

Commodity Market Study: Update (October 2017)

Tuvshintugs Batdelger
Manlaibaatar Zagdbazar
Munkh-Ireedui Bayarjargal
Delgermaa Begz
Dulguun Tuvshintugs
Oyunzul Tserendorj
Unurjargal Davaa
Khorol-Erdene Bayartsogt

Economic Research Institute (ERI)

Abstract

The aim of this report is to provide an update of the main exporting commodities coal, copper, gold and iron ore market. This study mainly highlights demand and supply factors influencing the world and Mongolian market, since the March 2017 commodity market studies.

Keywords:

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

Ulaanbaatar, Mongolia

2018

COMMODITY MARKET STUDY





COMMODITY MARKET STUDY

Update report

ULAANBAATAR, 2018

COMMODITY MARKET STUDY

Update Report

Team Leader: Tuvshintugs Batdelger (Ph D)
Members: Manlaibaatar Zagdbazar
Munkh-Ireedui Bayarjargal
Delgermaa Begz
Dulguun Tuvshintugs
Oyunzul Tserendorj
Unurjargal Davaa
Khorol-Erdene Bayartsogt

ULAANBAATAR, 2018

CONTENTS

Coal market.....	1
Background	1
World market	1
Demand side	1
Supply side	6
Price of coal	9
Mongolian market	10
Demand side	10
Supply side	11
Price of mongolian coal.....	13
Conclusion.....	15
Copper market	17
World market	17
Demand side	17
Supply side	19
World copper price	21
Mongolian market	23
Background	23
Demand side	23
Supply side	25
Summary	27
Gold market	29
World market	29
Demand side	29
Supply side	32
Price outlook	35
Mongolian market	36
Demand side	36
Supply side	37
Conclusion.....	39
Iron ore market.....	41

World market	41
Demand side	41
Supply side	43
Iron ore price	44
Iron ore trade	45
Mongolian market	47
Demand side	47
Supply side	48
Conclusion	49
References	50
Appendix	59

List of tables

table 1. coal import volume forecast, million tonnes	1
table 2. coal export volume forecast, million tonnes	1
table 3. crude steel production forecasts,	2
table 4. steel mill trade remedies in effect against china	4
table 5. crude steel production in china,	4
table 6. crude steel production forecasts	5
table 7. india's steel demand and production forecasts,	6
table 8. australian production and export volume,	7
table 9. china's coal production volume,	8
table 10. united states production and export	9
table 11. mongolian coal production and	12
table 12. global refined copper demand (thousand tonnes)	17
table 13. global copper consumption forecast	19
table 14. global copper production by countries,	20
table 15. total production and export of copper	26
table 16. world gold demand h1 (tonnes)	29
table 17. world gold demand q3 (tonnes)	29
table 18. local gold export (in millions of usd)	36
table 19: mongolian gold production (tonnes)	37
table 20: local gold reserves (tonnes)	38
table 21. iron ore production by major companies, million tonnes, year ended december 31	43
table 22. forecast of iron ore trade,	46

table 23. mongolian iron ore miners' sales, 2016	48
table 24. mongolia's iron ore export to china	49

List of figures

figure 1 . cyclone debbie rail line closures	8
figure 2. china 2016 coal imports	11
figure 3. mongolian coal, thousand tonnes'	12
figure 4. china import price forecasts, usd/mt.....	14
figure 5. chinese copper import quarterly (refined copper	18
figure 6. copper price dynamic	21
figure 7. world copper price projection	22
figure 8. imf price projections.....	23
figure 9. wb price projections.....	23
figure 10. world gold supply h1 (tonnes)	32
figure 11. world gold supply q3 (tonnes)	33
figure 12 world gold price forecasts,	35
figure 13. gold export income forecast	37
figure 14. mongolian gold production forecast (tonnes).....	38
figure 15. comparison of steel – making capacity, steel production and use, million tonnes.....	41
figure 16. china's crude steel production,	42
figure 17. world crude steel production forecast,	42
figure 18. iron ore price and metal price index.....	44
figure 19. average iron ore price projection,	45
figure 20. china's iron ore import,	46
figure 21. mongolia's steel production and use,	47

COAL MARKET

BACKGROUND

The aim of this report is to provide an update of the coal market, mainly highlighting factors influencing the Mongolian market, since the March 2017 Coal Market Study. There are two kinds of coal: thermal, which is used in electricity generation, and coking coal, also known as metallurgical coal, which is mainly used in the steel making process. As around 70–80 percent of Mongolian coal export is coking coal, a larger portion of this report will focus on coking coal rather than thermal. Hereafter, coking coal will simply be termed as coal. This report, similar to the last publication, consists of three sections – demand side, supply side, and price of coal – with an additional section on thermal coal.

TABLE 1. COAL IMPORT VOLUME FORECAST, MILLION TONNES

Year	2016	2017f	2018f	2019f
China	59	74	59	53
Japan	51	51	53	53
India	48	49	50	53
EU (28)	40	41	41	41

TABLE 2. COAL EXPORT VOLUME FORECAST, MILLION TONNES

Year	2016	2017f	2018f	2019f
Australia	189	180	194	194
United States	37	46	36	35
Canada	28	28	29	29
Russia	22	24	25	26

Source: Department of Industry, Innovation and Science (2017, September)

The tables above illustrate import and export volumes in million tonnes in 2016 and forecasts until 2019. The demand and supply side sections will discuss the occurrence of any recent events of significance which have and could affect the coal market by the top importers and exporters of coal. The top importers of coal are China, Japan, India, and the European Union. The top exporters are Australia, United States, Canada and Russia.

WORLD MARKET

Demand side

Coal is mainly used to produce coke, which is an input in the manufacturing of iron and steel. Demand for coal is heavily reliant on levels of steel production. Trends in demand for and output of steel are primarily the determinants of global demand for coal. Demand is also sensitive to changes in steel production methods. The higher the

availability of steel scrap, the more incentive to switch from blast furnaces to electric arc furnaces. Electric arc furnaces are primarily used in scrap recycling operations, thus, if steel producers use electric arc furnaces, the demand for coal will decrease.

CHINA

World steel forecasts demand for finished steel products in China will be around 765.7 Mt in 2017, a 12.4 percent increase from the 2016 demand of 681 Mt. The increase from 2016 to 2017 is due to a statistical correction. China closed most of its outdated induction furnaces in 2017, a category which was previously not captured in official statistics, and with the closures, the demand from this sector of the market is now satisfied by mainstream steel makers. Without this statistical capture, world steel expected the underlying growth rate of China's steel demand for 2017 to be 3 percent, which makes the corresponding global growth rate 2.8 percent. The outlook for China's demand for finished steel products in 2018 shows no growth over 2017 as the government continues shifting its focus from manufacturing to services and strengthens its environmental protection measures.

China represents around half of world production of crude steel. As seen in the table below, China's crude steel production is forecasted to reach a peak in 2017 and then slowly decline over the years.

**TABLE 3. CRUDE STEEL PRODUCTION FORECASTS,
MILLION TONNES**

	2016	2017f	2018f	2019f
China	807.3	844.4	834.6	823.3
World	1,624.8	1684.1	1688.9	1696.6

Source: BMI Research (2017); Department of Industry, Innovation and Science (2017, September); research team's calculation

In February 2017, the Chinese government issued "2+26" cities air pollution treatment plan for 2017. According to the plan, four cities in Hebei (Shijiazhuang, Tangshan, Handan and Anyang) are required to curtail crude steel capacities (blast furnaces) by 50 percent during the winter. The winter curtailment policy will take effect from mid–November 2017 to mid–March 2018 in order to improve air quality. In response to the announcement, steel prices have increased sharply. The increases in steel prices are supported by speculative stockpiling

and future trading, due to concerns of supply shortages following the winter curtailment policy and supply – side reforms.

However, due to high steel prices and margins, China's steel production has been strong. Also, steel producers have been stockpiling for winter in anticipation of future production limitations, which has increased steel inventories in the first half of September 2017. Strong production and increased inventories could cause additional downward pressures on steel price and production as concerns of a supply glut increases.

The global steel glut has been pushing steel prices down and making it harder for some steel companies to survive. The problem of "dumping" cheap steel into the global market due to slowdowns in domestic markets is being attempted to be resolved through anti – dumping duties. These duties are designed to increase the costs of importing cheap steel in order to give domestic steel producers a fair chance to compete in the market.

In April 2017, President Trump signed a presidential memorandum prioritizing an investigation of steel imports under Section 232 of the Trade Expansion Act of 1962 (U.S. Department of Commerce). The investigation was instigated by accusations of price dumping by the Chinese steel industry. In May 2017, the European Commission announced new anti – dumping duties on pipes and tubes made from steel and iron in China in its latest attempt to stop the flow of cheap metal (Official Journal of the European Union, 2017). The table below lists the current trade remedies against China by country. As the duties imposed are increased even further over the next few years, it may cause China to decrease their steel production significantly.

In the long – term, if the winter curtailment policy expands from suspending operations during the winters to closing down steel factories using blast furnaces, steel producers may be forced to use electric furnaces. The table below shows China's crude steel production by method. The transition from blast to electric arc furnace is likely as blast furnaces produce large quantities of carbon dioxide emissions and if China wants to significantly reduce its carbon emissions, steelmakers using blast furnaces may be the main casualty.

TABLE 4. STEEL MILL TRADE REMEDIES IN EFFECT AGAINST CHINA¹

Country	Antidumping Duties	Countervailing Duties	Suspension Agreements and Undertakings	Total
United States	14	10		24
Canada	10	8		18
European Union	10	1	1	12
Australia	6	4		10
Others	54		3	58
Total	94	23	4	122

Source: International Trade Administration (2017)

Electric arc furnaces rely on electricity generated by coal – fired power plants to operate, which means the demand for coal could decrease while demand for thermal coal increases.

TABLE 5. CRUDE STEEL PRODUCTION IN CHINA, MILLION TONNES

	2012	2013	2014	2015	2016
Crude Steel Production	731	822	822.8	798.8	808.4
Of which (%):					
Blast Furnace	89.8	90.5	93.9	93.9	94.8
Electric Arc Furnace	10.1	9.5	6.1	6.1	5.2

Source: Bureau of International Recycling (2017)

JAPAN AND EU

Japanese demand for finished steel was 62.2 Mt in 2016 and World Steel forecasts demand will be 64.0 Mt and 64.5 Mt in 2017 and 2018, respectively. From April to July of this year, Japan's steel production fell due to maintenance and other issues at mills. However, production is forecasted to rebound due to the government stimulus package, improving exports and preparation for the 2020 Olympic Games.

In October 2017, Kobe Steel Ltd., Japan's third – largest steel producer, admitted to falsifying data about the quality of various products such as copper, aluminum, iron powder, and so on. Every transport industry

¹ In May 2016, the United States imposed duties of 522 percent on Chinese cold – rolled flat steel, widely used for car body panels, appliances and in construction. It was more than a 300 percent increase from the previous duty of 266 percent.

company was affected by the news as safety concerns arose. Kobe Steel's top customers are Shinsho Corp, Mitsubishi Corp, Toyota Motor, General Motors, Ford Motors, Nissan Motor and Honda Motor. The scandal will hurt the company in the long run as they lose customers to competitors and Thanh Ha Pham, an analyst at Jefferies Japan Ltd., believes that it could even result in the break – up of the company. If Kobe Steel does break up, their market shares will likely be divided up among domestic competitors such as Nippon Steel & Sumitomo Metal Corporation and Nisshin Steel Co., Ltd. and international competitors such as Arcelormittal SA.

If market shares are redistributed due to the break – up of Kobe Steel, Japan's total crude steel production forecasts might decline while EU's crude steel production increases as Arcelormittal, who accounts for 10.3 percent of the European market, absorbs some of Kobe Steel's productions.

**TABLE 6. CRUDE STEEL PRODUCTION FORECASTS
IN JAPAN AND EU, MILLION TONNES**

	2016	2017f	2018f	2019f
Japan	105	105	105	103
EU	162	168	170	171

Source: BMI Research (2017); Department of Industry, Innovation and Science (2017, September); research team's calculation

EU demand for finished steel in 2016 was 158.2 Mt with forecasts of 162.1 Mt and 164.3 Mt in 2017 and 2018, respectively. Concerns about tensions within the EU, particularly over migration policies are receding, and the EU economy is recovering. As global business confidence and industrial production indicators have steadily been improving, steel production capacities have increased, leading to a strong growth in steel production and consumption.

INDIA

India's demand for finished steel was 83.5 Mt in 2016 and World Steel forecasts demand will be 87.1 Mt and 92.1 Mt in 2017 and 2018, respectively. India experienced an economic activity slowdown in 2017, but accelerating government reforms are expected to bring about a better investment environment leading to growth in the coming years. Investment activities are driven by government initiatives and private

sector investment is restrained due to a leveraged corporate balance sheet.

Steel production in India is forecasted to be supported by ongoing new additions to capacity and accelerating demand growth from government investment in urban development and infrastructure. However, meeting official targets laid out in the National Steel Policy 2017 may face some challenges such as barriers in accessing infrastructure, raw materials and finance.

TABLE 7. INDIA'S STEEL DEMAND AND PRODUCTION FORECASTS, MILLION TONNES

	2016	2017f	2018f	2019f
Demand for Finished Steel Products	83.5	87.1	92.1	
Crude Steel Production	92.1	98.9	106.4	114.7

Source: BMI Research (2017); Department of Industry, Innovation and Science (2017, September); world steel; research team's calculation

Supply side

Increases in price can arise from growth in domestic demand, limits in capacity and drops in production due to natural disasters or accidents. As seen in the current market, global coal spot prices are estimated to have risen to an average of around 190 USD per tonne in the September quarter due to both production disruptions in Australia and China and strong import demand from China. The supply outlook for the global coal market is forecasted to peak in 2017 and then decline as operations return to normal.

The main importers of coal in 2016 to China were Australia, Indonesia and Mongolia (Figure 2). The following section will discuss the coal supply of the top global coal exporters with a greater emphasis on Australia, Mongolia's main competitor in coal imports.

AUSTRALIA

Australia produces around 18 percent of the world's coal and exports 98 percent of its production. Coal production in 2015 and 2016 were 189.3 and 190.0 Mt, respectively, and it is forecasted that it will be 195.7 Mt in 2017 and 198.5 Mt in 2018. The 2017 production is forecasted to increase by 3.0 percent from the previous year. During the September quarter, there were production disruptions caused by industrial action at Glencore's Oaky North mine and a temporary shutdown of South32's Appin mine due to gas leakages. The

production disruption coupled with the supply transportation disruption in March from Cyclone Debbie caused prices to increase significantly which prompted other mines to increase production to take advantage of high coal prices. The increased production at other mines is forecasted to outweigh the production disruptions of Glencore and South32.

In 2018, Australian coal production is expected to be around 199 Mt as ramp-ups in production from Queensland's Byerwen (3.5 million tonnes capacity) and the start-up of operations at Eagle Downs (1.4 million tonnes) take effect.

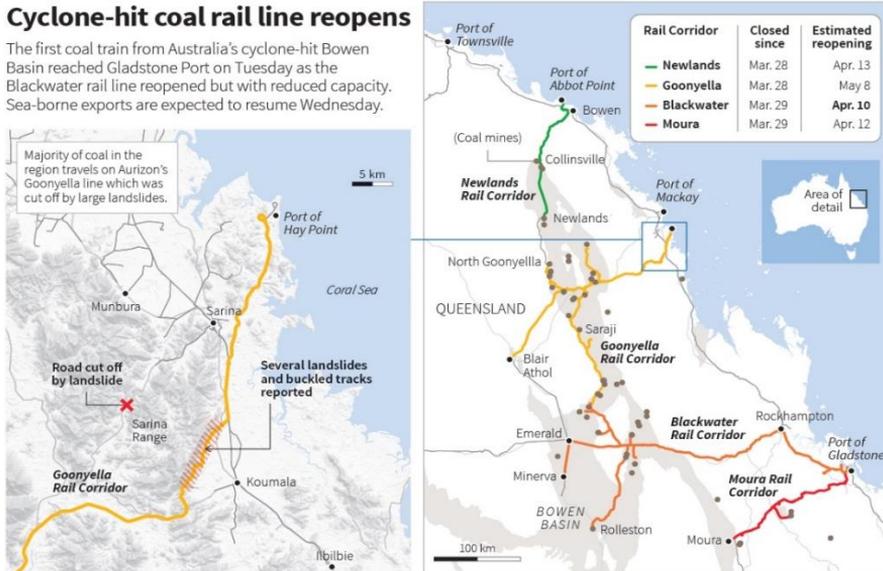
TABLE 8. AUSTRALIAN PRODUCTION AND EXPORT VOLUME, MILLION TONNES

	2015	2016	2017f	2018f
Production	189.3	190.0	195.7	198.5
Export Volume	188.0	176.6	194.7	192.5

Source: Department of Industry, Innovation and Science (2017, September)

In late March, Cyclone Debbie hit the north-east Australian coast, causing a supply disruption in Australian coal exports as it damaged several mines and rails. The supply disruption caused exports delays in the June quarter forcing BHP Billiton and Glencore to declare force majeure. The affected mines include Hail Creek, South Walker Creek, Isaac Plains, Carborough Downs, Caval Ridge, Peak Downs and Foxleigh and a temporary closure of the Goonyella rail line. These closures caused export delays at the Dalrymple Bay coal terminal, a major coal export terminal in Australia. The disruption is expected to be distributed over the September and December quarters as delayed cargoes.

In the long-term, a major roadblock for Australian miners are environmental concerns. For instance, despite approval of the Queensland government for Adani Group's Carmichael coal, rail and port project, the group is having a hard time sourcing funds due to environmental protectionism.

FIGURE 1 . CYCLONE DEBBIE RAIL LINE CLOSURES

Source: Thomson Reuters; Aurizon

Intense lobbying and lawsuits by environment activists are causing banks to refuse to bankroll the expansion. In addition, in early 2016, the diagnosis of the "Black Lung Disease" in multiple coal mine workers for the first time in 30 years has led to heightened regulation of mines and increasing protests by activists.

CHINA

China is the world's largest coal producer; however, they tend to consume a large majority of what they produce. In March, China's National Development and Reform Commission announced that total Chinese coal production – coking and thermal coal – would be cut by 150 million tonnes in 2017.

TABLE 9. CHINA'S COAL PRODUCTION VOLUME, MILLION TONNES

	2016e	2017f	2018f
Production	353.1	343.3	343.7

Source: BMI Research; BP Statistical Review 2017; Statista; research team's calculation

UNITED STATES

The United States is the second largest coal exporter after Australia, making up around 12 percent of the seaborne market. In response to higher coal prices, US producers utilized latent capacity and was able to increase their exports. In 2017, exports are forecasted to increase by 25 percent and then decline by 22 percent in 2018 and further in 2019 by 3 percent as coal prices stabilize and coal demand from China softens. EIA expects production levels to remain level.

TABLE 10. UNITED STATES PRODUCTION AND EXPORT VOLUME, MILLION TONNES

	2016	2017f	2018f
Production	107.5	108.4	108.8
Export Volume	37	46	36

Source: Department of Industry, Innovation and Science (2017, September), EIA, research team's calculation

The United States tends to be a swing supplier of coal. Coal exports to Asia is highly price – dependent as the freight costs usually make it difficult to compete in the market. As coal prices surge enough to make the economics of the transportation possible, coal exports tend to increase. This trend has been seen in previous years of coal price spikes similar to the one this year. Thus, coal exports from United States is expected to increase significantly in 2017 and then revert back to normal levels as prices decline.

Price of coal

The price of coal is determined by demand and supply where demand is mainly driven by China and supply by Australia. Depending on China's crude steel production or domestic coal production, demand will fluctuate. Australia is the main exporter of coal with nearly all production exported, meaning any supply shocks or disruptions in transportation will cause severe volatility in the market.

AUSTRALIA

As mentioned above, Australian coal exports experienced several weeks of disruption due to Cyclone Debbie which damaged key railways. This event caused disruptions in transporting the coal to ports for export. Despite the fact that the railways were only temporarily closed, it had nations scrambling to fulfill the upcoming shortage from

Australian mining companies declaring force majeure, pushing up the spot price of coal significantly. Thus, most analyst expect there to be a peak in spot price of coal in 2017 followed by a considerable decline in 2018 as operations return to normal and then a steady decline as environmental regulation tighten further and demand from China decreases as climate change targets and goals are fulfilled.

The following coal price forecasts were retrieved from Bloomberg. The estimates utilized for the average coal price were from Citigroup Inc., Promsvyazbank PJSC, Westpac Banking Corp., Societe Generale SA, and Deutsche Bank AG as the forecasts were published within six months leading to October 2017. Thus, as of 3 October 2017, Australian coal price is expected to be 177 USD/Mt in 2017, 126 USD/Mt in 2018, 114 USD/Mt in 2019, 116 USD/Mt in 2020 and 118 USD/Mt in 2021.

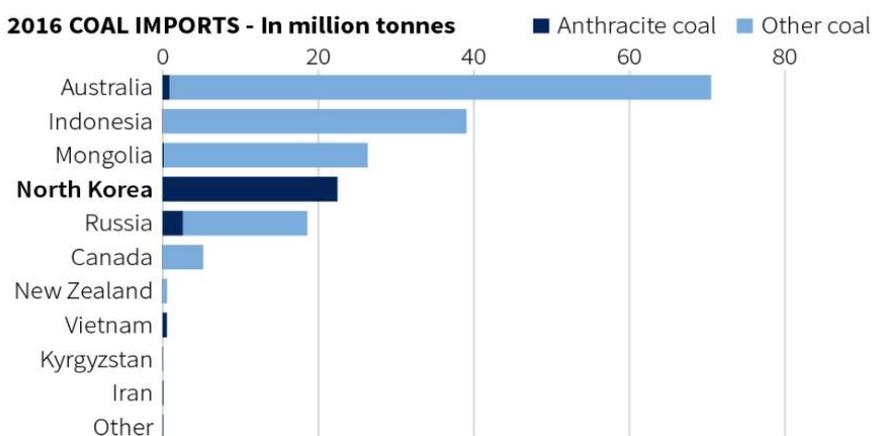
MONGOLIAN MARKET

Demand side

Demand for Mongolian coal is mainly driven by China as most coal exports from Mongolia are to China. As mentioned above, crude steel productions are expected to decline after a peak in 2017 and demand for finished steel products will experience a slight increase in 2017, followed by no growth in 2018. Thus, in the long-term, demand for Mongolian coal will likely decline.

However, in the short-term, there are a couple of events creating demand shocks from China. In February of this year, China announced a ban on North Korean coal imports. The ban of high-quality anthracite imports from North Korea, typically used for steel making has increased the demand for coal. Following the ban, coal imports from Russia, Australia, Mongolia, Indonesia, and United States increased substantially.

In the past, China went around embargoes against North Korea on humanitarian grounds, saying a ban would hurt ordinary citizens of the impoverished country. Then in August, the UN Security Council issued sanctions against North Korea after several ballistic missile tests. China extended its ban on imports from North Korea to include iron, iron ore, seafood, petroleum products, and textiles.

FIGURE 2. CHINA 2016 COAL IMPORTS²

Source: Thomson Reuters

The sanctions were due to take effect in early September, but Beijing issued an official order implementing the new rules starting August 16.

Additionally, since the implementation of the dirty coal ban and goal to decrease levels of carbon emissions, several small Chinese coal firms have been shut down causing a further demand shock on domestic and foreign coal producers. Under the dirty coal policy, mining, sale, transportation and imports of coal with ash and sulfur content exceeding 40 percent and 3 percent, respectively are banned. Also, for coal that will be transported for more than 600 km from production site or receiving port, the ash content limit is 20 percent.

Supply side

The Mineral Resources and Petroleum Authority of Mongolia forecasts that Mongolian coal production will reach 31.2 Mt in 2017 and then steadily increase as coal mines increase their productions to operate at almost full capacity. Table A1 in the Appendix lists Mongolian coal mines and their annual production capacity and reserves. Considering strong demand from China and the low price of Mongolian coal, coal production is forecasted to increase over the next few years.

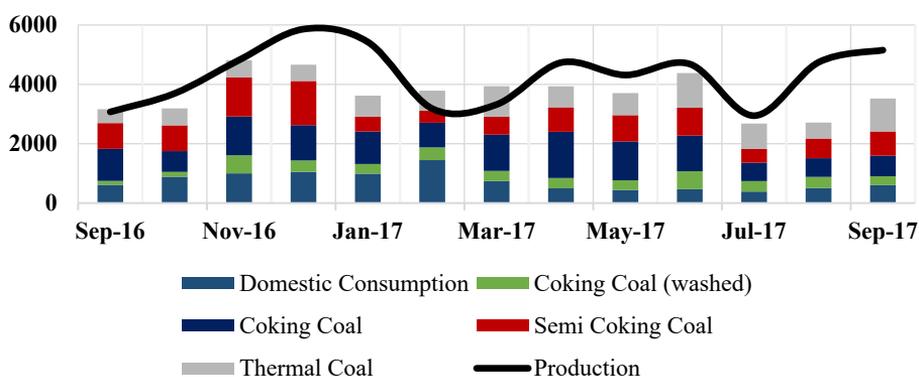
² Anthracite coal is the rarest and most mature coal, accounting for about 1 percent of the world's total coal reserves. Anthracite has the highest carbon content, which means it burns cleaner and hotter and can be used as a replacement for coking coal.

TABLE 11. MONGOLIAN COAL PRODUCTION AND EXPORT FORECAST, THOUSAND TONNES³

	2017f	2018f	2019f	2020f
Production	31,241.5	37,058.0	41,186.0	44,191.0
Export	23,000.0	25,500.0	28,000.0	30,000.0

Source: MRPAM (2017)

Taking advantage of high coal prices like other nations, Mongolia's coal production and export volumes have increased substantially from the previous year. The figure below is Mongolia's coal production by type of coal and export volumes from September 2016 to September 2017.

FIGURE 3. MONGOLIAN COAL, THOUSAND TONNES^{4,5}

Source: MRPAM (2017, September), research team's calculation

From January 2017 to September 2017, total coal production was 38,503.2 thousand tonnes. As it can be observed, the actual total production has already exceeded the forecasted production volume of 31,241.5 thousand tonnes estimated by the MRPAM in their 2016 Annual Report, published in early 2017.

³ This data includes both thermal and coking coal.

⁴ The four listed coals – coking coal (washed), coking coal, semi coking coal, and thermal – are coal exports. Coal exports plus domestic consumption equals total coal sales. Excess coal from production, not consumed domestically or exported, is stored in the reserve. Whenever sales exceed production, the difference is withdrawn from the reserve.

⁵ The difference between coal production volumes and total coal export and consumption is indicative of how much is put into or withdrawn from the coal reserve.

The decrease in Mongolian coal exports from July to September is due to a bottleneck issue at the Gashuun Sukhait – Gants Mod border crossing. The queue of trucks stretched over 100 kilometers into the Gobi Desert. The long delays have been blamed on a surge in traffic driven by the increased trade. However, Mongolia's inability to stop rampant smuggling across the border has also played a role as China has imposed more stringent checks on incoming deliveries in recent months. Another contribution to the traffic jam is understaffing during Mongolia's traditional summer Naadam festival as well events such as the Chinese Communist Party Congress in October.

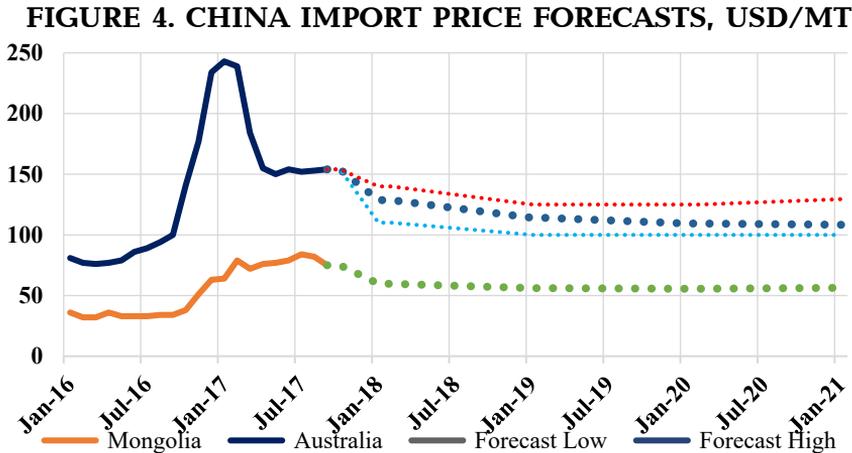
On 13 December 2017, coal loading was suspending at the mines until the roads were cleared. Mongolian officials have been in discussion with Chinese officials to try and resolve the backlog of trucks. A long – term solution is the planned railway from the mines to the Chinese border; however, despite more than 200 kilometers of foundation having been laid, the project remains unfinished due to a shortage of funds.

As of the end of 2016, there are 295 coal mining licenses, which accounts for approximately 19 percent of all mining licenses. On 10 November 2017, the Parliament of Mongolia adopted an amendment to the Law on Minerals. In accordance with the amendment, license issuances will be centered in provinces where the corresponding government organization will determine and confirm the coordinates of an area eligible for exploration and mining licenses. In order to confirm, the government organization will forward a written proposal to the provincial Governor's Office, which will consult with the local Citizens' Representative Khural who has the right to reject. Thus, starting this year, mining licenses will be granted through tender.

Price of Mongolian coal

The figure below illustrates the fluctuation of China's import price of coal by country. The dash lines are our research team's estimates while the lower and higher limits are various institutions' forecasts. Our estimates are based upon forecasts of thermal coal prices by World Bank, International Monetary Fund, and KPMG. Similar movements can be observed in the price trends of thermal coal and coking coal as seen in the Figure A1 in the Appendix. Based on the regression of thermal coal to coal, the research team was able to use the forecasted spot price of thermal coal to forecast the coal price. Then, using

China's import price of coal from Australia and Mongolia, the research team conducted another regression model to forecast Mongolian coal price relative to Australian coal price. Just as Australian coal prices are expected to decline and then level off, Mongolian coal prices follow a similar pattern.



Source: Department of Industry, Innovation and Science (2017, September); Bloomberg; WB; IMF; KPMG; research team's calculations

THERMAL COAL

As mentioned previously, approximately around 20–30 percent of Mongolian coal exports to China is comprised of thermal coal. Thus, demand in the thermal coal market is dependent upon domestic consumption and China's demand.

China's domestic coal sector is highly fragmented with 2,000 producers and 12,000 coal mines in operations. These mines are classified under three categories: national, provincial national, and township coal mines. There has been a push for the closure of small-scale township mines since the late 1900s due to inefficient operations and poor safety and environmental records. Township mines constitute around 37 percent of total coal productions.

In January, the Chinese government cancelled approximately 103 coal-fired power plant projects that were planned or under construction, eliminating 120 gigawatts of future coal-fired capacity. This is an attempt to meet China's commitment to the UN Paris climate conference to cap coal intake and increase the use of renewable energy to 15 percent by 2020.

In early August, it was announced that China Shenhua Energy Co. Ltd has suspended operation at two large open – pit coal mines in northern China – Ha'erwusu and Baorixile mines in Inner Mongolia – as a result of "land requisition" delays. The two mines produced more than 50 million tonnes of coal in 2016 and over 30 million from January to July this year; thus, shortages in the Inner Mongolia region will most likely be filled by thermal coal imports from Mongolia.

Demand for thermal coal in major electricity producing regions have been relatively weak since 2011. Many developed nations and China have been shifting towards cleaner energy sources in an attempt to combat air pollution by reducing coal's share of energy consumption as well as implementing policies to ban transportation, import, production and use of coal which do not meet certain ash and Sulphur content requirements.

The increased demand for Mongolian thermal coal seen in the past couple of months is most likely due to the demand shock created from the suspension of Shenhua Energy's two coal mines, thus its short term. In the long – term, thermal coal demand will likely decrease as China transitions to cleaner energy sources.

Due to the increased demand from China, most analysts have forecasted a spike in Australian thermal coal price in 2017, followed by a gradual decline and then stagnation. The average forecasted price for 2017 is 78 USD/Mt, 70 USD/Mt in 2018, 65 USD/Mt in 2019, 63 USD/Mt in 2020 and 64 USD/Mt in 2021. These prices are an average of forecasts from the International Monetary Fund, World Bank, and KPMG. IMF's forecasts were published 7 July 2017 and World Bank's was 26 April 2017 and KPMG are from their June/July 2017 newsletter.

CONCLUSION

In summary, world coal production and exports have increased significantly this year due to high prices and strong demands. As China aims to meet carbon emission level targets, domestic steel and coal producers are being greatly affected, creating more demand for coking and thermal coal from abroad. The strong demand from China coupled with supply disruptions in Australia are pushing up coal prices. Coal prices have been very volatile this year but on average, it's been high enough that even the United States have been exporting record volumes. Normally, the freight cost from United States to Asia makes the export of coal unprofitable but with high prices, the margins are more attractive.

China cutting domestic coal while related industries, such as steel, productions are increasing is creating a stronger demand for its neighbors' coal. China continues to be the top producer of coal but as most production is consumed domestically, coal needs to be imported to meet domestic demand. This is where China turns to Australia, Indonesia, and Mongolia for its coal imports. Demand will continue be relatively strong due to China in the near future; however, as crude steel production decreases, the demand for coal will also decline. For this reason, most analysts forecast that prices will decline and then stabilize over the next few years to account for decreases in crude steel productions. Most price forecasts beyond 2018 do not accounting for short term supply shocks, which will cause temporary price surges as seen with Cyclone Debbie.

Mongolian coal prices are expected to follow a similar trends as Australian coal. However, production is forecasted to increase over the years as coal mines operate at almost full capacity to meet China's coal demand. Mongolian coal exports may also expand from mainly exporting to China to include other Asian countries as railways and new transportation routes are constructed. Some potential partners are Russia, India, Japan, and so on. With the addition of these countries, Mongolian coal productions and exports will be able to increase substantially.

COPPER MARKET

WORLD MARKET

Demand side

Mines produce copper concentrates that are sold to smelters and refineries for their copper content. The refineries then convert the copper concentrates into refined copper for final usage.

According to the International Copper Study Group (ICSG), the total world refined copper usage was 23.4 million tonnes, up 2.3 percent versus a year earlier in 2016. In first half of 2017, the apparent usage was 11.7 million tonnes, a 1.4 percent decrease in comparison to the first half of 2016 (Bloomberg, 2017).

**TABLE 12. GLOBAL REFINED COPPER DEMAND
(THOUSAND TONNES)**

	2017 Q1	2017 Q2	2017 H1	Change YoY, %*
Global Refined Copper Demand	5647	6069	11716	-1.4
North America	606	602	1208	-1.5
South & Central America	187	180	367	18.2
Europe	900	1012	1912	-3.8
Asia	3909	4236	8145	-1.6
Oceania	11	3	14	24.3
Africa	34	35	70	5.7

*Source: Bloomberg *last column is estimated as comparing 2017 H1 with 2016 H1*

On a regional basis, the usage is estimated to have declined by 1.5 percent in North America, by 4 percent in Europe and by 2 percent in Asia, while increasing by 1 percent in the Americas (North, South and Central America) (Table 12). Asia accounts for about 70 percent of the global refined copper usage, of which China, a major actor in the global copper market, accounts for 50 percent alone. In the first 6 months of 2017, the reported Chinese refined copper usage (excluding changes in unreported stocks) decreased by 4 percent while globally, copper usage excluding China remained essentially unchanged. As for other major copper consumer countries, the copper usage increased in India, Japan and the US but declined in Germany in the first half of 2017.

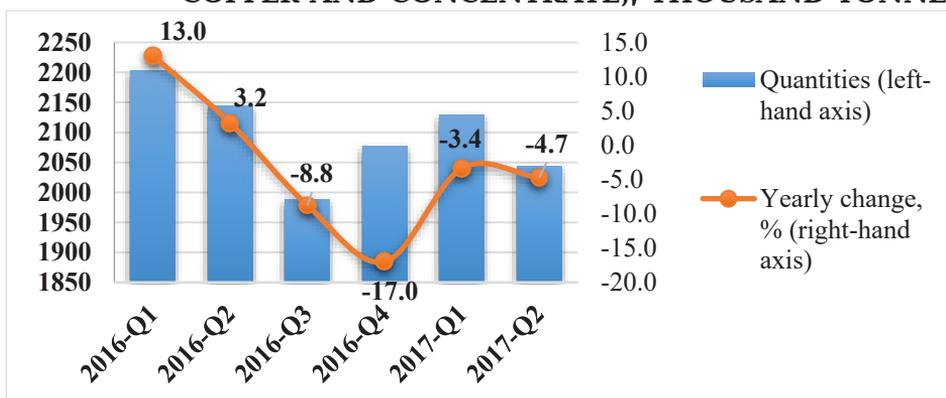
Copper refineries generate copper concentrate demand in the global market. The top copper concentrate buyers (refinery countries) are China, USA, India, Spain and the Republic of Korea. On the contrary,

the top 5 exporter countries are Peru, Chile, Australia, Indonesia and Mongolia. According to the International Trade Center (ITC) and Bloomberg, China imported 4.1 million tonnes of copper concentrate in the first half of 2017.

Chinese copper imports, including both copper concentrate and refined copper, has decreased by 3.4 percent and 4.7 percent in the first (2 million tonnes) and second (2 million tonnes) quarter of 2017 respectively, in comparison to the same time period last year (figure 5). However, the short-term weakness in refined metal imports is linked more to the turnaround in availability of copper scrap. As of September 2017, world secondary refined production (3.1 thousand tonnes) has increased by 8 percent year on year. Increased availability of scrap allowed world secondary refined production to increase, notably in China where the upward trend started in 4th quarter 2016. In addition to the Chinese government policy against environmental degradation, this may lead to lower copper imports.

Under Chinese 13th five year plan, the Chinese government set a target that will support its energy-saving and environmentally friendly industries. This may lead not only to lower demand from China but also a lack of refined copper supply in world market.

FIGURE 5. CHINESE COPPER IMPORT QUARTERLY (REFINED COPPER AND CONCENTRATE), THOUSAND TONNES



Source: International Trade Centre

Although Chinese imports have decreased, total worldwide copper usage is likely to increase modestly in 2017.

Outlook of Copper Demand

The earlier expectations of increased global copper demand shared by many analyst institutions such as BHP Billiton, ICSG and the World

Bank remain essentially unchanged. The prospect of rising copper demand is expected to continue throughout 2017 and beyond as copper is an essential input in infrastructure and technology.

TABLE 13. GLOBAL COPPER CONSUMPTION FORECAST

	2016	2017f	2018f	2019f	2020f	2021f
Global consumption, Mt	23.4	23.7	24.3	25.1	25.7	26.2
Change, YoY	2.3%	1.0%	2.4%	2.3%	2.2%	1.9%

*Source: Macquarie Research, ICSG *Authors estimation based on Macquarie research growth rate and 2016 actual performance*

According to the ICSG analysis, Indian and Chinese infrastructure development will continue to sustain growth in total copper demand. The Chinese copper usage is expected to grow by 1 percent and 3 percent respectively in 2017 and 2018. Growth of ex – China usage is forecasted to be 1 percent and 1.5 percent respectively in 2017 and 2018. The expected modest growth from USA and Europe will also further contribute to the growth in copper demand.

Supply side

Global copper mine production was 20.2 million tonnes in 2016, a 6 percent increase from 2015. On the other hand, in first six months of 2017, copper mine production was 9.6 million tonnes, an estimated 2 percent decrease in comparison to a year earlier. The main contributing factor to these results is attributed to the top copper producing countries such as Chile, Peru and Indonesia confronting mining and exporting issues earlier in 2017. Some of these issues include the following:

- Workers of the Escondida mine in Chile, the world's largest mine, went on strike for 43 days, eventually ending in late March. As a result, Chilean copper exports fell 15 percent in the second quarter of 2017 in comparison to the first quarter of 2017. Production also decreased by 9 percent in first half of 2017.
- A three week strike in Peru's Cerro Verde mine, one of the world's top 20 mines, compounded by flooding led to a 1.2 percent decrease in copper production in Peru.
- Meanwhile, the Indonesian government set a temporary ban on copper concentrate export to support the local refining industry that started in January and ended in April. As a result, the Indonesian copper concentrate production output fell by 9 percent.

These factors negatively affected global total copper mining production in the first half of 2017. However, this reduction was partially compensated by the Mexican output rise of 9 percent.

Global refined copper production was 23.3 million tonnes in 2016, up 1.9 percent compared with the previous year. Secondary refined copper production (3.8 million tonnes) accounted for 16.5 percent of total refined copper production while the world production capacity increased by 4.5 percent. In the first half of 2017, the refined copper production (11.6 million tonnes), of which secondary refined production account for 17.8 percent, remained at a consistent level. On a regional basis, the refined output is estimated to have increased in Asia (5%) and in Europe (including Russia) (3%) while declining in the Americas (10%) and in Oceania (6%) while remaining essentially unchanged in Africa (ICSG, 2017).

Outlook of the short – term Copper Supply

According to ICSG estimations, the world copper mining production is expected to decline by 2.7 percent in 2017 due to supply disruption within the top world mines. However world copper mine production is expected to grow again by 2.5 percent in 2018. On the contrary, mining production in Chile is expected to decline by 4 percent and 1 percent in 2017 and 2018 respectively.

TABLE 14. GLOBAL COPPER PRODUCTION BY COUNTRIES, THOUSAND TONNES

	2016	2017f	2018f	2016	2017f	2018f
	Mining production			Refining production		
Africa	1,909	1,875	2,116	1,249	1,209	1,369
N. America	2,936	2,725	2,825	2,015	1,940	1,997
Latin America	8,350	8,144	8,708	3,199	3,004	3,114
Asean – 10 /Oceania	2,100	2,010	2,139	1,082	1,067	1,138
Asia ex ASEAN	2,629	2,542	2,611	11,651	12,103	12,657
Asia – CIS	684	825	856	429	438	438
EU	916	945	939	2,674	2,733	2,781
Europe Others	835	842	855	1,040	1,109	1,135
Total	20,359	19,908	21,049	23,339	23,603	24,629
Change	6.3%	–2.7%	2.5%	2.0%	1.0%	2.5%

Source: ICSG

Refined copper production is expected grow by 1 percent and 2.5 percent respectively in 2017 and 2018. In accordance with the EIU,

China is a major contributor to the continued growth of global refined copper production.

The expectation of a copper supply deficit, estimated to start approximately in 2019 due to grade decline and availability of power and water, is still expected by some analysts. In order for the copper market to be roughly balanced through the end of the decade, the solid demand growth must be met by existing and committed supply. A structural deficit is expected to open up in the early 2020s, at which point we can expect to see some sustained price increases (BHP billiton, 2017).

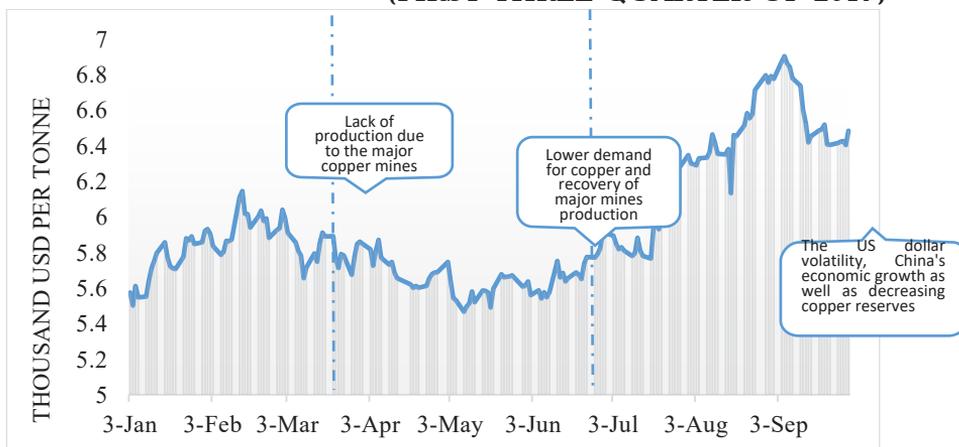
World Copper Price

World copper price movement

Since the beginning of 2017, the world copper price has achieved its highest level since 2015. In the first 9 months of 2017, the average price of a tonne of pure copper was 5867.8 USD in the London Metal Exchange (LME).

The price in the first quarter of 2017 was 5,833.1 USD per tonne due to the waning supply caused by the lack of production from major copper mines (Figure 6). The price decreased slightly to 5,661.8 USD in the second quarter of this year due to lower demand for copper and the steady growth of copper reserves. However, copper prices have rebounded since July 2017 due to the US dollar volatility, China's economic growth as well as due to decreasing copper reserves.

**FIGURE 6. COPPER PRICE DYNAMIC
(FIRST THREE QUARTER OF 2017)**

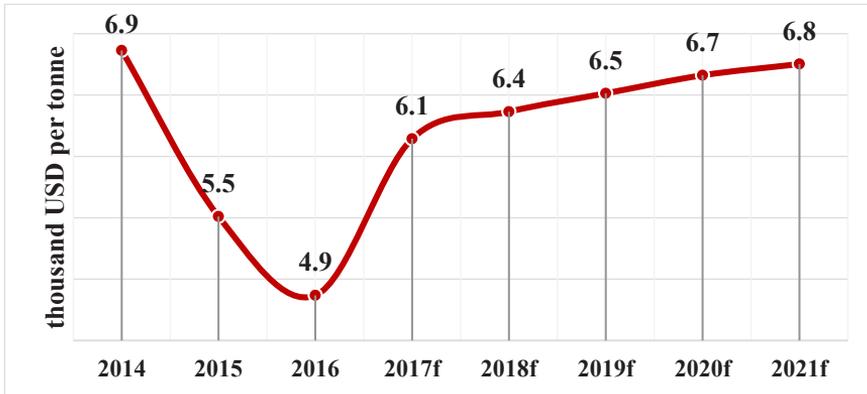


Source: ICSG, 2017

Price projections

The world copper price is heavily dependent on Chinese demand and refined copper production, supply vitality and the amount of total stock in addition to economic expansion in other countries. International financial institutions and analysts maintain that the copper price per tonne will continue to increase till 2021. (Figure 7)

FIGURE 7. WORLD COPPER PRICE PROJECTION

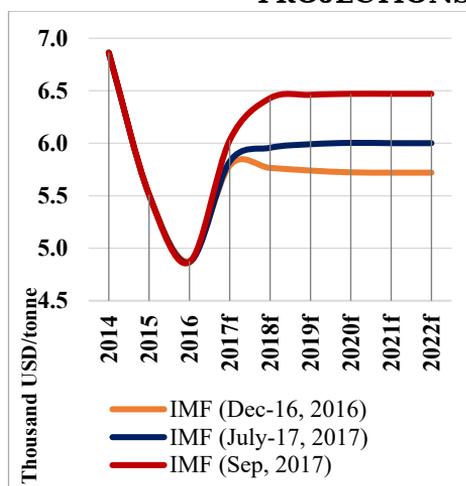


**Estimated as average of projections from international financial institutes
Source: WB, IMF, Bloomberg and LME*

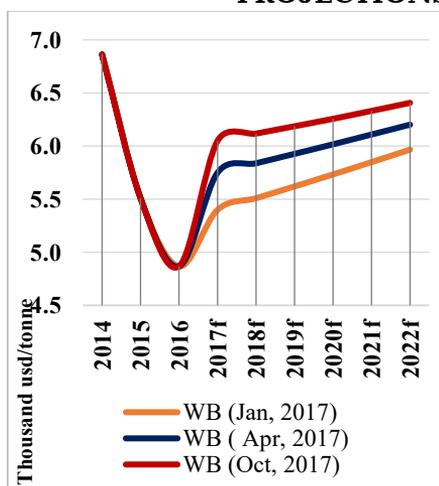
By 2021, the copper price is expected to increase by 28.8 percent, 24.7 percent and 23.4 percent according to Bloomberg, IMF and WB projections respectively.

The price projections from WB, IMF and other international organizations have increased noticeably in comparison to former projections. This is mainly caused by changes in supply and demand. According to BHP Billiton, grade decline, increased input costs, water constraints and a scarcity of high-quality future development opportunities are expected to drive up copper prices in order to attract sufficient investment to balance the market.

According to the latest IMF projection (September 2017), the price projected in 2018 grew by 11 percent and 8 percent in comparison to the projections from December 2016 and July 2017 respectively. For the WB, the difference between projections was 5 percent and 6 percent respectively for 2018.

FIGURE 8. IMF PRICE PROJECTIONS

Source: IMF

FIGURE 9. WB PRICE PROJECTIONS

Source: World bank

MONGOLIAN MARKET

Background

According to the National Statistical Office (NSO), the mining sector constituted 20.1 percent and 21.2 percent of the Mongolian GDP in 2016 and in the first half of 2017 respectively. The mining sector also employed about 4 percent of the total work force. Mining products accounted for 71 percent and 82 percent of total export value in 2016 and in the first half of 2017 respectively. Copper (15.9 thousand tonnes, with a value of 1.6 billion USD) and copper concentrate (1.6 thousand tonnes, valued at 74 million USD) export accounted for one-third (34%) of total export and 48 percent of the total mining commodity export value in 2016.

Demand side

Demand for Mongolian copper is generated mainly from local construction and infrastructure industries (for refined copper) and foreign smelters (for refined copper and concentrate).

Local demand

Mongolian copper usage is about 200 tonnes on average per annum. The local demand for copper is for Erdmin Co.Ltd (hereafter expressed as Erdmin) and Achit Ikht Erdmin Co.Ltd (hereafter expressed as Achit Ikht) products and import products.

In the first 8 months of 2017, Mongolia imported 89.7 tonnes of refined copper, worth 1.2 million USD, and other copper products along with 0.1 tonnes of copper concentrate, worth around 0.3 thousand USD. The total copper import value is 1172.8 thousand USD, up 13.6 percent in comparison to the year before. 83.3 percent of imported copper is used for construction and infrastructure products such as copper tube armatures (29.5%), copper tube (21%), copper wire (15.6%) and copper bars (9.4%) (Mongolian Customs Office, 2017).

Mongolian export of refined and copper concentrate

Mongolia exports copper concentrate mainly from the Oyu Tolgoi (OT) and Erdenet mines, while exporting copper cathodes from Erdmin and Achit Ikht. Copper concentrate exports account for more than 95 percent of total copper exports.

Refined copper: According to the Mongolian Customs office, Mongolia exported 10.8 thousand tonnes of refined copper (cathode copper), worth 60.9 million USD, and 0.3 tonnes of other copper products (copper wire and copper tube armatures), worth 0.3 million USD, to China (58%), Singapore (12.6%) and Taiwan (29.7%) in first eight months of 2017. Refined copper exports to China decreased by 11 percent, while copper exports to Singapore and Taiwan have increased significantly.

Total refined copper export value reached 60.9 million USD in 2017, a 45.3% increase versus the previous year. The world copper price increase (a 12% increase in comparison to the previous year's average price) and the significant increase in exports to Taiwan and Singapore are the main factors contributing to the substantial increase in export value.

Copper concentrate: According to the Mongolian Customs office, Mongolia exported 981 thousand tonnes (100%) of copper concentrate to China, down 10.3 percent versus a year earlier, in first 8 months of 2017. The copper concentrate was valued at 1032.2 million USD and accounted for 25.2 percent (49 percent in 2015 and 33 percent in 2016) of total export value. The decline was caused by waning Chinese imports in the first quarter of this year as well as due to the average copper grade decrease (a decrease of 3 percent versus a year earlier).

Outlook of demand for Mongolian Copper

Local Demand

The growth of the overall Mongolian economy, as well as the expansion of the construction and infrastructure sectors led to an increase in local demand in 2017. In particular, the half-year GDP increased by 16.8 percent and the production of the manufacturing and construction sector grew by 9.6 percent in comparison to the first half of 2016. In the long term, further economic growth and population growth would generate larger demand and lead to higher copper product usage.

Mongolian export

Mongolia exports 100 percent of its refined copper produced by Achit Ikht. With that in mind, the outlook of the exports of refined copper will be flat as it fluctuated between 13 thousand tonnes and 15 thousand tonnes in the near future. If the new plant project, which is included in the Mongolian government's plan for 2016–2020, is implemented, an additional 257 thousand tonnes of cathode copper (refined copper) will be supplied to the local and foreign markets.

According to the Ministry of Finance, 1371 thousand tonnes and 1366 thousand tonnes of copper concentrate is planned to be exported by the OT and Erdenet mines in 2017 and 2018 respectively. This is a 12 percent and 0.4 percent decrease in comparison to the previous year. Of this forecasted export, OT is expected to produce 764.8 thousand tonnes (56%), while Erdenet mine produces 601.2 thousand tonnes (44%) of the total copper concentrate in 2018. In the next few years, the decrease of the copper grade in concentrated lead is expected to lower export. However, if the OT underground mine and Tsagaan Suvarga project are implemented, the total concentrate export will reach 2 million tonnes with 600 thousand tonnes of copper content. Additionally, Chinese economic growth and infrastructure development may support Mongolian copper export further in the future.

Supply side

Refined copper

Erdmin and Achit ikht are the main Mongolian refined copper producers. Mongolian total refined copper output was 15.1 thousand tonnes in 2016. According to NSO preliminary estimations, the two companies together produced 7.5 thousand tonnes of refined copper in the first half of 2017.

Copper concentrate

According to the NSO, Mongolian copper concentrate production and export was 647.4 thousand tonnes and 732.9 thousand tonnes in first half of this year, down 11.8 percent and 10.3 percent compared with the first half of 2016 respectively. OT, the biggest copper concentrate producer of Mongolia, produced about 53.5 percent of the total production (Table 15).

TABLE 15. TOTAL PRODUCTION AND EXPORT OF COPPER CONCENTRATE, THOUSAND TONNES (INC.OT)

	2016H1	2016H2	2017H1
Total production (by metal content)	734.2	575.8	647.4
Here of :			
1. OT mine	436.6	410	347
OT – Average concentrate grade	25.0	22.6	21.7
OT – (Cu)	109.2	92.7	75.3
2. Others	297.6	165.8	300.4
(Cu)	68.4	38.1	69.1
Total export	817.0	745.0	732.9
Here of :			
1. OT mine	440.5	388.1	372.2
OT – (Cu)	105.7	83.2	76.7
2. Others	376.5	356.9	360.7
(Cu)	86.6	82.1	83.0
Balance of concentrate	-82.8	-169.2	-85.5

Source: Turquoise Hill, Ministry of Finance

OT copper production for H1'17 was 347 thousand tonnes, a decline of 20.5 percent and 15.3 percent compared to the H1'16 and H2'16 copper production respectively. OT average copper concentrate grade decreased by about 1.7 percent compared with the 2016 average. Therefore, OT sales of copper in Q2 decreased 5.6 percent over Q1 due to lower concentrate volumes during the quarter (Turquoise Hill, July, 2017).

Outlook of Mongolian copper supply in near future, long term 10 years

The Mongolian copper supply, supported by the latest developments in the sector, is expected to increase further in the future. Some of these developments are mentioned below:

- In March 2017, the Minister of Mining and Heavy industry, Dashdorj Tsedev, announced that Mongolia plans to double the amount of land available for exploration. Mongolia will increase the land available for exportation from 9.6 percent currently to 20.9 percent.
- In August 2017, Chilean State Miner Codelco, the world's second largest producer of copper, announced its interest to invest in Mongolia as the copper market improves.

The OT mine will be the sector's key driver of growth and account for around one – third of Mongolia's economy once the mine reaches its full production capacity of 500 thousand tonnes in 2021. Based on this, BMI Research forecasted Mongolia's annual copper output growth to average 11.6 percent over 2017 – 2026, reaching 933 thousand tonnes in 2026, up from 344 thousand tonnes in 2017 (BMI Research, August 2017).

The Mongolian government's action plan for 2016 – 2020 includes the implementation of a copper concentrate processing plant. The government plans to build the plant in Khanbogd soum in Umnugobi aimag, close to the OT mine. The amount of investment necessary is calculated to be around 1.5 billion USD and the investment criteria is still under preparation. The plant is planned to have the capacity to process 1 million tonnes of copper concentrate per annum. Approximately 257 thousand tonnes of cathode copper, 5.9 t of gold, and 57 t of silver and other precious metals will be derived from the projected amount of copper concentrate. However, the project's investor and the time required for the plant to be completed are still unclear. There are also several copper mine projects currently at the exploration phase (Appendix).

SUMMARY

Copper demand was weaker in the first half but it is likely to recover in the second half of this year mainly due to the steady growth of the Chinese economy. Copper industry analysts forecasted that the global demand for copper is likely to increase in 2017 and beyond. In particular, the apparent Chinese copper usage is expected to grow by 1 percent and 3 percent respectively in 2017 and 2018, due to the fact that Chinese economic growth was higher than initially expected. Modest growth from the USA and Europe and solid growth in emerging markets such as India will support global copper demand further.

Globally, copper concentrate supply decreased significantly in first half of this year due to the strike at the Escondida and Cerro Verde mines in addition to the Indonesian government's temporary ban on copper concentrate exports. On the contrary, refined production remained essentially unchanged. Analysts expect that mining copper production will decrease by 2.7 percent in 2017. The copper market is expected to be roughly balanced to the end of the decade, with solid demand growth met by existing and committed supply. In the long run, grade decline and availability of power and water will constrain the copper supply globally. As a result, a structural deficit is expected to open up in the early 2020s.

In the first eight months of 2017, the price of copper rose by 12 percent on average due to the changes in global supply and demand mentioned above. The price projections from international financial and banking institutions have been changing significantly from previous forecasts since the beginning of this year. Analysts expect the copper price per tonne to continue to grow in next 5 years and beyond due to the lack of supply and the solid increase in demand.

For the Mongolian copper market, local demand is flat in the short term and could increase in the long run depending on economic growth, especially on the expansion of the infrastructure sector. On the supply side, copper concentrate production is expected to decrease in the upcoming 2 years due to the average grade decline. However, in the long run, production is expected to increase noticeably due to the OT underground mine as well as the Tsagaan Suvarga mine operations.

GOLD MARKET

WORLD MARKET

Demand side

World demand for gold in the first three quarters of 2017 fell by 9 percent in comparison to the same period last year (World Gold Council, 2017). Gold demand is made up of demand for jewelry, investment, technology and reserve assets by central banks. Of this, jewelry and investment make up the largest portions of overall demand with jewelry being dominated by Indian and Chinese demand while investment is closely linked to the attractiveness of gold exchange – traded fund (ETF) products.

TABLE 16. WORLD GOLD DEMAND H1 (TONNES)

	Jewelry	Investment	Technology	Reserve	Total
H1'16	922.4	1057.4	156.4	182.5	2318.7
H1'17	967.4	699.6	160.0	176.7	2003.8
Year – on – year	% 5	– 34	2	– 3	– 14
change					

Source: World Gold Council

TABLE 17. WORLD GOLD DEMAND Q3 (TONNES)

	Jewelry	Investment	Technology	Reserve	Total
Q3'16	495.3	334.5	82.6	88.8	1001.1
Q3'17	478.7	241.2	84.2	111	915
Year – on – year	% – 3	– 28	2	25	– 9
change					

Source: World Gold Council

The demand for jewelry grew a modest 5 percent in the first half of 2017 in comparison to H1 of 2016. This growth in global demand was primarily driven by India, the largest consumer of gold for jewelry behind China, who experienced a spike (230 tonnes demanded in H1 2017 compared with just 170 tonnes in H1 2016) in rural gold jewelry purchases as overall liquidity in India increased due to the government's re – monetization policy (World Gold Council, 2017). This finding is in line with our earlier report that predicted better economic performance in India but weaker performance from China and the rest of the world. However, the Indian demand revival was due in part to advanced buying before the new GST tax in July. While, the

new GST⁶ tax was not as high as feared, it will still negatively impact demand in the future (GFMS, 2017). This resulted in a lower Indian demand for jewelry in the third quarter of 2017, leading to an overall 3 percent decrease in gold demand for jewelry compared to the third quarter of 2016. Indian jewelry demand was also negatively impacted by the government's Prevention of Money Laundering Act (PMLA) which required documentation for transactions over the value of Rs 50,000 and came into effect in August 2017 (World Gold Council, 2017). However, this act was pulled back for gems and jewelry dealers in October, loosening the regulations around gold transactions (PTI, 2017). Jewelry demanded in 2018 is expected to remain sluggish as Indian demand will continue to contract after increasing sharply in first half of 2017 and the global trend for jewelry continues to divert away from gold (World Gold Council, 2017).

The demand for gold for investment decreased sharply in the first half of 2017 compared to the first half of 2016 and this trend continues into the third quarter of 2017. Demand for investment is closely linked to the state of the US economy and was therefore incredibly high in 2016 following the US elections and overall worldwide instability. Though it remained positive in 2017, it dropped from its unprecedented volume of 579.4 tonnes in the first half of 2016 to 167.9 tonnes in 2017 (World Gold Council, 2017). This was compounded by the US Federal Reserve raising its interest rates in June, making other forms of investment such as bonds more attractive and dampening the global demand for ETFs (Macquarie Research, 2017). Going into 2018, we expect investment to decrease as it continues to normalize from its sharp increase in 2016 (GFMS, 2017). However, the underlying problems that caused worldwide instability such as Brexit, Trump's administration policies, and US and North Korean relations are still unresolved making it hard to predict how investments will change in the future (Macquarie Research, 2017). The recent issues in Europe and the numerous terrorist attacks could also encourage more gold investment as an alternative to other types of investment. The International Monetary Fund (IMF) initially also forecasted US economic growth in 2017 and 2018 to be 2.3 percent and 2.5 percent, respectively, but in light of the new Trump administration's failure to deliver promised tax cuts, it is expected that the US economy will grow 2.1 percent in both 2017 and

⁶ General Sales Tax, according to the new tax, gold will have a 3% sales tax, with the addition of customs duties, making the effective gold jewelry tax 15.67, compared to the effect rate of 12.43 before the GST. <https://timesofindia.indiatimes.com/impact-of-gst-on-gold-and-gold-jewellery-prices/articleshow/60827287.cms>

2018 (IMF, 2017). Overall, investment will still be positive due to global instability but will decrease from its inflated 2016 volumes. Ultimately, though the world economic situation may seem calmer, in the case of the US, its current level of debt makes its monetary system unsustainable, ensuring the fact that gold will continue to be an attractive alternative investment in the long term (Stoeflerle & Valek, 2017).

Gold demanded for use in technology increased in the first half of 2017, going from 156.5 tonnes in the first half of 2016 to 160 tonnes in 2017 (World Gold Council, 2017). This increase in demand was prompted by increased demand in bonding wire for memory chips and in printed circuit boards (pcbs) (World Gold Council, 2017). This trend continued into the third quarter of 2017, with demand for gold for electronics increasing steadily by 3 percent as compared to the third quarter of 2016. This is in line with our previous projections that found the gold demanded by the smartphone industry to remain stable and positive. Additionally, Samsung Electronics in their Q3 earnings report mentioned that "strong demand for high-performance memory chipsets for servers and flagship mobile devices was a contributing factor to the company's overall robust performance" (Samsung Press Release, 2017). Gold demanded for use in wireless applications also grew 8 percent in the third quarter of 2017 as compared to 2016 and we expect the overall technological demand for gold to remain stable or improve marginally in 2018 (World Gold Council, 2017).

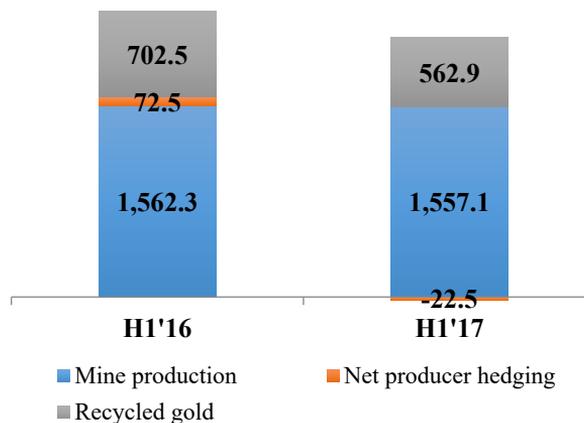
Central bank demand slowed marginally in the first half of 2017 compared to the first half of 2016, going from 182.5 in the first half-year of 2016 to 176.7 in the first half of 2017 (World Gold Council, 2017). We found that Russian purchases were a large part of the world demand, adding 117 tonnes of gold to their reserve as of October 2017 (CPM, 2017). Likewise, Turkey joined in buying reserves, reinstating a commitment to increasing its central reserves, ultimately adding 34 tonnes of gold in reserve in 2017 (CPM, 2017). Though there has been some central bank reserve selling by Germany and Venezuela, it is small compared to overall buying, which suggests more demand from central banks in the future (Macquarie Research, 2017). This inclination proved true in the third quarter of 2017, with central bank purchases of gold increasing 25 percent from 88.8 tonnes in the third quarter of 2016 to 111 tonnes in 2017 (World Gold Council, 2017). This increase was attributed mainly to Russia, Turkey and Kazakhstan. Continuing into 2018, gold remains an attractive way to diversify

central bank reserves, suggesting positive future central bank demand for gold.

Supply side

World supply is comprised of mine production, recycled gold and net producer hedging. Gold mine production accounts for most of world supply, accounting for over half of total world supply, while recycled gold accounts for one – third and net producer hedging the remainder. In the first half of 2017, overall mine production increased marginally by 1 percent, while recycled gold decreased by 20 percent, and net producer de – hedging caused a decrease of 131 percent, with overall gold supply falling by 10 percent in comparison to the first half of 2016 (World Gold Council, 2017).

FIGURE 10. WORLD GOLD SUPPLY H1 (TONNES)



Source: World Gold Council

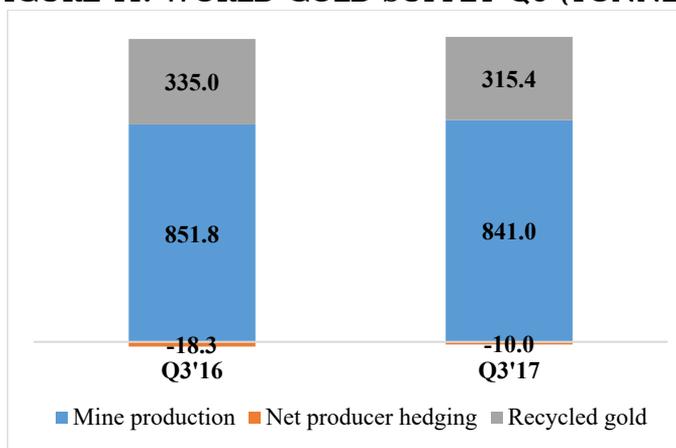
Mining production in the first half of 2017 stayed roughly the same as in 2016 at around 1560 tonnes. The largest decrease in output from countries such as China, Tanzania and Mongolia were offset by major increases in countries such as Indonesia, Suriname, Canada, Peru and Australia (World Gold Council, 2017). China is the largest producer of gold in the world and one possible reason for its decrease in gold mine production in 2017 can be attributed to the Chinese government's plan to overhaul the overall mining sector, leading to closure of older gold mines (Els, 2017). As for Tanzania, the government's ban on exporting unprocessed gold and copper, announced in March 2017, is hindering gold production in the country (Dean, 2017). In Mongolia's case, its largest mine, Oyu Tolgoi is currently undergoing restructuring which

is limiting gold production; however, production is expected to increase by 2019 (Mongolian Mining Journal, June 2017).

As for the increases in production, Indonesia's largest mine, Grasberg resumed exporting gold concentrates following a temporary resolution of a large dispute between the mine and the Indonesian government (Emont, 2017). In Canada, the new Hope Bay and Brucejack mines started production, and Peru's Tambomayo mine and Australia's Fortnum mine began productions as well (World Gold Council, 2017). In Suriname, the Merian gold mine continues to ramp up production after having reached commercial production levels in October 2016 (World Gold Council, 2017).

As for world supply in the third quarter of 2017, overall supply fell by 2 percent when compared to the third quarter of 2016. Continued government regulations and mining restructuring in China have kept Chinese production low while government issues in Tanzania are still ongoing, suppressing gold production. While Canada's Hope Bay and Brucejack mines have increased Canada's year-on-year output by 10 percent, and Suriname's gold production increased 90 percent due to the Merian mine, there was still an overall decrease in gold production by 1 percent due to continued issues with Tanzania and China.

FIGURE 11. WORLD GOLD SUPPLY Q3 (TONNES)



Source: World Gold Council

Though the overall gold mining production remained steady, the individual country analyses lead us to believe that mining production will be sluggish in the future. As China's production is a key component of overall world production, the Chinese government's

plans to overhaul the mining sector do not bode well for gold production in the short term (Forest, 2017). Though there have been proposed solutions in Tanzania, there is still a great deal of uncertainty that is bound to continue hurting gold production in 2018 (Jamasmie, 2017). The gains in Indonesia are from resumption of production rather than growth. In light of all this, gold mining production is not expected to rise significantly in the upcoming years.

As for recycled gold, the volume of gold decreased from 702.5 tonnes in the first half of 2016 to 563 in 2017 (World Gold Council, 2017). This high value in 2016 can be attributed to the spike in gold prices due to instability caused by political circumstances. Yet, as gold prices increase in 2017, there was still lower recycled gold, suggesting a new trend of consumers to hold onto their gold despite high prices (St. Angelo, 2017). This trend was seen in the Middle East where political instability prompted gold sellers to hold onto their reserves rather than sell (World Gold Council, 2017). Similarly, in the third quarter of 2017, recycled gold fell by 6 percent compared to the third quarter of 2016, further cementing the shift towards holding gold as prices even out. In the upcoming years, we expect the high amount of recycled gold in 2016 to continue to stabilize and for the volume of recycled gold to decrease coming into 2018.

In terms of net producer hedging, due to unprecedented increases in gold prices in 2016, and the steady 8 percent increase in gold prices in the first half of 2017, gold miners were incentivized not to create new hedges, leading to overall net de-hedging in 2017 (World Gold Council, 2017). Hedging is mainly linked to instability and though some hedging exists to protect cash flows and ensure debt and project financing; the process is less utilized now (Gold Fields, 2017). As such, though we expect overall gold hedging to decrease as gold prices remain high in 2018, some hedging is still expected in order to manage financing needs (World Gold Council, 2017).

This de-hedging trend continued on into third quarter of 2017, with approximately 10 tonnes of gold de-hedged (World Gold Council, 2017). However, as previously stated, gold hedging is still practiced by companies to manage cash flow and debt. For example, Acacia Mining hedged 210,000 ounces of gold at 1300 USD in order to protect its cash flow with the continued ban on gold exports by the Tanzanian government (Sanderson, 2017). Similarly, Yamana Gold, Teranga Gold and Pan African Resources all took part in gold hedging in order to

ensure the financing of their next mining projects (World Gold Council, 2017).

Price Outlook

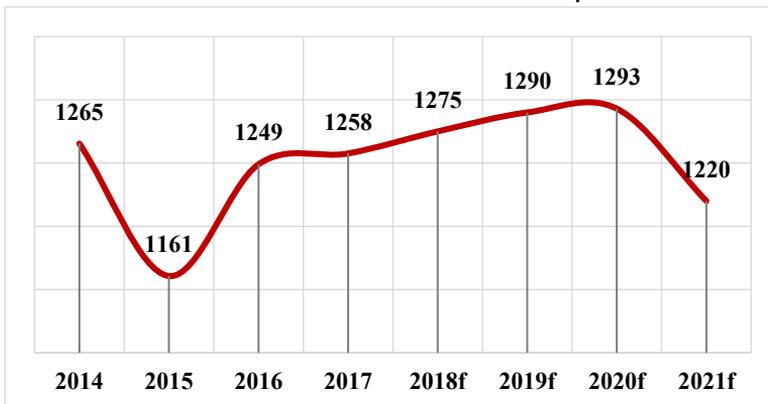
Gold price is determined by overall gold demand and gold supply. As explained above, overall demand is sluggish but gold remains an attractive investment to the US dollar, as there is still continued political instability in the world.

Conversely, overall supply is expected to drop in almost all respects, leading to a relatively smaller supply than demand.

As such, the expected gold prices in 2018 remain around the high 1200 USD mark. at around 1275 USD The average price of forecasts by the World Bank, Economic Forecast Agency and Bloomberg is around 1275 USD.

As for gold prices in the long term, gold price forecasts until 2021 remain mixed with Bloomberg expecting moderately steady growth, the Economic Forecast Agency expecting a sharp increase in 2019 and the World Bank maintaining a pessimistic view of gold prices for the foreseeable future (World Bank, 2017). Bloomberg's positive forecast is related to a lower dollar spot index while the exact calculations behind the Economic Forecast Agency's price forecast is unclear (Pakiam, 2017). The World Bank's forecast of a lower gold price is mainly driven by expected higher US interest rates (Benali, 2017). According to the average of their forecasts, the price of gold is expected to be 1290 USD in 2019, 1293 USD in 2020 and 1220 USD in 2021 as shown in the figure below.

FIGURE 12 WORLD GOLD PRICE FORECASTS, USD PER OUNCE



Source: World Bank, Economic Forecast Agency, Bloomberg

The price for Mongolian gold is determined by the worldwide price for gold as the Bank of Mongolia purchases gold at London Bullion market price. We expect gold prices to remain steady and increase to around the 1300 USD mark in 2018, but it is difficult to say whether or not the price will increase following the expected world price increase as prices in Mongolia are heavily influenced by the domestic currency exchange rate.

MONGOLIAN MARKET

Demand Side

Mongolian gold demand is largely determined by its gold export levels and local consumption, which is in turn dominated by purchases by the Bank of Mongolia.

As of August 2017, the export of non-monetary gold has decreased by 12 percent in comparison to last year and its contribution to total growth decreased from 13 percent in 2016 to 8 percent in 2017 (The Bank of Mongolia, 2017).

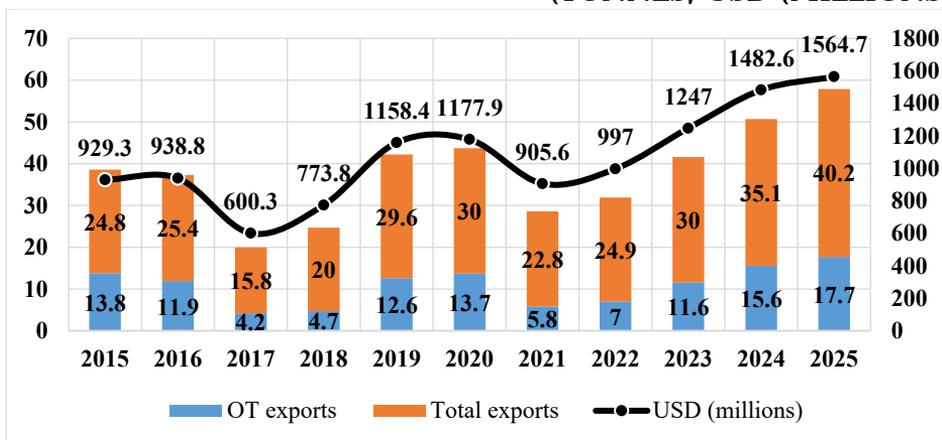
TABLE 18. LOCAL GOLD EXPORT (IN MILLIONS OF USD)

Non-monetary gold (tonnes)	2016.8			2017.8			YoY Change		
	Volume	Value	%	Volume	Value	%	Value	Change	%
	9.6	390	13%	7	342	8%	(49)	-12%	-2%

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

Mongolia exported 8.4 tonnes of gold in the first eight months of 2017, earning 341 million USD. This comes out to a 12.5 percent decrease in volume and value when compared to last year. However, the Bank of Mongolia softened this decrease by purchasing 12.2 tonnes of gold, a 0.55 tonne increase from last year (Tugs, September 2017). In line with the government's Gold-2 program, the bank aims to buy 20–25 tonnes of gold from 2017–2020. The amount of gold the government decides to buy is also closely linked to overall gold production in Mongolia.

According to Galsandorj's *Mongolian Gold Sector Development Prospects*, the income from gold exports is expected to increase from 2017 to 2020, decreasing in 2021 but continuing to grow until 2025 (Galsandorj, 2016, p. 137). This forecast suggests an increase in demand for Mongolian gold in the short-term.

**FIGURE 13. GOLD EXPORT INCOME FORECAST
(TONNES, USD (MILLIONS))**

Source: Mongolian Gold Sector Development Prospects 2016

In general, gold production in Mongolia is dominated by Oyu Tolgoi's production. Oyu Tolgoi will be discussed in more detailed in the following sections. Overall, we can expect the demand for gold to increase as the central bank continues to purchase more gold according to the government's Gold – 2 program and gold exports are projected to increase.

Supply Side

According to the Mineral Resource Authority of Mongolia, Mongolian gold production excluding Oyu Tolgoi production has grown 3 percent in the first half of 2017 compared to 2016. However, there was a sharp decrease in the Oyu Tolgoi production of gold, primarily due to the production of lower head grade gold.

TABLE 19: MONGOLIAN GOLD PRODUCTION (TONNES)

	H1 2016	H1 2017	YoY Change %
Gold production /except OT /	6.5	6.7	3.1%
Oyu Tolgoi production	6	1.4	-76.71%

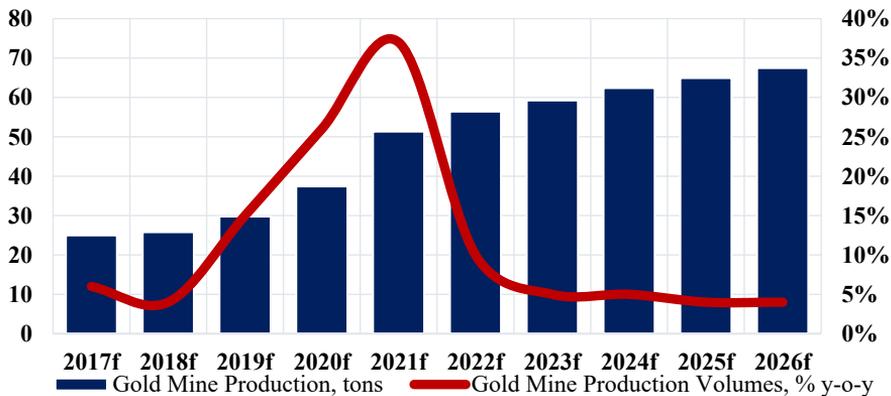
Source: Mineral Resource Authority of Mongolia, OT website

The production of gold is expected to increase in the coming years as Oyu Tolgoi undergoes phase 2 underground expansion according to a feasibility study that showed there is 337 tonnes of gold in reserve. The expansion is expected to be completed with a return to production by 2020 and production optimizing by 2021. According to Oyu Tolgoi's production forecast, production is expected to peak in 2025 which will have a substantial effect on profits. Overall, there is an anticipated 450

percent growth in gold production from 2017 to 2025 (Mongolian Mining Journal, June 2017).

Additionally, with the implementation of new projects such as the Gatsuert gold project owned by Canada's Centerra Gold and the Egen–Zost project owned by Xanadu Mines and currently under preliminary drilling, Mongolian gold production is expected to greatly increase. According to the BMI research of FitchGroup Company, production is expected to steadily increase until it hits approximately 2.4 moz (68 tonnes) by 2026. This means there is an expected average annual growth of 11.6 percent and a 6 percent year over year overall growth for 2017 (BMI Research, 2017).

FIGURE 14. MONGOLIAN GOLD PRODUCTION FORECAST (TONNES)



e/f = BMI estimate/forecast. Source: USGS, BMI calculation

Local gold reserves calculated in the first half of 2016 and 2017 by the Mineral Resource Authority of Mongolia are shown in the table below.

TABLE 20: LOCAL GOLD RESERVES (TONNES)

Gold reserves	H1 2016	H1 2017
Quartz vein gold, million tonnes	32.0	2.1
Placer gold, tonnes	4.4	1.2

Source: Mineral Resource Authority of Mongolia

Future gold reserves may also increase as, in March 2017, the former Minister of Mining and Heavy Industries announced that Mongolia plans to double the amount of land they allow for mineral exploration from 9.6 percent of total land to 20.9 percent (BMI Research, 2017). This could lead to the discovery of new gold reserves and more gold output in the future but unfortunately, this plan has been suspended as of October 23, 2017 (Aminaa, 2017). However, the Mongolian

Parliament adopted a new amendment to the Law on Minerals, adopted on November 10, 2017 along with the proposed budget for 2018 (Montsame, 2018). In line with the changes to the Law on Minerals, mining licenses will be granted via tender starting in 2018, with the license issuances headed by provincial government authorities (Montsame, 2018).

Policy wise, the Mongolian government is committed to the Gold – 2 program as shown by the Bank of Mongolia's increased purchase of local gold. In accordance with Article 3.3.8 of the Gold – 2 program, the government has been planning to create a gold refinery in Mongolia with a joint working group comprised of the Bank of Mongolia, the Ministry of Mining and Heavy Industry, Erdenes Mongol LLC and the Assay Inspection Department of Mongolia who are looking into its development (Montsame, 2017). Should this project prove successful in the near future, Mongolia will be able to export its gold without having to send raw gold for refinement to other countries such as Russia, Great Britain, Japan and Switzerland (Montsame, 2017). This could not only boost demand, but may cause a substantial push in gold production as now the added value of the product would make gold a more profitable commodity.

CONCLUSION

The world demand for gold decreased by 14 percent in the first half of 2017 compared to the first half of 2016 and decreased by 9 percent in the third quarter of 2017 as compared to the previous year. This decrease was mainly due to a fall in the demand for gold for investment from its peak quantity of 1057.4 tonnes in the first half of 2016. There is still a positive demand for gold for investment, though the quantity has stabilized since 2016. Demand for gold for jewelry is the largest component of overall demand and is mainly driven by consumption from India and China. Indian demand grew due to the country's improved economic situation, particularly in rural areas, while demand from China dropped as forecasted due to the shift in global taste for jewelry. Change in demand in technology and central bank reserves were minimal overall. In 2018, we forecast that the demand for gold will remain muted as demand for jewelry is expected to be sluggish, as shown by the 2017 third quarter results. It is unlikely that India will continue to increase demand with their new general sales tax, and the Chinese shift away from gold jewelry is still ongoing. Demand for gold for technology and reserves may increase in 2018 while investment stays positive but the positive changes are small in scale and will not

mitigate the overall decrease in demand due to the lower demand for gold jewelry.

The world supply for gold is determined by mine production, recycled gold and net producer hedging with a particular reliance on mine production. Mine production in the first half of 2017 stayed essentially unchanged from 2016 while the level of recycled gold decreased and there was a shift from gold hedging to de-hedging. These trends continued on into the third quarter of 2017. The decrease in recycled gold was mainly the result of people holding onto gold in the midst of global uncertainty while the gold de-hedging was due to gold price increases in 2016. As for production, in countries such as China and Tanzania gold production decreased mainly due to government policies and disputes; while in Indonesia, Canada, Peru and Australia, production increased due to resumption of production to normal after setbacks. We forecast that the global supply of gold will decrease in 2018 as the circumstances suppressing production continue on and China, the world's largest producer of gold, is expected to systematically reduce production as it revamps its mining sector.

World gold price is expected to hover approximately around 1300 USD in 2018 as overall gold supply is expected to drop more than global gold demand. Prevalent instability in the world economy, particularly in the US is expected to drive and keep the price of gold up in the coming years. Mongolian gold prices are fully reliant on world gold prices but as it is bought at the London Bullion market price, the Mongolian exchange rate plays a large role in determining Mongolian gold prices as well.

In Mongolia's case, in accordance with the government's Gold-2 program, the Bank of Mongolia is expected to increase its purchase of gold, keeping Mongolian demand at a relatively high level. Mongolian production is largely based on Oyu Tolgoi's production and is expected to be muted until 2020 when Oyu Tolgoi's phase 2 underground mine expansion is anticipated to be complete. Gold production is then expected to sharply increase and peak in 2025. This increase in production may be sustained as several new, smaller gold projects are being implemented. Though it has not been implemented yet, the government decision to resume issuance of mining and exploration licenses through tender in 2018 may also lead to new reserves of gold and future production opportunities.

IRON ORE MARKET

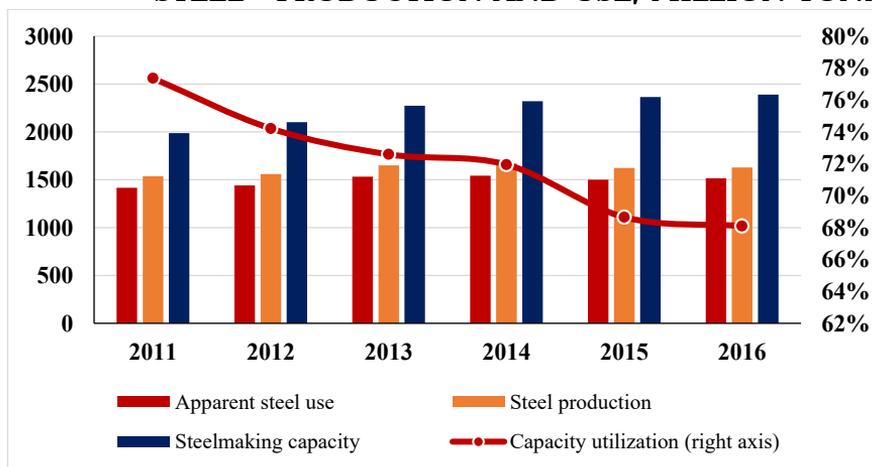
WORLD MARKET

Demand side

Global steel market

World apparent steel use was 1515 million tonnes in 2016, a 1 percent growth from the previous year. Apparent steel use in China, which accounts for 45 percent of the world apparent steel use, rose by 9 million tonnes or 1.3 percent. As a result, global crude steel production in 2016 increased by 0.5 percent to 1630 million tonnes. In particular, in the Middle East, and Asia and Oceania countries, production increased by 7 percent and 1 percent, respectively. It is estimated that steel production in 2017–2018 will be relatively stable, with an expected growth of 1 percent (World Steel Association, 2017).

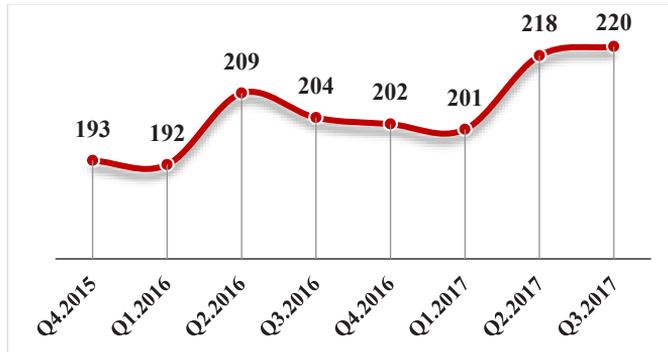
FIGURE 15. COMPARISON OF STEEL-MAKING CAPACITY, STEEL PRODUCTION AND USE, MILLION TONNES



Source: International Trade Administration

The world's largest steel producer is China, whose total steel production increased by 0.6 percent to 808.4 million tonnes in 2016 (World Steel Association, 2017). China's crude steel production has increased over the last two quarters and crude steel production is expected to increase in 2017 (Figure 16).

FIGURE 16. CHINA'S CRUDE STEEL PRODUCTION, MILLION TONNES

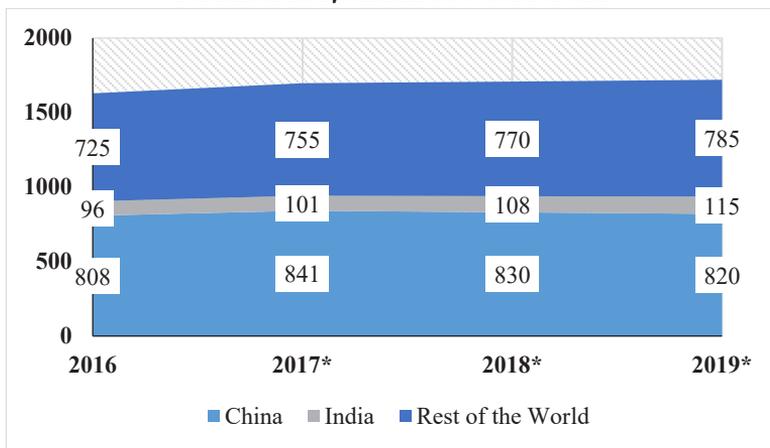


Source: Bloomberg

Trend in demand

World crude steel production is predicted to gradually increase between 2017 and 2019. The annual production is forecasted to grow by 4.4 percent and 0.7 percent in 2017 and 2018, respectively.

FIGURE 17. WORLD CRUDE STEEL PRODUCTION FORECAST, MILLION TONNES



Source: DIIS, 2017

China's crude steel production is projected to increase by 4.9 percent in 2017 and decrease by 2.5 percent between 2018 and 2019 (DIIS, 2017). The Chinese government is pursuing a strategy to reduce crude steel production due to technological and environmental factors. Part of the strategy is to reduce the nation's steel production by 50 million tonnes this year, with further reduction in 2018 (China Daily, 2017)

In recent years, India's usage of steel has been increasing due to rapid population and economic growth. As a result, its steel production is increasing year to year. The annual capacity of steel production stands at 126 million tonnes in 2016 and the Indian government forecasts that it will rise to 150 million tonnes by 2021 (The Economic Times, 2017). In the other countries, crude steel production is expected to stay relatively stable.

Supply side

Global iron ore production

Global iron ore production grew 5 percent year – on – year in 2016 to a total of 2,106 million tonnes. This was primarily driven by an additional 30 million tonnes of direct shipping ore from Australia (UNCTAD, 2017). In particular, the iron ore production of the three largest companies in Australia have dominated that growth. Vale, Anglo – American and Glencore have also increased their iron ore production notably.

TABLE 21. IRON ORE PRODUCTION BY MAJOR COMPANIES, MILLION TONNES, YEAR ENDED DECEMBER 31

Company	Country	2015	2016	Variance%/
Vale	Brazil	346.1	348.8	0.7
Rio Tinto	Australia	263	281.3	6.8
BHP Billiton	Australia	227	231.3	2
Fortescue	Australia	169.4	170.4	0.6
Arcelor Mittal	India	62.8	55.2	– 12.1
Anglo – American	UK and South Africa	54.1	57.6	6.5
Glencore	UK and Switzerland	41.2	47.1	14.3
Cliffs Natural Resources	USA	31	30	– 3
World total		2015	2106	4.3

Source: Anglo–American, Arcelor Mittal, BHP Billiton, Cliffs Natural Resources, Fortescue, Glencore, Rio Tinto and Vale

Trend in Supply

The supply of iron ore is expected to increase in the near future. According to Bloomberg Intelligence, iron ore production of the top four producers will reach 1.13 billion tonnes by 2018. Vale, Rio Tinto, BHP Billiton and Fortescue are forecasted to increase production by 14.8 percent, 3.5 percent, 12.2 percent and 3 percent, respectively in

2018 (Bloomberg, 2017). The forecasted increase in production is mainly due to:

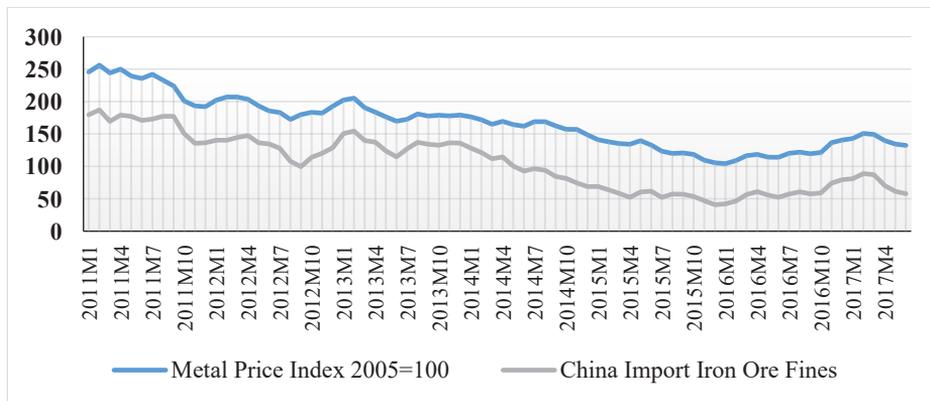
- In December 2016, Vale obtained the operational environmental license for the S11D project located in Carajás, Brazil. The average Fe content of S11D is 66.7 percent and production capacity is 90 million tonnes. S11D has cutting edge technology, low cost and high productivity (Vale, 2016).
- In August 2017, Rio Tinto started operations at new mine, Silvergrass, where production capacity is 10 million tonnes (Rio Tinto, 2017).
- The Samarco project, owned by Vale–BHP, is expected to begin production again in late 2018. Samarco's annual production capacity is 30.5 million tonnes (S&P Global, 2017).

Iron ore price

Price in the world market

The iron ore price has increased since the last quarter of 2016 and reached a peak at 88.8 USD per tonne in February 2017. It then declined and as of September 2017, it was priced at 71.5 USD per tonne. Iron ore demand has been decreasing in the past couple of months due to a reduction in China's steel production.

FIGURE 18. IRON ORE PRICE AND METAL PRICE INDEX



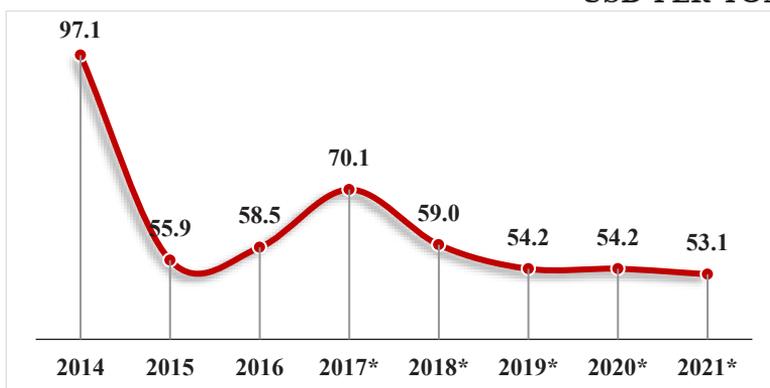
Source: IMF

Despite Chinese steel capacity reductions in 2016, looser than expected monetary policies encouraged infrastructure projects that has kept Chinese steel demand resilient, boosting the iron ore price in first half of 2017 (Bloomberg, 2017).

Trend in price

The price of iron ore in the world market is expected to decline further in 2018 to 2021. According to IMF, World Bank and Bloomberg forecasts, on average the price of iron is expected to be USD 53.1 in 2021.

FIGURE 19. AVERAGE IRON ORE PRICE PROJECTION, USD PER TONNE



**Estimated as average of projections from international financial institutes
Source: Bloomberg, World bank, Government of Mongolia*

The main contributing factor to iron ore's expected price decrease is due to the fact that iron ore markets have a surplus of supply until 2020. The top four iron production companies in particular are expected to increase production. Meanwhile, world steel production will not grow considerably. This is primarily driven by the Chinese steel production reduction.

On the other hand, major iron ore producers in Australia and Brazil are inclined to reduce operational costs. In June 2016, the iron ore operating cost of the top four producers was between 21.03 and 32.07 USD. As of January 2017, the average iron ore operating cost of the top four producers decreased by 1.46 USD reaching 24.58 USD, and costs are expected to decline further (Bloomberg, 2017).

Iron ore trade

China's iron ore import

China's iron ore imports have been increasing in recent years (Figure 18). Particularly, in the 2015, China cut its own production of iron ore by 36 percent and produced 123.5 million tonnes of iron ore. Following this decrease, total iron ore import increased by 2.1 percent and import

from Asia, including Mongolia, reached 55.5 million tonnes, doubling in volume (World Steel Association, 2017).

FIGURE 20. CHINA'S IRON ORE IMPORT, MILLION TONNES



Source: International Trade Center

During the first three quarters of 2017, Chinese imports of iron ore hit 817 million tonnes, exhibiting an increase of 7.1 percent. Over the same period, China's average import price increased by 38.4 percent (Chinese Customs office, 2017).

Trend in iron ore trade

China, the largest importer of iron ore, might cut import in 2018 – 2019, while Japan might raise its iron ore import by 2019. On the other hand, the largest exporters, Australia and Brazil, are expected to grow export by 10.7 percent and 12 percent, respectively through 2019.

TABLE 22. FORECAST OF IRON ORE TRADE, MILLION TONNES

	2016	2017 f	2018 f	2019 f
Iron ore imports				
China	1,024	1,074	1,068	1,066
European Union 28	137	141	144	145
Japan	130	126	133	134
South Korea	72	75	78	79
Iron ore export				
Australia	808	839	872	895
Brazil	374	384	403	419
India	22	38	36	33
Ukraine	37	48	44	42

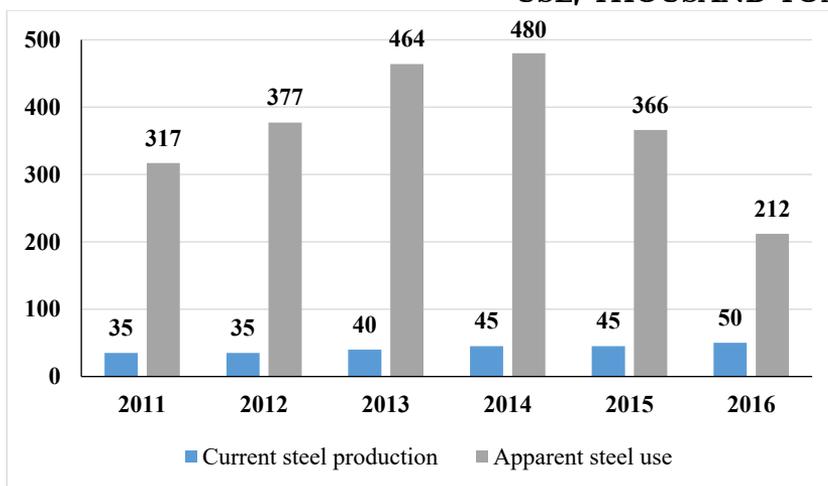
Source: DIIS

MONGOLIAN MARKET

Demand side

Currently, Mongolia's steel production is much lower than its consumption. The largest steel maker is Darkhan Metallurgical Plant which uses local steel scraps for its steel production. Its capacity is 100 thousand tonnes a year and its usage is around 50–60 percent of its total capacity.

FIGURE 21. MONGOLIA'S STEEL PRODUCTION AND USE, THOUSAND TONNES



Source: World Steel Association

Mongolia's steel production increased by 5 thousand tonnes while apparent steel use decreased to 212 thousand tonnes, a 42 percent decline, in 2016. The reason for the decline in apparent steel use is due to decreased demand from the manufacturing and infrastructure sectors.

During the recent economic boom years, Mongolia produced about 9 percent of its steel consumption and in 2016, produced 23.6 percent of its steel consumption. Furthermore, Mongolia faces the need to increase steel production to develop its industrial, construction and infrastructure sectors.

The Government of Mongolia is pursuing a strategy to develop its metallurgical production by implementing the metallurgical plant project in the Darkhan and Selenge region, which relies upon the Darkhan Metallurgical Plant. The metallurgical plant project was implemented by private investment from 2010 to 2014, and by

concession agreement since 2014. At its completion, it will be able to produce 500 thousand tonnes of direct reduced iron ore and 350 thousand tonnes of steel.

As of 2017, in accordance with the government project, iron ore mines have been added into economic circulation while iron ore concentrating plants that utilize dry and wet magnetic methods to process iron ore have been established. Furthermore, the feasibility studies on developing a new iron ore plant that can directly reduce iron ore as required in the next stage of the iron ore concentrating process, as well as on expanding the existing steel plant are underway. The Government of Mongolia intends to complete the project in 2020, which will in turn reduce steel imports.

SUPPLY SIDE

As of 2016, Mongolian total iron ore geological reserves was around 1.7 billion tonnes. In total, 63 deposits are registered and four iron ore miners were operational. As shown in the table below, Bold Tumur Eruu gol, Darkhan Metallurgical Plant and Mongolrostsvetmet increased iron ore sales volume (MRAM, 2016).

TABLE 23. MONGOLIAN IRON ORE MINERS' SALES, 2016

	Quantit y of sales (Mt)	Sales (MNT.blm)	Sales (USD.mln)
Bold Tumur Eruu gol	3.5	178.7	83.3
Altain Khuder	0.75	38.9	18.1
Darkhan Metallurgical Plant	1.06	138.7	64.6
Mongolrostsvetmet	0.97	30.0	14.0

Source: EITI, 2017

Mongolia's total iron ore production capacity is 11.5 million tonnes, however only 65 percent of this capacity was used in 2016. It is expected that Mongolian iron ore miners will operate at full capacity between 2017 and 2020 due to the metallurgical plant project in the Darkhan and Selenge region.

The main destination of Mongolia's iron ore export is China. Since the beginning of 2017, Mongolian iron ore exports to China reached 5.6 million tonnes, up 4.8 percent year – on – year (Table 24). Likewise, it is expected that Mongolian iron ore exports to China will continue to increase in 2017.

TABLE 24. MONGOLIA'S IRON ORE EXPORT TO CHINA

		2014	2015	2016	2017.11
China	Quantity (Mt)	6.3	4.5	5.8	5.6
	Amount (mln.USD)	446.4	206.9	240.3	284.3
	Price (USD/tonne)	70.6	45.5	41.1	50.8
Singapore& Hong Kong	Quantity (Mt)	–	0.5	0.2	–
	Amount (mln.USD)	–	20.3	9.6	–
	Price (USD/tonne)	–	38.1	39.9	–

Source: Customs Office

The income from iron ore exports was 249.9 million USD or 5 percent of Mongolia's total export income in 2016. Mongolia's share in Chinese iron ore imports was 0.6 percent in 2015 and this remained unchanged in 2016.

CONCLUSION

The world price of iron ore is forecasted to be lower than its current level until 2021 at USD 53.1 per tonne. This is due to the decline in China's demand for iron ore as policies of environmental protection and improved production technology take effect. Meanwhile, Australia and Brazil, the major suppliers of iron ore, have been inclined to improve Fe content, to reduce operational cost and to increase production of iron ore.

Iron ore is one of the main export mining commodities of Mongolia. In the future, iron ore exports will face some uncertainties. In particular:

- Chinese iron ore demand is likely to decrease as China has been cutting its own steel production.
- In the short term, domestic transport cost of iron ore will be stable while operational cost may increase. As most iron ore mines are open pit, there is a risk that it will become more difficult to mine iron ore, and the volume of iron ore concentrate may decrease.
- In the iron ore market, competition has become fierce while Mongolia's competitiveness remains weak.

REFERENCES

COAL:

- Aminaa, K. (2017, October 24). *Mining licenses to be granted through tender*. Retrieved from Montsame.mn: <http://montsame.mn/en/read/12988>
- Bloomberg. (2017, October). *Markets*. Retrieved from Bloomberg Terminal.
- BMI Research (2017). *Australia Mining Report Q4 2017*. London
- BMI Research. (2017). *BMI Steel Report Q4 2017*. London.
- BMI Research. (2017). *China Mining Report Q3 2017*. London.
- BMI Research. (2017). *Mongolia Mining Report Q4 2017*. London.
- British Petroleum. (June 2017). *BP Statistical Review of World Energy June 2017*. London.
- Bureau of International Recycling. (2017). *World Steel Recycling in Figure 2012–2016*. Brussels.
- DBS Group Research. (2017, August 21). *Background of supply curtailment in 4Q17*. Singapore.
- Department of Industry, Innovation and Science. (2017). *Office of the Chief Economist: Historic Data – September 2017*. Canberra, Australia.
- Department of Industry, Innovation and Science. (2017, September). *Resources and Energy Quarterly September 2017*. Canberra, Australia.
- Economic Research Institute. (2017). *Coal Market Study: March 2017*. Ulaanbaatar.
- Edwards, Terrance (2017, December 15). *Mongolia suspends coal customs clearance at border checkpoint to end dangerous traffic jam*. Retrieved from Reuters.com: <https://www.reuters.com/article/mongolia-coal-traffic/mongolia-suspends-coal-customs-clearance-at-border-checkpoint-to-end-dangerous-traffic-jam-idUSL4N1OF2HC>

- Edwards, Terrance (2017, November 14). *Border jam puts Mongolia's coal lifeline under threat*. Retrieved from Reuters.com: <https://www.reuters.com/article/us-mongolia-coal-trucks/border-jam-puts-mongolias-coal-lifeline-under-threat-idUSKBN1DD2QJ>
- International Energy Agency. (2017). *Coal Information 2017 Overview*. Paris.
- International Monetary Fund. (2017). *Price Forecasts: July 2017*. Washington, DC.
- International Trade Administration. (2017, August). *Steel Exports Report: China*. Washington, D.C.
- KPMG. (August 2017). *Coal Price and FX consensus forecasts: June/July 2017*. Brisbane, Australia.
- Mineral Resources and Petroleum Authority of Mongolia. (2017). *Annual Report 2016*. Ulaanbaatar.
- Mineral Resources and Petroleum Authority of Mongolia. (2017, September). *September 2017 Statistics*. Ulaanbaatar.
- Mongolian Mining Journal. (2017). Exploration Sector Ready to Regain Lost Ground. *Mongolian Mining Journal Monthly, April*, pp. 76–79.
- Morgan Stanley Research. (2016). *Global Metal Playbook 2Q 2016*. New York.
- National Statistics Office. (2017, October). *Home: National Statistics Office*. Retrieved from Statistical Database: www.1212.mn.
- Reuters. (2017, August 4). *China's Shenhua suspends two coal mines, Mongolia set to benefit*. Ulaanbaatar.
- Reuters. (2017, February 18). *China to suspend all imports of coal from North Korea*. Shanghai.
- Reuters. (2017, April 4). *Second Australia miner declares force majeure in wake of Cyclone Debbie*. Sydney.
- Statista. (2017) *Coke production in China 1993 to 2015 (in million metric tons)*. London.

Suga, M., & Stapczynski, S. (2017, October 10). Kobe Steel Scam Hits Planes, Trains, Automobiles. Retrieved from <https://www.bloomberg.com/news/articles/2017-10-10/kobe-steel-s-dodgy-data-rattles-boeing-to-toyota-quicktake-q-a>

United Nations Security Council. (2017, August 5). *Resolution 2371 (20187)*. New York.

U.S. Energy Information Administration. (2017, October). *Quarterly Coal Report April–June 2017*. Washington, D.C.

U.S. Energy Information Administration. (2017, October). *Short–Term Energy Outlook*. Washington, D.C.

World Bank. (2017). *Price Forecasts: April 2017*. Washington, DC.

World Steel Association. (2017). *Short Range Outlook: October 2017*. Brussels.

COPPER:

Achit Ikht Co.Ltd. Retrieved from Achit Ikht Co.Ltd: www.achit-ikht.mn

BHP billiton. (2017, August 22). *BHP's economic and commodity outlook*. Retrieved from BHP : www.bhp.com

Bloomberg. (2017, October). Retrieved from Bloomberg: www.bloomberg.org

BMI Research. (August 2017). *Mongolia Minig Report, Q4 2017*. London: BMI Research.

Erdmin Co.Ltd. Retrieved from Erdmin Co.Ltd: www.erdmin.mn

Government of Mongolia. (2017). *Medium term Fiscal Framework Statement*. Ulaanbaatar: Government of Mongolia.

ICSG. (2017, September 20). Press release. *Copper: Preliminary Data for 1st Half 2017*.

ICSG. (October, 2017). *Copper Market Forecast 2017/2018*. Lisbon: ICSG Press Release.

- International Monetary fund. (2017, September). *IMF Primary Commodity Prices*. Retrieved from International Monetary Fund: www.imf.org
- International Trade Centre. (2017, July). *Trade Map*. Retrieved from International Trade Center Web site: <http://www.trademap.org>
- Macquarie Research. (2017). *Commodities Compendium*. London: Macquarie Research.
- Mineral Resource and Petroleum Authority. (2017). *Operational report of Mongolian geology, mining, heavy industrial sector and MRPAM 2016*. Ulaanbaatar: Mineral Resource and Petroleum Authority.
- Ministry of Finance. (2017). *Draft of Mongolian Budget Plan 2018*. Ulaanbaatar: Government of Mongolia.
- Mongolian Customs Office. (2017, August). *System of Statistical Information*. Retrieved from Monthly Statistics: www.customs.gov.mn
- Mongolian Mining Journal. (August 2017). Copper Plant: Investment still under preparation. *Mongolian Mining Journal*, 70.
- National Statical Office. (2017). *National Accounts*. Retrieved from Mongolian Statical Information Service: www.1212.mn
- National Statistics Office. (2017). *Preliminary performance of GDP (th first half of 2017)*. Ulaanbaatar: NSO.
- Oyu Tolgoi LLC. (n.d.). Retrieved from Oyu Tolgoi LLC: www.OT.mn
- The bank of Mongolia. (August 2017). *Mongolia's foreign trade review*. Ulaanbaatar: The Bank of Mongolia.
- Turquoise Hill. (July, 2017, 7 17). *Turquoise hill announces second quarter 2017 production for Oyu Tolgoi*. Vancouver, BC: Turquoise Hill Resource Ltd.
- World Bank. (April 2017). *Commodity market outlook Q2, 2017*. Washington, DC: Wolrd Bank .
- World Bank. (October 2017). *Commodity Markets Outlook*. Washington: World Bank.

GOLD:

Aminaa, K. (2017, October 24). *Mining Minister suspends granting of licenses.* Retrieved from Montsame.mn: <http://montsame.mn/en/read/12061>

Benali, S. (2017, October 27). *World Bank places bets on this precious metal, and it's not gold...* Retrieved from Kitco.com: <http://www.kitco.com/news/2017-10-27/World-Bank-Places-Bets-on-This-Precious-Metal-And-It-s-Not-Gold.html>

Bloomberg. (2017, October). *Markets.* Retrieved from Bloomberg.

BMI Research. (2017). *Mongolia Mining Report Q4 2017.* BMI Research.

CPM. (2017). *Precious Metals Outlook: October 2017.* CPM Group.

Dean, S. (2017, September 4). *Acacia pulls back from major gold mine amid Tanzania export ban dispute.* Retrieved from Telegraph : <http://www.telegraph.co.uk/business/2017/09/04/acacia-pulls-back-major-gold-mine-amid-tanzania-export-ban-dispute/>

Els, F. (2017, February 28). *China closing 150 gold mines.* Retrieved from Mining.com: <http://www.mining.com/china-gold-output/>

Emont, J. (2017, August 29). *Freeport to Give Indonesia a Majority Stake in Its Grasberg Mine.* Retrieved from The New York Times: <https://www.nytimes.com/2017/08/29/business/indonesia-freeport-mcmoran-grasberg-deal-majority.html>

Forest, D. (2017, May 1). *What's Behind This Sudden Drop in China's Gold Production?* Retrieved from Oilprice.com: <https://oilprice.com/Metals/Gold/Whats-Behind-This-Sudden-Drop-In-Chinas-Gold-Production.html>

GFMS. (2017). *GFMS Gold Survey 2017 H1 Update & Outlook .* Thomson Reuters.

Gold Fields. (2017, June 20). *Gold Fields hedges oil and Australian gold prices.* Retrieved from Goldfields.co.za: https://www.goldfields.co.za/news_article.php?articleID=5014

4

- IMF. (2017). *World Economic Outlook Update, July 2017: A Firming Recovery*. International Monetary Fund.
- Jamasmie, C. (2017, October 20). *Acacia Mining takes further revenue hit, reviews Barrick–Tanzania deal*. Retrieved from Mining.com: [http://www.mining.com/acacia – mining – takes – revenue – hit – studies – barrick – tanzania – deal/](http://www.mining.com/acacia-mining-takes-revenue-hit-studies-barrick-tanzania-deal/)
- Macquarie Research. (2017). *Commodities Compendium: Politics, profits and protectionism*. Macquarie Research .
- Mongolian Mining Journal. (June 2017). 2025: Oyu Tolgoi's gold production will increase by 450 percent, copper by 320 percent. *Mongolian Mining Journal*, 47.
- Montsame. (2017, April 5). *Bank of Mongolia implementing project to build gold refinery* . Retrieved from Mongolian Business Database: [http://www.mongolianbusinessdatabase.com/base/newsdetials?id = 8486](http://www.mongolianbusinessdatabase.com/base/newsdetials?id=8486)
- Montsame. (2018, January 5). *Mining Licenses to be granted through tender*. Retrieved from Montsame: <http://montsame.mn/en/read/12988>
- Pakiam, R. (2017, August 31). *Gold is winning new fans* . Retrieved from Bloomberg.com: [https://www.bloomberg.com/news/articles/2017 – 08 – 30/gold – wins – new – fan – as – u – s – inflation – and – trump – s – agenda – falter](https://www.bloomberg.com/news/articles/2017-08-30/gold-wins-new-fan-as-us-inflation-and-trump-s-agenda-falter)
- PTI. (2017, October 6). *PMLA: Gems, jewellery dealers exempt from reporting requirement*. Retrieved from The Times of India: [https://timesofindia.indiatimes.com/business/india – business/pmlgems – jewellery – dealers – exempt – from – reporting – requirement/articleshow/60975778.cms](https://timesofindia.indiatimes.com/business/india-business/pmlgems-jewellery-dealers-exempt-from-reporting-requirement/articleshow/60975778.cms)
- Samsung Press Release. (2017, October 31). *Samsung Electronics Announces third Quarter 2017 Results*. Retrieved from Samsung Newsroom: [https://news.samsung.com/global/samsung – electronics – announces – third – quarter – 2017 – results](https://news.samsung.com/global/samsung-electronics-announces-third-quarter-2017-results)
- Sanderson, H. (2017, September 6). *Acacia buys \$3m in put options to hedge against gold price falls*. Retrieved from Financial Times : [https://www.ft.com/content/07be6c56 – 7807 – 37c0 – 8243 – 95d9f33fe01b](https://www.ft.com/content/07be6c56-7807-37c0-8243-95d9f33fe01b)

- St. Angelo, S. (2017, August 8). *Major Gold Market Indicator Shift: Trouble for future supply*. Retrieved from Money Metals Exchange:
<https://www.moneymetals.com/news/2017/08/08/major-gold-market-indicator-shift-001132>
- Stoeflerle, R.-P., & Valek, M. J. (2017). *In Gold We Trust . Incrementum* .
- The Bank of Mongolia. (2017). *Mongolia's foreign trade review August 2017*. The Bank of Mongolia .
- Tugs, B. (September 2017). Minerals form 80 percent of total exports until August – end. *Mongolian Mining Journal*, 97.
- World Bank. (2017, October 26). *World Bank Commodities Price Forecast (nominal US dollars)*. Retrieved from <http://pubdocs.worldbank.org/en/678421508960789762/CMO-October-2017-Forecasts.pdf>
- World Gold Council. (2017). *Gold Demand Trends Q3 2017*.

IRON ORE:

- Anglo – American. (2017). *Annual Report 2016*. Anglo American.
- Arcelor Mittal . (2017). *Annual Report 2016*. Acelor Mittal.
- BHP Billiton. (2017). *Annual Report 2017*. BHP Billiton.
- Bloomberg. (2017). *Data*. Retrieved from Bloomberg.
- Bloomberg. (2017). *New Iron Ore Supply Model*. Bloomberg Intelligence.
- China Daily. (2017, Apr 14). Retrieved from http://www.chinadaily.com.cn/business/2017-04/14/content_28930059.htm
- Chinese Customs office. (2017). *Statistics*. Retrieved from [www.english.customs.gov.cn: http://english.customs.gov.cn/Statics/bd1fb1fa-5e86-4352-abfa-84f5cb711099.html](http://english.customs.gov.cn/Statics/bd1fb1fa-5e86-4352-abfa-84f5cb711099.html) /
- Cliffs Natural Resources. (2017). *Annual Report 2016*. Cliffs Natural Resources.

- Customs Office. (2014–2017). *Custom's Annual Statistics*. Ulaanbaatar: Custom's Office of Mongolia.
- DIIS. (2017). *Resources and Energy Quarterly*. Department of Industry, Innovation and Science, Australian Government.
- EITI. (2017). Retrieved from eitimongolia.mn: <https://e-reporting.eitimongolia.mn/>
- Fortescue. (2017). *Annual report 2017*. Fortescue.
- Gelencore. (2017). *Annual Report 2016*. Gelencore.
- Government of Mongolia. (2017, oct). Draft of Mongolian Budget Plan 2018.
- IMF. (2017, Oct). *Montly data*. Retrieved from www.imf.org.
- International Trade Administration. (2017). *Global Steel Report*. U.S. Department of Commerce, International Trade Administration.
- International Trade Center . (2017). *Trade Statistics*. Retrieved from www.intracen.org:
http://www.trademap.org/tradestat/Product_SelCountry_TS.aspx?nvpm=1|156|||72||4|1|1|2|1|1|1|1
- MRAM. (2016). *Iron Ore in Mongolia: Opportunities and Bottlenecks for the Economic Development of the Country*. Ulaanbaatar: Mineral Resource Authority of Mongolia.
- MRAM. (2017). *Annual report of activity 2016*. Ulaanbaatar: Mineral Resource Authority of Mongolia.
- Reuters. (2017, Sep 27). Retrieved from www.reuters.com:
<https://www.reuters.com/article/china-steel-royhill/australias-roy-hill-says-can-expand-iron-ore-capacity-beyond-target-idUSL4N1M829S>
- Rio Tinto. (2017, Aug). Retrieved from [Riotinto.com](http://www.riotinto.com):
http://www.riotinto.com/media/media-releases-237_23046.aspx
- Rio Tinto. (2017). *Annual Report 2016*. Rio Tinto.
- S&P Global. (2017, Jul 24). Retrieved from www.platts.com:
[://www.platts.com/latest-news/metals/london/brazilian-iron-ore-miner-samarco-restart-not-21419978](http://www.platts.com/latest-news/metals/london/brazilian-iron-ore-miner-samarco-restart-not-21419978)

- The Economic Times. (2017, Oct 11). *Industry*. Retrieved from [economictimes.indiatimes.com: economictimes.indiatimes.com/articleshow/61030327.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst](http://economictimes.indiatimes.com/economictimes.indiatimes.com/articleshow/61030327.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)
- UNCTAD. (2017). *The Iron Ore Market 2017*. UNCTAD.
- Vale. (2016, Des). Retrieved from www.vale.com/brazil/En: http://www.vale.com/brasil/EN/initiatives/innovation/s11d/Pages/default.aspx
- Vale. (2017). *Annual Report 2016*. Vale.
- World bank. (2017, Oct 26). World Bank Commodities Price Forecast.
- World Steel Association. (2017). *Steel Statistical Yearbooks* .
- World Steel Association. (2017, Oct). World steel short range outlook.

APPENDIX

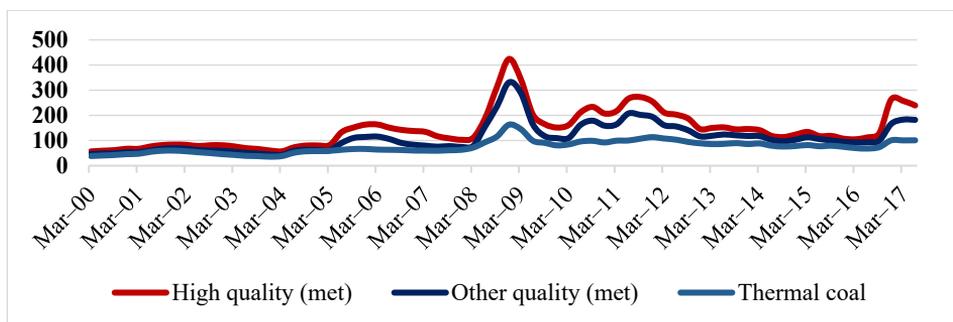
COAL:

TABLE A1. MONGOLIAN COAL MINES

Mine	Capacity (million tonnes per annum)	Reserve (million tonnes unless otherwise specified)
East/West of Tsankh	15–20	1.5 billion
Ukhaa Khudag	15	435.7
Tavantolgoi Baruun Noyon Uul-1	1	218.8
Ovoot tologoi	9	136.7
Nariin Sukhait	14	587.5
Khurenshand	3	42.8
Khushuut Mandakh Nuur	3	171.1
	1	54.8–8.6

Source: MRPAM, 2017

FIGURE A1. HISTORICAL AUSTRALIAN COAL EXPORT PRICES, AUSTRALIAN DOLLAR PER MT



Source: Department of Industry, Innovation and Science (2017)

COPPER:**TABLE A2. GOVERNMENT FORECAST OF COPPER PRICE AND EXPORT IN BUDGET PLAN**

Copper	2017	2018	2019	2020
Export of copper concentrate, million tonnes	1371.3	1366	1340	1510
Market price (USD/t)	5149.8	5159.7	5148.9	5137.2
Equilibrated price (USD/t)	4599.4	4658.9	4725.5	4725.5

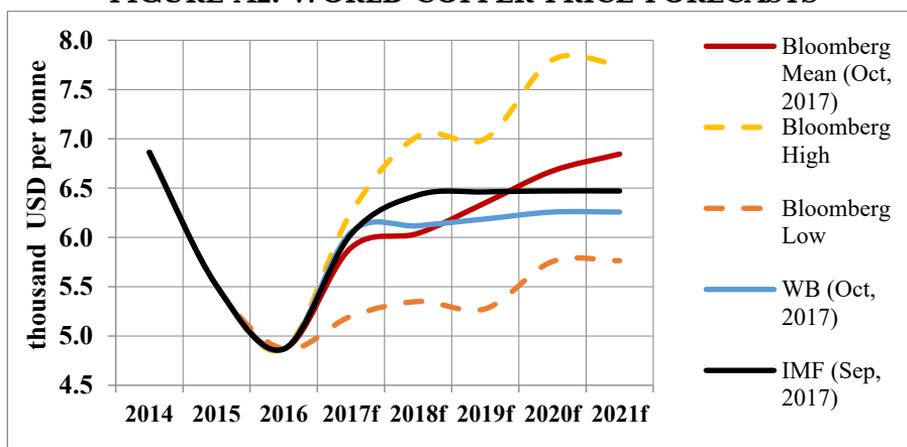
Source: Government of Mongolia

TABLE A3. MONGOLIA – SELECTED MINE PROJECTS

Mine	Primary company	Notes
Zuun Mod	Erdene (100%)	Project is at advance exploration stage; Resources – 218mnt
Sharchuluut Uul	Xanadu Mines (100%)	Project is in exploration phase; Resources – 2.4 mnt; Expected annual production – 20–25 mnt
Oyut Ulaan	Xanadu Mines (90%)	Project is in exploration phase
Tsagaan suvarga	Mongolyn Alt Group (100%)	Expected mining rate – 14.6 mnt/yr
kharmagtai	Xanadu mines (76.5%)	Resources – 203.4mnt
Oyu Tolgoi	Turquoise Hill Resources (66%) Government of Mongolia (34%)	Commercial production started in mid2013; Rio Tinto owns 50.8 percent investment in Turquoise Hill Resources Ltd which in turn owns 66 percent of Oyu Tolgoi. Mongolia has approved the nearly USD 5bn expansion at the mine; Total Reserves – 995 mnt. Latest Output: 450 thousand tonnes per annum.
Hutag Uul	Xanadu Mines (100%)	Reserves – 350 thousand tonnes; Project is in exploration phase
Alag Bayan	Central Asian Natural Gas Pipeline (70%)	Estimated Reserves – 1.9mnt
Khuvyn Khar	Erdene (100%)	Operations to start in 2014. No output figures as yet
Altan Nar	Erdene (100%)	Project is at advance exploration stage; Indicated Resources

Source: BMI, Mongolia Mining Report Q4 2017

FIGURE A2. WORLD COPPER PRICE FORECASTS



Source: WB, IMF, Bloomberg

GOLD:

TABLE A4. HISTORICAL DATA FOR WORLDWIDE GOLD DEMAND (TONNES)

	Q1' 16	Q2' 16	H1' 16	Q1' 17	Q2' 17	H1' 17	YoY % change	
Jewelry	475.5	446.8	922.4	486.7	480.8	967.4	▲	5
Technology	76.4	80.1	156.4	78.7	81.3	160.0	▲	2
Electronics	59.9	63.0	122.8	62.3	64.3	126.6	▲	3
Other Industrial	11.9	12.5	24.5	12.1	12.7	24.7	▲	1
Dentistry	4.6	4.6	9.1	4.3	4.3	8.7	▼	-5
Investment	607.1	450.3	1057.4	402.8	296.9	699.6	▼	-34
Total bar and coin	265.1	212.9	478.0	290.9	240.8	531.7	▲	11
Physical Bar demand	203.6	153.7	357.3	233.6	176.4	409.9	▲	15
Official Coin	49.2	46.2	95.4	42.8	46.6	89.3	▼	-6
Medals/Imitation Coin	12.2	13.1	25.3	14.6	17.9	32.5	▲	28
ETFs	342.0	237.4	579.4	111.9	56.0	167.9	▼	-71
Central banks	104.1	78.4	182.5	82.2	94.5	176.7	▼	-3
Gold demand	1263.1	1055.6	2318.7	1050.4	953.4	2003.8	▼	-14
LBMA Gold Price, USD/oz	1182.6	1259.6	2442.2	1219.5	1256.6	2476.1	▲	1

Source: World Gold Council

TABLE A5. HISTORICAL DATA FOR GOLD SUPPLY (IN TONNES)

	Q1'16	Q2'16	H1'16	Q1'17	Q2'17	H1'17	YoY % change
Mine production	768.5	793.8	1,562.30	766	791.2	1,557.10	▼ 0
Net producer hedging	48.5	24	72.5	— 17.5	—5	—22.5	— —
Recycled gold	360	342.5	702.5	283.2	279.7	562.9	▼ — 20
Total supply	1176.9	1160.3	2337.3	1031.6	1065.9	2097.5	▼ — 10

Source: World Gold Council