



WORLD SILVER SURVEY 2018

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Coeur Mining, Inc.

Endeavour Silver Corp.

Fresnillo Plc

Hecla Mining Company

Industrias Peñoles, S.A.B. de C.V.

Pan American Silver Corp.

Wheaton Precious Metals



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WORLD SILVER SURVEY 2018

Produced for The Silver Institute
by the GFMS team at Thomson Reuters

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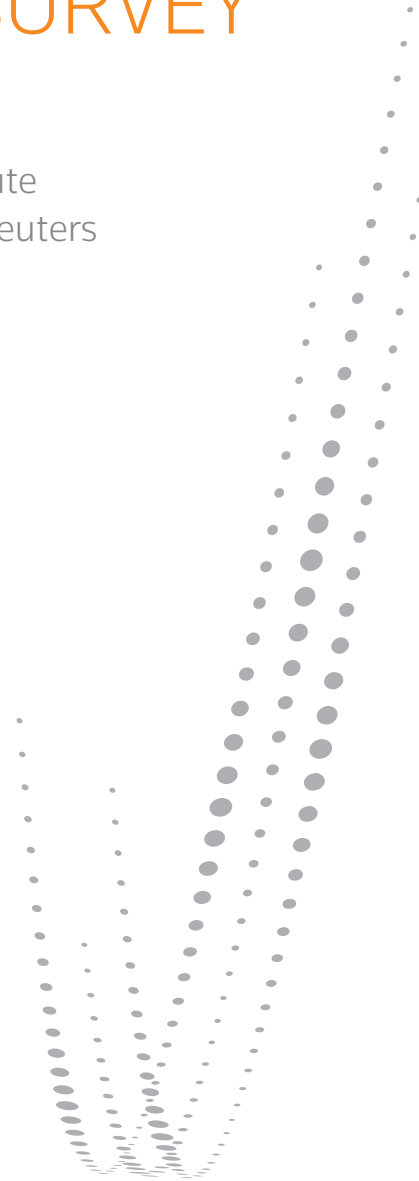
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ABOUT THE MAJOR SPONSORS OF WORLD SILVER SURVEY 2018

Coeur Mining, Inc.

Coeur Mining, Inc. is a well-diversified, growing precious metals producer with five mines in North America employing approximately 2,000 people. Coeur's wholly-owned operations include the Palmarejo silver-gold complex in Mexico, the Silvertip silver-zinc-lead mine in British Columbia, the Rochester silver-gold mine in Nevada, the Kensington gold mine in Alaska, and the Wharf gold mine in South Dakota. In addition, the Company owns the La Preciosa project in Mexico, a silver-gold exploration stage project, and conducts exploration activities throughout North America.



Fresnillo Plc

Fresnillo plc is the world's largest primary silver producer and Mexico's second largest gold producer, listed on the London and Mexican Stock Exchanges under the symbol FRES. Fresnillo plc has seven operating mines, all of them in Mexico - Fresnillo, Saucito, Ciénega (including the San Ramón satellite mine), Herradura, Soledad-Dipolos¹, Noche Buena and San Julián (phase I), three development projects - San Julián (phase II), the Pyrites plant, and second line of DLP at Herradura, and four advanced exploration projects - Orisyvo, Juanicipio, Las Casas Rosario & Cluster Cebollitas and Centauro Deep, as well as a number of other long term exploration prospects. In total, Fresnillo plc has mining concessions covering approximately 2 million hectares in Mexico. Fresnillo plc has a strong and long tradition of mining, a proven track record of mine development, reserve replacement, and production costs in the lowest quartile of the cost curve for silver. Fresnillo plc's goal is to maintain the Group's position as the world's largest primary silver company, producing 65 million ounces of silver per year by 2018, having already surpassed the gold target of 750,000 ounces.

¹ Operations at Soledad and Dipolos are currently suspended.



Industrias Peñoles, S.A.B. de C.V.

Peñoles is a mining group with integrated operations in smelting and refining non-ferrous metals, and producing chemicals. Peñoles is the world's top producer of refined silver, metallic bismuth and sodium sulfate, and the leading Latin American producer of refined gold and lead. The Company was founded in 1887 and it is part of "Grupo BAL", a privately held diversified group of independent Mexican companies. Peñoles' shares have traded on the Mexican Stock Exchange since 1968 under the ticker PE&OLES.



Peñoles highlights:

- ***Began operations in 1887 as a mining company.***
- ***Has integrated operations in the areas of exploration, mining, metallurgy and chemicals.***
- ***Listed on the Mexican Stock Exchange since 1968; the stock is included in the IPC index.***
- ***One of the largest net exporters in Mexico's private sector.***

Pan American Silver Corp.

Pan American Silver is the world's second largest primary silver producer, providing enhanced exposure to silver through a diversified portfolio of assets, large silver reserves and growing production. The Company owns and operates six mines in Mexico, Peru, Argentina and Bolivia. Pan American maintains a strong balance sheet, has an established management team with proven operating expertise, and is committed to responsible development. Founded in 1994, the Company is headquartered in Vancouver, B.C. and its shares trade on NASDAQ and the Toronto Stock Exchange under the symbol "PAAS".



PAN AMERICAN
— SILVER —

In 2017, Pan American produced 25 million ounces of silver and 160 thousand ounces of gold at consolidated cash costs of \$4.55 per payable ounce of silver, net of by-product credits. Consolidated all-in sustaining costs per silver ounce sold ("AISCOS") were \$10.79.

By 2020, the Company expects to produce 30.5 to 33.0 million ounces of silver and 165 to 179 thousand ounces of gold at cash costs of \$4.75 to \$6.75 per payable ounce of silver, net of by-product credits. Consolidated all-in sustaining costs per silver ounce sold ("AISCOS") are expected to be between \$8.50 and \$11.00.

Pan American completed expansions at its La Colorada and Dolores mines in Mexico in 2017, and in 2018, embarked on the development of two new underground mines in Argentina - COSE and Joaquin. The Company aims to provide investors with enhanced exposure to silver by leveraging its competitive advantages to grow low-cost, un-hedged silver production. Its competitive advantages include more than 20 years of experience operating in major silver producing jurisdictions, a portfolio of long-life producing mines providing continuous cash flow, and strong financial capacity.

Wheaton Precious Metals

Wheaton Precious Metals, formerly Silver Wheaton, is the world's largest pure silver and gold streaming company with the highest production and operating cash flow relative to its peers. The Company has entered into agreements to purchase all or a portion of the silver and/or gold production from high quality mines for an upfront payment and an additional payment upon delivery of the precious metals.



The Company offers investors leverage to increasing silver and gold prices, a sustainable dividend, and both organic and acquisition growth opportunities. Wheaton Precious Metals offers these benefits while at the same time seeks to reduce many of the downside risks faced by traditional mining companies. For example, operating costs are contractually set at the time the stream is entered into, allowing investors to benefit from cost predictability and strong margin growth in an environment of rising silver and gold prices. The Company's production profile is driven by a portfolio of high quality assets, including a gold stream on Vale's Salobo mine, and silver streams on Glencore's Antamina mine and Goldcorp's Peñasquito mine.

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The **World Silver Survey** has been published annually by The Silver Institute since 1990. Hard copies of previous editions can be obtained by contacting The Silver Institute at the address and telephone number on the opening page. All previous editions are available for download at the Silver Institute's website. For copies outside of North America, contact Thomson Reuters at the address on the page overleaf.

ISSN: 1059-6992 (Print)

ISSN: 2372-2312 (Online)

ISBN: 978-1-880936-30-6 (Print)

ISBN: 978-1-880936-31-3 (Online)

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This is the twenty-eighth annual edition of the World Silver Survey produced for The Silver Institute. The World Silver Survey 2018 was produced by the GFMS team of metals market analysts at Thomson Reuters. The information contained herein is based in part on the analysis of publicly available data such as hallmarking series, trade statistics, company reports and other public-domain information. More importantly, it is also based on a large series of interviews with the industry's main players, carried out over the year by the team. This work generates the essential data to allow the compilation of reliable estimates for world supply and demand and inform the analysis of market structures, and the degree of significance of any changes and developments.

Thomson Reuters is grateful to the many miners, refiners, bullion dealers, bankers and fabricators throughout the world who have contributed their time and information to ensuring that the picture of the industry described in the World Silver Survey is as complete and accurate as possible.

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UNITS USED:

supply and demand data are given in units of million troy ounces (Moz) rounded to one decimal place.

1 Moz = 31.103 t (metric tons)

1 ton = 32,151 troy ounces

1 ton = 1,000,000 grams (g)

TERMINOLOGY:

"-"	Not available or not applicable.
"0.0"	Zero or less than 0.05.
"dollar", "\$"	US dollar unless otherwise stated.
"Identifiable Investment"	The sum of physical bar investment and all coin fabrication, plus the net change in Exchange Traded Product (ETP) holdings.
"Physical Surplus/ Deficit"	The difference between the supply of new and secondary silver to the market in a calendar year and measurable demand for physical silver. This excludes opaque Over the Counter (OTC) investment in silver and commercial bank transactions.
"Net Balance"	The physical surplus or deficit of silver with the addition of highly visible ETP and exchange stock inventory changes.

PRICES:

Unless otherwise stated, US dollar prices are for the London Silver Market fixing prior to August 15, 2014. As of this date prices refer to the LBMA Silver Price as successor to the silver fix.

TABLE ROUNDING:

Throughout the tables and charts, totals may not add due to independent rounding.

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1. SUMMARY AND OUTLOOK

Last year, for the fifth year in a row, the silver market recorded another deficit; this time of 26.0 Moz (810 t). Mine supply fell for the second consecutive year by 4% in 2017, following 13 consecutive annual increases prior to 2016. This was a result of years of Capex reductions in combination with supply disruptions, particularly in the Americas. With scrap supply contracting by 1% in combination with net-hedging of 1.4 Moz (44 t), total silver supply fell by 2% to just under one billion ounces.

Physical demand contracted by 2% in 2017 due to a 27% drop in coin and bar demand. The fall was the second significant decline in a row and was mainly driven by robust equity performances across various exchanges globally. At several periods throughout last year, speculators looked away from commodities, such as precious metals, notably gold and by association silver, towards new elements such as crypto-currencies. Investors also opted for used coins as opposed to new ones which hindered new coin sales. Silver used in jewelry, silverware and industrial fabrication, however, all recorded increases last year, rising

by 2%, 12% and 4% respectively. Silver demand used in photovoltaics recorded another strong year, rising by 19%, driven in particular by strong solar panel uptake from Chinese households. Following various years of increased thrifting and substitution pressure, silver used in electrical components, brazing & alloys and other applications also recorded a positive performance last year. Demand from the automotive sector was reportedly strong.

In spite of lower retail demand, silver ETP investors continued to add a net total of 2.4 Moz (74 t) to the total outstanding silver ETP stock across the various funds, with silver stored in Switzerland and the United States benefiting from the annual rise. On balance, global exchange stocks also rose by 6.8 Moz (210 t) which was largely a function of lower physical demand in major consuming regions. Combined, the silver net-balance recorded another 35.2 Moz (1,094 t) deficit, representing on average 3% of total annual demand, the lowest since 2005. Following a 9% rise the prior year, the silver price on an annual average basis fell 1% to 17.05/oz in 2017.

TABLE 1 - WORLD SILVER SUPPLY AND DEMAND

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Supply										
Mine Production	684.7	717.3	753.0	758.3	791.7	823.3	867.8	895.1	888.6	852.1
Net Government Sales	30.5	15.6	44.2	12.0	7.4	7.9	-	-	-	-
Scrap	200.7	200.6	227.2	261.2	253.8	191.0	165.4	141.1	139.7	138.1
Net Hedging Supply	-8.7	-17.4	50.4	12.2	-47.1	-34.8	16.8	7.8	-18.9	1.4
Total Supply	907.2	916.1	1,074.8	1,043.8	1,005.8	987.4	1,050.0	1,044.0	1,009.4	991.6
Demand										
Jewelry	177.6	176.9	190.0	191.5	187.4	220.6	226.4	226.7	205.0	209.1
Coins & Bars	197.9	94.9	150.3	212.7	159.7	241.1	234.1	292.1	207.8	151.1
Silverware	58.4	53.2	51.9	47.5	43.8	59.3	61.2	63.2	52.4	58.4
Industrial Fabrication	641.9	528.2	633.8	661.5	600.1	604.6	596.3	583.2	576.8	599.0
...of which Electrical & Electronics	271.7	227.4	301.2	290.8	266.7	266.0	263.9	246.0	233.9	242.9
...of which Brazing Alloys & Solders	61.8	53.8	61.2	63.2	61.1	63.7	66.7	61.5	55.3	57.5
...of which Photography	98.2	76.4	67.5	61.2	54.2	50.5	48.5	46.6	45.2	44.0
...of which Photovoltaic*	-	-	-	75.8	58.2	55.9	51.8	59.2	79.3	94.1
...of which Ethylene Oxide	7.4	4.8	8.7	6.2	4.7	7.7	5.0	10.2	10.2	6.9
...of which Other Industrial*	202.8	165.8	195.2	164.2	155.1	160.8	160.6	159.8	152.9	153.7
Physical Demand	1,075.8	853.1	1,026.0	1,113.1	990.9	1,125.6	1,118.0	1,165.3	1,041.9	1,017.6
Physical Surplus/Deficit	-168.6	63.0	48.9	-69.4	14.9	-138.2	-68.0	-121.3	-32.5	-26.0
ETP Inventory Build	101.3	156.9	129.5	-24.0	55.3	2.5	1.4	-17.8	49.8	2.4
Exchange Inventory Build	-7.1	-15.3	-7.4	12.2	62.2	8.8	-5.3	12.6	79.8	6.8
Net Balance	-262.8	-78.6	-73.2	-57.5	-102.6	-149.5	-64.0	-116.1	-162.1	-35.2
Silver Price, \$ per oz.	14.99	14.67	20.19	35.12	31.15	23.79	19.08	15.68	17.14	17.05

*Photovoltaic demand included in "Other Industrial" prior to 2011

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WORLD SILVER SURVEY: SUPPLY AND DEMAND METHODOLOGY

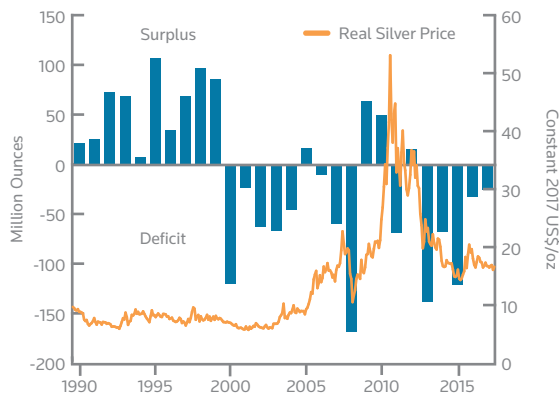
Physical imbalances in any commodity market both explain and influence price action, physical premia and margins and, logistical areas such as lead times and scrap recycling patterns. Silver is no exception; indeed it also attracts varying attention from the investment and speculative fraternities with, for example, ETP inventory build in 2017 standing at 2.4 million ounces, almost nothing, especially when compared with almost 50 million ounces in the previous year. In order to deal with risk and price management, silver has also a very active Over-The-Counter (OTC) market and a broad rule of thumb is that LBMA loco London volumes are roughly twice the London Bullion Market Association (LBMA) published transfer numbers. In order to estimate the global OTC volume we assume that loco London accounts for approximately 70% of the total.

Until only a few years ago, loco London accounted for roughly 90% of the global total, but the growing influence of the Middle and Far East has reduced London's share. Following a period of relatively stable trading volumes in the range of approximately 60-80 Bn ounces, 2012 set the tone for a prolonged period of rising volumes, peaking last year at a whopping 163 Bn ounces; just 2% short of the all time high recorded in 1997, when the LBMA started releasing the trading and turnover statistics. At that level, the notional value stood at \$2.8 Tr, which is still considerably lower than the peak of \$3.5 Tr recorded in 2011. Chapter 3 covers this topic in more detail.

Another factor that typifies the difference between silver and purely industrial metals is that it is held as an above-ground asset by private and institutional investors, users, dealers, banks, and other entities. Increases or decreases in these stocks, whether accumulations or sales into terminal markets, can be both price takers and price makers. Indeed, old jewelry scrap, coins and bars make up a significant part of the scrap pool (and they are arguably the only truly price-sensitive elements in the whole silver market) as opposed to scrap collected from recycled electronics, for example.

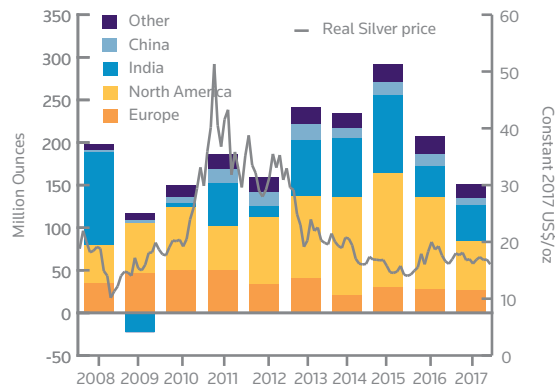
Thomson Reuters' supply and demand statistics are collected and collated by a team of full time research analysts based in Australia, China, the United Kingdom, United States, India and Singapore within an extensive field research program that includes interviewing participants throughout the industry. When undertaking that primary research, analysts garner information on jewelry and silverware fabrication, coin fabrication and sales, bar sales, industrial fabrication, refining volumes, shifts in above-ground bullion stocks, and scrap sales. On a global basis, Thomson Reuters also collects information and data on government sales and acquisitions and collates producer hedging and de-hedging levels. As part of compiling the statistics, the GFMS team at Thomson Reuters maintains individual demand databases for over 85 countries around the world and for almost 600 mines and producer projects.

SILVER PHYSICAL SURPLUS / DEFICIT



Source: GFMS, Thomson Reuters

WORLD COIN AND BAR DEMAND



Source: GFMS, Thomson Reuters

SUPPLY IN 2017

- **Global silver mine production declined by 4.1% in 2017, to a total of 852.1 Moz (26,502 t).**
- **Global scrap supply declined again last year, driven by lower Asian flows, although partially offset by marginally higher volumes from the industrialized world.**

Silver **mine production** fell for the second consecutive year following a string of supply disruptions across the Americas. Guatemala stood out as one of the most affected countries with a 15.3 Moz (477 t) drop in output year-on-year. Collectively, these disruptions caused the balance to contract by 4.1%, or 36.5 Moz (1,136 t). A large portion of the drop was attributable to the primary silver and gold sectors, where production fell by a combined 29.4 Moz (915 t). Of the key producing countries, Peru and China registered subtle drops, followed by more acute losses in Australia and Argentina. Offsetting the losses was higher output from Mexico led by a ramp-up and first complete year of operations at Fresnillo’s San Julián mine. We estimate that on a co-product accounting basis, Total Cash Cost + Capex at the global level stood at \$10.54/oz, down 5% from last year.

Global **scrap** supply slipped by 1% last year to 138.1 Moz (4,296 t), with divergent performance across various regions. Supply from the western world was marginally higher, driven by slightly higher volumes from the United States as well as Europe, although in case of the latter the growth rate slowed considerably compared to 2016. On the contrary, supply from Asia edged lower, led by a 10%

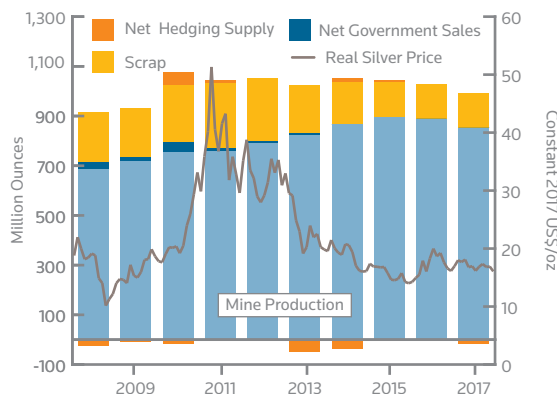
drop in China, largely due to the yuan’s sharp appreciation, which weighed on the local price and saw many across the supply chain hold material rather than sell it for refining.

The global silver producer hedge book inched higher by 1.4 Moz (44 t) to leave the delta-adjusted position at the end of the year at 21.5 Moz (667 t). The fresh hedging that brought about the switch back to net hedging came from Nyrstar using forward sale contracts. The outcome was partially offset by Minera Frisco and KGHM Polska Miedz delivering into their silver hedges last year.

DEMAND IN 2017

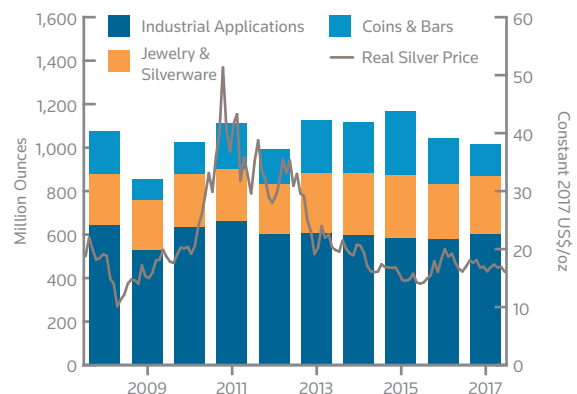
- **Total physical demand eased 2% in 2017 to 1,017.6 Moz (31,652 t), dragged lower by a significant contraction in retail investment.**
- **The largest falls were recorded from coin and bar investment, which declined 27% to 151.1 Moz (4,699 t) due largely to a precipitous fall in demand from the industrialized world.**
- **Global jewelry fabrication returned to growth in 2017, rising 2% to 209.1 Moz (6,503 t), with growth in India and North America accounting for the bulk of the rise.**
- **Industrial fabrication increased 4% to 599.0 Moz (18,632 t), the highest level since 2013. Demand was supported by another record from photovoltaic applications, as well as a recovery in electronics, brazing alloys and solders. Softer photographic demand and a decline of silver use in ethylene oxide catalysts were the only drag on consumption growth.**

WORLD SILVER SUPPLY



Source: GFMS, Thomson Reuters

WORLD SILVER DEMAND



Source: GFMS, Thomson Reuters

Total **physical demand** eased 2% in 2017 to an estimated 1,017.6 Moz (31,652 t), the lowest level in five years. The decline was recorded despite another year of robust growth from the photovoltaic sector, healthy overall industrial demand, and solid gains from the jewelry and silverware markets. The overall weakness was largely a function of a significant contraction in retail investment, with demand for bars and coin falling to levels not seen since 2010. These losses offset gains elsewhere.

Industrial demand for silver increased for the second year in succession to reach 599.0 Moz (18,632 t), the highest level since 2013. Another year of significant expansion from the photovoltaic sector to a new record level was the chief architect of the increase. This was, however, not the only market to enjoy a renaissance. A stronger global economy and robust demand from the semi-conductor market led to improved offtake in electrical and electronics as well as brazing alloys and solders. Demand from photographic applications continued to ease, while demand from ethylene oxide (EO) was the largest casualty in this sector, falling by a third from 2016 volumes.

Silver used in **photographic** applications continued to decline, falling by 3% in 2017, to 44.0 Moz (1,367 t), the lowest level in our series, which began in 1990. That said, it would appear that the market has now largely bottomed and broadly stabilized as the bulk of structural change in the photography market is now behind us and that current fabrication volumes may be largely sustainable moving forward. Indeed, there are reports of growth in certain segments of the industry.

Silver demand from the **photovoltaic** (PV) industry rose to a fresh record high of 94.1 Moz (2,926 t) in 2017, surging 19% from the previous year. China was again the main contributor to the growth, accounting for more than a half of the world’s new solar panel installations last year, while Europe and India also enjoyed healthy gains.

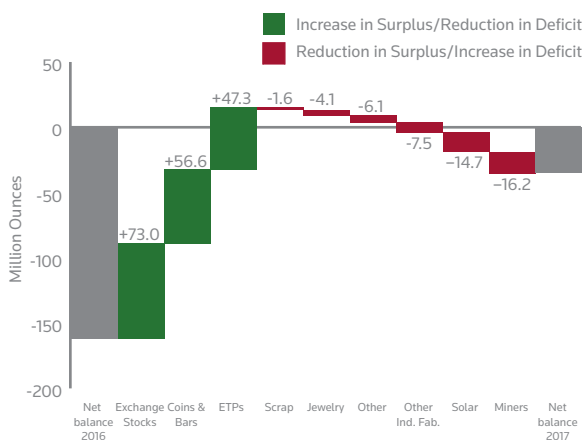
Silver **jewelry** fabrication edged higher in 2017, rising 2% to an estimated 209.1 Moz (6,503 t). The increase last year was mainly attributed to a strong performance in India, which jumped 7% over 2016 volumes, largely due to stock building ahead of the implementation of the goods and services tax (GST), retail store expansion, and another good monsoon. Fabrication demand also picked up sharply in North America, with offtake in the United States enjoying a 12% rise to an all-time high, while Mexico also recorded a healthy increase. Demand in Europe was mixed, but as a whole delivered a 2% annual increase, boosted primarily by a 5% increase in Italian fabrication. A similar pattern emerged across East Asia, with both China and Thailand retreating last year, by 5% and 9% respectively, but there were several markets in the region that enjoyed gains, most notably Vietnam and Indonesia.

India also played a central role in delivering a 12% annual increase in global **silverware** fabrication to an estimated 58.4 Moz (1,817 t), with a 19% jump in domestic production offsetting falls in several key markets.

Identifiable investment, which consists of physical bar investment, coins & medals purchases, and additions or drawdowns to ETP holdings, fell by 40% to 153.5 Moz (4,774 t) in 2017, the lowest level since 2007. In value terms, annual identifiable investment was approximately \$2.6 billion in 2017, a 61% drop off from the historical high in 2012. Following a 10% fall in 2016, coin fabrication volume dropped 35% in 2017, dragged down by a decline from the United States, Canada and China. Meanwhile, physical bar demand slipped by 16% in 2017, while ETP holdings increased by 2.4 Moz (75 t) for the year to finish at 669.8 Moz (20,834 t).

Silver **coin and medals** fabrication tumbled by a sharp 35% in 2017, to hit 79.4 Moz (2,471 t), the lowest level since 2008, led by subdued demand from the western hemisphere on the back of growing risk appetite and rallying equity markets, which saw investors holding back from buying zero-yielding assets.

SILVER INDUSTRIAL FABRICATION



Source: GFMS, Thomson Reuters

2. SILVER PRICES

- *The LBMA silver price averaged \$17.05/oz in 2017, down by 0.5% year-on-year. Prices traded in a range of \$15.22/oz-\$18.56/oz, starting the year at \$15.95/oz and ending it at \$16.87/oz.*
- *Despite the slight decline in the annual average price, the LBMA silver price still managed to gain 3.8% throughout the year, mostly because of a weaker dollar. However, silver's price performance fell behind that of gold, reflecting the market's risk-off attitude over much of the year.*

The market sentiment ended 2016 on a high note with optimism that Donald Trump, after being elected as President of the United States, would lead the country to become “great” again. The dollar index reacted strongly to the market optimism and closed the year at 102.2. However, the market started to calm down during the first quarter of 2017, with Trump’s reforms meeting several obstacles. Domestic equities stabilized in January, following a late surge in the final quarter of 2016. The U.S. Federal Reserve (Fed) raised its interest rate benchmark by 25 basis points during the first quarter, in line with market expectations. The dollar showed some strength briefly, but then headed

south after the event. Silver outperformed gold in the first quarter, rising 11% compared to a 9% increase for the latter. Both copper and the S&P index rose by less than 6%, while the dollar index was actually 1.8% lower during the first quarter.

In a widely expected move, the Fed raised interest rates for the second time on June 17th, up by 25 basis points to a range of 1% to 1.25%. What was slightly more surprising was that the central bank also announced its intention to reduce its balance sheet starting from 2017. Neither development helped the dollar, as the dollar index just managed to rebound modestly, before embarking on a free fall afterwards as softer economic data coming from the United States, along with some stronger-than-expected data from the EU, extended dollar weakness. The dollar index closed the second quarter at 95.6, the lowest since September 2016. Gold rose by 7% in the first half of 2017, but silver fell behind and only gained 1% over the same period.

Continuous tensions with North Korea, softer-than-expected inflation data as well as the fact that new orders

US\$ SILVER PRICE

	1987	1997	2007	2017
Annual Average	7.02	4.90	13.38	17.05
Maximum	10.93	6.27	15.82	18.52
Minimum	5.36	4.22	11.67	15.58
Range:Average	79%	42%	31%	17%

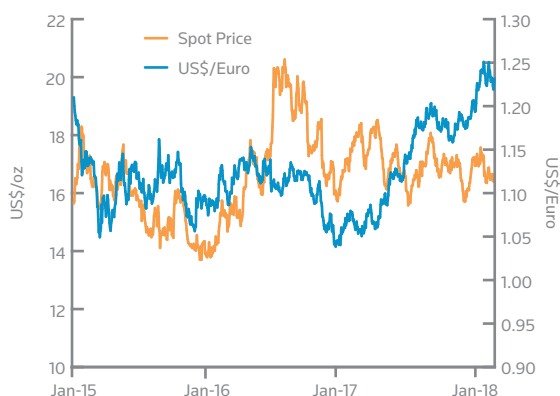
Source: LBMA; GFMS, Thomson Reuters

THE SILVER PRICE IN OTHER CURRENCIES IN 2017

	Euro/kg	Rupee/kg	Yen/10g	Yuan/kg
Annual Average	486.31	39,886	614.6	3,926
Maximum	562.30	44,000	674.1	4,234
Minimum	427.00	29,000	558.0	3,561
Range:Average	28%	38%	19%	17%

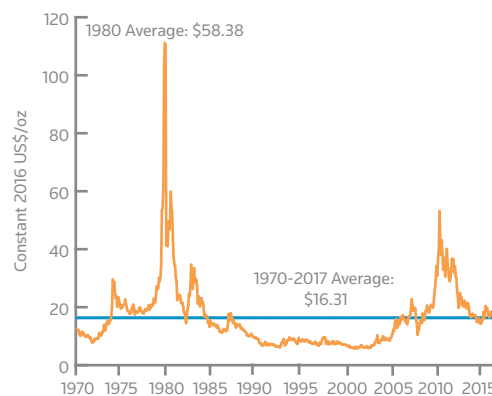
Source: GFMS, Thomson Reuters

THE SILVER PRICE AND THE U.S. DOLLAR



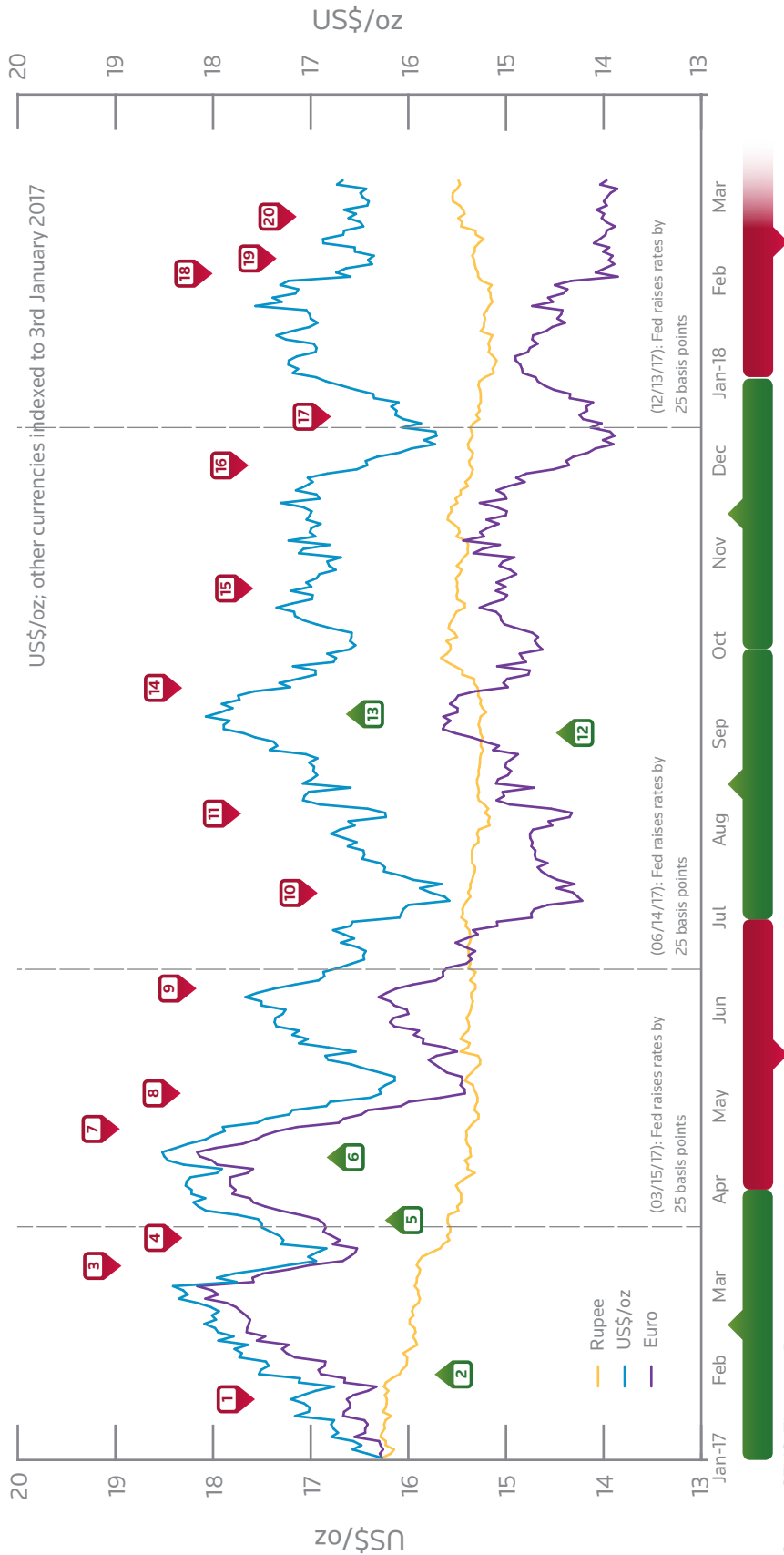
Source: Thomson Reuters Eikon

MONTHLY REAL SILVER PRICES (\$2017)



Source: Thomson Reuters Eikon; GFMS, Thomson Reuters

LONDON SILVER MARKET: SPOT PRICE



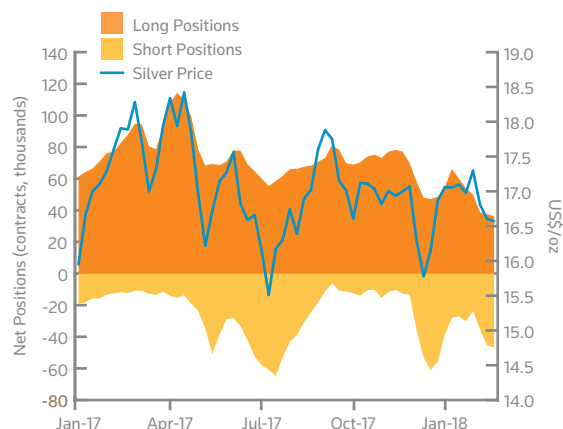
Source: GFMS, Thomson Reuters

- 01** (01/26/17): S&P500, Dow Jones, and Nasdaq hit record highs on rising inflationary expectations.
- 02** (01/31/17): DXY falls below 100 level after comments by Trump on currency manipulation.
- 03** (03/10/17): Prices under pressure ahead of U.S. jobs data.
- 04** (03/14/17): Speculative net long position hits a two week low as investors cut silver exposure by 10 Moz in COMEX futures positions.
- 05** (03/22/17): US Mint American Eagle coin sales rise above the one million mark.
- 06** (04/14/17): Silver near five month peak, poised for best week since June on tensions in North Korea.
- 07** (04/24/17): Risk-on sentiment drives equities higher after French election result. Macron and Le Pen to face each other on 7th May.
- 08** (05/05/17): Biggest weekly drop in two months on strong U.S. jobs data; U.S. rate hike expectations grow. Eurozone political risk drops.
- 09** (06/09/17): Euro declines after the ECB cuts its inflation forecast.
- 10** (07/07/17): Treasuries and U.S. dollar rise on strong U.S. non-farm payroll data.
- 11** (08/04/17): Signs of labour tightness provide Fed assurance that inflation will gradually rise to 2% target.
- 12** (09/01/17): Silver hits 5 month high in wake of North Korean nuclear test.
- 13** (09/06/17): CFTC charges Monex with US\$290 M precious metals fraud.
- 14** (09/21/17): Silver slips to 5 week low as Fed flags December rate hike.
- 15** (10/20/17): Prices fall as hopes of U.S. tax reform boost riskier assets.
- 16** (12/01/17): Silver touches eight week low on upbeat U.S. Data and Fed Yellen bullish view on the economy. Third quarter GDP revised up to 3.3%.
- 17** (12/15/17): Speculators cut net long position for 5th straight week to total 93 Moz.
- 18** (02/05/18): Jerome Powell is sworn in as new Federal Reserve Chairman.
- 19** (02/06/18): U.S. wage growth triggers market concerns. Investors unwind short volatility positions; VIX surges.
- 20** (02/28/18): Non-commercial speculators add 100 Moz to gross short position. Net position at two month low.

for U.S. made goods recorded the biggest drop in three years in July, plus a somewhat surprising interest rate move by the Central Bank of Canada, all put downward pressure on the dollar in the first two weeks of September. At the September FOMC meeting, the Fed announced that it would begin to unwind its balance sheet, starting with a reduction of up to \$10 billion a month and reaching \$50 billion a month in a year's time. This, along with a series of hawkish statements from the Fed Chair Janet Yellen, the dollar rebounded, bringing downward pressure to the metals. Meanwhile, the U.S. equity market continued to drive to new highs, with the market eagerly awaiting Trump's tax reform that could benefit the U.S. economy. The dollar index closed the third quarter at 93.1, while gold gained 11% in the first three quarters of 2017. Silver also edged higher, yet continuing to underperform gold, with the white metal only rising by 4% during the same period.

Silver's price action was not particularly surprising in the final quarter of the year. With the markets expecting the Fed to raise rates by another 25 basis points in December, to a range of 1.25% to 1.5%, metals prices suffered downward pressure in the run-up to the meeting, then quickly recovered after the event (a classic example of "sell the rumor, buy the fact"). The dollar sustained its downward path during the final quarter, despite the successful approval of Trump's tax reform proposals by Congress. The dollar index ended the year at 92.1, representing a 10% loss during the year. On the other hand, gold ended the year on a high note, registering a 12% return on an intra-year basis, while spot silver only advanced by 6% for the year. For comparison, gold and silver rose 9% and 15% respectively over the course of 2016.

COMEX LONG AND SHORT MANAGED MONEY POSITIONS



Source: CFTC

VOLATILITY (US\$ PRICE)

	2014	2015	2016	2017
Annual	22%	24%	28%	19%
	Q1-17	Q2-17	Q3-17	Q4-17
Quarterly	19%	17%	23%	14%

Source: GFMS, Thomson Reuters

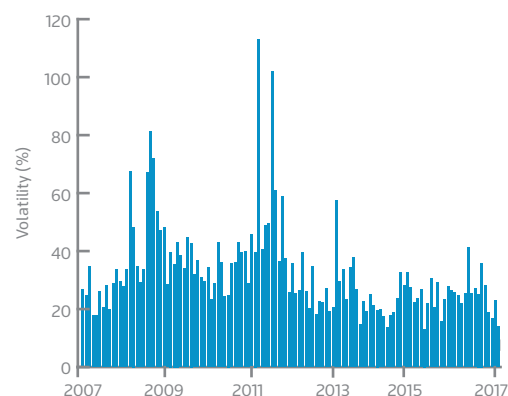
Silver price volatility retreated to 19% in 2017, from 28% in 2016, posting the lowest annual average volatility recorded over the last decade. For reference, silver price volatility on an annual average basis was as high as 61% in 2011. Of the four quarters last year, silver's volatility exceeded 20% in only the third quarter.

CHINESE SILVER PREMIA

Based on the silver trading contract on the Shanghai Gold Exchange (SGE), the Chinese silver price actually fell 6% in local terms in 2017, compared to the 6% gain for the international benchmark. The decline of the Chinese silver price is attributed to the appreciation of the yuan, which appreciated by more than 6% against the dollar in 2017. All the silver prices quoted on the domestic futures exchanges in China are inclusive of a 17% Value Added Tax (VAT). Despite the yuan appreciation during 2017, a moderate improvement in silver demand saw the local premia increase from an annual average of \$0.74/oz in 2016 to \$1.04/oz in 2017.

Silver inventories at the Shanghai Futures Exchange (SHFE) decreased from 59.7 Moz (1,858 t) at the end of 2016 to 43.1 Moz (1,342 t) a year later. Inventories at the SGE increased from 32.1 Moz (999 t) to

DAILY SILVER PRICE VOLATILITY



Source: GFMS, Thomson Reuters

40.5 Moz (1,260 t) during the same period. As a result, total physical inventories at the two exchanges fell from 91.8 Moz (2,856 t) to 83.7 Moz (2,602 t) at the end of last year, representing a 9% year-on-year decline.

An increase in the domestic average premia and the depletion of physical stocks in 2017 suggested that the local demand for silver improved during the year, mostly from the industrial sector.

SILVER IN OTHER CURRENCIES

While the London silver price increased 4% in dollar terms last year, prices in yen terms rose just 0.4%, but recorded a drop of 8% and 4% in euro and British pound terms respectively. The Indian silver price also fell by 2% last year.

The relatively weak silver prices denominated in non-dollar currencies last year demonstrated that the positive price performance was mostly a function of a weaker U.S. dollar. After appreciating by nearly 4% in 2016, the dollar index got knocked off 10% last year.

GOLD:SILVER RATIO

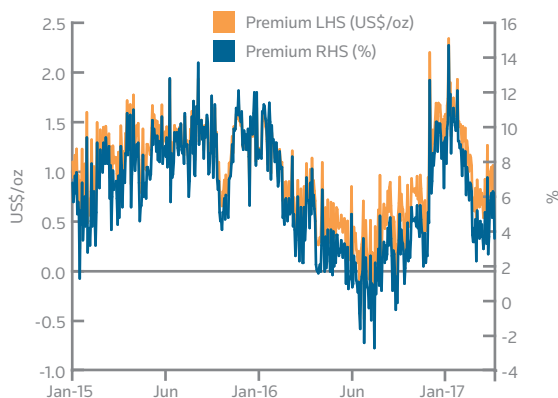
After bottoming in 2010, the gold:silver ratio has increased steadily. The ratio retreated briefly in the middle of 2016 to close the year at 71.4 (although averaged 73.4 for the full year), but resumed its uptrend since the middle of 2017. The gold:silver ratio can rally in the face of a crisis, although the nature of such a crisis would dictate how the ratio develops. If circumstances suggest that market instability increases then investors would favor gold over silver. A good example

was during the 2008 global financial crisis, when the ratio surged above 80. Meanwhile, a high ratio in the early 1990s was in response to the Gulf War. It is arguable that in anticipation of a crisis the market could see 80 or beyond. At the end of 2017, the gold:silver ratio was at 77 (though the full year average was just a moderate year-on-year increase to 73.9), a high level that perhaps suggests that the market is trying to tell us something. We suspect the high gold:silver ratio indicated that the market had been expecting another major crisis could be looming, or at the least that it was about time for equities correction, and therefore investors had been accumulating physical gold in the market.

Another interesting observation is that silver was not the only precious metal to underperform gold in 2017, but so did platinum. While the historical average of gold:platinum ratio was at 0.82 from 1985, the ratio broke above 1 at the beginning of 2015, and remained on a steady uptrend in recent years. At the end of 2017, the ratio hit a historical high of 1.4.

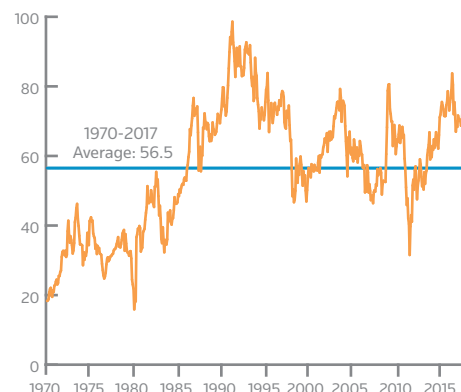
While on the surface, the high ratios of gold to silver and to platinum may suggest that the latter two metals might be better investments compared to gold in the long run on a “catch-up” argument, we should not ignore gold’s role as a safe haven, and that some smart money has been hedging against geopolitical risks and potential correction in equities.

SGE SILVER PREMIA



Source: Shanghai Gold Exchange; GFMS, Thomson Reuters

THE GOLD / SILVER PRICE RATIO



Source: Thomson Reuters Eikon

SILVER AND OTHER COMMODITY PRICES

The analysis of correlation coefficients provides information about prevailing underlying themes influencing prices. It must be noted, however, that the existence of either a positive or inverse correlation between two assets varies from time to time, and past histories do not necessarily translate into future performances.

As expected, silver's relationship remained strong with gold over the course of 2017. In the first quarter of the year, silver's correlation with copper was also relatively strong, while unsurprisingly showing a strong negative relationship with the dollar. Despite the fulfilment of the market's expectation for a Fed rate hike in the first quarter, the dollar index suffered. Metals, in general, benefited from dollar weakness, but oil retreated towards the end of the quarter. It is also the first time we add Bitcoin into our correlation analysis, and unsurprisingly the correlation between Bitcoin and silver can be quite extreme and volatile from quarter to quarter.

In the second quarter, the market was characterized by a lack of strength in the dollar despite another rate hike, as an improving EU economy underpinned a stronger euro. With the exception of copper, which was aided by strong demand from China, most other commodities fell along with the dollar. The gold:silver ratio consequently rose, along with the U.S. equities as well as Bitcoin.

An escalation of tensions between the United States and North Korea, softer U.S. economic data, in addition to a somewhat surprising interest rate move by the Central Bank of

CORRELATIONS OF CHANGES IN DAILY PRICES

	Q1 17	Q2 17	Q3 17	Q4 17
Gold	0.93	0.66	0.98	0.85
US\$ Index	-0.33	0.51	-0.87	0.08
Oil (WTI)	0.12	0.69	0.43	-0.36
CRB Spot Metals	0.35	0.31	0.86	-0.07
Copper	0.70	0.26	0.87	0.34
S&P 500	0.69	-0.60	0.37	-0.69
Bitcoin	0.55	-0.48	0.81	-0.80

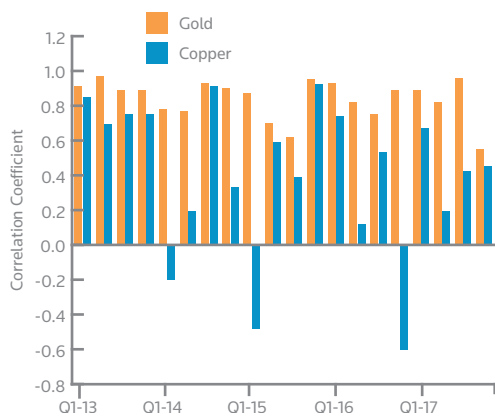
Source: GFMS, Thomson Reuters

Canada, pressured the dollar in the third quarter, resulting in better performances in gold, silver and other commodities.

The U.S. rate hike in the fourth quarter was already priced in and the dollar remained under pressure. The majority of the asset classes under scrutiny here posted gains, although silver remained flat.

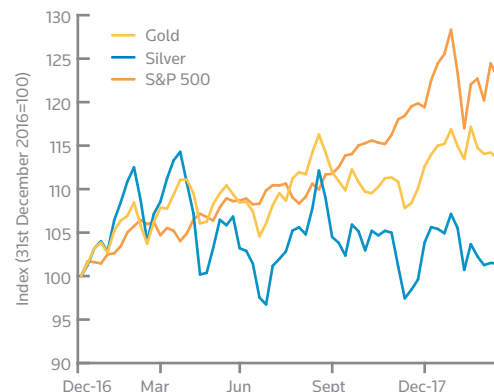
Silver's correlation with gold and other commodities remained strong in the first two months of 2018, but Bitcoin's shine came to a halt as cryptocurrencies experienced a hefty retreat. U.S. Treasury Secretary Steven Mnuchin said that the United States welcomes a weaker dollar, and how it would benefit the U.S. economy, sparking another dollar sell-off. Already losing close to 2% in the first two months in 2018, and failing to rebound substantially above 90 suggested that the momentum of the dollar is pointing towards the downside. However, if volatility in the equity markets persist, the correlation between silver and gold may drift downwards.

QUARTERLY CORRELATION OF THE SILVER PRICE



Source: Thomson Reuters Eikon; GFMS, Thomson Reuters

GOLD & SILVER PRICES & S&P INDEX



Source: Thomson Reuters Eikon

3. INVESTMENT

- **Identifiable Investment, which includes net-physical bar investment, coins and medals and changes to ETP holdings, fell by 40% to 153.5 Moz (4,774 t) in 2017.**
- **Coin and bar demand dropped 27% in 2017, to 151.1 Moz (4,699 t); 48% below the all time high recorded in 2015.**
- **Meanwhile investors bought a net 2.4 Moz (74 t) of ETP holdings, compared to 49.8 Moz (1,548 t) net inflows in the prior year**
- **In value terms, annual identifiable investment declined by 41% to an estimated \$2.6 billion in 2017.**

OVERVIEW

Identifiable Investment, which consists of net-physical bar investment, coin purchases, and changes to ETP physical holdings, fell by 40% to 153.5 Moz (4,774 t) in 2017. Not only was the 2017 estimate 44% lower than the all-time high recorded in 2015, which stood at 274.4 Moz (8,534 t), it was also the lowest level since 2007. In value terms, annual identifiable investment was worth \$2.6 billion in 2017, a 61% fall from the historical high in 2012, when the market was worth \$6.7 billion and the average silver price was trading above \$30/oz.

After falling 10% in 2016 from the historical peak recorded the year before, coin fabrication volume dropped 35% in 2017, dragged down mostly by declines from the United States, Canada and China, which fell 50%, 44% and 41%

WORLD IDENTIFIABLE INVESTMENT

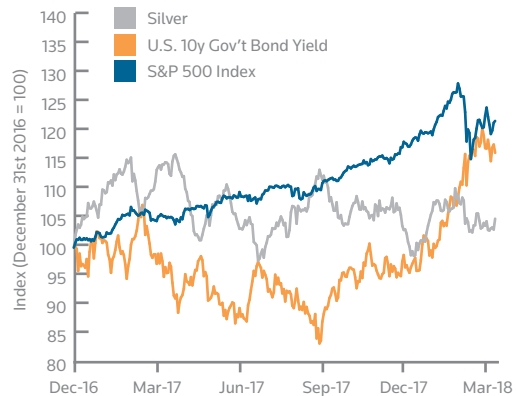
(million ounces)	2015	2016	2017
Physical Bar Investment	156.2	85.3	71.7
Coins & Medals	135.9	122.5	79.4
ETP Inventory Build	-17.8	49.8	2.4
Total Identifiable Investment*	274.4	257.5	153.5
Indicative Value US\$(bn)**	4.3	4.4	2.6

* Identifiable Investment is the sum of investment in physical bars, coins & medals as well as the build in ETP holdings and hence is all the quantifiable forms of investment.

** Indicative Value calculated on an annual basis using annual average silver prices.

Source: GFMS, Thomson Reuters

EQUITY, FIXED INCOME, & SILVER PERFORMANCE

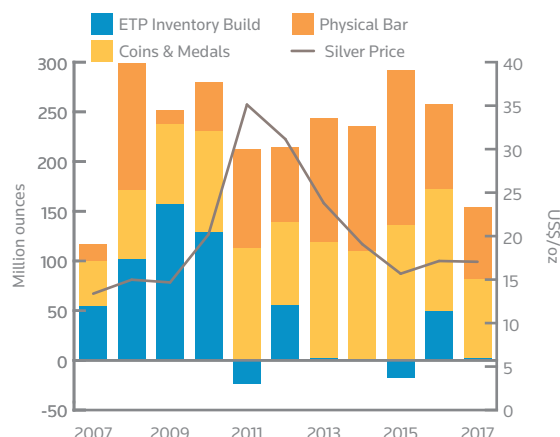


Source: Thomson Reuters Eikon

respectively. Considering that coin collectors in general are price sensitive, it is not surprising that demand for silver coins continued to decrease after the silver price bottomed in 2015. The silver price only rose by around 8% between 2015 and 2017 and therefore in theory coin demand should not have been hindered by much; it was more likely the risk of rising interest rates, and strength of other asset classes, that were holding off any substantial purchases. Coin demand may only pick up in a meaningful way when there is a more volatility in the silver price.

On the other hand, physical bar investment fell by 'only' 16% in 2017, after contracting by 45% the year before; this was, however, the lowest level recorded since 2010. The largest year-on-year falls were seen from Brazil, China, Indonesia, Saudi Arabia and the United States. These falls were partly offset by the increase in demand from Canada

WORLD IDENTIFIABLE INVESTMENT



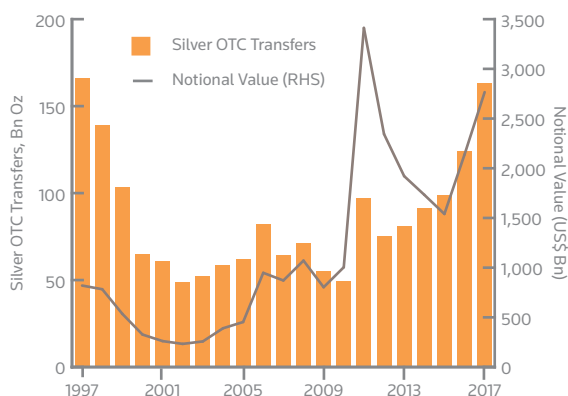
Source: GFMS, Thomson Reuters

and India. In contrast to physical coins and bars, investors in ETPs increased holdings by 2.4 Moz (75 t) for the year. As a result ETP holdings amounted to 669.8 Moz (20,834 t) by year-end, which was equivalent to approximately 76% of annual mine supply. Total holdings reached a historical high of 696 Moz (21,655 t) in late July 2017 when the silver price was below \$16.50/oz. The steady increase in the silver price thereafter prompted profit taking, resulting in holding liquidations.

After peaking in 2015 at such an elevated level, it is not surprising that investment contracted in 2017 for the second consecutive year, with demand falling for both coins and bars. Silver also lagged gold, evidenced by the continual increase in the gold:silver ratio, rising from 69 in the first quarter to 77 at the end of the year. Two of the more important investment themes in 2017 were the escalation in geopolitical risk, as well as the dollar weakness. Rising tension between the United States and North Korea prompted the market to embrace safe haven assets at times during 2017, bidding up the gold price further against silver.

On the other hand, it is fair to say that 2017 caught the investment community by surprise. In a year in which the Fed continued its interest rate normalization program, including details on reducing the balance sheet, the dollar index dropped 11% during the year. Some commodities offered investors a lucrative return that even outperformed the U.S. equities market. Silver, generally regarded as the leveraged version of gold in commodities trading, disappointed the market somewhat in 2017, underperforming its rich cousin by 600 basis points.

GLOBAL SILVER OTC TRANSFERS



Source: LBMA

Another barometer that we can use to gauge market interest in silver is through studying trading activities on COMEX. In 2017, there were two different periods (two weeks in July and the final three weeks in December) when silver managed money positions were net-short. This is relatively rare and usually signifies hefty pessimism in the market. To put this into context, the average COMEX silver net-long position was 242.6 Moz (7,546 t) in 2017, a 14% fall against 2016, when volumes averaged 283.4 Moz (8,815 t). The periods of net-short reflected both long liquidation and increases in gross shorts, driven by robust U.S. economic data and dollar strength, a pattern particularly prevalent in February and early March 2018.

In the first two months of 2018, silver continued to lag gold, with the gold:silver ratio exceeding 80, a level often seen during market instability throughout history. After edging up 2% in January, silver fell by 5% in the following month due to sharp corrections in the equities market, resulting in a drop of over 3% in the first two months of the year. While the market expects the Fed to raise interest rate three times in 2018, a change in this sentiment will likely create further volatility in both the dollar and commodity prices.

OTC MARKET

Although trading in silver futures is offered at an increasing number of exchanges across the globe these days, over-the-counter (OTC) deals, between two parties directly, have always had a substantial presence in the market. Due to the opacity of these deals, it is a challenge to present a reliable overview. A good place to start is to monitor the transfers on the LBMA, usually a good gauge of activity, but they also display only a part of the whole story. Non loco London OTC markets, for example, are excluded from their data, but some other physical market movements are included, although with a lack of differentiation between pure investment flows and other forms of activity.

Therefore, to present an overview of the silver OTC market we use the following methodology. We start by monitoring the LBMA transfer statistics. Loco London volumes, on average, are about twice the amount of the LBMA transfers and to extrapolate this to a global overview we consider London's share of the global market to be around 70%. Until a few years back, London's hegemony accounted for approximately 90% of the global OTC market, but an increased appetite for trading silver OTC in the Middle and

LONDON BULLION MARKET ASSOCIATION AND COMEX TURNOVER

(daily averages)	LBMA No. of Transfers	Turnover Moz	COMEX Turnover Moz	LBMA/ COMEX Ratio
2011	797.8	173.7	389	0.4:1
2012	811.1	134.5	264	0.5:1
2013	871.7	136.5	287	0.5:1
2014	777.6	144.4	272	0.5:1
2015	681.3	145.9	267	0.5:1
2016	754.3	171.8	362	0.5:1
2017	969.8	226.8	459	0.5:1

Source: LBMA; COMEX

Far East, among other regions, has resulted in a decline of London's dominance.

Compiling all this data suggests that, following an annual rise of 26% in 2016, implied OTC transactions increased another 31% to 163 billion ounces last year, marking a fifth consecutive year of increases. Last year's total was only 2% below the peak of 166 billion ounces recorded in 1997, the year when the LBMA started making its data publicly available and represented 10% of the global notional value of gold. Although volumes recorded on OTC represent both buying and selling, comparing its annual turnover volume to our annual physical silver balance shows that approximately one billion ounces of physical demand represented a mere 1% of OTC trading activity last year.

The notional value of silver transfers increased 29% year-on-year to approximately \$2.8 trillion in 2017, a second consecutive increase, representing a CAGR of 6% since 1997. While silver OTC transfers have been increasing since 2010, discarding 2011 as an outlier, the notional value of these transactions followed a more erratic pattern driven by the significant rise and fall in the silver price in 2011 and the years shortly after. As such, the notional value of silver transfers spiked to almost \$3.5 trillion in 2011, 19% higher than the value recorded last year.

EXCHANGE TRADED PRODUCTS

Total holdings of silver exchange traded products (ETPs) rose by 0.4%, or 2.4 Moz (74 t), to 669.8 Moz (20,834 t) in 2017. In value terms, total holdings increased 4% to \$11.3 Bn, as the silver price advanced during the year.

The largest silver ETP, iShares Silver Trust, recorded an outflow of 20.7 Moz (644 t), to a total of 320.6 Moz (9,973 t). The outflow represented a loss of

6% year-on-year. By the end of 2017, holdings of iShares Silver Trust represented 48% of total silver ETP holdings, down from 51% a year earlier. ETF Securities' various silver funds reported an overall increase of 12% year-on-year, or 9.3 Moz (292 t), to a total of 88.9 Moz (2,765 t). Meanwhile Deutsche Bank's silver funds also recorded an overall rise of 24%, or 3.3 Moz (104 t) year-on-year, to a total of 16.7 Moz (521 t). On the other hand, the Mitsubishi Tokyo silver fund, Silver Bullion Trust, Royal Canadian Mint ETR and iShare Silver Bullion ETF all recorded outflows during the year.

Similar to the trend in 2016, outflows were recorded in the first month of 2017, with a total of 5.8 Moz (179 t) of silver leaving ETPs. This was merely a function of profit taking driven by a 9% rise in the silver price in January in combination with the anticipation of a rate increase from the Fed. While flows stabilized in February, another round of outflows began to emerge towards the end of March. A total of 7.6 Moz (235 t) of silver came out from the ETPs in the first quarter. While the Fed raised interest rates in March, the dollar index was still down 2% for the quarter. A more substantial volume of inflows finally emerged at the end of April, as the silver price took a breather and investors took advantage of the price weakness. The silver price fell 9% in the second quarter, which prompted opportunistic buying among investors, lifting total silver holdings in ETPs by 22.6 Moz (700 t) during the period. Silver continued to descend in July with the price trading below \$16/oz for six consecutive trading days, after the Fed raised interest rates the second time in June. The price weakness continued to stimulate capital flowing into ETPs, with total holdings of silver ETPs peaking at 696.2 Moz (21,655 t) in late July. However as silver recovered in the following months, investors reversed to profit taking again, resulting in selling of 10.2 Moz (316 t) from ETPs in the third quarter. The anticipation of another interest rate hike in December prompted further liquidation in November, but the weakness in the silver price encouraged some buying in December. Overall, 2.4 Moz (74 t) of silver flowed out from ETPs in the final quarter.

In general, the ETP investment trend was not particularly surprising in 2017, given the silver price was stuck in a trading range. What was quite obvious is that these players were more interested in making short-term trading profits rather than buying for the long-term. We should also remember that the silver ETP constituency is more heavily

INVESTMENT IN COMMODITIES

Last year, the performance of the commodity space as a whole can be roughly divided into two halves. The first six months of the year recorded negative returns among the energy and base metals markets on the back of monetary tightening from China and unrealized promises on infrastructure spending under the new Trump Administration, in addition to OPEC’s inability to convince investors they can successfully rein in the oil supply glut. Meanwhile, the second half of the year (in a manner not that dissimilar to 2016) recorded gains in the energy and base metals sectors. Indeed, with the exception of agriculture, positive returns were recorded across the entire commodities space, led by precious metals.

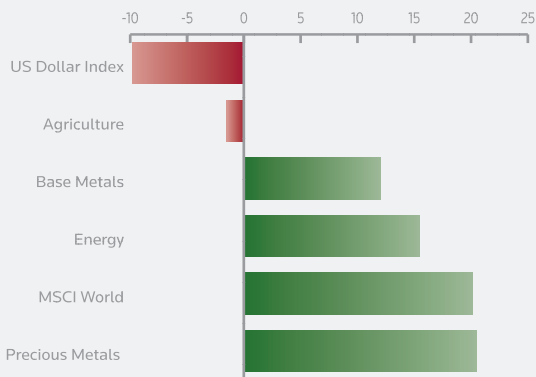
The reasons behind the strong performance of precious metals prices was, in most part, due to significant bull rallies in both rhodium and palladium. While rhodium rose by 123% over the year to reach a six-year high, palladium rose by 50% to reach a 16-year high.

Energy was the second best performing commodity sector in 2017, despite the fact that by August each segment was still recording negative returns. Brent crude oil was the top price performer for the segment in 2017. Following a shaky start to the year, when rumors about excess inventory and new supply were haunting the market, OPEC and Russia finally agreed in November to extend production cuts to the end of 2018. On the other end of the spectrum, natural gas fell 11% over the year, with abundant North American supply facing a warmer North American winter.

Base Metals (with the exception of tin) in general performed well last year, as a weaker dollar and improving economic landscape helped to stimulate demand. This was particularly apparent from key industrial focussed countries, for example China, where the economy surpassed expectations in the first half of the year and the long predicted negative impact of a property market slump failed to materialize. Aluminium recorded the largest jump over the year, rising by 34%. Fears over shortages in supply following China’s environmental crackdown on winter smog (China is responsible for over half of the world’s primary aluminium production), led to prices soaring towards the end of the year. In the month of December alone, aluminium rose by a significant 9% or \$193/t. Meanwhile, the LME benchmark copper contract pierced \$7,000/tonne on its way to \$7,313/tonne in late December, with zinc surging to a ten-year high above \$3,300 in early October on the back of dwindling mine supply. Tin was the only base metal to record a negative price return on the year, falling by 5%, with a reduction in investor interest for the metal in the western markets.

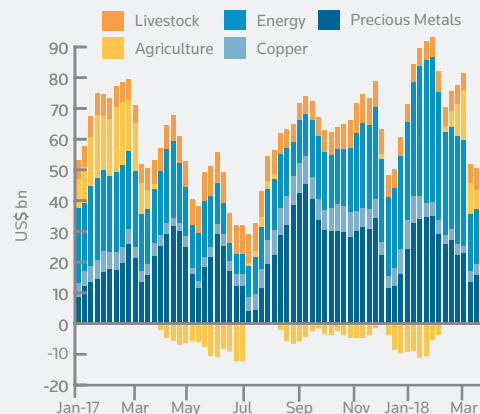
Cotton stole the top spot in price performance across the agricultural sector, rising by 10% over the year as supply availability was affected in the United States by tropical storms and pesticide problems, while China banned trading firms from purchasing cotton from its national reserves over September. Meanwhile, the overriding theme across the agriculture sector remained that of supply excess with corn, soybeans and wheat each recording a second consecutive year of bumper crops, with combined prices for the sector recording a negative year-on-year return of 1.5%. Sugar recorded the most negative price performance in the face of global over-supply, falling by 26% over the course of the year.

PRICE PERFORMANCE ACROSS VARIOUS ASSET CLASSES IN 2017



Source: GFMS, Thomson Reuters

NET POSITIONS IN KEY COMMODITY FUTURES

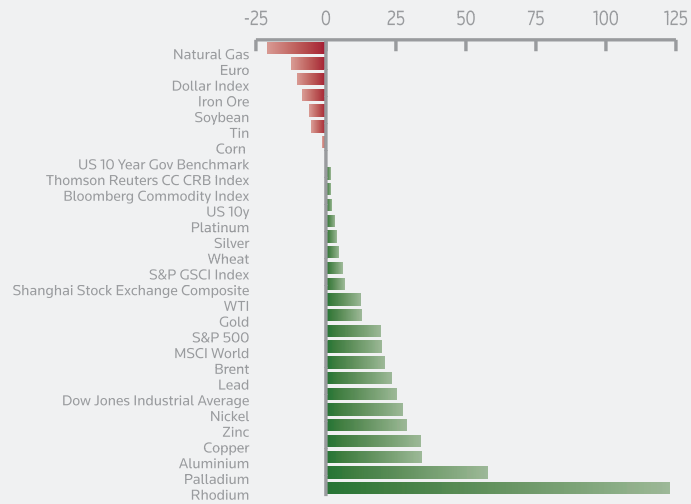


Source: CTFC

WHAT TO LOOK OUT FOR IN 2018?

One of the largest uncertainties in 2018 surrounds central banks and their ability to normalize monetary policy and reduce their balance sheets. We have recorded already a sharp (although short-lived) impact on global equity markets stemming from inflation concerns coming out of the United States and the likelihood of a more aggressive tightening from the Fed. Higher interest rates will in turn strengthen the U.S. dollar, creating negative headwinds for commodities, while raised volatility in the markets could result in investors assuming a more 'risk-off' approach in 2018.

INDEXED PERFORMANCE ACROSS ASSETS IN 2017 (JANUARY 2 2017 = 100)

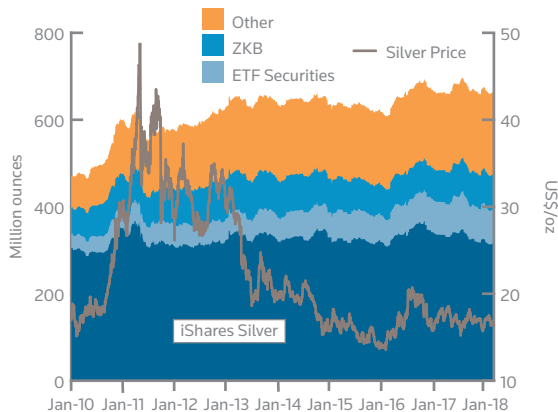


Source: GFMS, Thomson Reuters

Meanwhile, the recent announcement by U.S. President Donald Trump of his intention to impose new tariffs on steel and aluminium imports into the United States, has conjured uncertainty towards future global trade and opened up the prospect of trade wars. The move followed an already earlier imposed import tariff on washing machines and solar panels from China and debate is ongoing about including some form of restrictions on imports of automobiles too. This is in addition to the uncertainty already created by Brexit.

Looking to China, the world's largest industrial country, debt concerns could reduce the government's appetite to pull financial levers on fixed asset investment projects, resulting in a slowdown in Chinese GDP. The continued war on pollution and supply-side reforms, however, could see certain markets such as zinc and copper tighten, with higher prices as a result. But silver, through the use of solar panels, is likely to benefit from China's relentless drive to become less dependent on fossil fuels for its electricity generation. Solar energy will become even more widely available, not only on a utility scale but also among private households.

SILVER ETP HOLDINGS



Source: Respective Issuers

*ETF Securities: includes LSE, Australia, NYSE, GLTR and WITE

**Other: includes Sprott Physical Silver Trust, Julius Bär, DB Physical Silver, BlackRock Silver Bullion Trust, Silver Bullion Trust, Mitsubishi UFJ Tokyo, iShares Physical Silver ETC, Source Physical Silver, Royal Canadian Mint;

SILVER ETP HOLDINGS

(Moz)	end-2016	end-2017
iShares Silver Trust	341.3	320.6
ETF Securities*	79.6	88.9
ZKB Silver ETF	71.9	79.7
Sprott Physical Gold & Silver Trust	75.6	75.2
Others**	96.3	105.4
Total	664.7	669.8

* Includes LSE, Australia, NYSE, GLTR, WITE and Hong Kong (until the latter closed)

** Includes Sprott Physical Silver Trust, Julius Bär, DB Physical Silver, BlackRock Silver Bullion Trust, Silver Bullion Trust, Mitsubishi UFJ Tokyo, iShares Physical Silver ETC, Source Physical Silver, Royal Canadian Mint.

Source: Respective issuers

weighted to retail than institutional holdings, and the investment horizon of the former is usually much shorter than the latter.

On the other hand, gold holdings in ETPs increased 9%, or 5.7 Moz (177 t), to 72.7 Moz (2,262 t) in 2017. Due to geopolitical instabilities ETP investors continued to favor gold over silver as an investment, as evidenced by a larger percentage increase in gold ETPs and the continuing increase in the gold:silver ratio.

Turning to 2018, the tradition of silver outflows in January continued, with 10.8 Moz (335 t) of silver leaving the ETPs, representing a 2% loss over the month while the silver price gained 2% over the period as well. However, silver retreated close to 5% in February, as volatility in the global equity markets increased on concerns that the Fed might raise rates more times than originally expected, with the first hike likely in March. As silver became cheaper in February, silver holdings in ETPs increased by 6.2 Moz (192 t) during the month, supported by bargain hunters.

PHYSICAL BAR INVESTMENT

For the second year in a row, global physical bar investment dropped, by 16% in 2017, to 71.7 Moz (2,229 t), the lowest level since 2010. This was largely attributed to a sharp fall in investment demand in North America. By contrast, demand in Asia picked up by 14% thanks to a rebound in Indian bar purchases; excluding India from the regional total reveals that physical bar investment declined by 9%.

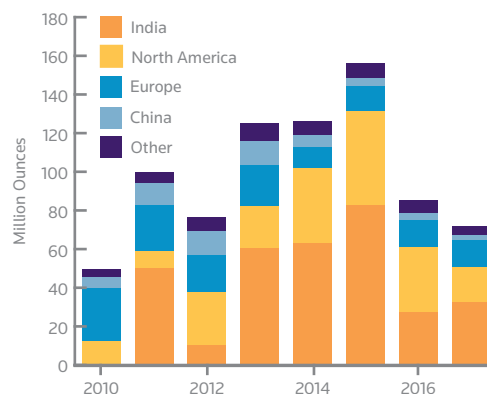
Indian bar investment demand in 2017 increased 19% year-on-year to 32.5 Moz (1,012 t), equivalent to approximately 17% of the total supply. There was increasing investor interest for buying into dips, as local investors were looking for a near 40% return on investment over the next two years. It was interesting to note that in various instances investors did not take delivery of the metal from the dealer but instead made the payment and let the dealer hold the metal in an unallocated account on their behalf. The unofficially agreed norm is that delivery takes place within three working days. Demand was particularly strong during the third and the fourth quarters, with investors ordering shipments by air and paying the higher premia, freight and insurance cost during the first half of December 2017, as the price in rupee terms declined to the lowest level for the year. Investor interest, however, declined, with the

cash-futures spread trade despite annualized yields in the range of 8% to 9%. This was due to liquidity constraints in the unaccounted cash market and diversion of funds to equities; a fallout of the demonetization scheme.

Following a 25% annual contraction in 2016, physical bar investment in the **United States** had another meager year in 2017, declining by 50% to 16.1 Moz (501 t). Buoyant stock market performances across the various exchanges in the United States as well as increased speculative interest in crypto currencies impinged to a degree on investor interest in physical silver. The U.S. market accumulated a net total of 225.1 Moz (7001 t) of physical silver bars on the retail side between 2008-2017, in addition to demand from silver ETP's (and coins). With the lack of any significant shocks to the macroeconomic system and the camp of the perma bulls slowly declining, it is not that surprising that interest is waning and the market is struggling to absorb the additional metal.

Physical bar investment in **Europe** slipped by 2% in 2017, following two years of healthy increases, to 14 Moz (436 t). This was largely driven by weaker investment demand in Germany, which represents the largest market in the region for bar demand, accounting for more than 60% of the total. Central to this was growing optimism about the Eurozone economy, following a series of upbeat economic data, which along with a wider economic recovery prompted a shift in risk sentiment. This, in addition to the rally fever across key equity markets saw reduced interest in zero-yielding assets. As a result silver bar purchases fell not just in Germany but across other smaller markets in the region.

PHYSICAL BAR INVESTMENT



Source: GFMS, Thomson Reuters

In addition, a lack of volatility in the silver price and a relatively narrow price range failed to attract much interest from retail investors; however, anecdotal evidence suggests that periods of sharp declines in the price, such as in July 2017, when the euro price plunged to its lowest in more than a year (and even below that level in mid-December) sparked some opportunistic buying.

Chinese bar investment fell 17% to 2.6 Moz (82 t) in 2017 which was the lowest level since 2010. It is worth noting that silver bar investment is not that popular among retail investors in China. In contrast to gold, silver retail purchases are subject to an additional 17% value added tax, that is non-refundable when cashing out. Therefore, silver bar investment is mostly restricted to investors and traders working in the silver industry.

COMMODITY EXCHANGES ACTIVITY

Since surpassing the Chinese futures exchanges in 2016, silver trading volume on **COMEX** continued to diverge from its peers in 2017, posting a strong 27% annual growth, to a nominal 115,175 Moz (3,582,315 t). Turnover peaked in August, which was equivalent to a daily average of 566 Moz (17,604 t). The continuous tension between North Korea and the United States spooked the market from time to time, and stimulated demand for safe haven assets, including gold and (by association) silver. The dollar index on the other hand, weakened.

CFTC reports on managed money positions can be used as a proxy for investor activity on the exchange. The first few months of 2017 were characterized by a steady rise in long positions, with managed money net long positions peaking in early April, equivalent to 494 Moz (15,372 t). This was also approximately 2% higher than the previous peak recorded in July 2016. After that, speculators began trimming down their long positions and building up shorts, falling into net short in mid-July and again for the last three weeks in December.

Turnover on the **Shanghai Futures Exchange** (SHFE) dropped for the third consecutive year in 2017, declining by 39% to a nominal 25,613 Moz (796,647 t). The falloff in silver trading activities in China was partly due to the renewed speculative interests in other metals over the course of 2017. For example, trading volumes of aluminum, zinc and lead on the SHFE surged by 47%, 25% and 174%

SILVER TURNOVER ON MAJOR COMMODITY EXCHANGES

(total volume in nominal million ounce equivalents)

	2015	2016	2017	Change y-o-y
COMEX	67,272	90,638	115,175	27%
SHFE	69,825	41,716	25,613	-39%
SGE	12,935	19,711	18,572	-6%
MCX	7,454	6,931	4,911	-29%
ICE FUTURES US	135	147	95	-36%
TOCOM	20	20	7	-65%

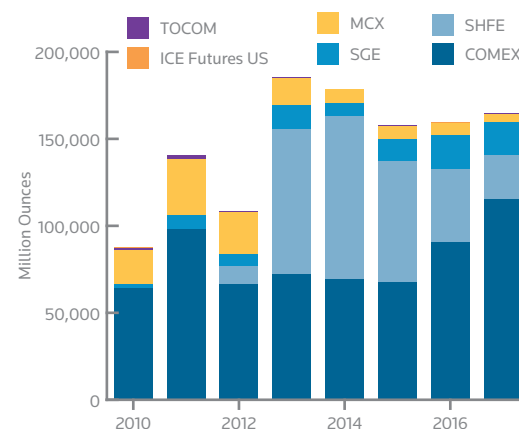
*N.B. : Includes the 5,000-ounce and 1,000-ounce contracts

Source: GFMS, Thomson Reuters; TOCOM, MCX, SGE and SHFE

respectively. February was the only month in 2017 to record year-on-year growth in silver trading volumes, but that was mainly due to the holiday season. Trading volume started to pick up in July and peaked in August, resulting in 33.5 million contracts (buy-sell combined) being traded in the third quarter, which was still 38% lower than the corresponding period in 2016.

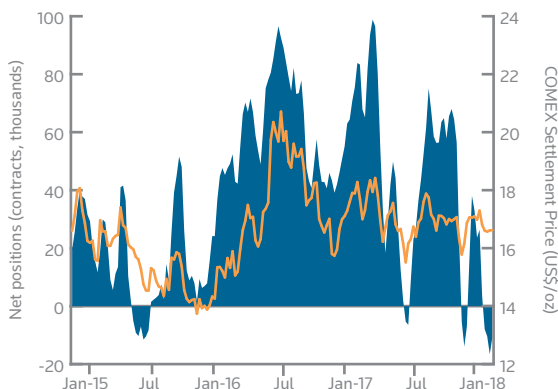
Meanwhile, after experiencing some stellar growth in recent years, silver trading volume on the **Shanghai Gold Exchange** (SGE) finally took a breather in 2017, with volumes easing 6% to a nominal 18,572 Moz (577,469 t). Despite the decline, SGE continued taking market share from the SHFE, rising from 32% in 2016 to 42% a year later compared to the SHFE. Domestic banks continued increasing their participation and trading activities on the SGE. The potential to gain the deferred interest fee while trading on the SGE also offered a greater incentive for traders compared to the other exchanges.

SILVER TURNOVER ON MAJOR COMMODITY EXCHANGES



Source: Various Exchanges

NET MONEY MANAGER POSITIONS ON COMEX



Source: CFTC

Volume in the benchmark silver contract traded at the **Multi Commodity Exchange of India** declined by 29% year-on-year in 2017, falling to the lowest level since 2004. This is attributed to the impact of the demonetization scheme, which significantly reduced the liquidity funneled through unaccounted funds into exchange products. Following the demonetization scheme, the unaccounted funds had reduced significantly, dragging down silver trading volumes. Total volumes delivered to the exchange were at just 3.8 Moz (117 t), which was down by 67% year-on-year; the second lowest delivery over this decade.

ICE Futures U.S. posted a 36% year-on-year decline in turnover, while TOCOM volumes fell by another 65% in 2017. Although some major global exchanges recorded lower trading volumes in 2017, total trading volumes in volume still grew by over 3%, thanks to the increased activity on COMEX.

COINS AND MEDALS

Silver coin and medals fabrication declined for the second consecutive year in 2017, falling by 35% to 79.4 Moz (2,471 t) in 2017. To put this into perspective, this was the lowest level since 2008 and down by 42% from the peak recorded in 2015. The approximate value of investment in this category, using annual averages, fell to \$1.4 Bn., from \$2.1 Bn., in the previous year.

Last year's decline in fabrication volumes was broadly in line with findings from the GFMS' proprietary quarterly coin survey, which showed that total sales of bullion silver coins for 2017 as a whole decreased for the second year in

MANAGED MONEY NET POSITIONS IN COMEX FUTURES

	Contracts	Moz	Price
2014	9,613	48.1	19.07
2015	16,470	82.3	15.65
2016	56,679	283.0	17.11
2017 Q1	65,333	326.7	17.36
Q2	55,684	278.4	17.32
Q3	34,179	170.9	16.81
Q4	42,218	211.1	16.75

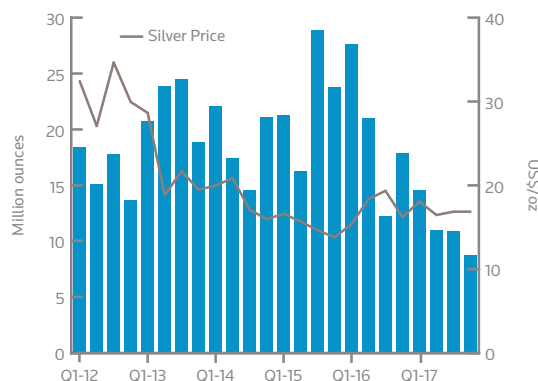
(Managed Money net positions, Moz equivalent and average COMEX settlement price in \$/oz)

Source: CFTC

a row, down by 43% compared to 2016, to a nine-year low. The worst performance was registered in the fourth quarter of the year, when total sales tumbled by 51% compared to the same period in 2016, with all major regions, except Japan, recording double-digit percentage declines year-on-year. The first half of the year was only a little better, with sales posting a 47% year-on-year drop and all key regions experiencing hefty declines. This was, to a large extent, driven by improving economic sentiment and growing risk appetite among investors, which along with a rally fever across key equity markets hindered buying of silver coins.

It is interesting to note that, while global sales of silver coins declined again in the third quarter of 2017, the overall performance in that quarter was better than the rest of the year, falling by 11% year-on-year. Key to this was a slight shift in investor demand in Europe, primarily driven by a sharp drop in the euro silver price in July to its lowest level in more than a year. This sparked some opportunistic buying, lifting sales in that region by 2% year-on-year. However, this later proved to be only a temporary shift as sales in that region tumbled again in the final quarter.

SILVER BULLION COIN SALES



Source: GFMS, Thomson Reuters

TABLE 2 - SILVER FABRICATION: COINS AND MEDALS (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
United States	25.4	34.3	41.7	41.0	34.8	44.2	45.5	48.1	39.2	19.6
Canada	4.3	9.0	10.8	18.6	23.5	18.0	29.7	36.3	34.3	19.1
Australia	5.9	6.5	8.8	11.3	6.5	9.1	7.9	12.3	12.9	10.1
India	5.3	3.3	4.7	1.9	2.0	5.4	6.3	8.9	9.4	9.8
China	2.8	3.0	1.5	4.1	4.5	6.2	5.9	10.7	10.7	6.3
Germany	7.2	7.5	6.4	3.3	1.1	0.6	0.6	3.5	4.8	4.8
United Kingdom	0.5	0.5	0.5	1.0	0.7	2.2	2.1	3.7	3.5	3.6
Austria	8.3	9.5	11.6	18.4	9.2	14.7	4.8	7.5	3.6	2.1
Japan	0.3	0.4	0.6	0.6	0.7	0.8	0.7	0.7	0.7	0.7
Hungary	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.6	0.7	0.6
Other Countries	4.6	4.9	6.1	5.3	7.5	3.9	3.6	3.7	2.7	2.7
World Total	69.4	80.9	100.6	112.7	83.4	116.2	107.9	135.9	122.5	79.4

© GFMS, Thomson Reuters; The Silver Institute

Looking in greater detail at trends on a regional basis, silver coin fabrication in North America, the largest fabrication region, slumped by 47% in 2017, to a total of 39.3 Moz (1,223 t). Fabrication volumes in the United States halved last year, to 19.6 Moz (610 t), which was the lowest level since 2007. Coin fabrication in Canada fell by 44% from the previous year's level to a five-year low of 19.1 Moz (594 t), while Mexico saw an 18% drop to 0.6 Moz (19 t).

Coin fabrication in Asia, the second largest fabrication region in 2017 with a share of 18%, recorded a year-on-year decline of 19% to 17.5 Moz (544 t) last year. Following two consecutive years of strong performance, coin production in China dropped to 6.3 Moz (196 t) in 2017, representing a hefty decline of 41%. To put it in context, Chinese silver coin demand exploded in 2015, which saw coin fabrication soar by 80% that year to a fresh high of 10.7 Moz (333 t), with volumes staying at a similar level in 2016. This was driven by a rebound in investor interest for bullion coins as a means to store wealth and as a cheaper alternative to safe-haven gold, particularly among smaller retail investors.

The momentum, however, faltered last year partly on a cautious view towards the gold outlook, and silver for that matter, amid expectations that the Fed would continue raising interest rates, which would weigh on the dollar value of the metal. In addition, better-than-expected economic activity and the yuan's sharp appreciation during 2017 reduced gold's and silver's appeal as safe haven assets. As a result of the steep decline last year, China lost its status as the top silver coin fabricator in Asia, with its share of the total slipping to 36%, from nearly 50% a year earlier.

India became the largest coin manufacturer in the region, with its share rising from 43% in 2016 to 56% last year, as the country expanded its bullion coin fabrication for the sixth year in a row. Production rose by 4% last year, to hit a new record of 9.8 Moz (303 t) thanks to continued strength in demand from the gifting segment, helped by lower prices in local terms.

Silver coin fabrication in Australia, another key bullion coin producing market, posted a sharp year-on-year drop of 21% last year from an all-time high in 2016. Standing at 10.1 Moz (315 t), production volumes still remained quite significant in the historical context, with the country accounting for 13% of global coin fabrication.

Turning to Europe, silver coin fabrication dropped by 10% in 2017, to a three-year low of 12.5 Moz (388 t), as sales were hampered by a strong economic recovery in the Eurozone and the stock market frenzy. The most prominent decline came from Austria as fabrication stumbled by 43%, which was the second year in a row to record double-digit percentage declines, to 2.1 Moz (64 t), the lowest level since 2007. On the other hand, the United Kingdom saw 4% growth, partly helped by sharply lower prices, particularly in April and July, which prompted some interest among bargain hunters.

4. MINE SUPPLY

- Global silver mine production declined by 4.1% in 2017, to a total of 852.1 Moz (26,502 t).
- Nearly two-thirds of the variation posted year-on-year came from lower output from primary silver mines. Less pronounced drops were witnessed in silver sourced from other metals.
- Losses in South America, Oceania and Europe were partly offset by gains in North America.
- On a co-product basis, we estimate cash costs with capex for 2017 averaged \$10.54/oz, a 6% decrease relative to 2016.
- In 2017, the delta-adjusted hedge book expanded by 1.4 Moz (44 t).

TOP 20 SILVER PRODUCING COUNTRIES

Rank		Country	Output (Moz)	
2016	2017		2016	2017
1	1	Mexico	186.3	196.4
2	2	Peru	148.7	147.5
3	3	China	114.8	112.6
5	4	Russia	46.6	42.0
4	5	Chile	48.0	40.5
7	6	Bolivia	43.5	40.0
8	7	Poland	38.5	39.5
6	8	Australia	43.5	35.4
9	9	United States	37.0	33.7
10	10	Argentina	29.8	25.6
12	11	Kazakhstan	17.8	19.0
14	12	India	14.0	16.9
13	13	Sweden	16.4	15.5
15	14	Canada	13.0	12.7
11	15	Guatemala	26.9	11.6
16	16	Indonesia	11.2	11.5
17	17	Morocco	10.2	10.9
18	18	Turkey	5.6	5.5
19	19	Armenia	4.8	5.0
20	20	Iran	3.6	3.6
Rest of the World			28.3	26.8
World Total			888.6	852.1

Source: GFMS, Thomson Reuters

MINE PRODUCTION

- Silver mine supply decreased by 36.5 Moz (1,136 t) in 2017, the second consecutive drop after thirteen years of uninterrupted growth.

Global silver mine production extended losses in 2017 following a string of supply disruptions across the Americas, namely in Guatemala and the United States. At the former, the country's largest primary silver operation, Escobal, ceased operations over the second half of the year due to a temporary suspension of its mining license and increasing opposition from anti-mining groups. Meanwhile, in the United States, an ongoing strike at Lucky Friday damped output over the last three quarters of the year. Lower grades at aging mines also took a toll on output, in particular in Argentina and Bolivia. Collectively, these significant drops in output at the country level caused the Americas to contract by 25.4 Moz (790 t) year-on-year.

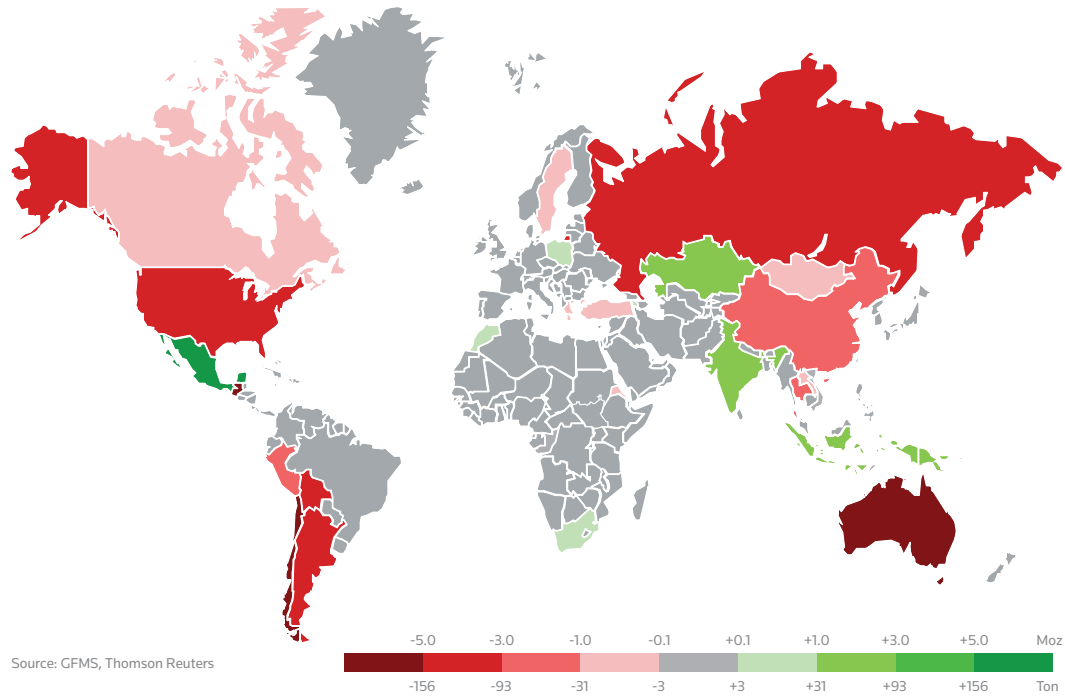
TOP 20 SILVER PRODUCING COMPANIES

Rank		Company	Output (Moz)	
2016	2017		2016	2017
1	1	Fresnillo plc. ^{1,2}	45.7	54.2
3	2	KGHM Polska Miedz S.A. Group ^{3,4}	38.8	40.0
2	3	Glencore plc. ⁵	39.1	37.7
5	4	Goldcorp Inc.	28.1	28.6
4	5	Polymetal International plc.	29.2	26.8
7	6	Cia. De Minas Buenaventura S.A.A. ⁵	24.7	26.4
6	7	Pan American Silver Corp. ²	25.4	25.0
13	8	Hochschild Mining plc. ⁶	17.3	19.1
8	9	Volcan Cia. Minera S.A.A. ⁵	22.0	17.3
18	10	Hindustan Zinc Ltd. ⁷	14.0	16.9
10	11	Corp. Nacional del Cobre de Chile	20.4	16.8
16	12	Coeur Mining, Inc. ²	14.8	16.4
12	13	Sumitomo Corp. ⁴	18.1	16.2
15	14	Southern Copper Corp. ⁸	16.2	15.9
17	15	Boliden A.B. ⁹	14.4	13.3
14	16	Hecla Mining Company ²	17.2	12.5
19	17	Industrias Peñoles S.A.B. De C.V. ¹⁰	12.4	12.2
11	18	South 32 Ltd.	18.2	12.0
22	19	BHP Billiton plc. ⁹	10.3	9.9
9	20	Tahoe Resources Inc. ²	21.3	9.9

¹ Including 100% of Penmont mines, excluding silverstream; ² Primary silver producer; ³ Reported metallic silver production; ⁴ Estimate; ⁵ includes minority partners; ⁶ Includes 100% from Pallancata, includes Moris; ⁷ Integrated refined metal; ⁸ Mined silver; ⁹ Metal in concentrate; ¹⁰ Excludes 100% of Fresnillo plc.

Source: GFMS, Thomson Reuters

SILVER MINE PRODUCTION WINNERS AND LOSERS, 2017 VERSUS 2016



Elsewhere, environmental concerns in China led to a weak performance in the base metals sector, while Australian production continued to drop as output at several mines slowed, most notably at Cannington. Further losses were also noted in Europe (-4%), where Russian production fell 4.7 Moz (145 t) due to lower grades at Dukat. Revised mine plans at numerous operations, chiefly primary silver mines, have led to lower cut-off grades in an attempt to optimize output, while keeping mining and treatment costs under control. The global skew was not all negative, however, with higher production reported in North America (3%). At a national level, the main driver behind the increase was Mexico led by a ramp-up and first complete year of operations at San Julián

NORTH AMERICA

North American mine production resumed its upward trajectory in 2017 after a hiatus last year that saw output drop for the first time in seven years. Though losses continued to accrue in United States and Canada, the story was more upbeat in the case of Mexico, lifting the balance by 6.4 Moz (199 t) to a new record high of 242.7 Moz (7,549 t). This outcome was driven by an increase in the primary silver and lead/zinc sector, though partially offset by a decrease in output from gold mines.

Mine supply from **Mexico** rose by 10.1 Moz (314 t), or 5%, led by higher production at San Julián and Peñasquito. Fresnillo’s San Julián operation, which was commissioned in Q3 2016, accounted for the majority of the growth in the country, producing a total of 10.5 Moz (328 t). The start-up of operations at the second phase saw output climb by 10.5% in the fourth quarter and is expected to continue reaping benefits over 2018. Following a prolonged mill maintenance period in 2016 that saw output drop near 2011 levels, production at Peñasquito rose by 20%, or 3.6 Moz (112 t) supported by higher grades and metal recoveries. Processed grades are expected to increase over the near term as mining activities at Phase 6D begin in Q4 2018 after an intensive stripping campaign last year. Further gains were recorded at Palmarejo and San Jose, where aggregate output rose by 4.2 Moz (131 t) on a ramp-

WORLD SILVER MINE PRODUCTION

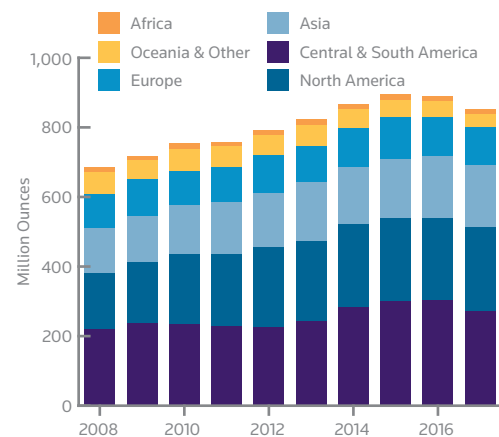


TABLE 3 - WORLD SILVER MINE PRODUCTION

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Russia	36.4	42.2	36.8	39.3	45.4	44.4	46.6	51.1	46.6	42.0
Poland	39.0	39.2	37.6	40.8	41.3	37.6	40.7	41.5	38.5	39.5
Sweden	8.4	8.7	9.2	9.1	9.8	10.8	12.7	15.9	16.4	15.5
Turkey	10.1	12.5	12.3	9.3	7.3	6.0	6.6	5.5	5.6	5.5
Portugal	1.3	0.7	0.7	1.0	1.1	1.4	1.7	2.4	1.2	1.3
Spain	0.1	0.1	0.7	1.1	1.2	1.3	1.3	1.3	1.3	1.2
Greece	1.1	0.9	0.9	0.8	1.0	0.9	0.9	1.0	0.9	0.8
Bulgaria	0.4	0.5	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6
Macedonia	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
Romania	0.0	0.1	0.2	0.4	0.3	0.3	0.1	0.1	0.1	0.1
Finland	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Ireland	0.3	0.2	0.1	0.2	0.3	0.3	0.2	0.1	0.0	0.0
Other Countries	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Europe	97.4	105.5	99.4	102.8	108.6	104.2	111.8	119.9	111.8	107.0
North America										
Mexico	104.1	114.3	141.8	153.6	172.3	177.3	185.4	192.1	186.3	196.4
United States	36.0	40.2	41.2	36.0	34.1	33.4	37.9	35.0	37.0	33.7
Canada	21.5	19.6	18.4	18.7	22.0	20.6	15.9	12.2	13.0	12.7
Total North America	161.6	174.0	201.4	208.3	228.4	231.3	239.3	239.4	236.3	242.7
Central & South America										
Peru	120.2	127.7	118.7	111.7	114.0	120.7	122.9	138.0	148.7	147.5
Chile	45.2	41.8	41.4	41.5	38.4	39.2	51.3	49.7	48.0	40.5
Bolivia	35.8	42.6	40.5	39.0	38.8	41.2	43.2	42.0	43.5	40.0
Argentina	10.8	18.0	23.3	22.8	24.5	24.9	29.1	34.7	29.8	25.6
Guatemala	3.2	4.2	6.3	8.8	6.6	9.0	27.6	27.5	26.9	11.6
Dominican Republic	0.0	0.6	0.6	0.6	0.9	2.8	4.5	4.1	3.4	3.4
Nicaragua	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.6	0.7	0.6
Honduras	1.9	1.9	1.9	1.6	1.6	1.6	1.8	1.1	0.6	0.6
Ecuador	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Brazil	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6
Colombia	0.3	0.3	0.5	0.8	0.6	0.4	0.4	0.5	0.5	0.5
Venezuela	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Other Countries	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
Total C. & S. America	218.5	238.2	234.4	228.0	226.9	241.5	282.5	299.4	303.3	271.5
Asia										
China	84.0	86.7	94.6	102.6	109.3	113.0	112.0	112.6	114.8	112.6
Kazakhstan	20.2	19.7	17.6	17.6	17.5	19.6	19.0	17.3	17.8	19.0
India	6.8	6.2	8.2	7.5	9.0	10.7	8.4	12.0	14.0	16.9
Indonesia	8.0	7.7	6.7	6.1	5.3	8.2	7.3	10.0	11.2	11.5
Armenia	1.4	1.3	1.6	2.4	2.9	3.4	3.7	4.0	4.8	5.0
Islamic Rep. of Iran	3.2	3.4	3.6	3.6	3.5	3.2	3.2	3.3	3.6	3.6
Mongolia	1.1	1.1	1.1	1.1	1.1	1.6	2.1	2.6	2.8	2.1
Uzbekistan	1.7	1.7	1.9	1.9	1.9	1.9	1.7	1.6	1.6	1.6
Dem. Rep. of Laos	0.2	0.5	0.6	0.6	0.6	1.0	1.3	1.3	1.6	1.4
Philippines	0.5	1.1	1.4	1.4	1.5	1.5	0.9	0.9	0.9	0.8
North Korea	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8
Saudi Arabia	0.4	0.4	0.4	0.3	0.3	0.6	0.7	0.7	0.8	0.8
Kyrgyzstan	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.6	0.6

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TABLE 3 - WORLD SILVER MINE PRODUCTION

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Japan	0.4	0.4	0.3	0.5	0.6	0.5	0.5	0.5	0.5	0.5
Azerbaijan	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.2
Thailand	0.4	0.7	0.7	0.8	1.2	1.2	1.1	0.8	1.3	0.1
Tajikistan	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pakistan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
Total Asia	129.7	132.2	140.2	147.9	156.2	168.0	163.2	169.3	177.5	177.8
Africa										
Morocco	8.1	8.7	10.5	8.3	8.3	9.2	8.8	9.6	10.2	10.9
South Africa	2.4	2.5	2.6	2.4	2.2	2.2	1.2	1.5	1.6	1.8
Burkina Faso	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.7	0.7
Zambia	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Tanzania	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Botswana	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.2	0.1	0.1
Zimbabwe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Ethiopia	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mali	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Ghana	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Dem. Rep. of the Congo	1.1	0.0	0.2	0.4	0.4	2.0	0.3	0.2	0.1	0.1
Eritrea	0.0	0.0	0.0	0.1	0.7	0.8	1.5	2.3	0.4	0.0
Other Countries	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1
Total Africa	12.9	12.4	14.6	12.6	13.3	15.9	13.9	15.4	14.4	15.0
Oceania & Other										
Australia	61.9	52.4	60.4	55.5	55.5	59.2	53.9	49.0	43.5	35.4
Papua New Guinea	1.6	2.2	2.1	3.0	2.6	2.9	2.8	2.3	1.4	2.5
New Zealand	1.0	0.5	0.4	0.3	0.2	0.4	0.5	0.4	0.3	0.3
Other Countries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Oceania & Other	64.6	55.0	63.0	58.7	58.3	62.4	57.2	51.7	45.2	38.1
World Total	684.7	717.3	753.0	758.3	791.7	823.3	867.8	895.1	888.6	852.1

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up ahead of schedule and higher grades, respectively. Meanwhile, output at Fresnillo remained buoyant though fell below expectation due to development delays caused by lower productivity and mining equipment failures.

Providing a partial offset, production from the gold sector fell due to a 2-month strike at Primero's San Dimas that caused output to drop by an estimated 1.4 Moz (39 t). Development delays due to faulty underground equipment and a second period of inactivity in July added further pressure on output despite a jump in processed grades.

Production in **Canada** was relatively unchanged year-on-year with only a small contraction recorded in the copper sector. Losses at Kidd Creek and Highland Valley Copper compounded with a slowdown at Minto as low grade stockpiles were processed to offset an underground

ore shortfall. We estimate production at Vale's Sudbury operation decreased by as much as 0.5 Moz (16 t) due to management's decision to reduce its nickel footprint and operate with a single furnace. Elsewhere, Agnico Eagles' LaRonde Complex gold operation posted an increase of 0.3 Moz (8 t) on the back of higher grades from the lower portion of the mine.

The **United States** also experienced a reduction in silver output of 9% year-on-year to total 33.7 Moz (1,048 t). The largest change year-on-year was registered at Hecla's Lucky Friday, where output fell by 2.8 Moz (86 t) due to an ongoing strike since mid-March 2017. Further losses at Greens Creek on lower grades consolidated the 3.8 Moz (116 t) output from primary silver mines. Providing a partial offset, we estimate that production at Teck's Red Dog rose by approximately 0.3 Moz (9 t).

CENTRAL & SOUTH AMERICA

In 2017, South American mine production slumped by 10% to total 271.5 Moz (8,455 t), representing the biggest contraction at the regional level.

The largest country decrease globally was from **Guatemala**, where production fell by 15.3 Moz (477 t), or 57%, to a total 11.6 Moz (360 t). Though the country accounts for only 4.3% of the region's output (down from 9.8% in 2014), this portion can fluctuate widely since only two mines make-up the balance. One of them, Tahoe's Escobal primary silver mine, ceased operations during the second half of the year due to a temporary suspension of its mining license and increasing opposition from anti-mining groups. In the first six months of 2017, Escobal produced a total of 9.7 Moz (301 t), or 15% below for the same period last year. It is yet unclear whether this issue will be solved in H1 2018, and with the closure of Goldcorp's Marlin operation at the end of May 2017, the country has yet to produce a single ounce of silver in 2018.

Silver output also fell in **Chile**, by 7.5 Moz (232 t), explained by an estimated 14% reduction in output from private companies, amounting to approximately 3.8 Moz (118 t). This fall came despite a muted change in copper output in 2017. Production was first hampered by a 10 day strike early in the year at Yamana's El Peñón, followed by a 42 day strike at BHP's Escondida in February. The strike at Escondida was the longest mining strike in Chile since 1973 when miners walked out for 74 days at Codelco's El Teniente mine. However, higher mining rates over second half of the year, coupled with a jump in grades against the same period last year managed to nearly close the

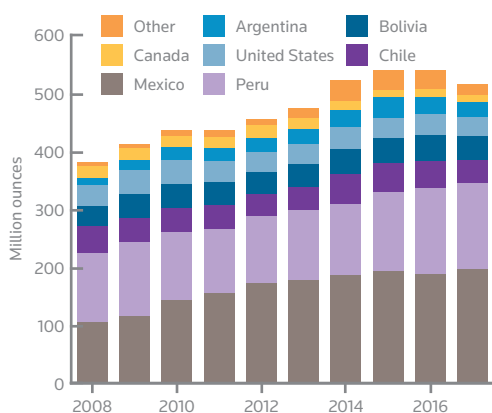
gap by year-end. The standout decline in Chile was a 3.6 Moz (113 t) fall in copper by-product silver at Codelco's operations, due to a combination of lower silver grades, and a significant fall in throughput at Ministro Hales.

Turning to **Argentina**, mine production contracted for the second consecutive year to its lowest level since 2013 due to lower output from its largest silver mine. Production at Puna, a newly formed joint venture between SSR Mining's Pirquitas property and Golden Arrow Resources' Chinchillas property, fell by 4.2 Moz (132 t) as mining activities at the San Miguel open pit ceased in January 2017. As a result, lower grade stockpiles were processed throughout the year leading to a 40% jump in costs. Elsewhere, gains were posted at Goldcorp's Cerro Negro as higher mining rates offset a slight drop in recovery rates and processed grades. Looking beyond 2017, throughput is expected to continue to rise with fresh feed coming from Mariana Norte in the second half of 2018. With construction near completion and open pit operations at the Escondida Central pit already underway, Yamana's Cerro Moro gold operation is expected to be commissioned by the end of Q1 2018 and produce 3.8 Moz (117 t) in the current year.

Further losses were recorded in **Bolivia**, where production fell by 3.6 Moz (111 t), primarily led by a contraction at San Cristóbal and San Bartolomé, the latter operated by Coeur until December 2017. In addition, lower grades and recoveries from mining co-operatives pushed the balance lower by an estimate 0.4 Moz (12 t).

Mine supply from **Peru**, the world's second largest silver producer, recorded a 1% decrease to register annual output of 147.5 Moz (4,587 t). Though the primary sector remained near record highs, losses from lead/zinc operations outweighed the growth from the gold and copper sector. The greatest losses came from Volcan's operations, where output fell by a combined 21% to 17.3 Moz (538 t) due to lower grades at Yauli despite higher throughput at Cerro de Pasco and Alpamarca. Declines were also seen at Hochschild's Arcata primary silver operation following a revision to the mine plan to reduce costs. Narrower veins led to a 9% drop in grades, while a lower number of available stopes caused throughput to fall by 26%. Production at Antamina and Julcani also suffered grade related losses.

MINE PRODUCTION IN THE AMERICAS



Source: GFMS, Thomson Reuters

Providing a partial offset, output at Hochschild's Pallancata rose by 27% to total 6.0 Moz (184 t) led by a ramp-up at the high-grade Pablo vein. The company beat guidance for the fifth consecutive year, and aims to produce 7.5 Moz (233 t) in 2018 as exploration in adjacent areas to the vein continue.

Further gains were headed by two of Buenaventura's operations, Tambomayo and El Brocal, which added 1.8 Moz (56 t) and 1.4 Moz (45 t), respectively. Tambomayo, an underground gold operation located in the southern highland province of Arequipa, reached commercial production in the third quarter of 2017 – one quarter behind schedule – due to bottleneck issues in the tailings filtration process. The company was able to meet its silver production guidance for 2017, and aims to produce nearly 3.3 Moz (101 t) at these operations this year. Following two years of straight declines, output at El Brocal rose by 55% to reach 2008 levels on the back of higher grades and recoveries despite mechanical failures at the mill.

Consolidating the improvements in Peru's output sourced from copper mines was a strong performance from MMG's Las Bambas and Freeport's Cerro Verde, two operations not accounted in the silver production statistics published by the Ministry of Mines and Energy. MMG's Las Bambas produced 453,749 t of copper, a record from the mine and ahead of schedule. We estimate silver production at both mines rose by a combined 1.0 Moz (31 t).

ASIA

Silver output in Asia posted its smallest net change since 2004 to inch higher to 177.8 Moz (5,529 t), a modest 0.1% improvement. Gains were spearheaded by India and Kazakhstan, where output rose by a combined 4.1 Moz (127 t). Last year was the third consecutive year of growth posted in **India** as higher silver grades and ore volumes were processed at Hindustan Zinc. Similarly, further gains were noted in the zinc sector in **Kazakhstan**, with production from Kazzinc's assets higher by 28%, or 1.3 Moz (30 t). Kazakhstan continues to step up efforts to promote its domestic precious metals refining capacity, treating mine doré and scrap from several international sources, most notably Russia.

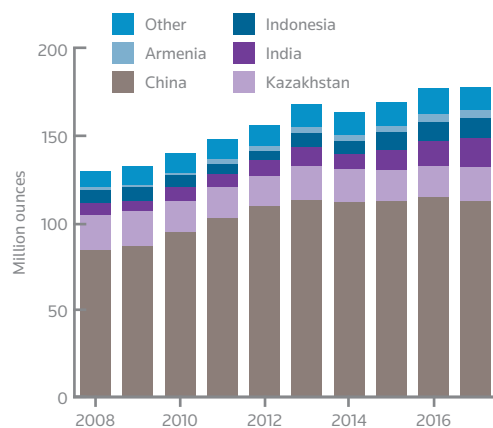
Growth was, however, partly offset by losses in **Thailand** and China due to mine closures. At the former, production fell by 1.2 Moz (36 t) as mining activities ceased at Kingsgate's Chatree gold mine after the government ordered its closure in December 2016 despite having a valid mining license through 2028.

China, the region's number one producer and accounting for 13% of global mine production, took a step back in 2017, reducing mine supply 2% to 112.6 Moz (3502 t). Chinese silver production is mainly sourced from copper, zinc and lead mines, so production is largely tied to the variance in the country's base metals output. While we estimate that China's copper production increased by 5% in 2017, mine production of both lead and zinc fell during the year, which resulted in lower silver output overall for 2017.

The most important aspect that dragged down Chinese silver production last year was the government's escalating efforts to fight pollution and increase attention to environmental protection. As a result, a wide mine site visit campaign was set in motion to ensure mine operations, particularly those with tailings treatments, were up to environmental standards. Those who failed to meet the standard were forced to close until improvements were implemented. Given that Chinese mine production is heavily dominated by small scale mines, many were not able to fund such upgrades, and thus those operations were forced to shut down.

An overarching theme in 2017 was the concentrate supply tightness in the lead market due to lower mined ore in

MINE PRODUCTION IN THE ASIA



Source: GFMS, Thomson Reuters

CORPORATE ACTIVITY

In the most recent silver merger and acquisition activity, a number of strategic investments were made as companies remained buoyant of price prospects and the global economy. Several of the larger deals in the precious and base metals space concerning silver producing assets were registered in the Americas, with activity focused in Argentina, Chile, and Peru. A total of 13 deals with a market valuation greater than US\$50 M were registered in 2017, out of which two were newly formed joint ventures.

Standing out was Shandong Gold Mining's 50% stake in the Barrick's Veladero gold operation in an all-cash deal valued at US\$960 M. We estimate that in 2017, Veladero produced a total of 0.7 Moz (22 t) of silver, together with 641 koz (20 t) of gold. The news comes almost 6 months after an investor group, comprised of Shandong Gold Mining and Zijin Mining, was rumored to be planning to acquire the mine. In addition, Barrick and Shandong, will explore the joint development of the Pascua-Lama deposit.

In March 2017, Goldcorp raised its interest in the Cerro Casale gold project in Chile to form a 50/50 joint venture with Barrick after buying Kinross' 25% stake in the property. The project has 29.3 Moz (913 t) of proven and probable reserves of silver according to Goldcorp. The deal, valued at an estimate US\$600 M, which includes a 100% interest in the Quebrada Seca project, will look to realize synergies within

the Maricunga Gold Belt to develop the Cerro Casale and Caspiche gold deposits.

Other smaller deals in the sector include, most recently, Coeur's acquisition of JDS Silver Holdings, and its subsidiary JDS Silver, which operates the high grade silver-lead-zinc Silvertip mine in British Columbia, Canada for an estimated US\$250 M. Silvertip started operations in Q4 2016, and is expected to produce 1.6 Moz (50 t) in 2018. Three months later, the sale of the operating San Bartolomé silver mine, which produced 4.3 Moz (133 t) of silver in 2017, was announced, in an all-shares transaction valued at an estimated US\$46 M. Under the agreement, Empresa Minera Manquiri, a wholly-owned subsidiary of Coeur, will be sold to Argentum Investments, a private Swedish company. We estimate 2018 production will remain near last year's levels after accounting for reserves at the Antuco deposit.

Finally, silver streaming was a less prominent feature of the market last year. Franco-Nevada entered into an agreement with First Quantum Minerals for US\$178 M to increase their stake in Cobre de Panama, an open-pit copper project. The project is expected to come on-line in late 2018, and produce 0.1 Moz (3 t) of silver.

the country's largest producing region, Inner Mongolia. In addition, a number of new mines were behind schedule in their ramp-up to name plate capacity as tighter environmental guidelines were enforced. The result was a tight market which led to a drop in primary lead production that was exacerbated by high base metal prices and low treatment charges.

Another change in regulation that dampened mine output last year was the central government's order that all mining operations, including exploration activities, needed to be halted if the property was situated within an Environmental Protection Area (EPA). As a result, companies were required to write off their projects and cease activities. The provinces that were hit the hardest were Xin Jiang, Si Chuan, Tibet and Gan Su.

AFRICA

In Africa, an increase in the primary sector led to a 0.6 Moz (17 t) gain – the smallest net change since 2009. Output at Africa's largest silver producing mine, Imiter in **Morocco**, grew by 0.7 Moz (22 t) on higher mining rates. Management envisions to produce 9.7 Moz (300 t) by 2020, or 24% above 2017 levels, as ramp-up efforts continue. Elsewhere, in **Eritrea**, higher base metal prices and low treatment charges meant a shift away from silver-rich pyrite sand material to zinc-only stockpiles. Though more difficult to treat, a new mineralogy identification and a reconfiguration of the reagents required to treat the ore led to high (>80%) zinc recoveries when both flotation circuits were in use. The end result was a drop in silver production of 0.4 Moz (12 t).

AVERAGE PRICES OF SOURCE METALS

(\$/ton)	2013	2014	2015	2016	2017	Change y-o-y
Lead 3-Mth	2,157	2,113	1,795	1,875	2,325	24%
Zinc 3-Mth	1,940	2,167	1,938	2,101	2,890	38%
Copper 3-Mth	7,345	6,827	5,493	4,870	6,200	27%
Gold (\$/oz)	1,411	1,266	1,160	1,251	1,257	1%

Source: GFMS, Thomson Reuters; LME; ILZSG

WORLD MINE PRODUCTION OF SOURCE METALS

(Thousand tons)	2013	2014	2015	2016	2017	Change y-o-y
Lead	5,265	4,946	4,780	4,790	4,749	-1%
Zinc	13,039	13,493	13,610	12,769	13,230	4%
Copper	17,932	18,291	19,050	20,031	19,835	-1%
Gold (tons)	3,076	3,175	3,222	3,236	3,214	-1%

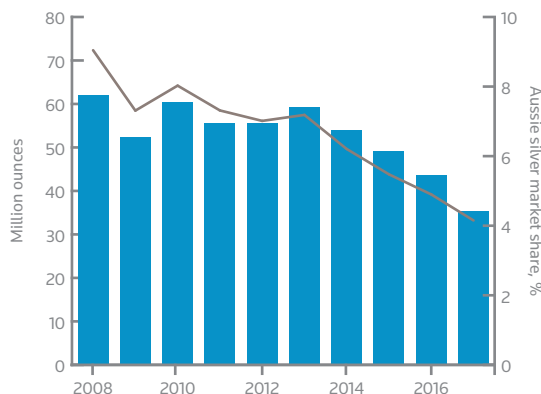
Source: GFMS, Thomson Reuters; ILZSG

OCEANIA

Production declined in Oceania in 2017, falling 16% year-on-year, or 7.1 Moz (222 t), to hit a 20-year low at 38.1 Moz (1,185 t). **Australia**, accounting for 93% of the region's total in 2017 was instrumental in the reported decline in the region. Silver output in Australia fell by 19% or 8.2 Moz (254 t).

The decrease was mostly attributable to the country's largest silver mine, Cannington, which often dominates Australian production. Output contracted by 6.2 Moz (193 t) due to lower grades and lower throughput caused by an underground fire in April that damaged the load-out and shaft haulage infrastructure. As a result, the higher-grade stopes scheduled for mining over 2017 were delayed as the underground crusher also became inoperable in mid-September. Mining rates are expected to increase over 2018 following the commissioning of the new crusher scheduled for March and the resumption of mining activities on stope 60L. Adding to the losses, a substantial production decrease was seen at Glencore's Mount Isa operation, where output fell by 1.8 Moz (57 t) due to a scheduled maintenance at its smelter.

MINE PRODUCTION IN AUSTRALIA



Source: GFMS, Thomson Reuters

EUROPE

European silver production dropped by 4% last year, or 4.8 Moz (150 t) to total 107.0 Moz (3,328 t). Although the regional decline slowed by half relative to 2016, much of it was attributed to the start up of the smelter and refinery at KGHM Polska Miedź operations and stable output out of Portugal. The year-end result was explained by annual variances across the region's two largest producers, with a substantial loss in Russia (-10%), partly offset by an increase in Poland (+2%).

Russian silver production dropped by 4.7 Moz (145 t) in 2017 to reach 42.0 Moz (1,305 t), extending the losses reported in the previous year. Output at Polymetal's Dukat operation fell by 2.1 Moz (65 t) due to mine sequencing resulting in increased waste mining and lower grade ore (-14%). At Lunnoye the depletion of the high grade portion of the Zone 7 vein, resulted in a 0.8 Moz (25 t) drop in production despite a 6% increase in throughput.

Sweden also saw a decrease, of 5%, or 0.9 Moz (27 t) attributable to the lead/zinc sector, with lower silver output at Boliden's Garpenberg, on lower grades.

INDEXED SILVER & BY-PRODUCT METAL PRICES



Source: GFMS, Thomson Reuters

SILVER OUTPUT BY SOURCE METAL

(million ounces)	2016 Output	% of Total	2017 Output	% of Total	Change y-o-y
Primary	264.2	30%	241.1	28%	-9%
Gold	106.9	12%	100.5	12%	-6%
Lead/Zinc	310.3	35%	306.7	36%	-1%
Copper	202.1	23%	199.0	23%	-2%
Other	5.1	1%	4.8	1%	-6%

Source: GFMS, Thomson Reuters

BY-PRODUCT ANALYSIS & OUTLOOK

In 2018, we expect silver supply to grow as mining rates return to normal and output from gold and primary silver mines in the Americas increases. The majority of this growth is expected to come from Yamana’s Cerro Moro gold operation in Argentina, followed by Fresnillo’s San Julián silver mine in Mexico. At the country level, we estimate Mexican production will post the largest gain and grow by 6.0 Moz (187 t) led by Fresnillo. Higher grades at Cannington in Australia will also provide support to the global balance. Finally, we also expect to see some growth from the copper sector in Peru.

Looking at last year’s performance and the outlook of the major source metals, global gold mine production contracted for the first time since 2008, falling by 0.7% in 2017 to 103.3 Moz (3,213 t). On a regional basis, Asia, the largest gold producing region, registered a 7% decline due to mine closures in China, and a crackdown on illegal mine production in Indonesia. Losses in South America were modest, falling by 3%, while North America posted 5% year-on-year, led by higher output from the United States and Canada.

SILVER PRODUCTION GUIDANCE - MINE BY MINE OUTLOOK

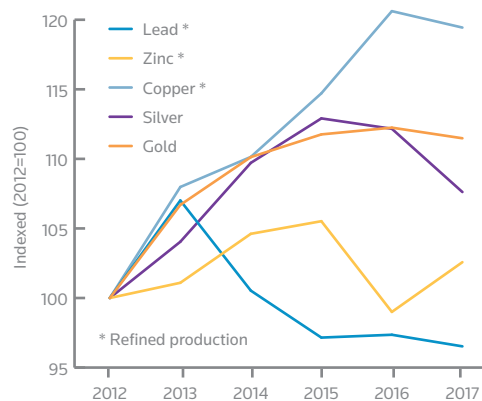
(million ounces)	Primary Metal	Country	2017 Output	2018e Output	Change y-o-y
Cerro Moro	Au	Argentina	0.0	3.8	3.8
San Julián	Ag	Mexico	10.5	13.0	2.5
Fresnillo	Ag	Mexico	16.5	18.9	2.4
Cannington	Ag	Australia	12.0	14.4	2.3
Escobal	Ag	Guatemala	9.7	12.0	2.3
San Sebastian	Ag	Mexico	3.3	2.5	-0.8
San Bartolomé	Ag	Bolivia	4.3	3.5	-0.8
San Dimas	Au	Mexico	3.8	3.0	-0.8
Marlin	Au	Guatemala	1.9	0.0	-1.9
Puna	Ag	Argentina	6.2	4.0	-2.2

Source: GFMS, Thomson Reuters

Our provisional forecast for global copper mine production in 2017 is for a modest dip with a fall of just less than 1% year-on-year. The setback, after a number of years of strong growth, was mostly due to major supply disruptions which plagued copper in the early part of the year. This year looks to be a stronger one and including our allowance for the standard 5% disruption, mine output is expected to grow by around 3% facilitating refined production growth also in the order of 3%. That growth will be driven largely by expanding smelter capacity in China. A similar rate of growth in mine output is expected in 2019 before levels are reined back from 2020 by the lack of committed projects.

Based on latest production figures from the International Lead and Zinc study group (ILZSG), global lead mine production decreased by 0.9% in 2017, compared to an 3.6% increase in zinc. Despite the impressive headline growth for the latter, the concentrate market remains tight, and based on our latest review of the timetable of western mining projects and harder to assess-Chinese zinc mines, it will be some time yet before a recovery in concentrate supply comes to the aid of the refined market balance. Towards the end of last year, Glencore announced its plan to partially restart its Australian projects, while Dugald River started commercial production and the first batch of concentrates has already been shipped to China. In addition the Gamsberg project is set to start in mid-2018 and, together with other smaller increases, these will begin to relieve concentrate supply tightness from the second half of 2018. We currently estimate some 600kt of contained zinc supply coming from ramp-ups, expansions and restarts. Overall global refined zinc production in 2018 is expected to grow by just over 2% year-on-year in line with a slow improvement in mine supply.

INDEXED GLOBAL METAL MINE PRODUCTION



PRODUCTION COSTS

- On a co-product basis, we estimate Total Cash Costs with capex for 2017 averaged \$10.54/oz, a 6% decrease relative to 2016.
- We estimate silver equivalent production rose by 9%, or 78.5 Moz (2,442 t) led by higher zinc and copper output in India and Poland, respectively.

Silver Total Cash Costs (TCC) net of by-product credits fell for the fifth consecutive year in 2017, by 123% to \$-9.46/oz. Higher production and by-product credits from India and Poland were the influential factor behind the global trend. However, this was partially offset by higher cost inflation in Argentina, Australia, and Russia, amplified by lower grades. In 2017, primary silver producers accounted for 28% of global output, of which our cost data capture represented 80% of primary supply.

On a co-product accounting basis, TCC + capex stood at \$10.54/oz, down 6% from last year. The principal element of this reduction was a 9% increase in silver equivalent ounces, which offset a 10% increase in capital expenditure (including sustaining and expansionary investments) to \$ 2.2 Bn. KGHM Polska Miedź accounted for nearly 60% of the increase in silver equivalent ounces, while Mexico saw the largest expansion in capex, followed by Australia.

If we exclude silver production from India and Poland, however, TCC + capex on a co-product basis rose by 3.8% to \$11.36/oz following a 3% decrease in silver equivalent

SILVER MINE PRODUCTION COSTS

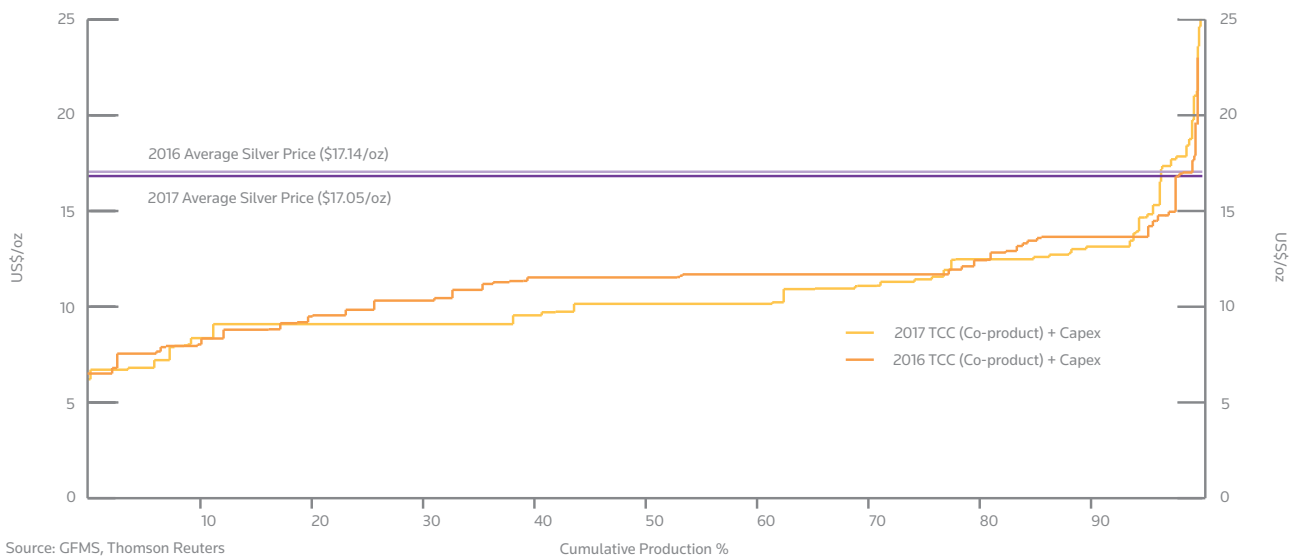
(US\$/oz unless stated)	2015	2016	2017
TCC (by-product)	-3.75	-4.25	-9.46
TCC (co-product)	8.52	8.77	8.08
TCC (co-product) + Capex	10.80	11.21	10.54
Average Silver Price	15.68	17.14	17.05
Sample Size (Moz)	335.2	318.0	296.6

Source: GFMS, Thomson Reuters

ounces. Over 2017, the U.S. dollar saw mixed results against the domestic currencies of the major silver producers. Last year, the Peruvian sol strengthened by 3% relative to the U.S. dollar, while the Mexican peso weakened by 1%. This was of particular importance to producers with operations at the top end of the cost curve, predominantly composed of Mexican operators. Losses within this group accounted for almost 60% of the drop in production recorded in our cost data capture. Hence, it is interesting to note that though Mexico led the change at the global level with a 10.0 Moz (311 t) increase in production, it also contributed to the drop in global output by dumping marginal ounces as guided by the cost curve. By the co-product TCC+capex measure, 4% of the primary industry was ‘underwater’ against the annual average silver price of \$17.05/oz, a 2% increase relative to 2016.

We expect global by-product costs to stabilize over 2018 as marginal ounces continue to drop off the cost curve and credits from base metal operations are realized at a slower rate. However, we believe silver costs on a co-product accounting basis will edge higher as silver prices post a strong recovery in the current year.

SILVER MINING COSTS



Source: GFMS, Thomson Reuters

PRODUCER HEDGING

- *In 2017, we estimate the delta-adjusted hedge book expanded by 1.4 Moz (44 t).*
- *On a nominal basis, the global producer hedge book stood at 33.3 Moz (1,036 t) at the end of 2017.*
- *De-hedging activity was modest in scale, and often consisted of producers delivering into their forward sales agreements.*

The global producer hedge book expanded by 1.4 Moz (44 t) on a delta-adjusted basis, representing a 7% increase on the hedge book total at the end of 2017. As a result, the hedge book stood at a total of 21.5 Moz (667 t) at end-December last year. Over 2017, Nyrstar entered into five pre-paid silver agreements, through which it agreed to deliver 15.5 Moz (482 t) of silver to July 2019, in return for an up front consideration of \$230 M. This is in addition to the outstanding forward sales entered in 2014 covering a portion of future production from the Port Pirie smelter.

The net nominal (number of contracts) hedge book fell last year, by 11.5 Moz (359 t), with the drop entirely attributable to a reduction in the number of outstanding option positions. In contrast, the forward sales component of the book grew, by 2.4 Moz (73 t).

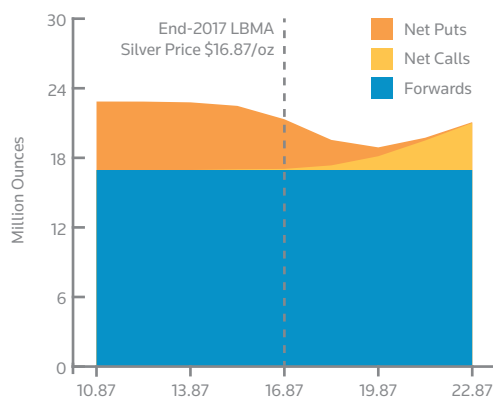
Of the net de-hedgers, Minera Frisco saw the largest hedge book reduction, as the company delivered 7.4 Moz (230 t) in forward sales last year. Despite being an active hedge book player over the last two years, the company has yet to announce any new silver hedges in 2018.

Approximately just over five million ounces of options expired or exercised in the first half of 2017. When adjusted for option delta, to represent the true draw on the supply and demand of metal in the silver market, the net-drawdown was only a fraction of the total, with the change in options positions accounting for only an additional 0.5 Moz (16 t) of silver demand in 2017. This was the result of a net-increase in forward sales led by Nyrstar, while partially offset by a reduction in the outstanding balance of Fresnillo’s and KGMH’s options book. At year-end, most of the options positions in the global hedge book were part of Fresnillo’s collar options structures.

Overall, the aggregate liability (marked-to-market) of the producer options book rose by over US\$5.0 M, from negative US\$1.6 M at end-2016, to positive US\$3.5 M. By far the biggest impact on this was the change in the end-year spot price, which fell by 1%, or \$0.09/oz in 2017. This reduced the degree to which many of the contracts on the book were out-of-the-money.

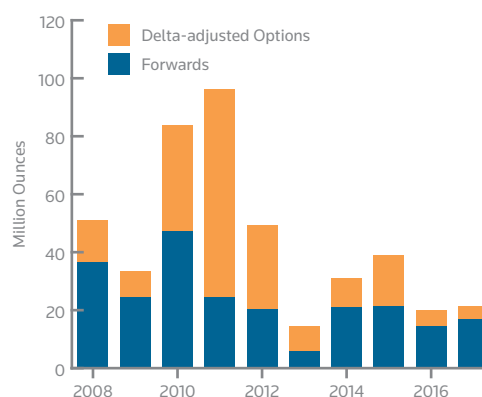
The GFMS team at Thomson Reuters calculates the delta-adjusted global hedge book volume using market data and proprietary tools from Thomson Reuters Eikon. The chart below plots sensitivity of the hedge book with respect to changes in the silver price, assuming that volatility, and other factors remain equal. Had silver prices dropped by an additional \$3/oz, the volume of silver delta-hedged against the option book would have risen by 5.8 Moz (182 t), while a \$3/oz increase would have resulted in a 1.9 Moz (61 t) drop in volume delta-hedged. Therefore, the options book continues to act as price floor with Fresnillo’s bought puts constituting the largest portion of the book.

SENSITIVITY OF THE GLOBAL HEDGE BOOK



Source: GFMS, Thomson Reuters

PRODUCER HEDGING: OUTSTANDING POSITIONS



Source: GFMS, Thomson Reuters

5. SUPPLY FROM ABOVE-GROUND STOCKS

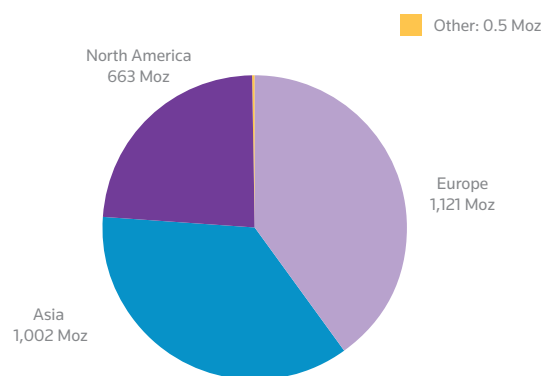
- **Identifiable above-ground stocks rose 3% year-on-year to 2,785.9 Moz (86,651 t) by the end of last year. These inventories could cover 33 months' worth of physical demand, a 22-year high.**
- **Scrap receipts contributed 138.1 Moz (4,296 t) to total supply, a contraction of 1% compared to 2016. Lower flows from Asia mainly ensured that scrap supply fell for the sixth consecutive year.**

OVERVIEW

Due to silver's hybrid nature as an investment and its role in a wide range of industrial and jewelry fabrication processes, it usually gets refined in various forms. The most common are bullion bars, blanks and rounds (for bullion and commemorative coins), grains and doré. Silver products are stored in custodian vaults (allocated inclusive of ETP holdings, or unallocated), held by governments and stockpiled by futures exchanges and some players in the industry. Silver held in custodian vaults, the largest category of above-ground stocks, is estimated based on data collection of ETP silver holdings and other reported volumes, a confidential survey, and field research. Indeed, the majority of bullion stocks are allocated to ETPs, institutional and hedge fund investors, retail investors and other longer-term holders.

Silverware, jewelry and other fabricated products that are, in one form or another, available to the market are not included in our above-ground refined stock definition. Typical above-ground stocks consist of high purity silver bars and coins. When silverware, jewelry, coins, e-waste, photographic papers and other "open-loop" sources get

BULLION STOCKS - REGIONAL BREAKDOWN IN 2017



Source: GFMS, Thomson Reuters

recycled and refined back into usually either bars, coins, doré or grains, they will be qualified as scrap. As such, newly recycled silver is qualified as metal ready to be sold again (in either of the four forms alluded to before) and, in addition to mine production and hedging, added to supply.

Although not all categories of our above-ground stocks movements are part of the supply/demand balance in a given year, changes in above-ground stocks can have significant implications in determining the direction of the price. This depends on the liquidity and availability of the stocks, or the ease to refine the silver products back to a resalable form. For both gold and silver, the level of above-ground stocks have far wider implications on the dynamics of the market compared to agricultural commodities, oil or even base metals, due to the fact that a large portion of annual demand roughly stays within a high degree of its original form.

IDENTIFIABLE ABOVE-GROUND SILVER BULLION STOCKS

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Custodian Vaults*	615.6	846.6	836.6	945.6	818.4	1,011.7	1,168.4	1,376.3	1,670.1	1,756.3
ETPs	313.9	470.8	600.3	578.2	630.0	635.3	635.4	619.3	669.4	671.5
Exchange*	114.7	93.6	83.4	98.2	159.4	168.1	161.5	170.2	250.1	254.5
Government	176.2	160.5	116.4	104.3	97.0	89.1	89.1	89.1	89.1	89.1
Industry	17.3	14.4	18.5	17.7	18.3	15.5	13.8	14.7	15.4	14.6
Total	1,237.6	1,585.9	1,655.1	1,743.9	1,723.0	1,919.8	2,068.3	2,269.6	2,694.0	2,785.9
Months of Demand	14	22	19	19	21	20	22	23	31	33

Source: GFMS, Thomson Reuters; Respective ETP issuers, exchange websites, Japan Ministry of Economy, Trade and Industry, USGS

*Custodian vault and exchange warehouse stocks exclude stocks allocated to ETPs.

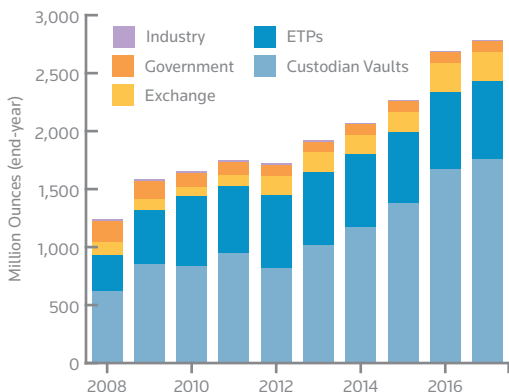
IDENTIFIABLE BULLION STOCKS

Identifiable bullion stocks can be separated into two categories: reported and unreported bullion stocks. Reported stocks consist of industry, exchange, ETP and part of the government stock category. Insights into these holdings are collected from publicly available sources, company yearbooks and through interaction with industry participants. Unreported stocks represent the largest part of identifiable above-ground stocks and consist of the majority of government and custodian vaulted stocks.

Over 2017, total identifiable above-ground stocks rose another 3% to 2,785.9 Moz (86,651 t). Following a dip during the height of the financial crisis in 2008, above-ground stocks have continued to increase for ten consecutive years, representing a CAGR of 8% over the 2007-2017 period. At 63%, custodian vault stocks make up the bulk of the total, followed by ETP's at 24% and exchange and government held inventory at 9% and 3% respectively. Industry stocks have remained small and stable over the period representing 1% of total in 2017.

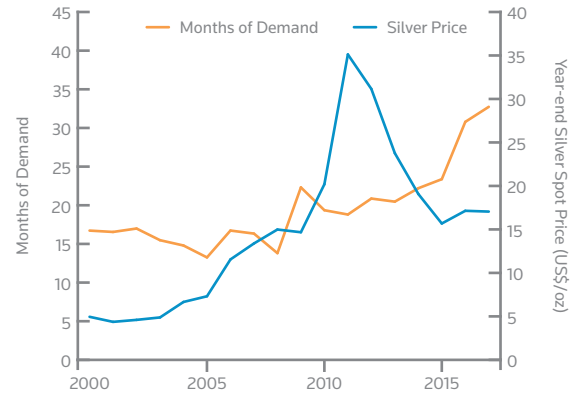
Reported stocks account for around one third of total above-ground stocks and rose another 2% to 949.0 Moz (29,518 t) last year, representing a 12% CAGR over the 2007-2017 period. The increase can be mainly attributed to the rising popularity of silver backed ETP's, particularly between 2005 and 2010, when silver allocated to ETP's rose almost twentyfold. Trading of silver on exchanges rose too, notably on the Shanghai Futures Exchange (SHFE) and the Shanghai Gold Exchange (SGE) in China, driven by a higher appetite for silver from the Far East.

IDENTIFIABLE ABOVE-GROUND SILVER INVENTORIES



Source: GFMS, Thomson Reuters; exchanges, ETP issuers, METI, USGS

IDENTIFIABLE STOCKS EXPRESSED AS MONTHS OF DEMAND

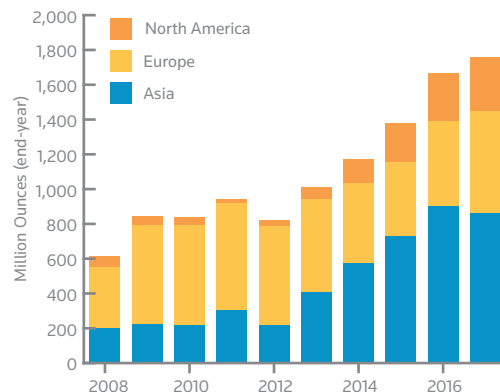


Source: GFMS, Thomson Reuters

Unreported stocks also continued to rise, but followed a slightly different trajectory compared to reported stocks. The bulk of this category is held by custodian vaults across the world. Considering the general rise in silver physical investment since the beginning of the millennium, vaulted stocks followed a steady path upwards over the 2000-2012 period. But shortly after ETP growth ran out of steam, at around 2010, vaulted silver stocks witnessed a considerable rise and doubled in volumes to 1,838.3 Moz (57,178 t) in 2017. This was largely a function of disappointing physical demand which forced refiners to ship more metal to London and Zurich, as well as other storage hubs. Silver vaulted stocks in Asia contracted slightly last year while those in Europe and North America continued to grow.

Total identifiable above-ground stocks represented approximately 33 months' worth of demand in 2017; a record for the third consecutive year.

CUSTODIAN VAULT STOCKS*



Source: GFMS, Thomson Reuters *Stocks exclude silver stocks allocated to ETP's

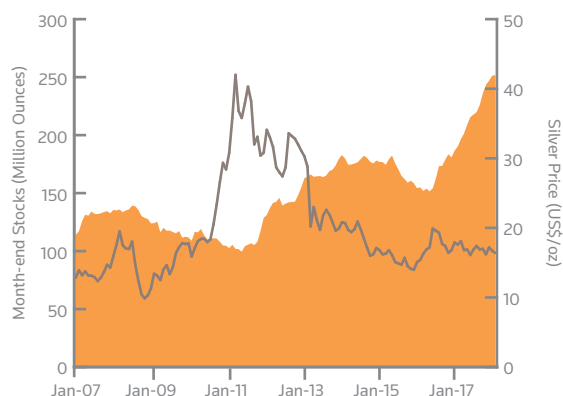
CUSTODIAN VAULT STOCKS

Our custodian stock data exclude ETP holdings. However, in many cases silver stocks are also stored in vaults not allocated to ETP's and for the sake of discretion we have to roll up the data into a total. Total vaulted stocks held by custodians rose by 5% to 1,756.3 Moz (54,627 t) last year representing a 63% share, the largest category of total above-ground stocks.

Custodian vaulted stocks, not allocated to ETP's, have steadily increased over the last five years, doubling in volumes compared to 2012. The rise of 937.9 Moz (29,173 t) over that period can be chiefly attributed to increased appetite for silver storage in Asia. Although rising silver stored in India, Singapore and Japan have played their part, the bulk of the rise (97%) is accounted for by an increase in Chinese vaulting. Indeed, various Chinese banks have steadily increased their precious metals holdings in recent years, rising more than threefold between 2012-2017. Last year however, this growth pattern stopped, and holdings dropped 4%.

Vaulted custodian silver stocks in North America also contributed to the rise in overall vaulted silver stocks, representing almost one third of the increase over the 2012-2017 period. Contrary to Asia, silver stocks vaulted in North America continued to rise last year by 10% reaching approximately 308.4 Moz (9,592 t) by the end of the year. Stocks not allocated to ETP's have been on an increasing trend in North America. Disappointing retail demand forced refiners to ship metal into the vaults instead of to their customers directly.

COMEX WAREHOUSE STOCKS



Source: COMEX

In **India**, vaulted silver stocks increased 4% in 2017 to 16.4 Moz (510 t). A significant part of the increase is attributed to stock built at the Free Trade Warehousing Zone (FTWZ) in Sri City, which has become a major entrepot. In addition, silver imported on a consignment basis was held unfixed for a longer period due to weak demand towards year-end.

In **Europe**, custodian stocks not allocated to ETP's modestly increased over the 2012-2017 period, rising on average 1% per year. Last year, however, the stocks rose approximately 20% to 586.5 Moz (18,242 t) driven by weak demand in North America. Europe is the only region in which the share of vaulted stocks allocated to ETP's and those that are not is roughly balanced. This has been mainly a function of silver allocated to ETP's stored in Europe, which, in line with other regions, saw a significant increase over the last decade.

FUTURES EXCHANGES

The number of exchanges in the world that offer trading of silver futures has risen in recent years. In order to raise the profile of local markets and attract OTC activity into a standardized trading format, various exchanges across the world, particularly but not exclusively in the Middle East and Far East, have introduced precious metals contracts. Inventories have increased accordingly.

As a rule of thumb, approximately 2% of futures trading activity get settled in physical delivery. Exchanges only hold a fraction of open interest in inventory, if any at all.

Four exchanges report silver stocks; COMEX in the United States, the Tokyo Commodity Exchange (TOCOM) in Japan, SHFE in China and the SGE also in China. Total silver inventory held by the various exchanges rose 2% to 282.2 Moz (8,777 t) in 2017. Silver stocks held by COMEX rose 8% to 198.6 Moz (6,178 t) by year-end in 2017, representing approximately 70% of total silver stocks held by exchanges.

SHFE SILVER STOCKS

(million ounces; end period)

	Q1	Q2	Q3	Q4
2015	9.2	12.1	10.2	19.2
2016	49.4	59.5	52.6	59.7
2017	63.3	43.6	42.8	43.1

Source: SHFE

SILVER ETP HOLDINGS BY VAULT LOCATION

This focus box addresses mainly the investor domicile and holdings by vault location for silver held by ETPs. In chapter three, covering investment specifically, we delve into greater detail in regards to silver ETP holdings and how they progressed last year.

While total ETP holdings increased slightly by 0.32% to 671.5 Moz (20,885 t) in 2017, the distribution of stocks by vault location remained largely unchanged. At 405.3 Moz (12,607 t) in 2017 compared to 415.3 Moz (12,917 t) in 2016, the United Kingdom was still the largest location for storing silver, accounting for 60% of total ETP stocks. Canada comes second with a share of 21% followed by Switzerland with 14%. The United States and Japan both account for the smallest share of 4% and 0.4% respectively.

Last year, the main ETP stock migrations took place in Canada, Switzerland and the United States. However, the most pronounced was between Switzerland and the United Kingdom. Physical stocks moved out from the regions that experienced political uncertainty, such as the United Kingdom. The ongoing Brexit saga has created an environment of uncertainty and as a result, ETP stocks migrated to more political stable destinations, such as Switzerland. Stocks of ETPs stored in Switzerland rose by 10.1% compared to a lower growth rate in Canada (1%) and the United States (9.3%). The relatively larger rise in Switzerland is mainly a function of proximity, particularly in the case of Europe, or more specifically the United Kingdom.

This development has been an ongoing trend for quite some years, starting during the great financial crisis in 2007. As the

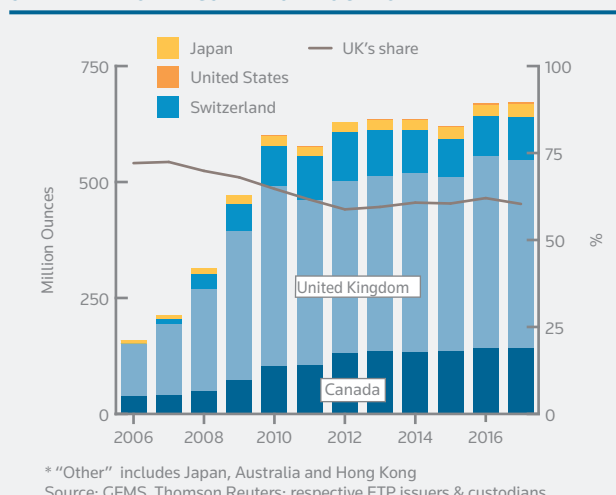
crisis violently unfolded, with the United States and the United Kingdom at centre stage, ETP stock growth was strongest in Switzerland, which seemed far less affected by global turmoil. For instance, between 2008 and 2012, ETP stocks in the United Kingdom and the United States rose 59% and 52% respectively. Meanwhile, ETP stocks in Switzerland increased 227% over the same period .

In the case of silver ETP holdings based on investor domicile, or by exchange location, the picture is slightly different. The United States dominates this category with a market share of 52% last year. Contrary to developments in vault location, ETPs recorded a rise of 14% in the United Kingdom, accounting for approximately 12% of total holdings. Switzerland also witnessed an increase at the expense of Japan and the United States, with these markets declining 10% and 5% respectively last year.

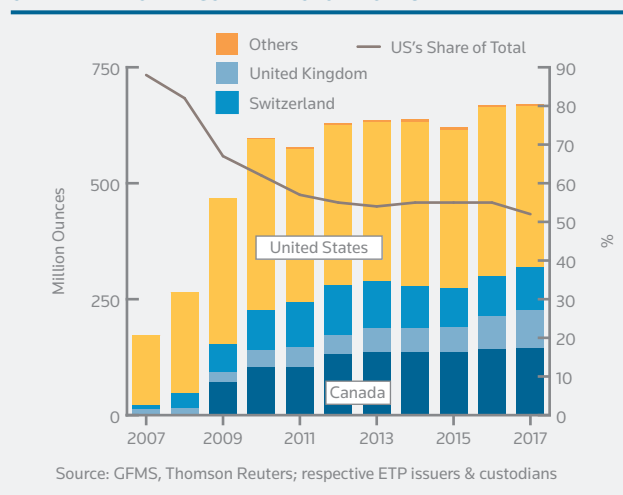
The decline recorded in the largest exchange location, the United States, is perhaps unsurprising considering the robust economic climate the country has been facing. With continued strong equity markets and a tightening Fed interest rate cycle, investors have been eagerly eying other asset classes.

Although silver has significant industrial attributes, it also has the risk hedge characteristics similar to gold. Investors located in regions of relatively higher uncertainty tend to invest more in silver whereas others tend to have a higher risk prone attitude. But that does not mean the ETP holdings by domicile will follow a similar trend. In fact, quite the opposite as demonstrated above. As such, we expect the share of global ETP stocks in the United Kingdom to continue to fall in 2018, with Brexit negotiations in progress, and Switzerland likely to further benefit from this trend.

SILVER ETP HOLDINGS BY VAULT LOCATION



SILVER ETP HOLDINGS BY INVESTOR DOMICILE



The global dominance of COMEX silver warehouse stocks has waned in recent years, falling from 96% in 2014 to 70% at present. Both eligible and reported COMEX silver stocks steadily rose throughout the second half of 2016 and most of 2017. Eligible stocks are inventories in COMEX warehouses that meet the criteria for delivery via the exchange, but cannot be delivered. Eligible stocks make up the bulk of the silver inventory accounting for 82% of total silver COMEX warehouse stock, slightly down from 85% reported by the end of 2016. Registered stocks are stocks that meet the criteria for delivery and are ready to be delivered into the market. Registered stocks doubled at the end of 2017 compared to the same period the previous year. Eligible stocks, which are not for immediate market delivery, however, soared in 2017, increasing by 24% year-on-year reaching a record high of 243.4 Moz (7,571 t) by the end of 2017.

In China, silver inventories on SHFE and SGE followed opposite trends, almost exactly offsetting each other. Stocks held by SHFE fell 28% to 43.1 Moz (1,342 t) by the end of last year whilst stocks held at the SGE rose 26% to 40.5 Moz (1,260 t). In the case of the former, turnover in silver trading dropped for the third consecutive year due to increased speculative interest in other metals. For example, trading volumes of aluminum, zinc and lead on the SHFE surged by 47%, 25% and 174% respectively. In case of the latter, silver trading volumes declined 6% to a nominal 18,572 Moz (577,469 t) last year, following stellar growth in recent years. The SGE continues to win market share from the SHFE supported by increased participation from domestic banks.

Meanwhile, silver inventories at TOCOM declined dramatically, dropping 98% to 4,373 ounces (0.1 t) by year-end. The sharp drop was driven by strong industrial demand in Japan. A shortage of silver resulted in a powerful drawdown of inventory held by the exchange.

GOVERNMENT STOCKS

Silver stocks held on account of governments at 89.1 Moz (2,771 t) has remained unchanged in 2017. In general, there is little public information available on government held silver stocks and we have compiled our numbers through field research and private information. Sales of silver stocks were minimal in the early part of the decade and we expect none have taken place in the last four years.

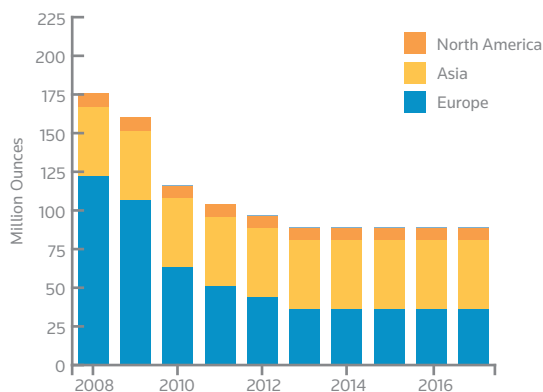
Approximately half of silver government stocks are held in Asia by a variety of governments. At two-thirds, China accounts for the largest share. Despite its active involvement in the gold market, in our assessment the Chinese government hasn't made any transactions since 2006, when it sold one-third of its silver holdings.

Europe takes second place at 40% of government stocks, almost exclusively held by Russia. In 2013, Russia had sold approximately 90% of its holdings compared to the peak of 336.1 Moz (10,454 t) recorded in 1994. Since then, holdings have remained unchanged as well. As with many other countries, silver does not seem to be part of the strategic reserves anymore. Other countries in Europe such as France, Switzerland and Austria are believed to have sold all of their holdings in silver.

INDUSTRY

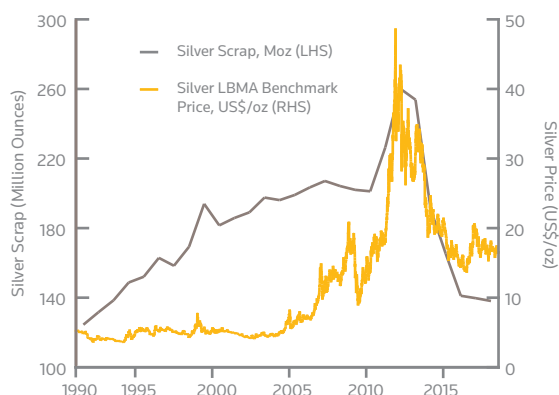
Industry stocks are mainly concentrated in Japan and the United States. Japanese inventories consist of producer and merchant stocks and recorded a 10% drop to 9.8 Moz (305 t) last year on the back of robust industrial demand. Silver stocks held in the United States consist of producer, consumer and dealer inventory and witnessed a minor uptick. Overall, industry silver stocks nudged down 5% to 14.6 Moz (454 t) in 2017.

SILVER GOVERNMENT STOCKS



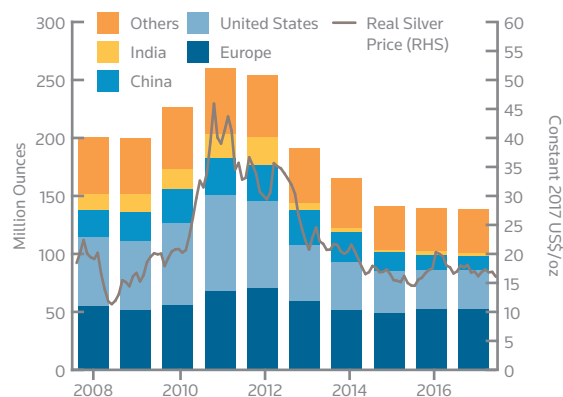
Source: GFMS, Thomson Reuters

WORLD SCRAP SUPPLY



Source: GFMS, Thomson Reuters

WORLD SCRAP SUPPLY



Source: GFMS, Thomson Reuters

SCRAP

- **Silver scrap supply fell by 1% to 138.1 Moz (4,296 t), the sixth consecutive year of decline and the lowest level in 21 years.**
- **Asia was the main region responsible for the annual drop, driven by a lack of incentives from both suppliers and consumers to recycle their silver valuables. In addition, the relatively low silver price motivated cash-rich recyclers to wait for better days.**
- **Open-loop Industrial generated scrap, either returning from the market or as a residue of various manufacturing processes, did show a bit of an increase in different parts of the world, such as North America, but not enough to offset the declines generated elsewhere.**
- **Despite the decline, the overall picture of global silver scrap generation is pointing towards stabilization at the levels equal to those recorded in the mid-nineties of the previous century.**

Last year witnessed marginally higher scrap supply from the western hemisphere, led by a modest recovery in flows from North America, the United States in particular, and higher volumes from Europe. Although in case of the latter, supply grew at a much slower rate compared to a year earlier. On the other hand, scrap flows from Asia continued to decline, as lower prices in local terms saw many across the supply chain hold on to their material rather than sell it for refining.

Europe remained the dominant source of scrap supply in 2017, accounting for 38% of global total, with volumes edging higher by 1% to 52.4 Moz (1,629 t). To put this into context, despite reaching a four-year high, 2017 volumes were down by a quarter from the 2012 peak.

The largest increase was recorded by Russia, where scrap supply rebounded for the first time in seven years, surging by a quarter to hit a four-year high of 8.2 Moz (254 t). This may come as a major surprise given that the silver price in rouble terms posted a double-digit decline last year. However, anecdotal evidence suggests that last year's notable increase was a function of renewed attempts to reduce corrupt and opaque collection practices through small individual pawnbrokers and the introduction of more transparent mechanisms, similar to the situation in the gold scrap market a few years ago.

By contrast, the worst performance in the region was recorded by the United Kingdom, with scrap volumes tumbling by 15% last year. This followed an impressive increase in scrap flows to a four-year high in 2016, when a steep decline in the British pound, following the results of the EU referendum, saw the local silver price surge to a near three-year high. Scrap supply from other major markets, including Germany, Italy and France, remained somewhat limited. This was largely a function of lower silver prices in euro terms as well as a lack of price volatility, but even more importantly, depleted stocks as the bulk of sales took place between 2008 and 2012.

TABLE 4 - SUPPLY OF SILVER FROM THE RECYCLING OF SCRAP

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Germany	14.6	12.6	14.9	16.7	21.6	17.3	14.3	14.9	15.3	15.5
Russia	8.3	8.4	11.5	11.1	10.9	10.0	8.0	6.7	6.5	8.2
United Kingdom	10.9	10.2	6.4	11.3	9.8	7.2	5.6	5.8	7.9	6.7
Italy	5.9	5.8	6.5	9.7	9.9	8.7	7.9	6.2	6.3	6.3
France	5.1	5.5	6.2	7.0	5.9	5.2	4.9	4.9	5.2	5.0
Turkey	1.1	1.1	1.0	1.2	1.0	1.0	1.5	1.7	2.0	2.1
Austria	1.2	1.1	1.1	1.2	1.2	1.2	1.1	1.1	1.2	1.2
Czech Republic	0.9	0.9	1.2	1.6	1.6	1.4	1.4	1.1	1.2	1.1
Poland	0.7	0.7	0.9	1.1	1.2	1.0	0.9	1.0	1.1	1.0
Netherlands	1.1	1.0	1.1	1.2	1.2	0.9	0.8	0.9	0.9	0.9
Spain	0.5	0.5	0.7	1.3	1.3	1.1	1.0	0.8	0.8	0.7
Belgium	0.6	0.6	0.6	0.7	0.7	0.5	0.5	0.5	0.5	0.5
Sweden	0.8	0.6	0.8	0.6	0.6	0.6	0.6	0.4	0.5	0.4
Denmark	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
Other Countries	2.2	2.2	2.4	2.7	2.6	2.2	2.1	2.1	2.3	2.2
Total Europe	54.4	51.6	56.0	67.9	70.1	58.7	51.0	48.5	52.1	52.4
North America										
United States	55.4	54.4	64.8	76.4	68.9	46.9	40.3	35.3	32.5	33.2
Canada	1.7	1.5	1.6	1.8	1.6	1.1	1.0	0.8	0.8	0.7
Mexico	3.1	3.2	4.0	4.5	4.7	1.1	0.4	0.4	0.3	0.3
Total North America	60.2	59.1	70.4	82.7	75.2	49.1	41.7	36.6	33.6	34.2
South America										
Brazil	1.0	1.1	1.5	2.5	2.5	2.0	1.9	2.3	2.4	2.3
Venezuela	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.5
Uruguay	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Argentina	0.5	0.4	0.6	0.7	0.7	0.5	0.2	0.2	0.3	0.4
Other Countries	1.0	1.0	1.2	1.5	1.4	0.9	0.8	0.8	0.8	0.9
Total South America	3.0	2.9	3.9	5.5	5.4	4.2	3.6	4.1	4.4	4.5
Asia										
Japan	23.7	21.3	20.9	23.0	21.3	20.0	19.6	17.4	16.2	15.7
China	22.7	25.3	29.2	31.9	30.9	30.1	26.7	16.1	13.8	12.3
S Korea	7.7	8.4	9.4	10.0	9.1	8.4	6.9	4.1	4.4	4.3
Taiwan	3.1	3.6	4.1	4.5	4.3	3.6	3.1	2.7	3.0	2.9
India	13.8	15.0	17.9	20.6	24.8	5.4	3.0	2.5	2.7	2.7
Thailand	2.9	3.1	3.7	3.7	3.2	2.8	2.2	2.0	2.1	2.0
Other Countries	5.0	6.2	7.4	7.9	6.1	5.5	5.0	4.4	4.7	4.5
Total Asia	78.9	82.8	92.8	101.6	99.7	75.9	66.5	49.3	46.9	44.4
Africa										
Egypt	1.6	1.4	1.4	0.7	0.8	0.7	0.6	0.6	0.6	0.6
Morocco	0.4	0.5	0.5	0.5	0.5	0.6	0.4	0.4	0.4	0.4
Other Countries	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
Total Africa	2.6	2.5	2.6	1.9	2.0	1.8	1.6	1.5	1.6	1.6
Oceania										
Australia	1.6	1.6	1.6	1.6	1.4	1.3	1.2	1.1	1.1	1.1
Total Oceania	1.6	1.6	1.6	1.6	1.4	1.3	1.2	1.1	1.1	1.1
World Total	200.7	200.6	227.2	261.2	253.8	191.0	165.4	141.1	139.7	138.1

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Last year saw lower volumes not only from the more price-sensitive jewelry sector, but also from the industrial sector due to ongoing improvements in production processes, resulting in lower metal content in industrial applications.

Silver scrap generated in **North America** edged up a moderate 2% last year, reaching 34.2 Moz (1,063 t). At 97%, the United States is almost exclusively responsible for the entire scrap generation on this continent. The moderate rise last year is a welcome development, following five consecutive years of declines. At last year's level, scrap supply stands almost 60% below the peak of 82.7 Moz (2,572 t) recorded in 2011. Unsurprisingly, it was that year when the silver price rallied to a record high of \$48.70/oz on the LBMA silver benchmark. Those times are well behind us and as such the eagerness of consumers to return their excessive amounts of silverware and silver jewelry has receded. Last year's rise, however, was more a function of industrial waste generated in the actual production process driven by a robust industrial climate in the United States. We do notice an increasing amount of silver scrap from industrial applications coming back to the market in conjunction with the higher grade and more traditional silverware and silver jewelry items.

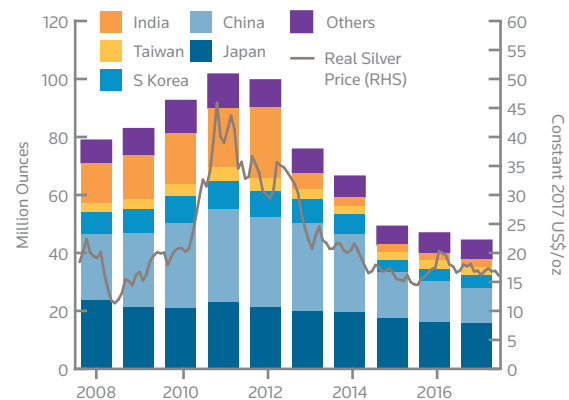
At 2.7 Moz (83 t), **Indian** scrap supply in 2017 was down by 2% compared to 2016. Steady prices and reduced economic distress contributed to the marginal decline. Sources of supply varied from jewelry, articles, electrical contacts and plated materials. A significant proportion of the volume last year came from silver jewelry and articles that were collateralized against loans, which were later auctioned on the non-repayment of the loan. Our research indicates that these were primarily of 75% silver content. Scrap from retail consumers was mainly in the form of exchanging old lower carat pieces for new higher value ones. Looking ahead, the source of scrap from the industrial segment is expected to shift higher with the increase in capacity for Ethyl Oxide production as the silver post scrapping is sold in the domestic market. Secondly, rules related to e-waste management are going to tighten and this will require a more organized recycling of electronic waste in India.

Last year, silver scrap across **Asia** (excluding Japan) fell by 7% to 28.7 Moz (893 t), the sixth consecutive annual decline and the lowest level since 2001. While the dollar silver price saw little change in 2017, the price in local terms declined in several Asian markets due to the weaker

U.S. dollar, which curtailed recycling volumes across the region as the supply chain delayed recycling in the hope of a return to higher prices. Old scrap silver from **China** retreated by 10% in 2017 to 12.3 Moz (384 t), a level not seen for 15 years as the lack of price action saw many across the supply chain, where they had sufficient cash flow, hold on to scrapped material rather than refine it for payment. It was a similar outcome in both **South Korea** and **Taiwan**, where despite a more robust industrial sector scrap receipts declined, retreating by an estimated 2% and 4% respectively. In other markets, a softer domestic silver price and moribund fabrication demand were largely to blame for falls in **Thailand** and **Indonesia** as the supply chain and consumers alike delayed non-essential jewelry and silverware recycling, declining 7% and 3% respectively.

Scrap supply in **Japan** last year retreated by just 3% to 15.7 Moz (487 t), the sixth annual fall in succession, though the decline was the lowest in percentage terms since 2014. An improved industrial sector, especially within the electronics industry and solar segments, generated greater recycling volumes, but a significant proportion of this is within a closed-loop and as such is not captured in our data. The yen silver price edged 2% higher in 2017, a function of a weaker yen, but this was not enough to tease out consumer held stocks. Moreover, a stronger economic footing, combined with a lack of price action discouraged the scrapping of old electronics and electrical products. Silver recovered from old X-ray films retreated only marginally in 2017, thanks to regulations which dictate statutory obligations for hospitals to archive X-ray films.

ASIA SCRAP SUPPLY



Source: GFMS, Thomson Reuters

6. SILVER BULLION TRADE

- **Global silver bullion movements were dominated by India last year with imports more than doubling and offsetting weaker flows elsewhere, most notably in the United States. Outflows from China and Hong Kong rebounded strongly, easily accounting for the significant falls seen in South Korea, Europe, and Canada.**
- **Swiss exports dropped by 9% in 2017, driven by lower shipments to Germany and India. The United Kingdom remained the largest destination for Swiss good delivery silver, accounting for nearly half of total exports.**
- **China's bullion exports soared by 28%, with Hong Kong remaining the largest export destination with a share of 97% of the total. Exports to India surged by 186%, reflecting the strength of that market.**

EUROPE

Europe (excluding Russia) is traditionally one of the world's main deficit regions as fabrication demand exceeds mine supply and locally generated scrap. That said, even after adding Russia, the region remained in a small deficit of 6.5 Moz (201 t) in 2017, as the country's silver production had been declining for two consecutive years.

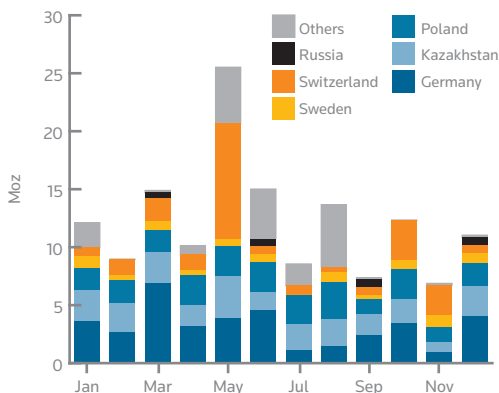
Following a sharp double-digit percentage drop in 2016, **UK** official exports of silver bullion fell by just 2% in 2017 to 43.0 Moz (1,338 t). This was a mixed bag, with a 27% rebound in flows to India, the UK's largest export destination, although volumes remained substantially

below levels seen in 2013-2015. Last year also recorded a strong recovery in exports to Hong Kong and China. Flows to Canada, which accounted for 36% of the total in 2016, tumbled by 59% in 2017 to just 15% of total exports.

UK bullion imports jumped by 16% to 146.6 Moz (4,559 t) last year, with much of the increase coming from Germany, Australia and Switzerland. After being a top supplier of UK silver bullion for two years, Kazakhstan lost its dominant position in 2017, with flows declining by 21%. The United Kingdom remained a net importer for the second year in a row, with net imports of 103.6 Moz (3,221 t), an increase of 27% from a year earlier.

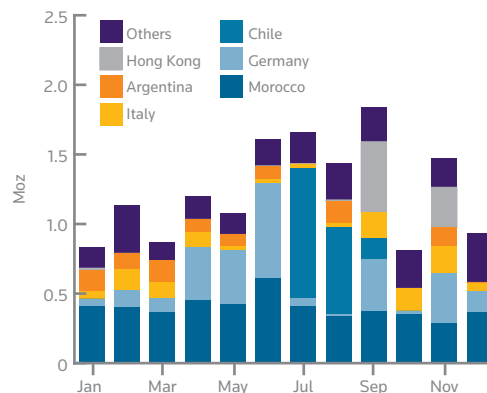
Following a recovery in 2016, **Swiss** silver bullion imports dropped by 47% in 2017, to 14.9 Moz (463 t), with lower volumes coming from its key suppliers. Shipments from Italy, which had been the largest supplier in 2016, with a share of 20% of the total, tumbled by 80% last year, to account for just 8% of all imports. Flows from Hong Kong also experienced a sharp reduction, falling from the second largest supplier with a share of 11% in 2016 to the sixth place in 2017. Key to this was higher flows to India, which accounted for roughly 66% of total Hong Kong exports, up from 43% in 2016. Meanwhile, lower silver production and increased shipments to India saw Swiss supplies from Russia tumble by 77%, accounting for 4% of the total as opposed to 10% in 2016. While imports from Germany slipped by 16%, the country reinforced its position in the Swiss market by increasing its share to 18% from 12% in the previous year, now being the second largest supplier.

2017 MONTHLY UNITED KINGDOM BULLION IMPORTS



Source: GFMS, Thomson Reuters; HMRC

2017 MONTHLY SWISS SILVER IMPORTS



Source: GFMS, Thomson Reuters; Swiss Impex

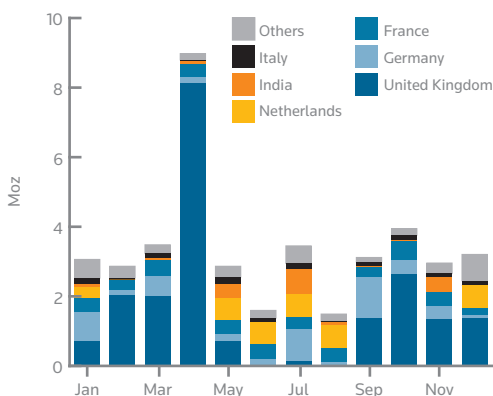
Imports from some of the major mining countries registered a diverse performance. For instance, shipments from the United States, the fifth largest source in 2016, registered a steep decline of 99% last year, largely attributed to lower mine production in the country, which saw its volumes plunge to merely above one ton. Argentina recorded a double-digit percentage decline, while flows from Morocco soared by 57%, thanks to higher production at the country's largest silver mine, Imiter, making the country the top supplier of Swiss bullion imports in 2017, compared to the fourth place a year earlier. Imports from Chile rose for the third year in a row, with volumes more than tripling in 2017, to account for 11% of the total, from just 2% in 2016.

Switzerland exported 41.0 Moz (1,276 t) of silver bullion in 2017, representing a 9% decline from a year earlier. The fall was driven by lower shipments to Germany, following a strong rebound in 2016, although the country retained its status as the second largest export market, with a share of total exports standing at 13%, down year-on-year but substantially above the level of previous years. In addition, flows to India, the third largest destination for Swiss bullion exports in 2016, registered a steep decline of 59% last year, slashing its share of total exports from 10% to 5%, due to increased competition from China and a greater portion of flows now being routed via the Indian Free Trade and Warehousing Zones (FTWZs). Italy and Singapore were among other countries that recorded double-digit percentage declines in flows from Switzerland. In contrast, the U.K. remained the largest destination for Swiss good delivery silver, with volumes rising by 27%, to account for nearly half of total exports, as opposed to 35% the year earlier.

Official **German** figures showed that silver bullion exports eased by 2% in 2017 to 50.8 Moz (1,580 t), compared to 14% growth in the previous year. The slowdown was largely due to sharply lower shipments to India, down by 78% compared to 2016, resulting from increased supplies from China and Russia at lower premia, with the bulk of shipments now being routed through Free Trade and Warehousing Zones (FTWZs). As a result, India's share of total exports slipped from 10% in 2016, when the country was the second largest export market, to just 2% last year. Following a dramatic increase in 2016, flows to Turkey decreased by 15% last year, although in absolute terms volumes remained substantially above the level seen in previous years. The ongoing weakness in demand for investment products was largely responsible for lower shipments to Austria and the United States. This was partially offset by a 19% rise in deliveries to the United Kingdom, which remained the top destination for German bullion exports since 2014, and higher flows to Switzerland.

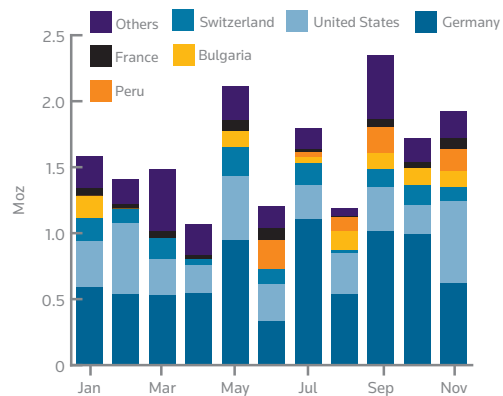
Meanwhile, bullion imports into Germany rebounded by 90% last year back to levels seen in 2015, at around 18.7 Moz (580 t). Interestingly, after five years of non-existent flows, Kazakhstan became the largest supplier in 2017, surpassing Sweden in absolute terms and accounting for just over 28% of all imports. Sweden remained one of the most important sources, with volumes almost doubling in 2017 to 5.2 Moz (162 t), to share the market with Kazakhstan at 28% of the total. Arrivals from Switzerland and Argentina, the third and fourth largest sources, also recorded strong gains, while shipments from Canada and Peru posted sharp declines, returning to insignificant levels as seen in previous years.

2017 MONTHLY SWISS SILVER EXPORTS



Source: GFMS, Thomson Reuters; Swiss Impex

2017 MONTHLY ITALIAN SILVER BULLION IMPORTS



Source: GFMS, Thomson Reuters; Eurostat

After two consecutive years of declines, **Italian** silver bullion imports recovered in 2017, rising by 12% to 19.4 Moz (605 t). The recovery was largely driven by higher flows from Germany, the country’s largest exporter, which saw its volumes rise by 11% year-on-year. Deliveries from the United States, the second largest source of Italy’s bullion imports, were up by 21%, to hit the highest volume since 2010. On the other hand, the Swiss share in total imports slipped further last year, to account for 8%, as shipments recorded a 12% drop, falling for the second year in a row. Arrivals from Bulgaria, which became Italy’s fourth largest source back in 2014, tumbled by 41%, although its share remained relatively stable at around 5% of the total. Meanwhile, Italy’s silver bullion exports slumped by 44% to 6.5 Moz (202 t), with shipments to Switzerland, which used to be the top export destination in 2015 and 2016, plunging by 78% last year, to account for just 20% of total exports compared to over 50% in 2016.

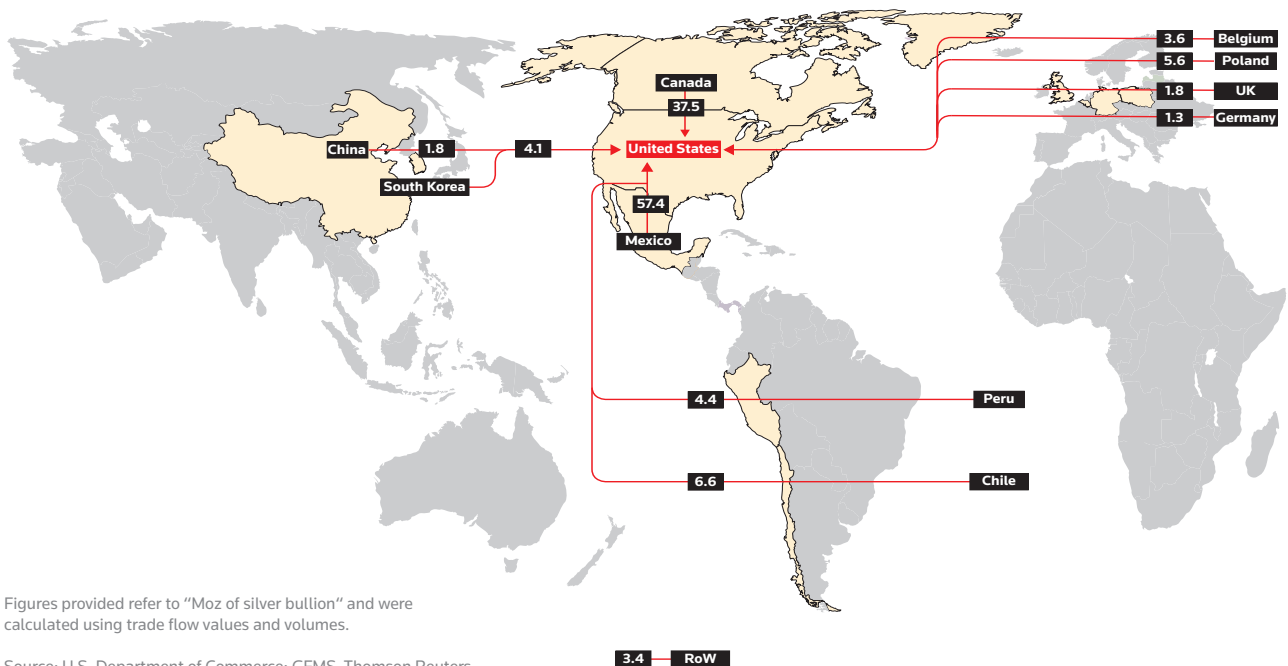
Russian silver bullion exports soared by 56% to 25.2 Moz (783 t) last year, largely thanks to a strong rebound in shipments to India, the country’s top export destination, accounting for over 80% of total exports. This was partially offset by lower exports to Switzerland, the United Kingdom and Hong Kong. Silver bullion imports more than tripled thanks to a recovery in shipments from Italy, but absolute volumes remained small in comparison to exports.

THE AMERICAS

Following two consecutive annual increases, silver bullion and doré imports into the **United States** fell 19% to 162.0 Moz (5,039 t) last year. The drop was not a surprise given the weak investment sentiment in the country for the bulk of 2017. Of total imports, doré accounted for approximately 22%, being largely shipped from mines in Mexico and South America as feed for refiners in the United States. Bullion imports, on the other hand, are classified as finished products ready to be sold to investors and account for 78% of trade flows. Inflows from Mexico also account for the largest share, approximately 45% of total or 57.4 Moz (1,785 t), followed by Canada 37.5 (1,166 t) and Chile 6.6 Moz (205 t). Combined, Mexico, Canada and Peru posted the most significant declines last year whereas flows stemming from Chile, and to a lesser extent the U.K. rose.

Feedstock sourcing has become more challenging in recent years driven by stricter regulation in terms of due diligence and responsible material sourcing. Those refiners that get their material straight from mines in, for example, South America, have to be very aware of the mining practices that are taking place by their suppliers. Being caught on the wrong side of the regulators can have dramatic implications for your business as a refiner, as was demonstrated in at least one case recently in the U.S. What we increasingly

MAJOR TRADE FLOWS IN SILVER BULLION TO THE UNITED STATES IN 2017



Figures provided refer to “Moz of silver bullion” and were calculated using trade flow values and volumes.

Source: U.S. Department of Commerce; GFMS, Thomson Reuters

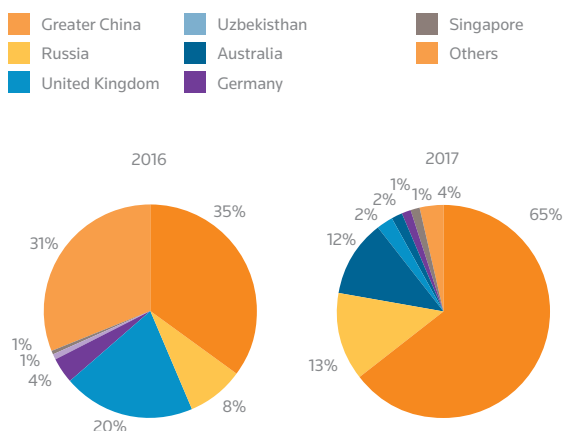
notice, therefore, is a stronger desire for scrap metal as a primary source of feed or a deviation of supply lines towards areas and countries where business conducted is more transparent.

MIDDLE EAST AND INDIAN SUB-CONTINENT

Imports of silver bullion to **Turkey**, which include fine silver, scrap and mined doré, retreated by 7% in 2017 to an estimated 8.7 Moz (270 t). Imports from the two main sources, namely Belgium and Morocco, which combined contribute more than half the total, both declined, falling 20% and 11% respectively. Shipments from Germany and the UAE were also lower than in 2016, the former retreating by 30%, while flows from Switzerland returned after being absent from the market in 2016. Reported bullion exports fell sharply last year, sliding 47% to a nine-year low. Singapore remained the largest market for Turkish silver bullion, but flows to this market slumped 67% from 2016 volumes and fell from 60% market share that year to below 40% in 2017. Shipments to India saw a healthy rise, reflecting stronger domestic demand, as did flows to Nepal which is often used as unofficially imports into India.

The **United Arab Emirate** receives most of its silver as part of a by-product from refining gold doré. The recovered silver is normally then exported to major refining or consuming countries. We estimate that in 2017 close to 5.6 Moz (173 t) were refined, a fraction lower than 2016 volumes. On the other hand, bullion exports from the UAE last year were just 0.4 Moz (13 t) to India, Turkey and Switzerland combined, as against 1.8 Moz (57 t) to the same countries in 2016. The share of exports to India declined since much of the consignments to India are now arriving by sea routes

2017 INDIAN SILVER IMPORTS- SUPPLY COUNTRY SHARE



Source: GFMS, Thomson Reuters; GTIS; Various

INDIAN BULLION IMPORTS

(million ounces)	2013	2014	2015	2016	2017
Total Imports	187.1	220.0	255.7	89.8	176.7
Spot Price/kilogram	49,331	42,374	36,500	40,639	39,586

** Includes duty free and duty paid imports

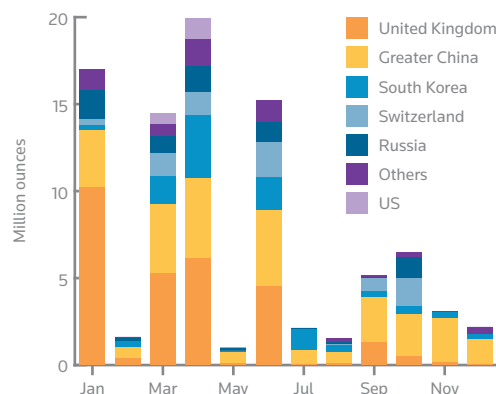
Source: GFMS, Thomson Reuters; Indian Ministry of Commerce; MCX

instead of by air. That said, Nepal has turned to be a good business partner for the UAE, since it primarily trades silver jewelry with Turkey and the UAE, whilst unofficially carrying them into India.

Indian silver bullion imports reached 176.7 Moz (5,677 t) in 2017, higher by 103% year-on-year. The gains were attributed to restocking by fabricators and a pickup in investment demand. In addition to imported bullion, supplies also came from domestically mined and refined silver, metal refined from imported concentrates, and gold and silver doré. Our estimate is that these together contributed to approximately 22.3 Moz (717 t).

Last year a significant change in the silver trade flow emerged as 82% of the imports were routed through the Free Trade Warehousing Zone (FTWZ) which is located near Chennai. The convenience of clearing from here, and its proximity to East Asian countries, made it the most popular way to import silver. Thus it wasn't a surprise when 65% of the silver imports originated from both Greater China. While the lower cost of sourcing from China was a critical factor, the lack of differentiation amongst end consumers as to whether the silver was from a LBMA accredited refinery or not was also a contributing factor. It explains the rise in supply from Greater China in particular, the share of which was 61% of the total imports. For this reason, the

2017 MONTHLY INDIAN SILVER IMPORTS



Source: GFMS, Thomson Reuters

UK, which normally ranks as one of the top two suppliers to India, shifted to third spot with a market share of 12% and Russia moved to second with its share at 13%.

Looking at the monthly trend, the highest imports were in May, interestingly at a time when prices were high and the customs tariff was at the highest since May 2015; imports reached 25.2 Moz (810 t). Also this was a continuation of a trend in place since April when imports were at 19.1 Moz (611.8 t). The total imports in just these two months together contributed 25% of the annual imports, due to a ramp up of stock building ahead of the GST (which came into effect from the 1st July).

Looking at the destination markets, the trend was similar to previous years with highest volumes moving to Agra, followed by Ahmedabad, Chennai, Hyderabad, Bangalore and Mumbai. Until the GST came into effect, Mumbai was an unofficial market for silver, due to smuggling from neighboring states to avoid local taxes. Post GST it is now synched with other states on taxation and for the marginal stamp duty charges.

EAST ASIA

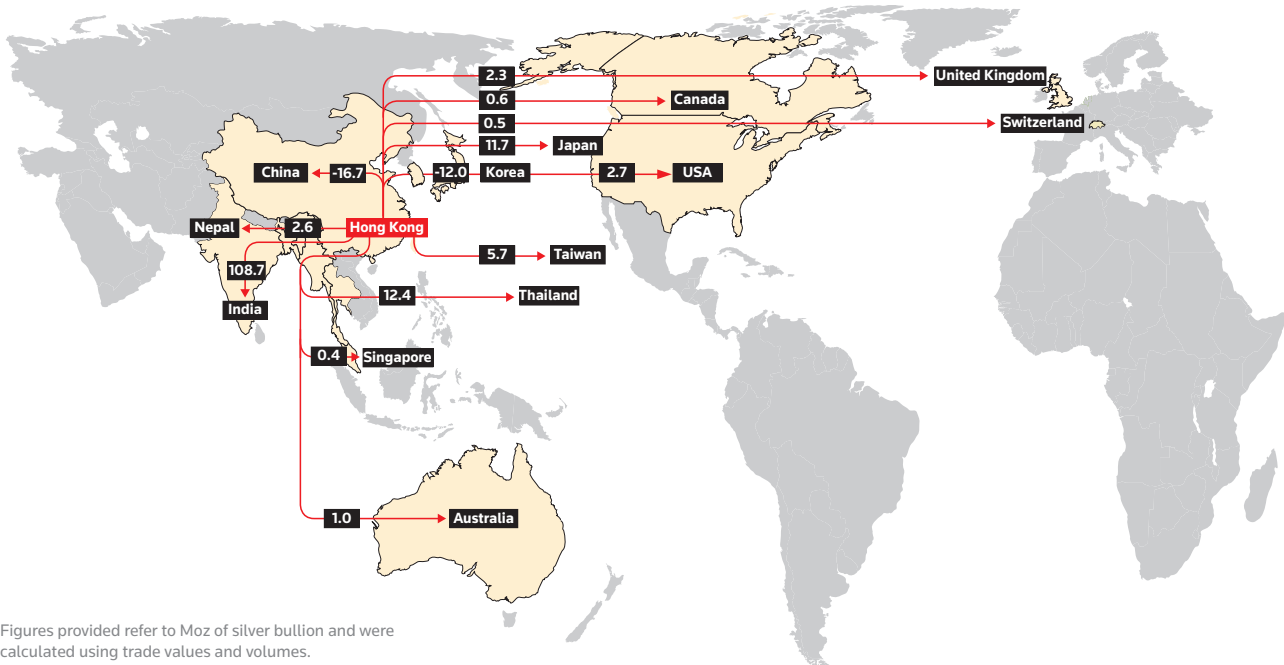
The imports of silver to **China** as discussed are focused on bullion form. Meanwhile, silver contained from base metal

concentrates imports surged 9% to 225 Moz (7,012 t). After falling in 2016, silver bullion imports rose by 0.6% year-on-year to 25.7 Moz (800 t). Imports from Hong Kong and China's Free Trade Zone together still dominated, to be the largest source of supply. Imports from Hong Kong alone declined 30% year-on-year to 6.5 Moz (201 t) while imports from China's Free Trade Zone rose an impressive 164% over 2016 volumes to 10 Moz (311 t). The combined market share rose from 51% of total silver bullion imports in 2016 to 64% in 2017. Imports from Taiwan, the third largest source, continued to gain market share, rising 15% year-on-year, while shipments from Australia and Japan slipped 8% and 9% respectively.

Looking at bullion exports, after a slight decrease of 2% in outflows in 2016, Chinese silver bullion exports surged 28% year-on-year, to 79.6 Moz (2,475 t). Hong Kong remained the largest destination, receiving 97% of total exports from the mainland. Exports to India soared 186% to 1.8 Moz (57 t) from 0.64 Moz (20 t) in 2016 reflecting the strength of the market there. On the other hand, direct exports to Thailand, which were non-existent in 2016, hit 0.5 Moz (16 t) last year.

In China, a quota is required for exporting silver which was set at 145 Moz (4,499 t) in 2017, 16% lower compared to 2016. Only 55% of the quota was used in 2017, which was

MAJOR TRADE FLOWS IN SILVER BULLION FROM HONG KONG IN 2017



Figures provided refer to Moz of silver bullion and were calculated using trade values and volumes.

Source: Hong Kong Census & Statistics Department; GFMS, Thomson Reuters

higher than the utilization rate of 35% in 2016. Besides the quota restriction, exported silver usually is recovered from base metal concentrates in order to enjoy the VAT refund; otherwise, exporting is generally a non-profitable business given the Chinese silver price is usually higher than the international silver price when combined with VAT. Due to export quota restrictions, silver bullion cannot flow freely between China and the international market. All silver produced domestically is required to stay in China and not able to leave the country. The fact that the export quota has not been fully utilized reflects the silver recovered from the base metal concentrates, which rose substantially last year, is limited and not always exported.

Imports of bullion into **Hong Kong** more than doubled in 2017 to estimated 45.8 Moz (1,424 t), a seven-year high. A near 59% year-on-year rise in outflows from China and a significant uptick in supply from South Korea last year accounted for the bulk of the increase. Shipments from the United Kingdom and Indonesia also rose sharply while flows from Switzerland, Taiwan and the United States all declined. Meanwhile, exports surged by 117% last year to a record high 164.9 Moz (5,129 t). India remains the largest market at nearly two-thirds of the total with shipments to this market surging 235% over 2016 volumes.

Taiwan's total silver bullion imports rose 3% in 2017, to 5.9 Moz (182 t) in 2017. China remained the largest supplier of silver to Taiwan, at 38% of the total, although quantities dropped 3% to 2.2 Moz (69 t). On the other hand, Taiwan imported substantially more from Hong Kong and South Korea, which when combined, contributed almost 50% of the total. Meanwhile, exports jumped 54% in 2017, led higher by shipments to Singapore which offset falls to both Hong Kong and Switzerland.

Singapore imports last year are thought to have increased by 3% to an estimated 5.0 Moz (156 t). The bulk, at around 80% of the total, was derived from inflows from Indonesia which jumped more than 20% year-on-year. This impressive rise in shipments offset substantive falls elsewhere, most notably Hong Kong, the United States, and Japan. Bullion exports were dominated by flows to India which more than doubled last year while flows to Thailand recorded a material fall.

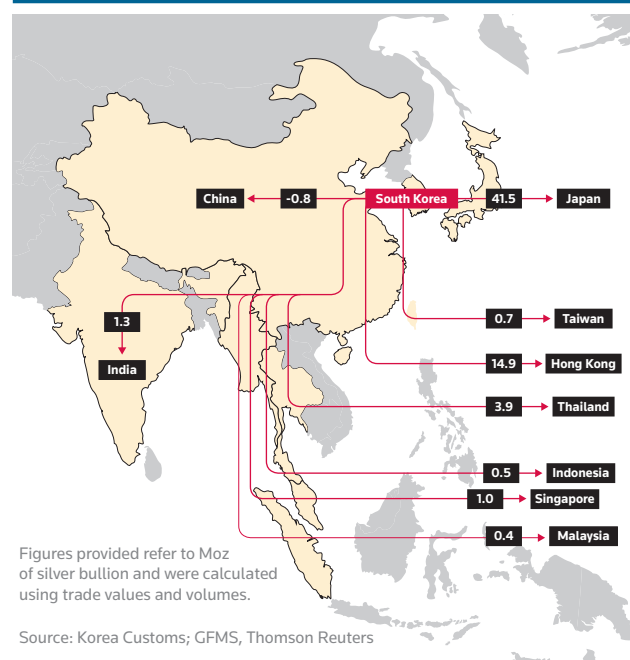
South Korea's silver imports surged significantly in 2017 by 335%, to 6.3 Moz (197 t). The United States became the largest supplier in 2017 with high grade deliveries of

3.8 Moz (117 t). China shipments, which was the dominant supplier in 2016, rose 75% year on-year in 2017 to 1.6 Moz (51 t). The United States accounted for 60% of South Korea's total import volume in 2017, while China's market share retreated from 64% in 2016 to 26% in 2017. The country's silver exports dropped 21% to 74.9 Moz (2,330 t). Japan remained the country's largest silver bullion buyer, with a 55% market share. South Korea was also a net exporter of silver bullion last year although net outflows fell 27% to 66 Moz (2,133 t).

Silver bullion imports into **Japan** rose a healthy 18% last year to a six-year high 58.9 Moz (1,833 t), with increased shipments from South Korea, which accounts for the vast bulk of deliveries, rising 23% year-on-year. Shipments from Thailand re-emerged last year making it the second largest source of supply while shipments from Hong Kong and China were broadly steady. Japan's silver exports fell heavily last year, by 37%, to an estimated 1.3 Moz (41 t). Shipments to India were weaker while exports to Vietnam were marginally stronger. In a reflection of the stronger solar industry Japan's silver powder exports surged 47% year-on-year on a calculated basis, with a significant increase in flows to Taiwan, South Korea, and China.

A weaker fabrication sector saw **Thailand's** silver bullion imports decline 18% last year to estimated 24.5 Moz (763 t). The sizeable fall, to the lowest level since 2012, was principally a function of a weaker jewelry fabrication sector.

MAJOR TRADE FLOWS IN BULLION FROM SOUTH KOREA IN 2017



7. INDUSTRIAL FABRICATION

- **World industrial fabrication increased 4% to 599.0 Moz (18,632 t), the highest level since 2013. Demand was well-supported by another record from photovoltaic applications, but also from a recovery in electronics, brazing alloys and solders.**
- **Photovoltaic (PV) demand for silver totaled 94.1 Moz (2,926 t) in 2017, up 19% from the previous year after it recorded a 34% expansion in 2016. This impressive growth was the result of a 24% rise in solar panel installations.**
- **Brazing alloy and solder silver fabrication also recorded an annual rise in 2017, up 4% to 57.5 Moz (1,790 t), boosted mainly by robust growth from China and Japan.**
- **Demand for silver from the ethylene oxide (EO) industry declined 33% last year to 6.9 Moz (214 t), dragged lower by a fall in new installations.**
- **Increases in silver demand from the electrical, photovoltaic, brazing alloys and solders, and the other industrial sector amounted to 26.7 Moz (832 t), which comfortably offset the 4.5 Moz (141 t) decline in photographic and EO demand.**

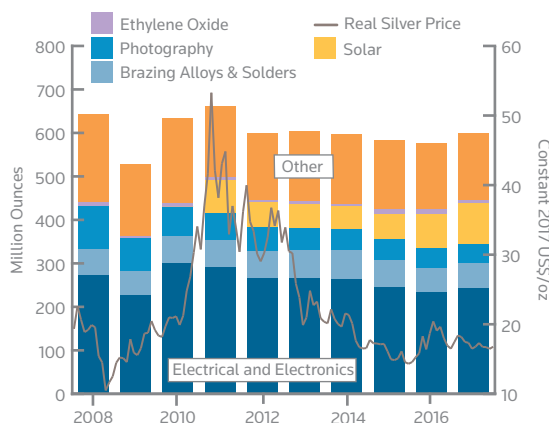
Silver consumed for industrial applications returned to growth in 2017, the first increase in demand since 2013. After a modest 1% decline in 2016, demand for fresh silver rebounded almost 4% last year to an estimated 599.0 Moz (18,632 t). Unlike 2016 when most industrial segments declined and were almost entirely offset by a 34% surge

in demand from the photovoltaic industry, the market last year was more uniform, with healthy gains seen in several market categories. Another year of significant expansion from the photovoltaic sector led to a new record level. But this was not the only market to enjoy a renaissance. A stronger global economy and robust demand from the semi-conductor market also contributed to the improved offtake.

The rate of growth in global industrial production strengthened to a six-year high last year. And so did the global economy, which expanded by 3.3%, largely benefitting from broadly accommodative monetary policies, supporting labor markets and robust global trade. China's gross domestic product rose by 6.9% in 2017, reversing a downward trend for the first time since 2010, an indication of strong resilience of the world's second-largest economy. The GDP expansion meant China's economy grew to about two-thirds the size of the United States' last year and contributed 30% to global economic growth in 2017. Meanwhile, the U.S economy grew 2.3% in 2017, an acceleration from the 1.5% logged in 2016.

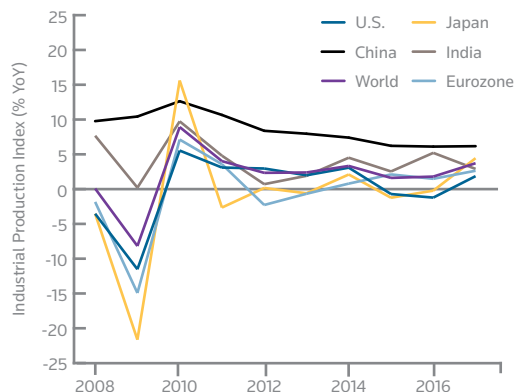
As mentioned above, the photovoltaic sector was again the stand out in 2017, with silver consumed in this sector jumping 19% to a record high, boosted by a 24% increase in solar panel installations last year. Investment in this sector by China in recent years has been extraordinary, and 2017 was no exception, with a 55% addition in capacity. This industry segment, like most we cover, continues to face

INDUSTRIAL SILVER FABRICATION (BY CATEGORY)



Note: Photovoltaic in "Other" category prior to 2011
Source: GFMS, Thomson Reuters

INDUSTRIAL PRODUCTION IN KEY SILVER-USING COUNTRIES



Source: GFMS, Thomson Reuters; Oxford Economics

TABLE 5 - SILVER FABRICATION: INDUSTRIAL APPLICATIONS (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Germany	27.4	20.3	26.5	25.4	21.7	21.3	20.9	20.9	21.5	23.0
United Kingdom	22.0	17.7	20.6	20.8	19.0	17.9	17.6	17.5	17.4	17.3
Russia	21.9	18.7	20.3	19.4	19.1	19.2	18.2	16.6	15.6	15.5
Belgium	24.4	19.4	18.3	16.4	15.4	14.3	14.2	14.0	14.1	14.0
Italy	11.2	9.0	9.9	9.2	8.6	8.4	8.4	8.1	7.7	8.0
France	10.8	7.5	8.8	8.0	7.2	7.0	6.8	6.9	6.8	6.9
Switzerland	2.5	2.2	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4
Bulgaria	2.1	0.4	0.4	1.9	2.0	2.1	2.1	2.1	2.1	2.1
Czech Republic	1.7	1.3	1.5	1.6	1.8	1.9	1.9	1.9	1.8	1.8
Turkey	1.6	1.3	1.4	1.5	1.4	1.5	1.5	1.6	1.6	1.6
Netherlands	1.6	1.3	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.5
Spain	1.9	1.7	1.8	1.4	1.2	1.1	1.1	1.2	1.2	1.3
Poland	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
Austria	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Other Countries	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Total Europe	131.0	102.3	115.1	111.2	102.7	100.1	98.3	96.1	95.2	97.2
North America										
United States	149.5	124.4	151.2	166.4	132.7	127.4	124.3	127.1	133.2	135.5
Mexico	3.1	3.1	4.8	6.0	6.6	6.6	6.7	7.9	8.0	8.0
Canada	2.4	1.3	1.9	1.8	1.8	1.9	1.8	1.7	1.8	1.8
Total North America	155.0	128.8	157.9	174.2	141.1	135.9	132.8	136.6	143.0	145.3
Central & South America										
Brazil	5.2	4.6	5.7	5.4	5.3	4.7	4.5	4.1	3.9	3.9
Argentina	1.0	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.7
Colombia	0.2	0.1	0.1	0.1	0.1	0.3	0.6	0.6	0.5	0.5
Other Countries	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total C. & S. America	6.8	5.9	7.2	6.9	6.8	6.3	6.4	5.9	5.6	5.6
Asia										
China	145.5	136.7	156.8	164.1	165.4	179.7	185.9	168.6	144.0	155.6
Japan	103.2	65.5	94.2	101.2	89.0	90.0	83.8	95.4	107.4	115.1
India	32.6	31.9	35.1	38.6	36.3	35.1	33.5	31.8	31.9	34.3
Taiwan	16.6	12.3	15.1	15.8	14.3	14.6	15.1	14.4	14.6	15.4
South Korea	25.9	19.7	24.5	24.5	23.6	22.3	20.4	14.4	12.2	12.4
Hong Kong	6.9	5.5	6.4	6.4	6.2	5.8	4.9	4.4	3.6	3.2
Iran	3.4	1.8	1.9	1.8	1.8	1.7	1.8	1.8	4.3	2.1
Kazakhstan	1.9	1.6	1.8	1.7	1.7	1.7	1.7	1.5	1.5	1.5
Uzbekistan	1.9	1.6	1.8	1.7	1.7	1.7	1.7	1.5	1.5	1.4
Singapore	0.0	0.1	1.8	1.9	0.5	0.7	0.8	1.6	1.0	1.1
Indonesia	0.6	0.5	0.8	0.8	0.9	0.8	0.9	0.9	1.0	1.0
Israel	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9
Thailand	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	0.9
Other Countries	3.0	7.1	6.1	3.4	0.8	0.8	1.0	0.9	2.8	0.7
Total Asia	343.3	286.0	348.1	363.6	343.8	356.8	353.2	339.1	327.6	345.5
Oceania										
Australia	5.1	4.5	4.9	5.0	5.0	4.8	5.0	4.8	4.8	4.8
Africa										
Morocco	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
South Africa	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

TABLE 5 - SILVER FABRICATION: INDUSTRIAL APPLICATIONS (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
continued										
Other Countries	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Africa	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
World Total	641.9	528.2	633.8	661.5	600.1	604.6	596.3	583.2	576.8	599.0

© GFMS, Thomson Reuters / The Silver Institute

pressures from ongoing thrifting and substitution, with the production-weighted average silver loadings per cell estimated to have been reduced by a further 5% compared to the prior year. Elsewhere, the surge in electronics, and, most notably in semi-conductor fabrication demand last year, filtered through to the electrical and electronics segment to deliver the first annual increase in offtake since 2010. Likewise, the surge in semi-conductor output, coupled with a stronger economic backdrop, saw demand for brazing alloys and solders return to expansion mode after a double-digit decline in 2016, with both sectors enjoying 4% year-on-year growth.

Silver used in photographic applications continued to retreat, falling by 3% in 2017 to the lowest level in our series. It should be noted, however, that we think the market has now largely bottomed; the bulk of structural change in the photography market has taken place and current fabrication volumes may be largely sustainable moving forward. Demand for ethylene oxide was the other casualty last year, retreating 33% from 2016 volumes but this segment commands less than 1% of global industrial demand. Demand for our 'other industrial' sector also returned to growth in 2017, following three consecutive annual declines.

EUROPE

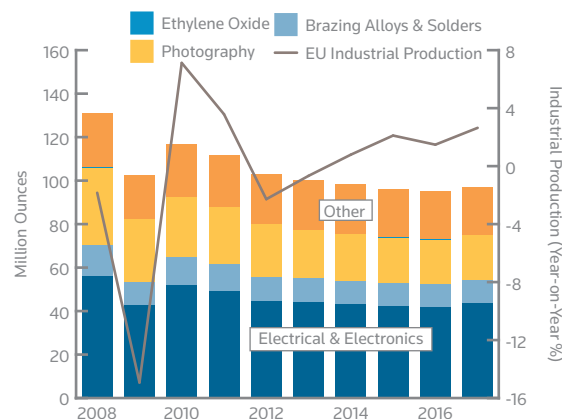
Silver industrial fabrication in Europe rose by a modest 2% last year, to an estimated 97.2 Moz (3,025 t). This was the first annual growth after six consecutive years of declines; however, continuous falls for most of the past decade saw the European share of global silver industrial fabrication slip to 16% in 2017, from 20% a decade ago.

A strong rebound in the Eurozone economy and industrial production, along with a stronger euro, saw an uptick in demand across most industrial segments. That said, last year's growth was largely driven by gains in the electronics industry, the largest sector with a share of 45% of total

European industrial fabrication. Offtake in the brazing alloys and solders sector also posted gains. The only two sectors that continued to drag silver consumption lower were the photographic sector and ethylene oxide demand. The use of silver in photographic applications remained weak as demand for traditional consumer photographic products continued to decline. That said, the long-running decline in this sector seems to have come to an end, suggesting that current fabrication volumes may be sustainable going forward. Ethylene oxide demand was once again the only segment to register a sharp double-digit percentage decline last year; however, it remained the smallest sector of the European industrial demand, with a share of less than 1%.

Turning to individual countries, industrial fabrication in **Germany**, which is the largest user in the region, jumped for the second year in a row, up by 7% in 2017. The overall economy expanded by 2.2% last year, marking the highest annual GDP growth since 2011, with robust performance across manufacturing sectors and strong gains in employment. Last year's growth in industrial fabrication was mainly due to an increase in demand from the electronics sector, largely driven by continued electrification of automobiles, resulted in a growing use of a number of

EUROPE INDUSTRIAL FABRICATION



Source: GFMS, Thomson Reuters; Oxford Economics

connectors. That said, there is an ongoing pressure among manufacturers to reduce costs by switching to lower silver content options.

Industrial fabrication in **Belgium**, which is the center for the bulk of European photographic fabrication, edged lower last year due to ongoing migration to digital radiology from traditional X-ray film in the healthcare sector.

Russian industrial fabrication of silver remained broadly flat in 2017, after three consecutive years of declines. With GDP growth returning in 2017, after two consecutive years of economic recession, and the value of the rouble somewhat stabilizing, 2017 saw an uptick in demand from the electronics industry. This was, however, offset by continued weakness in demand from other industrial segments. While avoiding negative growth last year, industrial offtake was down by 30% from levels witnessed a decade ago.

NORTH AMERICA

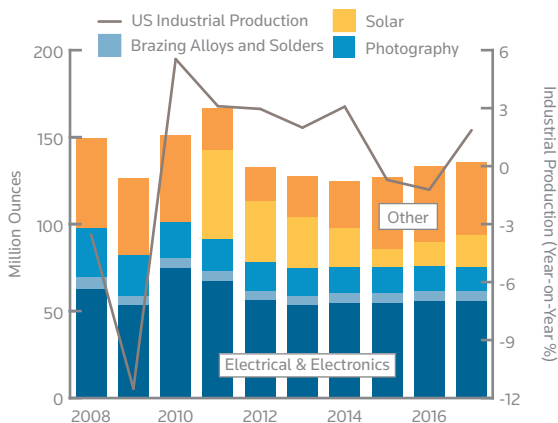
Industrial fabrication in North America rose a modest 2% to 145.3 Moz (4,519 t) in 2017. This was the third consecutive annual increase and seems to have set the tone for a period of steadying growth on the continent. Unsurprisingly, the fortunes in this sector are strongly dependent on what happens in the United States, responsible for 93% of total industrial fabrication. The largest segment in this category, electrical contacts & electronics, accounts for 56% of demand in the United States, and remained flat last year, which was, considering the continued thrifing pressure and substitution efforts, not a bad performance.

As is the case in other parts of the world, electrical contacts & electronics has mainly seen demand from the automotive industry increasing in recent years. Due to the increased use of computing power in normal combustion cars as well as hybrid and electric vehicles, we expect the use of electrical equipment in this end-use sector to remain a steady source of silver demand in the coming years. The main two growth areas in the United States, however, were again the solar sector and demand for ethylene oxide catalysts. As was the case in previous years, demand for solar related products in particular continues to be the driving force in the industrial sector. Demand for silver powder used in photovoltaic rose a significant 27%, or 3.7 Moz (115 t), year-on-year to 17.9 Moz (556 t) in 2017.

Despite the impressive growth, the silver powder fabrication market in the United States continues to be a challenging environment to operate in. As is the case with solar cells, competing with cheaper imports from overseas, such as China, has been tough for domestic producers. In the past they could more easily compete on quality, but that advantage is diminishing fast. Silver powder for the photovoltaic market is becoming increasingly commoditized with detrimental effects on producer margins. Volumes for silver used in this sector are still rising but a lot of it is attributed to increased installations.

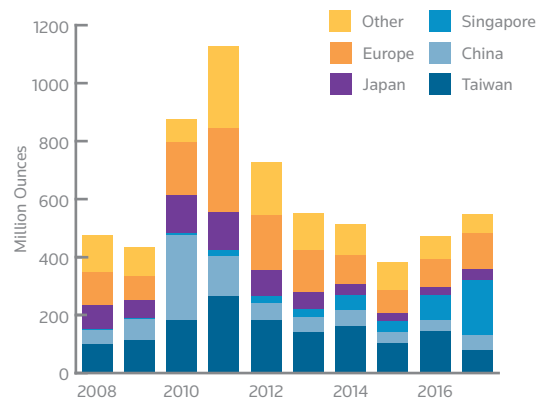
President Trump's imposed import tariffs on solar cells and washing machines this year could have a positive effect on domestic solar cell production, which will have a more level playing field competing with cheaper imports. The cost of solar panel installations, however, will likely rise, possibly softening demand for silver powder somewhat.

US INDUSTRIAL FABRICATION



Note: Photovoltaic in "Other" category prior to 2011
Source: GFMS, Thomson Reuters; Oxford Economics

US SILVER POWDER EXPORTS



Source: U.S. Dept of Commerce; GFMS, Thomson Reuters

Other fabrication, which accounts for approximately 29% of total industrial demand, declined 4% to 42.0 Moz (1,306 t) last year. Despite the drop, however, next to electronics demand from the automotive industry, we expect this segment to show steady increases in the coming years driven by an increased use of wearables technology, such as health and fitness watches, monitors and smart clothing.

EAST ASIA

Chinese silver industrial demand bottomed out in 2016, and rebounded by 8% in 2017, to 156.2 Moz (4,858 t). The country's silver industrial demand peaked in 2014, at 186.1 Moz (5,788 t), before suffering from decreasing demand for the following two years. China's official GDP growth reached 6.9% in 2017, and the domestic economy was notably stronger compared to recent years.

After recording monthly ratings below 50.0 in three months in 2016, the official manufacturing Purchasing Manager's Index (PMI) never fell below that level again in 2017. A value below 50.0 indicates that manufacturing activities are contracting, while a value above indicates expansion. While the official PMI tracks manufacturing activities of the larger enterprises, the Caixin manufacturing PMI, which tracks orders of the middle and smaller sized companies, shared a somewhat similar picture. In 2016, there were six months when the Caixin PMI readings fell below 50.0 (all in the first half), while only one month (May) in 2017 was below that level and indicated that the manufacturing industry was in decline. The difference between the official and Caixin PMIs demonstrates that large enterprises have a competitive advantage against the medium and smaller sized entities. Larger corporates typically have easier access to credit due to their inherent perceived lower credit risks. Regardless of the difference, there is no doubt that China's manufacturing businesses was on an uptrend throughout 2017, buoyed by a recovery in the global industrial sector.

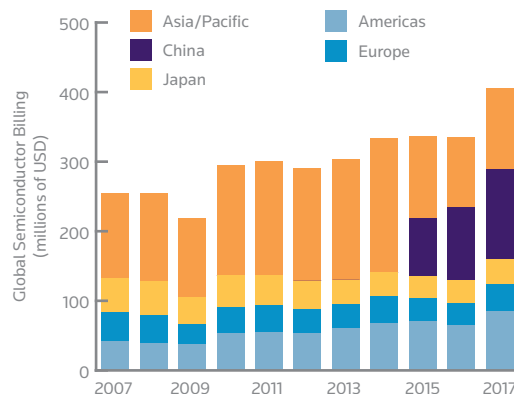
While sometimes GDP growth and PMI data may not necessary reflect the true economic state of a country, another useful metric to gauge China's economy is to measure the country's electricity consumption. In 2017, the country consumed 6,308 billion kilowatt-hours of electricity, a 6.6% year-on-year growth. This compared to 0.5% and 5.0% annual increases in 2015 and 2016 respectively.

The electrical and electronics sector remained the largest area of silver industrial fabrication, which made up approximately 41% of silver used in industrial applications. The use of silver in this segment increased 7% to 63.3 Moz (1,968 t). However, the increase was not evenly distributed across the board, with certain areas actually retreating from the year before. According to IDC, global smartphone shipments fell 0.1%, to 1.5 billion units in 2017, the first year-on-year decline since the emergence of smartphones. During the year, competition in the smartphones industry intensified, with the top five phone manufacturers gaining market share from 55.6% in 2016 to 60.5% in 2017. However, the trend of the industry is pointing down, with global shipments falling 6% in the final quarter of 2017. The market for mobile devices looks saturated and this looks particularly apparent in China where the situation may be even more dire, according to the Ministry of Industry and Information Technology. The value of domestic shipments of smartphones fell 12% in 2017, while shipment volumes declined over 20% on an annual basis in the fourth quarter. The market share of the five largest smart phone manufacturers increased by 15.1% to 71.3% last year.

On the other hand, electrical contacts was one of the bright spots in 2017. The strong demand propelled some manufacturers to enjoy double-digit sales growth, and the industrial operating capacity was close to 100%.

In terms of home appliances, air conditioners deserved the spotlight. An excessive inventory overhang in 2015 was carried over into 2016, and thus 2016 was mostly a year for destocking. With the majority of excessive inventories gone last year, production of air conditioners picked up again,

GLOBAL SEMI-CONDUCTOR BILLINGS



Source: SIA

reaching 180 million units, approximately 20% above the production level in 2016. The hot weather in 2017 and the continued growth in many third and fourth tier cities in China, also helped spur demand for air conditioners. Production of refrigerators and washing machines increased as well, by 13% and 3% respectively.

The Chinese solar industry remains the brightest spot in terms of the country's silver demand, rising 64% to 17.8 Moz (553 t) in 2017. The country's solar industry deployed 53 GW of new photovoltaic (PV) capacity during the year, indicating additions of 55% on the 2016 volume. At the end of 2017, China's cumulative installed solar capacity amounted to 130 GW, with solar contributing over 7% of the country's total power generation capacity. Demand for backside silver paste was already completely supplied by domestic production as well as approximately 20% of frontside silver paste. We believe the market share of domestically produced frontside silver paste will continue to increase this year, as the quality (mainly in regards to consistency challenges) continues to improve.

Silver usage in the Chinese ethylene oxide (EO) industry decreased by 45% to 2.4 Moz (73 t). Within the demand, replacement demand actually increased 13% to 181,000 oz (6 t), while newly installed demand fell 48% to 2.2 Moz (68 t). Silver used in the EO industry is used as a catalyst, and thus whenever there is new producing capacity going in, silver is required (newly installed demand). While silver is not consumed during the process, it is always recycled after a period of time, and thus there is demand for silver once the old silver is to be replaced (replacement demand). EO production capacity in China expanded by over 6%

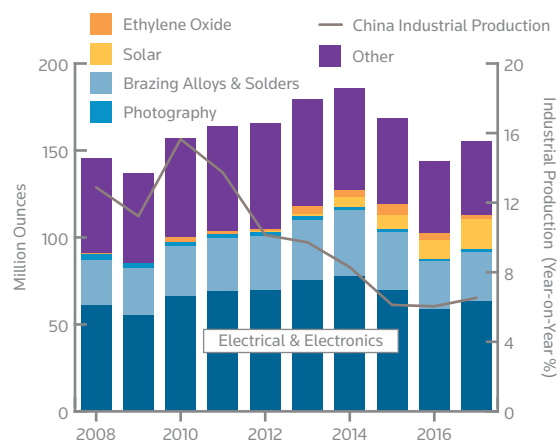
(compared to global average of 4%) in 2017, to 7.3 million tons. We expect the Chinese demand growth from the EO sector to continue to decline in 2018, as a lack of significant EO capacity expansion in the near future is expected to drag down demand for silver from this industry.

Looking forward to 2018, we expect growth in China's industrial sector to slow down again. The Chinese government will continue cutting its steel and coal production in 2018, as well as focusing on deleveraging the financial system. Rising protectionism may also hurt international trade and industrial sectors. The official manufacturing PMI peaked in September 2017 at 52.4, and has been on a downward trend since then, falling to 50.3 in February 2018. The Caixin manufacturing PMI has been relatively steady, however. One of the segments that may carry vast potential is the continual development of the smart-home market. Some institutes are forecasting China's smart homes adoption to surge from less than 3% of all households today to above 12% by 2021. This mass adoption will be led by the country's growing number of young tech-savvy consumers. Another potential highlight is the slow adoption of silver bonding wire. While it is still at early stage, silver could potentially take market share from copper and gold within the bonding wire industry in the next five years.

Japanese industrial demand continued its upward trajectory in 2017 recording a healthy 6% year-on-year increase to an estimated 115.1 Moz (3,580 t). This marks the third consecutive annual rise and lifts silver consumption in this segment to a ten-year high. A stronger domestic economy and a more robust global outlook, coupled with a weaker yen for much of the year, boosted fabrication demand across a myriad of industries. Strong global demand has driven a year-long recovery in exports, prompting Japanese manufacturers to steadily raise production throughout 2017. In 2016, Japanese industrial silver demand was buoyed by a surge in demand from the photovoltaic sector for powder, with these gains offsetting weakness across most other segments, while last year delivered a genuine uptick across most industrial areas with several achieving multi-year highs.

Japan's manufacturing sector ended 2017 on a high note, growing at its fastest pace since early 2014 in December as output growth continued to improve. Japan's Nikkei-Markit purchasing managers index rose to 54 in December,

CHINESE INDUSTRIAL FABRICATION



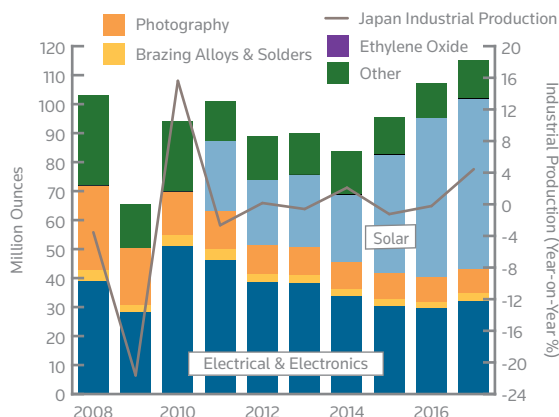
Source: GFMS, Thomson Reuters; Oxford Economics

up from 53.6 in the previous month and the highest since February 2014. Industrial production in Japan accelerated in December at the fastest pace in eight months, pushing output to the highest level since the global financial crisis. The third straight month of rising factory output pointed to solid economic growth in the fourth quarter. The overall economy expanded at a 0.5% annualized rate in October-December, slightly lower than market expectations. That followed a revised 2.2% annualized increase in July-September. Japan's economy grew at a real rate of 1.6% in the 2017 calendar year, the fastest increase since a 2% expansion in 2013.

Last year saw a surge in demand from the electronics industry, both for domestic consumption and the export sector. These findings are backed up by data published by the Japanese Electronics and Information Technology Industries Association. According to their findings, Japanese exports of electronics jumped more than 10% in value terms in 2017 with the largest segment of 'electronic components and devices' surging 12% last year. On the domestic front, they report production growth of 6% compared to 2016, with integrated circuits jumping almost 19% year-on-year, boosted by strong demand from the auto industry for electronic components.

Turning to individual sectors' performance, the photovoltaic sector was again the star of the show, but in 2017 it was not the sole performer as was the case in the prior year, with the supporting cast also making a solid contribution. GFMS estimate that silver powder fabrication for the solar industry jumped 8% last year to 59.0 Moz (1,834 t), following a 34% surge in 2016. This industrial segment now

JAPANESE INDUSTRIAL FABRICATION



Note: Photovoltaic in "Other" category prior to 2011
Source: GFMS, Thomson Reuters; Oxford Economics

JAPANESE NON-PHOTOGRAPHIC NITRATE & CONTACT PRODUCTION

(million ounces)	2013	2014	2015	2016	2017
Non-Photo Nitrates	1.1	1.1	1.2	0.9	1.1
Contacts	3.9	2.1	2.2	1.9	2.0

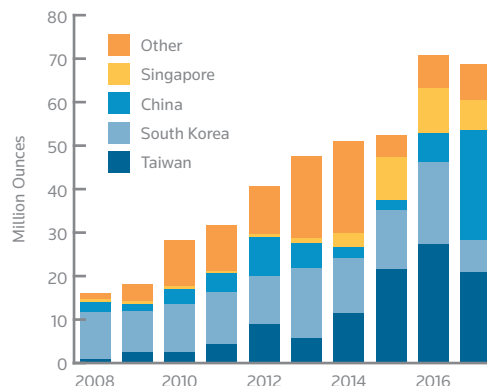
Source: GFMS, Thomson Reuters

accounts for almost half of total industrial silver demand in Japan and has lifted Japan's global market share of powder production to over 60%. Global powder demand was boosted by a 20% increase in solar panel production in 2017; this followed a 42% jump in 2016, with panel installations reaching 94 GW last year, a 24% rise. Powder exports picked up only marginally last year, according to customs data, with gross shipments to China jumping over 80%, while flows to Taiwan and South Korea (the next largest export markets for Japanese silver powder) declined by 20% and 33% respectively.

Offtake in brazing alloys and solders jumped by 17% last year, to a five year high of 2.7 Moz (85 t), boosted by stronger demand from the electronics and construction sectors, and improved export demand. Silver consumed in the electrical and electronics category also reached a multi-year high in 2017, while silver in other segments (such as silver used in catalysis during the production of ethylene oxide) saw little change over 2016. The photographic sector continues to drag silver consumption lower, but a 3% decline last year suggests that the current fabrication volumes may be largely sustainable moving forward.

The outlook for industrial demand this year has been tempered by a slower start than forecasted. Japanese industrial production fell at a faster rate than expected

JAPANESE SILVER POWDER EXPORTS



Source: GFMS, Thomson Reuters

in January, recording the sharpest fall since the 2011 earthquake. Industrial production fell 6.6% month-on-month in January, tumbling at a faster pace than the 4.2% forecast and down from 2.9% growth recorded in December. However, this is thought to be temporary and exports are set to continue to expand in the coming months, led by demand for semiconductor-related products that boosted exports in 2017. A stronger yen may slow the momentum but most in the market remain optimistic.

Industrial fabrication in **Hong Kong** continued to ease, as producing facilities shift to regions with lower costs. Hong Kong remained an important trading hub, and electronics accounted for 66% of the region's total exports during the year. Electronics exports increased close to 10% in the first ten months of 2017, with household electrical appliance exports increasing 9% year-on-year. According to buyers and exhibitors surveyed during the HKTDC Hong Kong Electronics Fair 2017, participants in general were optimistic towards the industry outlook in 2018 as overseas markets started to pickup, and a majority of respondents expecting an increase in sales in 2018.

Regarding market potential in 2018, Taiwan and Australia received the highest vote of confidence as the regions that contain the most potential in terms of their local electronics market, according to the HKTDC survey. Product-wise, the market potential of robotics and AR/VR products, especially for entertainment purposes, looks promising over the next two years.

South Korean industrial offtake increased by a modest 2% in 2017 to an estimated 12.4 Moz (385 t), after bottoming in 2016. While there is no denial that the domestic economy improved in 2017, the country's economic performance is still lagging behind its competitors. Based on the readings of the South Korea Nikkei Markit Manufacturing PMI, there were eight months in 2017 that came in below 50.0 (indicating industrial contraction), which was similar to 2016. On a brighter note, South Korea's exports expanded to the highest level in at least six decades, boosted by a 57% rise in shipments of semi-conductors. Total export value surged 16% in 2017, with the trade surplus widening to \$96 billion. The improving economy saw the Korean government raise rates in November 2017, for the first time since 2011.

TABLE 6 - SILVER FABRICATION: ELECTRICAL AND ELECTRONICS (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	60.9	55.4	66.2	69.1	69.5	75.3	77.8	69.9	59.0	63.3
United States	62.2	53.4	74.6	67.0	56.1	53.1	54.3	54.3	55.3	55.5
Japan	38.7	28.2	51.1	46.2	38.4	38.3	33.6	30.4	29.5	32.1
Germany	21.7	15.7	21.3	20.3	17.2	17.0	16.7	16.7	17.2	18.5
India	15.0	16.1	17.1	17.2	17.6	15.1	16.1	14.5	14.6	14.0
Taiwan	12.3	9.9	12.1	12.7	11.3	11.8	12.3	11.7	12.0	12.6
Russia	12.1	10.3	11.3	10.9	10.7	10.9	10.1	9.2	8.6	8.7
South Korea	15.9	12.5	16.1	16.0	15.5	14.6	13.3	9.1	8.0	8.2
Mexico	2.1	2.2	3.8	5.0	5.7	5.7	5.8	6.9	6.9	6.8
France	8.6	5.7	6.9	6.1	5.3	5.3	5.1	5.2	5.1	5.2
United Kingdom	4.7	3.4	3.9	4.0	3.9	3.9	4.0	4.1	4.1	4.2
Italy	4.1	3.4	3.9	3.3	2.8	2.5	2.4	2.3	2.2	2.2
Hong Kong	3.3	2.7	3.1	3.1	3.0	2.8	2.3	2.1	1.8	1.6
Czech Republic	1.3	1.0	1.2	1.3	1.4	1.4	1.5	1.4	1.4	1.4
Brazil	1.5	1.2	1.6	1.6	1.6	1.5	1.5	1.3	1.2	1.2
Turkey	1.1	0.9	0.9	1.0	0.9	0.9	1.0	1.0	1.0	1.0
Kazakhstan	1.1	1.0	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
Uzbekistan	1.1	1.0	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
Singapore	0.0	0.0	0.2	0.3	0.3	0.5	0.6	0.7	0.7	0.8
Other Countries	4.0	3.3	3.8	3.6	3.5	3.5	3.5	3.5	3.5	3.6
World Total	271.7	227.4	301.2	290.8	266.7	266.0	263.9	246.0	233.9	242.9

© GFMS, Thomson Reuters / The Silver Institute

While an important player in the global semiconductor sector, Korea is one of the global hubs that produce bonding wires. In 2017, fabrication volume of all bonding wires in Korea, regardless of the metals used, increased. Korean fabricators noted that China increased investment in the artificial intelligence (AI) and high end electronics that would require bonding wires that are more reliable in terms of performance. While still early stage, the application of silver bonding wire increased by a large margin in 2017, from a low base. Copper and palladium coated copper (PCC) are not very suitable for semiconductors, as copper oxidizes easily, and thus only suitable for cheap electronics with a short life cycle. Therefore, fabricators are eager to find a new material that could be more reliable than copper based wires, but would cost much lower than gold wires. While costs of silver bonding wire is already comparable to PCC, with even a more reliable performance, it will take a few good years to adopt the new technology.

Taiwan's industrial use of silver is estimated to have increased by 4.8% last year, to 15.4 Moz (477 t), the highest level since 2011. Manufacturing industries grew 2% in 2017 compared to 2016 and its portion of the country's GDP rose to 30.84% in 2017, from 30.66% the year before. Meanwhile, the industrial production index performed better in 2017; the highest value captured was 115.86 compared to 112.17 in 2016.

Most quarters last year recorded moderate growth of between 2% to 4%, with the exception of the second quarter, which recorded negative growth of 1.39%. With the stable growth throughout last year and a strong rise of 15% in exports of electrical and electronics products, we estimated that demand for silver from local electrical and electronics industry surged by 6% to 12.6 Moz (393 t).

It is expected that the manufacturing industries, especially local electrical and electronics, will continue to grow in 2018 given the stronger global demand outlook for electronic products, driven by growing commercial use of artificial intelligence and technological improvement.

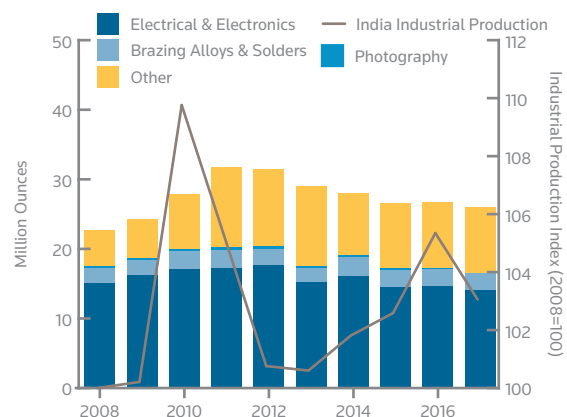
Indian industrial fabrication contracted marginally year-on-year reaching 34.3 Moz (1,067 t) by the end of last year; this excludes demand for silver from ethylene oxide industry. The drop in industrial fabrication was smaller compared to the decline in GDP growth, which recorded

6.2% expansion, the lowest figure in four years. In addition, growth in the Industrial Production Index (IIP) contracted as well, to 2.9%; the lowest figure in two years.

Silver demand used in electrical contacts and electronics declined 4% year-on-year to 14.0 Moz (435 t), the lowest in 11 years. That, however, stood in strong contrast to the growth recorded in the switchgear market, which was supplied primarily by increased imports as opposed to more domestically fabricated products. According to data collected by the Indian Electrical and Electronic Manufacturers Association (IEEMA), approximately 50% of low voltage (LV) switchgears, the one application that consumes major volumes of silver in the contacts market, stems from imports. This tends to inflate the silver contact fabrication volumes. For the year as a whole, IEEMA data shows that the LV market registered average 7.4% growth year-on-year in first three quarters, which is estimated to be mainly a function of a strong first half, considering we expect a weak fourth quarter when the data gets released later this year. The weakness in the second half can be mainly attributed to the implementation of the Goods and Service Tax (GST), with fabricators raising their production and stock volumes ahead of the GST introduction in order to qualify for a tax advantage.

Silver demand from the brazing alloy market was steady last year, despite strong demand for brazed alloys from the automotive and power distribution sectors; the two key segments contributing to brazing alloy demand in India. Similar to electrical contacts, however, this sector is also plagued by cheaper imports and in some cases sourcing from their OEMs. Last year growth of transmission lines

INDIAN INDUSTRIAL FABRICATION



Source: GFMS, Thomson Reuters; Oxford Economics

SILVER ETHYLENE OXIDE CATALYST MARKET

Ethylene Oxide (EO) is a chemical compound in the production of several industrial chemicals, most notably ethylene glycol, making up over 60% of EO's industrial application. Other industrial chemicals include ethoxylates, glycol ethers and polyethylene glycols. These industrial chemicals in turn produce daily necessities that are in demand from the textile (polyester), household (detergents), personal care (cosmetics) and the pharmaceutical industries.

EO is produced from polyethylene grade ethylene, and industrially produced by oxidation of ethylene in the presence of silver catalyst, at a temperature between 200 and 300 degrees Celsius. Therefore, before an EO production plant starts commissioning, silver catalyst is already in place, and we term this as newly installed demand.

Similar to other chemical process, while the metal catalyst is not consumed during the reaction process, the silver does need to be recycled (though approximately 2% is lost during the recovery process), and the cycle varies from 18 to 36 months depending on the technology uses and capacity utilization of the plant. The new silver metal used to replace the old catalyst we term as the replacement demand. In general, the higher the silver content the catalyst is, the longer the cycle can last before replacement.

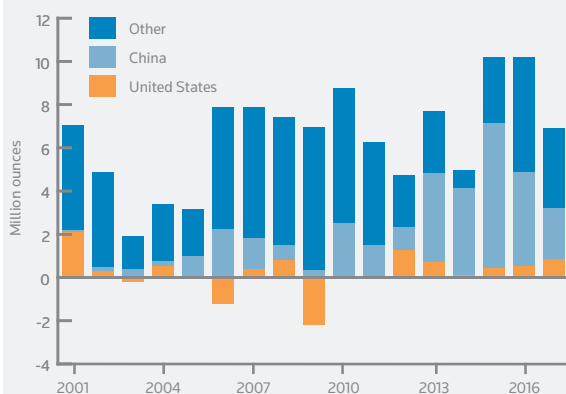
Polyester fiber, which is used in textile products like apparel and carpeting, is the largest source of EO demand and accounts for an estimated 36% market share. Asia is the major producing region for polyester fiber, constituting 88% of global productivity. From it, China is the largest global producer, with

an estimated producing capacity of over 50 million tons by the end of 2017, with utilization rate over 60%. According to China's Keqiao prosperity index, after the domestic polyester fiber industry softened in June and July 2017, the whole industry was on an upswing for the rest of the year, before softening again in 2018.

We estimate that global EO production capacity grew by 4% in 2017, to a total of 33.4 million tons. However as we explained above, just because global EO capacity continued to grow, this does not necessarily mean demand for silver from this sector would also increase, as it depends on newly installed capacity, as well as replacement needs.

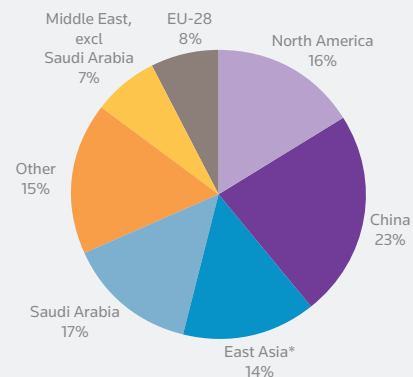
Silver demand from this sector was at 10.2 Moz (317 t) in 2016, seconded to the 13.5 Moz (420 t) level back in 1976. Global demand fell by 33% in 2017, to 6.9 Moz (214 t), mostly dragged down by a 35% decrease from newly installed demand, which made up of 6 Moz (186 t). Only China, India and the United States recorded newly installed demand in 2017, compared to five countries in 2016. Meanwhile, replacement demand also fell by 14% in 2017, mostly dragged down by the reduced consumption from the United States. As new EO production capacity may be far and between in the next few years, total demand of silver from the EO industry will continue heading downwards in the near future.

GLOBAL SILVER EO DEMAND



Source: ICIS via Eikon; GFMS, Thomson Reuters

LOCATION OF SILVER INSTALLED IN EO FACILITIES IN 2017



*excl China
Source: GFMS, Thomson Reuters

NEW USES OF SILVER - THE AUTOMOTIVE INDUSTRY

Silver is a key component in automotive manufacturing and is increasingly used in internal combustion engine vehicles (ICE); autonomous vehicles (AV), electric (EV) and even photovoltaic (PV) technologies, that are creating new applications for silver in automotive fabrication, driving future demand.

Nearly all electrical connections in a modern automobile are outfitted with silver-coated contacts. Starting the engine, opening windows, adjusting seats and closing a trunk each use silver membrane switches. Silver is also crucial to infotainment systems, window defogging, heated seats, and luminescent displays. Extending beyond established automotive features, AV and EV technologies employ silver in the complex electronic circuitry. Automotive manufacturing used approximately 50 Moz (1,555 t) of silver in 2017, up 5% from the year before.

While physical demand is likely to remain at approximately one billion ounces for the foreseeable future, automotive use, on the other hand, is expected to increase its market share in coming years, contributing up to 14% of total physical silver demand by 2040. Premium and newer models – those outfitted with more “features” – tend to contain more silver than economy models because they require silver switches and relays. It is estimated that up to 60 relays are employed in a luxury car today, compared to around 30 in a basic model.

Growth in silver demand will be motivated by increasing auto sales, particularly in developing countries, and the rise of new technology. Although EVs and hybrid electric vehicles (HEVs) currently comprise just 6% of new global automotive production in 2018, they will become much more prominent in the medium term, bolstered by national regulations that will curb ICE vehicle sales. Among the many countries proposing future bans on ICE vehicles are China and India, whose emerging middle classes are major drivers of global auto sales. China has proposed a ban on sales of new ICE vehicles by 2025, while India has announced plans to become 100% electric by 2030. EVs and HEVs are projected to account for over half of global automotive silver demand by 2040.

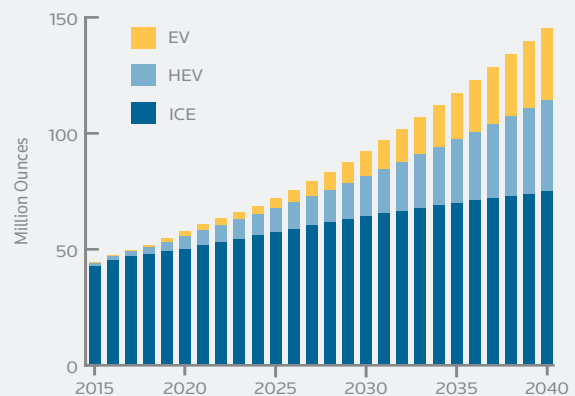
Silver is used in actuators in robotic and sensing applications, the technology behind autonomous driving. Although autonomous vehicles are often considered to belong to technology of the future rather than present, many vehicles use elements of autonomous technology today. Auto Emergency

Braking, which is referred to by different proprietary names by respective OEMs, for example, is a feature that alerts drivers to potential crashes and helps them use the maximum braking capacity. Such technologies will find wider application in the coming years as vehicle autonomy advances and proliferates.

PV technology will be another driver of silver in automotive. Although few EVs contain PV technology today, the technologies go hand in hand. Due to the scarcity of public charging infrastructure and an overlapping client base, particularly in the United States, many EV owners are opting to charge their cars at home using solar technology. In a survey conducted by CleanTechnica of over 2,000 EV owners in 49 of the 50 U.S. states, nine Canadian provinces, and 26 European countries, between 28-40% of respondents own at home solar panels depending on regional demographics. The rising popularity of one technology feeds demand for the other. Furthermore, future EV technology is expected to increasingly incorporate solar cells into the structure of the car. A few OEMs are currently experimenting with on-board solar panels that feed power to EV batteries and ex-powertrain features, particularly in China. Lightweighting and more advanced PV technology will push this application further.

Under pressure to cut costs, producers are experimenting with silver-coated copper and silver-coated nickel relays and contacts. Test alloys, however, have by and large failed to maintain the necessary acid resistance, conductivity, and/or stability at high temperatures. Thrifting – using less silver but not replacing it entirely – on the other hand, has been successfully implemented over the past decades in various applications. At the same time, declining use due to thrifting will be offset by new uses in advancing automotive technology.

SILVER DEMAND IN AUTOMOTIVE



Source: GFMS, Thomson Reuters, Silver Institute

TABLE 7 - SILVER FABRICATION: BRAZING ALLOYS AND SOLDERS (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	25.9	26.6	28.6	30.5	31.4	34.7	37.6	33.3	27.2	28.5
United States	7.2	5.2	5.9	6.0	5.3	5.7	5.8	6.0	6.1	6.2
Japan	3.9	2.5	3.7	3.5	3.0	2.8	2.5	2.4	2.3	2.7
India	2.2	2.2	2.6	2.7	2.4	2.1	2.6	2.5	2.5	2.5
United Kingdom	2.3	1.8	2.3	2.4	2.2	2.1	2.2	2.2	2.2	2.3
Germany	3.4	2.3	2.8	2.8	2.3	2.2	2.1	2.1	2.1	2.2
Canada	2.2	1.1	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.6
Russia	2.0	1.7	1.9	1.8	1.8	1.8	1.8	1.6	1.5	1.5
Italy	2.4	1.7	1.8	1.7	1.6	1.5	1.5	1.5	1.4	1.5
South Korea	2.6	2.1	2.3	2.4	2.2	2.1	1.9	1.5	1.4	1.5
Switzerland	1.4	1.2	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.3
Taiwan	1.2	1.0	1.2	1.3	1.2	1.2	1.1	1.1	1.1	1.1
Brazil	0.8	0.9	1.0	1.0	1.0	1.0	0.9	0.8	0.8	0.8
Mexico	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.7	0.6
France	0.8	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Australia	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5
Belgium	0.6	0.6	0.6	0.7	0.7	0.5	0.5	0.5	0.5	0.5
Spain	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Other Countries	1.2	1.0	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4
World Total	61.8	53.8	61.2	63.2	61.1	63.7	66.7	61.5	55.3	57.5

© GFMS, Thomson Reuters / The Silver Institute

commissioned in India increased 7%, which equals an average of 2,300 circuit kilometers installed monthly. While the usage of silver brazing alloys in the power transmission network is relatively low compared to silver used in power distribution, as expansions in infrastructure for power distribution increases, we should see stronger growth in demand for silver brazing alloys as well.

We expect that fabrication demand will revive by the second half of this year and will post stronger growth for the next few years, driven by the government's incentive to introduce protectionist measures, such as imposing higher import tariffs, in order to support Indian producers.

Domestic silver nitrate production fell 20% last year due to a drop in exports. Nevertheless, its usage in the pharma industry continued to progress with some of the mainstream fabricators indicating the growth was at an average 5% for the domestic market last year.

Demand for silver in the food and health industry remained strong due to stable prices and increased consumer expenditure on lifestyle expenses.

Silver used in the photovoltaic (PV) market is still nonexistent in India with the subcontinent importing their

entire panel and silver paste requirements. We estimate that approximately 15 tons of silver paste were imported by PV cells manufacturers in India last year. The government pushed through high tariff barriers to encourage the manufacturing of PV cells in India. However its is unlikely this will encourage silver powder fabrication in India due to higher production cost.

PHOTOGRAPHY

- ***Demand for silver used in photographic applications declined by 3% last year to an estimated 44.0 Moz (1,367 t).***

Global photographic demand for silver retreated by just 3% in 2017, falling to 44.0 Moz (1,367 t), the lowest level in our series, which began in 1990. Despite the modest fall it would appear that the market has stabilized, only declining marginally in the last few years; the bulk of structural change in the photography market is now behind us and current fabrication volumes may be largely sustainable moving forward. Indeed there are even reports of growth in certain segments of the industry that may finally see a reversal in a long term down trend.

Before moving onto new developments in this industry, it is worth highlighting the importance that this sector

TABLE 8 - SILVER FABRICATION: PHOTOGRAPHIC USE (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
United States	28.1	23.4	20.2	17.9	16.8	16.0	15.3	14.8	14.2	13.7
Belgium	23.5	18.6	17.4	15.5	14.4	13.6	13.5	13.3	13.3	13.3
Japan	29.2	19.6	15.0	13.2	9.7	9.5	9.3	8.8	8.4	8.2
United Kingdom	9.9	8.6	9.0	9.4	8.4	7.4	6.7	6.5	6.2	6.0
China	3.7	3.1	2.6	2.4	2.2	1.9	1.8	1.6	1.5	1.4
Russia	1.8	1.5	1.4	1.2	1.2	1.1	1.1	1.0	1.0	0.9
Brazil	1.3	1.0	1.4	1.2	1.1	0.5	0.3	0.2	0.2	0.2
India	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.1
Czech Republic	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Australia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
World Total	98.2	76.4	67.5	61.2	54.2	50.5	48.5	46.6	45.2	44.0

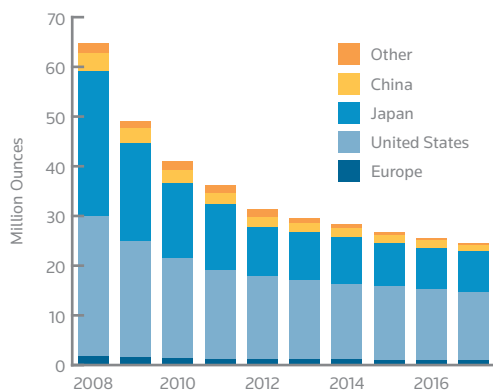
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previously played within the global silver market and the impact the digital revolution played in the demise of this sector. Within just the last decade, demand from this segment has fallen by 55% or 54.2 Moz (1,687 t). In 2017, photography’s share of total silver physical demand stood at just 4%, compared to 9% in 2008, with photography’s share in 1980 exceeding 50% of total demand. The rapid decline in the use of silver in this segment has almost entirely been the result of the shift to digital applications, with this technology superseding the use of silver halide in most of the key demand segments, most notably consumer cameras and paper to lithography, cinema film, and medical applications (X-ray). The greatest impact the digital age has had on silver demand has been the downfall of consumer film and paper with both segments sliding precipitously following, firstly, the introduction of digital cameras, and then more recently, the introduction of cameras on cell phones. Demand from

the medical/healthcare system also experienced a radical change as the market moved away from wet chemical silver halide X-ray to digital imaging. Despite the migration away from analogue systems in the industrialized world many years ago the rapid improvement in health care in the developing world has seen demand for traditional X-ray (due to the lower cost) partially offset declines elsewhere.

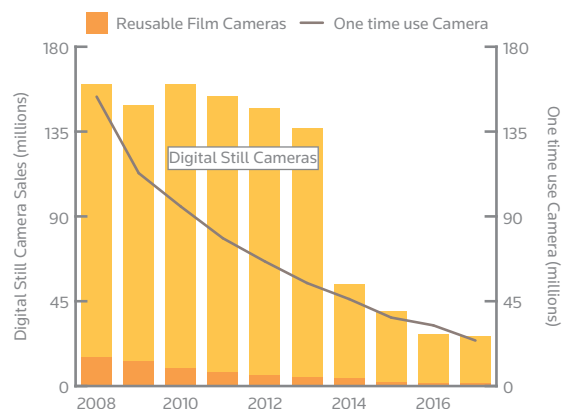
While the demise of the photographic industry is well known, this report hopes to highlight new areas of demand in this sector that may deliver gains in the future. One such area that is enjoying a renaissance is instant cameras. Companies such as Polaroid, Fujifilm, Lomography, and even HP have entered or re-entered the space over the past few years, to both critical and financial success. According to The NPD Group, instant print cameras saw U.S. dollar growth of over 30% in 2017 and sold 2.7 times more units than digital point-and-shoot cameras. This migration back

WORLD PHOTOGRAPHIC FABRICATION



Source: GFMS, Thomson Reuters

DIGITAL AND FILM CAMERA SALES



Source: Photofinishing News Inc.; GFMS, Thomson Reuters

to retro products is also filtering through to consumer film as younger generations who have only known a digital world are dabbling in 'old school' photographic. Companies like Kodak, Fujifilm and Harman Technology, which manufactures the popular Ilford Photo black-and-white films, have been experiencing a comeback as new users are introduced to this medium. Another growth area we have touched on previously and continues to gain traction is touch screen flexible mesh technology where silver is increasingly (from a low base) being used as an alternative to indium tin oxide (ITO) in smart phones, tablet PCs, notebook PCs, and vehicle navigation systems. Silver nanowire transparent conductors are also key elements in many other devices, especially the optoelectronic devices such as LCDs, LEDs and flexible displays.

Japanese photographic demand eased 3% in 2017 to reach 8.2 Moz (254 t). The modest declines in recent years suggest the domestic market has broadly stabilized and the worst of the falls are now behind us. As mentioned above demand for instant cameras has boosted film demand with Fujifilm's Instax instant cameras continuing to surge. Having launched several new versions last year, including a new square format, sales have enjoyed impressive gains. Indeed, Fujifilm reported a 76% year-on-year surge in operating income from its image business in its Q3 financial report, thanks to strong demand for its Instax cameras and film.

In the **United States**, photographic demand fell by 4% to reach 13.7 Moz (427 t) last year, a similar contraction to the previous year. Demand for both photographic film and color negative paper maintained the downwards trend

declining in 2017 retreating 11% and 15% respectively, with these losses partially offset by a more tempered decline in the medical sector and rapid growth of instant cameras, especially among the millennial generation.

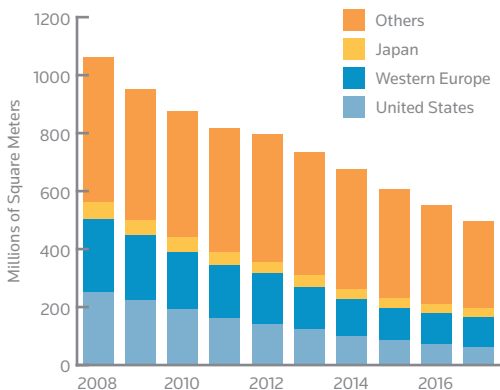
European demand was only marginally weaker in 2017, declining 1% year-on-year to an estimated 20.3 Moz (632 t). The use of silver in photographic applications was one of the two sectors that continued to drag silver industrial demand lower (the other sector was ethylene oxide). Central to this has been ongoing weakness in demand for traditional consumer photographic applications. In addition, demand from the medical and graphics sectors slipped only at the margin. One area to highlight was growth in consumer photobooks, which can be printed directly from cell phones or other devices, with this boosting demand for photographic paper.

PHOTOVOLTAIC

- **Silver demand from the photovoltaic (PV) industry continued to rise in 2017, to a fresh record high of 94.1 Moz (2,926 t), up by 19% from the last year. China was the main contributor for the growth, accounting for more than a half of the new solar panel installations.**

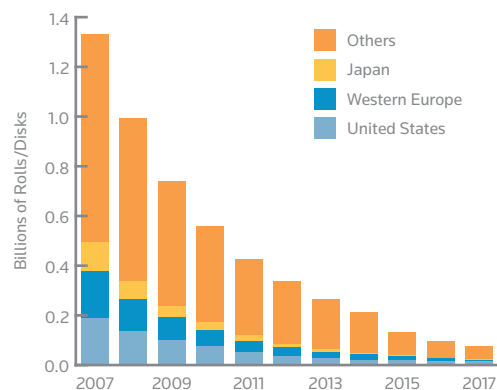
In 2017, silver demand from the PV industry continued to surge, largely due to the ongoing growth in annual solar panel installations in China. World installations are estimated to have increased to 94 GW, up 24% from 2016. Installations in China rose to 53.06 GW from 34.24 GW, up 55% year-on-year. The growth in China was mainly due to the increase in household installations of solar panels, up

WORLD COLOR PHOTOGRAPHIC PAPER CONSUMPTION



Source: Photofinishing News Inc.

CONSUMER & PROFESSIONAL FILM SALES



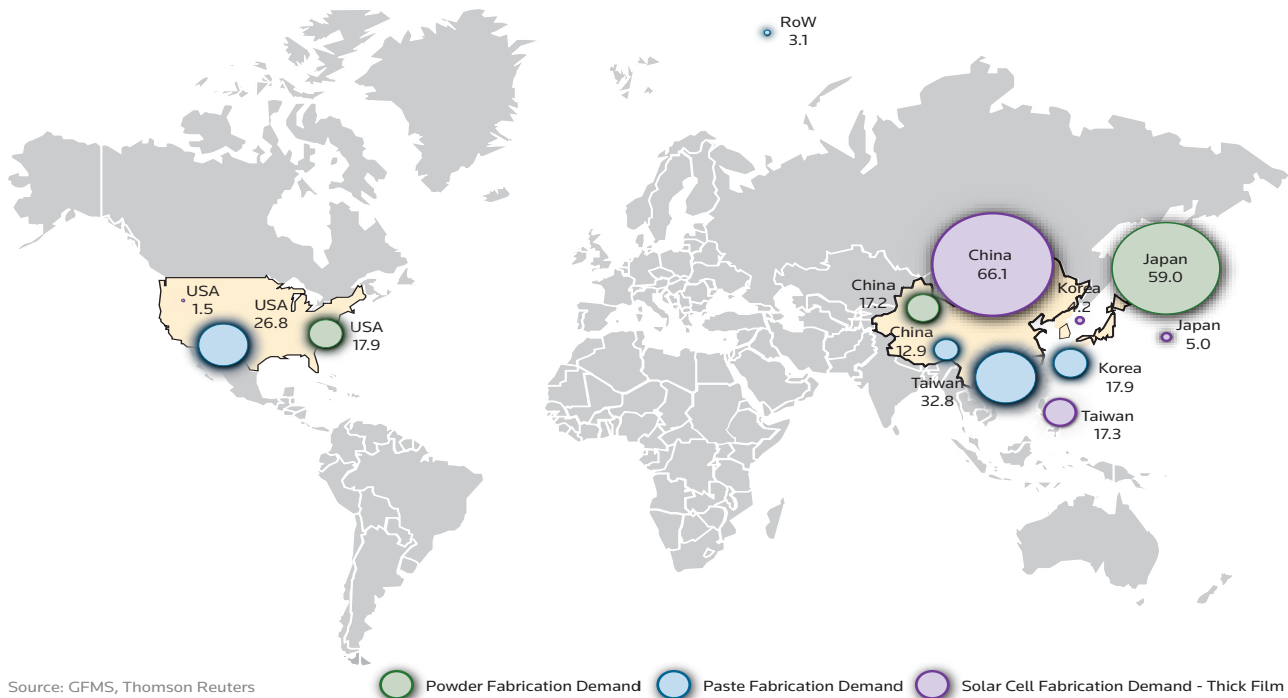
Source: Photofinishing News Inc.

by 370% year-on-year to hit 19.44 GW in 2017. India almost doubled its growth of new solar panel installation, to 8 GW last year. New solar panel installations in Europe gained 28% over 2016, with Turkey the biggest single contributor of 1.79 GW. Although new solar panel installations in the United States fell by 17% to 12.1 GW compared to 2016, it still contributed towards 13% of global installation in 2017.

The strong increase in household installations in China was in pursuit of the National Energy Administration's goal to add 110 GW of capacity between 2016 and 2020, with target capacity of household installation standing at 60 GW. Besides, households were keen to install the solar panels in order to enjoy government subsidies. Although part of these subsidies will not be eligible after 2017, the impact on the new solar panels installation is expected to be rather low in 2018 since the cost of installation has been declining. In 2017, the quoted price of solar module in China declined by 13% further after 32% dropped in 2016, which already offset the cut in subsidies. While the global solar market is forecast to increase in 2018, the United States is expected to experience a further decline due to the enactment of the Section 201 that is imposing a 30% of import tariff on imported modules after the first 2.5 GW.

Total silver demand from the industry is measured based on annual solar cell production, with no adjustments made

SILVER SUPPLY CHAIN IN GLOBAL PV INDUSTRY IN 2017 (MOZ)



Source: GFMS, Thomson Reuters

ESTIMATED SILVER POWDER PRODUCTION FOR PV BY COUNTRY

(million ounces)	2013	2014	2015	2016	2017
Japan	25.2	23.3	40.8	54.7	59.0
United States	29.1	22.3	10.7	14.1	17.9
China	1.7	6.2	7.7	10.5	17.2
World Total	55.9	51.8	59.2	79.3	94.1
..of which Frontside	36.3	36.3	44.4	64.1	71.3
..of which Backside	19.6	15.5	14.8	15.2	22.7

Source: GFMS, Thomson Reuters

for lead times. Production typically exceeds installations in a given year due to a range of factors, namely lead times, cell breakage, and overproduction to maintain cost competitiveness. Cell breakage is when cells break during the fabrication process or module assembly. It is unclear if these broken cells are recycled for materials value at present. Solar cell production was estimated at 96.8 GW last year, roughly 6% higher than installations. This margin remained stable compared to 2016.

Silver is mainly used in the form of paste on the front and back contact within a solar cell. Last year, an estimated 76% of silver demand was used in frontside paste while the balance was used in backside paste. This allocation compares to a 75/25 split in 2015 where the split in frontside was lower than in 2016, which was at 81%.

Production-weighted average silver loadings per cell are estimated to have remained stable at 0.13 grams. That said, the rate of technology improved last year, the impact of which will start to be felt in 2018. Last year's average industrial efficiency rate was 19%. It is expected that the efficiency rate will gradually increase in the coming years.

In the long-term, the improvement of efficiency rate will reduce the use of silver required to produce one watt of electricity, but is unlikely to have a noticeable effect in the short term due to the strong momentum in demand for solar energy and the time required to adopt the new technology in the commercial usage.

GFMS measures country-level silver demand from the PV industry at the first point of transformation, when silver is fabricated to make silver powder. Silver powder is then used to make silver paste, which is, in turn, loaded onto the solar cell. Over the past few years, as solar cell production grew exponentially in China, silver paste production migrated to China and Taiwan, where a combined 89% of solar cells are produced. Last year, the Chinese silver powder producers were in cooperation with the Japanese producers to establish new powder factories in China. It is expected that the quality of silver powder produced in China will become competitive to silver powder produced in foreign countries and therefore demand for foreign silver powder is expected to decrease.

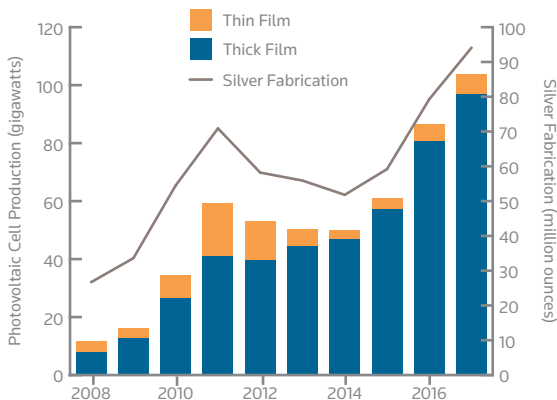
Silver paste used by the PV industry is mainly made in Taiwan, the United States, South Korea and China. About 80% of China's frontside silver paste requirements are imported, while Chinese paste producers are currently

able to fulfill all of domestic backside paste needs. In line with our expectations, in the last few years, this paste production started shifting to China.

It is expected that front side paste production will be transferred to China from Taiwan and the United States over the next few years, in order to reside closer to solar cell production facilities. At present, Taiwan and the United States account for a combined 64% of front silver paste production, while China accounts for 13%. Meanwhile, China accounted for 70% of global solar cell production last year.

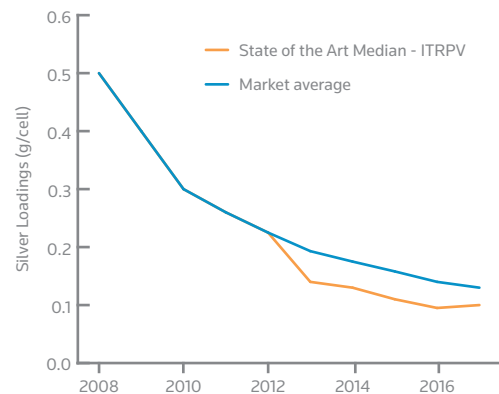
With a rapidly growing solar market, China has become a major solar modules producer that not only satisfies domestic needs, but also those of foreign markets. In 2017, China exported 37.9 GW of solar modules, up by 78% compared to 2016. In the fourth quarter of 2017, in an effort to avoid the tentative import tariff on solar modules in the United States in 2018, quantities exported soared significantly compared to the previous three quarters. After the imposition of tariffs, it is expected that the share of the U.S. market will be absorbed domestically and by other countries such as India, South America and South East Asia.

SILVER PHOTOVOLTAIC FABRICATION



Source: Solarbuzz; Earth Policy Institute; ITRPV; GFMS, Thomson Reuters

SILVER LOADINGS IN PHOTOVOLTAIC CELLS



Source: GFMS, Thomson Reuters; ITRPV

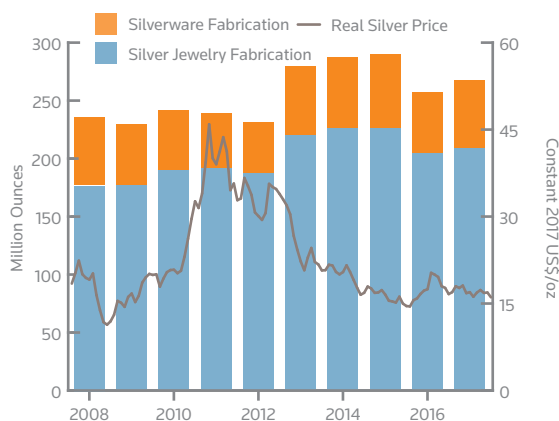
8. JEWELRY & SILVERWARE

JEWELRY

- **Global jewelry fabrication returned to growth in 2017, rising 2% to 209.1 Moz (6,503 t), with India accounting for the bulk of the rise in volume terms.**
- **Indian jewelry fabrication jumped 7% last year to 66.2 Moz (2,059 t), boosted by stocking ahead of the introduction of a Goods & Services Tax (GST) midyear, and lower prices.**
- **Chinese fabrication recorded another decline in 2017, slipping 5% to 26.7 Moz (830 t), driven lower by economic pressures and changing consumer trends.**

Global jewelry fabrication returned to growth in 2017, after slipping 10% the previous year from a record high in 2015, rising 2% year-on-year to an estimated 209.1 Moz (6,503 t). The rise last year was largely attributed to strong performances in India, which increased 7% over 2016 volumes, but remained 9% below the record level recorded in 2015. Fabrication demand picked up sharply in North America, with offtake in the United States enjoying a 12% rise to an all-time high while Mexico also recorded a healthy increase. Demand in Europe was mixed, but as a whole delivered a 2% annual increase, boosted primarily by a 5% increase in Italian fabrication. A similar pattern emerged across South East Asia, with both China and Thailand retreating last year, by 5% and 9% respectively, but there were several markets in the region that enjoyed solid gains, most notably Vietnam and Indonesia.

WORLD JEWELRY AND SILVERWARE FABRICATION



Source: GFMS, Thomson Reuters

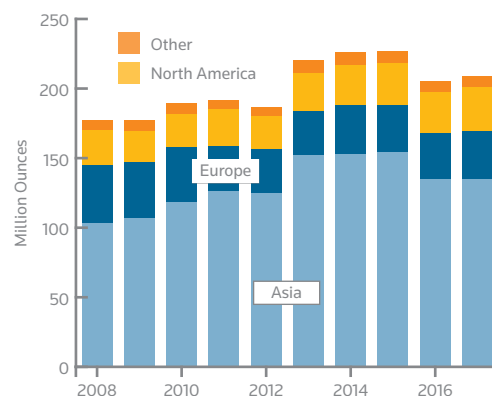
EUROPE

Jewelry fabrication in **Europe** recovered by 2% in 2017 to an estimated 33.9 Moz (1,054 t), following two consecutive years of declines. To put this in historical context, the European share of global jewelry fabrication slipped to 16% last year, compared to 25% a decade ago. Last year's recovery was largely driven by an increase in Italian fabrication, the largest jewelry manufacturer in the region, accounting for over half of European jewelry production. Excluding Italy from the regional total reveals that fabrication in the rest of the region slipped by 1%, with most of the key markets posting year-on-year falls.

Silver jewelry fabrication in **Italy** increased by 5% year-on-year to an estimated 19.0 Moz (590 t), which was the highest level since 2010. Last year's growth was, to a large extent, a function of higher exports, as the bulk of Italian production is destined for foreign markets. That said, anecdotal evidence suggested that performance in the local market slightly improved as well.

Official trade figures showed that Italian jewelry exports for the January to November period jumped by 7% compared to the same period a year ago, after posting a 4% year-on-year decline in 2016. It is interesting to note that shipments to the United States, the largest export market for Italian jewelry, slipped by 2% over the eleven month period. This was largely due to a gradual shift in local jewelry consumption towards gold, supported by improved economic conditions, jobs growth and higher disposable

WORLD JEWELRY FABRICATION



Source: GFMS, Thomson Reuters

incomes. This has also been supported by gold jewelry trade statistics, which showed an increase of 6% in Italian gold jewelry exports to the United States over the same period, although volumes are substantially lower compared to silver jewelry.

Interestingly, silver jewelry exports to the United Arab Emirates (UAE) rebounded by 22% for the period from January to November last year. It is worth adding that the UAE accounted for just 6% of total Italian silver jewelry exports in 2017. Given the UAE's historical affinity to gold and its role as a trading hub for India, the Middle East and North Africa, last year's rebound was likely a reflection of higher demand from these markets. Indeed, last year saw an increase in Indian jewelry demand, helped by a favorable monsoon season in both 2016 and 2017 and lower prices in local terms. Exports of silver jewelry directly to India surged by 29% over the eleven month period, although it represents only a small portion of total Italian exports.

Hong Kong, which accounted for 10% of Italian silver jewelry exports in 2017, was another market to register positive growth, with shipments rising by 9% over the January to November period. Improving local consumption saw exports to Poland and Spain rise by 8% and 5% respectively, while Russia's slightly improved economic sentiment and a relative stabilization of the rouble saw jewelry exports to this country rebound by 11% in the first eleven months of 2017, following sharply lower volumes over the past two years. On the other hand, exports to France and Germany eased by 9% and 4% over the period.

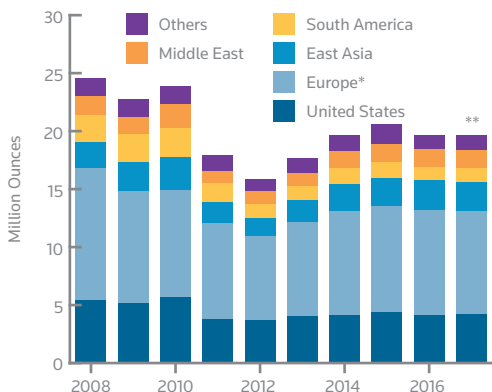
Turning to jewelry demand in Italy, silver continued to outperform gold thanks to its relative affordability, particularly at the lower end of the market, and its sustained popularity among younger consumers. That said, absolute volumes remain pretty limited and Italian jewelry fabrication continues to be driven by foreign demand.

Silver jewelry fabrication in **Germany** declined by 3% last year, to 3.0 Moz (93 t), as local demand continued to suffer from ongoing competition from alternative materials and other consumer goods such as electronic gadgets. In addition, local fabricators continue to face growing competition from manufacturers in the Far East, such as Thailand and China. **Turkish** silver jewelry fabrication rose marginally in 2017 reaching 4.3 Moz (136 t), however growth has been tempered by a soft domestic market due in part to the weakness in the lira and raging inflation. The weakness in the local currency has benefited exporters with this sector enjoying a 5% annual rise. Moreover a 22% rise in the domestic gold price encouraged migration to silver, especially for gemset fashion jewelry.

Silver jewelry fabrication in **Russia** slipped by 5% in 2017, to an estimated 1.9 Moz (60 t). While fabrication volumes continued to decline, last year recorded a somewhat better performance compared to double-digit percentage falls in the previous two years. This was driven by improved economic conditions, as the Russian economy rebounded in 2017 after two consecutive years of negative growth, as well as markedly lower prices in rouble terms, down by 13% year-on-year. It is worth adding that, with improved consumer sentiment and purchasing power, gold jewelry fabrication posted positive growth last year for the first time in four years. In addition, imports of silver jewelry increased in the January to November period, following sharp falls in the past two years.

Last year saw silver jewelry fabrication in the **United Kingdom** recover by 2% to an estimated 0.3 Moz (9 t), after dropping 11% in the prior year. This was thanks to improving local consumption, helped by relatively stable economic conditions and a modest recovery in the British pound during the year, with the latter putting pressure on the local silver price, which rose by 4% in 2017 on an annual average basis as opposed to a 24% rise in 2016. It is worth adding though that local fabricators continued to face growing competition from imported branded silver jewelry such as Pandora as well as alternative materials.

ITALIAN JEWELRY EXPORTS



* including Turkey and Russia; ** Jan-Nov 2017
Source: GFMS, Thomson Reuters; Eurostat

French silver jewelry fabrication continued to weaken last year, slipping by 2% to an estimated 1.6 Moz (48 t). Despite better economic conditions, consumer demand remained broadly flat. Retail sales of foreign branded silver jewelry continued to perform well thanks to more aggressive promotion and advertising campaigns, while local branded and non-branded silver continued to face headwinds.

NORTH AMERICA

North American jewelry fabrication rose 9% to 31.7 Moz (987 t) last year, driven by both **Mexico** and the **United States**, North America’s largest markets. Jewelry fabrication is actually almost equally divided between these two countries; **Canada** plays a very minor role. Unsurprisingly, the U.S. and Mexican markets are very much interwoven. Mexico has an advantage based on more competitive labor costs, while the United States is the larger market when it comes to domestic consumption. Indeed, although both markets trade substantial amounts of silver jewelry with each other, the United States is Mexico’s biggest export partner, representing 63% of the total last year, or approximately 0.5 Moz (14 t) on a net-export basis. Mexican imports of silver jewelry, however, are far more evenly distributed amongst a range of countries from Europe, Asia and North America. Compared to 2008, Mexican exports have literally collapsed from as much as 3.3 Moz (102 t) to as little as 0.8 Moz (25 t) in 2017.

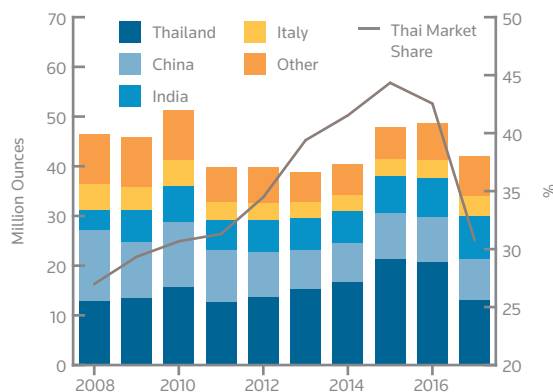
Last year the country was only modestly a net exporter of silver jewelry to the tune of 0.1 Moz (4 t). Mexican jewelry fabrication, however, has managed to increase moderately over the years indicating that the domestic market was

able to absorb some of the extra silver jewelry. Mexican jewelry fabricators face a tough conundrum. On the one hand they could go down the route of appealing to the domestic consumers who favor the more traditional designs with religious themes and advocate these typical Mexican style designs abroad. The downside is a tougher sell to the international consumer as they seem to favor a more trendy design mix with universal elements.

Jewelry fabrication in the United States also rose by an estimated 12% to 15.9 Moz (494 t) last year. Silver jewelry imports fell 29% and exports rose 46% indicating that domestic consumption slowed compared to 2016. The rise in silver jewelry fabrication can be explained by more consumers buying domestically fabricated products and less from foreign sources. Pandora, which crafts the majority of its jewelry from silver, indicated a continued challenging environment in the United States at the same time outlining a strategy focused on an increased presence in Latin America in the coming years.

According to a study conducted by the Silver Institute, 59% of U.S. retailers reported increased sales in 2017, with average store growth of 17%. Silver also topped the list with regards to retail margins, which were particularly strong during public holidays. Silver jewelry contributed on average around one fifth to the revenue of retailers interviewed in the survey last year. Silver jewelry remains an affordable fashion item, particularly popular under the younger crowds who are in many instances unable to afford gold jewelry. Indeed, according to the Silver Institute retail study, approximately 95% of silver jewelry purchases were conducted on price points below \$500. It is, based on their findings, the ultimate female self-purchase item.

U.S. OFFICIAL SILVER JEWELRY IMPORTS



Source: GFMS, Thomson Reuters

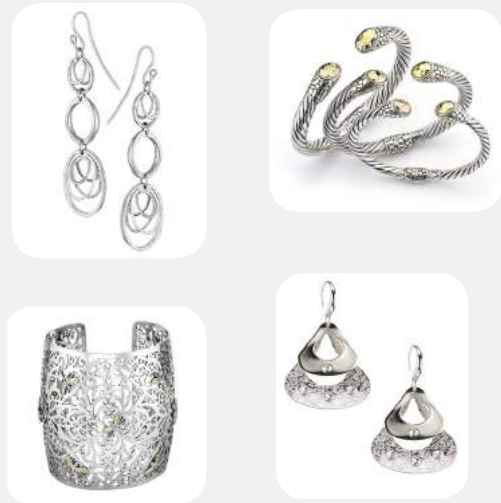
The methods of jewelry purchasing are slowly changing. Not all consumers visit a store. Various major fabricators have indicated that online sales of jewelry items are steadily rising, not just those of silver. Buyers seem to be better informed these days and like to be more engaged in a pre-buying process where they select and compare items online before paying the brick and mortar store a visit. In addition, retailers are experimenting with augmented reality in the pre-buying process and more customization, which charges a premium and offers more unique designs that seem to particularly appeal to the millennials.

SILVER JEWELRY – ADAPTING TO CHANGE

The health of the economy, especially across the industrialized world, has a significant impact on consumer spending and with regards to the silver market, the willingness of consumers to spend on discretionary items. The stronger economic backdrop last year, coupled with improving consumer sentiment, was certainly a factor in the impressive 12% year-on-year gain in jewelry fabrication in the United States and indeed across the advanced economies worldwide. However it is not as simple as opening the doors and waiting for customers to stroll in. Indeed, fabricators, wholesalers, and retailers alike, need to adapt to changing market forces; be it the range of designs, retail price points, or even the method of sale.

Jewelry sales in the United States, and indeed broadly across the industrialized world, have traditionally been conducted out of standalone independent retailers. Higher rents and falling foot traffic have seen many retailers turn to e-commerce as a means of remaining relevant to a changing consumer base and to reach a wider audience. While e-commerce continues to capture only a fraction of the overall consumer retail market (13% of 2017's \$3.5 trillion total adjusted U.S. retail sales), e-commerce punches above its weight contributing to 49% of the sector's year-over-year growth, according to data published by the U.S. Commerce Department. The lower price point of silver jewelry lends itself to on-line selling as the perceived risk is modest with demand rising exponentially in recent years. Both new and established brands are increasingly harnessing the internet and social media to go "direct-to-consumer" in order to meet this expanding demographic.

Of course adapting to change is not just limited to western markets. India dominates global silver jewelry fabrication at over 30% of total offtake. While still a very traditional market in terms of cultural designs and style, the market is rapidly evolving to meet the changing needs of modern consumers. Significant investment has taken place so that fabricators can now produce more intricate and higher margin items to meet the needs of the rapidly increasing standalone silver retail outlets that are emerging in urban areas. Whether it is a retailer on the high street in New York or in a shopping district in Agra, India, the industry is adapting to new market forces. It would seem the silver market is well ahead of the curve and it will be consumers that benefit from this early adoption and willingness to change.



Clockwise from top: Sterling silver earrings by **Thistle & Bee**, Sterling silver bracelets by **Samuel B.**, Earrings in sterling silver by **Frederic Duclos**, Sterling silver cuff by **Phillip Gavriel**.

AFRICA

Despite a more robust economic outlook, **Egyptian** jewelry fabrication remained moribund due to higher domestic prices with inflation averaging 23.5% for the full year. Fabrication volumes dipped 7% to an estimated 0.6 Moz (19 t), a six-year low. Egypt's tourist trade, which is vital for the domestic economy, has not fully recovered since the 2011 uprising with foreign investors and tourists still keeping their distance. The pound's devaluation in November 2017 saw the Egyptian currency lose about half its value, driving prices higher and pushing many discretionary items out of reach for many. There was some migration to silver from gold with consumption of the former continuing to fall due to the higher price environment.

ASIA

China's silver jewelry fabrication registered a fourth consecutive year of decline in 2017, though it appears fabrication is stabilizing. Chinese silver jewelry peaked in 2013, when our estimated volume reached 62.9 Moz (1,955 t). After falling 17% in 2016, silver used in jewelry fabrication fell 5% in 2017 to 26.7 Moz (829 t), which represents a 58% cumulative drop since the peak. The perceived stabilization of the Chinese silver jewelry industry can be attributed to several factors. First, the continual progress of the Chinese economy has stimulated domestic consumption as GDP grew 6.9% in 2017, compared to 6.7% in 2016 with growth accelerating again for the first time in seven years.

Second, as we have outlined in the past, increased consolidation has tackled the issue of overcapacity of silver jewelry fabrication in the country. Softening demand in recent years and a reduction in available credit facilities provided by the banks, resulted in bankruptcies across the industry. After several years of industrial consolidation, many players with inadequate capital filed for bankruptcy. The remaining companies left had to share the entire market (though the actual size of the market has considerably contracted as well compared to its peak). This is also supported by a rise in fabrication fees.

Similar to the gold jewelry industry, silver jewelry fabricators have also shifted their focus from traditional pieces to higher margin products. Demand for bracelets, the more traditional silver jewelry items, have been in decline since 2015. Since the silver content in a bracelet is relatively high compared to other silver jewelry, the drop in bracelet demand has been dragging down silver consumption for the entire industry in recent years. On the other hand, fabricators have been focusing on producing higher margin products that come with more sophisticated designs and higher qualities, like the increased use of rhodium (in liquid form) on silver jewelry to counter oxidization. These items are usually sold by piece or by weight. High-end silver jewelry also lends itself well to be used in combination with pearls and crystals, to offer a more elegant look and attract high-end consumers.

In general, the market reception towards high margin silver jewelry has been quite positive, and more importantly, consumers are willing to pay more for higher quality. The fabrication charge of many jewelry fabricators almost doubled in 2017 year-on-year, as higher quality jewelry can demand a higher premium compared to more traditional pieces. In addition consumers have been eagerly looking for something new in recent years.

Another trend that developed in recent years has been the notable increase in the purity of the silver used in jewelry. Products in 999 and 9999 purities have become very popular in the country, as consumers, particularly those in the rural areas, rightly believe that jewelry in higher purities is a better form of storing value.

While some jewelry fabricators stated that 2016 was the worst year for the industry since the peak in 2013, the silver jewelry market now looks to have formed a bottom in 2018. Last year can be characterized as a year of re-

stocking, following substantial destocking efforts, that even saw some fabricators suspend their entire production lines for a few months and shift focus to higher margin gold or platinum jewelry. Therefore, the restocking in 2017 pushed up demand for silver and we remain cautious on the outlook for 2018. In addition, the Chinese government has offered economic guidance, with a focus on deleveraging the financial system. The Chinese economy is targeted to grow at 6.5% in 2018 (compared to 6.9% in 2017). If growth decelerates, it may negatively affect discretionary spending and indeed jewelry consumption.

Indian jewelry fabrication increased 7% year-on-year to 66.2 Moz (2,058 t) in 2017. Gains were mainly attributed to stocking ahead of the Goods and Services Tax (GST), lower prices during the last quarter of the year and very strong consumer demand during the wedding season. Also a better monsoon season in 2016 and 2017 helped growth in disposable income in the agricultural sector resulting in higher net consumption of silver jewelry. On the fashion front, notable increases in demand for jewelry with greater art work, consisting of studded and enamel paintings, have been recorded last year. These items weigh usually more than 50 grams which is well above the industry's average of 30 grams in similar category.

If 2016 was a year of destocking and disinvestment, last year, on the contrary, was a period of restocking ahead of the implementation of the GST, which came into effect on July 1st 2017 at the rate of 3% on bullion, and 5% on any value addition. Given that margins at retail level for silver jewelry are at least 25%, the incremental tax increase didn't have a negative impact on consumer demand as jewellers could absorb the tax hike themselves.

The demonetization plan of high value currency notes, introduced in November 2016 has so far had a very positive impact on the fabrication industry, as it brings transparency in pricing and volumes handled. This was made possible by deploying the unaccounted funds to developing infrastructure. Major anklet (chain worn around ankle) fabrication areas like Rajkot, Agra and Salem, are going through a rigorous transformation process that aims to improve their organized trade, modernizes their facilities and allows fabricators to focus a lot more on introducing various designs also geared towards entering the export market to support local consumption offtake.

In terms of designs, the foremost change noted was the

increasing shift of consumer appetite towards children’s anklet silver jewelry with a 92% purity. Although this trend was not a widespread phenomenon in the anklet category in places like Agra and Rajkot, it was more popular amongst manufacturers in Salem and other branded silver jewelry manufacturers. Volumes are concentrated in urban consumers, which incidentally was not a function of high prices but due to lower availability and sale by on-line.

Demand for antique designs has been strong recently in addition to designs inspired from tribal Indians. This has a significant implication for volumes as the gram per piece is usually high; above 50 grams. Various designs have been made available across the segment, such as ear-drops, waist chains, waist-key chains, chokers, and necklaces of purity no less than 92%. The silver filigree work on these designs has made it lot more popular for daily wear but also as wedding jewelry. This influence is attributed to television soap operas, which are seen as a strong medium to popularize jewelry designs amongst women.

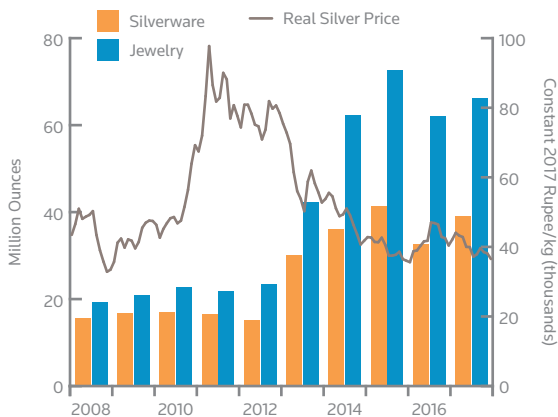
Thailand’s silver jewelry fabrication retreated 9% last year to an estimated 20.8 Moz (648 t), the second consecutive decline after a strong performance in 2015. Last year was in some regards a mirror image of 2016 with a significant proportion of the domestic market struggling for survival, while a handful of fabricators producing high-end branded product at least maintained their production volumes or in some cases surpassed them. However the performance of this segment of the market masks the true nature of an industry which continues to face stiff head winds that have left many smaller family run operations struggling for existence. Unwilling to invest in new machinery, and with

limited marketing budgets, many fabricators are choosing to exit the industry as cash flow pressures force them out. This is most notable at the lower end of the market (plain light-weight items) which historically has contributed to the bulk of Thai fabrication demand.

In the 2017 World Silver Survey we outlined the rapid expansion of the Danish company Pandora, the world’s largest jewelry manufacturer by production volume, which fabricates the bulk of their product range in Thailand and is easily the largest consumer of silver in the country. Not surprisingly they also account for a significant proportion of the export trade. The Denmark-based company’s Thai unit is in the Gemopolis Industrial Estate in Bangkok and they also commissioned an additional plant in Lamphun in the north of Thailand in early 2017, with another planned in the coming years, which they expect will continue to expand and build on new production categories such as necklaces, rings and earrings.

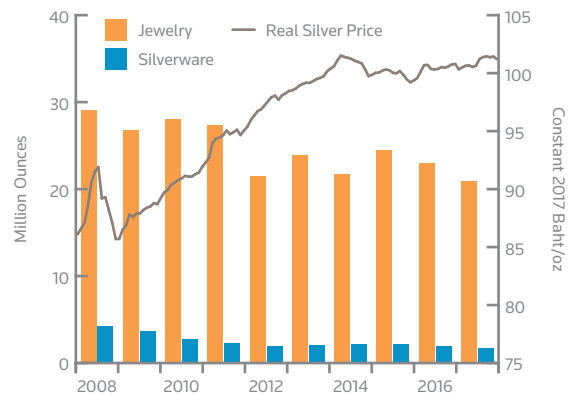
Last year its revenue exceeded Bt114 billion (US\$ 3.7 billion), a 15% increase compared with 2016. In addition to Pandora’s individual growth a number of higher-end fabricators are also benefiting from this rapid expansion as some specialized manufacturing is currently being outsourced. This has helped stave off weakness from the domestic sector and in some cases has actually boosted annual fabrication volumes for some, but very few domestic fabricators have the finishing quality and technology required to meet the Pandora standard. They have also voiced concern that this arrangement may only be temporary as Pandora may bring these tasks back in-house once they have completed their capacity expansion.

INDIAN JEWELRY AND SILVERWARE FABRICATION



Source: GFMS, Thomson Reuters

THAI JEWELRY AND SILVERWARE FABRICATION



Source: GFMS, Thomson Reuters

TABLE 9 - SILVER FABRICATION: JEWELRY (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Italy	22.6	21.3	21.8	16.5	15.1	15.9	17.8	18.4	18.1	19.0
Turkey	4.5	3.9	3.4	3.1	3.4	4.0	4.8	4.4	4.3	4.3
Germany	3.9	3.7	3.8	3.7	3.6	3.4	3.3	3.3	3.1	3.0
Russia	2.5	3.0	3.3	2.7	2.6	2.6	2.8	2.3	2.0	1.9
France	1.6	1.7	1.9	2.2	2.0	1.7	1.6	1.6	1.6	1.6
Spain	1.1	1.2	1.1	1.1	1.0	0.9	0.9	0.9	0.9	0.9
Poland	1.9	1.5	1.3	0.8	0.6	0.6	0.6	0.5	0.5	0.6
Greece	1.2	1.0	0.9	0.7	0.6	0.5	0.5	0.5	0.5	0.5
Sweden	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
United Kingdom	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Portugal	0.6	0.6	0.6	0.4	0.2	0.2	0.3	0.3	0.3	0.3
Denmark	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Switzerland	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Netherlands	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Norway	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	0.8	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.5
Total Europe	42.3	40.1	40.3	33.2	31.1	31.8	34.7	34.2	33.2	33.9
North America										
United States	12.0	10.7	12.0	11.1	10.3	11.2	12.3	12.7	14.2	15.9
Mexico	11.8	10.5	10.4	13.9	13.3	15.2	16.3	16.8	14.3	15.3
Canada	0.8	0.8	0.8	0.8	0.8	0.7	0.6	0.7	0.6	0.6
Total North America	24.6	22.0	23.2	25.8	24.3	27.1	29.2	30.2	29.0	31.7
Central & South America										
Brazil	1.5	1.7	1.9	1.5	1.5	3.0	2.8	2.1	2.0	2.2
Dominican Republic	0.9	1.5	1.4	0.9	0.9	1.3	1.4	1.5	1.4	1.4
Peru	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5
Colombia	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.3
Other Countries	1.3	1.4	1.6	1.3	1.3	1.7	1.6	1.5	1.3	1.2
Total C. & S. America	4.4	5.3	5.6	4.4	4.5	6.8	6.8	6.0	5.6	5.6
Asia										
India	19.3	20.8	22.7	21.8	23.3	42.3	62.2	72.5	62.1	66.2
China	36.1	40.0	46.4	54.4	56.6	62.9	46.7	33.9	28.1	26.7
Thailand	29.1	26.7	28.0	27.3	21.4	23.9	21.7	24.4	23.0	20.8
Indonesia	4.2	4.2	4.7	5.5	6.2	6.5	6.2	6.5	7.0	7.3
South Korea	4.1	4.2	4.7	5.2	5.4	5.5	5.0	4.8	3.8	3.4
Japan	2.0	2.1	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.3
Vietnam	1.2	1.2	1.4	1.4	1.4	1.4	1.5	1.6	1.8	1.9
Nepal	1.1	1.2	1.1	1.1	1.2	0.7	0.7	0.8	0.8	0.8
Cambodia	0.6	0.6	0.7	0.7	0.8	0.8	0.7	0.8	0.7	0.8
Bangladesh	0.7	0.8	0.8	0.8	0.8	0.5	0.6	1.1	0.8	0.8
Saudi Arabia	0.6	0.6	0.7	0.8	0.8	0.9	0.8	0.8	0.7	0.7
Malaysia	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.7	0.6	0.6
Israel	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4
UAE	0.5	0.5	0.6	0.7	0.7	0.8	0.7	0.7	0.4	0.4
Pakistan	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.5	0.3	0.4
Iran	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Philippines	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Taiwan	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2

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TABLE 9 - SILVER FABRICATION: JEWELRY (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sri Lanka	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.1	0.1	0.2
Bahrain	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Kazakhstan	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Uzbekistan	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Kuwait	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.5	0.4	0.4
Total Asia	103.4	106.8	118.1	125.9	125.1	152.4	153.0	153.7	134.8	135.3
Africa										
Egypt	1.3	1.2	1.1	0.5	0.7	0.8	0.9	0.8	0.7	0.6
Morocco	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2
Tunisia	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Other Countries	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
Total Africa	2.3	2.0	2.0	1.4	1.6	1.7	1.8	1.7	1.6	1.6
Oceania										
Total Oceania	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9
World Total	177.6	176.9	190.0	191.5	187.4	220.6	226.4	226.7	205.0	209.1

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On the domestic front, a stronger economic backdrop did not translate to stronger demand for silver jewelry. Economic growth last year was the highest since the military government took power in 2014. The death of the King in 2016 hung over the market as the year long mourning period impacted consumer spending, especially for luxury products. However, the tourism sector, which accounts for more than 10% of the country's economy, saw healthy growth and helped lift waning consumption levels.

Silver jewelry exports last year reflected the overall state of the market, gaining less than 1% on a gross weight basis. The United States remains the largest market for Thai fabricators, taking almost 40% of total volume with shipments to this key market enjoying a 22% increase according to customs data, while deliveries to Germany were marginally weaker. Flows to the United Kingdom picked up sharply, jumping 80% year-on-year and shipments to Australia were largely unchanged.

Jewelry fabrication in **South Korea** registered an 8% drop to a total of 3.4 Moz (107 t) in 2017. It was the fourth consecutive decline and a cumulative loss of 38% since the peak in 2013. While the economy and consumer sentiment are improving, the jewelry industry is still undergoing consolidation among the larger fabricators and sales of silver jewelry are still lagging. In addition, silver fabricators have been lowering silver content and weight in jewelry pieces in order to save costs to reduce sticker prices. As

the major consumers of this product segment are mostly younger generations in their 20s, they are more price sensitive and tend to pay more attention to fashion and designs than worry about the silver purity.

Indonesian silver jewelry fabrication enjoyed a modest rise in 2017 reaching 7.3 Moz (226 t), the third consecutive increase as the domestic market continues to develop. Although the export sector was weaker last year the acceptance of silver as an alternative to gold is helping to build the local industry. Following the introduction of standalone retail outlets in recent years, especially in the larger shopping malls, silver jewelry has gained market share. The lower price point is attractive to younger consumers who are looking for affordable fashion jewelry. Although the pace of the expansion has slowed the retail network is still expanding with a greater product offering catering to all price points. Those factories relying solely on exports had a challenging year with shipments to the United States weaker after a significant rise in 2016. Annual customs data is not available for the full year; but the limited data that is, points to a weaker sector, with shipments to the United States and Singapore providing the catalyst for weakness in this sector.

SILVERWARE

- **Global silverware fabrication jumps 12% in 2017 to an estimated 58.4 Moz (1,817 t) with a strong recovery in Indian demand accounting for much of the rise.**

Global silverware fabrication rebounded strongly in 2017, enjoying a 12% year-on-year rise to an estimated 58.4 Moz (1,817 t). India dominates this market segment at almost two-thirds of world demand and with a 19% annual increase last year due to strong consumer spending and additional retail outlets and this strong recovery easily offset falls in other regions. North America was another market to post solid gains last year but winners were few and far between, with Europe broadly weaker, slipping 3%, as falls in Russia and Italy dragged the total lower. In East Asia, Chinese demand looks to have nearly bottomed following precipitous falls in recent years due to the crackdown on corruption, which severely impacted gifting, retreating just 3% in 2017. Compared to the peak in 2013 output has now contracted 75%.

EUROPE

European silverware fabrication declined by 3% in 2017 to an estimated 9.2 Moz (286 t). This segment of the market has been in decline for many years, as offtake in most key markets suffered from a structural shift in gifting culture, driven by rapidly growing competition from other consumer goods such as electronic gadgets. In addition, a prolonged period of weak economic performance and high unemployment rates, along with rising silver prices, weighed on consumer demand in this sector. Silverware fabrication in **Russia**, the largest fabricator in the region with a share of 41% of the total, declined by 3% last year to an estimated 3.8 Moz (117 t). Demand in this sector continued to be affected by structural changes in consumer spending behavior, as well as affordability issues.

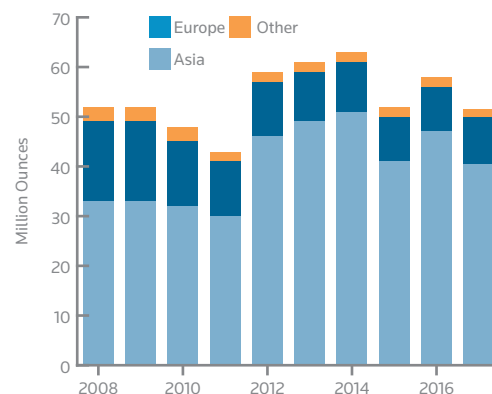
Silverware offtake in **Italy**, which accounted for roughly 17% of the European silverware market in 2017, slipped by 3% to an estimated 1.6 Moz (49 t). In addition to a long-running shift in local gifting culture away from heavyweight and costly silverware towards fashion accessories and electronic gadgets, export volumes continued to decline for the second year in a row.

Similarly, silverware fabrication in **Germany**, which accounted for 9% of Europe's total silverware offtake, recorded a year-on-year drop of 3%. Central to this was a continued lack of interest from the local market and weak performance from its key export markets such as Switzerland and the United States. **Turkish** silverware fabrication benefited from a stronger export sector in 2017, driven primarily by a rise in shipments to Israel. However, the domestic market remained constrained by a weak currency and double-digit inflation. Fabrication volumes are estimated to have slipped 4% last year to 1.4 Moz (41 t).

NORTH AMERICA

Silverware fabrication in **North America** rose 5% to 1.6 Moz (50 t) in 2017. Following years of steady decline the market found its nadir in 2012 at a low of just 1.3 Moz (40 t) before turning the corner. Since then, silverware fabrication in North America has been on a slow but steady increase, particularly supported by demand from the **United States**. Indeed, silverware fabrication rose 8% last year in the United States to 0.8 Moz (25 t). The United States is responsible for 53% of the continent's total, followed by **Mexico** with 36% and Canada at 11%. At the retail level, demand in both the United States and Mexico was also robust last year, with exports declining but imports and domestic consumption rising. Strengthening economic sentiment as well as some restocking at the fabrication level was pivotal to the improving silverware demand.

WORLD SILVERWARE FABRICATION



Source: GFMS, Thomson Reuters

TABLE 10 - SILVER FABRICATION: SILVERWARE (INCLUDING THE USE OF SCRAP)

(million ounces)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Russia	5.2	5.5	6.0	5.0	4.8	4.6	4.4	4.1	3.9	3.8
Italy	5.5	4.6	4.0	2.8	2.3	2.0	1.9	1.8	1.6	1.6
Turkey	2.2	1.8	1.5	1.3	1.1	1.2	1.4	1.5	1.4	1.4
Germany	2.3	1.6	1.6	1.4	1.1	0.9	0.9	0.9	0.9	0.9
Norway	0.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Sweden	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Greece	1.0	0.8	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.2
Denmark	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
United Kingdom	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
France	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Austria	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	0.7	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Total Europe	19.0	16.3	15.7	12.8	11.3	10.6	10.3	10.0	9.5	9.2
North America										
United States	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.8
Mexico	1.2	0.9	0.7	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Canada	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Total North America	2.3	1.9	1.6	1.4	1.3	1.3	1.3	1.4	1.5	1.6
Central & South America										
Colombia	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Peru	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	0.7	0.6	0.5	0.4	0.4	0.4	0.3	0.2	0.2	0.2
Total Central & South America	1.2	1.0	0.9	0.8	0.8	0.7	0.6	0.5	0.4	0.4
Asia										
India	15.5	16.6	16.9	16.6	15.2	30.0	36.1	41.3	32.6	39.0
China	8.7	6.9	7.6	8.3	8.6	10.0	6.1	3.4	2.4	2.4
Thailand	4.3	3.7	2.7	2.2	1.9	2.0	2.2	2.1	1.9	1.7
Israel	1.3	1.1	1.0	0.7	0.6	0.7	0.8	0.9	0.8	0.9
Iran	1.4	1.2	1.2	1.0	0.9	0.9	0.8	0.8	0.8	0.8
Bangladesh	0.7	0.7	0.6	0.6	0.5	0.4	0.4	0.5	0.4	0.7
Indonesia	0.6	0.7	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.3
Pakistan	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.4	0.3	0.3
South Korea	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.3
Cambodia	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Saudi Arabia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Countries	1.3	1.1	1.1	1.0	0.9	0.8	0.8	0.8	0.5	0.5
Total Asia	35.5	33.5	33.2	32.2	30.2	46.3	48.6	51.2	40.7	47.0
Africa										
Africa	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Africa	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Oceania										
Australia	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Total Oceania	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
World Total	58.4	53.2	51.9	47.5	43.8	59.3	61.2	63.2	52.4	58.4

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ASIA

Indian silverware fabrication increased 19% year-on-year to 39.0 Moz (1,212 t) in 2017. This is largely attributed to a rise in demand from new regional and national chain stores. In addition, in order to increase visibility and enhance the value of their products, some of the major fabricators are establishing a solo practice in key consuming centers. Silverware demand, which is highly income elastic, was strong last year driven by robust consumer spending. In addition to solid domestic demand, exports of silverware reported stable growth too, primarily to the Gulf countries and the United States.

Some of the fabrication regions that posted strong growth in India were Kolhapur, Bangalore and Tenali which are primarily into manufacturing utensils. The retail markup for these items is generally 35% and higher. Bangalore is seeing a faster growth in fabrication of articles with a purity of 92% and above. With respect to silver utensils, there was a gradual shift towards light weight western designs last year which also has become the norm for corporate gifting. The mark-ups here are higher than the traditional material due to the aesthetic finishes. In addition, silver articles with filigree work, purchased for show piece items increasing in popularity.

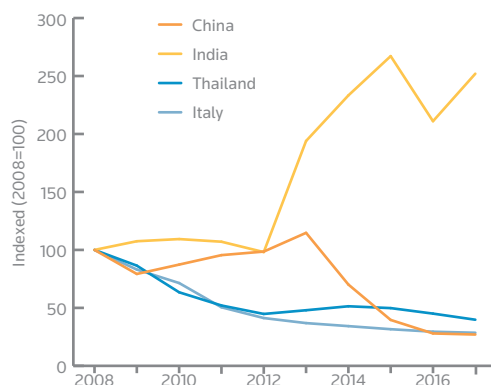
In 2017, **China** silverware retreated by just 3% to an estimated 2.4 Moz (73 t). While this was the fourth consecutive decline the modest fall suggests that this market is now close to finding a floor after slumping by an average 37% per annum during the previous three years. This severe contraction was largely the result of the

crackdown on corruption by government authorities with gifting, both silver and gold, severely affected from the closer scrutiny. Compared to the 5% decline in silver jewelry demand, silverware performed slightly better as demand recovered moderately in the second half of 2017 due to the improved Chinese economy and stronger consumer spending. Moreover, the marketing of online platforms also helped the sales of silverware although customers are only willing to purchase items under certain price levels given the lack of physical access to the real products.

A 3% dip in the local silver price last year failed to arrest the decline in **Thai** silverware fabrication, which retreated 12% to an estimated 1.7 Moz (53 t). The decline, the third in succession, saw offtake slip to a record low as both domestic consumption and the export markets suffered losses. On the domestic front, Thailand's gross domestic product grew an inflation-adjusted 3.9% in 2017, up from 3.3% the previous year, marking its fastest expansion since 2012 but this failed to translate to higher demand for silverware. As seen in the jewelry market, higher labor costs and a shrinking market have seen many smaller family run operations exit the industry. Demand in the fourth quarter, typically the peak tourism period, picked up following the funeral of the long serving King with many consumers reluctant to be seen spending or socializing publicly during the official one-year mourning period. Following the funeral, retail sales rebounded across all sectors with silverware offtake noting a moderate recovery. Exports were markedly weaker, falling more than 50% according to custom data, with flows to Brunei and the United Kingdom experiencing declines of over 20% in 2017.

Silverware production in **Israel** rebounded 8% in 2017 to an estimated 0.9 Moz (28 t), a seven-year high. Demand in 2017 was boosted by stronger consumption from Israel's key market, the United States, particularly for Judaic products with stronger demand across the year leading to a robust finish during the lead up to Hanukkah in December. The improved economy and increased stock building across the supply chain in the United States helped offset a modest fall on the domestic front in Israel, where demand is declining among the younger generations. While an important part of their religious traditions, younger locals are turning to lighter items or even plated menorahs and other religious articles. In addition, cheaper imports from Turkey are also impacting local production volumes with domestic fabricators losing market share.

MAIN GLOBAL SILVERWARE FABRICATORS



Source: GFMS, Thomson Reuters

9. APPENDICES

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APPENDIX 1

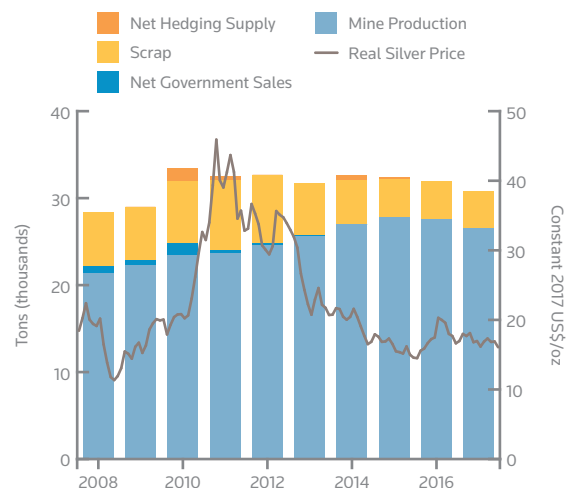
WORLD SILVER SUPPLY AND DEMAND

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Supply										
Mine Production	21,297	22,312	23,422	23,587	24,625	25,607	26,993	27,841	27,638	26,502
Net Government Sales	949	486	1,375	374	229	245	-	-	-	-
Old Silver Scrap	6,242	6,239	7,066	8,123	7,894	5,941	5,145	4,387	4,347	4,296
Net Hedging Supply	(269)	(541)	1,569	381	(1,464)	(1,081)	521	244	(589)	44
Total Supply	28,218	28,495	33,431	32,465	31,284	30,712	32,659	32,472	31,396	30,843
Demand										
Jewelry	5,524	5,502	5,909	5,956	5,828	6,862	7,041	7,050	6,376	6,503
Coins & Bars	6,154	2,951	4,675	6,615	4,967	7,500	7,281	9,086	6,462	4,699
Silverware	1,818	1,654	1,613	1,476	1,363	1,844	1,903	1,967	1,628	1,817
Industrial Fabrication	19,966	16,427	19,715	20,575	18,664	18,804	18,548	18,141	17,942	18,632
...of which Electrical & Electronics	8,451	7,072	9,367	9,044	8,295	8,274	8,208	7,652	7,274	7,554
...of which Brazing Alloys & Solders	1,924	1,674	1,905	1,965	1,900	1,981	2,073	1,912	1,721	1,790
...of which Photography	3,054	2,377	2,098	1,905	1,687	1,569	1,508	1,448	1,405	1,367
...of which Photovoltaic*	-	-	-	2,359	1,809	1,739	1,611	1,840	2,468	2,926
...of which Ethylene Oxide	231	148	272	194	148	239	154	317	317	214
...of which Other Industrial	6,307	5,156	6,073	5,108	4,824	5,002	4,995	4,971	4,757	4,782
Physical Demand	33,462	26,534	31,912	34,623	30,822	35,010	34,773	36,244	32,408	31,652
Physical Surplus/ Deficit	(5,243)	1,961	1,519	(2,158)	462	(4,298)	(2,114)	(3,772)	(1,012)	(810)
ETP Inventory Build	3,152	4,880	4,027	(747)	1,720	77	44	(552)	1,548	74
Exchange Inventory Build	(222)	(475)	(231)	378	1,934	273	(166)	392	2,482	210
Net Balance	(8,173)	(2,445)	(2,277)	(1,789)	(3,192)	(4,649)	(1,992)	(3,611)	(5,042)	(1,094)
Silver Price (London US\$/oz)	14.99	14.67	20.19	35.12	31.15	23.79	19.08	15.68	17.14	17.05

*Photovoltaic demand included in "Other Industrial" prior to 2011

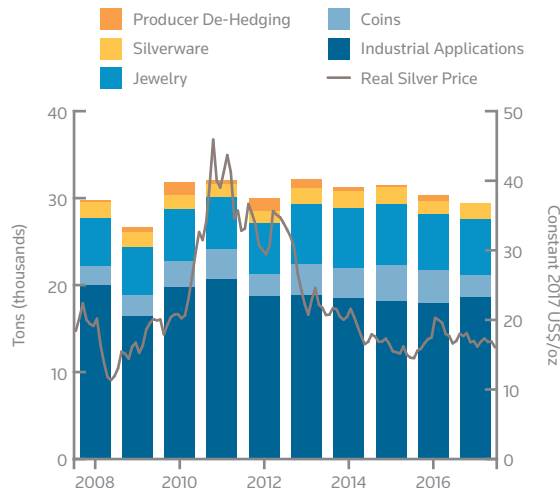
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WORLD SILVER SUPPLY



Source: GFMS, Thomson Reuters

WORLD SILVER DEMAND



Source: GFMS, Thomson Reuters

WORLD SILVER MINE PRODUCTION

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Russia	1,132	1,312	1,145	1,221	1,412	1,381	1,448	1,588	1,450	1,305
Poland	1,212	1,220	1,171	1,270	1,284	1,170	1,264	1,291	1,199	1,227
Sweden	263	270	285	283	306	337	396	494	511	484
Turkey	314	389	384	288	228	188	205	172	175	172
Portugal	41	22	23	31	34	45	54	74	39	40
Spain	2	5	23	33	37	41	40	40	39	39
Greece	35	29	27	25	30	29	27	32	28	24
Bulgaria	11	15	13	17	19	19	18	19	18	18
Macedonia	9	9	9	9	10	11	10	11	11	11
Romania	-	3	7	12	9	9	3	3	3	3
Finland	-	-	-	-	-	3	2	2	2	2
Ireland	8	5	4	6	9	8	6	4	1	1
Other Countries	1	1	2	2	1	1	1	1	1	1
Total Europe	3,030	3,281	3,092	3,198	3,378	3,240	3,476	3,730	3,478	3,328
North America										
Mexico	3,236	3,554	4,411	4,778	5,358	5,513	5,767	5,975	5,796	6,108
United States	1,120	1,250	1,280	1,120	1,060	1,040	1,180	1,090	1,150	1,048
Canada	669	609	573	582	685	640	495	380	405	394
Total North America	5,026	5,412	6,264	6,480	7,104	7,193	7,442	7,445	7,350	7,549
Central & South America										
Peru	3,739	3,971	3,691	3,473	3,547	3,754	3,821	4,291	4,625	4,587
Chile	1,405	1,301	1,287	1,291	1,195	1,218	1,597	1,547	1,492	1,260
Bolivia	1,114	1,326	1,259	1,214	1,206	1,281	1,345	1,306	1,353	1,243
Argentina	337	560	726	708	762	774	906	1,080	928	797
Guatemala	100	129	195	273	205	281	858	856	838	361
Dominican Republic	0	18	19	19	27	87	141	127	105	107
Nicaragua	3	4	7	8	10	14	14	18	21	19
Honduras	59	58	58	49	51	51	57	35	18	18
Ecuador	13	13	15	16	17	16	18	18	17	17
Brazil	11	12	12	12	12	15	15	17	17	17
Colombia	9	11	15	24	19	14	12	16	16	16
Venezuela	1	1	1	1	1	1	1	2	2	2
Other Countries	4	4	4	3	6	5	3	3	2	2
Total C. & S. America	6,797	7,408	7,290	7,091	7,057	7,511	8,788	9,313	9,434	8,445
Asia										
China	2,613	2,698	2,942	3,192	3,401	3,515	3,484	3,503	3,569	3,502
Kazakhstan	629	614	548	547	545	611	590	538	554	591
India	212	193	255	234	280	333	261	374	436	526
Indonesia	248	240	209	190	165	255	227	310	347	358
Armenia	43	41	51	74	90	105	115	124	150	155
Islamic Rep. of Iran	98	107	112	112	110	99	98	104	111	112
Mongolia	36	35	34	33	33	49	64	82	88	67
Uzbekistan	53	52	59	59	59	60	54	49	49	49
Laos	7	15	17	18	20	32	40	41	51	43
Philippines	14	35	42	43	48	47	27	29	27	26
N Korea	29	25	26	27	27	28	28	26	26	26

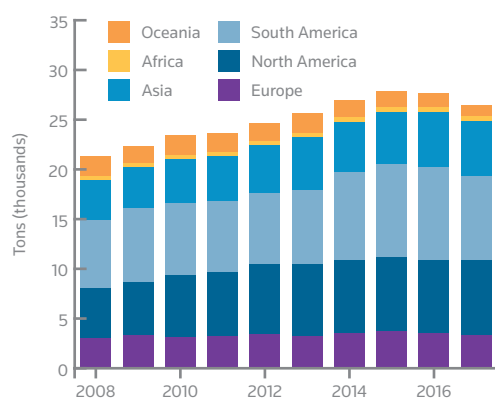
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WORLD SILVER MINE PRODUCTION

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Saudi Arabia	12	12	12	9	11	19	22	23	24	24
Kyrgyzstan	10	9	10	10	6	11	10	12	18	18
Japan	12	12	11	17	17	15	15	16	16	14
Azerbaijan	-	-	1	4	3	1	1	1	5	5
Thailand	13	21	23	24	38	36	34	25	40	4
Tajikistan	1	1	1	2	2	3	3	4	4	4
Other Countries	4	4	7	5	5	4	4	4	4	4
Total Asia	4,034	4,112	4,360	4,601	4,858	5,225	5,077	5,266	5,521	5,529
Africa										
Morocco	251	270	326	257	260	285	274	298	316	340
South Africa	75	78	79	73	67	69	37	47	50	56
Burkina Faso	-	-	-	0	1	1	13	12	22	21
Zambia	12	14	15	15	15	16	15	15	15	15
Tanzania	9	11	12	13	13	12	12	12	13	12
Botswana	5	5	5	5	7	10	10	5	5	5
Zimbabwe	2	2	3	3	4	4	4	4	4	4
Ethiopia	1	2	2	3	3	3	3	3	3	3
Mali	2	3	2	2	3	3	2	3	3	3
Ghana	2	2	2	2	2	3	3	2	2	3
DRC	34	1	7	11	14	62	8	5	2	2
Eritrea	-	-	0	4	23	25	47	70	13	1
Other Countries	8	1	1	2	2	2	2	2	2	2
Total Africa	403	386	455	392	414	494	431	478	449	467
Oceania & Other										
Australia	1,926	1,631	1,880	1,725	1,727	1,840	1,675	1,525	1,354	1,100
PNG	50	67	67	92	82	91	87	71	45	76
New Zealand	32	14	13	8	6	11	16	12	8	8
Total Oceania	2,009	1,712	1,960	1,826	1,814	1,942	1,778	1,609	1,407	1,185
World Total	21,297	22,312	23,422	23,587	24,625	25,607	26,993	27,841	27,638	26,502

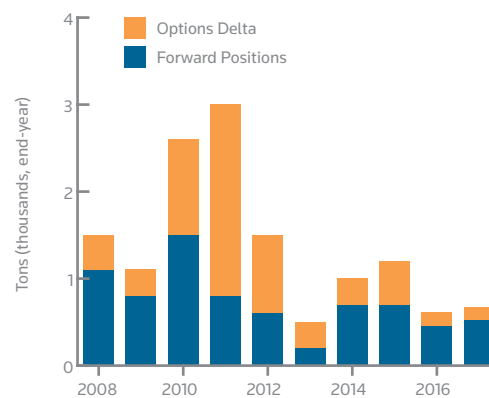
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WORLD SILVER MINE PRODUCTION



Source: GFMS, Thomson Reuters

SILVER PRODUCER HEDGING: OUTSTANDING POSITIONS



Source: GFMS, Thomson Reuters

SILVER FABRICATION: COINS AND MEDALS INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
United States	790	1,067	1,296	1,348	1,027	1,352	1,390	1,495	1,219	610
Canada	281	336	579	729	561	925	971	1,129	1,068	594
Australia	182	201	272	350	201	283	245	384	401	315
India	166	103	146	58	61	169	195	278	291	303
China	88	94	46	128	141	193	185	331	333	196
Germany	223	232	200	102	35	20	20	110	150	150
United Kingdom	16	17	16	31	22	68	66	115	108	113
Austria	259	296	360	571	285	458	149	233	112	64
Japan	9	12	19	19	23	25	22	22	22	22
Hungary	5	4	4	4	4	0	1	18	23	20
Other Countries	142	153	190	166	232	120	112	114	84	83
World Total	2,160	2,516	3,129	3,506	2,592	3,613	3,355	4,228	3,810	2,471

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SUPPLY OF SILVER FROM THE RECYCLING OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Germany	455	391	465	519	672	537	446	464	475	482
Russia	258	261	356	346	340	311	249	208	203	254
United Kingdom	340	316	198	350	305	223	173	182	245	209
Italy	183	181	203	303	309	270	245	193	197	195
France	158	170	193	217	182	161	153	151	160	157
Turkey	36	33	32	36	32	32	46	53	61	67
Austria	36	33	35	38	37	36	34	35	39	38
Czech Republic	27	28	37	48	51	45	42	33	37	35
Poland	22	23	28	35	36	31	29	31	33	32
Netherlands	34	32	35	38	39	27	25	27	29	28
Spain	14	16	23	40	41	35	32	25	26	23
Belgium	19	18	20	21	22	15	15	14	15	15
Sweden	24	19	26	19	19	19	20	13	14	14
Denmark	15	14	16	17	16	13	12	12	13	12
Slovakia	5	6	7	10	11	9	8	10	10	10
Hungary	6	6	8	11	11	10	9	9	10	10
Bulgaria	14	13	13	13	13	11	10	9	10	9
Finland	10	10	10	11	11	9	8	8	9	9
Portugal	12	12	12	14	8	8	10	10	11	9
Other Countries	23	24	25	26	26	22	20	20	22	22
Total Europe	1,691	1,606	1,742	2,112	2,181	1,825	1,585	1,508	1,620	1,629
North America										
United States	1,724	1,692	2,015	2,375	2,143	1,457	1,252	1,099	1,011	1,031
Canada	52	48	51	56	51	34	30	26	24	21
Mexico	95	98	123	140	145	35	14	14	10	10
Total North America	1,871	1,838	2,189	2,571	2,339	1,526	1,296	1,139	1,045	1,063
Central & South America										
Brazil	32	34	46	78	79	62	59	72	76	73
Venezuela	8	8	10	11	10	12	11	13	14	15

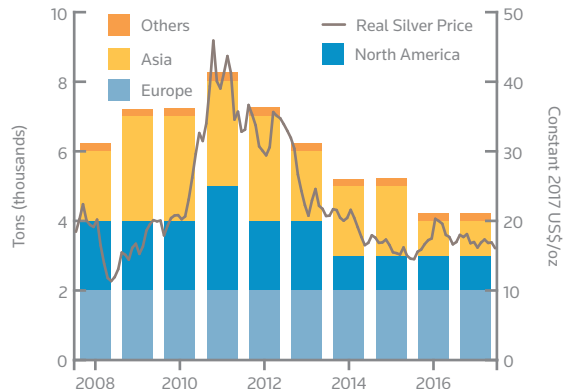
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SUPPLY OF SILVER FROM THE RECYCLING OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Uruguay	6	5	8	13	12	11	11	12	12	13
Other Countries	48	44	58	68	66	45	30	32	36	40
Total C & S America	94	91	122	170	167	131	111	128	138	141
Asia										
Japan	736	662	649	714	662	623	609	542	504	487
China	705	787	909	992	962	935	830	501	428	384
S Korea	240	262	294	310	281	262	215	126	135	133
Taiwan	97	111	129	140	133	113	97	85	94	90
India	429	465	558	642	771	169	92	79	85	83
Thailand	91	96	115	116	99	87	69	62	65	61
Saudi Arabia	32	60	69	65	48	50	54	47	49	47
Israel	13	13	16	17	16	13	14	13	14	13
Uzbekistan	7	7	9	9	9	8	8	9	10	13
Singapore	15	15	17	18	17	16	14	12	13	12
Kazakhstan	7	7	9	9	9	8	8	10	11	10
Indonesia	12	12	13	15	14	13	11	9	10	10
Vietnam	12	11	12	12	11	10	9	8	8	8
Other Countries	59	69	85	102	67	53	38	29	31	27
Total Asia	2,455	2,577	2,885	3,162	3,100	2,361	2,068	1,532	1,458	1,380
Africa										
Egypt	48	43	43	21	23	21	20	18	20	19
Morocco	13	16	16	16	16	17	11	11	12	12
Tunisia	4	4	5	6	5	5	4	4	5	5
Other Countries	14	14	15	16	16	14	14	14	15	15
Total Africa	80	77	80	59	61	57	48	47	51	51
Oceania										
Australia	51	49	49	49	45	41	37	33	35	33
Total Oceania	51	49	49	49	45	41	37	33	35	33
World Total	6,242	6,239	7,066	8,123	7,894	5,941	5,145	4,387	4,347	4,296

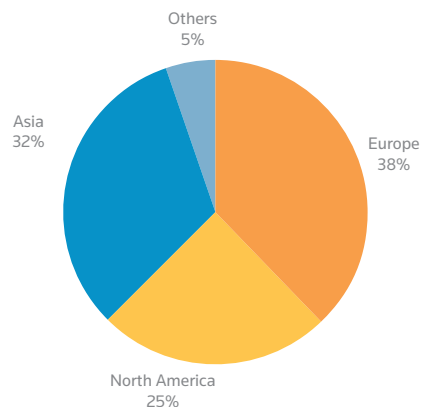
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WORLD SILVER SCRAP SUPPLY



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WORLD SCRAP SUPPLY, 2017



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WORLD SILVER FABRICATION INCLUDING THE USE OF SCRAP

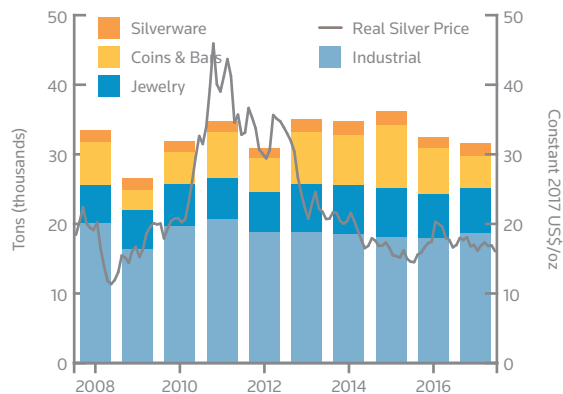
(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Germany	1,546	1,503	1,690	1,488	1,204	1,205	1,003	1,121	1,213	1,250
Italy	1,226	1,088	1,109	886	808	820	875	878	854	890
United Kingdom	725	588	677	698	631	641	629	677	665	667
Russia	930	854	944	864	845	832	793	724	671	663
France	597	633	697	633	544	551	415	446	439	443
Belgium	768	613	577	519	487	449	447	440	441	439
Turkey	262	221	201	181	184	208	240	233	228	228
Switzerland	94	86	92	92	89	88	86	85	85	88
Austria	279	315	380	591	304	476	168	251	130	83
Spain	118	112	109	96	83	76	81	80	80	83
Bulgaria	74	21	22	67	68	69	71	70	68	69
Czech Republic	61	48	56	58	61	64	65	63	61	60
Netherlands	66	58	63	61	61	62	56	55	52	53
Poland	99	82	77	58	48	48	49	48	44	49
Norway	40	30	33	34	34	32	30	28	28	27
Greece	68	56	46	36	28	24	25	24	23	23
Hungary	5	4	4	4	4	0	1	18	23	20
Sweden	24	21	29	19	19	18	19	18	18	18
Denmark	17	15	16	16	15	14	15	15	14	14
Other Countries	41	30	35	26	25	22	22	22	21	22
Total Europe	7,041	6,378	6,857	6,427	5,541	5,699	5,088	5,297	5,158	5,189
North America										
United States	6,138	5,664	6,768	7,177	6,352	6,343	6,838	7,346	6,828	5,845
Mexico	545	504	556	689	657	729	763	815	736	763
Canada	386	404	667	813	644	1,031	1,079	1,243	1,182	732
Total North America	7,068	6,572	7,992	8,680	7,653	8,103	8,680	9,404	8,746	7,339
Central & South America										
Brazil	223	219	319	345	349	416	379	358	304	228
Dominican Republic	28	46	42	28	29	42	45	47	46	45
Argentina	43	34	39	39	38	40	39	36	34	34
Colombia	19	17	18	17	17	24	35	32	31	30
Peru	23	25	26	22	22	23	24	23	23	22
Other Countries	57	57	61	51	52	55	54	49	45	43
Total C. & S. America	393	399	504	503	509	601	576	546	482	402
Asia										
China	6,013	5,843	6,792	7,534	7,710	8,446	7,801	6,855	5,862	6,020
India	5,469	1,457	2,486	4,001	2,697	5,379	6,247	7,374	5,081	5,651
Japan	3,280	2,113	3,020	3,234	2,864	2,901	2,700	3,056	3,431	3,674
Thailand	1,074	982	991	954	763	843	779	863	815	733
S Korea	955	763	929	941	928	895	820	628	516	514
Taiwan	533	397	486	510	463	471	488	467	471	492
Indonesia	168	166	199	225	245	254	243	254	268	274
Hong Kong	224	182	210	211	300	192	162	145	117	103
Singapore	3	6	84	88	53	69	65	94	95	100
Islamic Rep. of Iran	154	98	102	95	92	91	89	88	167	99
Israel	82	69	67	55	50	57	62	64	62	67

WORLD SILVER FABRICATION INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Vietnam	39	40	45	46	46	45	49	51	56	60
Kazakhstan	72	61	66	63	62	62	61	55	53	53
Uzbekistan	72	61	66	63	62	62	61	55	53	51
Other Countries	347	480	467	387	314	287	282	297	312	251
Total Asia	18,486	12,721	16,009	18,407	16,649	20,054	19,907	20,345	17,359	18,144
Africa										
Egypt	49	44	43	19	27	29	32	29	24	23
Morocco	19	17	18	18	18	18	19	18	18	18
Tunisia	11	10	11	10	10	11	11	11	10	10
Mali	10	9	9	9	9	9	9	9	9	9
South Africa	8	8	8	8	8	8	8	8	8	8
Algeria	6	6	6	5	5	6	6	6	5	5
Other Countries	5	4	5	4	4	4	4	4	5	5
Total Africa	109	98	99	74	81	85	89	85	79	78
Oceania										
Australia	362	364	450	531	387	467	430	566	583	499
Other Countries	1	1	1	1	1	2	2	2	2	2
Total Oceania	363	365	452	532	388	468	432	568	585	501
World Total	33,462	26,534	31,912	34,623	30,822	35,010	34,773	36,244	32,408	31,652

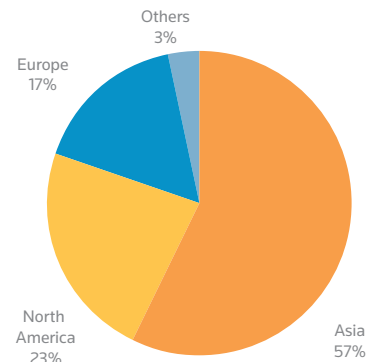
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WORLD SILVER FABRICATION



Source: GFMS, Thomson Reuters

WORLD SILVER FABRICATION, 2017



Source: GFMS, Thomson Reuters

SILVER FABRICATION: INDUSTRIAL APPLICATIONS INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Germany	853	632	824	791	673	664	651	651	667	715
United Kingdom	686	550	640	647	591	557	546	545	541	539
Russia	681	582	630	602	593	599	565	515	484	483
Belgium	758	603	568	510	478	444	443	435	437	434
Italy	350	281	307	287	267	261	260	250	241	250
France	336	232	274	248	223	218	211	213	210	216
Switzerland	76	69	75	74	71	70	72	71	71	73
Bulgaria	64	11	14	60	62	65	66	66	64	65
Czech Republic	53	41	48	51	55	58	60	59	57	57
Turkey	51	42	44	46	45	46	48	50	49	51
Netherlands	49	40	47	46	45	44	45	44	45	46
Spain	58	53	55	45	38	35	36	36	37	39
Poland	25	21	23	22	22	22	23	24	24	25
Austria	17	15	16	16	16	16	15	16	16	16
Norway	15	11	13	12	12	12	12	12	12	12
Slovakia	3	2	2	0	3	3	3	3	3	3
Finland	1	1	1	1	1	1	1	1	1	1
Other Countries	-	-	-	-	-	-	-	-	-	-
Total Europe	4,074	3,181	3,579	3,458	3,195	3,114	3,056	2,990	2,961	3,025
North America										
United States	4,649	3,868	4,702	5,175	4,126	3,963	3,867	3,953	4,141	4,214
Mexico	97	97	148	187	206	205	209	245	250	250
Canada	75	40	60	57	56	59	56	53	55	54
Total North America	4,821	4,006	4,910	5,419	4,388	4,227	4,131	4,250	4,447	4,519
Central & South America										
Brazil	161	142	177	168	165	148	140	128	121	121
Argentina	31	24	28	28	27	27	26	25	24	23
Colombia	5	4	5	4	4	9	19	17	17	16
Other Countries	14	13	14	13	13	13	13	13	13	13
Total C. & S. America	211	183	223	214	210	196	198	183	174	173
Asia										
China	4,525	4,251	4,876	5,104	5,145	5,589	5,782	5,244	4,479	4,840
Japan	3,209	2,036	2,931	3,147	2,769	2,801	2,607	2,966	3,340	3,581
India	1,013	992	1,093	1,200	1,128	1,091	1,041	990	993	1,066
Taiwan	518	382	470	492	445	453	471	449	456	478
S Korea	806	612	762	761	733	694	636	447	378	385
Hong Kong	213	171	199	199	193	180	152	137	112	99
Islamic Rep. of Iran	106	55	59	55	55	54	55	55	132	65
Kazakhstan	60	51	56	54	53	54	52	48	46	46
Uzbekistan	60	51	56	54	53	54	52	47	46	45

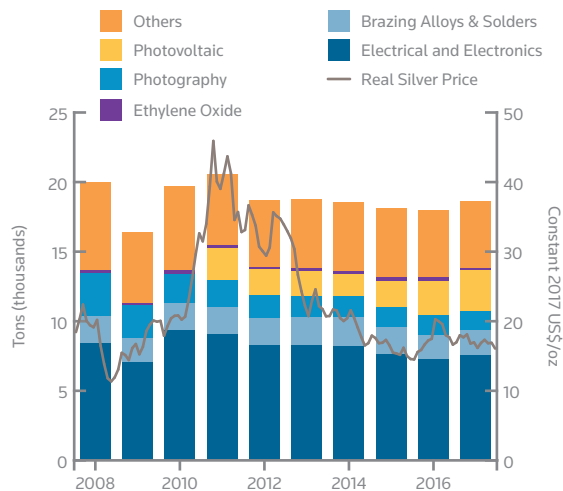
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SILVER FABRICATION: INDUSTRIAL APPLICATIONS INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Singapore	-	4	55	58	16	22	26	51	31	34
Other Countries	168	292	270	186	105	105	114	114	178	108
Total Asia	10,678	8,897	10,826	11,310	10,694	11,096	10,987	10,547	10,191	10,745
Africa										
Morocco	8	7	8	8	8	8	8	8	8	8
South Africa	4	4	4	4	4	4	4	4	4	4
Other Countries	11	9	11	9	9	9	9	9	9	9
Total Africa	23	20	23	21	21	21	22	21	20	21
Oceania										
Australia	158	140	154	154	157	150	154	150	149	150
Total Oceania	158	140	154	154	157	150	154	150	149	150
World Total	19,966	16,427	19,715	20,575	18,664	18,804	18,548	18,141	17,942	18,632

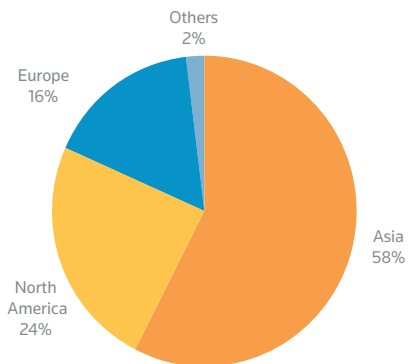
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COMPONENTS OF INDUSTRIAL DEMAND



Source: GFMS, Thomson Reuters

WORLD SILVER INDUSTRIAL FABRICATION, 2017



Source: GFMS, Thomson Reuters

SILVER FABRICATION: ELECTRICAL AND ELECTRONICS INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	1,893	1,722	2,058	2,148	2,161	2,343	2,419	2,173	1,836	1,968
United States	1,935	1,660	2,320	2,085	1,745	1,651	1,672	1,685	1,720	1,727
Japan	1,204	877	1,588	1,438	1,194	1,190	1,044	945	918	998
Germany	674	488	664	631	534	529	521	519	536	577
India	468	502	531	534	547	470	501	451	453	435
Taiwan	384	309	377	395	353	367	384	365	372	393
Russia	375	321	353	339	334	338	315	285	266	271
South Korea	495	390	500	499	481	453	415	282	250	256
Mexico	64	69	118	157	177	176	179	213	213	213
France	269	178	215	189	166	164	159	161	159	162
United Kingdom	145	107	120	125	122	121	125	127	128	129
Italy	127	107	121	103	86	78	75	72	69	70
Hong Kong	104	83	97	97	94	87	72	66	59	51
Czech Republic	39	30	36	39	42	45	46	45	44	44
Brazil	46	37	50	49	48	47	45	42	38	38
Turkey	34	28	29	31	29	29	30	31	31	32
Kazakhstan	36	31	34	32	32	32	31	29	27	27
Uzbekistan	36	31	34	32	32	32	31	29	27	27
Other Countries	125	103	123	122	119	123	128	128	129	137
World Total	8,451	7,072	9,367	9,044	8,295	8,274	8,192	7,648	7,274	7,554

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SILVER FABRICATION: BRAZING ALLOYS AND SOLDERS INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	805	826	890	949	975	1,079	1,169	1,037	845	887
United States	225	162	182	187	166	178	182	187	190	193
Japan	122	78	115	108	93	87	79	75	73	85
India	67	68	80	83	75	65	82	77	77	77
United Kingdom	72	57	72	76	67	66	68	69	70	70
Germany	107	71	87	86	70	68	66	65	65	68
Canada	68	34	53	53	49	49	48	47	48	50
Russia	62	54	59	56	56	56	55	51	48	47
Italy	75	52	57	54	50	48	47	45	44	45
S Korea	81	64	72	73	68	64	59	45	45	45
Switzerland	42	38	41	41	39	39	40	39	39	41
Taiwan	39	31	38	39	38	36	35	34	34	35
Brazil	25	27	30	31	30	30	29	26	24	24
Mexico	14	12	13	12	12	12	12	14	20	20
France	26	17	20	19	17	16	16	16	16	16
Australia	17	15	16	18	18	17	17	16	15	16
Belgium	19	18	20	21	22	15	15	14	14	15
Spain	20	18	18	16	13	11	11	11	12	12
Other Countries	38	32	41	42	43	44	44	42	42	43
World Total	1,924	1,674	1,905	1,965	1,900	1,981	2,073	1,912	1,721	1,790

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SILVER FABRICATION: PHOTOGRAPHIC USE INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
United States	875	728	630	556	521	498	476	459	443	427
Belgium	730	580	540	482	448	423	420	415	415	414
Japan	908	610	465	410	303	295	290	275	261	254
United Kingdom	308	268	280	292	260	229	207	201	192	187
China	115	95	81	74	69	60	56	49	46	43
Russia	56	47	42	38	37	36	34	32	30	29
Brazil	40	32	45	37	35	14	10	8	7	6
India	10	10	10	10	10	10	10	6	6	4
Czech Republic	4	4	3	3	3	2	2	2	2	2
Australia	3	3	3	2	2	2	2	2	2	2
Other Countries	4	-	-	-	-	-	-	-	-	-
World Total	3,054	2,377	2,098	1,905	1,687	1,569	1,508	1,448	1,405	1,367

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SILVER FABRICATION: ETHYLENE OXIDE CATALYST USE INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
India	1	(16)	(1)	2	20	20	1	1	1	95
China	20	11	76	46	33	129	125	209	134	73
United States	25	(69)	2	1	39	22	3	13	17	27
S Korea	63	37	0	3	1	49	6	37	1	4
Saudi Arabia	-	162	153	53	7	5	-	11	69	2
Kuwait	8	16	24	33	-	-	3	-	1	2
Islamic Rep. of Iran	52	1	6	1	1	-	1	2	72	2
Russia	9	1	(2)	(6)	-	1	3	4	-	1
Taiwan	41	3	2	11	13	3	1	3	2	1
Malaysia	1	-	-	1	-	-	1	-	-	1
Brazil	-	4	-	4	24	1	-	1	-	1
Japan	2	(4)	2	-	2	-	2	1	1	1
France	-	-	-	1	-	-	1	-	-	1
Mexico	(1)	1	6	1	-	1	-	1	-	1
Germany	-	1	1	1	1	1	-	2	1	1
Other Countries	8	1	3	42	5	8	7	31	17	2
World Total	231	148	272	194	148	239	154	317	317	214

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SILVER FABRICATION: JEWELRY AND SILVERWARE INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Italy	875	806	802	599	540	559	614	627	612	639
Turkey	207	175	153	134	139	162	192	184	177	177
Russia	241	263	291	240	228	225	223	199	183	177
Germany	193	166	169	159	147	134	131	130	123	120
France	57	59	64	73	67	56	54	53	52	51
Spain	41	41	37	37	32	29	30	29	30	30
Greece	68	56	46	36	28	24	25	24	23	23
Poland	62	49	41	24	19	20	19	17	17	18
Sweden	22	20	20	19	19	18	18	18	18	18
United Kingdom	23	21	21	20	18	16	17	17	15	16
Norway	26	19	20	18	18	16	17	16	15	15
Denmark	17	15	16	16	15	14	15	15	14	14
Portugal	17	18	18	12	8	7	8	9	9	9
Netherlands	8	8	8	7	7	7	7	7	7	7
Switzerland	7	7	7	7	7	7	7	7	7	7
Bulgaria	9	9	7	5	4	4	4	4	4	4
Belgium	5	4	4	4	4	4	4	4	4	4
Finland	7	5	5	5	5	4	3	3	3	3
Czech Republic	5	4	5	4	3	4	4	3	3	3
Austria	4	3	3	3	3	3	3	3	3	3
Cyprus	5	3	3	3	2	1	2	2	2	2
Croatia	2	2	2	2	2	2	2	1	1	1
Other Countries	2	2	2	2	2	2	2	1	1	1
Total Europe	1,904	1,754	1,744	1,429	1,317	1,318	1,401	1,373	1,325	1,340
North America										
United States	404	362	400	370	342	368	402	415	464	519
Mexico	404	355	344	450	428	490	523	540	463	493
Canada	30	28	28	27	26	26	23	26	23	24
Total North America	838	745	772	847	797	884	948	981	950	1,036
Central & South America										
Brazil	54	57	64	50	50	95	90	67	62	67
Dominican Republic	28	46	42	28	29	41	43	46	44	43
Peru	19	22	23	19	19	21	21	20	20	19
Colombia	14	13	14	13	13	15	16	15	14	14
Argentina	12	10	11	11	11	13	13	12	10	11
Chile	10	10	10	9	9	12	12	11	9	9
Ecuador	10	7	7	7	7	9	10	9	9	9
Uruguay	6	8	12	9	9	10	10	8	8	8
Other Countries	19	21	19	14	15	16	14	13	11	10
Total C. & S. America	173	195	202	161	163	231	229	200	187	189
Asia										
India	1,082	1,164	1,233	1,194	1,196	2,248	3,058	3,539	2,945	3,270
China	1,392	1,457	1,681	1,952	2,029	2,266	1,642	1,160	951	902
Thailand	1,037	946	954	917	726	806	742	826	774	701
Indonesia	149	150	168	190	207	215	206	215	230	236
S Korea	149	150	167	179	183	186	167	161	126	116
Japan	62	65	70	69	72	75	70	69	69	71

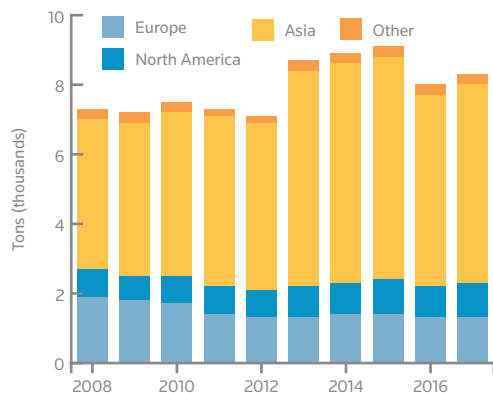
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SILVER FABRICATION: JEWELRY AND SILVERWARE INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Vietnam	39	40	45	46	46	45	49	51	56	60
Bangladesh	46	45	43	41	40	28	30	50	35	45
Israel	55	46	42	32	29	34	37	39	37	40
Islamic Rep. of Iran	48	44	43	40	37	37	34	33	34	34
Cambodia	26	26	27	28	28	28	27	27	27	28
Nepal	36	37	36	36	37	23	22	25	26	27
Saudi Arabia	22	23	24	26	29	29	27	26	25	23
Pakistan	32	31	28	24	23	20	20	26	20	21
Malaysia	20	20	21	23	24	25	25	22	21	20
UAE	18	19	21	23	25	26	24	23	15	13
Philippines	8	8	8	8	9	9	9	9	9	9
Taiwan	12	11	12	13	12	13	12	12	9	9
Kazakhstan	12	10	10	9	8	9	9	8	7	7
Sri Lanka	29	28	26	23	22	19	21	13	5	7
Uzbekistan	12	10	10	9	8	9	9	8	7	7
Bahrain	5	5	5	6	6	6	6	6	6	6
Hong Kong	11	11	12	12	13	12	10	8	5	4
Other Countries	17	17	18	19	17	17	16	15	14	14
Total Asia	4,319	4,362	4,705	4,918	4,829	6,182	6,271	6,373	5,457	5,670
Africa										
Egypt	46	42	39	17	24	27	29	27	23	21
Morocco	11	9	10	10	10	10	10	10	10	10
Tunisia	10	10	10	9	9	10	10	10	9	9
Other Countries	18	17	17	16	17	17	18	17	17	17
Total Africa	86	78	75	53	60	64	67	64	58	57
Oceania										
Australia	20	20	22	23	24	25	25	26	26	27
Total Oceania	22	22	23	25	26	26	27	27	28	29
World Total	7,342	7,156	7,522	7,432	7,191	8,705	8,943	9,017	8,004	8,320

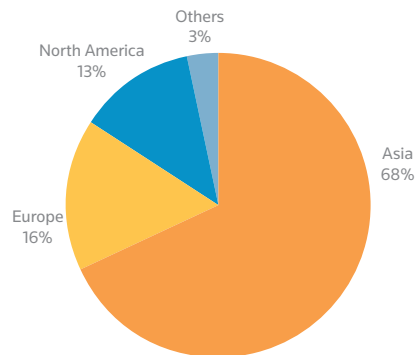
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Source: GFMS, Thomson Reuters

WORLD JEWELRY & SILVERWARE FABRICATION, 2017



Source: GFMS, Thomson Reuters

SILVER FABRICATION: JEWELRY INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Italy	703	663	679	512	469	495	555	572	561	590
Turkey	139	120	105	95	105	124	149	137	133	135
Germany	122	115	119	115	113	104	103	102	96	93
Russia	79	92	104	84	80	82	87	72	63	60
France	49	54	59	68	63	53	51	50	49	48
Spain	35	38	34	35	30	27	29	27	28	29
Poland	61	48	41	23	18	19	19	17	17	17
Greece	36	32	28	22	18	16	17	16	15	15
Sweden	10	9	10	9	10	10	10	10	10	10
United Kingdom	14	12	13	12	11	9	10	10	9	9
Portugal	17	18	18	12	8	7	8	9	9	9
Denmark	8	7	7	7	7	7	7	7	7	7
Switzerland	7	7	7	7	7	7	7	7	7	7
Netherlands	7	7	7	6	7	6	6	6	6	6
Norway	4	5	5	5	5	5	5	4	4	4
Other Countries	25	20	20	18	17	16	17	16	16	16
Total Europe	1,315	1,246	1,254	1,032	966	988	1,080	1,063	1,031	1,054
North America										
United States	372	334	374	346	321	348	381	394	440	494
Mexico	368	327	323	433	412	472	505	523	445	476
Canada	26	24	25	24	23	23	20	22	18	18
Total North America	766	685	722	803	757	843	907	939	903	987
Central & South America										
Brazil	48	52	60	47	47	92	88	67	62	67
Dominican Republic	28	46	42	28	29	41	43	46	44	43
Peru	13	16	17	14	15	17	18	17	17	17
Colombia	6	7	7	7	7	10	12	10	10	10
Argentina	8	7	8	8	8	11	10	10	9	9
Other Countries	33	37	40	32	33	40	40	36	32	30
Total C. & S. America	136	165	174	137	140	210	211	185	173	175
Asia										
India	601	647	707	679	724	1,315	1,936	2,254	1,930	2,058
China	1,121	1,243	1,444	1,693	1,762	1,955	1,452	1,053	875	829
Thailand	904	832	870	848	667	742	674	760	715	648
Indonesia	129	129	146	172	192	201	192	203	218	226
S Korea	127	131	147	162	168	172	154	151	117	107
Japan	61	64	69	68	71	74	70	68	69	71
Vietnam	36	37	42	44	44	43	47	50	55	59
Nepal	35	36	35	35	37	22	21	25	26	26
Cambodia	19	19	22	23	24	24	23	23	23	24
Bangladesh	23	24	23	23	24	16	17	33	23	24
Saudi Arabia	18	20	21	23	26	26	25	24	23	21
Malaysia	19	19	20	21	23	24	24	21	20	20
Israel	14	12	13	10	10	11	13	12	12	12
UAE	15	16	18	20	22	24	22	21	13	11
Pakistan	13	14	13	11	11	10	10	15	10	11
Islamic Rep. of Iran	6	6	7	8	8	9	9	8	9	10

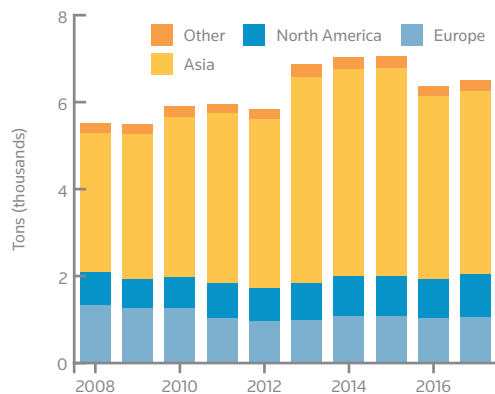
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SILVER FABRICATION: JEWELRY INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Philippines	6	6	6	7	7	7	7	8	8	8
Taiwan	8	8	9	10	10	10	9	10	7	7
Sri Lanka	16	17	16	14	14	12	13	4	5	6
Bahrain	4	4	5	5	5	6	5	6	5	6
Kazakhstan	9	8	7	7	6	6	7	6	6	6
Uzbekistan	9	8	7	7	6	6	7	6	6	5
Other Countries	22	23	25	27	27	25	23	21	17	17
Total Asia	3,217	3,322	3,674	3,917	3,890	4,741	4,760	4,781	4,192	4,210
Africa										
Egypt	40	36	34	15	22	24	27	25	21	19
Morocco	8	7	8	8	8	8	8	8	8	8
Tunisia	7	7	7	7	7	7	7	7	7	7
Other Countries	15	14	14	13	14	14	15	14	14	14
Total Africa	70	64	62	43	50	54	57	54	50	48
Oceania										
Total Oceania	20	21	22	24	25	26	26	27	27	28
World Total	5,524	5,502	5,909	5,956	5,828	6,862	7,041	7,050	6,376	6,503

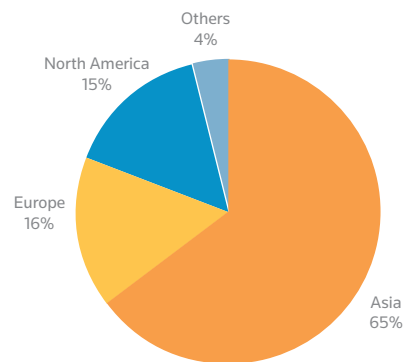
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WORLD JEWELRY FABRICATION



Source: GFMS, Thomson Reuters

WORLD JEWELRY FABRICATION, 2017



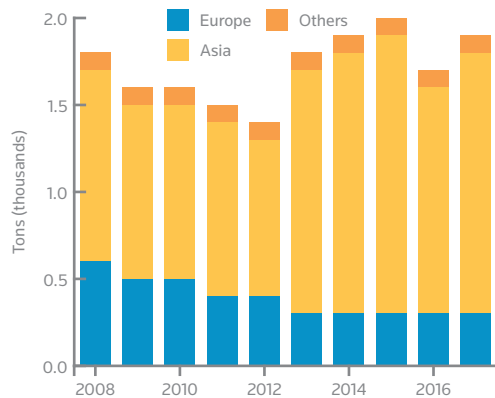
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SILVER FABRICATION: SILVERWARE INCLUDING THE USE OF SCRAP

(tons)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Europe										
Russia	162	171	187	156	148	144	136	127	120	117
Italy	172	143	123	87	71	64	59	54	51	49
Turkey	68	55	48	39	34	38	43	46	44	42
Germany	71	51	51	44	34	30	29	28	27	26
Norway	21	14	15	14	14	12	12	12	11	11
Sweden	12	10	10	9	9	8	8	8	8	8
Greece	32	24	18	14	10	8	8	8	8	7
Denmark	10	9	9	9	8	7	7	7	7	7
United Kingdom	10	9	8	8	7	6	7	6	6	6
France	8	6	5	5	4	3	3	3	3	3
Austria	3	3	3	2	2	2	2	2	2	2
Other Countries	21	14	13	10	9	8	7	7	6	6
Total Europe	589	508	490	397	350	330	322	310	294	286
North America										
United States	32	28	26	24	21	20	21	21	26	26
Mexico	36	28	21	17	16	18	18	18	18	17
Canada	4	4	3	3	3	3	3	4	5	6
Total North America	72	60	51	45	40	41	42	42	46	49
Central & South America										
Colombia	8	7	7	6	6	5	5	4	4	4
Peru	6	6	6	4	4	4	3	3	3	3
Other Countries	22	17	15	13	13	11	10	7	7	7
Total C. & S. America	36	30	27	24	23	21	18	14	14	13
Asia										
India	481	517	526	515	472	933	1122	1285	1015	1212
China	271	215	237	259	267	311	190	107	76	73
Thailand	133	115	77	60	55	50	52	55	52	53
Israel	41	34	30	22	19	23	24	27	26	28
Islamic Rep. of Iran	42	37	36	32	29	28	26	25	25	25
Bangladesh	23	21	20	17	16	13	12	17	12	21
Indonesia	20	21	22	18	15	14	14	12	12	11
Pakistan	19	17	15	13	11	10	10	11	10	10
South Korea	22	20	19	17	15	14	12	11	9	9
Cambodia	7	6	6	5	4	4	4	4	3	3
Saudi Arabia	3	3	3	3	3	3	2	2	2	2
Other Countries	41	36	34	30	27	25	25	24	14	15
Total Asia	1,103	1,041	1,024	992	934	1,427	1,495	1,580	1,265	1,461
Africa										
Africa	16	14	13	9	10	10	10	9	9	8
Total Africa	16	14	13	9	10	10	10	9	9	8
Oceania										
Australia	1	1	1	1	1	1	1	1	1	1
Total Oceania	1	1	1	1	1	1	1	1	1	1
World Total	1,818	1,654	1,613	1,476	1,363	1,844	1,903	1,967	1,628	1,817

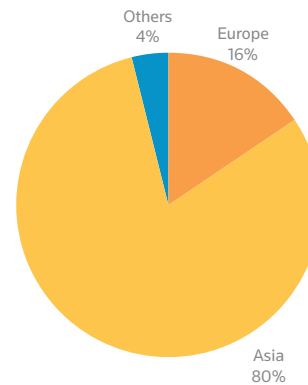
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WORLD SILVERWARE FABRICATION



Source: GFMS, Thomson Reuters

WORLD SILVERWARE FABRICATION, 2017



Source: GFMS, Thomson Reuters

TOP 20 SILVER PRODUCING COUNTRIES

Rank 2016	Rank 2017	Country	Output (tons)	
			2016	2017
1	1	Mexico	5,796	6,108
2	2	Peru	4,625	4,587
3	3	China	3,569	3,502
5	4	Russia	1,450	1,305
4	5	Chile	1,492	1,260
7	6	Bolivia	1,353	1,243
8	7	Poland	1,199	1,227
6	8	Australia	1,354	1,100
9	9	United States	1,150	1,048
10	10	Argentina	928	797
12	11	Kazakhstan	554	591
14	12	India	436	526
13	13	Sweden	511	484
15	14	Canada	405	394
11	15	Guatemala	838	361
16	16	Indonesia	347	358
17	17	Morocco	316	340
18	18	Turkey	175	172
19	19	Armenia	150	155
20	20	Iran	111	112
Rest of World			880	833
World Total			27,638	26,502

Source: GFMS, Thomson Reuters

TOP 20 SILVER PRODUCING COMPANIES

Rank 2016	Rank 2017	Company	Output (tons)	
			2016	2017
1	1	Fresnillo plc. ^{1,2}	1,421	1,687
3	2	KGHM Polska Miedź S.A. Group ^{3,4}	1,207	1,244
2	3	Glencore plc. ⁵	1,215	1,174
5	4	Goldcorp Inc.	874	890
4	5	Polymetal International plc.	908	834
7	6	Cia. De Minas Buenaventura S.A.A. ⁵	767	822
6	7	Pan American Silver Corp. ²	791	777
13	8	Hochschild Mining plc. ⁶	538	595
8	9	Volcan Cia. Minera S.A.A. ⁵	684	538
18	10	Hindustan Zinc Ltd. ⁷	436	526
10	11	Corp. Nacional del Cobre de Chile	635	521
16	12	Coeur Mining, Inc. ²	461	510
12	13	Sumitomo Corp. ⁴	564	504
15	14	Southern Copper Corp. ⁸	503	495
17	15	Boliden A.B. ⁹	447	413
14	16	Hecla Mining Company ²	534	388
19	17	Industrias Peñoles S.A.B. De C.V. ¹⁰	385	379
11	18	South 32 Ltd.	567	375
22	19	BHP Billiton plc. ⁹	320	307
9	20	Tahoe Resources Inc. ²	661	307

¹ Including 100% of Penmont mines, excluding silverstream; ² Primary silver producer; ³ Reported metallic silver production; ⁴ Estimate; ⁵ Includes minority partners; ⁶ Includes 100% from Pallancata, includes Moris; ⁷ Integrated refined metal; ⁸ Mined silver; ⁹ Metal in concentrate; ¹⁰ Excludes 100% of Fresnillo plc.

Source: GFMS, Thomson Reuters

APPENDIX 2

NOMINAL SILVER PRICES IN VARIOUS CURRENCIES

Prices are calculated from the London price and the average exchange rate for the year.

In the case of India, the price shown is the one actually quoted in the Mumbai and Ahmedabad market.

	London US\$/oz	India Rupee/kg	Thai Baht/oz	Japan Yen/10g	Korea Won/10g	China Yuan/kg	Eurozone* Euro/kg	Mexico Peso/oz
1983	11.415	3,435	262.89	873.8	2,851	726	479	1.37
1984	8.145	3,514	192.53	622.0	2,111	608	382	1.37
1985	6.132	3,880	166.54	470.3	1,715	579	296	1.58
1986	5.465	4,105	143.71	296.1	1,549	607	195	3.34
1987	7.016	5,124	180.46	326.2	1,855	840	208	9.67
1988	6.532	6,231	165.23	269.2	1,536	782	189	14.85
1989	5.500	6,803	141.36	244.0	1,187	666	170	13.54
1990	4.832	6,779	123.62	224.9	1,099	743	129	13.59
1991	4.057	6,993	103.51	175.7	956	694	111	12.24
1992	3.946	7,580	100.24	160.7	991	700	101	12.21
1993	4.313	6,163	109.20	154.2	1,113	799	117	13.44
1994	5.285	6,846	132.92	173.7	1,365	1,465	141	17.84
1995	5.197	6,864	129.49	157.2	1,289	1,395	122	33.36
1996	5.199	7,291	131.77	181.8	1,345	1,390	128	39.51
1997	4.897	7,009	153.60	190.5	1,498	1,305	139	38.78
1998	5.540	8,016	229.30	233.3	2,498	1,476	160	50.65
1999	5.218	8,022	197.38	191.2	1,994	1,389	158	49.90
2000	4.953	8,002	198.61	171.6	1,800	1,318	172	46.82
2001	4.370	7,420	194.15	170.7	1,814	1,163	157	40.82
2002	4.599	7,934	197.57	185.4	1,850	1,224	156	44.41
2003	4.879	8,138	202.39	181.8	1,869	1,298	139	52.64
2004	6.658	10,606	267.79	231.6	2,452	1,772	172	75.14
2005	7.312	11,083	294.07	259.1	2,407	1,926	189	79.68
2006	11.549	17,843	437.51	431.8	3,545	2,958	296	125.88
2007	13.384	18,794	461.98	506.7	3,999	3,273	314	146.26
2008	14.989	21,620	499.34	498.1	5,311	3,349	328	166.82
2009	14.674	23,815	503.12	441.4	6,024	3,223	339	198.30
2010	20.193	32,007	640.59	569.7	7,507	4,393	489	255.16
2011	35.119	55,638	1,069.25	900.0	12,508	7,296	811	436.30
2012	31.150	57,086	967.03	799.0	11,187	6,309	777	405.47
2013	23.793	48,618	730.53	742.1	8,366	4,708	576	303.52
2014	19.078	41,805	585.76	646.5	6,448	3,778	461	253.93
2015	15.680	36,146	537.10	610.3	5,704	3,168	560	248.91
2016	17.138	40,639	604.48	595.6	6,369	3,662	498	318.00
2017	17.048	39,885	578.35	591.0	5,810	3,454	442	322.36

* From 1977-1998, the DM/kg price is expressed in Euro/kg at the official conversion rate of 1.95583

APPENDIX 3

REAL SILVER PRICES IN VARIOUS CURRENCIES (LOCAL CPI DEFLATED - CONSTANT 2017 MONEY TERMS)

Prices are calculated from the London price and the average exchange rate for the year.

In the case of India, the price shown is the one actually quoted in the Mumbai market.

	London US\$/oz	India Rupee/kg	Thai Baht/oz	Japan Yen/10g	Korea Won/10g	China Yuan/kg	Eurozone Euro/kg	Mexico Peso/oz
	US\$/oz	Rupee/kg	Baht/oz	Yen/10g	Won/10g	Yuan/kg	Euro/kg	Peso/oz
1983	28.314	40,539	743.15	1,084.11	9,827	3,103	794.38	526.38
1984	19.367	38,131	538.84	754.42	7,113	2,529	618.62	317.81
1985	14.079	39,957	454.78	559.02	5,640	2,153	469.11	232.37
1986	12.319	38,813	385.88	349.85	4,958	2,110	309.43	263.58
1987	15.244	44,541	473.27	384.88	5,762	2,723	329.25	329.25
1988	13.646	49,628	416.81	315.53	4,453	2,135	295.43	236.11
1989	10.961	52,378	338.39	279.62	3,255	1,537	258.55	179.37
1990	9.136	47,862	279.84	250.14	2,776	1,663	191.04	142.16
1991	7.359	43,487	221.40	189.18	2,209	1,500	174.39	104.38
1992	6.947	42,115	205.80	170.13	2,154	1,423	151.01	90.14
1993	7.376	32,144	217.07	161.20	2,310	1,418	167.51	90.41
1994	8.809	32,460	251.76	180.35	2,666	2,092	196.48	112.19
1995	8.425	29,516	231.62	163.42	2,410	1,704	167.12	155.40
1996	8.189	28,752	222.94	188.74	2,396	1,568	172.84	136.96
1997	7.537	25,814	245.82	194.35	2,555	1,432	184.23	111.44
1998	8.396	26,077	339.90	236.45	3,963	1,633	210.10	125.56
1999	7.739	24,895	291.81	194.42	3,138	1,559	206.30	106.10
2000	7.106	23,871	289.07	175.64	2,770	1,475	221.32	90.92
2001	6.097	21,347	277.91	176.13	2,682	1,293	198.09	74.53
2002	6.316	21,891	281.01	193.84	2,662	1,371	194.07	77.20
2003	6.552	21,606	282.51	189.76	2,598	1,437	171.15	87.52
2004	8.708	27,176	363.87	241.75	3,291	1,888	208.31	119.34
2005	9.250	27,233	382.05	271.20	3,144	2,016	225.41	121.69
2006	14.153	41,272	543.31	450.88	4,528	3,051	347.55	185.52
2007	15.947	40,897	561.30	528.78	4,982	3,223	360.40	207.33
2008	17.199	43,423	575.02	512.77	6,321	3,115	366.83	224.95
2009	16.898	43,118	584.76	460.60	6,977	3,019	377.95	253.94
2010	22.878	51,750	720.72	598.79	8,445	3,983	539.23	313.72
2011	38.571	82,605	1,158.95	948.65	13,530	6,276	876.13	518.76
2012	33.518	77,562	1,017.76	842.47	11,842	5,287	822.87	463.06
2013	25.232	59,551	751.97	779.67	8,741	3,844	600.96	333.92
2014	19.909	48,142	592.12	661.12	6,653	3,025	476.65	277.69
2015	16.343	39,328	547.36	619.18	5,844	3,294	577.66	268.31
2016	17.499	42,758	609.16	602.45	6,439	3,730	505.22	332.75
2017	17.048	39,885	578.35	591.00	5,810	3,454	442.00	322.26

* From 1977-1998, the DM/kg price is expressed in Euro/kg at the official conversion rate of 1.95583

Source: Thomson Reuters Datastream

APPENDIX 4

SILVER PRICES IN US\$ PER OUNCE

	London Silver Market Fix*			COMEX Settlement Price		
	High	Low	Average	High	Low	Average
1992	4.3350	3.6475	3.9464	4.3180	3.6400	3.9353
1993	5.4200	3.5600	4.3130	5.4430	3.5230	4.3049
1994	5.7475	4.6400	5.2851	5.7810	4.5730	5.2808
1995	6.0375	4.4160	5.1971	6.1020	4.3750	5.1850
1996	5.8275	4.7100	5.1995	5.8190	4.6760	5.1785
1997	6.2675	4.2235	4.8972	6.3350	4.1550	4.8775
1998	7.8100	4.6900	5.5398	7.2600	4.6180	5.4953
1999	5.7500	4.8800	5.2184	5.7600	4.8720	5.2142
2000	5.4475	4.5700	4.9525	5.5470	4.5630	4.9653
2001	4.8200	4.0650	4.3702	4.8050	4.0260	4.3597
2002	5.0975	4.2350	4.5990	5.1130	4.2160	4.5955
2003	5.9650	4.3700	4.8787	5.9830	4.3460	4.8916
2004	8.2900	5.4950	6.6578	8.2110	5.5140	6.6927
2005	9.2250	6.3900	7.3115	9.0000	6.4270	7.3220
2006	14.9400	8.8300	11.5492	14.8460	8.8090	11.5501
2007	15.8200	11.6700	13.3835	15.4990	11.4650	13.3762
2008	20.9200	8.8800	14.9891	20.6850	8.7900	14.9471
2009	19.1800	10.5100	14.6743	19.2950	10.4200	14.6961
2010	30.7000	15.1400	20.1929	30.9100	14.8230	20.2382
2011	48.7000	26.1600	35.1192	48.5840	26.8110	35.2485
2012	37.2300	26.6700	31.1497	37.1400	26.2470	31.1459
2013	32.2300	18.6100	23.7928	32.4090	18.5330	23.7469
2014	22.0500	15.2800	19.0778	22.0470	15.3920	19.0304
2015	18.2300	13.7100	15.6800	18.3460	13.6660	15.6576
2016	20.7100	13.5800	17.1376	20.6660	13.7370	17.1365
2017	18.5600	15.2200	17.0481	18.4930	15.3710	17.0208

* "LBMA Silver price" as of 15 August 2014; operated by CME and administered by Thomson Reuters

US PRICES IN 2017

COMEX Settlement

US\$ per ounce	High	Low	Average
January	17.5120	16.3560	16.8857
February	18.4200	17.4020	15.1294
March	18.4430	16.8830	17.5789
April	18.4930	17.1910	17.9921
May	17.3880	16.0080	16.6994
June	17.6770	16.3550	16.8892
July	16.7500	15.3710	16.1151
August	17.4800	16.2210	16.9172
September	18.0270	16.6070	17.3727
October	17.3550	16.5630	16.9509
November	17.3580	16.3820	17.3563
December	17.0600	15.5820	16.1339

Source: COMEX

LEASE RATES, 2017

Quarterly Averages

Average	3-month	6-month	12-month
Q1 2017	-0.0004%	0.1232%	0.3434%
Q2 2017	0.1992%	0.1977%	0.3384%
Q3 2017	0.0839%	0.2060%	0.3823%
Q4 2017	-0.0057%	0.1371%	0.4070%

Calculated using silver forward offered rate and LIBOR;

forward rates dataset was discontinued with effect from May 2014 and replaced with Silver Forward Lending Rate Composite.

The lease rates shown here are indicative, reflecting the difference between prevailing forward rates in the currency markets and in the silver market itself. They do not take into account the counter-party risk that any lender would apply to a transaction, or any other external influences, and should therefore be seen as a guide to the shape of the forward curve, rather than absolute levels.

Source: Eikon, Thomson Reuters

APPENDIX 5

LEADING PRIMARY SILVER MINES

Rank	Mine Name	Country	Company	2016 Moz	2017 Moz
1	Saucito	Mexico	Fresnillo plc.	21.9	21.2
2	Dukat	Russia	Polymetal International plc. ¹	19.8	17.7
3	Uchucchacua	Peru	Cia. De Minas Buenaventura S.A.A.	16.2	16.6
4	Fresnillo	Mexico	Fresnillo plc.	15.9	16.5
5	Cannington	Australia	South 32 Ltd. ²	18.2	12.0
6	San Julián	Mexico	Fresnillo plc.	2.1	10.5
7	Escobal	Guatemala	Tahoe Resources Inc.	21.2	9.7
8	Greens Creek	United States	Hecla Mining Company	9.3	8.4
9	Imiter	Morocco	Société Métallurgique d'Imiter	7.1	7.8
10	San Jose	Mexico	Fortuna Silver Mines Inc.	6.1	7.5
11	Palmarejo	Mexico	Coeur Mining, Inc.	4.4	7.2
12	La Colorada	Mexico	Pan American Silver Corp.	5.8	7.1
13	San José	Argentina	Hochschild Mining plc./ McEwen Mining Inc	6.7	6.4
14	Puna	Argentina	SSR Mining Inc./ Golden Arrow Resources Corporation	10.4	6.2
15	Pallancata	Peru	Hochschild Mining plc.	2.6	6.0

¹ including Gottsovoye; ² reported payable metal in concentrate

SILVER MINE PRODUCTION BY SOURCE METAL

(million ounces)	2013	2014	2015	2016	2017
Primary					
Mexico	82.1	85.6	88.5	89.0	98.3
Peru	32.8	34.1	35.3	39.3	39.2
Russia	22.4	24.3	27.6	25.7	22.8
Other	98.4	113.0	111.0	110.2	80.8
Total	235.8	257.0	262.4	264.2	241.1
Gold					
Mexico	25.4	25.7	30.0	29.0	26.8
Peru	7.5	7.7	11.7	11.6	13.8
Russia	13.0	11.6	12.4	11.3	10.7
Other	58.0	63.8	62.9	54.9	49.2
Total	103.9	108.8	116.9	106.9	100.5
Copper					
Peru	24.9	24.0	35.0	40.6	42.1
Poland	37.3	40.4	41.2	38.3	39.2
Chile	25.4	38.2	38.5	39.4	34.5
Other	82.2	77.5	78.9	83.8	83.1
Total	169.8	180.0	193.7	202.1	199.0
Lead/Zinc					
China	80.3	77.8	79.7	81.7	79.7
Mexico	63.3	67.5	67.2	59.5	62.5
Peru	54.5	56.4	55.5	56.6	51.9
Other	110.6	115.5	114.9	112.6	112.6
Total	308.8	317.2	317.2	310.3	306.6
Other	4.9	4.8	4.9	5.1	4.8
World Total	823.3	867.8	895.1	888.6	852.1

Source: GFMS, Thomson Reuters; Company Reports

SILVER MINE PRODUCTION BY MAIN REGION AND SOURCE METAL

(million ounces)	2013	2014	2015	2016	2017
North America					
Primary	98.4	102.2	106.1	108.1	113.6
Lead/Zinc	76.0	79.2	75.7	65.5	69.1
Copper	18.7	18.7	15.8	20.6	20.7
Gold	35.8	36.6	39.0	39.3	36.6
Other	2.4	2.5	2.8	2.9	2.7
Total	231.3	239.3	239.4	236.3	242.7
Central & South America					
Primary	65.6	86.4	88.2	92.7	73.5
Lead/Zinc	86.8	91.4	88.9	90.4	84.2
Copper	53.1	64.2	75.1	81.8	77.9
Gold	35.1	39.8	46.8	37.9	35.4
Other	0.9	0.7	0.5	0.6	0.5
Total	241.5	282.5	299.4	303.3	271.5
Asia					
Primary	7.2	7.2	6.4	7.1	6.4
Lead/Zinc	103.0	99.6	102.4	108.1	110.4
Copper	44.5	42.0	46.1	47.1	47.3
Gold	11.7	12.7	12.7	13.6	12.1
Other	1.6	1.6	1.6	1.6	1.6
Total	168.0	163.2	169.3	177.5	177.8
Rest of the World					
Primary	64.6	61.1	61.7	56.4	47.7
Lead/Zinc	43.2	46.9	50.3	46.4	43.0
Copper	53.5	55.1	56.7	52.6	53.1
Gold	21.3	19.7	18.4	16.1	16.3
Other	0.0	0.0	0.0	0.0	0.0
Total	182.5	182.8	187.0	171.5	160.1
World Total	823.3	867.8	895.1	888.6	852.1

APPENDIX 6

COMEX FUTURES AND OPTIONS TURNOVER AND OPEN INTEREST, AND LONDON BULLION MARKET (LBMA) TRANSFERS

		Comex Number of Contracts				LBMA Clearing Turnover ³		
		Futures		Options		Ounces transferred (millions)	Value (US\$bn)	Number of transfers
		Turnover ¹	Open Interest ²	Turnover ¹	Open Interest ²			
2016	Jan	960,457	158,711	73,091	100,572	156.0	2.2	676
	Feb	1,694,167	163,623	130,102	106,479	140.9	2.1	674
	Mar	1,212,488	177,267	108,157	117,244	135.1	2.1	695
	Apr	1,974,067	201,872	154,422	131,206	175.4	2.9	798.
	May	1,183,591	198,844	101,348	133,697	182.2	3.1	690
	Jun	1,828,292	212,393	98,847	149,190	165.5	2.8	672
	Jul	1,458,746	224,453	121,351	131,943	178.5	3.6	881
	Aug	1,939,332	189,839	125,379	128,889	179.8	3.5	757
	Sep	1,290,090	202,973	135,144	131,932	179.2	3.5	691
	Oct	1,327,617	194,016	105,337	137,363	193.6	3.4	708
	Nov	2,214,364	160,161	129,032	101,204	157.6	2.7	783
	Dec	1,135,529	164,943	80,152	104,888	218.1	3.6	1,027
2017	Jan	1,414,048	187,630	94,442	111,063	207.5	3.49	966
	Feb	1,809,310	199,354	80,783	97,934	171.6	3.07	1,007
	Mar	1,495,885	217,076	129,651	108,239	203.2	3.57	924
	Apr	2,120,883	200,033	113,784	105,294	218.3	3.94	1,132
	May	1,904,525	204,633	152,980	116,395	265.7	4.45	1,029
	Jun	2,371,502	201,430	108,479	102,991	203.7	3.45	892
	Jul	1,829,718	208,072	131,387	115,501	207.1	3.34	939
	Aug	2,604,600	179,356	172,149	113,211	190.3	3.22	957
	Sep	1,730,400	183,000	130,003	109,781	225.4	3.93	857
	Oct	1,826,444	198,755	108,549	126,957	260.6	4.41	772
	Nov	2,539,514	187,033	104,738	93,564	241.7	4.11	1,083
	Dec	1,388,100	194,009	119,985	116,700	326.1	5.27	1,080

¹ Monthly total; ² Month-end; ³ Daily average; Source: LBMA, COMEX

SILVER ETP HOLDINGS

(Moz, end-period)	iShares Silver Trust	ETF Securities*	ZKB	Central Fund of Canada	Other**	Total	Value US\$ Bn***
2016 Q1	332.6	73.7	69.7	76.9	88.1	642.4	9.84
Q2	333.5	75.2	71.4	75.6	100.6	658.4	12.08
Q3	360.3	74.8	71.9	75.6	100.1	684.2	13.24
Q4	341.3	79.6	71.9	75.6	96.3	667.4	10.83
2017 Q1	330.3	80.9	73.4	75.6	99.6	659.8	11.92
Q2	339.6	88.7	75.3	75.6	103.2	682.4	11.24
Q3	326.7	85.5	77.9	75.6	106.5	672.2	11.34
Q4	320.6	88.9	79.6	75.2	105.5	669.8	11.29

*Includes ETF Securities LSE, Australia, NYSE, GLTR, and WITE & Hong Kong until they closed

**Other: includes Sprott Silver Trust, Julius Bär, DB Physical Silver, iShares Silver Bullion ETF, Silver Bullion Trust, Mitsubishi UFJ Tokyo, iShares Physical Silver ETC, Source Physical Silver, Royal Canadian Mint ETR

***Using the quarter-end London price

Source: Respective issuers; GFMS, Thomson Reuters

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