (PR)	20.61%	27.07%	1.09%	0.72
Senior Gold Producers Index (PR)	17.96%	29.45%	1.07%	0.57
Junior Gold Producers Index (PR)	21.89%	28.02%	1.07%	0.74
Exploration Gold Producers Index (PR)	39.84%	48.40%	1.07%	0.80

Unsurprisingly, the correlation between spot gold and these various buckets followed this same trend of the largest producers being tied most closely to spot gold prices and the junior and exploration names becoming less and less tied to changes in spot gold prices.

As of 5/31/2022	Spot Gold Price (AM)		
	5 Years	3 Years	1 Year
Gold Spot Price (AM)	-	-	-
All Gold Producers Index (PR)	0.4988	0.5253	0.6026
Senior Gold Producers Index (PR)	0.5333	0.5563	0.6205
Junior Gold Producers Index (PR)	0.3840	0.4206	0.5332
Exploration Gold Producers Index (PR)	0.2182	0.2936	0.3491

How to Value a Junior Miner

As with all companies, equity valuation of gold miners is an exercise of discounting cast flows to the present. Unlike many other industries, gold miners have a much better sense of their revenue potential given changes in the price of gold simply because unlike many other industries, it is almost guaranteed that the market will buy every ounce they produce. The initial geological surveys give a fairly firm estimate of the anticipated resources available to mine.

As operations commence, those estimates become more and more a reality. A company's operations are built with specific processing targets in mind and given the estimates of available gold and its concentration in the surrounding ore, a "life of mine" timeline can also be estimated. Once these companies have established a baseline for production, it is a relatively easy process to estimate revenues based on expected move in the gold spot price.

An industry group known as the World Gold Council developed a metric to create a standard baseline expense measure called the "All-In Sustaining Cost" or AISC. Besides being a non-GAAP metric, AISC measures a number of income and cash flow statement items to arrive at a kind of holistic cost-of-goods-sold metric specific to gold miners. Exploration companies are much more difficult to value.

If an exploration company surveys land in an existing active mining area that is favorable and if the area is previously unexplored, the level of uncertainty is significantly higher. Even if an exploration company's claim has an extremely favorable geological profile, it may be undercapitalized or simply not have a senior team in place experienced or savvy enough to manage the company's journey from exploration to an operational junior miner.

How to Invest in Junior Mining Companies

Exploratory and junior gold mining stocks are a classic investment example of high reward, coupled with higher risk profiles. Investing in individual companies is highly speculative and fraught with risk. But our results demonstrate that these risks can be mitigated by pursuing a diversified, index-based approach.

Conclusion

- The current volatile market environment supports the case for gold as a safe haven asset investment, serving as a store of value during this period of low to negative interest rates, currency debasement and inflationary concerns.
- Investors have the choice to own physical gold, gold mining stocks, or a blend of these exposures.
- Gold mining stocks provide operating leverage and earnings-amplification potential and have historically outperformed physical gold during gold bull-market cycles.
- The case for junior mining stocks is even more compelling given the “peak gold” scenario where gold demand and gold prices are rising but capital investment and new exploration has failed to keep pace.
- To meet rising demand for gold, capital investment and acquisition activity favors exposure to pure-play junior gold mining names, defined not just by standard definitions such as market capitalization, but based on revenue and production levels.
- The risk of owning individual exploratory and junior gold mining stocks can be reduced by owning a diversified basket of names in a rule-based index product.

ABOUT US

EQM INDEXES LLC.

EQM Indexes LLC is a woman-owned firm dedicated to creating and supporting innovative indexes that track growth industries and emerging investment themes. Co-founded by Jane Edmondson, a former Institutional Portfolio Manager with almost 30 years in the investment industry, our index design expertise spans a wide range of asset classes and financial instruments.

We partner with issuers and work jointly with other index firms to provide benchmarks for Exchange Traded Products (ETPs) such as Exchange Traded Funds (ETFs), Exchange Traded Notes (ETNs), and other similar products. EQM Indexes LLC also assists firms on a fee basis to design and implement their index ideas.

EQM Indexes does not offer investment advice, nor offer the sale of securities.

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EQM Indexes, LLC (“EQM Indexes”) is a woman-owned firm dedicated to creating and supporting indexes that track growth industries and emerging investment themes. Co-founded by Jane Edmondson, a former Institutional Portfolio Manager with nearly 30 years of investment industry experience, EQM Indexes’ index designs spans a wide range of asset classes and financial instruments. EQM Indexes does not provide investment advice, nor offer the sale of securities, but does partner and receive compensation in connection with licensing its indices to third parties to serve as benchmarks for Exchange Traded Products (“ETPs”) such as Exchange Traded Funds (“ETFs”), Exchange Traded Notes (“ETNs”), and other similar products. All information provided by EQM Indexes is impersonal and not tailored to the needs of any person, entity or group of persons.

The EQM Pure Junior Gold Miners Index (“JRGOLD” or the “Index” intends to provide exposure to global companies engaged in junior and exploratory gold mining. Index components must derive at least 75% of the revenues from the sale of gold or through gold royalty agreements, or for exploratory gold producers, 75% of surveyed deposits must be attributable to gold. Components are either Junior Gold Producers (companies producing less than 1 million troy ounces of gold per year or royalties less than 1 million equivalent troy ounces per year or Exploratory Gold Producers, companies in pre-production (0 troy ounces of gold produced per year).

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DEFINITIONS

Corporate Action – Activity that brings material change to an organization and impacts its stakeholders.

Discounted Cash Flow – A valuation method estimating an investment's value based on its expected future cash flows.

Peak Gold – The point at which gold discoveries start to decline in the absence of new resources to find.

Sharpe Ratio – Measures the return of an investment compared to its risk.

Standard Deviation – Measures the dispersion of a data set relative to its mean.

Return on Investment – Measures the efficiency of an investment relative to the investment's cost.

Tonne – A metric tonne equates to 32,150.7 troy ounces of gold.