Precious and base metals overview

Trends and facts for silver, gold, zinc and lead

Prepared for Sotkamo Silver

London, 31 January 2014
Limitations

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This document is not intended to provide any investment advice for precious- or base metals, or any other markets or products but solely represent an educational and informative analysis of the markets for silver, gold, zinc and lead as they apply to Sotkamo Silver’s operations.
Introduction – [1/3]

Background and scope

- This document has been prepared by Metals International for Sotkamo Silver
- The material is intended to provide an overview of the silver, gold, lead and zinc markets and to be used for investor communication purposes on websites and in presentations

Structure of this presentation

- This document gives detailed insight into Sotkamo Silver’s main area of operation, which is silver. It also covers gold, zinc and lead as the price trends for these metals have an impact on silver resources
- Each metal is covered in three sections:
  - Overview
  - Supply & demand
  - Applications
Precious and base metals overview
Trends and facts for silver, gold, zinc and lead

Sotkamo Silver and the metal market
• The value of Sotkamo Silver's ore resources are affected by the silver, gold and zinc price trends
• The prices of base metals (zinc, lead, copper, aluminum, etc.) are strongly influenced by the global industrial economy
• The price of silver, however, follows a slightly different pattern being both an industrial metal as well as a precious metal
• Demand for gold is primarily driven by private consumption and private investment

Base metals – a snapshot
• Base metal prices are limited downwards by beneficiation costs, but have no theoretical limit to the upside
• The price trend of base metals was upward from 2002 to the middle of 2008 but fell sharply during the financial crisis
• Prices did recover significantly in 2009 though and rallied until mid-2011 when most commodity markets fell. Since then prices have been more choppy
• The supply of base metals increases with a lag, due to the long lead times from exploration permits to mining operations and also because of the exploration budgets that were sharply reduced in the early 2000s, when metal prices were substantially lower
• Looking forward, the demand for zinc specifically looks promising due to increased demand from emerging markets and potential supply constraints
Precious metals – a snapshot

• The prices of precious metals are affected by both industrial demand (for silver, platinum and palladium) as well as private consumption, in for example jewelry, and investments in bars and coins

• Gold and silver have enjoyed a strong secular bull market since the early 2000’s, and even though they saw a fall during the financial crisis of 2008–2009 prices quickly recovered and reached new highs

• It wasn’t until mid-2011 when a cyclical downturn dragged markets down further

• In early 2014 gold and silver seem to have stabilized and both technical and fundamental drivers looks stronger than in a long time

• There are furthermore issues with supply constraints due to the prolonged period of falling prices

• Still, it’s too early to say if prices have reached a final bottom from where a new leg in the bull market can be initiated
The secular bull market for silver still seems to be intact

- Silver has enjoyed a strong secular bull market since the early 2000’s - due to ease of trading through new securities such as ETFs, due to increasing demand from emerging economies in Asia, Latin America and the Middle East and because of a general increase in investment and industrial demand.

- In the wake of the 2008 financial crisis silver sold-off as precious metals were liquidated to offset portfolio losses, only to reach new highs shortly thereafter.

- Since the peak in 2011 there has been a natural break in the bull run, partly because stimulus efforts have fueled risky assets and reduced safe haven demand for precious metals.

- Silver is cheap today in comparison to gold, from a historical perspective, as illustrated by the gold/silver ratio.
Attractive opportunities in silver today

- The price of silver has fallen with over 56%, from $47.84 in the end of April 2011 to $20.11 by end of January 2014
- This drop has to a large extent been driven by QE tapering fears and a general negative sentiment for precious metals safe haven demand, especially for gold with heavy ETF outflows which has affected silver negatively
- The mining sector has suffered a significant correction since early 2011 parallel to the fall in silver prices
- From a historical perspective there is now great value and opportunity in the mining space. Still, prices will be affected by the overall movements in silver futures

Silver spot price)
Years 2008–2013 (USD)

Silver miners ETF compared to S&P 500
April 2010 – Jan 2014 performance

Source: Bloomberg, Metals International analysis
Precious and base metals overview
Trends and facts for silver, gold, zinc and lead

Silver
• Overview
• Supply and demand
• Applications

Gold

Zinc

Lead

Extreme negative sentiment signals a potential reverse

• In the past, bearish sentiment like we currently are seeing in futures positions has lead to significant gains – as in 2007–2008 and 2008–2011
• The longevity of a potential rally is still unclear as it will be determined by many factors, both technical and fundamental

Large speculators’ net positions vs. silver price
2006–2013

Source: Bloomberg, Metals International analysis
Precious and base metals overview
Trends and facts for silver, gold, zinc and lead

Similarities between past and present bull markets

- During the bull market in silver of the 1970's, the spot price decreased with 43% in an intermediate cycle low. In the current cycle, the low point has been a 61% thus far.

- The low point in the 1970's was reached after 482 trading days, after which it took an additional 779 trading days to reach the previous high – for a total of 1261 trading days from intermediate top–to bottom–back to intermediate top. The drop in the current bull market has been both longer and deeper.

Silver – comparison of cycle correction
1974 to 1979 versus Current correction (indexed to 100)

Source: Bloomberg, Metals International analysis

Dates:
- Feb 26, 1974 – Feb 26, 1979
- Apr 27, 2011 – Sept 12, 2013
Investment interest is soaring despite a drop in the silver price

- Since 2008 the total demand for silver has increased by 18% and thus remain strong while there are question marks regarding supply levels – indicating a potential price trend reversal
- Investment demand (implied net investment and coins & medals) has become increasingly important components of total demand
- Investments in physical silver bullion have also been soaring at times when the spot price for silver has dropped significantly, like it did in April and May 2013
- Silver ETFs have seen a slight inflow for 2013 but have not suffered nearly as much as gold ETFs which have seen a more profound exodus of capital
- Total mine supply is up for the tenth consecutive year but the total silver supply has decreased since the top in 2010. There is furthermore a possibility of supply constraints given the magnitude of the drop in the silver price

Silver demand and price
2008–2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand (million ounces)</th>
<th>Price (London USD/oz.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>800</td>
<td>10</td>
</tr>
<tr>
<td>2009</td>
<td>900</td>
<td>10</td>
</tr>
<tr>
<td>2010</td>
<td>1100</td>
<td>40</td>
</tr>
<tr>
<td>2011</td>
<td>1200</td>
<td>40</td>
</tr>
<tr>
<td>2012</td>
<td>1200</td>
<td>40</td>
</tr>
</tbody>
</table>

Source: Bloomberg, Silver Institute; Metals International analysis

Coin sales and spot price

<table>
<thead>
<tr>
<th>Year</th>
<th>Sold coins (million ounces)</th>
<th>Spot price (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1</td>
<td>$10</td>
</tr>
<tr>
<td>2007</td>
<td>2</td>
<td>$20</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>$10</td>
</tr>
<tr>
<td>2009</td>
<td>4</td>
<td>$10</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>$10</td>
</tr>
<tr>
<td>2011</td>
<td>6</td>
<td>$10</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>$10</td>
</tr>
<tr>
<td>2013</td>
<td>8</td>
<td>$10</td>
</tr>
</tbody>
</table>

Source: Bloomberg, United States MINT, Metals International analysis
### Overview of global silver supply and demand

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUPPLY, by type:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mine Production</td>
<td>684.7</td>
<td>709.6</td>
<td>751.4</td>
<td>757.0</td>
<td>787.0</td>
</tr>
<tr>
<td>Net Government Sales</td>
<td>27.6</td>
<td>13.7</td>
<td>44.2</td>
<td>12.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Old Silver Scrap</td>
<td>176.0</td>
<td>165.7</td>
<td>228.7</td>
<td>258.1</td>
<td>253.9</td>
</tr>
<tr>
<td>Producer Hedging</td>
<td>0.0</td>
<td>0.0</td>
<td>50.4</td>
<td>12.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Implied Net Disinvestment</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total Supply</strong></td>
<td>888.3</td>
<td>889.0</td>
<td>1074.7</td>
<td>1039.4</td>
<td>1048.3</td>
</tr>
</tbody>
</table>

| **DEMAND, by type:** |       |       |       |       |       |
| Fabrication, of which: |       |       |       |       |       |
| -Industrial Applications | 443.4 | 352.2 | 500.0 | 487.0 | 465.9 |
| -Jewelry               | 158.3 | 156.6 | 167.4 | 186.5 | 185.6 |
| -Coins & Medals        | 65.2  | 78.7  | 99.4  | 118.3 | 92.7  |
| -Photography           | 104.9 | 82.9  | 72.1  | 66.1  | 57.8  |
| -Silverware            | 56.9  | 59.5  | 51.2  | 48.3  | 44.9  |
| Net government purchases | 0.0 | 0.0   | 0.0   | 0.0   | 0.0   |
| Producer de-hedging    | 11.6  | 22.3  | 0.0   | 0.0   | 41.5  |
| Implied net investment | 48.2  | 136.9 | 184.6 | 132.3 | 160.0 |
| **Total Demand**       | 888.4 | 889.0 | 1074.7| 1039.4| 1048.3|

**Silver Price (London US$/oz)**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
</table>

Source: Silver Institute, Bloomberg, Metals International analysis
Global silver supply fell between 2010 and 2012

- Global silver mine production grew in 2012 by 4% for the tenth year in a row
- Since 2008 the above-ground silver supply has grown by 8.7%, but it decreased by 7.5% to 261 million ounces in 2012 – as a result of a drop in government stock sales, scrap supply and the absence of net-producer hedging
- Mine production typically accounts for around 65% of total silver supply. Scrap, disinvestment, government sales and producer hedging are other supply sources
  - **Old scrap** – silver that is returned to the market from manufactured goods such as jewelry, computers etc. and which typically makes up about 20% of total supply. Old scrap doesn’t include so called process scrap which never becomes an end product
  - **Disinvestment and government sales** – bars and coins that are returned to the market by the private sector and governments, something which won’t add supply to the market every year
  - **Producer hedging** – early sale by mining companies of future production

**Global silver supply**
Five year overview by type
(million ounces)

Source: World Silver Surveys 2010–2013, Silver Institute; Metals International analysis
Precious and base metals overview
Trends and facts for silver, gold, zinc and lead

Silver
- Overview
- Supply and demand
- Applications

Gold

Zinc

Lead

Lead/zinc by-product output – the largest source of silver supply

Global silver supply (2012)
Breakdown by type (million ounces)

- Most of the 2012 growth in silver supply came from by-product output from the lead/zinc sector
- The majority of silver is actually a by-product from other mining operations – lead/zinc accounted for 39% in 2012, copper 20% and gold 13%
- Primary mine supply represented 28% of total silver supply in 2012

Silver output, split by source metal
Mine production output (2012)

Historical silver output, split by source metal
Share of total mine production output

Source: World Silver Surveys 2010-2013, Silver Institute;
Metals International analysis
Top 15 silver producing countries make up 94% of production

- The top 15 countries together account for 94% of world silver production
- The top five countries accounted for a whole 63% of world silver production in 2012
- Mexico is the largest primary silver producing country and accounts for 21% of global production alone

Top 15 countries of silver mine production (millions of ounces)

Source: Silver Institute; Metals International analysis
South America has the majority of leading primary silver mines

- The top 15 leading silver mines (below) accounted for 20% (158 million ounces) of total silver mine production in 2012 (787 million ounces)
- Most of the leading primary silver mines are located in South America. Australia, Russia, Turkey. The U.S. is also represented in the top 15 list
- The Cannington silver mine in Australia is the world’s largest silver mine and had a production of 32.2 million ounces in 2012 – accounting for 57% of Australia’s total silver mine production that year

**Leading primary silver mines in the world**
By production in 2012 (million ounces)

Source: Silver Institute; Metals International analysis
Silver fabrication is by far the biggest demand component

Global silver demand
Split by type (2012)

- In 2012 the bulk of global silver demand came from fabrication – comprising a whole 81%
- Implied net investment represented 160 million ounces of demand (15%)
- Government purchases (0%) and producer de-hedging (4%) may not always feature, on a net-basis, on the demand side

Global fabrication demand for silver
Split by type of application (2012)

- The main demand component is industrial applications (45% of the total in 2012), followed by jewelry (18%), coins (9%), photography (6%) and silverware (4%)
- The share of photography demand have been decreasing rapidly over the years due to digital technology

Source: World Silver Surveys 2010-2013, Silver Institute; Metals International analysis
Largest growth in coins & medals over the last five years

- Demand from coins and medals grew the most between 2008–2012 with a five year CAGR of 7.3%, followed by jewelry with 3.2%
- Silver fabrication demand from photography and silverware have both experienced a decrease with a five year CAGR of -11.2% and -4.6% respectively
- Between 2008 and 2012 the global fabrication demand for silver grew with an annual compound growth rate (CAGR) of 0.4%
- Total silver demand grew with a five year CAGR of 3.4% mostly driven by increased net government purchases and producer de-hedging

Five year CAGR* global fabrication demand for silver (2008-2012)
By type of application:

<table>
<thead>
<tr>
<th>Application</th>
<th>Five Year CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Applications</td>
<td>1.0%</td>
</tr>
<tr>
<td>Jewelry</td>
<td>3.2%</td>
</tr>
<tr>
<td>Coins &amp; Medals</td>
<td>7.3%</td>
</tr>
<tr>
<td>Photography</td>
<td>-11.2%</td>
</tr>
<tr>
<td>Silverware</td>
<td>-4.6%</td>
</tr>
<tr>
<td>Fabrication, total</td>
<td>0.4%</td>
</tr>
<tr>
<td>Total silver demand*</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

Source: World Silver Surveys 2010-2013, Silver Institute; Metals International analysis
*CAGR: Compound Annual Growth Rate
**Total silver demand: this includes implied net investment, producer de-hedging and net government purchases
Total demand has increased despite a higher silver price

- Between 2008 and 2012 the global demand for silver increased by 160 million ounces while the price of silver doubled from $14.99 to $31.15 per ounce.
- Investment has been one of the main drivers behind the increase in demand in recent years, which is a big contrast to the disinvestment seen during the 1990’s.
- Total investment demand for silver (implied net investment and coins & medals) stands at 253 million ounces, which is roughly $8 billion in value terms – amounting to 24% of total demand. This figure is lower than in 2011 but still considerably higher than the 1.2 billion 2001–2010 annual average in value terms.

Global silver demand
Five year historical breakdown by type
(million ounces)

Source: World Silver Surveys 2010–2013, Silver Institute; Metals International analysis
Asian countries account for the majority of silver consumption

- The U.S. accounted for 22% of total silver consumption in the world in 2010, followed by China (15%), Japan (12%) and India (11%)
- The five largest Asian countries (China, Japan, India, Thailand and South Korea) together represented 44% of global silver consumption, while the four largest European regions (Germany, Italy, UK/Ireland and Belgium) accounted for 13%

Global silver demand
Split by key regions
Year 2010

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
<th>Consumption (m. ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>22%</td>
<td>192m.</td>
</tr>
<tr>
<td>China</td>
<td>15%</td>
<td>129m.</td>
</tr>
<tr>
<td>Japan</td>
<td>12%</td>
<td>103m.</td>
</tr>
<tr>
<td>India</td>
<td>11%</td>
<td>95m.</td>
</tr>
<tr>
<td>Thailand</td>
<td>4%</td>
<td>103m.</td>
</tr>
<tr>
<td>Germany</td>
<td>5%</td>
<td>129m.</td>
</tr>
<tr>
<td>Italy</td>
<td>4%</td>
<td>95m.</td>
</tr>
<tr>
<td>UK and Ireland</td>
<td>2%</td>
<td>194m.</td>
</tr>
<tr>
<td>Belgium</td>
<td>2%</td>
<td>194m.</td>
</tr>
<tr>
<td>South Korea</td>
<td>3%</td>
<td>194m.</td>
</tr>
<tr>
<td>Others</td>
<td>22%</td>
<td>890m.</td>
</tr>
</tbody>
</table>

Total world silver consumption in 2010: 890m. ounces

Size of bubbles proportionally represents consumption in million ounces
Source: GFSM, Silver Institute, Metals International analysis
Investment demand for silver is becoming increasingly important

- During 2013 ETF investors have significantly cut their holdings in gold. Silver ETFs, however, have enjoyed a much more stable ride, showing a positive net inflow for the year, despite a falling spot price.

- Investment in physical silver has become an increasingly important driver for demand over the last three years, reaching 185 million ounces in 2010, 132 million ounces in 2011 and 160 million ounces in 2012.

- It’s interesting to note how physical bullion demand is soaring when the spot price for silver is falling, as displayed by the sales figures for U.S. Mint Silver Eagles below.

Historical coin sales and silver price

Source: Bloomberg, United States MINT, Metals International analysis
There is a continuous growth in the applications for silver

- Silver is a very useful metal with a growing range of areas of application:
  - **Home**
    - Jewelry
    - Décor and tableware
    - Fine photography
    - Insulation and energy saving
    - Alternative energy
  - **Industrial**
    - Batteries
    - Bearings
    - Electronics
    - Catalysts
    - Brazing & soldering
    - Automotive industry
  - **Technology**
    - Green technology
    - Medicine
    - Nano technology
  - **Monetary**
    - Bullion
    - Numismatics
Silver applications explained by category – [1/3]

**Home**

- **Jewelry** – silver is used in all sorts of jewelry, often alloyed with copper as the purest form of silver is too soft. Sterling silver, for example, is 92.5% silver and 7.5% copper.

- **Décor and tableware** – sterling silver has been the standard for silver holloware and silver flatware since the 14th century and is appreciated not only for its looks but also for resisting tarnish very well.

- **Fine photography** – digital photography has to a large part replaced silver’s role in the negative from which an image is made, but silver is still used for fine photography, medical x-ray machines and in motion pictures.

- **Insulation and energy saving** – silver is part of two chemical compounds that increasingly are being used in thermal and electrical insulation – ethylene oxide and formaldehyde.

- **Alternative energy** – Silver is used in 90% of all crystalline silicon photovoltaic cells, which are the most common type of solar cells.

**Industrial**

- **Batteries** – silver oxide batteries are starting to replace lithium batteries, due to environmental and safety concerns, and lithium ion batteries. Considering the focus on health and safety standards as well as the environment in recent years the importance of silver in batteries is likely to grow.
Silver applications explained by category – [2/3]

**Industrial**
- **Bearings** – silver bearings are a key component in many engines due to strength, heat resistance, reduction of friction etc – part of the reasons why it’s used in for example jet engines
- **Electronics** – silver plays a key role in most electronic items that has an on and off switch. Its excellent electrical conductivity makes it a crucial part in everything from printed circuit boards to switches and TV screens
- **Catalysts** – silver is an important catalyst in the production of two major industrial chemicals; ethylene oxide and formaldehyde – both essential ingredients in plastics
- **Brazing & soldering** – silver provides safety, strength and quality in the soldering and brazing of pipes, faucets, ducts and joints
- **Automotive industry** – silver membrane switches are used for every electrical action in a modern car

**Technology**
- **Green technologies** – silver is used in a wide variety of new areas such as solar energy, purification of water and heat resistance in windows and glass
- **Medicine** – due to its antibacterial properties silver is used in many different medical fields and also in x-rays in many developing countries
- **Nanotechnology** – over the last century, products containing nanoscale silver have been commercially available and used in diverse applications such as pigments, photographics, wound treatment, conductive/autostatic composites, catalysts etc. Silver is also used in washing machines, refrigerators, air conditioners, air purifiers and vacuum cleaners to remove bacteria. Nanotechnology is still a new area and scientists are hopeful regarding its future environmental implications
Silver applications explained by category - [3/3]

**Monetary**

- **Bullion** – there is a continuous increase in investment silver bars and coins
- **Numismatics** – similar to bullion, collector’s coins in silver have seen an increased influx of capital
Significant drop in the spot price of gold creates opportunities

- The price of gold has fallen with over 51%, from $1897.46 in the end of August 2011 to $1254.10 by the end of January 2014
- This drop has to a large extent been driven by the fear of tapering of quantitative easing (QE3), the U.S. fiscal cliff and a general negative sentiment, with heavy ETF outflows for gold
- The extreme bearish sentiment that we currently are witnessing in futures positions has often, in the past, lead to significant gains
- Movements in gold will impact the entire precious metals space

Gold (USD spot)
Years 2003-2013

Source: Bloomberg, Metals International analysis

Large speculators’ net positions vs. Gold price
Years 2006-2013

Source: Bloomberg, Metals International analysis
Similarities between current and past bull markets

- During the bull market in gold of the 1970’s, the price decreased significantly in an intermediate cycle low, before staging a come-back and going on to reach new highs. The price performance of the current bull market has, so far, been very similar to the last secular bull market.

Gold—comparison of cycle correction
1974 to 1976 versus Current correction (indexed to 100)

Source: Bloomberg, Metals International analysis
Supply is increasing moderately while demand is strong

- The supply of gold has increased by 14% between 2003–2012, but more recently only increased moderately – by 1.3% when comparing the first half of 2013 with 2012
- Parallel to the fall in the spot price, gold mining companies have seen increased all-in production costs, which now are closer to $1250 per ounce – now the same as the spot price
- To summarize, supply is only increasing moderately and looks set to decrease or remain low if the gold price continues to fall or stay at current levels, due to small production margins
- Meanwhile, demand is continuing to increase, primarily driven by coin and bar investment
- Demand did see a drop of 12% to 856.3 tonnes when comparing Q2 2013 to Q2 2012, primarily due to a falling spot price, but the increase between 2003–2012 has still been a massive 69%

**Total demand and supply**
2003–2012 (tonnes)

**Recent quarterly supply**
Split by type (tonnes)
Strong fundamental drivers for the price of gold

- Key current drivers for gold include:
  - Negative real interest rates
  - Money printing/stimulus
  - Central bank buying
  - Potential re-classification of BASEL risk weightings
  - Institutional (and private) ownership
  - High global debt-to-GDP ratios
  - Competitive currency devaluation
  - Safe haven demand
  - Supply constraints
  - Demand from emerging economies
China is the largest primary gold producer in the world

- The top 15 countries together accounted for 77% of the global gold mine production in 2012
- The top five countries accounted for 46% of total production alone
- China is the largest primary gold producing country, accounting for 14% of global gold mine production

### Top 15 countries of gold mine production (tonnes)

<table>
<thead>
<tr>
<th>Country</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>392</td>
<td>367</td>
</tr>
<tr>
<td>Australia</td>
<td>258</td>
<td>231</td>
</tr>
<tr>
<td>United States</td>
<td>234</td>
<td>218</td>
</tr>
<tr>
<td>Russia</td>
<td>208</td>
<td>192</td>
</tr>
<tr>
<td>Peru</td>
<td>174</td>
<td>170</td>
</tr>
<tr>
<td>Canada</td>
<td>105</td>
<td>98</td>
</tr>
<tr>
<td>Mexico</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>Ghana</td>
<td>69</td>
<td>92</td>
</tr>
<tr>
<td>Indonesia</td>
<td>81</td>
<td>82</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Brazil</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Papua New</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Argentina</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>Mali</td>
<td>62</td>
<td>634</td>
</tr>
<tr>
<td>Others</td>
<td>2,950</td>
<td>2,762</td>
</tr>
</tbody>
</table>

Source: U.S. Geological Survey, Thomson Reuters GFSM, Metals International analysis
Overview of the global gold supply and demand

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUPPLY, by type:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Mine supply</td>
<td>2313</td>
<td>2022</td>
<td>2464</td>
<td>2076</td>
<td>2031</td>
<td>2060</td>
<td>2296</td>
<td>2600.2</td>
<td>2849.6</td>
<td>2824.4</td>
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<tr>
<td>Recycled gold*</td>
<td>1556</td>
<td>1306</td>
<td>1548</td>
<td>1499</td>
<td>1440</td>
<td>1453</td>
<td>1593</td>
<td>1563.7</td>
<td>1649.4</td>
<td>1590.7</td>
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<tr>
<td><strong>Total Supply</strong></td>
<td>3870</td>
<td>3328</td>
<td>4012</td>
<td>3574</td>
<td>3471</td>
<td>3513</td>
<td>4034</td>
<td>4164</td>
<td>4499</td>
<td>4415.1</td>
</tr>
</tbody>
</table>

| **DEMAND, by type:** |      |      |      |      |      |      |      |      |      |      |
| Jewellery          | 2484 | 2616 | 2719 | 2300 | 2423 | 2304 | 1816 | 2020 | 1975 | 1896 |
| Total bar and coin investm | 304   | 354   | 398   | 417   | 438   | 875   | 791   | 1218   | 1519   | 1256 |
| Central banks      | -620  | -479  | -663  | -365  | -484  | -235  | -34   | 77    | 457   | 544  |
| Technology         | 386   | 419   | 438   | 468   | 476   | 431   | 410   | 465   | 452   | 407  |
| ETFs and similar   | 0     | 133   | 208   | 260   | 253   | 321   | 623   | 382   | 185   | 279  |
| **Total Demand**   | 2594  | 3043  | 3100  | 3080  | 3106  | 3726  | 3606  | 4163  | 4587  | 4383 |

*incl. official sector sales

Source: World Gold Council, Metals International analysis
Precious and base metals overview
Trends and facts for silver, gold, zinc and lead

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Lead

Production has increased but higher cost can still restrain supply

- Global gold supply (recycled gold and mine production incl. net producer hedging) has increased by 14% between 2003 and 2012
- The supply reached a low in 2004 and a high in 2011
- 2012 was the fourth year of growth in mine supply (excluding net producer hedging) and a third successive record
- Global gold mine production increased in the first half of 2013 by only 1.3%, or 19 tonnes, compared to 2012
- Average total cash costs rose by 7%, to $782 per ounce, a new record high on a half year basis
- All-in costs continued to escalate and are estimated to have risen to $1,250 per ounce – primary driven by higher grades and labour costs

Historical supply globally
Split by mine supply and recycled gold, 2003–2012

![Historical supply graph]
Source: World Gold Council, Metals International analysis

Global gold supply
Recent quarterly breakdown by type of supply

![Global gold supply graph]
Source: World Gold Council, Metals International analysis
Mixed picture for gold demand

- Between 2003–2012 gold demand increased by a whole 69%, to a large extent fuelled by bar and coin investment

- Demand did, however, experience a drop of 12% to 856.3 tonnes when comparing Q2 2013 to Q2 2012

- Much of the decrease can be attributed to the significant outflows in ETFs since the top in gold prices in early 2011. There’s also been a decrease in central bank purchases

- Despite a significant fall in the gold price, bullion investment demand has soared and jewelry demand remains sturdy, increasing by 37%

Total demand
2003–2012 (tonnes)

Source: World Gold Council, Metals International analysis
Demand from bars and coins have increased in the last years

- Demand from jewelry has been decreasing in proportion to overall demand (and in absolute numbers), from representing over 60% in 2003 to just over 40% of demand in 2012
- The largest increase over the last few years has been in total bar and coin investments, which has grown from 12% of total demand in 2003 to over 28% in 2012
- Central banks started to account for positive demand in 2010 again following a period of net sell-offs in 2003 to 2009
- ETF demand experienced a high in 2009 but has mostly been decreasing since then

Breakdown of demand by type
Share of total

Source: World Gold Council, Metals International analysis
Jewelry demand is dominated by China and India

- Jewelry demand is dominated by India and China who together account for 57% of the world's total jewelry demand.
- India, China, Middle East, and the USA together account for 71% (1,353 tonnes) of total jewelry demand (1,908 tonnes).
- European demand for jewelry mainly comes from Italy (24 tonnes) and the UK (21 tonnes).

Global jewelry demand
Split by key regions (tonnes)
Year 2012

USA 108
Europe 45
Middle East 148
China 544
India 552
Other APAC 72

Notes:
- China includes Hong Kong and Taiwan
- Middle East includes Saudi Arabia, Egypt, UAE and other Gulf states
- Other APAC includes Japan, Indonesia, South Korea, Thailand and Vietnam

Size of bubbles proportionally represents demand in tonnes
Source: World Gold Council, Metals International analysis
Precious and base metals overview
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Europe, India and China are dominating bar and coin demand

- India accounts for 25% of global bar and coin demand alone, followed by China with 22%
- The three largest regions, Europe, India and China, together account for 68% of total gold bar and coin demand in the world
- The main European demand for gold bars and coins comes from Germany (110 tonnes) and Switzerland (81 tonnes)

Global bar and coin investment demand
Split by key regions (tonnes)
Year 2012

Notes:
- China includes Hong Kong and Taiwan
- Middle East includes Saudi Arabia, Egypt, UAE and other Gulf states
- Other APAC includes Japan, Indonesia, South Korea, Thailand and Vietnam

Size of bubbles proportionally represents demand in tonnes
Source: World Gold Council, Metals International analysis
Gold is used in a wide range of applications

- The many valuable properties of gold makes its applications possible in a wide range of areas:

  - Jewelry
  - Automotive
  - Electronics
  - Engineering
  - Medicine
  - Nano technology
  - Space

  - Bullion
  - Numismatics

  Home
  Technology
  Monetary
Gold applications explained by category

**Home**

- **Jewelry** – the primary use for gold is jewelry, something for which the metal has been used since 2,600 BC

**Technology**

- **Automotive** – gold is used by the automotive industry in catalytic converters, which are effective in reducing harmful emissions from the engine exhaust
- **Electronics** – gold is used in many electronic applications, especially telecommunications and information technology
- **Engineering** – several uses for high-tech applications, such as a lubricating material, as a coating on architectural glass, in fuel cells, jet engines etc
- **Medicine** – gold has several uses in the medical field within for example dentistry and precise surgery
- **Nanotechnology** – gold is used in some diagnostic devices for pregnancy and salmonella and its also proving to be an important catalytic material, with numerous industrial processes benefitting from its reactivity
- **Space** – gold’s reflectivity, conductivity and corrosion resistance have played an important role in space exploration for decades

**Monetary**

- **Bullion** – there is a continuous increase in investment gold bars and coins
- **Numismatics** – similar to bullion, collectors’ coins in gold have seen an increased influx of capital
Zinc demand is controlled by macroeconomic factors

- Zinc is a base metal and thus to a large extent governed by macroeconomic factors
- Being a mid-economic cycle commodity zinc is well positioned to benefit from the increasing demand seen from many emerging markets
- The main drivers behind the demand for zinc in emerging economies, China specifically, is:
  - Urbanization demand for steel (China's demand for steel is 4–5x that of the U.S.)
  - Industrialization and machinery production
  - Growth of affluent middle class (30% of population in 2005 and estimated at 74% of population by 2015 – totalling 625 million people)
  - Improved economic conditions drives demand for transportation and living. Both of which have a high impact on galvanized products
  - Increased vehicle ownership (68 vehicles per 1000 population vs 788 per 1000 in the US, equivalent to where the US was in 1920's)
  - Increased usage for vehicles (zinc utilization per unit is only ¼ of western cars and likely to increase with more focus on exports)
- The demand for zinc at times of increasing prosperity is well illustrated by the following examples: in 1960 about 2.5 million tonnes of zinc was consumed in the western world. The volume more than doubled by 2002, reaching 5.8 million tonnes
- The total zinc consumption in selected emerging markets (China, India, South and North Korea, Thailand, South Africa, Mexico and Brazil) was 233,000 tonnes in 1960. In 2002 the consumption in these countries was 3 million tonnes, which was more than a tenfold increase in 40 years
Zinc operations are important for silver supply

- The world is naturally rich in zinc. It is estimated that the first mile of the earth’s crust under land contains 224,000,000 million tonnes of zinc. It wouldn’t be economic or environmentally acceptable to exploit all of these resources though.

- 80% of zinc mines are underground, 8% are of the open pit type and the remainder is a combination of both. The open pit mines account for 15% of zinc production, underground mines produce 64% and 21% of mine production comes from the combined underground and open pit mining.

- Typically, zinc ore needs to be concentrated as it only contains 5–15% zinc. Once concentrated the produce contains about 55% of zinc with some copper, lead and iron. Zinc concentration is usually done at the mine site to keep transport costs to smelters as low as possible.

- Zinc is often mined in association with lead, copper, silver and other metals and it's actually one of the most important supply components for silver, owing to silver being produced as a by-product of many zinc operations.

- In 2012 a whole 39% of mine production output of silver came from lead/zinc operations.
Zinc mine production up by 11% the last five years

- Between 2008–2013 zinc mine production has grown by 11%, zinc production by 7% and zinc usage by 6%
- Definitions:
  - **Zinc mine production** – zinc content by analysis of zinc ores and concentrates plus the zinc content of other ores and concentrates known to be intended for treatment for zinc recovery
  - **Metal production** – production of refined zinc by smelters and refineries in marketable form or used directly by the producer for alloying, regardless of the type of source material, i.e. whether ores, concentrates, residues, slag or scrap
  - **Zinc usage** – usage of the types of metal mentioned under metal production

**World production of zinc**
Years 1990–2013 (million tonnes)

Source: ILZSG, USGS, Metals International analysis

*Includes estimation for December figures*
Zinc supply and demand overview

Worldwide zinc supply and demand overview

<table>
<thead>
<tr>
<th>Year</th>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mine Production</td>
<td>Metal Production</td>
</tr>
<tr>
<td>2003</td>
<td>9579</td>
<td>9868</td>
</tr>
<tr>
<td>2004</td>
<td>9664</td>
<td>10157</td>
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<td>2005</td>
<td>10146</td>
<td>10221</td>
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<td>2006</td>
<td>10447</td>
<td>10655</td>
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<tr>
<td>2007</td>
<td>11122</td>
<td>11360</td>
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<tr>
<td>2008</td>
<td>11881</td>
<td>11774</td>
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<td>2009</td>
<td>11623</td>
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<td>2010</td>
<td>12390</td>
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<td>2011</td>
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<td>2012</td>
<td>13149</td>
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<td>2013*</td>
<td>13311</td>
<td>13279</td>
</tr>
</tbody>
</table>

*Preliminary full year, Dec 2013 figure has been estimated based on 2012 figures

Source: ILZSG, Metals International analysis
Zinc is used in everything from heavy industry to sunscreen

• About 12 million tonnes of zinc are produced annually worldwide
• More than half of this amount is used for galvanizing to protect steel from corrosion in such things as sheet metal, rebar or sacrificial anodes on ships or bridges
• Approximately 17% goes into the production of zinc base alloys, mainly to supply the die casting industry
• 17% also goes to produce brass and bronze
• Significant amounts are also utilized in rolled zinc applications including roofing, gutters and down-pipes. The remainder is consumed in compounds such as zinc oxide (used in paints, rubber industry and sunscreens) and zinc sulfate
• The main application areas for zinc include construction, transport, consumer goods and electrical appliances and general engineering
Emerging markets drives the demand for lead

- Lead is, just like zinc, a base metal and thus to a large extent controlled by macroeconomic fundamentals – at least for long term price movements
- Two of the more prominent drivers for lead today are:
  - Demand from emerging markets – lead demand has increased in recent years predominantly due to increased urbanisation, improved economic conditions and industrialisation in countries such as China and India. China is a major user of lead and also by far the world's biggest supplier
  - The auto and construction industries – the majority of lead in the U.S. is used to make acid batteries. The auto industry is one of the major recipients of these products which makes the demand for lead dependent on the overall health of the auto industry. Construction applications, such as lead pipes, creates a link to home manufacturers and other builders
- The outlook for lead for 2014 remains positive due to possible supply constraints and increased demand, specifically from China
Silver a by-product of lead mining operations

- Lead is usually found in ore with zinc, silver and copper and is extracted together with these metals. Just as with zinc, lead operations are one of the main producers of silver as a by-product.
- Zinc and lead are the two most widely used non-ferrous metals after aluminium and copper and are vital materials in everyday life.
- The main lead mineral is galena (PbS). Other common varieties include cerussite (PbCO3) and angelsite (PbSO4).
Increased lead supply and usage over the last five years

- Between 2008–2013 lead mine production has grown by 31%, lead production by 13% and lead usage by 13%

- Definitions:
  - **Lead mine production**: lead content by analysis of lead ores and concentrates plus the lead content of other ores and concentrates known to be intended for lead recovery
  - **Metal production**: total production by smelters and refineries of refined pig lead, including the lead content of antimonial lead and other fully refined lead alloys, regardless of the type of source material, i.e. whether ores, concentrates, lead bullion, mattes, residues, slag or scrap. Production on toll carried out in the reporting country should be included. Re-melted lead and lead alloys recovered from secondary materials without undergoing a full refining process should be excluded
  - **Metal usage**: usage of the types of metal reported under metal production

### Global lead supply
Overview by type, 2008–2013

(000 tonnes)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Supply</th>
<th>Incremental Metal Production</th>
<th>Mine Production</th>
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</thead>
<tbody>
<tr>
<td>2008</td>
<td>9,230</td>
<td>59%</td>
<td>41%</td>
</tr>
<tr>
<td>2009</td>
<td>9,236</td>
<td>59%</td>
<td>41%</td>
</tr>
<tr>
<td>2010</td>
<td>9,843</td>
<td>58%</td>
<td>42%</td>
</tr>
<tr>
<td>2011</td>
<td>10,592</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>2012</td>
<td>10,441</td>
<td>52%</td>
<td>48%</td>
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<tr>
<td>2013**</td>
<td>10,840</td>
<td>52%</td>
<td>48%</td>
</tr>
</tbody>
</table>

**Source**: ILZSG, Metals International analysis

**Includes estimation for December figures**
Precious and base metals overview
Trends and facts for silver, gold, zinc and lead

Silver
Gold
Zinc

Lead
• Overview
• Supply and demand
• Applications

Overview of lead supply and demand

Worldwide lead supply and demand overview

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<tr>
<th>Year:</th>
<th>2003</th>
<th>2004</th>
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<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<th>2013*</th>
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<td>SUPPLY</td>
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<tr>
<td>Mine Production</td>
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<td>10592</td>
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<td>10841</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal Usage</td>
<td>6825</td>
<td>7142</td>
<td>7786</td>
<td>8063</td>
<td>8182</td>
<td>9222</td>
<td>9245</td>
<td>9815</td>
<td>10444</td>
<td>10382</td>
<td>10907</td>
</tr>
</tbody>
</table>

*Preliminary full year, Dec 2013 figure has been estimated based on 2012 figures

Source: ILZSG, Metals International analysis
China has become the largest mine producer of lead

- China is the largest mine producing country of lead today, accounting for 50% of world production alone – this is a significant shift considering China accounted for 15% of world production in 2001.
- The top five countries account for 78% of world mine production.

Top 10 countries of lead mine production (000 tonnes)

Lead primarily used in lead–acid batteries

- By the mid–1980’s a significant shift in lead applications had taken place from lead in non–battery products, such as gasoline, paints, solders, and water systems.
- The main application of lead today is lead–acid batteries which are used in vehicles, emergency systems and in industrial batteries found in computers and fork lift trucks.
- Lead is also used in remote access power systems and load levelling systems as well as in compounds in the glass, ceramics and plastics industries as well as for radiation shielding.

**Main end uses of lead**
Breakdown by application

- Batteries: 80%
- Rolled and extruded products: 5%
- Pigments and other compounds: 3%
- Shot/Ammunition: 3%
- Alloys: 2%
- Cable sheathing: 1%
- Miscellaneous: 1%

Source: ILZSG, Metals International analysis
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