

# Market Overview



as of: 21<sup>st</sup> November 2022

- **Copper:** Refined copper consumption in India during January-August this year jumped 45% from 2021 to 435,466 tonnes, outpacing 4% growth globally and a 5% uptick in China in the same period, World Bureau of Metal Statistics data showed (page 2).
- **Precious metals:** Demand in India almost doubled in 2022 as buyers took advantage of low prices to replenish stockpiles drawn down in 2020 and 2021. As Metals Focus predicts, you could see some decent figures in 2023 but it may not match 2022 (page 5).
- **Euro zone:** Despite inflation readings below expectations, economists mostly stick to their forecast that the Federal Reserve will raise interest rates to 5% by March and keep them at that level for most of 2023 (page 6).

## Key market prices

|                        | Close price | 2w chng. |
|------------------------|-------------|----------|
| <b>LME (USD/t)</b>     |             |          |
| ▲ Copper               | 8 047.00    | 1.8%     |
| ▲ Nickel               | 24 850.00   | 4.7%     |
| <b>LBMA (USD/troz)</b> |             |          |
| ▲ Silver               | 21.10       | 5.7%     |
| ▲ Gold (PM)            | 1 751.60    | 4.6%     |
| <b>FX</b>              |             |          |
| ▲ EURUSD               | 1.0366      | 5.0%     |
| ▲ EURPLN               | 4.7067      | 0.4%     |
| ▼ USDPLN               | 4.5337      | -5.5%    |
| ▼ USDCAD               | 1.3385      | -1.0%    |
| ▼ USDCLP               | 920.86      | -2.9%    |
| <b>Stocks</b>          |             |          |
| ▲ KGHM                 | 113.95      | 4.5%     |

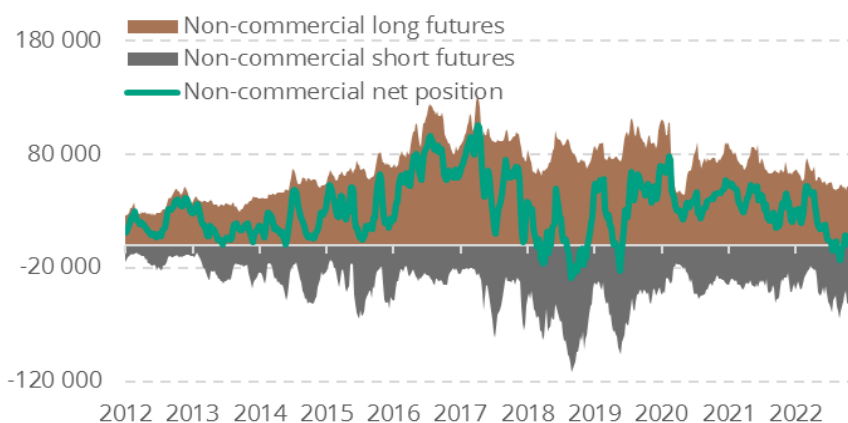
Source: Bloomberg, KGHM Polska Miedź S.A.; (more on page 10)

## Important macroeconomic data

| Release   | For |         |
|---|-----|---------|
|  Industrial prod. (yoy)    | Oct | 5.0% ▼  |
|  Industrial prod. (mom)    | Oct | -0.1% ▼ |
|  Industr. prod. (sa, mom)  | Sep | 0.9% ▼  |
|  Industr. prod. (wda, yoy) | Sep | -0.5% ▼ |
|  Copper exports (\$)       | Oct | 3 485 ▲ |

Source: Bloomberg, KGHM Polska Miedź S.A.; (more on page 8)

## Silver positioning among investment funds on COMEX\*



\*BBG index: CEI1SNCL; CEI1SNCS; CEI1SNCN

Source: Bloomberg, KGHM Polska Miedź S.A.

## Market Risk Unit

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## Base and precious metals | Other commodities

### Copper

#### India Bucks Global Trend With Robust Copper Demand This Year

**Refined copper consumption in India during January-August this year jumped 45% from 2021 to 435,466 tonnes, outpacing 4% growth globally and a 5% uptick in China in the same period, World Bureau of Metal Statistics data showed.**

India is set to be one of the world's fastest growing copper markets in 2022, bucking the trend of softening demand expansion elsewhere, including top consumer China, amid a slowing global economy. Despite the global downturn, India's economy is humming across manufacturing to infrastructure and property sectors, as pent-up demand post the COVID-19 pandemic, rising income and a series of government policies have boosted consumption. Refined copper consumption in India during January-August this year jumped 45% from 2021 to 435,466 tonnes, outpacing 4% growth globally and a 5% uptick in China in the same period, World Bureau of Metal Statistics data showed. "Copper demand is back to pre-COVID levels," Satish Pai, managing director at metal maker Hindalco Industries told Reuters. "We see a robust domestic growth trajectory driven by revival in housing demand, automation and shift towards e-mobility (including railway electrification and metros) and a strong pipeline of renewable energy and infrastructure projects." While its copper usage is dwarfed by China's, which made up for 55% of the world's demand for the red metal last year, India's surge may result in consumption reaching a record this year, illustrating the strength of the country's economic rebound after COVID. Copper's main consumers include the property sector, home appliance makers and green energy transition industries such as electric vehicles, solar and wind power plants. Strong copper demand in India was underpinned by growing domestic end-use market amid urbanisation and industrialisation and government's stimulus measures, said Wood Mackenzie analyst Bhavya Laul. "(The government's) production-linked incentive scheme for white goods which also incentivises air conditioner copper tube production is attracting investments," she said. Wood Mackenzie forecast India's refined copper consumption in 2022 to expand by over 15% from a year earlier to around 620,000 tonnes, and the annual growth rate is seen averaging at more than 12% during 2022-2027. That is compared to a projected 0.7% increase in global refined copper consumption this year, and an average annual global growth of 2.5% during 2022-2027, Laul said. India's economy grew 13.5% in the second quarter, its fastest pace in a year, driven by expansion in the manufacturing and services sectors. The country's factory activity, which has been consistently expanding since July last year, picked up speed in October, with firms hiring workers at the fastest pace in nearly three years. Import duties on copper fabricated products also supported domestic semis production, which

consumes refined copper, Wood Mackenzie's Laul said. Cheaper copper prices - down some 23% since its record high hit in March - also encouraged market participants to pick up orders and projects again, said an India-based refined copper consumer. However, the Indian refined copper market is not in shortage due to rising domestic production and a surge of imports from Japan, which has a free trade agreement with India, the person said. India's primary copper refining capacity is seen growing to 1.6 million tonnes in the near term, from around 1 million tonnes now, according to the Federation of Indian Mineral Industries.

### **Electric Vehicles With Advanced Autonomous Features To Need More Copper**

**The average mid-size ICE vehicle today has about 11.6 kg of copper, while hybrid-electric vehicles will require about 14.3 kg, battery-electric vehicles about 17.1 kg and plug-in hybrid-electric vehicles about 17.5 kg.**

Electric vehicles with advanced autonomous features will require about 1.7 million mt/year of copper from 2025 to 2032 for copper wire harnessing, according to one independent research analyst. Automation features that employ radar and detecting and ranging (lidar) technology require high-speed data transfers, which can only be met by small-gauge copper wiring, project manager Emily Bielak of the Detroit-based Martec Group told an audience at the American Copper Council Fall Meeting in Miami. "Over the years, we've heard a lot of stories about aluminum being an alternative material being tested for wire-harness purposes," Bielak said. "We've done this study every two or three years, but we find that after talking with [automakers and automotive parts suppliers] that copper continues to be the material of choice. And it comes down to reliability, durability and conductivity," Bielak said, citing feedback from Ford, GM, Tesla, BMW, Honda, Toyota, VW, Stellantis and Nissan, among others. Sport-utility vehicles and crossovers, which are expected to grow in market share over the next 5-10 years, will require the most copper wire harnessing, Bielak said. "That's driven by two things: one they require the most copper on a vehicle; there's a lot more sensors, and the bigger the vehicle, the more wiring you need. But also, they are going to require more sensors, more cameras, and more connection points as we move toward more autonomous vehicles," she said. Martec expects global vehicle production to remain near 90 million units to 2028, but battery-electric vehicles are expected to grow to about 34.3% of market share by 2032 from 7.6% in 2023. Much the growth is being driven by new legislation passed in India, China, Japan, some European countries and certain US states prohibiting the production of internal combustion engine vehicles after 2030 or 2035, Bielak said. Hybrid-electric vehicles are expected to grow to 18.7% of all vehicles made by 2032 from 10.5% in 2023. But the market share for internal combustion engine vehicles is expected to fall to 51.8% by 2032 compared with 81.8% in 2023. The average mid-size ICE vehicle today has about 11.6 kg of copper, while hybrid-electric vehicles will require about 14.3 kg, battery-electric vehicles about 17.1 kg and plug-in hybrid-electric vehicles about 17.5 kg. "As we work our way up, that plug-in hybrid has 52% more copper on that vehicle than

the current ICE vehicle," Bielak said. As a result, an additional 250,000 mt of copper will be needed by 2032 to satisfy the demand from vehicles with advanced autonomous features, compared with about 100,000 mt today, she added

### Other important information on copper market:

- Global miners and Chinese smelters could set higher annual treatment and refining charges (TC/RCs) in 2023 as rising copper concentrate supply is expected to outpace smelting capacity growth. The TC/RCs benchmark, referenced in supply contracts globally, is usually taken from the first settlement between a major miner and a smelter in top copper consumer China in annual negotiations. "2023 undeniably looks like a strong year for concentrate growth. Moreover, it comes at a time of limited Chinese smelter capacity addition," said Colin Hamilton, a managing director at BMO Capital Markets. "This raises the spectre of a smelter bottleneck for the first time in over a decade, where smelter utilisation is maxed out, forcing excess concentrate to be stockpiled or forced offline via economics," he added. BMO forecast the 2023 benchmark at \$85 a tonne and 8.5 cents per pound, with an upward skew. This year the benchmark was set at \$65 per tonne and 6.5 cents per pound, but China's top copper smelters already lifted their floor TC/RCs in the fourth quarter to a five-year high at \$93/9.3c due to a supply glut. "Buyers will have an upper hand in negotiation," said a Chinese smelter source, who sees the TC jumping to \$100 a tonne.
- Peru's copper production rose in September, while zinc, lead, tin, molybdenum, and precious metals all fell. Copper output rose 13% y/y to 229,990 mt on the startup of Anglo American's \$5.3 billion Quellaveco mine and gains at mines operated by Freeport-McMoRan, Hudbay Minerals, and Antamina. Zinc production fell 14% on the year to 109,966 mt, lead was down 11% to 19,278 mt, and silver slid 8% to 255,000 kg. Gold production fell 9% to 7,912 kg. Tin output ticked down 1% to 2,263 mt from 2,281 mt the previous year at the country's lone producer Minsur, while molybdenum plunged 38% to 2,159 mt.

## Precious Metals

### Silver heads for biggest deficit in decades, Silver Institute says

**Demand in India almost doubled in 2022 as buyers took advantage of low prices to replenish stockpiles drawn down in 2020 and 2021. As Metals Focus predicts, you could see some decent figures in 2023 but it may not match 2022.**

Global demand for silver is expected to rise 16% this year to 1.21 billion ounces, creating the biggest deficit in decades, according to the Silver Institute on Thursday night. Use of silver by industry, for jewellery and silverware and for bars and coins for retail investors were all forecast to reach record levels, the institute said. Automakers are using more silver as the amount of electronics in vehicles increases, but the sector accounts for only around 5% of total demand. Solar panels account for around 10% of silver demand. Demand in India almost doubled in 2022 as buyers took advantage of low prices to replenish stockpiles drawn down in 2020 and 2021. Exchange traded funds (ETFs) storing silver for investors shrank, however, returning metal to the market, but the Silver Institute does not count ETFs as physical demand because they only store wholesale silver bars and do not rework them. The Silver Institute predicted a deficit of 194 million ounces this year, up from 48 million ounces in 2021. Demand is likely to fall next year, said Philip Newman at Consultants Metals Focus, which prepared the Silver Institute's numbers. "India's restocking is likely to trip over into 2023 but at some point will dissipate," he said. "By extension, you could see some decent figures in 2023 but it may not match 2022." Newman said he expected strong demand from industries such as solar panel and auto makers and more silver supply deficits in the coming years, but not as large as in 2022. The amount of silver stored in vaults in London and New York monitored by the COMEX exchange and the London Bullion Market Association has fallen by around 370 million ounces – or 25% -- this year. But Newman said there was plenty of silver left. "You do have still sizeable stocks," he said. "I don't think that's a concern." Silver prices have fallen around 10% this year to \$21 an ounce, mostly due to financial investors selling silver in response to rising U.S. bond yields and a strengthening dollar.

## Global economies | Foreign exchange markets

### Fed Seen Sticking With Higher Peak Rate








**Despite inflation readings below expectations, economists mostly stick to their forecast that the Federal Reserve will raise interest rates to 5% by March and keep them at that level for most of 2023.**

Economists largely stuck to their forecasts that the Federal Reserve will raise interest rates to 5% by March and hold them there for most of 2023, even after inflation slowed last month by more than forecast. The Federal Open Market Committee will raise rates an additional percentage point over the next several meetings to confront inflation near a 40-year high, according to a Bloomberg survey of 65 economists that took place Nov. 4-11. The economists kept their view of the Fed's policy path despite a surge in markets following an unexpectedly large slowdown in price gains in October. Officials got a bit more good news after Labor Department data showed US producer price growth stepped down in October by more than expected in the latest sign that inflationary pressures are beginning to ease. The producer price index for final demand advanced 8% from a year ago, the smallest annual gain in more than a year, and 0.2% from month earlier. Fed officials remain resolute to continue their fight against inflation and not prematurely halt rate hikes in order to ensure a return to the 2% target, even as they acknowledge the economy could suffer pain and a possible recession. The US central bank has raised its benchmark rate from almost zero in March to a target range of 3.75% to 4% this month in a bid to slow the economy and bring inflation that surged following the Covid-19 disruptions of 2020 and 2021. The most aggressive tightening campaign since the 1980s has included rate hikes of three-quarters of a percentage point at each of the last four policy meetings, triple the usual move. "The Federal Reserve is focused on defeating inflation, whatever the economic cost," James Knightley, chief international economist at ING Groep NV, said in a survey response. "We look for Fed funds to peak at 5%, but with nascent signs that inflation will fall sharply next year and the likelihood that recession will bite hard, the chances of a policy reversal in 2023 are high." The economists see the Fed as somewhat more steadfast in keeping rates higher for longer than investors, despite recent positive inflation news. Data showed consumer prices cooling by more than expected in October, with the consumer price index rising 7.7% from a year earlier versus 8.2% the month before. News of the better-than-expected CPI report sent bond yields plummeting and saw investors harden bets that the Fed would scale back the size of its next rate increase in December to 50 basis points. Markets are now pricing in a peak near 5% with rates falling to 4.5% by the end of 2023. The economists were split on when the central bank will back off of its aggressive rates. The median projection predicts rates will drop by a quarter in the fourth quarter of next year, though nearly half disagree and put rates at 5% or higher. Economists at Goldman Sachs Group Inc. predicting the Fed will hold at 5% at the end of 2023, while some competitors see cuts following economic weakness and lower inflation. Reflecting the view that rates may be nearing





a peak and that the path is largely priced in, the economists surveyed look for the 10-year Treasury yield to peak at 4.03% at the end of the current quarter and decline to 3.5% by the fourth quarter next year. There's not a lot of doubt about the near-term outlook for rates. Economists now expect Fed officials to opt for a smaller, half-point hike at their Dec. 13-14 meeting following a signal from Chair Jerome Powell on Nov. 2 that such a downshift was in the offing, as well as the more positive inflation report.

# Macroeconomic calendar

## Important macroeconomic data releases

| Weight  | Date   | Event  | For | Reading <sup>1</sup> | Previous | Consensus <sup>2</sup> |
|---|--------|--|-----|----------------------|----------|------------------------|
| <b>China</b>       |        |  |     |                      |          |                        |
| ☉☉  | 07-Nov | Trade balance (USD bn)‡                                    | Oct | 85.2 ▲               | 84.8     | 96.0 ◡                 |
| ☉☉  | 07-Nov | Exports (yoy)‡   | Oct | -0.3% ▼              | 5.9%     | 4.5% ◡                 |
| ☉   | 07-Nov | Foreign reserves (USD bn)                                  | Oct | 3 052 ▲              | 3 029    | 3 039 ▲                |
| ☉☉☉☉  | 09-Nov | Consumer inflation CPI (yoy)                               | Oct | 2.1% ▼               | 2.8%     | 2.4% ◡                 |
| ☉☉  | 09-Nov | Producer inflation PPI (yoy)                               | Oct | -1.3% ▼              | 0.9%     | -1.5% ▲                |
| ☉   | 10-Nov | New yuan loans (CNY bn)‡                                   | Oct | 615 ▼                | 2 474    | 800 ◡                  |
| ☉☉☉☉  | 15-Nov | Industrial production (yoy)                                | Oct | 5.0% ▼               | 6.3%     | 5.3% ◡                 |
| ☉☉  | 15-Nov | Fixed assets investments (ytd, yoy)                        | Oct | 5.8% ▼               | 5.9%     | 5.9% ◡                 |
| ☉   | 15-Nov | Retail sales (yoy)   | Oct | -0.5% ▼              | 2.5%     | 0.7% ◡                 |
| <b>Poland</b>      |        |  |     |                      |          |                        |
| ☉☉☉☉☉   | 09-Nov | NBP base rate decision                                     | Nov | 6.75% -              | 6.75%    | 7.00% ◡                |
| ☉☉  | 14-Nov | Trade balance (EUR mn)‡                                    | Sep | -2 054 ▲             | -2 642   | -2 236 ▲               |
| ☉☉  | 14-Nov | Exports (EUR mn)‡  | Sep | 28 498 ▲             | 25 746   | 27 565 ▲               |
| ☉☉  | 14-Nov | Current account balance (EUR mn)‡                          | Sep | -1 561 ▲             | -3 332   | -3 100 ▲               |
| ☉☉☉☉☉   | 15-Nov | GDP (yoy) - preliminary data‡                              | 3Q  | 3.5% ▼               | 5.8%     | 3.4% ▲                 |
| ☉☉☉☉☉   | 15-Nov | GDP (qoq) - preliminary data‡                              | 3Q  | 0.9% ▲               | -2.3%    | 0.0% ▲                 |
| ☉☉☉☉  | 15-Nov | Consumer inflation CPI (yoy) - final data                  | Oct | 17.9% -              | 17.9%    | --                     |
| ☉☉☉☉  | 16-Nov | Core CPI (excluding food and energy, yoy)                  | Oct | 11.0% ▲              | 10.7%    | 11.1% ◡                |
| <b>US</b>        |        |  |     |                      |          |                        |
| ☉☉☉☉  | 10-Nov | Consumer inflation CPI (mom)                               | Oct | 0.4% -               | 0.4%     | 0.6% ◡                 |
| ☉☉☉☉  | 10-Nov | Consumer inflation CPI (yoy)                               | Oct | 7.7% ▼               | 8.2%     | 7.9% ◡                 |
| ☉☉  | 11-Nov | University of Michigan confidence index - preliminary data | Nov | 54.7 ▼               | 59.9     | 59.5 ◡                 |
| ☉☉☉☉  | 16-Nov | Industrial production (mom)‡                               | Oct | -0.1% ▼              | 0.1%     | 0.1% ◡                 |
| ☉☉  | 16-Nov | Retail sales (excluding autos, mom)                        | Oct | 1.3% ▲               | 0.1%     | 0.5% ▲                 |
| ☉   | 16-Nov | Capacity utilization‡                                      | Oct | 79.9% ▼              | 80.1%    | 80.4% ◡                |
| ☉☉  | 17-Nov | Philadelphia Fed business outlook                          | Nov | - 19.4 ▼             | - 8.7    | - 6.0 ◡                |
| <b>Eurozone</b>  |        |  |     |                      |          |                        |
| ☉☉  | 08-Nov | Retail sales (yoy)‡  | Sep | -0.6% ▲              | -1.4%    | -1.1% ▲                |
| ☉☉☉☉  | 14-Nov | Industrial production (sa, mom)‡                           | Sep | 0.9% ▼               | 2.0%     | 0.5% ▲                 |
| ☉☉☉☉  | 14-Nov | Industrial production (wda, yoy)‡                          | Sep | 4.9% ▲               | 2.8%     | 3.0% ▲                 |
| ☉☉☉☉☉   | 15-Nov | GDP (sa, yoy) - preliminary data                           | 3Q  | 2.1% -               | 2.1%     | 2.1% ○                 |
| ☉☉☉☉☉   | 15-Nov | GDP (sa, qoq) - preliminary data                           | 3Q  | 0.2% -               | 0.2%     | 0.2% ○                 |
| ☉   | 15-Nov | Trade balance (EUR mn)                                     | Sep | - 34.4 ▲             | - 50.9   | --                     |
| ☉   | 15-Nov | ZEW survey expectations                                    | Nov | - 38.7 ▲             | - 59.7   | --                     |
| ☉☉☉☉  | 17-Nov | Consumer inflation CPI (yoy) - final data                  | Oct | 10.6% ▲              | 9.9%     | 10.7% ◡                |
| ☉☉☉☉  | 17-Nov | Core CPI (yoy) - final data                                | Oct | 5.0% -               | 5.0%     | 5.0% ○                 |
| <b>Germany</b>   |        |  |     |                      |          |                        |
| ☉☉☉☉  | 07-Nov | Industrial production (wda, yoy)‡                          | Sep | 2.6% ▲               | 1.6%     | 2.0% ▲                 |
| ☉☉☉☉  | 11-Nov | Harmonized consumer inflation HICP (yoy) - final data      | Oct | 11.6% -              | 11.6%    | 11.6% ○                |
| ☉☉☉☉  | 11-Nov | Consumer inflation CPI (yoy) - final data                  | Oct | 10.4% -              | 10.4%    | 10.4% ○                |
| <b>France</b>    |        |  |     |                      |          |                        |
| ☉☉☉☉  | 15-Nov | Harmonized consumer inflation HICP (yoy) - final data      | Oct | 7.1% -               | 7.1%     | 7.1% ○                 |
| ☉☉☉☉  | 15-Nov | Consumer inflation CPI (yoy) - final data                  | Oct | 6.2% -               | 6.2%     | 6.2% ○                 |
| <b>Italy</b>     |        |  |     |                      |          |                        |
| ☉☉☉☉  | 10-Nov | Industrial production (wda, yoy)                           | Sep | -0.5% ▼              | 2.9%     | 1.0% ◡                 |
| ☉☉☉☉  | 16-Nov | Harmonized consumer inflation HICP (yoy) - final data      | Oct | 12.6% ▼              | 12.8%    | 12.8% ◡                |



| Weight  | Date   | Event                                     | For | Reading <sup>1</sup> | Previous | Consensus <sup>2</sup> |
|---|--------|---|-----|----------------------|----------|------------------------|
| <b>UK</b>      |        |   |     |                      |          |                        |
| ★★★★★   | 11-Nov | GDP (yoy) - preliminary data              | 3Q  | 2.4% ▼               | 4.4%     | 2.1% ▲                 |
| ★★★★★   | 11-Nov | GDP (qoq) - preliminary data              | 3Q  | -0.2% ▼              | 0.2%     | -0.5% ▲                |
| ★★★★  | 11-Nov | Industrial production (yoy)‡              | Sep | -3.1% ▲              | -4.3%    | -4.4% ▲                |
| ★★  | 15-Nov | Unemployment rate (ILO, 3-months)         | Sep | 3.6% ▲               | 3.5%     | 3.5% ▲                 |
| ★★★★  | 16-Nov | Consumer inflation CPI (yoy)              | Oct | 11.1% ▲              | 10.1%    | 10.7% ▲                |
| <b>Japan</b>   |        |   |     |                      |          |                        |
| ★★★★★   | 15-Nov | GDP (annualized, qoq) - preliminary data‡ | 3Q  | -1.2% ▼              | 4.6%     | 1.2% ◡                 |
| ★★★★★   | 15-Nov | GDP (qoq, sa) - preliminary data‡         | 3Q  | -0.3% ▼              | 1.1%     | 0.3% ◡                 |
| ★★★★  | 15-Nov | Industrial production (yoy) - final data  | Sep | 9.6% ▼               | 9.8%     | --                     |
| ★★★★  | 18-Nov | Consumer inflation CPI (yoy)              | Oct | 3.7% ▲               | 3.0%     | 3.6% ▲                 |
| <b>Chile</b>   |        |   |     |                      |          |                        |
| ★★★   | 07-Nov | Copper exports (USD mn)‡                  | Oct | 3 485 ▲              | 3 344    | --                     |
| ★★  | 07-Nov | Nominal wages (yoy)                       | Sep | 11.2% ▲              | 11.1%    | --                     |
| ★★★★★   | 18-Nov | GDP (yoy)‡                                | 3Q  | 0.3% ▼               | 5.6%     | 0.2% ▲                 |
| <b>Canada</b>  |        |   |     |                      |          |                        |
| ★★★★  | 16-Nov | Consumer inflation CPI (yoy)              | Oct | 6.9% =               | 6.9%     | 6.9% ○                 |

<sup>1</sup> Reading difference to previous release: ▲ = higher than previous; ▼ = lower than previous; = = equal to previous.

<sup>2</sup> Reading difference to consensus: ▲ = higher than consensus; ◡ = lower than consensus; ○ = equal to consensus.

mom = month-on-month; yoy = year-on-year; qoq = quarter on quarter; ytd year-to-date; sa = seasonally adjusted; wda = working days adjusted; ‡ = previous data after revision.

Source: Bloomberg, KGHM Polska Miedź

## Key market data

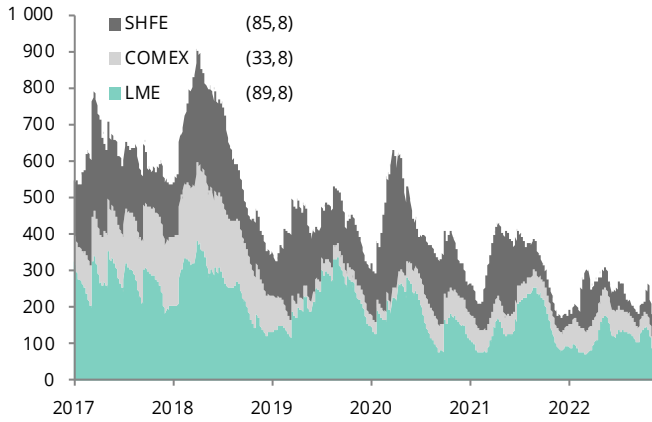
### Key base & precious metal prices, exchange rates and other important market factors

| <i>(as of: 18-Nov-22)</i>         |           | Price change <sup>1</sup> |          |          |          |           | From year beginning <sup>2</sup> |           |  |
|-----------------------------------|-----------|---------------------------|----------|----------|----------|-----------|----------------------------------|-----------|--|
|                                   | Price     | 2W                        | QTD      | YTD      | 1Y       | Average   | Min                              | Max       |  |
| <b>LME (USD/t; Mo in USD/lbs)</b> |           |                           |          |          |          |           |                                  |           |  |
| Copper                            | 8 047.00  | ▲ 1.8%                    | ▲ 5.2%   | ▼ -17.0% | ▼ -14.8% | 8 863.62  | 7 000.00                         | 10 730.00 |  |
| Molybdenum                        | 19.71     | ▲ 5.2%                    | ▲ 7.3%   | ▲ 5.5%   | ▲        | 17.99     | 14.10                            | 19.71     |  |
| Nickel                            | 24 850.00 | ▲ 4.7%                    | ▲ 11.5%  | ▲ 18.8%  | ▲ 28.8%  | 25 303.87 | 19 100.00                        | 45 795.00 |  |
| Aluminum                          | 2 369.00  | ▲ 2.7%                    | ▲ 8.7%   | ▼ -15.6% | ▼ -9.1%  | 2 743.34  | 2 080.00                         | 3 984.50  |  |
| Tin                               | 21 750.00 | ▲ 18.4%                   | ▲ 4.8%   | ▼ -45.1% | ▼ -45.2% | 32 179.89 | 17 700.00                        | 50 050.00 |  |
| Zinc                              | 3 007.50  | ▲ 5.6%                    | ▲ 0.7%   | ▼ -17.1% | ▼ -6.1%  | 3 529.53  | 2 682.00                         | 4 530.00  |  |
| Lead                              | 2 175.00  | ▲ 7.6%                    | ▲ 15.1%  | ▼ -6.6%  | ▼ -2.9%  | 2 145.73  | 1 754.00                         | 2 513.00  |  |
| <b>LBMA (USD/troz)</b>            |           |                           |          |          |          |           |                                  |           |  |
| Silver                            | 21.10     | ▲ 5.7%                    | ▲ 10.9%  | ▼ -8.6%  | ▼ -15.5% | 21.61     | 17.77                            | 26.18     |  |
| Gold <sup>2</sup>                 | 1 751.60  | ▲ 4.6%                    | ▲ 4.8%   | ▼ -3.8%  | ▼ -5.8%  | 1 802.25  | 1 628.75                         | 2 039.05  |  |
| <b>LPPM (USD/troz)</b>            |           |                           |          |          |          |           |                                  |           |  |
| Platinum <sup>2</sup>             | 986.00    | ▲ 4.1%                    | ▲ 14.1%  | ▲ 2.5%   | ▼ -7.5%  | 955.40    | 831.00                           | 1 151.00  |  |
| Palladium <sup>2</sup>            | 1 967.00  | ▲ 4.1%                    | ▼ -11.2% | ▲ 2.0%   | ▼ -9.4%  | 2 143.72  | 1 786.00                         | 3 015.00  |  |
| <b>FX <sup>3</sup></b>            |           |                           |          |          |          |           |                                  |           |  |
| EURUSD                            | 1.0366    | ▲ 5.0%                    | ▲ 6.3%   | ▼ -8.5%  | ▼ -8.6%  | 1.0528    | 0.9565                           | 1.1464    |  |
| EURPLN                            | 4.7067    | ▲ 0.4%                    | ▼ -3.3%  | ▲ 2.3%   | ▲ 1.0%   | 4.6883    | 4.4879                           | 4.9647    |  |
| USDPLN                            | 4.5337    | ▼ -5.5%                   | ▼ -8.5%  | ▲ 11.7%  | ▲ 10.3%  | 4.4643    | 3.9218                           | 5.0381    |  |
| USDCAD                            | 1.3385    | ▼ -1.0%                   | ▼ -2.3%  | ▲ 5.6%   | ▲ 6.1%   | 1.2945    | 1.2451                           | 1.3856    |  |
| USDCNY                            | 7.1198    | ▼ -0.9%                   | ▲ 0.1%   | ▲ 12.0%  | ▲ 11.5%  | 6.6978    | 6.3093                           | 7.3050    |  |
| USDCLP                            | 920.86    | ▼ -2.9%                   | ▼ -4.7%  | ▲ 9.0%   | ▲ 12.4%  | 871.21    | 777.10                           | 1 042.97  |  |
| <b>Money market</b>               |           |                           |          |          |          |           |                                  |           |  |
| 3m LIBOR USD                      | 4.665     | ▲ 0.11                    | ▲ 0.91   | ▲ 4.46   | ▲ 4.51   | 2.111     | 0.216                            | 4.675     |  |
| 3m EURIBOR                        | 1.821     | ▲ 0.09                    | ▲ 0.65   | ▲ 2.39   | ▲ 2.39   | 0.138     | -0.576                           | 1.821     |  |
| 3m WIBOR                          | 7.400     | ▼ -0.19                   | ▲ 0.19   | ▲ 4.86   | ▲ 5.74   | 5.903     | 2.590                            | 7.610     |  |
| 5y USD interest rate swap         | 4.067     | ▼ -0.35                   | ▼ -0.07  | ▲ 2.70   | ▲ 2.75   | 2.966     | 1.445                            | 4.488     |  |
| 5y EUR interest rate swap         | 2.756     | ▼ -0.31                   | ▼ -0.21  | ▲ 2.74   | ▲ 2.85   | 1.596     | 0.031                            | 3.196     |  |
| 5y PLN interest rate swap         | 6.445     | ▼ -1.10                   | ▼ -0.60  | ▲ 2.71   | ▲ 3.24   | 5.935     | 3.780                            | 7.911     |  |
| <b>Fuel</b>                       |           |                           |          |          |          |           |                                  |           |  |
| WTI Cushing                       | 80.08     | ▼ -13.5%                  | ▲ 0.7%   | ▲ 4.0%   | ▲ 1.4%   | 96.78     | 76.71                            | 123.70    |  |
| Brent                             | 88.08     | ▼ -11.8%                  | ▲ 2.2%   | ▲ 13.7%  | ▲ 7.8%   | 102.39    | 79.83                            | 133.89    |  |
| Diesel NY (ULSD)                  | 362.81    | ▼ -25.4%                  | ▲ 7.9%   | ▲ 51.4%  | ▲ 51.9%  | 378.81    | 241.70                           | 534.54    |  |
| <b>Others</b>                     |           |                           |          |          |          |           |                                  |           |  |
| VIX                               | 23.12     | ▼ -1.43                   | ▼ -8.50  | ▲ 5.90   | ▲ 5.53   | 26.19     | 16.91                            | 36.45     |  |
| BBG Commodity Index               | 114.79    | ▼ -2.3%                   | ▲ 3.0%   | ▲ 15.8%  | ▲ 11.9%  | 119.61    | 100.58                           | 136.61    |  |
| S&P500                            | 3 965.34  | ▲ 5.2%                    | ▲ 10.6%  | ▼ -16.8% | ▼ -15.7% | 4 116.05  | 3 577.03                         | 4 793.54  |  |
| DAX                               | 14 431.86 | ▲ 7.2%                    | ▲ 19.1%  | ▼ -9.1%  | ▼ -11.0% | 13 818.49 | 11 975.55                        | 16 271.75 |  |
| Shanghai Composite                | 3 097.24  | ▲ 0.9%                    | ▲ 2.4%   | ▼ -14.9% | ▼ -12.0% | 3 239.45  | 2 886.43                         | 3 632.33  |  |
| WIG 20                            | 1 707.23  | ▲ 6.6%                    | ▲ 23.9%  | ▼ -24.7% | ▼ -24.8% | 1 813.12  | 1 358.50                         | 2 411.11  |  |
| KGHM                              | 113.95    | ▲ 4.5%                    | ▲ 30.0%  | ▼ -18.3% | ▼ -19.4% | 127.71    | 84.22                            | 182.20    |  |

° change over: 2W = two weeks; QTD = quarter-to-day; YTD = year-to-date; 1Y = one year. <sup>1</sup> based on daily closing prices. <sup>2</sup> latest quoted price. <sup>3</sup> central banks' fixing rates (Bank of China HK for USD/CNY). <sup>4</sup>

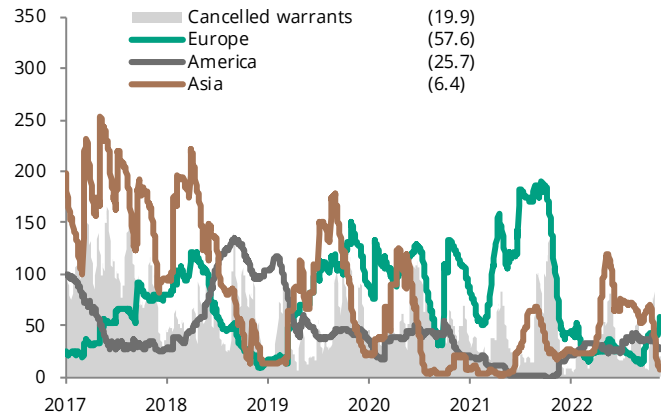
Source: Bloomberg, KGHM Polska Miedź

**Copper: official exchange stocks (thousand tonnes)**



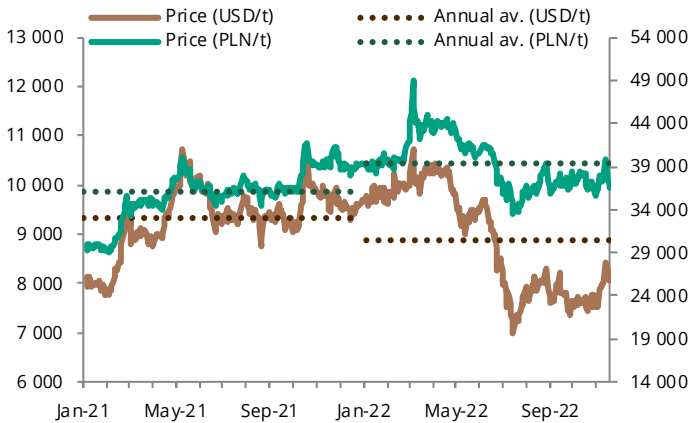
Note: Latest values in brackets. Source: Bloomberg, KGHM

**Copper: official LME stocks (thousand tonnes)**



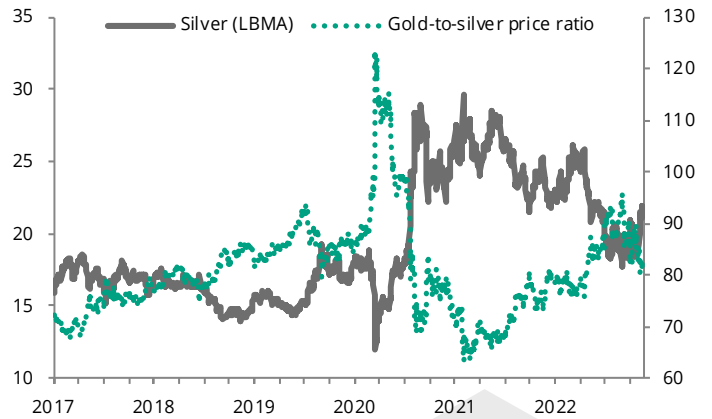
Note: Latest values in brackets. Source: Bloomberg, KGHM

**Copper: price in USD (lhs) and PLN (rhs) per tonne**



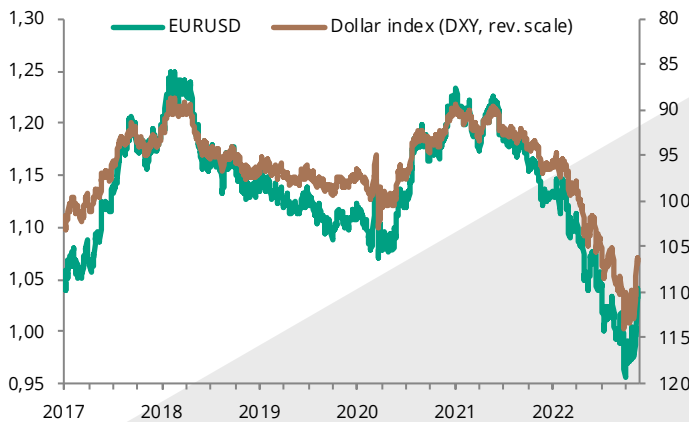
Source: Bloomberg, KGHM Polska Miedź

**Silver: price (lhs) and gold ratio (rhs)**



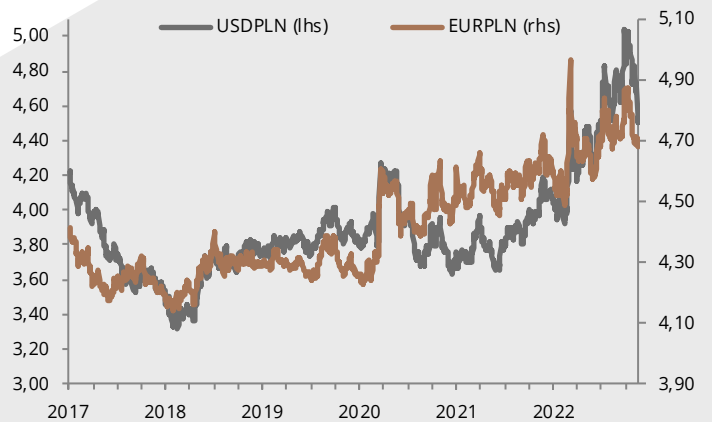
Source: Bloomberg, KGHM Polska Miedź

**USD: dollar index (lhs) and ECB-based EURUSD (rhs)**



Source: Bloomberg, KGHM Polska Miedź

**PLN: NBP-fixing based rate vs. USD (lhs) and EUR (rhs)**



Source: Bloomberg, KGHM Polska Miedź

## Legal note

This document has been prepared based on the below listed reports, among others, published in the following period:  
**7 -20 November 2022.**

- Barclays Capital, ▪ BofA Merrill Lynch, ▪ Citi Research, ▪ CRU Group, ▪ Deutsche Bank Markets Research,
- GavekalDragonomics, ▪ Goldman Sachs, ▪ JPMorgan, ▪ Macquarie Capital Research, ▪ Mitsui Bussan Commodities,
- Morgan Stanley Research, ▪ SMM Information & Technology, ▪ Sharps Pixley.

Moreover, additional information published here was acquired in direct conversations with market dealers, from financial institution reports and from the following websites: ▪ thebulliondesk.com, ▪ lbma.org.uk, ▪ lme.co.uk, ▪ metalbulletin.com, ▪ nbp.pl, , also: Bloomberg and Thomson Reuters.

Official metals prices are available on following websites:

- base metals: [www.lme.com/dataprices\\_products.asp](http://www.lme.com/dataprices_products.asp) (charge-free logging)
- silver and gold: [www.lbma.org.uk/pricing-and-statistics](http://www.lbma.org.uk/pricing-and-statistics)
- platinum and palladium: [www.lppm.com/statistics.aspx](http://www.lppm.com/statistics.aspx)

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