Commodity Market Study: Update (2019)

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Abstract

The aim of this report is to provide an update on the main export commodities: coal, copper, gold and iron ore market. This study mainly highlights demand and supply factors influencing the world and Mongolian market, since the January 2018 commodity market study update.

Keywords:

Coal, copper, gold, iron ore, market demand, market supply, commodity prices

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COAL

BACKGROUND

This is the third update of the coal market since the initial report which was published in 2017. Included in this update will be the main factors which have influenced the demand, supply and price of coal in 2018 and 2019. Similar to the previous updates, the report will follow a similar outline with a focus on the coking coal market.

WORLD MARKET

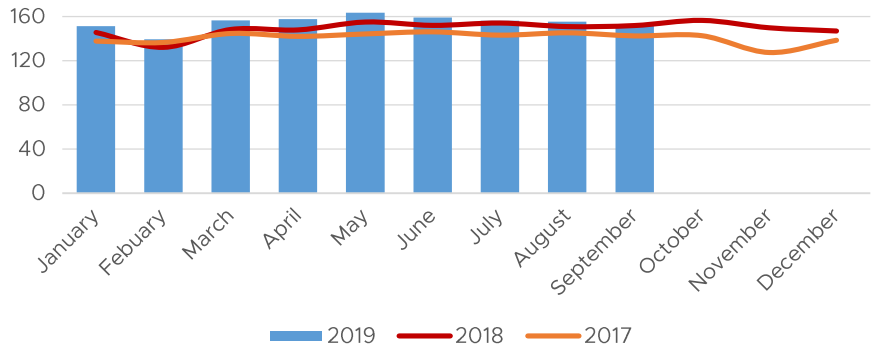
As coking coal is used in the steelmaking process, the main determinant of demand for the commodity is derived from the demand for crude steel and its production. However, a noticeable shift in recent years is the global movement towards being green and environmentally friendly. In that aspect, electric furnaces are being favored over oxygen blast furnaces in the production of crude steel. Additionally, countries such as China, the largest importer of coking coal, has been implementing measures to combat air pollution. Included in these measures are limitations on coal imports, forced curtailments of steel mills and closure of inefficient, small, and informal mills.

On the supply side, the largest global supplier and exporter of coking coal remains to be Australia. Any delays or disruptions in the production or transportation of Australian can cause a supply shock, pushing prices upwards as observed in previous reports.

DEMAND SIDE

World crude steel production was 1,808 million tonnes (Mt) in 2018, an increase of 4.5 percent from the previous year. As it can be observed in the figure below, based on the monthly crude steel production, 2019 will record an even higher production of crude steel relative to 2017 and 2018. Within the first nine months of 2019, the global crude steel production was 1,390 Mt.

FIGURE 1. MONTHLY CRUDE STEEL PRODUCTION MT

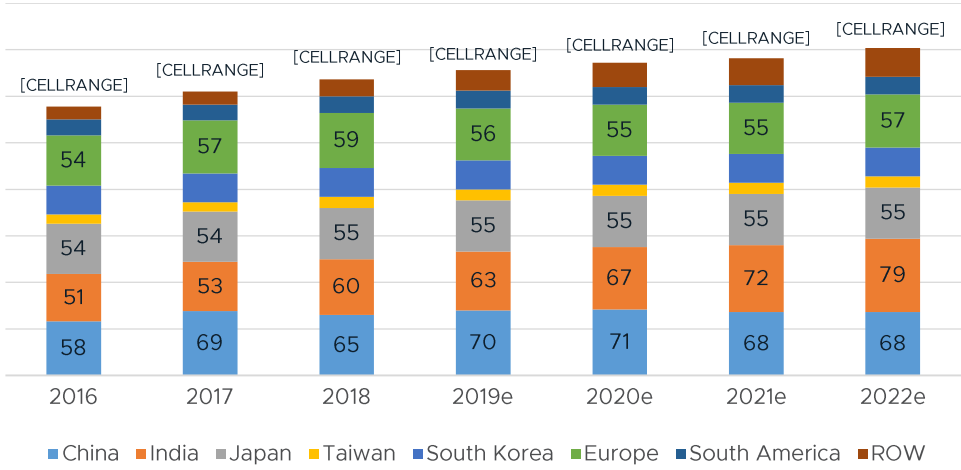


Source: World Steel Association

In the World Steel Association's Short-Range Outlook released in October 2019, it was forecasted that global steel demand for finished steel will increase by 3.9 percent to 1,775 Mt in 2019. Breaking down this expected growth in 2019, steel demand in China will grow by 7.8 percent in 2019 to 900.1 Mt while the rest of the world's demand increased by 0.2 percent to 874.9 Mt. The expected growth in 2020 for steel demand is 1.7 percent globally. Of that, Chinese steel demand is expected to grow by 1 percent in 2020 and the rest of the world by 2.5 percent. The 2.5 percent growth is likely to be driven by the growth in emerging and developing economies excluding China.

According to Bloomberg, the total demand for coking coal is expected to rise steadily over the years. Demand for seaborne coal has been boosted by China, India, Brazil and Southeast Asia, which has offset the decline from Europe due to idle blast furnaces (ArcelorMittal, 2019; Singh, 2019) and bankruptcies (Pitas, et al., 2019).

FIGURE 2. COKING COAL DEMAND OUTLOOK, MT



Source: Bloomberg

Over the next three years, steel capacities in Southeast Asia and India are expected to increase as steel producers bring new basic-oxygen furnaces online. Some of these additions are listed below:

TABLE 1. BASIC OXYGEN FURNACE STEEL-CAPACITY ADDITIONS, MT

Country	Company	2018	2019	2020	2021	2022
Malaysia	Alliance	0	2	3.5	3.5	3.5
Malaysia	Leader Steel	0	0	0	3	3
Vietnam	Formosa	4.5	7.5	7.5	7.5	7.5
Vietnam	Hoa Phat	0	1	2	2.5	4
Indonesia	Cilegon (Krakatau)	0	0.8	1.5	1.5	1.5

Indonesia	PT Gunung	0	0	0	1	1
Indonesia	Delong (China)	0	1	3	3.5	3.5
Indonesia	Hebei Bishi (China)	0	0	0	0	2
India	JSW	5	5	7	10	10
India	Tata	3	3	3	4	8
India	NMDC	0	0	0	1.5	3
India	SAIL	0	1.7	3	5	7
India	Jindal	4	5.5	6.5	7	8
India	Others	0	1	2	3	4

Source: Bloomberg

China

The reforms implemented by the Chinese government on the steel industry has been an ongoing story within the commodity market landscape over the past two-three years. The supply side reform of China's steel industry was first announced in late 2015 by President Xi to remove 150 metric tonnes per annum (Mtpa) of capacity by 2020 (Balhuizen, 2018). At first, the focus was on less-disruptive removal of idle electric arc and basic oxygen furnaces capacity; however, in late 2016, authorities removed 120 Mtpa of induction furnace capacity. Due to these two movements, the steel industry utilization rates spiked to 85 percent from 70 percent and along with this, margins also jumped despite the coal supply side reforms being pursued simultaneously[1].

As margins are higher, the productivity incentives are also high which means, steel producers are willing to purchase higher quality raw materials. As such, premiums paid for higher grade coking coal and iron ore has been elevated since late 2016. Steel margins skyrocketed even further in the winter of 2017 when the Chinese government implemented the "2+26" environmental restriction (ERI, 2018).

In 2019, there has been a strong demand from China and as a result, elevated production. Machinery, one of the major downstream sectors and the sector with the most exposure to the trade war, was expected to decline; however, it has held up in light of anticipated counter-cyclical domestic policies. Please refer to the the iron ore section of this report for more information on the counter-cyclical measures implemented by China. During the first eight months of 2019, Chinese coking coal imports increased by 20 percent, with Mongolia and Australia accounting for 87 percent of its imports (Leung, 2019).

China is likely to continue to pursue its supply side reforms, with a focus on industry optimization and upgrade. Steel mills have been actively upgrading their production facilities with bigger and more efficient blast furnaces and cokeries designed to produce high quality steel products (Balhuizen, 2018). Additionally, the steel industry has been increasingly implementing greener capacity which can meet the strict emission standards. For instance, stricter sulfur dioxide and nitrogen oxide

[1] China's long-term crude steel capacity utilization rate aim is 80 percent as stated in its steel industry Five Year plan (2016-2020).

standards have been introduced[2]. These are likely to support demand for high quality seaborne raw materials – coking coal and iron ore.

Besides environmental policies and reforms implemented by the Chinese government, the trade war between the United States and China has had major impacts on the steel industry and consequentially, its raw materials (coking coal and iron ore). As cited in previous reports, China is the largest producer of steel and thus, demand for steel is heavily dependent upon the Chinese steel industry. Chinese steel demand is likely to wane as the trade talks drag on. Downstream products such as machinery, appliances, and transportations are subject to a 25 percent tariff[3] and these products account for about 40 percent of China's steel use (Leung, 2019). Baowu Group, one of China's largest steel producers, is planning to relocate blast furnace to Cambodia from Xinjiang province to cut excess local capacity. This could trigger steel dumping and an oversupply in developing countries – driving steel prices further down. Steel manufacturing account for 85 percent of China's total coke demand. Thus, if the trade war persists, the demand for steel, iron ore and coking coal may decline.

SUPPLY SIDE

Australia remains the number one exporter of coking coal. The Australian government expects Australia to account for around 56 percent of world exports in 2021 (Department of Industry, Innovation and Science, 2019). Australia's market share is expected to remain below 60 percent, the level achieved in the pre-Cyclone Debbie in early 2017. Post-Cyclone Debbie, there was a supply shock which drove prices to favorable level that other exporting countries such as Russia, Canada, United States, Mozambique and Mongolia ramped up its productions.

Global supply of coking coal is expected to increase over the year with Australia driving the bulk of the growth. In Australia, the mixture of restarts, brownfield additions and one greenfield project led to a 6 Mt increase in 2019 from 2018. Russia also observed a 3 Mt increase due to the expansion by Mechel. Other projects which added to the supply was Willow Creek in Canada, Vale in Mozambique and multiple mines in the United States.

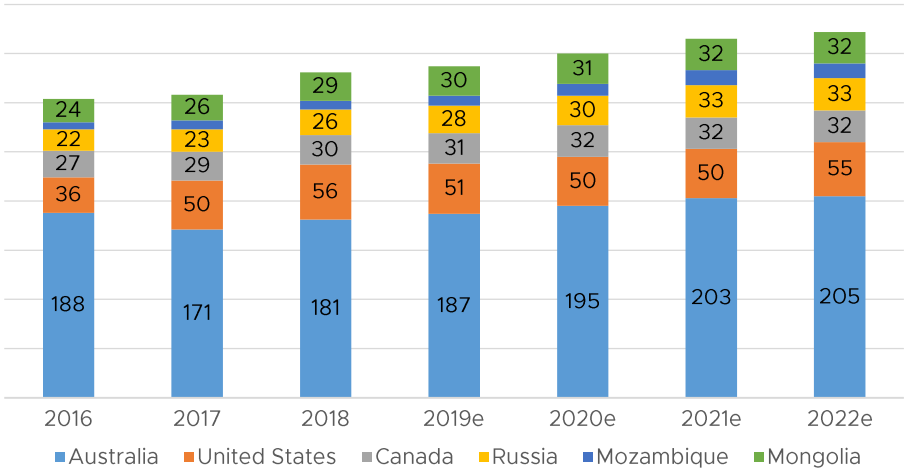
China has a significant influence on coking coal imports and any changes in its fiscal, monetary and import policies can pose a potential shift in the industry. For instance, in February, customs clearance for Australian coal took more than 40 days when typically, it used to take about 5-20 days. There have been speculations that the delays are due to issues over cyber security; however, the exact reason is still not clear (Xu, Meng, Patton, & Burton, 2019). These delays caused the spot price of Australian coal at the Chinese ports to slump slightly before reviving again in March as seen in **Error! Reference source not found.**

Coal import policies have been used as a tool to manage domestic markets. By limiting coal imports, the government hopes to encourage domestic supply and cool down prices.

[2] The Ultra-Low Emissions Standards Policy aims to limit the sulphur dioxide, nitrogen oxide and particulate matter emissions to 35, 50 and 10 milligrams per cubic meter, respectively.

[3] Effective since 23 March 2018 under Section 232 of the Trade Expansion Act of 1962

FIGURE 3. COKING COAL SUPPLY OUTLOOK, MT



Source: Bloomberg

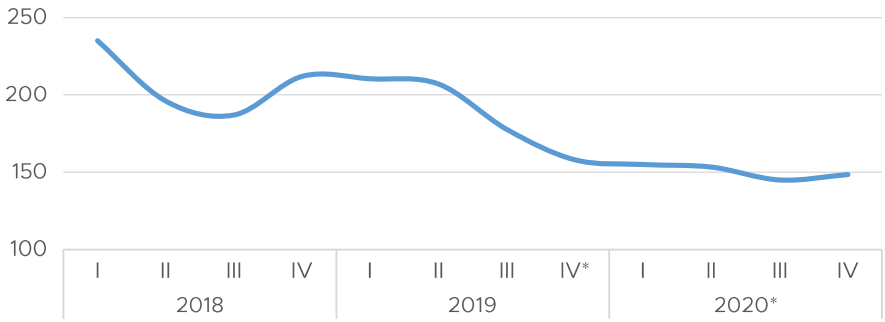
United States coal exports decline by 11 percent year-on-year in the first seven months of 2019 and are expected to decline further as the production costs and freight rates to Asia are high. Additionally, the price easing and increasing exports from other countries are likely to lessen the incentive for U.S. mines to export its coking coal. A similar trend is observed in Canadian exports.

Russian exports grew by 16 percent to 26 Mt in 2018 and during the first half of the year, exports continued to increase by 14 percent year-on-year. Another 4 Mt of coking coal is expected to be added to the seaborne coking coal supply by Russia between 2019 and 2021 due to new capacity, rail and port expansion and a weaker ruble. Additionally, the Russian Energy Ministry announced a draft plan which could increase total coal (both coking and thermal) output from 440 Mt to between 550 and 670 Mt. These additional capacities are likely to be exported by rail to Asia.

PRICE

In the third quarter of 2019, price of coking coal was 177.66 USD per Mt. Based on analysts' estimates from Société Générale, Commerzbank, Deutsche Bank and more, Bloomberg was able to derive an average forecast of coking coal prices until fourth quarter of 2020. As it can be observed in the figure below, analysts are estimating that the price of coking coal will decline further in the fourth quarter (to 158 USD per Mt) and maintain price levels around 150 USD per Mt.

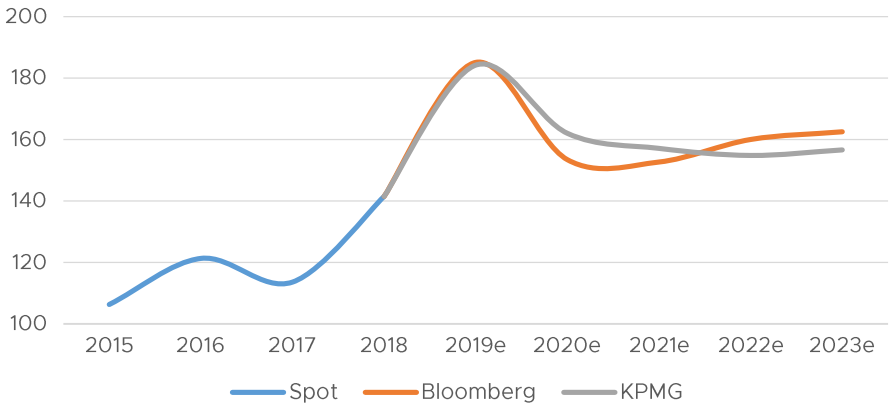
FIGURE 4. HARD COKING COAL FOB AUSTRALIA, USD/MT



Source: Bloomberg

The price of coking coal has declined more than anticipated in previous reports due to a number of factors. Demand growth has been relatively muted in light of deteriorating global economic outlook and weak global steel production excluding China. Although, Chinese imports of coking coal has been strong, it is not expected to sustain in the long term as steel margins decline and coal import restrictions are tightened. On the other hand, Australian, Russian and Mongolian coal supplies have been growing.

FIGURE 5. COKING COAL PRICE FORECAST, 2019-2023, USD/MT



Source: Bloomberg, KPMG

MONGOLIAN MARKET

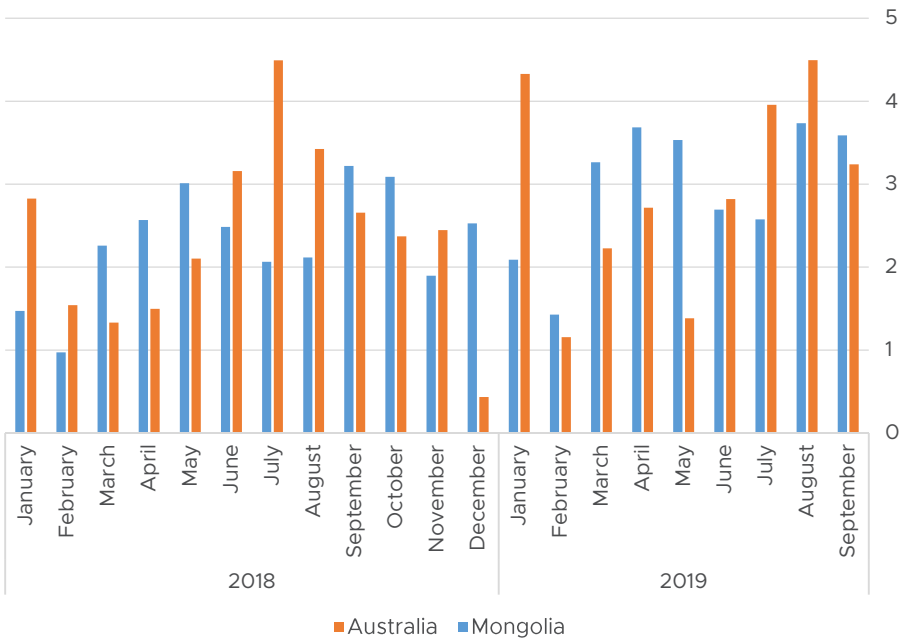
As mentioned in previous reports, the main market for Mongolian coking coal is China. As such, the main determinant of demand for Mongolian coal is demand from China. As for supply, a large majority of the export coals come from the Tavan Tolgoi and Nariinsukhait coal basins.

DEMAND SIDE

There are a number of conflicting factors which are influencing China's imports of coking coal. The government is expected to continue to implement the current import policies – with total coal imports restricted around 280 Mt in 2019. As coal imports have been high in the first three quarters of the year relative to the same period the previous year, volume of coal imports may drop sharply towards the end of 2019 as port reach their annual quotas. There has also been a slowdown in major steel consuming sectors such as construction and manufacturing. To which, the government responded with stimulus measures to boost industrial productions and infrastructure spending. In particular, China is expected to be more reliant on coking coal imports of high-quality grades which is difficult to source domestically.

The average calorific value of coal at the TT mine is about 5,500 kcal/kg, while sulphur content is around 0.5 percent and ash content around 0.2 percent. In comparison, Australian coal's calorific value is also high; however, its sulphur content is higher around 8-20 percent, which makes it less attractive.

FIGURE 6. CHINA COKING COAL IMPORTS, MT



Source: Bloomberg

Mongolia may replace Australia as China's largest coking coal supplier once the new railway becomes operational in 2021. The 240-kilometer railway track from Tavan Tolgoi, one of the world's largest open-pit coking coal mines, to China could exponentially increase Mongolian coal exports. Logistics costs per tonne may drop by 25 percent to about 24 yuan (Leung, 2019).

SUPPLY SIDE

In 2018, Mongolia exported 31.5 Mt of coking coal. These coking coals varied from raw to weak to washed.

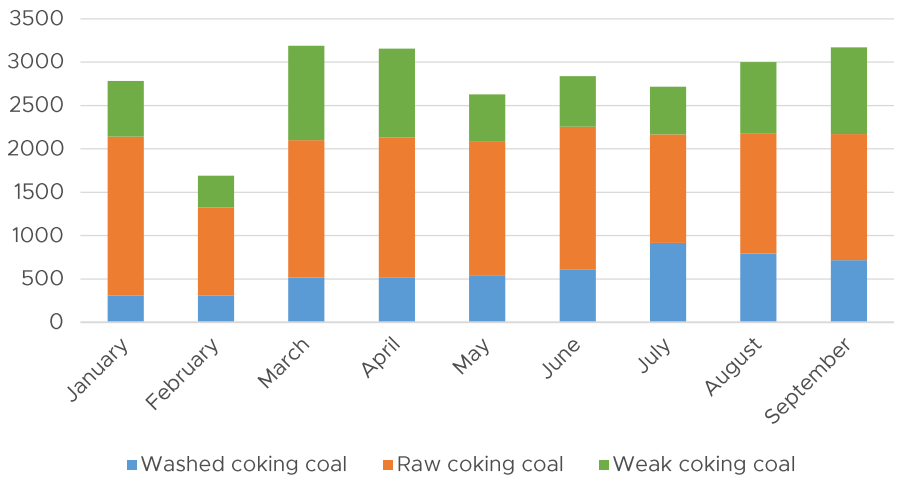
TABLE 2. COKING COAL EXPORT, MT

	2015	2016	2017	2018
*Production, Mt**	24.0	35.1	49.5	54.6
Export volume, Mt	12.7	20.3	24.6	31.5
Washed coking coal	1.5	2.2	4.5	5.4
Raw coking coal	5.6	10.1	11.5	14.4
Weak coking coal	5.6	8.0	8.6	11.7

*Source: NSO, MRPAM * Incudes thermal coal as well*

Mongolia's coking coal exports surged in 2019 as it tried to meet Chinese demand. As the bottlenecks at the Chinese border are cleared and substantial investment in infrastructures are made, export volumes are expected to follow suit and observe significant growths.

FIGURE 7. MONGOLIAN COKING COAL EXPORTS PER MONTH, THOUS. TONS



Source: MRPAM

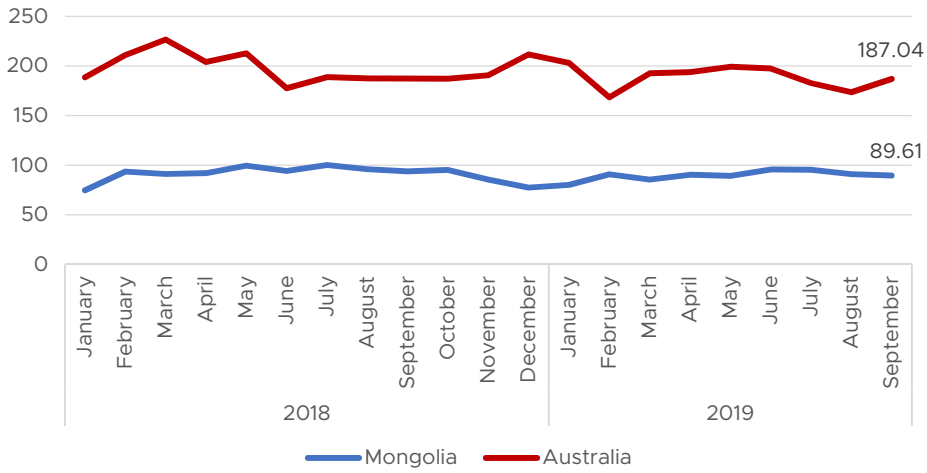
During the first nine months of the year, a total of 5.2 Mt, 13.3 Mt and 6.6 Mt of washed coking coal, raw coking coal and weak coking coal, respectively, was exported. Compared to the same period the previous year, Mongolian coal exports increased by 6.3 percent.

PRICE

Since 2018, the average monthly Chinese coking coal import prices have been around 90-100 USD per Mt for Mongolia. On the other hand, import prices for

Australian coal has tended to fluctuate due to supply disruptions and customs delays (February 2019).

FIGURE 8. CHINA COKING COAL IMPORT PRICE, USD/MT



Source: Bloomberg

In breaking down Mongolian coal prices further by mining companies, the prices vary according to the quality grade. It is known that the coals mined around the Ukhaa Khudag and Baruun Naran mines are of higher quality, especially when its processed further and washed. On the other hand, the coals from the Tavan Tolgoi coal basin tend to be exported raw. However, there are plans to construct a coal washing plant in order to add value.

TABLE 3. SALES STATISTICS AT TAVAN TOLGOI MINE SITE, 2018

	Description	Volume (Mt)	Value	Average Price
Mongolian Mining Corporation (Washed coking and thermal coal)	Exported to Chinese end-user	4.7	591 mill.USD	170.1 USD
	Exported through Gantsmod port			135.6 USD
	Payment for mining services	1.7		-
Erdenes Tavan Tolgoi JSC	Exported through auction	7.9	1986.9 bil.MNT	68.1-72.2 USD
	Exported directly to Chalco	3.47		59.3-61.0 USD
Tavan Tolgoi JSC	Export	1.70	226.14 bill.MNT	133.0 thou.MNT
	Domestic Market	0.14	257.4 mill.MNT	15.0 thou.MNT

Source: Annual reports of Tavan Tolgoi JSC, Erdenes Tavan Tolgoi JSC, and MMC

THERMAL COAL

Between 2016 and 2018, the strong demand and high prices drove up thermal coal trades; however, this growth is expected to reverse in the next couple of year. Imports from developed countries are in a decline as governments are phasing out coal-fired power generation and instead have been opting for other sources of energy generation such as hydro, nuclear and renewables. The coal phase-out will likely have a limited impact on the supply and demand of thermal coal and its prices in the long-term as emerging and developing countries fill the gaps created by the developed countries. Currently, China and India remains the largest importers of thermal coal.

In the first seven months of 2019, China's thermal coal imports was an estimated 143 Mt, an increase of 4.4 percent year-over-year. Import volumes have been volatile due to seasonal factors as well as government policies. Recently, imports have been supported by lower Chinese productions caused by heavy rainfall, heatwaves, national safety campaign at mines, enhanced quality testing which has caused customs clearance delays. In the long-term, China is expected to boost its domestic production further to decrease its reliance on imports. These boosts are expected to come from new, more efficient additions to capacity as well as enhanced Chinese railways networks which is expected to improve connections between coal producing regions and demand centers.

India's thermal coal consumption has been outpacing its production. Indian production was affected by the monsoon season, which caused disruptions in production and transporation. While the Indian government plans to be more self-sufficient in thermal coal in the long-term, import levels are expected to reamin at high levels in the short term as the country tries to meet its growing demand for power.

On the supply side, thermal coal exports was significant in 2018 as marginal producers were incentivized by high prices. However, demand and prices are expected to be lower in 2019, driving down supply. From Australia, export volumes were strong in light of recovery from various weather, industrial, technical and infrastructure-related disruptions. Interestingly, the volume of Australian thermal coal sold under contracts was around a third in 2018, which is lower than the volumes observed five year ago of 40 to 50 percent. This is indictative of a shift in the buying preferences of consumers towards purchasing more coal on shorter term contracts or at sport in order to lower costs following electricity sector reforms.

According to the mean estimates on Bloomberg, thermal coal prices are expected to be 78 USD per Mt in 2019 and then decline to around 70 USD per Mt from 2021 and on. This price trend is tantamount to the spot estimates made by Australia's Department of Industry, Innovation, and Science.

In the case of Mongolia, around 10.7 Mt of thermal coal was produced during the first nine months of 2019. Of which, around a third was exported and the remaining two-thirds was consumed domestically. As cited in the previous two updates, the thermal coal market is very small and of the volumes exported, it is mainly to China.

CONCLUSION

Coking coal demand is heavily dependent on China. The Chinese steel industry has observed a boosted production in 2019 due to government stimulus measures to promote infrastructure. However, this trend may not continue into the future as the Chinese environmental policies outweigh short term programs implemented by the government. Additionally, quotas on annual Chinese coking coal imports have been placed by the Chinese government to promote its domestic coal industry. Thus, any changes in Chinese trade or environment policies can significantly fluctuate demand for coking coal.

On the supply side, Australia remains the largest exporter of coking coal. However, even Australia's coal exports are heavily swayed by Chinese policies as observed in February when it took over a month for Australian coals to clear Chinese ports and customs and due to this, prices of Australian coal dropped. An interesting trend being observed over the last year is the emergence of Mongolia as a major exporter, especially to China. With favorable quality grade coking coals, there are speculations that Mongolia may surpass Australia as China's number main importer in the future.

As supply is expected to outpace demand growth slightly, prices of coking coal are expected to decline in 2020 and remain stable around 150 USD per Mt.

COPPER

WORLD MARKET

DEMAND SIDE

Copper is heavily used in construction and manufacturing and its demand is closely tied to momentum in the world economy, particularly in China. World refined copper usage between 1960 to 2018 grew by an annual growth rate of 3 percent per year (ICSG, 2019). Meanwhile, the annual growth rate of the world economy was 3.5 percent per year on average (The World Bank, 2019). Overall, the higher the economic growth rate, the more copper is consumed.

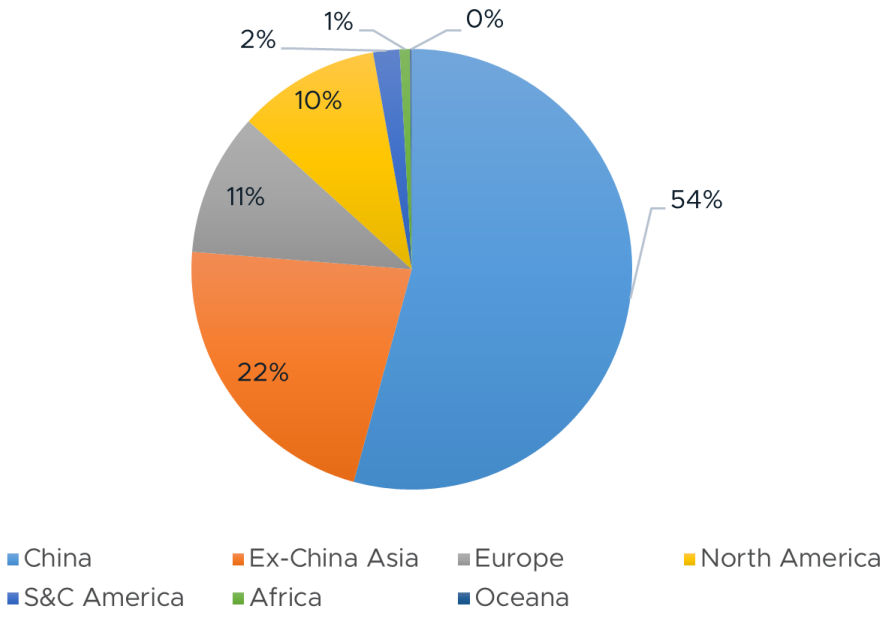
In 2018, global total refined copper usage was 24.1 Mt, increasing 3 percent compared to 2017. On a regional basis, Asia accounted for 71.7 percent of total demand. Out of this, China constituted more than 50 percent of demand alone, accounting for about 12.5 Mt. The United States, the second-largest refined-copper user, consumed about 1.8 Mt of copper, accounting for 7.6 percent of global total demand.

TABLE 4. GLOBAL DEMAND FOR REFINED COPPER, THOUSAND TONNES

Year	2018				2019	
Quarter	**I**	**II**	**III**	**IV**	**I**	**II**
Global Total	5759	6131	6100	6148	5625	6004
North America	595	596	601	590	581	557
USA	456	446	467	455	431	411
S & C America	88	110	101	102	101	110
Europe	897	959	891	866	850	889
Germany	303	323	299	280	253	246
Asia	4065	4352	4417	4484	3973	4331
China	2817	3175	3264	3260	2804	3103
Japan	244	255	240	287	242	253
India	131	119	122	132	130	128
Oceania	8	7	7	7	8	7
Africa	37	39	35	40	39	42

Source: Bloomberg

FIGURE 1.COPPER DEMAND ON REGIONAL BASIS AS OF 1ST HALF OF 2019, PERCENT



Source: Bloomberg

As of the first half of 2019, global refined copper usage was 11.6 Mt, exhibiting stable usage compared to the prior year. According to BMI Research, global refined copper consumption is expected to register steady growth in the coming years, driven by demand from the power industry, rising electric vehicle production and a broadly positive global outlook. Infrastructure development in major countries such as China and India and the global trend towards cleaner energy will continue to support copper demand. However, a slowdown in world economic growth is expected to have a negative impact on world refined copper usage in 2019 and 2020.

Chinese demand

China consumed 12.5 Mt of copper in 2018, and 5.9 Mt of copper in the first half of 2019, a 13 percent decrease compared to the same period of the previous year. According to Bloomberg, based on final usage, 46 percent of the total usage was for power, 15 percent for household appliances, 11 percent for electrical, 5 percent for machinery, 15 percent for property and the remaining 8 percent was used for other purposes.

BMI Research forecasted that the profitability of the Chinese metal and mining industry, copper production and consumption will continue to remain positive in 2019. The Chinese government's fiscal support to the infrastructure sector will buoy the demand for and prices of industrial metals (BMI Research, 2019). Moreover, Chinese demand for refined copper is expected to be strong in both the mid and

long term. As reported by Bloomberg, China is charging ahead of the United States when it comes to building pumps for electric cars. There are almost as many places to charge electric vehicle in the city of Beijing as there are in entirety of the United States. China is said to be aiming to account for 60 percent of all automobiles sold to run on electric motors by 2035.

World demand (excluding China)

The major copper users ranked after China are the United States, Japan, Germany and South Korea. In 2018, ex-China global usage was 11.7 Mt, up 0.2 percent versus a year earlier mainly due to increased demand from Japan and Brazil. Meanwhile, ex-China demand for refined copper in the first half of 2019 was 5.7 Mt.

As reported by industry analysts, ex-China usage is expected to reach about 11.2 Mt in 2019, driven mainly by the United States and India. US copper demand growth over the coming years due to Trump's infrastructure packages is expected to fall significantly short of expectations. US refined copper consumption on the other hand is expected to reach 1.5 Mt in 2019 (BMI Research, 2019). India has had strong economic growth and the government's “Make in India” campaign has boosted manufacturing sector growth.

Electric vehicles

Electric vehicles (EV) are more efficient than conventional gasoline and diesel vehicles. The use of EV will reduce oil use and carbon pollution, eliminate local air pollution, and spur economic development.

The growth of the EV market will significantly impact demand for copper. Copper is a major component of EV, used in electric motors, batteries, inverters, wiring and in charging stations. Internal combustion engines use 23 kg of copper while hybrid electric vehicles (PHEV) and battery electric vehicles (BEV) contain around 40 kg and 83 kg copper respectively. Between 2010 and 2018, the EV market increased from virtually no sales to more than 2 million per year. The demand for copper due to EV is expected to increase by 1.7 Mt by 2027 (Copper Development Association, 2017).

According to Bloomberg NEF, by the end of 2018, electric cars accounted for about 7 percent of total new vehicle sales in China, a 108 percent increase in comparison to 2011. In about a decade, China will account for around 40 percent of the global EV market, followed by Europe (26 percent) and the United States (20 percent). By 2025, the total number of EV is projected to reach 10 million and about 5 million charge ports will be required to support them. In addition, 57 percent of all passenger vehicle sales, and over 30 percent of global passenger vehicle fleets, will be electric by 2040. An estimated 56 percent of light vehicles sales and 31 percent of medium commercial vehicles in China, the United States and Europe to be electric by 2040 (BloombergNEF, 2019). Therefore, the global copper demand for electric vehicles are expected to increase dramatically in the long term.

SUPPLY SIDE

Mining production

In 2018, the total global mining production of copper was 20.6 Mt, increasing 2.3 percent compared to 2017 due to an unusually low rate of overall supply disruptions in 2018. Besides the restart of the Katanga mine in the DRC, no new major copper mine capacity was brought on stream in 2018. Reduced output in two major copper producing countries, namely Chile and Indonesia, more than offset growth in other countries. On the other hand, in the first half of 2019, global copper production was 9.9 Mt, a 2 percent drop compared to the same period of 2018, driven by a decrease in South and Central American (especially Chile) and Asian production.

TABLE 5. GLOBAL MINING PRODUCTION, QUARTERLY, THOUSAND TONNES

Year	2018				2019	
Quarter	I	II	III	IV	I	II
Global	**4978**	**5156**	**5167**	**5383**	**4855**	**5062**
N. America	608	647	632	641	621	650
S & C America	2075	2114	2132	2339	2021	2115
Chile	1417	1415	1422	1577	1346	1416
Peru	567	607	613	651	587	605
Others	91	92	97	111	88	94
Europe	412	415	413	406	407	414
Asia	967	1043	1042	1015	892	918
Oceania	260	256	258	276	263	269
Africa	546	568	580	585	542	565

**To highlight impact of top producers, we divided South & Central America into Chile, Peru and others*

Source: Bloomberg

Chilean production

Chile, the world's top producer of copper, constitutes more than 25 percent of global copper mining production each year. Of the top 20 copper mines in the world, 8 mines (including Escondido, the world's largest copper mine) are located in Chile (ERI, 2018). In 2018, production in Chile increased by about 6 percent year-on-year, mainly due to lower output in Feb/Mar 2017 that was restricted by a strike at the Escondida mine. In the first six months of 2019, Chilean copper production dropped 2.5 percent due to ore grade decline (BMI Research, 2019).

Escondida: Escondida produces copper concentrate, through a flotation process of sulfides ore, and copper cathodes, using a leaching process of oxide and sulfides ore. In 2018, despite a 44-day labor dispute, Escondida produced 1213 thousand tonnes of copper, a 34 percent increase compared to 2017. The increase is supported by the start-up of the Los Colorados Extension project in September 2017. The addition of the third concentrator helps offset grade decline over the next decade and adds incremental annual copper production. Production attributed to the Los Colorados concentrator in 2018 was 208.9 thousand tonnes (BHP, 2018). According to BHP, Escondida is expected to produce between 1120 and 1180 thousand tonnes of copper in 2019, as higher expected throughput is offset by a significant decrease in average concentrator head grade consistent with the mine plan.

Codelco: Codelco is Chilean state-owned copper mining company. It is the largest copper producer in the world and a key driver of Chile's development. The company engages primarily in the exploration, development, and extraction of copper ores and by-products as well as the processing of ore into refined copper and the international sale of refined copper and by-products. In 2018, Codelco produced 1806 thousand tonnes of copper, a 2 percent year-on-year decrease. Despite the 5.5 percent drop in the ore grade compared to the previous year, internal production (Chuquicamata, Radomiro tomic, Mina Ministro Hales, Gabiela Mistral, El Teniente, Andina and Salvador) fell only 3.3 percent (Codelco, 2018). In the first half of 2019, the copper production of Codelco's nine mines decreased by 12.8 percent in comparison to the same period of the prior year, mainly due to a decrease in copper grade.

TABLE 6. COPPER MINE PRODUCTIONS OF MINES OWNED BY CODELCO, THOUSAND TONNES

Mines	2018H1	2018H2	2019H1	Y-o-Y Δ%
*Codelco divisions**	814	864	710	-12.8
El Abra (20%)	22	22	18	-18.2
Anglo American Sur (49%)	40	44	42	5.0
CODELCO total	875	931	769	-12.1

**- Chuquicamata, Radomiro tomic, Mina Ministro Hales, Gabiela Mistral, El Teniente, Andina and Salvador Source: Codelco*

Codelco's giant Chuquicamata mine is set for a 40 percent drop in production over the next two years due to ore grade decline. This is a large challenge that will face the world's top copper miner as it scrambles to maintain output (Reuters, 2019).

Peruvian production

In 2018, Peruvian copper production was 2.4 Mt, a 0.9 percent increase from the previous year. Meanwhile, in the first half of 2019, the country produced 1.2 Mt of copper, exhibiting stable production compared to same period of last year. This sustained production was attributed to the Cerro Verde mine's improvement in productivity and copper grade.

Cerro Verde: Cerro Verde, 53.6 percent of which is owned by Freeport-McMoran, is an open-pit copper and molybdenum mining complex. Cerro Verde's expanded operations benefit from its large-scale, long-lived reserves and cost efficiencies. Cerro Verde's concentrator produced an average mill throughput rate of 395.8 thousand tonnes of ore per day in the fourth quarter 2018 and 387.6 thousand tonnes of ore per day for 2018 overall. In 2018, Cerro Verde received a modified environmental permit allowing it to operate its existing concentrator facilities at rates up to 409.5 thousand tonnes of ore per day (Freeport-McMoran, 2019). As a result, in the second quarter of 2019, Cerro Verde's concentrator facilities have continued to perform well, with an average mill throughput rate of 408 thousand tonnes of ore per day.

Asian production

According to Bloomberg, the main players of the Asian copper supply are China (36 percent of total Asia output as of 2019H1), Indonesia (19 percent), Kazakhstan (17 percent) and Mongolia (8 percent). Asian copper production was 4 Mt in 2018 and 1.8 Mt in the first six months of 2019. In 2018, copper mine production in China decreased, leading to an overall decline in Asian copper production. However, production surges in Indonesia and Kazakhstan have partially compensated for this decline. In the first half of 2019, Asian copper production fell by 10 percent in comparison to the same period of 2018, largely due to a sharp decrease in Indonesian copper production.

***China*:** In 2018, copper output reached 1.5 Mt (7.4 percent of total global output), a 7.8 percent year-on-year decrease, while in the first half of 2019, 0.8 Mt of copper was produced.

Chinese copper producers, supported by strong domestic demand are generally more profitable than foreign competitors. Domestic miners such as Jiangxi Copper, Hami Jiatai and China Polymetallic Mining are all looking to expand their production capacity in order to close the disparity between refined copper demand and domestic copper mine production. According to BMI Research, China's copper production is expected to value at 367.2 billion USD and 359.9 billion USD in 2019 and 2020 respectively. However, a slowdown in the automotive industry in China, elevated trade tensions despite nearing talks between the United States and China, and environmental regulations continue to pose risks to positive outlook on Chinese metals production and consumption going forward (BMI Research, 2019) (for more information on trade tensions, refer to Box 1).

Indonesia: After a sharp decline in copper production in 2017, Indonesia's copper production increased 11.3 percent from previous year, reaching 717 thousand tonnes in 2018. However, in the first half of 2019 production was estimated to be 174 thousand tonnes, a 55 percent decrease compared to the same period of 2018. Indonesian copper production declined as a consequence of the transition of the country's two major mines to different ore zones, leading to temporarily reduced output levels. In 2019, copper concentrate exports are expected to drop to 200 thousand tonnes from about 1.2 Mt last year. Grasberg is expected to produce around 1.2 Mt of copper concentrate in 2019, compared to 2.1 Mt in 2018 while domestic consumption is forecasted to reach 1 Mt compared to 800 thousand tonnes in 2018 (Munthe, 2019).

Grasberg, located in Indonesia, is the world's second largest copper mine. Grasberg produced 270 thousand tonnes of copper ore per day in 2018. Substantial progress has been made to prepare for the transition to mining the Grasberg Block Cave (GBC) underground mine. The initial undercut blasting occurred in September 2018, the first draw bell blasting occurred in December 2018 and cave production is scheduled for the first half of 2019. Production rates over the next five years are expected to reach 130 thousand tonnes of ore per day (Freeport-McMoran, 2019).

North American production

In 2018, North American copper production was 2.5 Mt, a 3.7 percent decrease from the previous year while copper production in the first half of 2019 was 1.2 Mt, a 4.3 percent increase from same period in 2018. The decrease in production in 2018 can be attributed to the 10 percent decrease in Canadian production, as well as decreased US production due to lower ore grades in Arizona and Mexico and a landslide at the Mission Mine. However, this was partially by higher output from the Bingham Canyon Mine in Utah, where mining activity progressed into higher grade ores (U.S. Geological Survey, 2019). Considering the circumstances above, North American copper production is expected to be subdued in the mid-term.

African production

African copper mine production reached 2.2 Mt in 2018, a 4 percent increase versus the prior year, and accounted for 11 percent of total global mine production. In the first half of 2019, the country produced 1.1 Mt of copper, exhibiting stable production compared to same period last year. The restart of the Katanga mine located in the Democratic Republic of the Congo (DRC) was a key driver of African output in 2018 and 2019. Moreover, the copper production of the Katanga mine in 2018 increased by 209 thousand tonnes from 2017 (Joel Shaffer, 2019). In addition, a high-grade copper discovery was made in the DRC in 2019. Called the the Kamao-Kakula copper project, the northern part of the project was found to contain very high-grade copper (Canadian Mining Journal, 2019). In light of this, the Kamao-Kakula copper project is expected to rank within the top reserves in the world, boosting African copper production.

Short-term outlook of global copper mine production

According to the latest Press Release of ICSG, global copper production is expected to decline by about 0.5 percent in 2019 and then to grow by around 2 percent in 2020 (ICSG, 2019). In 2019, production is expected to be significantly constrained by declining output in Indonesia as copper ore grade declined in two major mines. In 2020, additional supply from mine build-ups and expansions that began in 2019, together with a recovery in Indonesian output and improved production in Africa should support a growth of about 2 percent. In 2021, growth may exceed 2 percent, but will depend on whether committed projects can operate according to schedule. Overall, global copper production is expected to rise steadily over the next few years.

Refinery production

In 2018, copper refinery production was 24 Mt, a 2 percent increase from 2017. On a regional basis, refinery production increased in China, the top refinery producer, by

2.6 percent, and in Japan by 7.2 percent. On the other hand, this increase was partially offset by refinery production decreases among the top global refinery producers. In particular, refinery production decreased in Chile (-10 percent) and India (-33.7 percent). Chilean electrolytic refined production fell due to temporary smelter shutdowns whilst undergoing upgrades to comply with new environmental regulations. Meanwhile, Indian production which was negatively impacted by the shutdown of Vedanta's Tuticorin smelter in April 2018.

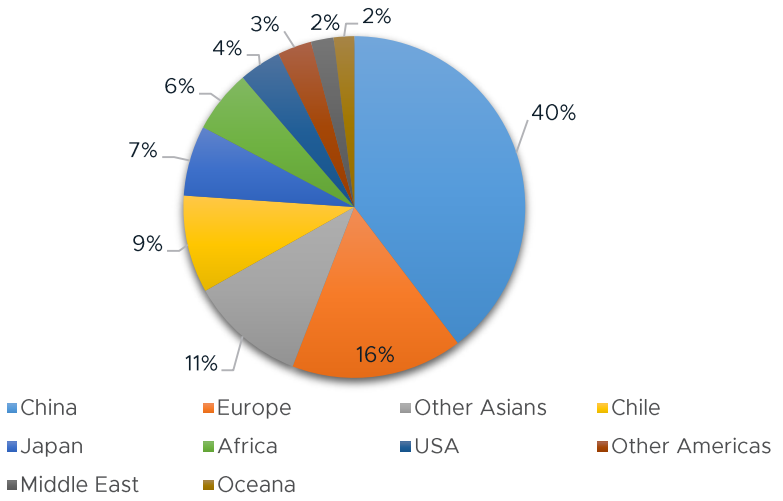
Meanwhile, in the first half of 2019, refinery production was 11.5 Mt, a 2.7 percent year-on-year decrease. On a regional basis, in the first half of 2019, refinery production decreased in Chile by 15.3 percent, in India by 33.6 percent and in Zambia by 13 percent, compared to the first half of 2018. These decreases in Chile and India were a continuation of the mitigating factors observed last year while the decrease in Zambia's refined copper production was caused by power supply interruptions, smelter outages and temporary shutdown as well as the introduction on January 2019 of a 5 percent custom duty on copper concentrate imports constraining smelter feed in Zambia (ICSG, October, 2019).

TABLE 7. GLOBAL REFINERY PRODUCTION, THOUSAND TONNES

Year	2018				2019	
Quarter	**I**	**II**	**III**	**IV**	**I**	**II**
Global Total	**5900**	**5931**	**5953**	**6139**	**5657**	**5850**
North America	468	444	458	470	416	408
USA	283	264	279	284	224	232
S & C America	708	761	739	754	619	676
Chile	603	638	603	616	519	532
Europe	927	933	947	929	929	917
Asia	3304	3287	3295	3448	3189	3332
China	2199	2258	2276	2387	2195	2320
Japan	398	410	398	389	375	383
Oceania	97	99	100	113	107	114
Africa	341	355	356	357	338	339

Source: Bloomberg

FIGURE 10. REFINERY PRODUCTION ON REGIONAL BASIS AS OF 1ST HALF OF 2019, PERCENT



Source: Bloomberg

Short-term outlook of global refinery production

As reported by ICSG, world refined production is expected to increase about 0.5 percent in 2019 and 4 percent in 2020 respectively. Planned output in Chile, the DRC and Zambia as well as reductions in Europe, India and the United States declined significantly. The reductions in the DRC have been at SX-EW mines. Continued expanded refinery capacity in China, and to a lesser extent, the recovery from 2018 operational issues at smelters in Australia, Brazil, Indonesia and Poland will more than offset declines in other countries. However, planned electrolytic refined production is likely to be constrained by tightness in the availability of concentrates in 2020. China is expected to remain the main driver of global copper production growth in both 2019 and 2020.

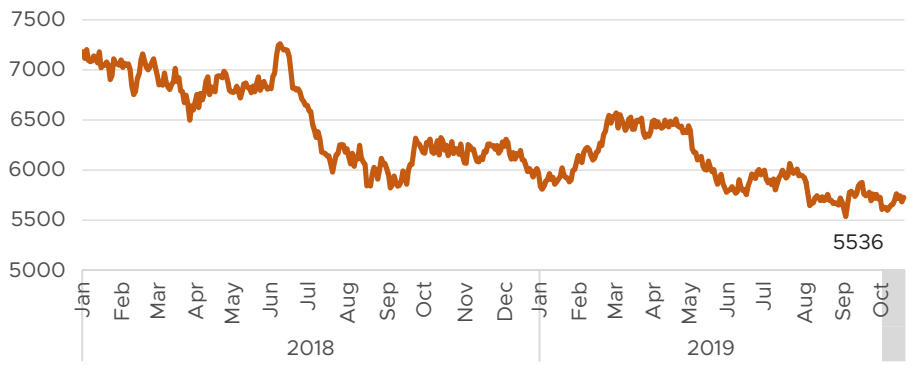
Refined copper balance

According to Bloomberg, refined copper surplus was 214 thousand tonnes in 2018. The refined copper supply is expected to increase and demand is expected to grow at a faster rate as the world shifts towards using more electricity powered goods. Global refined copper balance projections, as calculated by ICSG, indicate a deficit of about 320 thousand tonnes in 2019 and 280 thousand tonnes in 2020.

PRICE

In 2018, copper prices declined despite looming supply disturbance in Chile arising from labor disputes at Escondida, the world's largest copper mine. This downward trend was driven by trade tensions between the United States and China, reinforcing fears about the world economy. This global economic condition continued into 2019. In the first quarter of 2019, copper price grew due to better than expected economic growth in China, a consumer of 50 percent of the world supply of copper, and increased Chinese copper imports. However, after the second quarter of 2019, price have been declining. For instance, copper price dropped to 5536 USD per tonne, a two-year low, on September 4 2019. This sharp decline in prices can be attributed to continued trade tensions between the United States and China as well as the CNY weakening against the USD. Overall, the decline in copper prices is associate with global trade uncertainty.

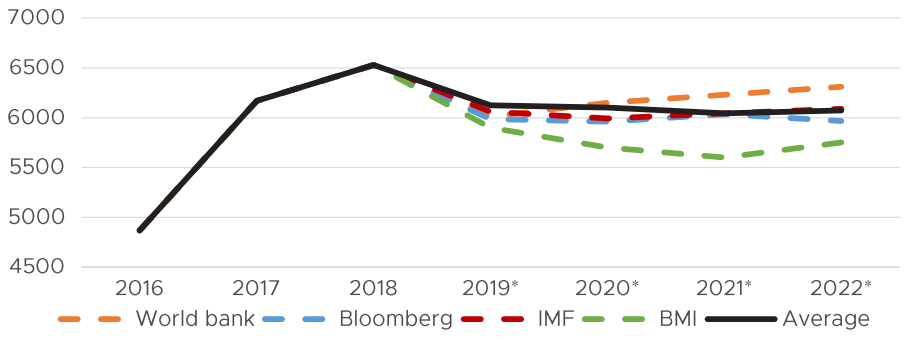
FIGURE 11. LME COPPER PRICE, USD PER TONNE



Source: London Metal Exchange Copper

In light of the aforementioned economic circumstances, international organizations have modified their forecast of copper prices. Due to the worsening macroeconomic environment, spurred on by the escalating trade war, Chinese consumption levels have dropped and loosened the global copper market.

FIGURE 12. PRICE PROJECTION, USD PER TONNE



Source: World Bank, BMI Research, IMF, Bloomberg

As reported by BMI Research, the copper price forecast was revised down for 2019 from 6300 USD per tonne to 5900 USD per tonne and is expected to reach 5750 USD per tonne by 2022. Meanwhile, the International Monetary Fund (IMF) predicts that the price of copper will average 6227 USD per tonne in 2019 and 6294 USD per tonne in 2022 (Yan, 2019). Moreover, the copper market is forecasted to be in surplus, rather than in deficit, from 2019-2021 and from 2022 onwards, the market is expected to shift back into a deficit as consumption level recover, leading to an upswing in prices.

The World Bank predicts that the price of copper will reach 6010 USD per tonne in 2019 and increase to 6311 USD per tonne in 2022 (World Bank , 2019). The strong world demand fueled by electric vehicles, global economic growth as well as the growth in refinery and mine production will be the main factors that affect price growth. On the other hand, Bloomberg forecasts that copper price will drop to 5985 USD per tonne in 2019 and hover around 6000 USD per tonne until 2022.

According to industry analysts, copper price is expected to increase in the long term. This is largely due to the sentiment that the current decline in the price of copper is temporary and the high demand for copper and its upcoming deficit in supply will drive up the price again. According to Wood Mackenzie, the supply of copper will scarce due to rising demand, declining grades and a lack of development. If no new capital is committed, a 5.7 Mt supply gap is expected by 2028 (Kettle, 2019).

MONGOLIAN MARKET

DEMAND SIDE

The demand for Mongolian copper is dependent, on the domestic side, by the construction and manufacturing sectors and on the export side, by the demand from foreign smelters and refineries.

Domestic demand

The local demand for copper is supplied by Erdmin LLC and Achit Ikht LLC, who produce copper for both the international and domestic markets. Most of the local demand is generated by the construction and infrastructure industries. In 2018, Mongolian refined copper usage was approximately 152 thousand tonnes, a 30 percent increase from the amount observed in 2017.

In 2018, the Mongolian import of refined copper increased by 35.6 thousand tonnes or 31 percent, reaching 150.4 thousand tonnes valued at 1.8 million USD (Customs Office of Mongolia, 2019). The key factors that resulted in high demand in 2018 can be attributed to high economic growth, with a GDP growth rate of 7.2 percent, and increased FDI inflow. FDI inflow into major mining projects such as Tavan Tolgoi and Oyu Tolgoi also have a positive effect on the domestic infrastructure and construction sector production, boosting copper consumption.

In the first half of 2019, Mongolia imported 106.9 tonnes of refined copper with value of 1.3 million USD, a 23 percent increase from the first half of 2018. Economic growth was 7.7 percent in first half of 2019 and mining sector developments were the key factors behind this growth. Moreover, the growth of construction sector was 5.3 percent in first half of the year. International organizations such as ADB, IMF and BMI Research forecasted that Mongolian economic growth is expected to be around 5 percent in 2019 and 2020.

Copper export

The one of Mongolia's key export products is copper. In 2018, the export of copper constituted 29.9 percent of total Mongolian exports. The vast majority of Mongolian copper concentrate is exported to China.

Refined copper: Mongolian refined copper is supplied by Erdmin LLC and Achit Ikht LLC. According to the Mongolian Customs Office, Mongolia exported 12.9 thousand tonnes of refined copper valued at 82.5 million USD in 2018. In the first half of 2019, the two aforementioned companies exported 4.6 thousand tonnes of refined copper valued at 27.3 million USD. This means that the volume of refined copper exports dropped 34 percent while its value decreased 41 percent compared to the first half of 2018. These results can be attributed to the slowdown in refined production and the decrease in China's refined copper imports.

*Copper concentrate**:*** Mongolian copper exports define foreign demand for Mongolian copper. As reported by the Mongolian Customs Office, the export of copper concentrate decreased 10.5 thousand tonnes, reaching 1436 thousand tonnes valued at 2 billion USD in 2018. However, the value of copper concentrate exports increased 0.4 million USD in comparison to the previous year due to the 286

USD increase (1400 USD in total) in the border price of copper concentrate. In the first half of 2019, copper concentrate export increased by 15 thousand tonnes or 2.1 percent year-on-year, to 749 thousand tonnes. In first 6 months of 2019 the border price of copper concentrate increased 36 USD compared to same period of 2018, reaching 1418 USD. Consequentially, the value of copper concentrate exports rose 4.8 percent compared to the first half of 2018.

In 2018, China's copper concentrate imports increased dramatically to 19.7 Mt, a 13.7 percent year-on-year increase. This upward trend continued into 2019 as Chinese copper concentrate imports reached 5.6 Mt in the first half of 2019, displaying a 20 percent year-on-year increase. In recent years, the establishment of new smelters and refineries, the expansion of the downstream copper industry and increasing electric vehicle demand have bolstered the Chinese demand for copper (Tom Daly, 2019). In light of this, Chinese demand for Mongolian copper concentrate is expected to continue to be strong in the mid and long term.

SUPPLY SIDE

In 2017, Mongolia's total copper reserve were calculated at 53.6 million tonnes (ERI, 2018). As reported by the Mineral Resources and Petroleum Authority of Mongolia, total copper reserves grew by 52 thousand tonnes in 2018 and by 1.3 thousand tonnes in the first half of 2019 (MRPAM, 2019).

Refined copper production

4 mining companies, operating out of the Erdenet mining site, produce refined copper in Mongolia. The two largest refined copper producers in Mongolia are Erdmin LLC and Achit Ikht LLC (National Audit Office of Mongolia, 2018). Achit Ikht produces copper cathode utilizing SX-EW technology and exports all of its output to Chinese copper refineries whereas Erdmin produces not only copper cathode but also copper wire products and supplies the copper wires to the domestic market (ERI, 2018). In 2018, Erdmin LLC and Achit Ikht LLC produced 14.2 thousand tonnes of copper cathode, a 3.5 percent decreased compared to the previous year. Meanwhile, in the first half of 2019, the two companies produced 6.3 thousand tonnes of cathode copper, a 12.4 percent decrease compared to the first half of the previous year. The drop in Achit Ikht LLC's production was due to the decrease in the copper grade of the Erdenet's deposit dump from which it produces refined copper. Achit Ikht LLC joined the London Metal Exchange on January 2019.

Copper concentrate production

Mongolian's main copper concentrate suppliers are Oyu Tolgoi and Erdenet. According to the National Statistics Office, Mongolia's copper concentrate production was 1310.8 thousand tonnes in 2018, a 6.6 percent decrease from 2017, and 681.6 thousand tonnes in the first half of 2019, a 4.8 percent increase from same period the previous year.

TABLE 8. COPPER CONCENTRATE PRODUCTION, THOUSAND TONNES

	2018H1	2018H2	2019H1
Total production (by metal content)	650.2	660.6	681.6
Of which:			
1. OT mine	356.1	368.8	390.7
OT- Average concentrate grade	22.0	21.9	21.8
OT – (Cu)	78.2	80.9	85
2. Erdenet	294.1	291.8	290.9
(Cu)	71.4	70.0	69.8
Total export	733.7	703.0	749.1
Here of:			
1. OT mine	383.1	363.3	410.3
OT- (Cu)	80.4	76.2	85.1
2. Erdenet	350.6	339.7	338.8
(Cu)	79.5	81.5	81.3
Balance of concentrate	-85.5	-169.2	-85.5

Source: Oyu Tolgoi Quarterly report, Mineral Resources and Petroleum Authority of Mongolia

In 2018, Mongolia's copper concentrate production decreased 6.8 thousand tonnes from the amount observed in 2017, dropping to 1310.8 thousand tonnes. In the first half of 2019, Mongolia produced 681.6 thousand tonnes of copper concentrate, increasing 31.4 thousand tonnes compared to the same period of the previous year (National Statistics Office, 2019).

Oyu Tolgoi: In 2018, Oyu Tolgoi delivered a strong operational performance exceeding planned production for both copper and gold (Turquoise Hill, 2019). Copper production was 159.1 thousand tonnes in 2018, a 1.1 percent increase over 2017, and exceeded the company's planned production by 2.6 percent. Meanwhile, in the first half of 2019, Oyu Tolgoi mined 85 thousand tonnes of copper, increasing 8 percent from same period of last year.

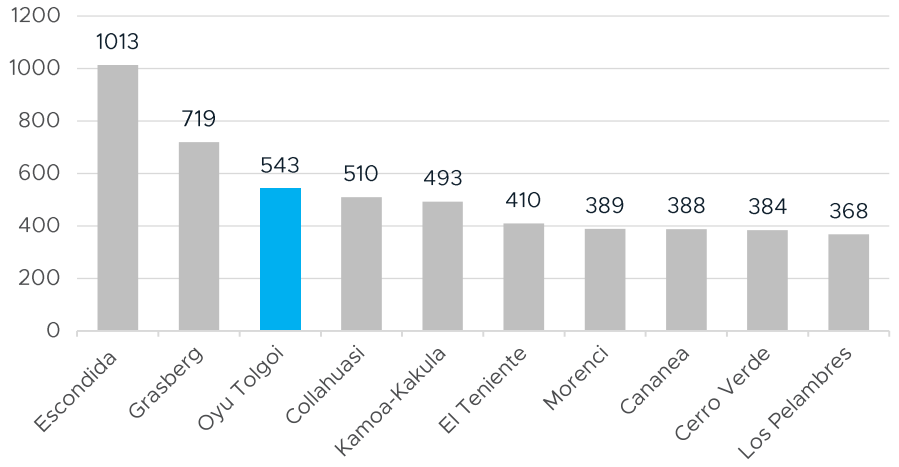
Oyu Tolgoi reported that the mine is forecasted to produce between 125 to 155 thousand tonnes of copper in 2019. The company's open-pit operations are expected to mine ore primarily from Phase 4 with contributions from Phase 6. Open-pit operations are expected to mine ore throughout the year while average copper mill head grades are anticipated to be lower over the remainder of the year (Turquoise Hill, 2019).

Oyu Tolgoi predicts that around 80 percent of the mine's value resides underground and that once the company completes its underground expansion, overall copper production will greatly increase as a result. Production is slated to peak in 2025 by which production is expected to more than triple current production levels. In the second quarter of 2019, Oyu Tolgoi spent 292 million USD on the underground expansion. Moreover, between January 1 2016 to June 30 2019, the total amount

spent on the underground project was approximately 2.9 billion USD. However, according to a news release by Oyu Tolgoi, due to ground stability risks, the first sustainable production of its underground mine is likely to be delayed 16 to 30 months, with an additional capital development cost of 1.2 to 1.9 billion USD (Turquoise Hill, 2019).

As reports by Oyu Tolgoi show, spending on the underground project on a cash basis include expansion capital, VAT and capitalized management services payment and excludes capitalized interest. In addition, Oyu Tolgoi had further capital commitments 0.9 billion USD as of June 30 2019. Since the restart of project development, Oyu Tolgoi has committed over 2.6 billion USD to Mongolian vendors and contractors.

FIGURE 13. TOP 10 COPPER PRODUCING MINES IN 2030, THOUSAND TONNES



Source: Turquoise Hill

As reported by Oyu Tolgoi, the mine is forecasted to be the world's third-largest copper mine by 2030, after the Escondida and Grasberg mines. By 2030, the company will produce 543 thousand tonnes of copper, a 3.4-fold increase compared to the 159 thousand tonnes of copper produced in 2018 (Turquoise Hill, 2019).

Erdenet: The Erdenet Mining Corporation was established in accordance with the agreement made between the governments of Mongolia and the (former) Soviet Union. Its operation started in 1978. The Mongolian Copper Corporation (MCC) purchased 49 percent of Erdenet mine from Russia in 2016 and the mine is currently 100 percent Mongolian owned (MCC, 2018). By 2016, Erdenet had about 8.3 million tonnes in copper reserves and around 854 thousand tonnes in molybdenum reserves

(Mineral Resources and Petroleum Authority of Mongolia, 2017). The company produces 530 thousand tonnes of copper concentrate on average per year with an average concentrate grade of 23 to 25 percent. In 2018, Erdenet produced 585.9 thousand tonnes of copper concentrate, increasing 15 percent from the previous

year, and in the first six months of 2019, extracted 290.9 thousand tonnes of copper concentrate. According to Budget Bill 2019, Erdenet's copper concentrate exports in 2019 is predicted to be approximately 700 thousand tonnes (Ministry of Finanace Mongolia, 2018). Thus, Erdenet's copper production is expected to increase in the second half of 2019.

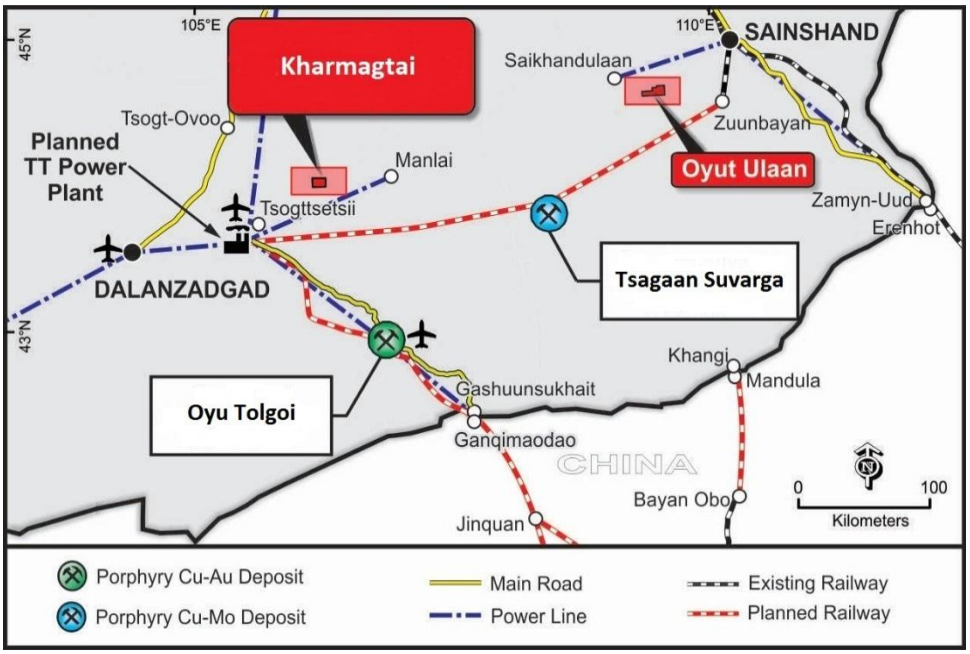
Tsagaan Suvarga: The Tsagaan Suvarga copper-molybdenum project, owned by Mongolyn Alt LLC (MAK) is located in the Dornogovi province located in the south-east of Mongolia. The Tsagaan Suvarga deposit contains 250.3 Mt of ore reserves. Of this, 1.6 Mt is copper while 66.1 thousand tonnes is molybdenum. The plant is of significant importance to the Mongolian economy as it is expected to be the third largest processing plant in Mongolia, after Oyu Tolgoi and Erdenet.

During "Belt and Road" conference[4], held in Beijing in April 2019, the chairman if MAK signed a contract that announced that the Tsagaan Suvarga copper-molybdenum plant will start working in July 2021.

Kharmagtai: Kharmagtai is an undeveloped copper-gold project in Mongolia. Xanadu and its joint venture partner, Mongol Metals LLC has a 90 percent interest in the Kharmagtai porphyry copper-gold project. The remaining 10 percent is owned by Quincunx Ltd. The Kharmagtai project is located in the Umnugovi province of Mongolia, located approximately 420 kilometers southeast of Ulaanbaatar and 120 kilometers north of the Rio Tinto-controlled Oyu Tolgoi deposit (Xanadu Mines, 2019). According to the annual report published by Xanadu Mines in 2018, the project contains an open-pit with indicated and inferred resources of 598 Mt, containing 1.9 Mt copper and 4.3 million ounces of gold (Xanadu Mines, 2018).

[4] The Belt and Road Initiative refers to the Silk Road Economic Belt and 21st Century Maritime Silk Road, and it is an international platform for promoting business collaboration along the Belt and Road (Belt and Road News, 2019)

FIGURE 14. COPPER MINES IN MONGOLIA



Source: Xanadu Mining

Short term outlook of Mongolian copper supply

According to 2020 Budget bill, the export of Mongolian copper is expected to reach 1225 thousand tonnes in 2020, lower than the volume exported in 2019, due to fluctuation in the price of copper (Ministry of Finance Mongolia, 2019). As reported by Oyu Tolgoi, due to ground stability risks, the first sustainable production of its underground mine is likely to be delayed. Additionally, copper concentrate grade is expected to drop throughout 2019 as the company shifts away from mining phase 4A ore to lower grade phase 4B. As a result, the production of copper concentrate in the coming years is likely to be negatively affected by the setbacks faced by Oyu Tolgoi. However, with new projects such as the Tsagaan Suvarga and Kharmagtai projects, Mongolia is expected to become one of the world's largest copper suppliers in upcoming decades.

CONCLUSION

International organizations such as the IMF, World Bank and Bloomberg modified their copper price forecasts in 2019 as the worsening macroeconomic environment, spurred by the escalating trade war between the United States and China, has lowered Chinese consumption levels and loosened the global copper market. However, according to industry analysts, copper prices are expected to increase in the long term as the current copper price decline is temporary and the high demand for copper will lead to a supply deficit that will drive prices up again.

Global refined copper consumption is expected to steadily grow over the coming years, driven by demand from the power industry, rising electric vehicle production, and broadly positive global outlook. Infrastructure development in major countries such as China and India and the global trend towards cleaner energy will continue to support copper demand. On the supply side, global copper production is expected to decline by about 0.5 percent in 2019 and then grow by around 2 percent in 2020. As such, in the long term, global copper production is expected to display steady growth.

As for the Mongolian market, anticipated economic growth is expected to increase local demand slightly. The Chinese demand for Mongolian copper concentrate is also likely to be strong in the mid and long term due to the government's ban on importing copper scraps and global increasing electric vehicle demand. On the supply side, refined copper production is expected to be steady and copper concentrate production is expected to decrease due to Oyu Tolgoi's delayed underground mine development and forecasted grade decline in short term. However, in the long term, copper production is expected to increase due to new projects such as the Tsagaan Suvarga and Kharmagtai projects.

GOLD

WORLD MARKET

DEMAND SIDE

Gold demand is made up of demand for jewelry, investment, technology and reserve assets by central banks with jewelry and investment making up the majority of world demand for gold. In the first half of 2019, world demand for gold grew 8 percent compared to the first half of 2018 (World Gold Council, 2019). This is the highest half year demand observed in 3 years and was largely influenced by the significant increase in gold reserves by central banks.

TABLE 9. WORLD GOLD DEMAND, TONNES

	Jewelry	% of Total	Investment	% of Total	Technology	% of Total	Reserves	% of Total	Total
2018H1	1048.2	51.9	570.3	28.2	165.1	8.2	237.6	11.8	2021.2
2019H1	1061.9	48.7	584.5	26.8	161.2	7.4	374.1	17.1	2181.7
Y-o-Y Δ%	1		2		-2		57		8

Source: World Gold Council

Jewelry

Jewelry, the largest subsector of gold demand, is traditionally dominated by Chinese and Indian demand. In the first half of 2019, gold demand for jewelry displayed a modest 1 percent growth that was largely due to rises in Indian demand (World Gold Council, 2019). While the subtle rise in gold demand for jewelry was in line with the predictions made in our previous report, we had predicted that China would be in the forefront rather than India.

In particular, Indian demand for gold increased 5 percent year on year in the first quarter of 2019, 12 percent in the second quarter and 9 percent overall in the first half of 2019. This increase, particularly the large jump in the second quarter was due to trade promotions, a higher number of auspicious days, the Indian wedding season and the Akshaya Tritiya festival, as well as a positive consumer response to lower gold prices in April and May (The Hindu Business Line, 2019).

In the second half of 2019, however, it is unclear if this elevated demand will continue. While gold prices were softer in April and May, they surged in June, greatly reducing domestic demand towards the end of the second quarter of 2019. Moreover, on July 5 2019 the government of India proposed to increase the import duty on gold and other precious metals from 10 to 12.5 percent in order to bolster the country's budget performance (The Hindu Business Line, 2019). While higher taxes will increase the overall domestic price of gold, Somasundaram PR, World Gold Council Managing Director, India, assures that while demand may drop in the third quarter of 2019, long term demand will not be affected (PTI, 2019).

TABLE 10. CHINESE AND INDIAN GOLD JEWELRY DEMAND, TONNES

	2018Q1	2019Q1	Y-o-Y Δ%	2018Q2	2019Q2	Y-o-Y Δ%
India	119.2	125.4	5	149.9	168.6	12
China	201.7	197.9	2	156.9	148.9	-5

Source: World Gold Council

Meanwhile, increased Indian gold demand for jewelry was tempered by decreased demand from China. Chinese jewelry demand for gold dropped 2 percent in the first quarter of 2019, an additional 5 percent in the second quarter and 3 percent overall in the first half of 2019 (World Gold Council, 2019). Despite China's elevated gold demand in 2018 and an overall optimistic outlook, in the first half of 2019, Chinese gold demand has hit a 5-year low (Williams, 2019). This decrease is speculated to be caused by higher gold prices, China's slowing economic growth and lower consumer discretionary spending due to the continued trade war and higher domestic food prices (Bloomberg News, 2019).

In the Middle East, demand decreased as gold prices surged in June 2019 while US gold demand for jewelry increased in the first quarter of 2019 as consumer confidence rose but quickly fell again in the second quarter as the trade war with China escalated and gold prices increased (World Gold Council, 2019).

Looking forward, while Indian demand traditionally increases in the second half of the year in response to the upcoming festival season, elevated domestic gold prices are expected to damped demand (Anna Golubova, 2019). The increase in gold import duties are expected to reduce Indian demand for gold imports by 2.4 percent in 2019, though long term consumer demand is only expected to decrease by less than 1 percent per year (World Gold Council, 2019). Likewise, Chinese demand is expected to remain low in light of high domestic gold prices and overall consumer concern over the economy. As world jewelry demand for gold is determined by Chinese and Indian demand, future gold demand is expected to fall slightly as Chinese demand remains low and the currently elevated Indian demand is damped by high prices and the new gold import duty.

Investment

Gold for investment consists of total bar and coin demand and exchange traded fund products (ETFs). In the first half of 2019, physical bar demand, the largest subcomponent of bar and coin demand, dropped 10 percent year-on-year, with total bar and coin demand falling 6 percent. This was offset by the drastic 77 percent increase in demand for ETFs, with overall investment demand increasing 2 percent year-on-year as a result (World Gold Council, 2019).

As an investment, gold can have 4 different roles in a portfolio, it can be a source of long-term returns, a diversifier that can mitigate losses, a liquid asset with no credit risk and a way to enhance overall portfolio performance (World Gold Council, 2019). Its value as an investment is largely dependent on perceived economic outlook, geopolitical stability, interest rates, and the value of the USD. Thus, in times of instability, gold is an especially attractive investment option.

This was the case in the first half of 2019 in which the holding of gold backed ETFs rose dramatically, led by Europe. In the first half of 2019, European holdings of ETFs grew 87.2 tonnes with 67.2 tonnes of the growth happening in the second quarter of 2019. The growth in Europe was mainly driven by the UK where investors were keen to buy gold as a hedge against political uncertainty and Brexit. The drop in the value of the British pound further spurred this on (World Gold Council, 2019). Moreover, the European Central Bank has extended its pledge to keep interest rates low until mid-2020, decreasing the investment attractiveness of other investment options (GFMS, 2019).

In the US, continued tensions surrounding the trade war with China have increased the attractiveness of gold as an investment. Moreover, since July, the US Federal Reserve has made 2 modest interest rate cuts, with a third cut expected, as a preventative measure against economic slowdown, further reducing demand for other investment options (Davidson, 2019). The main cause of dampened economic growth, according to Powell, Chair of the Federal Reserve, was volatile trade developments that could drag overall world growth (Long, 2019).

In terms of geopolitical stability and economic outlook, according to the Global Economic Policy Uncertainty Index (GEPU index), a measure of perceived political uncertainty, the GEPU has increased from 133 and 171 in the first and second quarters of 2018 to 255 and 248 in the first and second quarters of 2019. Moreover, according to the IMF's July World Economic Outlook Update, global growth is expected to continue to be sluggish and is projected to be 3.2 percent in 2019 and 3.5 percent in 2020, a 0.1 percentage point decrease for both years than forecasted in the IMF's April World Economic Outlook forecast (IMF, 2019). These highlight the generally lackluster perceptions of global geopolitical stability and economic growth.

Looking forward, while high prices may depress the bar and coin demand for gold, continued international instability, particularly in Europe and due to the trade war between the US and China, the looser monetary policies of several central banks and the reduced US Federal Reserve policy rate are all expected to boost gold's appeal as a safe investment. Thus, we can expect the demand for gold for investment to remain positive moving forward.

Box 1. US-China Trade War

Since the spring of 2018, US and Chinese trade relations have been tense as both countries have continued to levy higher and higher tariffs on imports.

Despite continuous talks between officials from both countries, between June 15 2018 and December 1 2018, in which a 3-month truce was agreed upon, both countries have implemented 3 rounds of tariffs on imports with the US applying tariffs to 250 billion USD worth of Chinese imports and China applying tariffs on 110 billion USD worth of US imports. The truce was held until March 1 2019 though relations soured again in May. In August the imposed tariffs by both sides were increased again and in September previous promises to increase tariff rates came into force as scheduled. A further round of talks was agreed to and in October 10-11 2019, the US and China announced that they had reached a "Phase 1" agreement that will take several weeks to finalize. As of the end of October 2019, the US has implemented tariffs on 550 billion USD worth of Chinese goods while China has

implemented tariffs on 185 billion USD worth of US goods (Wong & Koty, 2019). While the negotiations may take a positive turn based on the advancements made in the October meetings, the global effects of the trade war are far from over.

According to Reuters, overall global trade uncertainty caused by the escalating trade war between the two countries has waned interests in investment and reduced business production, with as much as 850 billion USD lost in global production and 200 billion USD lost in US production since the trade war began (Saphir, 2019). Moreover, the IMF has cited the trade war as the main cause behind expected sluggish global growth (IMF, 2019). In response to lackluster growth, the US Federal Reserve has cut its interest rate for the third time this year in order to keep the US economy growing as it slows down in response to the trade war (Elliott, 2019). While it is difficult to accurately calculate the overall effect of the trade war, there is no doubt that is has negatively affected global trade, the overall world economy and mineral commodity markets as a result.

Technology

Technology accounts for roughly 7 percent of total gold demand in the first half of 2019. Gold technology demand dropped 2 percent year-on-year in first half of 2019 as the demand for gold for electronics, the largest subsector of technology, fell 3 percent compared to the first half of 2018 (World Gold Council, 2019).

In 2019, the technology sector has experienced an overall slowdown in response to weaker sales as well as the ongoing US-China trade war. As a result, the volume of gold used in the technology sector has taken a hit, dropping 3 percent year-on-year in the both the first and second quarters of 2019 (World Gold Council, 2019). This marks the third consecutive fall in gold technology demand, though the rate of fall has been steadily decreasing.

Gold is typically used in bonding wiring, printed circuit boards, the smartphone sector and the wireless 5G sector. In the first half of 2019, these sectors, with the exception of printed circuit boards, have experienced a general slowdown that has in turn reduced gold demanded. For instance, according to the World Semiconductor Trade Statistics Organization's forecast, semiconductor demand, used in electrical circuits and a staple of the overall electronics sector, is expected to drop 12.1 percent in 2019 (WSTS, 2019). Moreover, demand in the smartphone sector has been fairly muted though the launch of several 5G smartphones have tempered the decline from the wireless sector. Demand for gold in the wireless sector saw a 10 to 15 percent decrease in the first quarter of 2019 that was continued onto the second quarter. This was mainly due to slow smartphone sales as well as delays in 5G infrastructure installments (World Gold Council, 2019). However, considering global trends, these issues are likely to be resolved soon with long term gold demand from the wireless sector looking optimistic. Moreover, gold is also utilized in parts of electric cars so while the overall slowdown of the electronics sector dampens gold demand, we can expect the overall rate of decline to decrease moving into the second half of 2019.

Reserves

Reserves, which make up about 17% of world gold demand grew a substantial 57% year-on-year in the first half of 2019. Overall net purchases in the first half of 2019 reached 374.1 tonnes, the highest level observed since central banks became net purchasers of gold in 2010. This is a continuation of the central bank buying momentum observed in 2018 that was driven by lowing global economic growth, heightened uncertainty in the financial markets and rising geopolitical tensions (World Gold Council, 2019). In light of these issues that have only been exacerbated in 2019, central banks turned to gold as a safe investment that can protect against possible risks.

This surge in central bank purchases was spearheaded by Russia, Poland, China, Turkey and Kazakhstan. India, Ecuador, Colombia and Kyrgyzstan also made gold purchases in the first half of 2019. This is line with our previous report that forecasted gold reserve increases due to increased purchases from Russia, Turkey and Kazakhstan.

Russia, in the first half of 2019, purchased 94 tonnes of gold in order to diversify its assets in light of continued Western sanctions, fluctuating oil prices and exchange rate depreciation (GFMS, 2019). However, gold purchases dipped slightly towards the end of the second quarter of 2019 as the Russian central bank discounted its gold purchasing price in order to promote gold exports instead. Head of the Russian central bank, Nabiullina, however, was quick to mention that this was not a special decision to reduce gold purchases (World Gold Council, 2019).

Poland purchased 100 tonnes of gold in the second quarter of 2019, greatly contributing to overall central bank purchases. This decision, according to the President Glapiński of the National Bank of Poland, was to ensure the financial security of the country. For similar reasons, Kazakhstan and Kyrgyzstan purchased 25 and 2 tonnes of gold respectively (World Gold Council, 2019). China, on the other hand, purchased 74 tonnes of gold in the first half of 2019, and has been steadily increasing its percentage of gold holdings against foreign exchange reserves (GFMS, 2019). Turkey continued to abide by its gold purchasing policies and increased its holdings by 60 tonnes in the first quarter of 2019. Moreover, the central banks of India, Ecuador and Colombia all increased their gold reserves by about 18, 10 and 6 tonnes respectively (World Gold Council, 2019).

Moving forward, in light of continued global uncertainty, central banks are likely to continuing purchasing gold to mitigate against possible risks. Russia is likely to continue to led total purchases while China may purchase more in light of the ongoing trade war. Other countries are also expected to continue to purchase gold as global conditions seem unlikely to change.

SUPPLY SIDE

Total world supply of gold increased 2 percent in the first half of 2019 as compared to the first half of 2018. This was largely due to a 7 percent year on year increase in recycled gold. Moreover, net de-hedging continued into 2019.

TABLE 11. WORLD GOLD SUPPLY, TONNES

	H1'18	H1'19	Y-o-y % change
Mine production	1712.02	1730.19	1
Net producer hedging	-0.16	-8.27	5127
Recycled gold	564.74	602.02	7
Total supply	2276.6	2323.9	2

Source: World Gold Council

Mining Production

Mining production, the largest subsection of gold supply, accounted for 74 percent of total gold supply in the first half of 2019. In terms of year-on-year change, total mine production increased 1 percent in the first half of 2019 as compared to the same period in 2018, going from 1712 to 1730 tonnes. This slight increase was due to boosted gold production in Russia, Canada and Ghana that were offset by lower production in China, South Africa and Indonesia (World Gold Council, 2019).

According to the Union of Gold Producers, in the first half of 2019, Russia increased year-on-year production by 11 percent, producing 142 tonnes of gold. This increase was driven by Polyus's Natalka mine which operated at full capacity in the first half of 2019, boosted the already high production levels observed in the first half of 2018 by 16 percent (Interfax, 2019). Going into the second half of 2019, total Russian gold production is expected to reach 340 tonnes in 2019 overall, a 3 percent increase from 2018. Moreover, Polymetal, the second largest gold producer in Russia after Polyus, has committed to building a pressure oxidation plant, which processes gold concentrate, in the eastern region of Russia. The company plans to invest 431 million USD into the plant which will start production in the third quarter of 2023 and boost the company's production by 0.85 tonnes to 1 tonne per year from the same amount of concentrate feedstock. This will reduce Polymetal's reliance on Chinese processing plants and the company ultimately plans to produce 44 and 45 tonnes of gold in 2019 and 2020 respectively (Astrasheuskaya, 2019).

Canada was the fourth largest gold producer in the world after China, Australia and Russia (Mining Technology, 2019). As mentioned in the last commodity report, this increase in production was largely due to the Brucejack, Rainy river and Moose river projects. This continued on into 2019 with Canadian gold output increasing an estimated 9 percent in both the first and section quarters of 2019 compared to the same period last year (World Gold Council, 2019). The sustained high performance of the aforementioned 3 mines in addition to new project streams, namely the Meliadine mine in Nunavat, Eagle Gold mine in Yukon and the Lamaque Gold project in Quebec in 2019 all attributed to Canada's production growth. In light of these new projects as well as other planned projects in 2021 and 2022, Canadian gold production is forecasted to grow by a compound average growth rate of 2.7 percent from 2019 to 2023, eventually reaching 215 tonnes (World Gold Council, 2019). Thus, future Canadian gold mine production looks very optimistic and we can expect Canada to continue to be a major global producer.

Another contributor to increased gold production in the first half of 2019 was Ghana. The West African country overtook South Africa as the largest gold producer on the continent, boasting an output in 136 tonnes in 2018 to South Africa's 119 tonnes (Njini, 2019). While small producers account for the majority of Ghanaian production, several large gold companies, including Newmont, Gold Fields and AngloGold all operate in the country. According to Gold Fields, the Ghanaian government has a 10 percent stake in all mining companies operating in the country, offering investment security. Moreover, in 2016 Ghana cut corporate taxes and changed Gold Field's gold royalty rate from a fixed 5 percent to a sliding scale royalty based on gold prices. Such incentives, coupled with several companies looking to Ghana amidst production difficulties in South Africa have boosted the country's gold production. Future output is also expected to continue to grow as AngloGold has committed to investing 500 million USD into the Obuasi gold project, with operations expected to restart at the end of 2019.

The increases in production observed by the countries above were mitigated by decreases in output from China, South African and Indonesia. Chinese production continues to decline following the government's strict environmental policies mentioned in the previous commodity report. In particular, in 2018, the country's production fell 5.9 percent due to the introduction of the Environmental Protection Tax (Matthis, 2019). While still the world's biggest gold producer, the future of Chinese gold production does not look optimistic with Fitch forecasting a stagnant annual average growth rate of 0.2 percent for China between 2019 and 2028 (Brightmore, 2019).

As mentioned above, South Africa lost its title as the biggest gold producer on the African continent in 2018. Ongoing worker strikes, such as the strikes at the Beatrix, Kloof and Driefontein mines that lasted from November 2018 to April 2019, as well as high operating costs have all detrimentally affected South African production (World Gold Council, 2019). This decrease however, was expected as the South African gold industry is an old one in which gold grade has been dropping over the course of 80 years and according to the Minerals Council South Africa, 71 percent of gold mining operations were only marginally profitable or lossmaking in 2018 (Whitehouse, 2019). In light of all this, large gold companies such as AngloGold and Gold Fields have shifted their focus away from South Africa to other options where mining may be easier and cheaper. Moreover, the largest remaining operator in South Africa, Sibanye Gold, has recently cut thousands of jobs and is considering diversifying into platinum-group metals to cut costs (Njini, 2019). Thus, the future of South African gold production remains bleak.

As mentioned in the previous commodity report, Indonesia's Grasberg mine started transition from open pit mining to underground operations, a process that began in September 2018 (Moore, 2019). As a result of this transition, the mine's copper and gold output has been drastically reduced, with the mine's output in the first quarter of 2019 dropped 59 percent compared to the fourth quarter of 2018 (Basov, 2019). This has drastic revenue implications with one estimate stating that the mine's gold revenues are expected to drop 1.8 billion USD over the course of 2019 and 2020 (Forbes, 2019). As the mine continues to transition, we can expect future Indonesian gold production to remain sluggish.

Moving forward, overall gold production is expected to continue to grow as high prices encourage investment and the project pipeline for key gold producing countries are abundant. According to Fitch Solutions, total gold production in 2019 is expected to be a little over 3000 tonnes, with an average annual growth of 2.4 percent, reaching 3260 tonnes in 2023 (Brightmore, 2019).

Net producer hedging

As mentioned in the previous report, hedging is a way for gold companies to lock in a price for future gold production as a preventative measure against price falls. In the first quarter of 2019, 10 tonnes of gold were hedged while companies engaged in de-hedging in the second quarter of 2019, with a total net de-hedging of 8.3 tonnes in the first half of 2019 (World Gold Council, 2019). The hedging experienced in the first quarter was dominated by Australian mining companies who wanted to take advantage of high local prices due to increasing gold prices and the depreciation of the Australian dollar. More specifically, Gold Fields, a major gold producer in Australia, hedged 14 tonnes of gold in the first quarter of 2019, in addition to renewing its existing position (World Gold Council, 2019). However, going into the second quarter of 2019, low global growth expectations, trade tensions between the US and China, as well as further expected Federal Reserve rate cuts created a generally optimistic picture of the gold prices, reducing the desire to create new hedges as companies can lose out on income if gold prices continue to rise while companies have already committed to a lower price (ERI, 2018). According to GFMS, 30 companies in the second quarter of 2019 were net de-hedgers while only 10 were net-hedgers (GFMS, 2019). There doesn't seem to be a set pattern for hedging with each company making decisions based on their own operations and the price of gold. As such new hedging positions are largely tactical and sporadic, though there seems to be a general trend towards net de-hedging (World Gold Council, 2019).

Recycled gold

In the first half of 2019, recycled gold increased 7 percent as compared to the first half of 2018. Disaggregated, recycled gold grew 5 and 9 percent year-on-year in the first and second quarters of 2019 respectively. This overall growth was supported by surging gold prices, particularly in the second quarter of 2019, coupled with exchange rate depreciation in several countries that further bolstered the domestic price of gold. In the first quarter, the increase in recycled gold was spearheaded by Iran and India as both experienced unusually high domestic gold prices and the deteriorating economic prospects in Iran made recycling gold more attractive (World Gold Council, 2019). In the second quarter however, North America and Europe joined in on the gold recycling trend (World Gold Council, 2019). China also experienced higher than usual gold recycling levels as the country made several advancements in easing the process of recycling gold. Most notably, it introduced automatic gold recycling vending machines that further incentivized the public into recycling gold (Jia, 2019). Moving forward, elevated gold prices are likely to maintain the positive sentiment towards recycling gold.

PRICE

The price of gold is determined by global demand and supply in addition to the investment factors mentioned above. Global demand, as detailed above, is likely to remain positive as slight decreases in jewelry and technology demand are expected to be offset by increases in investment and central bank reserves. In particular, geopolitical instability and trading difficulties are expected to keep investment and central bank purchases up.

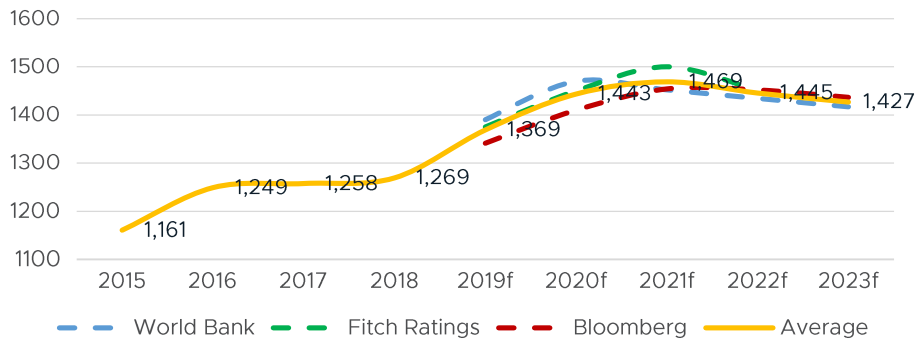
In terms of global supply, as mining production, the largest subsector of supply, is expected to grow steadily and high prices are likely to encourage gold recycling, overall global supply is forecasted to increase as Russian, Canadian and Ghanaian production ramps up.

Considering these demand and supply outlooks, in addition to continued global instability, the price of gold is expected to fluctuate around the 1350 USD per ounce mark, according to an average of forecasts by the World Bank, Fitch Ratings and Bloomberg.

Long term prices for gold remain are relatively consistent, with the World Bank, Fitch Ratings and Bloomberg all expecting the price of gold to remain elevated around 1450 USD per ounce. The World Bank forecasts the price of gold to increase steadily, reaching its peak at 1470 USD per ounce in 2020 before slowly tapering off, hitting 1417 USD per ounce in 2023. Meanwhile, Fitch Ratings expect the price of gold to steadily increase until it reaches its highest point in 2021 at 1500 USD per ounce before dropping to reach 1450 in 2022. Likewise, Bloomberg expects the price of gold to increase steadily, though at a slower rate, until it reaches a peak in 2021 at 1454 in 2021 and staying relatively steady afterwards.

Overall, the price of gold and other precious metals has risen sharply in 2019 amidst global uncertainty and monetary policy loosening (World Bank, 2019). This trend is likely to continue onto 2020 with most major organizations betting on the continued rise of gold prices.

FIGURE 15. WORLD GOLD PRICE FORECASTS, USD PER OUNCE



Source: World Bank, Fitch Ratings, Bloomberg

The price of gold in Mongolia is dependent on the world price of gold as the Bank of Mongolia purchases gold based on the prices set by the London Bullion. In addition to the world price of gold, the price of gold in Mongolia is also highly dependent on the exchange rate. In light of the recent economic indicators of Mongolia, it is unclear how exactly the exchange rate will affect the price of gold in Mongolia.

MONGOLIAN MARKET

DEMAND SIDE

Mongolian demand is determined by gold export levels and local consumption. Moreover, Mongolian demand for gold is largely determined by purchases made by the Bank of Mongolia.

TABLE 12. LOCAL GOLD EXPORT

	2018H1			2019H1			Change (2019/2018)	
	Volume (tonnes)	Value (mln USD)	%*	Volume (tonnes)	Value (mln USD)	%*	Change	%*
Non-monetary gold	3.432	144	4%	4.665	196	5%	36%	1%

Note: % - Contribution to total growth; Source: Bank of Mongolia*

In the first half of 2019, Mongolia exported 4.66 tonnes of gold, earning 196 million USD. This is a 36 percent year on year increase in value compared to the first half of 2018 where Mongolia exported 3.43 tonnes of gold valued at 144 million USD. Moreover, the export of gold's contribution to total growth increase 1 percent, as compared to the 1 percent decrease observed in the first half of 2018.

However, despite these positive export findings, gold purchases by the Bank of Mongolia decreased sharply in the first half of 2019. More specifically, in the first half of 2019, the Bank of Mongolia purchased around 6 tonnes of gold, a 16 percent decrease from the amount purchased in the first six months of 2018. Moreover, as of October 2019, the Bank of Mongolia has only purchased 10.5 tons of gold, a 27 percent decrease from the 14.5 tonnes purchased in the first 10 months of 2018 (Bank of Mongolia, 2019). While the Bank of Mongolia aims to buy 20-25 tonnes of gold each year from 2017 to 2020 in accordance with the Gold-2 program, a national program implemented by the Government of Mongolia to promote domestic gold production, it is unlikely that the Bank of Mongolia will reach its target volume by the end of the year.

This however, was not due to a lack of trying. In accordance with the Gold-2 program, the Bank of Mongolia organized another the "National Gold to the Fund of Treasures" campaign to last 6 months from April 1 2019 (Bank of Mongolia, 2019). According to the Head of Reserves Management and Financial Markets Department at the Bank of Mongolia, the campaign will include numerous planned activities to promote gold miners' contribution to the increase of foreign exchange reserves, the stability of the Mongolian exchange rate and increase gold purchases (B.Misheel, 2019).

The decrease in gold purchases is likely due to the increase in the gold royalty rate. Under the Gold-2 program, the Government of Mongolia amended the Minerals Law such that the gold royalty rate was decreased from 5 percent to 2.5 percent from the law's implementation in 2014 to January 2019. While the Bank of Mongolia made an official request to the Government of Mongolia to extend the amendment for another 5 years, the request was not fulfilled and the new gold royalty rate came into effect in January 2019 (B.Misheel, 2019). As a result, gold producers are faced with higher taxes that diminish profits and negatively affect Bank of Mongolia purchases and overall demand. Overall, the increase in the gold royalty rate seem to suggest a dip in Mongolian demand for gold moving forward.

SUPPLY SIDE

On the supply side, according to the National Statistical Office of Mongolia, gold production excluding Oyu Tolgoi production reached 5.5 tonnes in the first half of 2019. This is a 20% decrease compared to the 6.9 tonnes of gold recorded in the first half of 2018. While the exact cause of this decrease remains unclear, it is possible that the increased gold royalty rate reduced the overall profit of gold, despite its high world market price, dampening production.

TABLE 13. MONGOLIAN GOLD PRODUCTION, TONNES

	2018H1	2019H1	Y-o-y Δ%
Gold production /except OT /	6.9	5.5	-20.2
Oyu Tolgoi production	2.6	5.4	108

Source: NSO, OT website

This decrease however, was offset by the increase in Oyu Tolgoi gold production. In particular, Oyu Tolgoi's gold production reached 5.4 tonnes in the first half of 2019, more than doubling the 2.6 tonnes of production observed in the first half of 2018, displaying a 108% year-on-year increase. This substantial increase in production is linked to an increase in the company's gold grade. While gold ore grade averaged 0.25 grams per tonne in the first half of 2018, this shot up to 0.44 grams per tonne in the first half of 2019, greatly boosting production. Moreover, production was also bolstered by mill throughput increase 2.3 percent year-on-year with the mine transitioning from Phase 4A to Phase 4B (Oyu Tolgoi, 2019).

However, despite these leaps in gold production, Oyu Tolgoi has faced numerous in the first half of 2019 that are expected to reduce upcoming production. In particular, Oyu Tolgoi's underground mine expansions, which began in May 2015, have been plagued with delays. In October 2018, Oyu Tolgoi announced a 9-month delay in the construction of its "shaft two" project. Moreover, in June 2019, Oyu Tolgoi recently announced a 16 to 30-month delay as unstable ground conditions endanger the structural reliability of the mine when blasting the ground in order to proceed with the development of the underground mine (Oyu Tolgoi, 2019). As a result, sustainable production is now expected between May 2022 and June 2023. Additionally, as stated by Oyu Tolgoi, further technical work is necessary in order to accurately calculate a final cost estimate and schedule for the remaining

underground mine project. Currently, this technical report is expected to be delivered in the second half of 2020. As of now, preliminary estimates for the additional development capital necessary for the project has been estimated to be between 1.2 to 1.9 billion USD. In addition to the previously estimated development capital of 5.3 billion USD, this brings the total investment needed for the underground project to 6.5 to 7.2 billion USD (Oyu Tolgoi, 2019). However tumultuous, once the development of Oyu Tolgoi's underground mine is complete, gold production is expected to increase significantly, with an estimated forecasted production of almost 20 tonnes of gold annually at its peak (Oyu Tolgoi, 2018).

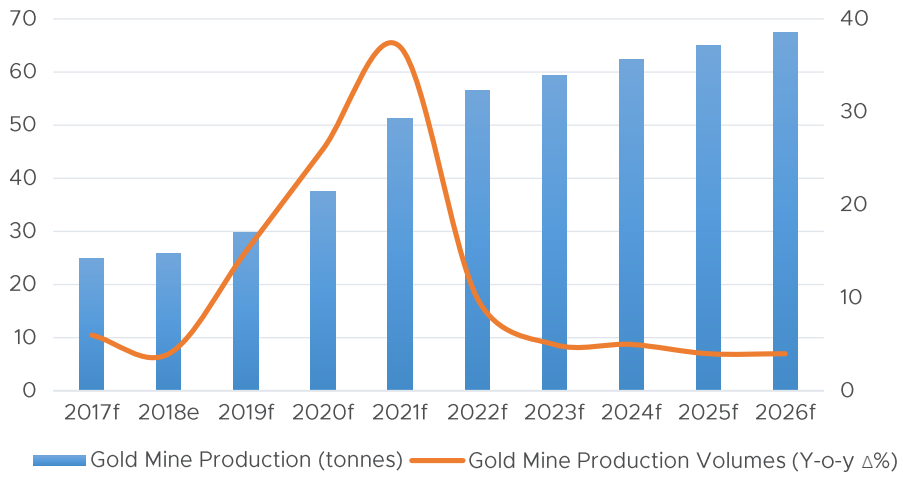
On a positive note, the Government of Mongolia and Rio Tinto, the majority shareholder of Turquoise Hill Resources, signed a framework agreement in January 2019 in order to sort out the issue of finding Oyu Tolgoi a domestic power provider. According to the agreement, a 300MW power plant located near the Tavan Tolgoi coalfields is to supply Oyu Tolgoi with power following its construction. The power plant was initially expected to be completed by 2022 but following the earlier cancellation of the power agreement by the Government of Mongolia detailed in the previous commodity report, the deadline was pushed back and is not expected to be operational until mid-2023. As detailed in the agreement, Oyu Tolgoi will be the majority owner of the power plant and the funding is likely to come from third-party debt. To prepare for the agreement, in July 2018, Rio Tinto signed an agreement with 3 Chinese companies for the design of a power plant to supply Oyu Tolgoi. Due to the agreement, Oyu Tolgoi has the opportunity to retain the 150 million USD it annually pays to China for power consumption once the power plant is operational (Mining Technology, 2019)

In addition to Oyu Tolgoi, several new project streams, particularly the gold projects implemented by Erdene Resource Development and Xanadu Mines, are expected to boost Mongolian gold production in the future. In October 2019, the European Bank for Reconstruction and Development (EBRD) agreed to provide a 5 million USD convertible loan to Erdene Resource Development in order to fund the development of the company's Khundii gold project in the southwest of Mongolia (M.Unurzul, 2019). The two deposits of the project, the Bayan Khundii and Altan Nar deposits, are expected to contribute a combined 3 tonnes of gold annually to Mongolia's total gold production. According to Erdene Resource Development, production is planned to begin in late 2021 (Fitch Solutions, 2019).

Another anticipated gold project is Xanadu Mines' copper-gold Kharmagtai project. The project has reported significant oxide mineralization results and is considered one of Asia's largest undeveloped copper projects, estimated to contain 1.9 Mt of copper and 122 tonnes of gold in open-cut mineral resources (Fitch Solutions, 2019).

While Oyu Tolgoi's underground development delays might lower previous gold production forecasts in the short term, overall production still remains positive. Moreover, this increase is expected to be supported by the project streams mentioned above.

FIGURE 16. MONGOLIAN GOLD PRODUCTION FORECAST



BMI Research estimated forecast. Source: USGS, BMI Research calculation

The table below shows local gold reserves as calculated by the Mineral Resources and Petroleum Authority of Mongolia.

TABLE 14. LOCAL GOLD RESERVES

Gold reserves	Measurement	2017H1	2018H1	2019H1
Quartz vein gold	Mt	2.1	15.9	50.5
Placer gold	tonnes	1.2	2.2	2.7

Source: Mineral Resource and Petroleum Authority of Mongolia

In the first half of 2019, quartz vein gold reserves increased substantially, more than tripling the amount observed in the first half of 2018. Meanwhile, placer gold reserves increased marginally, going from 2.2 tonnes in the first half of 2018 to 2.7 tonnes in the first half of 2019. This increase can be explained by the increase in the number of gold deposits registered to the Mineral Resources and Petroleum Authority of Mongolia's resource reserve registry. For instance, if 21 gold deposits, 3 quartz vein gold and 18 placer gold, were registered in the first half of 2018, 28 gold deposits, 3 quartz vein gold and 25 placer gold, were registered in the first 6 months of 2019 (MRPAM, 2019).

In addition to solid project streams and an increase in Mongolia's reported gold reserves, during the Mongolia-Kazakhstan Business Forum held on October 11 in Nur-Sultan, Kazakhstan, Mongolia and Kazakhstan have established an agreement on building and commissioning a gold and silver refining plant. This is the continuation of the agreement made during the 7th Mongolia-Kazakhstan Intergovernmental Commission's meeting mentioned in the previous report. According to the agreement Kazakhstan will introduce its gold and silver refining technology with

Mongolia, a patent normally estimated to be worth 30 million USD. Moreover, the Minister of Mining and Heavy Industry has mentioned that in relation to the commissioning of the refinery plant, the Government of Mongolia is preparing to submit a draft law on Precious Stones and Metals. Doing so with not only create regulations for refining silver and gold domestically but will also have the added benefit of promoting jewelry manufacturing in Mongolia. Overall, the gold and silver refining plant will require 81.7 million USD in investment and will be able to process 7 to 8 other elements in addition to 25 tons of gold and 50 tons of silver a year (B.Batchimeg, 2019). In light of Mongolia growing gold reserves, its expected project streams as well as government initiatives to support gold production, Mongolian gold supply is expected to increase.

CONCLUSION

In summary, world gold demand increased 8 percent year-on-year in the first half of 2019. This increase was supported by an increase in the demand for jewelry as well as an increase in the demand for gold for investment and central bank purchases. Jewelry demand, the largest component of world demand, increased 1 percent due to as 12 percent year-on-year surge in Indian demand. Technology demand was low as the trade war between the US and China led to a general slowdown of the electronics sector. Meanwhile, gold demand for investment grew 2 percent as the demand for gold backed ETFs were boosted by overall global uncertainty. Likewise, gold purchases by central banks grew an exponential 57 percent as central banks were keen to diversify their assets in response to geopolitical uncertainty, lackluster global economic growth and mounting trade tensions. Moving forward, jewelry demand is expected to be sluggish as high prices may reduce consumer demand while the ongoing trade war dampens technology demand. Continued global uncertainty on the other hand, is expected to keep gold demand for investment and central bank purchases elevated.

World gold supply, consisting of mining production, net producer hedging and recycled gold saw a 2 percent increase in the first half of 2019. Mining production in China, South Africa and Indonesia experienced continued falls as the issues detailed in the previous report persisted. This drop however, was mitigated by increased production in Russia, Canada and Ghana. Net producer hedging was led by Australia as the Australian dollar weakened during the first half of 2019 and mining companies were keen to take advantage of higher gold prices. However, the reporting period saw overall net de-hedging. Recycling increased 7 percent year-on-year as countries wanted to capitalized on the high price of gold. This was especially the case in Iran, India and China. Moving forward, overall gold supply is slated to increase as production in major gold producing countries ramp up and a steady project stream is expected.

In light of uncertain global economic conditions, the price of goal is expected to remain elevated around the 1350 USD per ounce mark for the rest of 2019. Moreover, this is supported by monetary policy easing in several countries with the policy rate cuts by the US Federal Reserve playing a particularly important to role is keeping gold prices up.

As a price taker, the price of Mongolia gold is dependent on the world price of gold coupled with the exchange rate. As the world price of gold is expected to continue to rise, the price of Mongolian gold is expected to increase in tandem. As for Mongolia demand and supply, demand is expected to drop as the increased gold royalty rate effective since January 2019 increases the cost of producing gold and dampens gold purchases made by the Bank of Mongolia. On the supply side, while Oyu Tolgoi's underground development has been delayed, Mongolia's overall project stream, its increase in gold reserves as well as the planned establishment of a gold refinery plant all support increased gold production in the future.

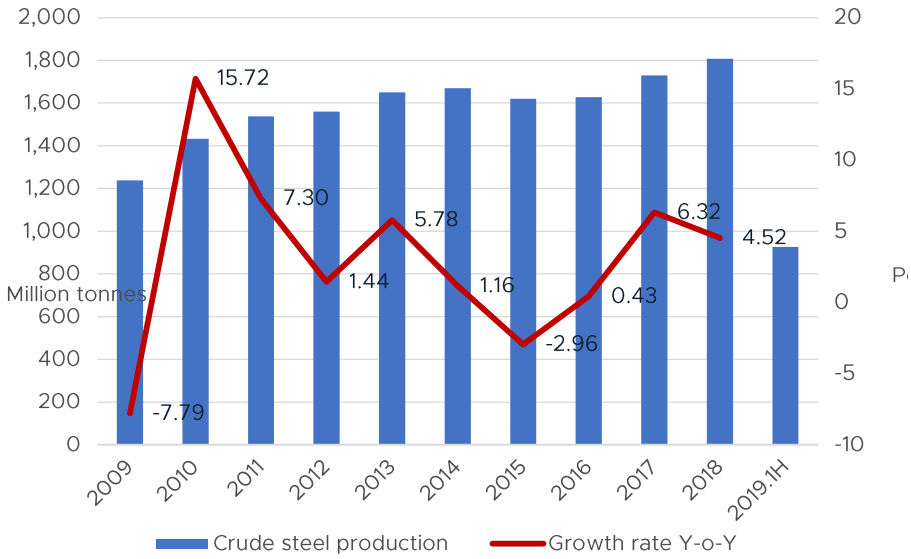
IRON ORE

WORLD MARKET

DEMAND SIDE

The steel industry is the main driving force of iron ore demand as iron ore is a major element utilized in the steel making process. In this section pertaining to the demand side, we focus on steel production and its projection World crude steel production grew 4.5 percent year-on-year and reached 1,808 million tonnes (Mt) in 2018. Production levels have been continuously increasing over the past three years (FIGURE 17). In the first half of 2019, crude steel production was 926 Mt, an increase of 5.3 percent year-on-year.

FIGURE 17. WORLD CRUDE STEEL PRODUCTION AND GROWTH



Source: World steel association

The top five steel producing countries produced 72 percent of the world crude steel production in 2018. These countries were China (51.3 percent), India (5.8 percent), Japan (5.7 percent) United States (4.7 percent) and South Korea (4 percent). The steel production of these countries is considered in this section.

China's steel industry displayed a 6.29 percent year-on-year growth in 2018 and produced 928 Mt crude steel. During the first half of 2019, China's steel industry produced 491 Mt of crude steel, a 10.1 percent year-on-year growth. This growth was mainly driven by increased steel demand spurred by local governments' investment in infrastructure projects.

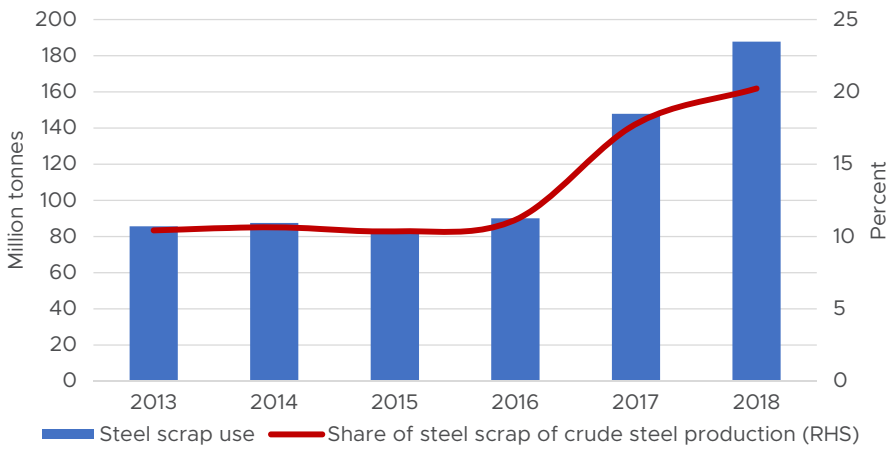
Chinese government began an economic stimulus program in July 2018 to mitigate the adverse effects of trade war with the United States and to stabilize economic growth. Refer to the gold and coal sections of this report for detailed information on

the trade war and its influence on global steel production. Within the framework of this program, the central government urged local governments to support infrastructure projects by issuing special bonds. The government increased the annual special bond quota for local governments to a record high of 311 billion USD in 2019 (Bloomberg, 2019). The government also waived the restrictions on the methods used by local government to finance their projects through the special bond. For instance, the Chinese government eradicated a 20 percent limit on the proportion of any local government bond sale that bank underwriter could purchase for their own balance sheets (Financial Times, 2018). Chinese steel production was boosted by the strong domestic demand and high prices along with strict environmental regulations which forced small or ineffective steel mills to shut down.

However, China's high steel production may have a limited effect on iron ore demand due to the rising usage of steel scrap. China is the largest consumer of steel scrap for steel making. In 2018, China's steel scrap consumption twice as much as the European Union, three times the United States and six times Japan. The consumption of steel scraps by China has been increasing rapidly in recent years. China's steel scrap consumption increased by 27 percent year-on-year and reached 187.8 million tonnes in 2018 (As for the supply side of steel scraps, an increasing number of machineries are reaching the end of their useful life and buildings are be demolished or replaced from wear and tear.

FIGURE 18). This upward trend is driven by stricter environmental regulation such as forcing steel mills to reduce their output pollution (Bureau of international recycling, 2018). As for the supply side of steel scraps, an increasing number of machineries are reaching the end of their useful life and buildings are be demolished or replaced from wear and tear.

FIGURE 18. CHINA'S STEEL SCRAP CONSUMPTION FOR STEEL MAKING



Source: Bureau of International Recycling (2018) World Steel Recycling in Figures 2014– 2018;

In further, removal of the above mentioned government stimulus program, moderating steel consumption and stricter environmental regulation will affect the

China's steel production negatively. China's steel production is expected to decline at an annual average rate of 0.1 percent, to 926 Mt in 2021 (DIIS, 2019). The Chinese government continues to combat air pollution through relocation and the closure of heavy polluting steel mills as well as limiting new capacities in key areas.

Indian steel production increased by 5 percent year-on-year to reach 106 Mt in 2018. This growth is mainly driven by ongoing expansion of steel-making capacity. During the first half of 2019, steel production increased by 5 percent or 2.7 Mt year-on-year. In the long term, policies to develop infrastructure and to expand steel-making capacity will continuously promote steel production in India. According to the national steel policy of India, the government will try to achieve 300 Mt of steel-making capacity by 2030. Steel production of India is expected to increase by 21.8 percent in 2021 relative to 2018 (DIIS, 2019).

Japan's crude steel production decreased by 0.3 percent year-on-year to reach 104.6 Mt in 2018. This decline was driven by a slump in residential construction, which was greater than the boost in infrastructure investments related to the Olympics and its construction projects. In contrast, United States crude steel production increased by 6.1 percent year-on-year to reach 87 Mt in 2018. This growth is mainly driven by an increase in industrial production and tariffs on imported steel products. In the long term, steel production of these countries is expected to decline due to decrease of manufacturing production. Crude steel production of South Korea increased by 2.1 percent year-on-year to reach 72.5 Mt in 2018.

SUPPLY SIDE

World iron ore production reached 2.5 billion tonnes in 2018, an increase of 2.8 percent year-on-year. This is a slower growth than the 8.9 percent year-on-year growth observed in 2017. Production increases in Australia and Brazil were offset by declines in Chinese iron ore production. In particular, Brazil's iron ore production increased by 15 percent year-on-year while China's iron ore production decreased by 5 percent year-on-year in 2018. Production in Brazil was boosted by a ramp up of the S11D mine production. The production of the S11D mine rose to 58 Mt in 2018, while its production was 22 Mt in 2017. Due to stricter environmental regulations, China's iron ore production declined in 2018.

TABLE 15. WORLD IRON ORE PRODUCTION, MT

	2015	2016	2017	2018
Australia	817	825	883	900
Brazil	397	391	425	490
China	375	353	360	340
India	156	160	202	200
Other	535	501	560	570
World	2280	2230	2430	2500

Source: United States Geological Survey

Brazilian iron ore production declined significantly in the first half of 2019 after a tailings dam at the Brucutu mine (part of Vale) ruptured in January. However, production is expected to pick up again and grow steadily in the near term. The rupture of the tailings dam, which was used to store mining waste, killed around 250 people. In order to prevent the same disaster from happening again, some Vale mines operations have been suspended to allow for monitoring and inspection. Vale reports that 93 Mt of iron ore production capacity had to be taken offline due to the collapse of the tailings dam (Vale, 2019Q2). When the Brucutu mine reopened, 30 Mt of capacity was restored in June. If Vale is able to successfully shift to the dry processing, another 30 Mt of production capacity may be recovered by the end of the year. Dry processing is safer than wet processing because water is not utilized to remove impurities and thus, does not require a tailings dam. The remaining 30 Mt of production capacity may be recovered over the next two to three years as the mines still use wet processing. Concurrently, the expansion of the S11D mine is expected to increase iron ore production capacity of Vale. The resumption of Vale operations and future projects are expected to increase Brazil's iron ore production in the future. Brazil's iron ore export is expected to decrease by 5 percent in 2019 year-on-year and increase by 4.9 percent and 3.8 percent in 2020 and 2021, respectively (DIIS, 2019).

In March 2019, Tropical Cyclone Veronica disrupted Australia's iron ore production. Operations of Rio Tinto, one of largest producers of iron ore, in particular was affected by the cyclone. Rio Tinto's Pilbara iron ore production decreased by 9 percent year-on-year to reach 76 Mt in the first quarter of 2019 (Rio Tinto, 2019Q1). The decline was due to the disruptions caused by the cyclone in March as well as a fire at the Cape Lambert A port in January. Rio Tinto announced that the combination of the damages caused by the fire and cyclone led to a loss of 14 Mt of production in 2019 (Rio Tinto, 2019). However, BHP operations did not suffer any major damages. Iron ore production of BHP reached 56 Mt and declined by 3 percent year-on-year in the first quarter of 2019 (BHP, 2019 March). Flooding at both the mine and part of the railways caused delays in transportation. BHP reported that the cyclone reduced production by approximately 6 to 8 Mt in 2019. Australia's iron ore production and export are expected to grow modestly in the future Iron ore production is expected to increase as Rio Tinto and BHP implements large iron ore projects. Australian iron ore production is expected to decline by 2.5 percent year-on-year in 2019 and increase by 6 percent and 2.2 percent in 2020 and 2021, respectively (DIIS, 2019). The following table lists the iron ore mines which are expected to become operational in the near term.

TABLE 16. LIST OF THE IRON ORE MAJOR PROJECTS

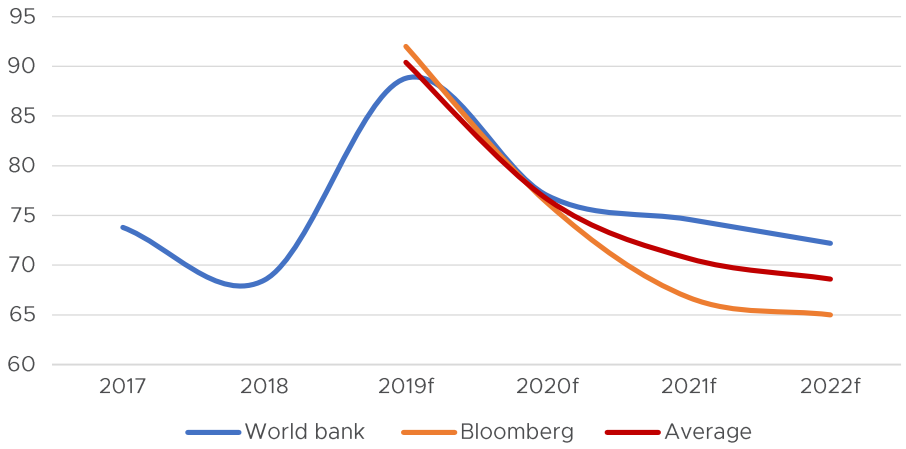
	Mines	Country	Owner	Commencing date	Annual capacity	Detail
1	Eliwana	Australia	Fortescue Metal Group	2022	30 Mt	Iron ore content is higher than 60.1 percent
2	Koodaideri	Australia	Rio Tinto	end of 2021	40 Mt	Main feature is the advanced technology such as autonomous trucks, trains and drills, and implement systems connecting all components of the mining value chain for the first time.
3	South Flank	Australia	BHP	2021	80Mt	The mine will replace existing production of Yandi as it ramps down by 2022
4	Mines-Rio	Brazil	Anglo American	2019	26 Mt	Iron ore production was 4.9 Mt in Q1 of 2019.
5	Samarco	Brazil	Vale and BHP	2020	32 Mt	The mine is closed since the tailing dam burst in November 2015. And is expected to reopen in 2020. Company is planning gradual resumption of its operation, initially 26 percent of capacity.
6	West Angelas (Deposits C & D)	Australia	Rio Tinto	2021	30 Mt	Expansion
7	Mesa B,C & H (Robe Valley)	Australia	Rio Tinto	2021	25 Mt	Expansion
8	Mayoko	Democratic republic of Congo	Sapro	2019	12 Mt from 2022	
9	Zanaga	Democratic republic of Congo	Zanaga Iron Ore Company (50%), Glencore (50%)	2019	30 Mt from 2024	The companies plan to produce 2 Mt of iron ore per year in 2019 and 2020

Source: Department of Industry, Innovation and Science, Reuters, related companies' website

PRICE

Moderate demand from China and oversupply from Australia and Brazil pushed the price of iron ore downwards in 2018. Iron ore price grew modestly from August 2018 due to the effects of the Chinese government stimulus program and the price increased sharply in the first half of the 2019. The spike in price was caused by two factors. First was the supply disruptions caused in major iron ore producing countries of Australia and Brazil, which led to a shortage. Iron ore price increased by 13 percent year-on-year in February 2019 after the rupture of the tailings dam at the Brucutu mines. Iron ore production of BHP and Rio Tinto were disrupted due to Cyclone Veronica in Australia. The disruptions of the cyclone caused iron ore prices to increase by 22 percent and 42 percent in March and April, respectively. Second, the Chinese government stimulus program raised the demand for steel.

FIGURE 19. IRON ORE PRICE FORECAST, USD PER TONNE



Source: World bank and Bloomberg

This elevated level of iron ore in 2019 is not expected to persist into the future. According to the World Bank forecast (October, 2019), iron ore price will decline and reach 72.2 USD per tonne in 2022 (FIGURE 19). The increase in supply from Australia and Brazil as well as decrease in Chinese steel production is expected to drive down prices. The recovery of Australian and Brazilian iron ore production from 2020 and the commencement of large iron ore projects is expected to promote iron ore productions. As the government stimulus program is phased out and and stricter environmental regulations are implemented, there will be a decline in iron ore demand.

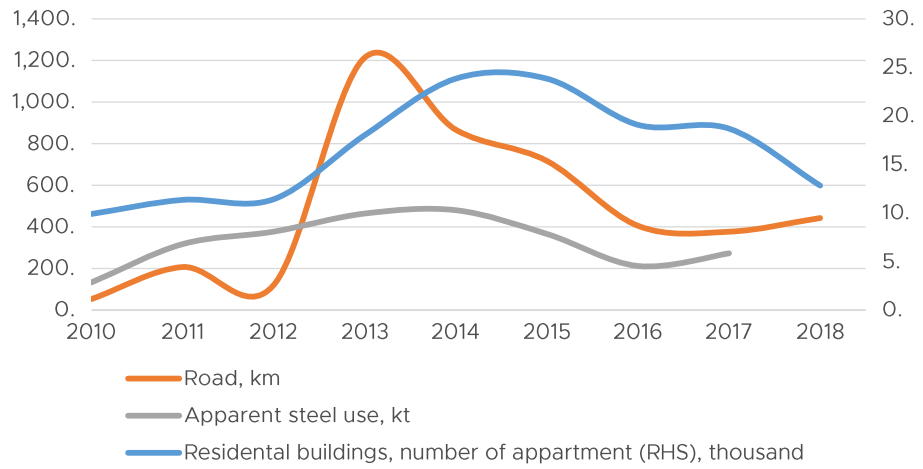
MONGOLIAN MARKET

DEMAND

As mentioned in previous reports, steel is primarily utilized in the infrastructure and construction sector. As such, steel consumption tends to follows the growth of these sectors. Outputs of the infrastructure and construction sectors mirrors economic growth but with delayed effect. For instance, the number of finished construction and roads soared in 2013 and 2014 after the economic boom from 2012 to 2013 (Figure 21).

In recent years, steel consumption of Mongolia has been increasing due to a steady economic growth. According to the World Bank (June, 2019), the Mongolian economy will grow by 7.2 percent and 6.9 percent in 2019 and 2020, respectively. However, the domestic steel consumption has limited effect on iron ore demand as domestic steel production capacity is very low.

FIGURE 20. FINISHED CONSTRUCTION, ROAD AND STEEL USE



Source: National statistical office and World steel association.

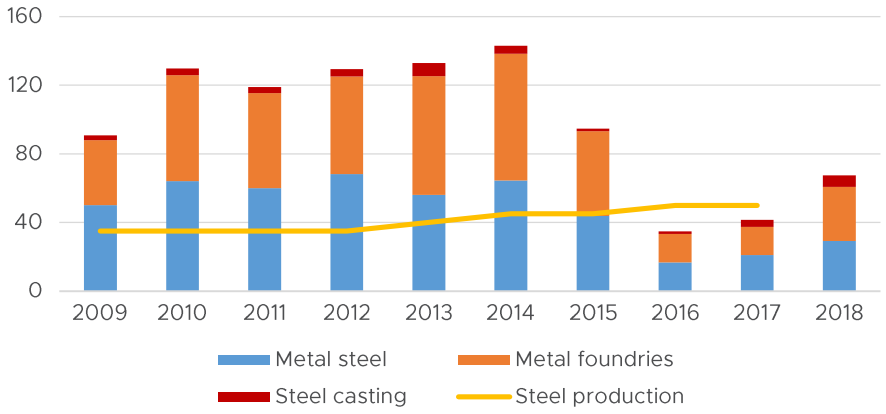
Several metallurgicalplant produce steel products in Mongolia. In 2018, 29.1 thousand tonnes of steel, 31.5 thousand tonnes of metal foundries and 6.7 thousand tonnes of steel casting were produced, an increase of 38 percent, 93 percent and 60 percent year-on-year, respectively. Production of all types of steel products declined sharply in 2016 (FIGURE 21). This was because of a slower economic growth and decrease in steel consumption. Steel consumption decreased by 42 percent year-on-year in 2016 (Figure 21).

Since the sharp decline in 2016, production of steel has been increasing as the economy recovers. The economic recovery and increase in steel production may translate to an increased domestic demand for iron ore. Domestic demand is limited, however, by the use of steel scraps in the metallurgical plants.

As cited in the previous commodity update report, there is an opportunity to increase domestic iron ore demand with the construction of new steel plants.

Currently, the Darkhan Metalurgical Plant only uses steel scrap in its production, but there are plans in the works about potentially producing steel from iron ore. In the future, a coke and steel plant complex may emerge as another domestic consumer of iron ore. Erdenes Steel Group is in the process of implementing the "Coke and Steel Plants Complex" project in Govisumber province (South-central Mongolia). In April 2019, the Mongolian Mineral's Council approved the feasibility study of the project.

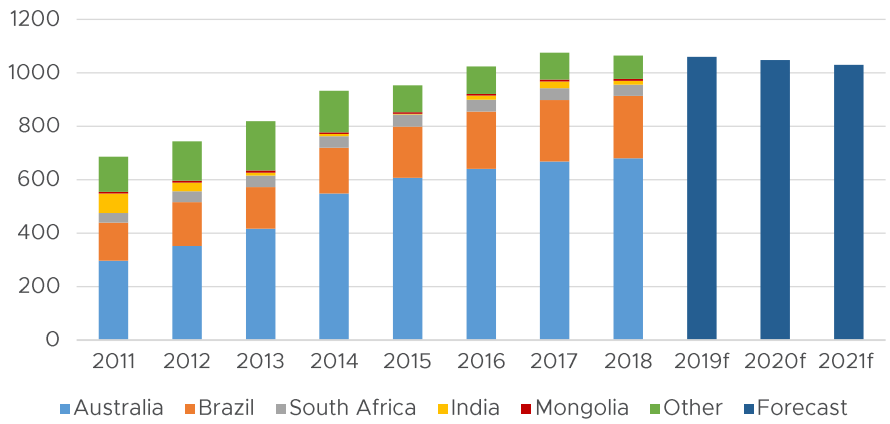
FIGURE 21. PRODUCTION OF CRUDE STEEL AND STEEL PRODUCTS, THOUSAND TONNES



Source: MRPAM and World steel association

The combination of China's large market capacity, Mongolia's lack of domestic steel production capacity and the strategic location of these two countries makes China the target market for Mongolian iron ore mines. China imported a total of 1065 Mt of iron ore, a decrease of 0.8 percent year-on-year in 2018. The main exporters of iron ore to China was Australia and Brazil (FIGURE 22). During the first five months of May 2019, Chine imported 425 Mt of iron ore, a decrease of 4.9 percent year-on-year. The decline is mainly attributable to supply disruptions in Australia and Brazil.

FIGURE 22. IRON ORE IMPORT OF CHINA, MT



Source: Department of Industry, Innovation and Science (2019), International Trade Center (2019)

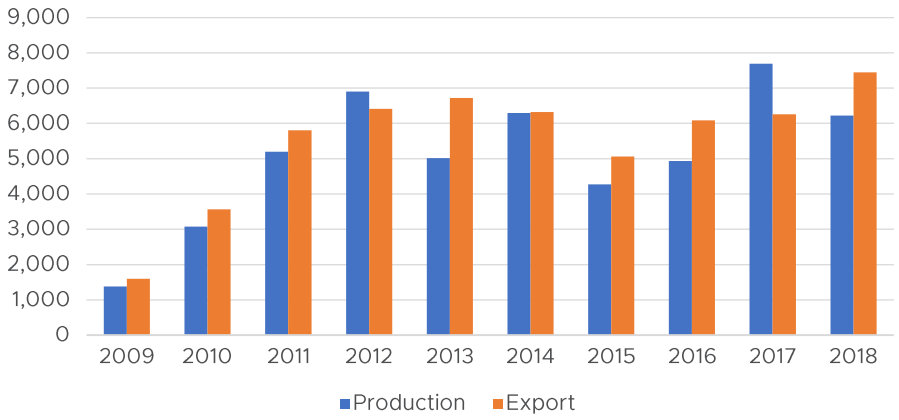
China's iron ore imports are expecting to gradually decline in the near term (FIGURE 22). Chinese iron ore imports are expected to reach 1029 Mt in 2021, a drop of 3.3 percent relative to 2018, as steel production decreases and scrap steel usage increases (DIIS, 2019).

The Mongolian government's policy to develop the industrial sector may create additional demand for iron ore in the long term. Currently, the Mongolian economy is highly depenfdent upon the mining sector and as such, the Government of Mongolia has been pursuing policies to develop the industrial sector which process the commodities and add value. The main policy documemts regarding promotion of the industrial sector are the State Industrial Policy and the Program on Heavy Industry Development. The former one was adopted by the Parliament of Mongolia in 2015 while latter was approved by the Government of Mongolia in 2019. Both policy documents are intended to develop value-adding industrial processes such as oil refinery, coal processing, metallurgy, machinery and chemicals. Included within these policies are goals to increase steel production through domestic consumption and add value to iron ore through processing.

SUPPLY

Iron ore is one of the major export products of Mongolia. In 2018, Mongolian iron ore production reached 6.2 Mt in 2018, decrease of 19 percent year-on-year whereas iron ore exports was7.4 Mt, and increase of 19 percent year-on-year (FIGURE 24). The discrepancies between production and export volumes can be explained by the inventory. The excess export volume in 2018 was from the inventory stockpile collected during 2017 when production levels were higher than export levels (FIGURE 24). Iron ore is being exported more due to favorable prices on the global market and stricter environmental regulation in China.

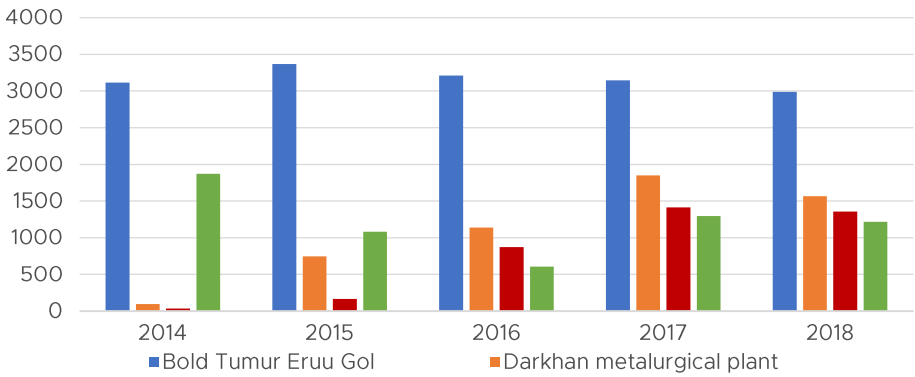
FIGURE 23. MONGOLIAN IRON PRODUCTION[5] AND EXPORT, THOUSAND TONNES



Source: National statistical office of Mongolia

There are four major iron ore producing companies in Mongolia (FIGURE 24). The largest iron ore producer and exporter is Bold Tumur Eruu Gol LLC, a private company with its own private railroad. Mongolrostsvetmet is state-owned mining company which also produces other commodities, such as gold and fluorspar. As mentioned previously, Darkhan Metallurgical Plant produces steel using steel scrap and is now working on producing steel from iron ore. Within the framework of that project, the plant owns several iron ore deposit licenses and is currently mining and exporting iron ore. The plant recently conducted a feasibility study in which the steel plant utilizes iron ore as an input. Altain Khuder LLC operates in Govi-Altai province and has its own concentrate plant.

FIGURE 24. IRON ORE PRODUCTION OF MAJOR COMPANIES, THOUSAND TONNES



Source: MRPAM and EITI

[5] Average grade of iron ore is 60% for Mongolian mines

During sharp decline of iron ore price in 2016, exports of these companies also declined and Altain Khuder and Bold Tumur Eruu Gol even decreased their productions due to the low price. The high prices in recent years has provided incentive for iron ore mines to increase their productions and exports. Mongolia exported 7.4 Mt iron ore to China in 2018, an increase of 19 percent year-on-year. During the first half of 2019, Mongolian iron ore export reached 4.1 Mt, an increase of 21 percent year-on-year. The main drivers were high prices and supply disruption in Australia and Brazil. Mongolian iron ore exports increased by 43 percent and 40 percent year-on-year in March and April of 2019, respectively, after the supply disruptions in Australia.

As mentioned in the previous update report, the main limitations facing iron ore exports is inadequate infrastructure. The limited capacity of the railway constrains export of iron. Due to these shortcomings, mining companies either decrease their exports or sell directly from the mine sites at a low price. As mentioned in previous reports, a new railroad project is being planned by the Mongolian government. The new railroad is expected to increase capacity of transportation and decrease freight costs. The railroad is expected to run from the Zuunbayan station to the Khangi border checkpoint, a distance of 281km. The feasibility study of the Zuunbayan-Khangi railroad is currently being discussed by the government.

CONCLUSION

Iron ore price is forecasted to be 88.8 USD per tonne in 2019 and decline to 72.2 USD per tonne in 2022. Iron ore demand is heavily dependent upon the Chinese market whereas supply and production are dependent on Australia and Brazil. In 2019, the combination of supply disruptions in Australia and Brazil and increased Chinese demand for iron ore will likely lead to higher iron ore prices. However, this elevated level of price will not sustain. Recovery in iron ore production of Vale and large planned iron ore projects in Australia will likely increase iron ore production from 2020 and on. The end of the Chinese government stimulus program and stricter environmental regulations will limit the steel production in China. These factors on both the demand and supply side will pull down iron ore prices from 2020.

Mongolian iron ore mines export a large majority of its products to China. In 2018 and during the first half of 2019, the iron ore exports sharply increased due to higher price. However, China's iron ore imports will likely decline due to the decrease in steel production and stricter environmental regulations. Considering expected domestic steel plants projects, there is a possibility to generate extra iron ore demand in the domestic market.

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