Impact of COVID-19 on Mongolian Mining Sector

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Abstract

The COVID-19 pandemic had devastating global and domestic economic and health impacts. While these effects are broadly understood, the impact of COVID-19 on the Mongolian mining sector, a key economic sector, remains unclear. This study attempts to bridge this gap in knowledge by analyzing relevant secondary data, conducting a survey from mining companies as well as simulating possible near-term economic outlooks using a recursive dynamic CGE model.

The study concluded that the slowdown of the Mongolian mining sector was a driving force behind overall economic slowdown during the COVID-19 pandemic. The mining sector was affected by various external and internal shocks including fluctuations in Chinese demand, price shocks and COVID-19 related government restrictions. Most of the surveyed mining companies reported decreases in both sales and production, coupled with numerous labor, production, and transportation issues due to COVID-19 related restrictions. While there were differences depending on the commodity the mining companies produced, most were optimistic about future recovery.

As the study found that post-COVID-19 economic recovery will be closely linked to mining sector recovery, we simulated 3 alternative scenarios of mining sector recovery using an in-house CGE model. Overall, the simulation results highlighted the detrimental economic effect of continued pandemic conditions and the need to diversify the Mongolian economy beyond mining. In light of these findings, the government must balance the consequences of COVID-19 related measures on the mining sector with containing the pandemic.

Key words: COVID-19, Mining, CGE model, Mongolia

Contents

Abbreviations

ADB	Asian Development Bank
BoM	Bank of Mongolia
CES	Constant elasticity of substitution
CET	Constant elasticity of transformation
CGE	Computable general equilibrium
CIT	Corporate Income Tax
EAP	East Asia and Pacific region
EITI	Extractive Industries Transparency Initiative
EMC	Erdenet Mining Corporation
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GoM	Government of Mongolia
GS-GM	Gashuun Sukhait - Gants Mod port
IMF	International Monetary Fund
MNT	Mongolian Togrog
NSO	National Statistics Office of Mongolia
OT	Oyu Tolgoi
PIT	Personal Income Tax
SAM	Social Accounting Matrix
SMEs	Small and Medium Enterprises
SOE	State Owned Enterprise
TFP	Total factor productivity
USD	Unites States Dollar
ADB	Asian Development Bank

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1. Introduction

The COVID-19 pandemic continues to have a devastating impact on global health and the overall economy, with the global economy contracting 3.3% in 2020 as a result. The effect was largely felt by the manufacturing and retail sectors especially in countries that rely on foreign trade and exports. Among this, the mining sector remains an interesting case. On one hand, the mining sector was negatively affected by COVID-19 related lockdowns and restrictions that ultimately led to costly disruptions in operations. However, on the other hand, policy efforts to boost economic recovery via supporting infrastructure projects in emerging market economies, particularly China, have led to unexpectedly high commodity prices for coking coal, copper and iron ore. Similarly, high global uncertainty has supported gold prices and investment demand. Due to these international developments, many resource dependent countries, including Mongolia, have expected the mining sector to spearhead economic recover amidst the COVID-19 pandemic.

While these effects are broadly understood, a detailed study of the impact of COVID-19 on the mining sector in Mongolia is still needed. In this study, we ask exactly how the mining sector was affected and how it might continue to be affected moving forward. This is especially important considering the mining sector's contribution to the state budget coupled with the fact that the mining sector was not included in any of the economic stimulus packages put forth by the government of Mongolia (GoM) but is in fact expected to finance these measures.

To understand the impact of COVID-19 on the Mongolian mining sector, we first looked at macroeconomic indicators such as GDP and sectoral production to gauge how the economy overall was affected. We then turned to fiscal policy, monetary policy and mining specific measures implemented by the GoM during this period and their future implications on the mining sector and overall economy. These findings seem to suggest that while the Mongolian mining sector was negatively affected by COVID-19 in early 2020, production and exports recovered in the second half of 2020 as restrictions eased and world mineral commodity prices rose.

However, to gather additional information beyond secondary data, we turned to mining companies directly to understand exactly how their production, sales and financial operations were impacted by COVID-19 and its related measures. We surveyed 252 mining companies on their operations during the pandemic, the responses they took as well as their future perceptions. The findings from the survey portray a bleaker picture than the one painted from secondary data alone as many companies mentioned facing numerous labor, production and transportation issues due to COVID-19 related restrictions. Most, however, are optimistic about future recovery despite these setbacks.

In order to gain a better understanding of possible near-term developments, we created a dynamic CGE model to analyze 3 possible ways the mining sector, and in turn the overall economy, may develop in the next 2 years. While the first scenario looked at the economic impact of smooth mining sector recovery where COVID-19 remained under control, the second scenario looked at the possible effects of an increased outbreak in 2021 followed by recovery in 2022. The final scenario looked at the effects of significant mining sector growth in 2021 followed by diminished output in 2022 as post-COVID-19 recovery waned. The findings from the scenario simulations prove just how integral mining sector growth is to economic recovery post-COVID-19 as economic growth in both alternate scenarios were significantly lower than in the smooth recovery scenario.

2. COVID-19 in Mongolia

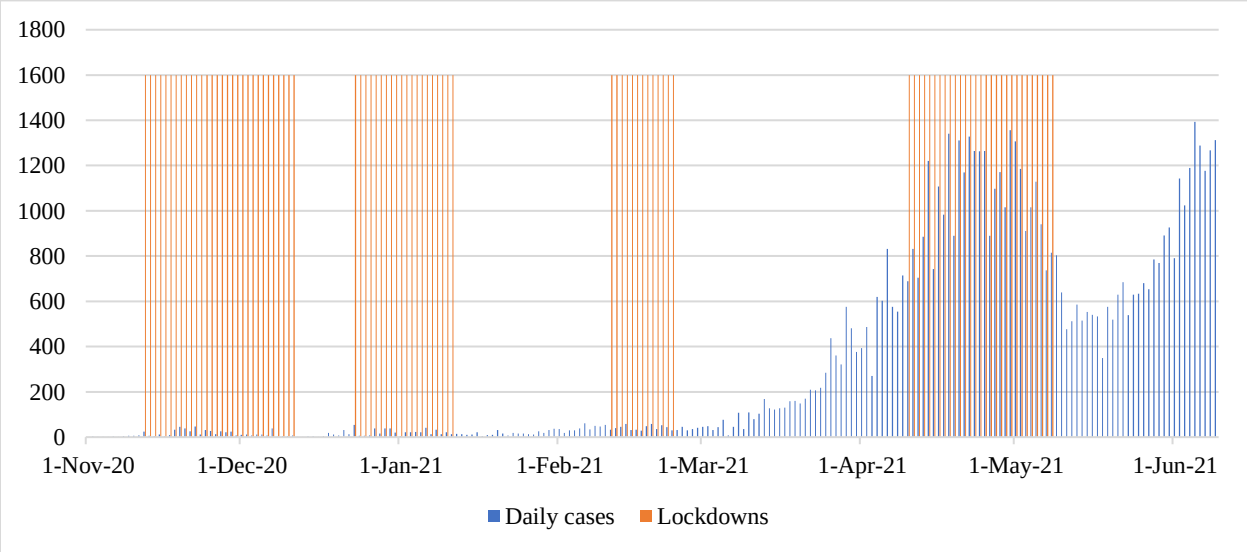
2.1 Current situation of COVID-19 in Mongolia

The Government of Mongolia (GoM) took timely and active measures against the COVID-19 pandemic since its initial outbreak in December 2019 in China. Despite Mongolia's reliance on trade with China, the government closed its border with China in addition to closing schools and restricting public meetings as early as January 2020. This was later enhanced to a closure of borders to other countries with cases of COVID-19. Eventually only Mongolian nationals were allowed to enter. These emergency measures were extended multiple times with additional measures like suspending movement between provinces and Ulaanbaatar during holidays such as Lunar New Year. Despite these strict restrictions, on March 10, 2020, the first COVID-19 case was reported from a visiting French national.

Initially, the first cases of COVID-19 were from Mongolian nationals coming back home or foreigners who were in quarantine. The first domestic case of COVID-19 outside of quarantine was reported on November 11, 2020. Following this, the GoM declared a state of national emergency, severely limiting non-essential activities until December 11, 2020. The city of Ulaanbaatar implemented another strict lockdown at the end of December until January 11, 2021, in order to limit possible spreading events coinciding with the New Year's holiday season. During this time, the daily number of new cases of COVID-19 remained below 50, usually ranging from 10 to 30 cases. Similar to the decision to preemptively limit anticipated movement, the GoM announced another nationwide lockdown from February 11, 2021 to February 23, 2021, coinciding with Lunar New Year holidays. This measure was particularly aimed at reducing travel between provinces and Ulaanbaatar as many people travel to the countryside to celebrate the holiday with their families (see Figure 1).

However, the cases of COVID-19 began ramping up steadily, escalating in March 2021 where the recorded instances of new cases reached well over 100. This led to the imposition of another strict lockdown from April 10, 2021 to May 8, 2021. Currently, as of June 8, the total number of cases of COVID-19 in Mongolia reached 67,710 and 54,713 recovered (Ministry of Health, 2021).

Figure 1. Daily cases of COVID-19 and imposed lockdowns



Source: NSO, Ministry of Health

Since February 2021, the Mongolian government has begun its vaccination program, offering free vaccinations to essential workers first. The government obtained vaccine donations from India, China, Russia and through the COVAX program. While there was a brief break in the number of vaccinations

due to a delay in vaccine shipments in mid-April, Mongolia's vaccination program has been going well with 1.85 million people (about 85% of citizens aged above 18 years old) vaccinated with their first dose and 1.45 million people (about 67% of citizens aged above 18 years old) vaccinated with their second dose by June 2021 (NSO, 2021).

2.2 Measures implemented by the Government of Mongolia

The Mongolian economy contracted 10.7% and 9.1% in the first and second quarters of 2020, respectively. Considering the economic slowdown, starting from March 2020, the GoM implemented expansionary fiscal and monetary policies to mitigate the negative impact of COVID-19. The GoM approved the COVID-19 Prevention Law in April 2020 (Legalinfo, 2020). The COVID-19 Prevention Law regulated the issues to be solved by the GoM, the State Emergency Commission and other relevant government agencies (Batzorig, 2020). In particular, it gave the GoM the authority to take COVID-19 prevention measures it deemed necessary, including lockdown measures, traffic restrictions and other procedures to be following during the pandemic.

The GoM first declared a state of high alert preparedness on February 13, 2020. The state of high alert preparedness was reduced to a state of daily preparedness on September 15, 2020. However, the GoM declared the state of all-out preparedness four times within a period of three months[1] between January 11 and mid-May 2021 following the first domestic case of COVID-19.

During the state of high alert preparedness, international travel as well as the operations of educational facilities, non-food trade, entertainment services, conferences and non-essential services such as restaurants, bars, and cinemas were restricted. Moreover, holidays such as New Year, Lunar New Year and Naadam were cancelled. In other words, the GoM implemented strict restrictive measures intended to restrict physical interactions and public gatherings. Meanwhile, during the state of all-out preparedness (strict lockdown), only essential activities such as health and defense services and food manufacturing and trading were allowed to operate within a limited timetable.

Fiscal measures

In 2020, the government implemented two stimulus packages totaling MNT 6 trillion to prevent the spread of the COVID-19 pandemic, revive the economy and support people's livelihood. In March 2020, the GoM announced the first economic stimulus package worth MNT 5.1 trillion. The first economic stimulus package increased healthcare expenditure and was focused on supporting businesses and households affected by the pandemic. This included measures to increase child money allowances and unemployment benefits, exemptions on corporate income tax (CIT), personal income tax (PIT) and social security contributions until the end of September 2020, and increased credit guarantees to SMEs and soft loans from the Development Bank to cashmere producers. In May 2020, the GoM then introduced its second economic stimulus package, largely focused on protecting vulnerable groups. This package included provisions to further increase child money allowances, food stamp allowances as well as social welfare pensions for vulnerable groups. The duration of fiscal measures included in these two stimulus packages were extended several times. The government plans to continue to implement some of these fiscal measures, including child money allowances, increased welfare, the gradual reduction of social insurance premiums and the exemption from tax penalties and fines, into 2021.

[1] Details: first lockdown in Ulaanbaatar (November 12, 2020 to December 11, 2020, 30 days), second lockdown in Ulaanbaatar (December 23, 2020 to January 11, 2021, 20 days), third lockdown in Ulaanbaatar (February 11, 2021 to February 23, 2021, 13 days), nationwide lockdown (April 10, 2021 to May 8, 2021, 28 days)

In December 2020, the GoM announced its decision to exempt households and businesses from utility payments. These exemptions will be in effect from December 2020 to July 2021. Government organizations, state-owned enterprises (SOEs), mining companies, wholesalers, retailers and alcohol producers were not included in this package. Erdenet Mining Corporation (EMC), one of Mongolia's largest SOEs, is expected to finance the MNT 650 billion needed to implement the utility exemption. Additionally, between December 2020 and April 2021, the price of improved briquettes was reduced 75% and Erdenes Tavan Tolgoi JSC funded the MNT 69 billion needed to implement the discount.

Before the latest round of strict lockdown in April, the GoM made the decision on April 10, 2021 to give each citizen MNT 300 thousand in order to help those negatively affected by the pandemic. It was mentioned that this expenditure was financed by tax payments made by Oyu Tolgoi (OT), a major copper mine in Mongolia (Anudari, 2021). Thus, mining companies played a part in financing government relief measures.

Monetary policy measures

The Bank of Mongolia (BoM) continually implemented monetary policy easing throughout the pandemic to keep the financial sector stable and promote economic growth. For instance, the BoM gradually decreased the policy rate by 5 percentage points to 6% and the reserve requirement by 4.5 percentage points to 6%. In light of decreased household income and the rising number of non-performing loans, existing borrowers were allowed to defer their principal and interest payments for consumer loans by up to 12 months and mortgage loans by up to 6 months (Bank of Mongolia, 2020).

In addition to the fiscal and monetary measures mentioned above, the GoM began implementing a comprehensive MNT 10 trillion medium-term plan in cooperation with the BoM to protect the health of its citizens, preserve jobs and revive the economy during a period of economic difficulty between 2021 and 2024. This includes soft loan programs to support jobs and agriculture, a youth employment program, a repo program, housing programs and the development of strategically important projects[2]. The size of the stimulus in 2021 is estimated at 5% of GDP and will be partially financed by the BoM.

Measures to support the mining sector

As the measures above show, the GoM has not implemented any COVID-19 related relief measures aimed at aiding the mining sector. In fact, many of the decisions by the government, such as border closures with China, Mongolia's largest trade partner, greatly disrupted the sales and transportation of mineral commodities. For instance, due to border closures, coal exports through the Gashuun Sukhait port were initially halted between February 10 and March 23, 2020, with only limited exports allowed after (70 coal trucks per day carrying 80 tonnes of coal each). Further, railway transportation to China and Russia were also reduced. Measures to reenergize mineral commodity exports were introduced in early April 2020 when the GoM realized the negative effects of border closures.

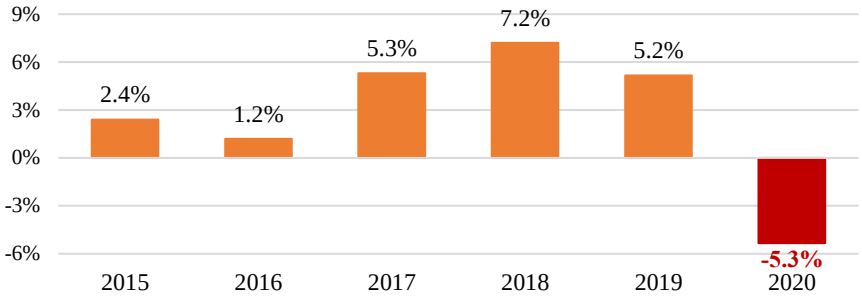
In light of the significance of the mining sector and the impact of its slowdown, the GoM approved the "Green Gateway" regulation in August 2020. The regulation was aimed at reviving trade, promoting economic cooperation, and moving large-scale projects and programs forward during the pandemic. The regulation allowed freight vehicle drivers to cross Mongolian and Chinese border checkpoints and enabled engineering and technical workers to travel between the countries. This greatly impacted coal exporters and around 1800-2000 trucks passed through the Gashuun Sukhait, Shivee Khuren, Khangi and Yarant ports per day in August. On August 26, 2020, a total of 2233 trucks passed through the ports, the highest recorded amount for a single day. In comparison, the highest number of trucks to cross the border in 2019 was 2138 trucks on March 13, 2019 (Gogo, 28 August 2020).

[2] Please refer to the Appendix for details.

2.3 Impact of COVID-19 on the Mongolian economy

The Mongolian economy was adversely impacted by the COVID-19 pandemic with real GDP, which has been consistently growing for the past decade, falling 5.3% year-on-year to MNT 18 trillion (in 2010 constant prices) in 2020.

Figure 2. Real GDP growth



Source: NSO

The economic slowdown can be attributed to contractions in almost all sectors with only the agriculture sector contributing positively to GDP. For instance, the mining sector contracted 9.4% year-on-year, accounting for a 2% decline in total GDP. The contraction of the mining sector was due to a decline in exports as a result of border closures and inter-city travel restrictions coupled with lower demand due to global economic slowdown. Similarly, the services sector shrank 7.1% year-on-year with the implementation of strict lockdowns and measures to restrict physical interaction and public gatherings including the closure and suspension of non-essential services such as cinemas, restaurants, bars, shopping centers and educational facilities. The trade and transportation subsectors were most affected, falling 11.1% and 20.1% year-on-year, respectively. As a result, the services sector accounted for 3% of the total decline in real GDP. Furthermore, lower demand due to overall economic slowdown coupled with tax exemption measures led to a 9.8% year-on-year contraction of net taxes on products.

Table 1. Sectoral contribution to Real GDP growth, %

	Real GDP growth	Sectoral contribution to real GDP growth
Real GDP growth	-5.3	-5.3
Agriculture	6.2	0.8
Manufacturing	-1.1	-0.1
Mining	-9.4	-2.0
Service	-7.1	-3.0
Net taxes on product	-9.8	1.1

Source: NSO

From the demand side, total final consumption contributed 3.8 percentage points and net exports contributed 10.1 percentage points to total GDP in 2020. On the other hand, total capital accumulation contributed -19.3 percentage points and caused total GDP to decline. Despite decreased labor income as a result of lockdowns and other restrictions, household consumption grew 16% year-on-year thanks to increased welfare and benefits given by the GoM in addition to income tax exemptions. Household income from pensions and benefits increased 37% year-on-year and accounted for 24% of total household income, compared to 19% of household income in 2018-2019. Moreover, government consumption increased 2.7% year-on-year due to higher health and defense expenditure.

Table 2. Real GDP growth by expenditures

	Real GDP growth	Sectoral contribution to Real GDP growth
Real GDP growth	-5.3	-5.3
Government consumption	2.7	1.6
Household consumption	16.0	2.2
Gross capital formation	-42.5	-19.1
Net exports	-48.1	10.0

Source: NSO

In 2020, total foreign trade turnover decreased 6.4% from the previous year due to the pandemic. On one hand, total exports fell 0.6% year-on-year due to lower external demand and border crossing disruptions. Within this, mineral commodity exports fell 17.6% year-on-year with coal exports decreasing 30.9 %, oil exports 58.8%, fluorspar exports 23.5%, and zinc concentrate exports by 11.3 %, respectively. These decreases were partially offset by increased gold and iron ore exports as gold exports experienced a 4-fold increase year-on-year as producers rush to make the most of global price hikes. Finally, non-mining exports decreased 37.5% year-on-year due to diminished domestic production and issues with border closures.

On the other hand, total imports of goods and services fell 13.6% year-on-year, valued at USD 5.3 billion, in 2020. Lower imports can be attributed to lower demand stemming from a decrease in mining production and a decline in imports of gasoline, diesel fuel, automobiles, machinery, and their parts due to the domestic economic slowdown caused by lockdown measures. However, as imports fell more than exports, the net export deficit was improved. In particular, the net export deficit decreased 48.1% year-on-year and contributed 10.1 percentage points to total GDP in 2020.

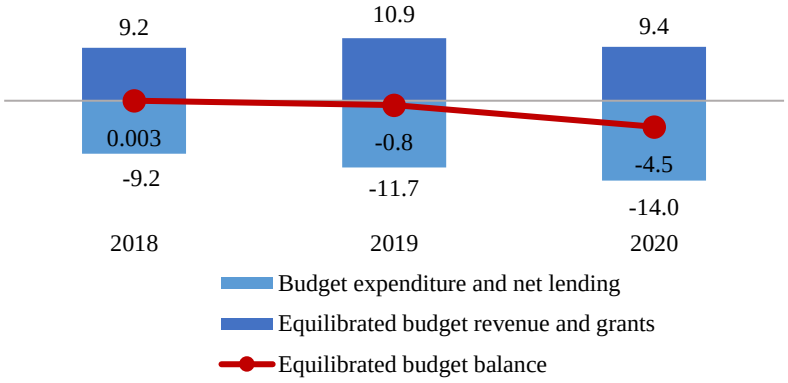
Annual inflation remained low at 2.3% at the end of 2020. More specifically, while food prices increased 8.5% year-on-year, as the prices of other goods and services remained stable, the overall inflation rate was low. Due to the domestic outbreak of COVID-19 and strict lockdown measures, the government reduced the price of coal briquettes by 75% for households in Ulaanbaatar. Additionally, the government purposefully kept domestic fuel prices stable. As a result, the average price of fuel and electricity decreased by 7.3% year-on-year. This offset the increase in food prices and overall inflation remained low.

The Bank of Mongolia decided to lower the policy rate to 6% in November 2020[3] and as of the end of 2020, annual money supply grew 16.3% year-on-year. However, this is well below the average growth rate of 20% observed between 2016 and 2019. Moreover, commercial bank lending rates were also low, reaching no higher than 15% per annum.

As for the government budget, the equilibrated budget balance reported a deficit of MNT 4.54 trillion, or 12.3% of nominal GDP, at the end of 2020. During the COVID-19 pandemic, budget revenues declined by 13.6% due to economic slowdown, declining exports and tax exemptions while expenditures increased by 19.7% due to fiscal measures and stimulus packages implemented by the government. In 2020, the government implemented two stimulus packages totaling MNT 6 trillion to combat the spread of COVID-19, revive the economy and support people's livelihood. As a result, the budget deficit widened.

[3] Monetary Policy Statement: https://www.mongolbank.mn/eng/news.aspx?tid=1&id=2682

Figure 3. State budget indicators, trillion MNT



Source: NSO

A vital source of budget revenue is the mining sector. While mining production decreased in 2020, the sector's contribution to budget revenue remained high, accounting for 25.7% of total budget revenue (MNT 2.67 trillion). As mentioned in previous sections, several mining companies provided non-budget financial assistance to the GoM to implement COVID-19 related measures such as utility payment exemptions for households and businesses.

As the budget deficit widened due to the pandemic, the state's debt pressure is likely to increase in upcoming years. In 2020, total government debt increased 15.3% year-on-year reaching MNT 27.9 trillion at current value. During the year, the government received new foreign project and program loans to combat the adverse impact of the COVID-19 pandemic. Additionally, due to economic difficulties and budgetary conditions, a new "Nomad" bond was issued on the foreign market to fully finance the "Mazaalai" bond which was scheduled to mature in 2021 and partially finance a small portion of the "Chinggis" bond maturing in 2022. In other words, the bonds which were scheduled to mature within the next two years were refinanced and replaced with the new bond.

Table 3. Government debt outstanding, billion MNT

	2018	**2019**	**2020**
Domestic debt	1,564.7	1,399.6	1,136.6
External debt	18,865.6	20,728.1	24,848.1
Government loan guarantee	1,130.7	1,076.3	1,060.4
Build-transfer concession loan	806.0	995.7	850.2
Total debt, current value	22,367.0	24,199.7	27,895.4
Year-on-year change, %	-1.7%	8.2%	15.3%
Total debt (NPV)	18,955.9	20,525.6	23,024.3
Total debt (NPV)/GDP	58.5%	55.1%	62.3%

Thus, in addition to the economic difficulties which are likely occur post-COVID-19, the GoM will also have to repay government bonds scheduled to mature in the next two to three years.

2021 Forecast

While Mongolia experienced above average economic contraction during the COVID-19 pandemic, its economy is expected to recovery significantly in 2021 (World Bank, 2021). According to the ADB's Asian Development Outlook, Mongolian GDP is expected to rebound 5.1% in 2021 (ADB, 2020). Similarly, the IMF forecasts a real GDP growth rate of 5% in 2021 (IMF, 2021).

These optimistic projects are based on a variety of factors. Namely, rising mineral commodity prices, China's strong economic growth, fiscal and monetary easing and vaccinations are all expected to have a positive impact on the economy. Easing of GoM regulations, particularly in regard to border closures, are also expected to boost mineral exports as talks of lifting the international travel ban will facilitate FDI and aid the operations of large mining companies such as OT (Ch. Ariunbold, 2021).

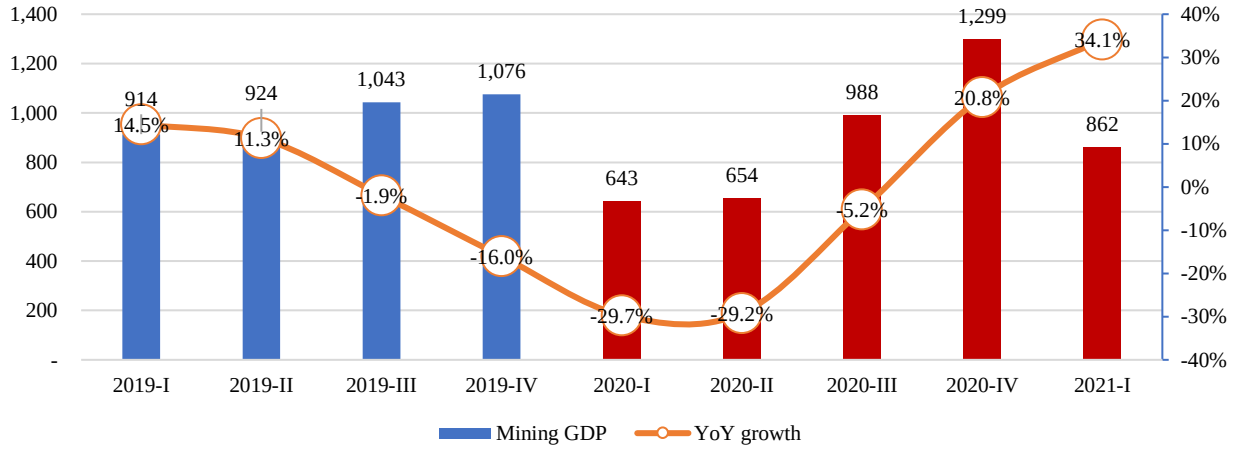
As for possible near-term risks, factors such as the spread of the virus, slower vaccination, and lower than anticipated global and regional economic recovery may curb Mongolia's economic growth. Currently, Mongolia has started its vaccination campaign and has plans to reach full vaccination by July 2021 (World Bank, 2021). Additionally, other domestic risks still persist. These include unemployment, unstable finances and deepening balance of payment pressures (ADB, 2020). Debt burdens are particularly salient as many of the GoM's relief measures have continued into 2021, adding to budgetary pressures while government bond repayments are expected in the near-term.

2.4 Impact of COVID-19 on the Mongolian mining sector

One of the most important economic sectors in Mongolia is the mining sector. It accounts for more than 20% of Mongolia's GDP per annum, 25% of government budget income, 80% total exports and is a vital source of foreign currency and foreign investment. As mentioned in the previous section, the mining sector's deceleration in 2020 was a major factor in Mongolia's economic slowdown. In 2020, real GDP of the mining sector decreased 9.4% year-on-year down to MNT 3.58 trillion and accounted for 22% of national GDP and 71% of total manufacturing sector production (for a quarter-by-quarter breakdown, see

Figure ***4***).

Figure 4. Mining sector real GDP (billion MNT) and YoY growth (%)



Source: NSO

Since the outbreak of the COVID-19 pandemic in late 2019, Mongolia's production of key mineral commodities was decreased drastically. Most pressingly, the production of coal and crude oil fell 21.3% and 40.3% year-on-year in 2020. This was largely due to disruptions in operations and transportation as a result of COVID-19 related government regulations. However, it was somewhat mitigated by an increase in the production of gold and iron ore as producers rushed to make the most of global price hikes. The table below shows the annual production of key commodities.

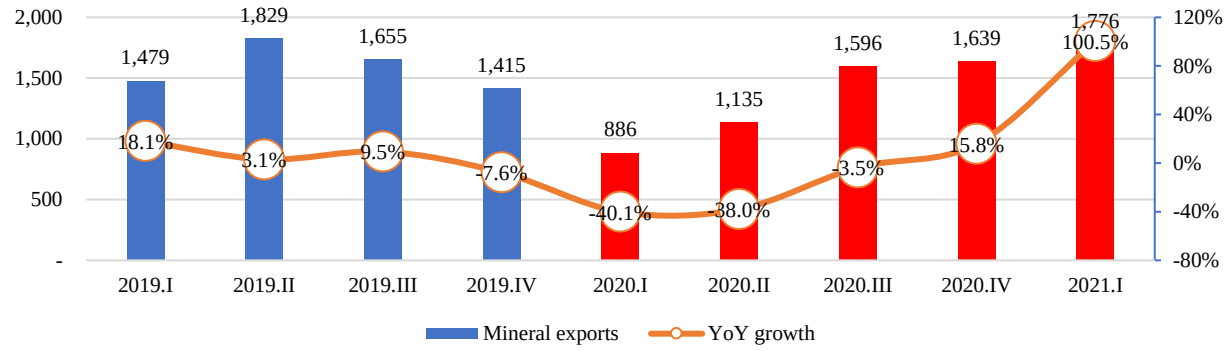
Table 4. Production of key commodities, 2019-2020

	2019.I	2019.II	2019	2020.I	2020.II	2020	YoY change, %
Coal, thou.tonnes	24,954	25,880	**50,833.7**	12,474	27,509	**39,982.7**	**-21.3**
Crude oil, thou.barrels	3,362	3,514	**6,875.9**	1,027	3,078	**4,104.9**	**-40.3**
Copper concentrate, thou.tonnes	682	581	**1,262.4**	626	649	**1,275.7**	**1.1**
Gold, kg	5,537	10,715	**16,251.3**	7,851	12,375	**20,225.3**	**24.5**
Iron ore, thou.tonnes	5,282	6,677	**11,958.7**	6,078	7,862	**13,940.7**	**16.6**

Source: NSO

With the outbreak of the COVID-19 pandemic, the mining sector's exports decreased significantly due to external and internal shocks, especially in the first half of 2020 (for a quarter-by-quarter breakdown of mineral exports, see Figure 5). External shocks include fluctuations in Chinese demand, a drop in FDI inflow into the mining sector and global price shocks. Meanwhile, internal shocks include production and transportation disruptions caused by measures implemented by the GoM. Overall, total mineral exports except gold decreased 17.6% year-on-year in 2020.

Figure 5. Mineral exports except gold, million USD



Source: NSO

In the first two quarters of 2020, mineral exports except gold decreased 38% to 40.1% year-on-year. The drop in mineral exports in the first half of 2020 was mainly due to decreased exports of coal and copper caused by the border closures of the Gashuun Sukhait and Shivee Khuren ports in February and March coupled with decreased Chinese demand. Following the COVID-19 shock in the first quarter, strong recovery in Chinese demand in the second half of 2020 led to higher copper and iron ore consumption as well as price hikes. As a result, the mineral exports increased 15.8% in the fourth quarter of 2020 (see Table 5).

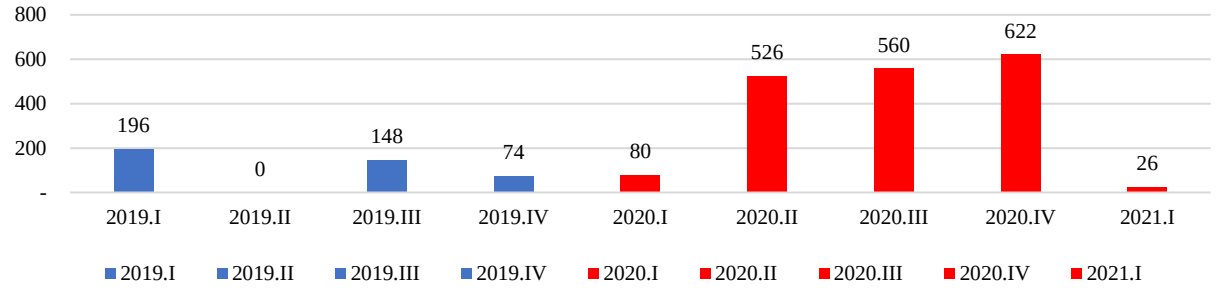
Table 5. Contribution to year-on-year growth of mineral exports, by mineral types, %

	2020.I	2020.II	2020.III	2020.IV	2021.I
Exports of mineral except gold	**-40.1**	**-38.0**	**-3.5**	**15.8**	**100.5**
Coal	-26.5	-25.2	-6.6	0.6	49.6
Copper concentrate	-10.3	-9.2	4.0	16.7	30.5
Iron ore	2.3	-0.2	0.6	1.6	11.0
Other minerals	-5.7	-3.3	-1.6	-3.1	9.4

Source: NSO

As for gold, Mongolia exported 30 tonnes of gold valued at USD 1.7 billion in 2020. This was a sharp 3-fold increase from the amount of gold exported in 2019. Gold exports in 2019 were significantly dampened by an increase in gold royalty rates from 2.5% to 5% in January 2019. This decision disincentivized gold producers and gold output in 2019 suffered as a result. By 2020, gold producers ramped up production again and many were keen to sell to the Bank of Mongolia due to high gold prices, increasing exports (for a quarter-by-quarter breakdown, see Figure 6). Globally, gold prices surged as overall uncertainty and perceptions of risk factors bolstered gold demand as a safe investment.

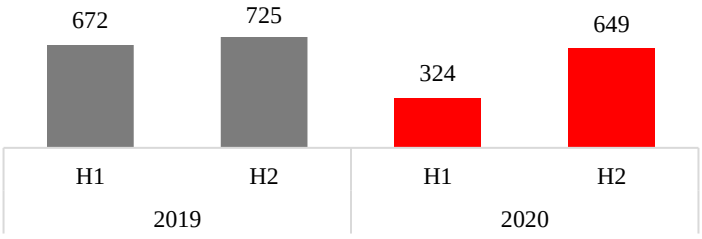
Figure 6. Gold exports, million USD



Source: NSO

According to company reports and operational updates from major coal producers including Erdenes Tavan Tolgoi, Energy Resources and South Gobi Sands, many mining companies have adjusted production levels in light of uncertainty surrounding COVID-19 prevention measures, particularly as it relates to border closures. Due to the border closures, coal exports were completely halted for over a month before a limited number of trucks were allowed to cross daily. In the first half of 2020, 324 trucks crossed the border per day, 2 times lower than the average observed in the first half of 2019. However, with the implementation of the "Green Gateway" regulation and strong Chinese demand, the number of coal trucks crossing the border per day reached 649 in second half of 2020. While this is still lower than the average number of truck crossings observed in the second half of 2019, it shows strong recovery (see Figure 7). As a result, coal export volumes increased 8.2% year-on-year in the second half of 2020. This implies that the volume of coal carried by each truck increased in the second half of 2020. Moreover, coal export prices reached USD 102 per tonne in the beginning of 2021. This is a significant increased compared to the average price of USD 77.2 per tonne observed in 2020 and can be attributed to the growth of China's manufacturing and infrastructure sectors. Owing to undisrupted border crossings and higher prices, revenue from coal exports increased almost 3-fold in the first quarter of 2021 as compared to the same period in 2020.

Figure 7. Average coal truck crossings via GS-GM per day, 2019-2020



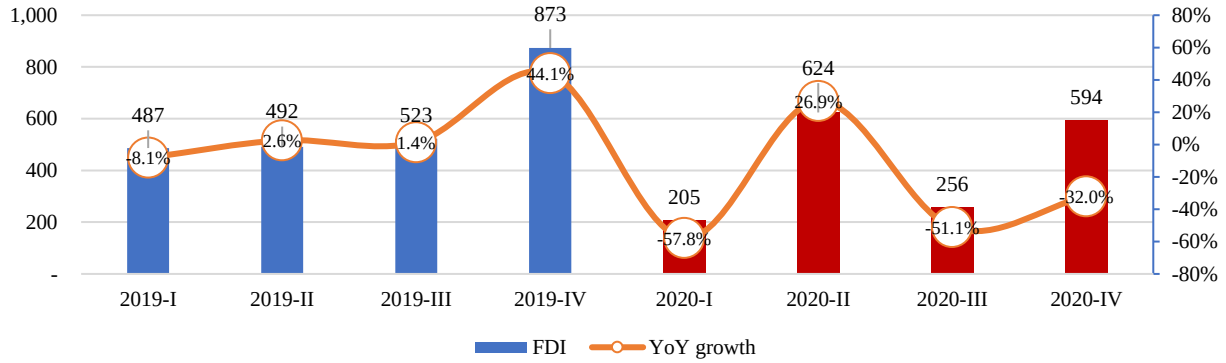
Source: MMC Annual Report, 2020

As for other mineral commodities, changes in copper and iron exports were mainly caused by fluctuations in Chinese demand and global market prices. In 2020, copper prices rose a staggering 73% from the lows

of March (USD 4,617 per tonne) to finish the year at USD 7,964 per tonne. Stimulus measures by many countries and the implementation of infrastructure and green investment programs boosted copper demand, causing price hikes in the last two quarter of 2020. The price increase fueled by growing demand continued into the first quarter of 2021 and copper concentrate exports almost doubled compared to the first quarter of 2020.

Another external negative shock caused by the COVID-19 pandemic was the lower inflow of FDI into the sector. In 2020, total FDI inflow into the mining sector was USD 1.68 billion, a 29.3% decrease compared to 2019. This was mainly attributed to a 17.4% decline (USD 228 million) in investment into OT's open-pit and underground development as a result of COVID-19 related restrictions (Turquoise Hill, 2021). According to OT, the main reason behind the slowdown of FDI into its underground mine was the GoM's travel ban that restricted the movement of foreign specialists (Oyu Tolgoi, 2021). Overall, FDI inflow into the mining sector decreased due to COVID-19 related restrictions coupled with the lower profitability of mining companies.

Figure 8. Foreign direct investment inflow into the mining sector, million USD



Source: Bank of Mongolia

Mining sector production and exports were also affected by labor regulations and restrictions as many mining companies opted to temporarily suspend operations in response to the pandemic. Moreover, in the third quarter of 2020, the number of people employed in the mining sector decreased 5.5% year-on-year as mining companies reduce operations. The restriction of movement between provinces and Ulaanbaatar as well as the international travel ban was a major negative shock to the mining sector.

In addition to analyzing secondary data and documents, the research team conducted a survey among mining companies in order to analyze the impact of COVID-19 on the Mongolian mining sector in more detail. The findings from the survey will be discussed in the next section. The survey was aimed at collecting primary data and was conducted in March and April 2021.

3. Impact at the Company Level – Findings based on the survey

As the largest sector of the Mongolian economy, fluctuations in the mining sector and its exports have a significant impact on the economy. The mining sector accounts for a substantial portion of the state budget and the impact of the pandemic on the mining sector is also important for future policy making. Despite its importance, the mining sector was not included in any of the economic stimulus packages and other measures put forth by the GoM. In fact, several large mining companies are already financing some government measures.

With this in mind, the research team decided to supplement the findings from secondary data with survey data from the affected mining companies. The main purpose of the survey was to analyze the impact of the COVID-19 on mining companies, their near-term expectations and policy perceptions.

To tackle this, the survey was divided into the following 2 parts:

- Impact of COVID-19 on the operations of mining companies
- Companies' response to and their perception of measures implemented by the GoM

This section will look the results from the survey and discuss the impact of COVID-19 on the mining sector at the company level.

Survey respondents

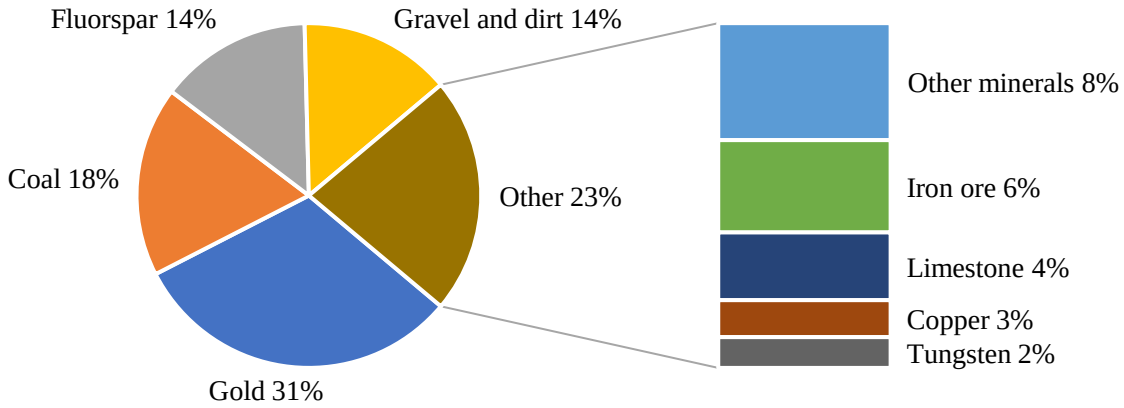
In light of the strict lockdown measures implemented by the GoM in April and May, the research team conducted phone surveys to follow social distancing regulations. We requested and obtained a full list containing the contact information of 2826 mining companies from EITI. The research team contacted each company on the list to take part in the survey. A total of 252 mining companies responded. The mining companies surveyed ranged in operational size from small to large companies. In terms of number of employees, 94.8% (238) of the surveyed mining companies has less than 100 employees while the remaining 5.2% has more than 100 employees. The biggest company that took part in the survey was EMC JSC with 6,586 employees.

Table 6. Surveyed mining companies by number of employees

Number of employees	Frequency	Percentage share, %
1-10	55	21.9
11-50	108	43.0
51-100	75	29.9
101-500	7	2.4
More than 500	7	2.8
Total	**252**	**100.0**

The survey covered a wide range of mining companies working with different types of mineral commodities. Out of the 252 mining companies that took part in the survey, 79 (31%) were gold mining companies, 45 (18%) were coal mining companies, 36 (14%) were fluorspar mining companies, 15 (6%) were iron ore companies and 6 were copper mining companies (see Figure 9).

Figure 9. Surveyed companies by mineral type



For more details on the mining companies surveyed, please refer to the Appendix.

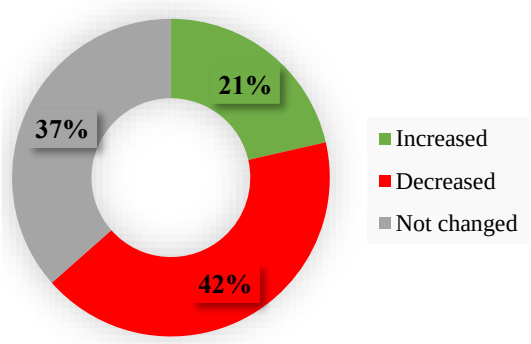
3.1 Impact of COVID-19 on operations

The impact of COVID-19 on operations was divided into 3 main categories: production, sales and financing. As COVID-19 throughout 2020, we considered the companies' 2020 indicators to reflect the impact of the pandemic. To measure the impact, we compared any changes in company indicators from 2019 to 2020 as well as the companies' performance of their 2020 implementation plans.

Impact on production

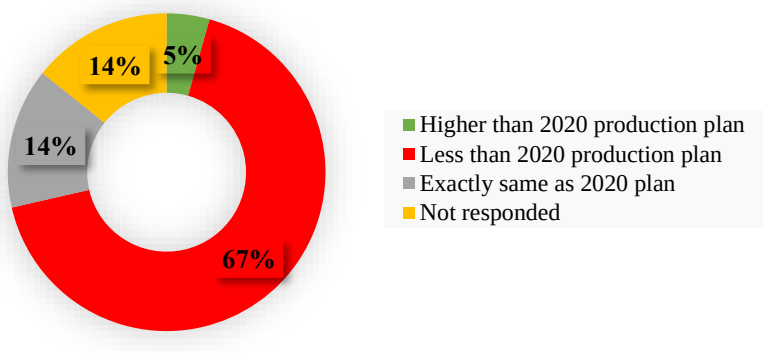
As shown in Table 4 in the section above, the COVID-19 pandemic had a significant impact on mineral production, particularly of coal and crude oil. The survey findings attest to the detrimental impact of the pandemic on mining companies' production. For instance, 42% (106) of the surveyed mining companies experienced a decrease in production in 2020 compared to 2019 (see Figure 10). Furthermore, 17.1% (43) of the surveyed mining companies reported completely stopping production in 2020. The median production decrease rate of these companies was 27.5%.

Figure 10. Year-on-year change of production



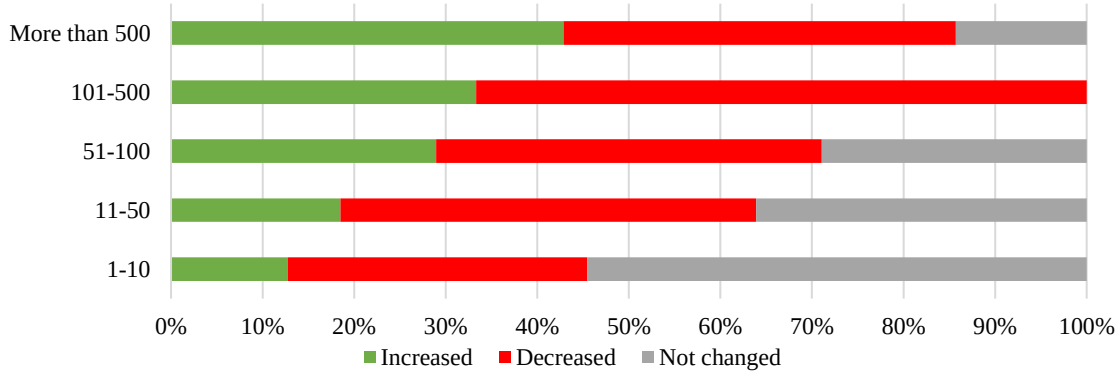
Other criteria that illustrated the negative impact of COVID-19 was the companies' lackluster performance of their 2020 production plan. For instance, 66.7% (169) of the companies included in the survey reported lower actual production than their anticipated 2020 production plan (see Figure 11). Overall, the surveyed mining companies were able to produce an average of only 65% of their 2020 production plan.

Figure 11. Performance of production plan of 2020



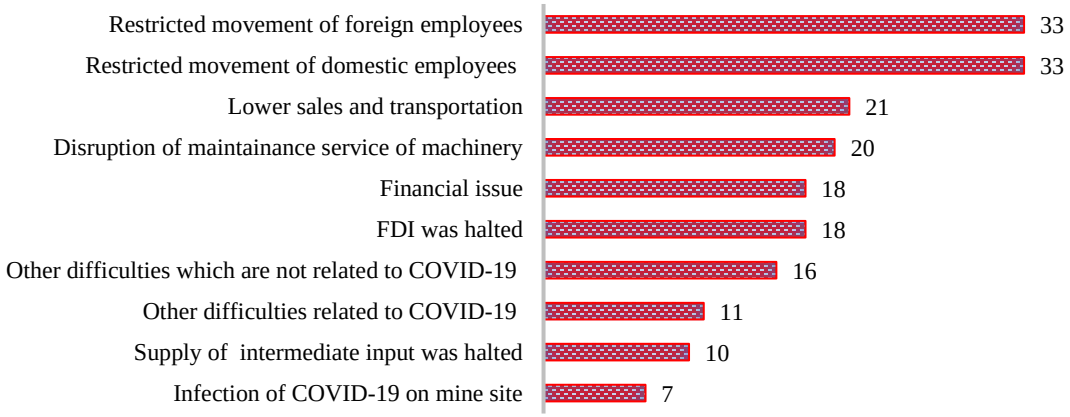
Disaggregated by the number of employees, smaller companies were more likely to report negative changes in production in 2020 as shown in the figure below. In other words, smaller companies made up a larger share of the companies that reported having lower or equal production levels as the previous year (see Figure 12). For larger companies with 500 or more employees, the share of companies that experienced an increase in production and a decrease in production are about the same.

Figure 12. Year-on-year change of production by number of employees



The main factors that contributed to the negative production shock in 2020 include domestic lockdowns, inter-city travel restrictions and border closures implemented throughout 2020. For instance, the leading causes of a decrease in production include restrictions on the movement of foreign and domestic employees involved in mining activities, decreased sales and transportation, and finance and investment issues (see Figure 13). These were the result of restrictive measures implemented by the GoM during the pandemic. Other difficulties not related to the COVID-19 pandemic include licensing issues with 12 respondents citing licensing issues as a potential cause of decreased production. Meanwhile, 3 companies reported intentionally reducing production in 2020 in order to ramp up production later.

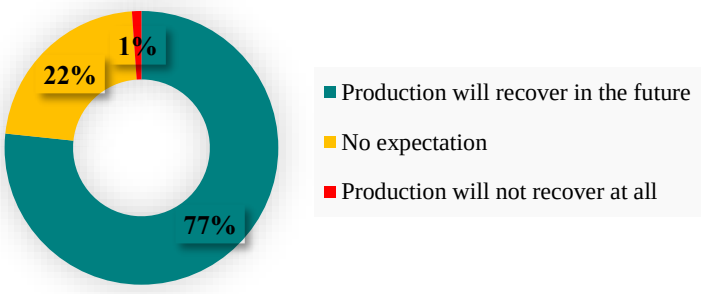
Figure 13. Causes of year-on-year production decrease by frequency, n=106



Although 2020 was a low year for the mining sector as a whole, this was not the case for all companies as several mining companies included in the survey reported enjoying increased production levels. For the companies that experienced production growth in 2020, the leading factors of the growth were improved geological and mining conditions, higher mineral commodity prices, and increased investment. Many gold companies, in particular, ramped up production in response to higher global prices owing to increased demand. Additionally, the removal of uncertainty caused by the increase in gold royalty rates in 2019 were also a factor[4].

The research team then clarified the near-term expectations of mining companies. Overall, the mining companies surveyed had positive expectations about future production even if they experienced difficulties due to COVID-19. For instance, out of the 89 mining companies that experienced a decrease in production in 2020, 77% (69) expected a recovery in production after COVID-19. On the other hand, 22% (20) of companies responded that they have no clear expectations about future production (see Figure 14). Only one company responded that production will not recover at all.

Figure 14. Expectation about future production recovery from companies that experienced a decrease in production in 2020, %



Companies with positive expectations stated that an average duration of 8-9 months will be required for production recovery. Half of the companies with positive expectations believed production will recover within half a year while the longest expected duration of production recovery after COVID-19 was 3 years. Despite these positive expectations, the situation of COVID-19 in Mongolia may worsen as the domestic infection rate shows no signs of falling.

[4] We will describe this in further detail in the "Gold market" section.

Impact on sales

With the exception of gold, Mongolia's mineral commodities are more geared towards exporting. Further, the sale of non-gold mineral commodities is highly dependent on transportation and border crossings. The results of the study show that the border closures implemented in 2020 hindered transportation and had a significant negative impact on the export sales of mining companies.

The majority (68.6%) of mining companies surveyed sold their mineral products to the domestic market while one-fourth of the surveyed mining companies exports their products to foreign markets (see Table 7). It is worth noting that most companies that sell their products to the domestic market are small and medium sized companies while larger mining companies opt to export their mineral commodities. 15 of the mining companies included in the survey stated that they sold products to both the domestic and foreign markets. Furthermore, 12 out of the 15 aforementioned companies that sold to both domestic and foreign markets reported selling the majority of their products to foreign markets while 3 mainly sold to the domestic market.

Table 7. Markets sold to by frequency

	Frequency	Share, %
Domestic market	173	68.6
Foreign market	64	25.4
Both	15	6.0
	252	100.0

The comparison between actual sales performance and mining companies' 2020 sales plans show how severely sales were impacted by the COVID-19 pandemic (see Figure 15). Of the 210 companies that disclosed their 2020 sales plan performance, 66.7% (168) reported lower than planned sales volumes. The average sales plan performance of the 210 mining companies that responded was 65%. In other words, companies were only able to sell about 65% of their planned sales in 2020. Moreover, 42% (107) of all surveyed companies reported a year-on-year decrease in sales in 2020 (see Figure 16). 39 companies even reported halting sales completely in 2020.

Figure 15. Performance of sales plan in 2020

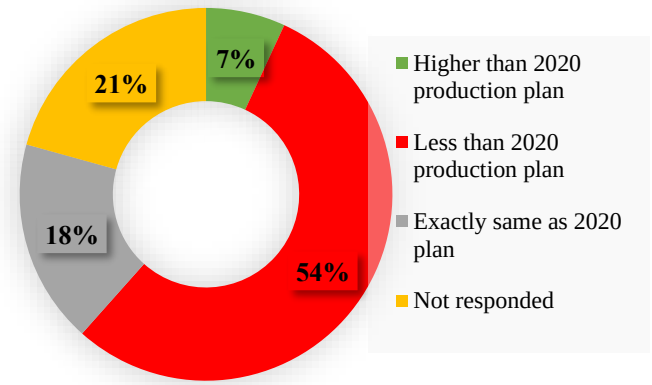
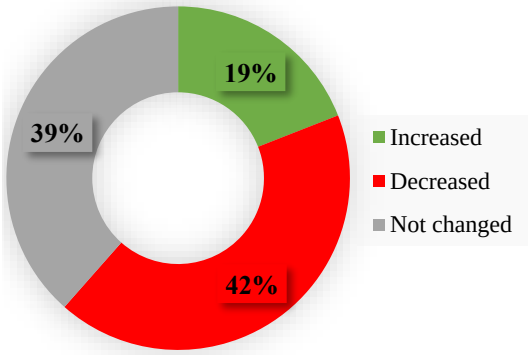


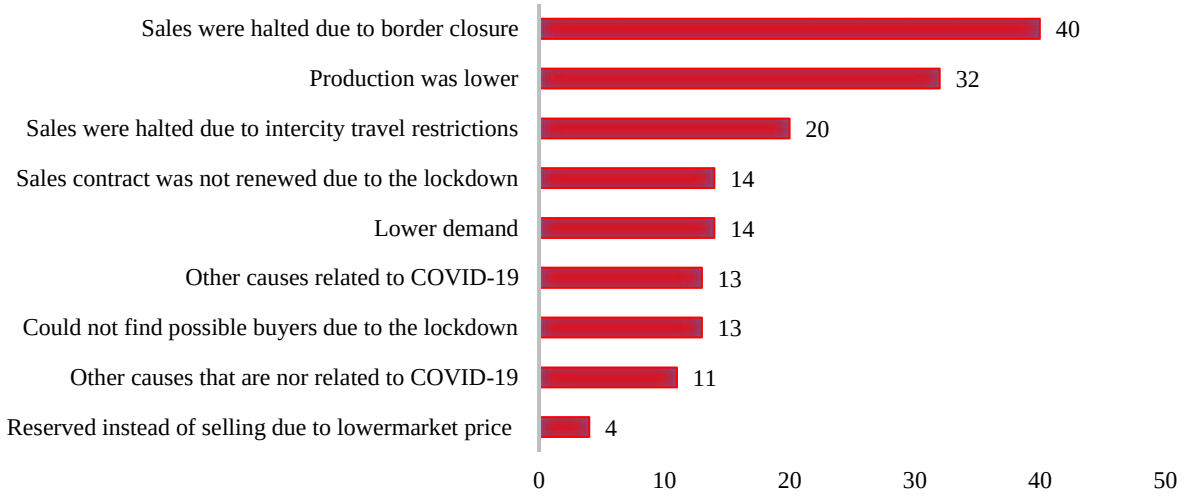
Figure 16. Year-on-year sales change of surveyed mining companies, %



As discussed above, the main causes behind the fall in sales include decreased transportation due to border closures and inter-city travel restrictions imposed by the GoM as well as lower demand and prices owing to a slowdown in manufacturing activity in 2020 (see Figure 17). Border closures were especially

challenging for coal and iron ore companies, many of whom experienced a halt in sales as a result of transportation difficulties[5].

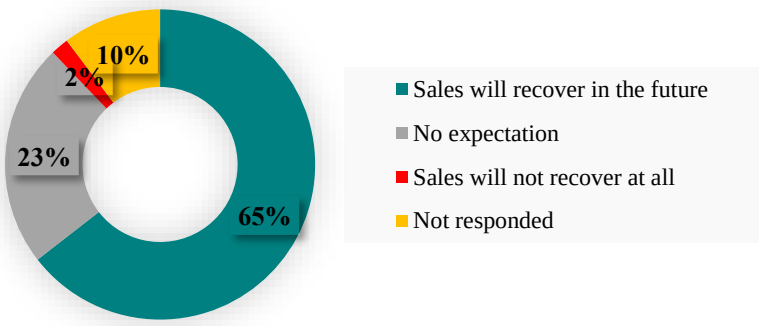
Figure 17. Causes of year-on-year sales decrease by frequency (n=107)



A few companies experienced a growth in sales in 2020 despite the negative impacts of COVID-19 (see Figure 16). Most of the mining companies that experienced an increase in sales were gold companies that were incentivized rising gold prices. The sales of gold companies were lower in 2019 due to the uncertainty associated with gold royalty regulations. Thus, the sales increase in 2020 was attributed to lower-than-normal sales in 2019. Other causes of the year-on-year growth in sales in 2020 include good geological conditions and increased ore grades.

Overall, the expectations of mining companies about future mineral commodity sales were the same as production expectations. For instance, out of the 107 mining companies that experienced a decrease in sales in 2020, 64% (68) expected sales to recover after COVID-19 (see Figure 18). 22% (25) of companies said that they have no clear expectation about future sales while only two company responded that sales will not recover at all.

Figure 18. Expectation about future sales recovery from companies that experienced a reduction in sales in 2020, %



Companies with positive expectations believe an average duration of 8 months will be required for sales recovery after COVID-19. In particular, half of the companies with positive expectations expect sales to recover within half a year after COVID-19. Conversely, other companies expect sales to take much longer

[5] We will describe this in further detail in the "Coal market" and "Iron ore market" sections.

to recover with one company expecting sales recovery within 3 years after COVID-19. This shows that while the majority of companies that experienced a decrease in sales in 2020 are optimistic about future sales, the duration of recovery is varied.

Impact on financing (investment)

One of the most salient concerns raised in association with COVID-19 was the financial issues faced by mining companies. The revenues of mining companies dropped as a result of decreased sales and limited mine operations while the operational costs of mining companies increased due to the arrangements made to comply with government measures. As a result, many mining companies faced financial problems. For instance, 78% (196) of all the companies surveyed reported facing some kind of financial problems due to COVID-19 (see Figure 19). According to respondents, most of the mining companies that faced financial issues could not pay wages to employees, cover operating expenses, make loan repayment nor purchase inputs involved in the production process (see Figure 20). These issues resulted in the decrease in mining sector employment mentioned before. Furthermore, not only was mining sector production affected as a result, but other sectors were also negatively impacted by financial issues.

Figure 19. Whether the respondent faced any financial issues, %

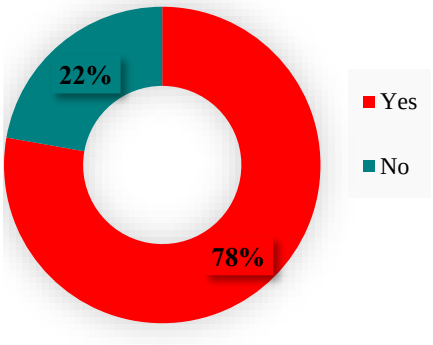
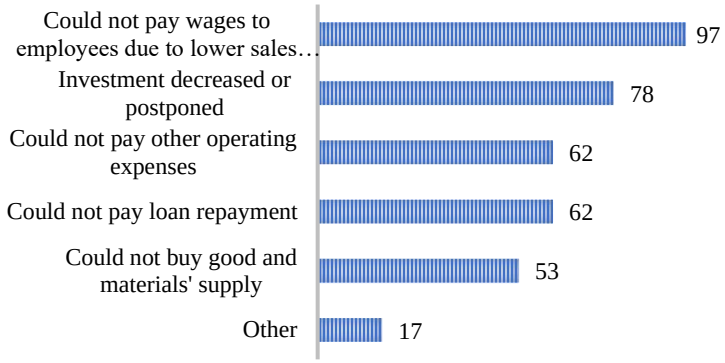


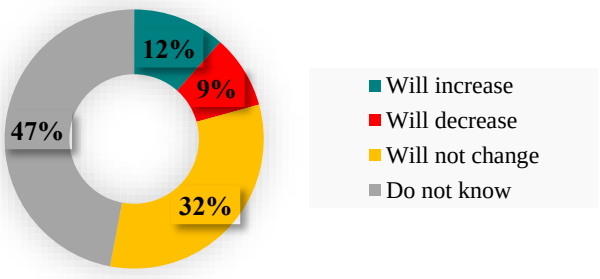
Figure 20. Obstacles associated with COVID-19 by frequency (n=107)



As shown in the Figure 20, 30.6% (78) of the surveyed companies' planned investments decreased or was postponed due to COVID-19. Companies reliant on foreign investment were more vulnerable than companies with domestic investment. In particular, the average performance of the foreign investment of companies with foreign investment was 58% while, the average performance of the domestic investment of companies with domestic investment was 69%. Overall, the negative shock in investments was another reason behind decreased production and reduced exports in the mining sector.

In general, mining companies had unclear investment expectation moving into 2021. In particular, almost half (47%) of mining companies have no clear expectations (see Figure 21). Only 12% expected investment increase in 2021.

Figure 21. Expectation about investment in 2021



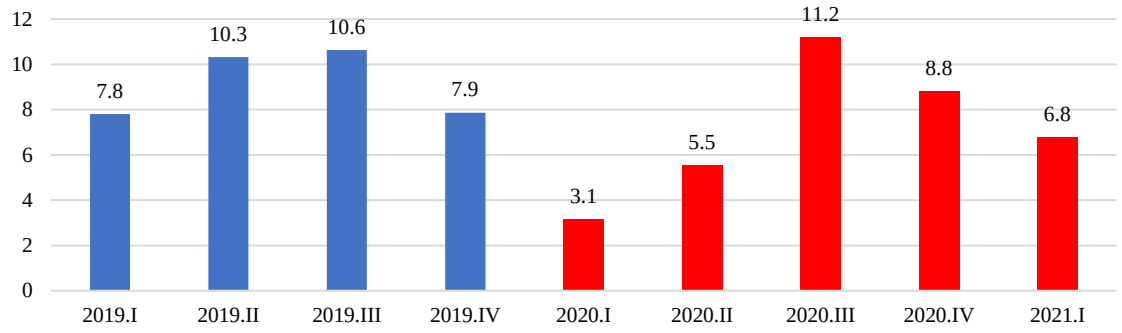
In addition to individual market factors and selling mechanisms, the production, sales and transportation processes vary greatly depending on the mineral commodity. For instance, while transportation is vital part of the coal value-chain, it is not as important for gold as gold mining companies sell directly to the Bank of Mongolia and transportation is not an issue owing to its small volume. Copper, on the other hand, has 2 main producers, EMC and OT, that sell their products to China. Iron ore is mainly produced by private companies and intermediaries and is also sold directly to Chinese buyers. In light of these differences, further analysis based on the mineral commodity is needed to better understand the impact of COVID-19. As such, in the following subsections, the research team analyzed the survey results by key commodities (coal, copper, gold, and iron ore).

3.1.1 Coal market

Sectoral data shows that coal mining companies were greatly affected by disruptions in transportation due to border closures in addition to fluctuations in Chinese demand during the first half of 2020 due to COVID-19. Due to early containment measures, most mining operations halted in early 2020 and coal export volume declined by 52.1% in the first half of 2020 (see Figure 22). Moreover, according to the business register database, the number of coal mining companies that temporarily halted operations reached 47 in 2020 from 39 in 2019.

As mentioned previously, Chinese demand rebounded quickly, ensuring a relatively consistent export market. Mongolia is the second largest coking coal supplier to China, with a market share of 32.8% in 2020. The year-on-year decline in Mongolian coking coal output can be attributed to the outbreak of COVID-19 impacting coal export transportation and border crossings in the first half of 2020. As coal exports account for almost half of total minerals exports, the drop came as a significant negative shock not only to the mining sector but to the economy as a whole. However, Mongolia reclaimed its position as a leading coking coal supplier accounting for almost half of total Chinese coking coal imports in the second half of 2020. This was primarily due to the informal ban imposed by Chinese authorities on Australian coal imports as well as the easing of bottlenecks in border crossings from Mongolia to China.

Figure 22. Coal export, million tonnes



Source: NSO

The rest of the section will clarify the issues mentioned above at the company level. In total, 45 coal mining companies took part in the survey.

Impact on production of coal companies

In 2020, the majority of the coal companies surveyed reported lower than anticipated production levels. In particular, the actual production of 30 (67%) companies were lower than their planned production (see Figure 23). 15 companies even reported a production performance lower than 50%. The average execution of the surveyed coal companies' planned production was 68%. Moreover, 38% (17) of the

surveyed coal companies experienced a year-on-year decrease in production in 2020 (see Figure 24). Overall, coal production in 2020 was adjusted to coal transportation and its sales profile was impacted by the outbreak of COVID-19.

Figure 23. Execution of coal production plan in 2020

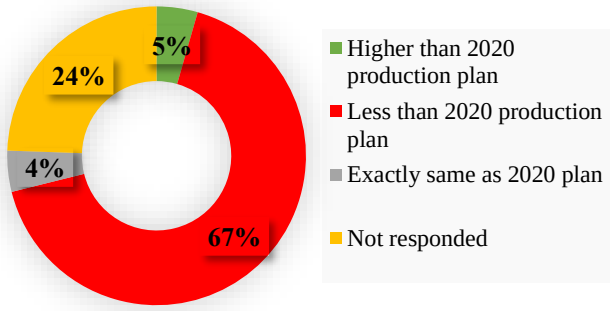
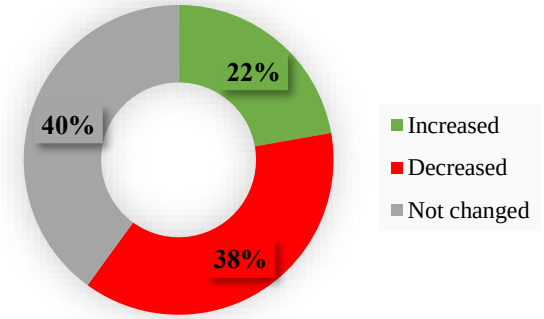


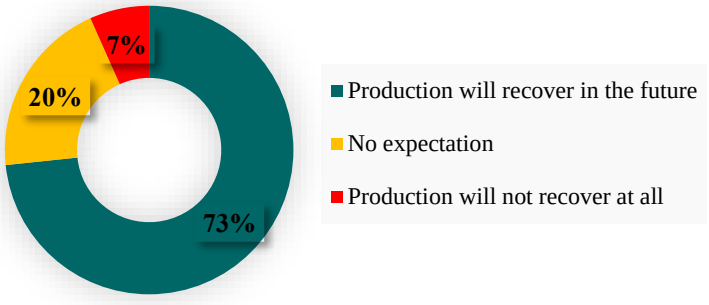
Figure 24. Year-on-year change of production of coal mining companies



According to the companies that experienced a negative production shock, the main factors that attributed to the decrease were reduced sales, transportation bottlenecks, restricted movement of domestic employees, disruption of machinery maintenance services and financial issues. Additionally, 2 companies mentioned halting production due to cases of COVID-19 at the mine site. It should be noted that the government required companies to stop operations for up to 2 weeks in the instance of a positive case of COVID-19.

Although some companies are adversely affected by COVID-19, they were quite positive about future coal production. 16 companies experienced a decrease in production due to COVID-19 in 2020. Out of these companies, 11 (73%) expected production to recover and reach normal levels within a year after COVID-19 with 10 of the 11 companies expecting production to recover within half a year (see Figure 25). 3 companies (20%) had no expectations about future and one company did not expect production to recover at all.

Figure 25. Expectation about future production recovery of coal companies that experienced a production decrease in 2020



Impact on sales of coal companies

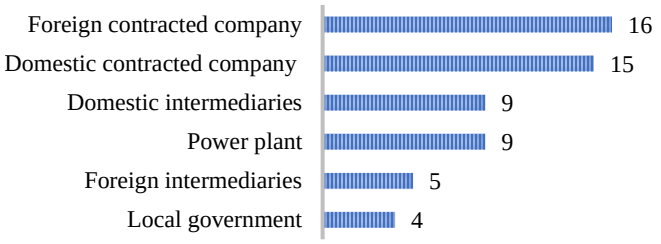
Part of coking coal is purchased by Chinese buyers and a small fraction of coal is auctioned off. Some coking coal producers sell directly from their open pit to Chinese buyers. Meanwhile, thermal coal is mainly purchased by domestic SOEs such as power plants at a constant price set by the purchaser.

Table 8 shows the sales markets of the surveyed coal companies. Half of the surveyed coal companies supply their coal to the domestic market. Consumers include domestic companies, power plants and local governments. On the other hand, 37.8% (17) of the surveyed coal companies export their coal to foreign contracted companies, including steel factories in China's northern region, and intermediaries (see Figure 26).

Table 8. Sales market of coal mining companies

	Frequency	Percentage share, %
Domestic	23	51.1
Foreign	17	37.8
Both	5	11.1
Total	45	100.0

Figure 26. Main consumer of coal mining companies (n=45)



As mentioned previously, one major reason behind decreased production was a fall in coal sales owing to early COVID-19 related containment measures. Coal sales were the most negatively affected compared to the other minerals. For instance, 71% (32) of the surveyed coal companies reported lower than planned sales volumes (see Figure 27). The average sales plan performance of surveyed coal companies was 67%. Relative to the 2019, 40% reported a decrease in sales in 2020 (see Figure 28).

Figure 27. Performance of coal production plan in 2020

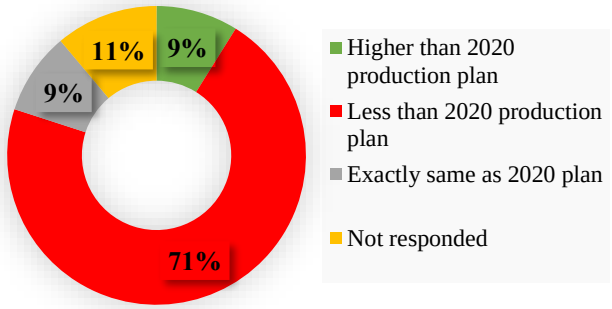
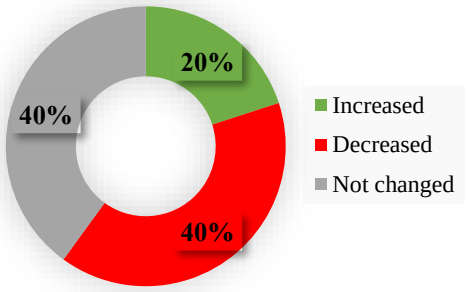
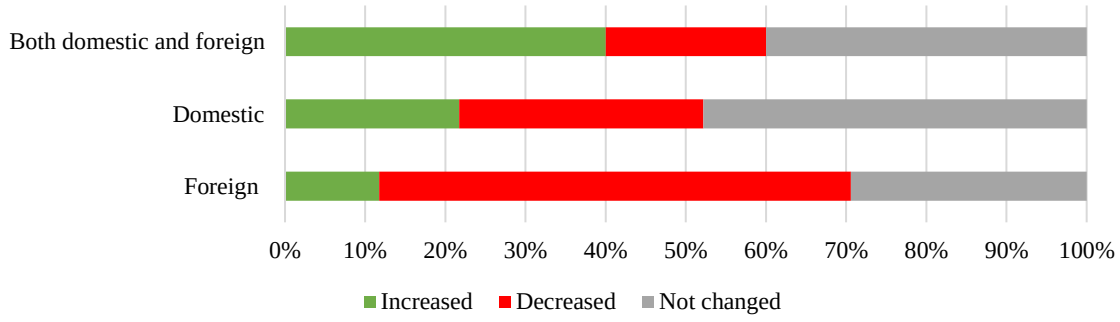


Figure 28. Year-on-year sales volume of coal change



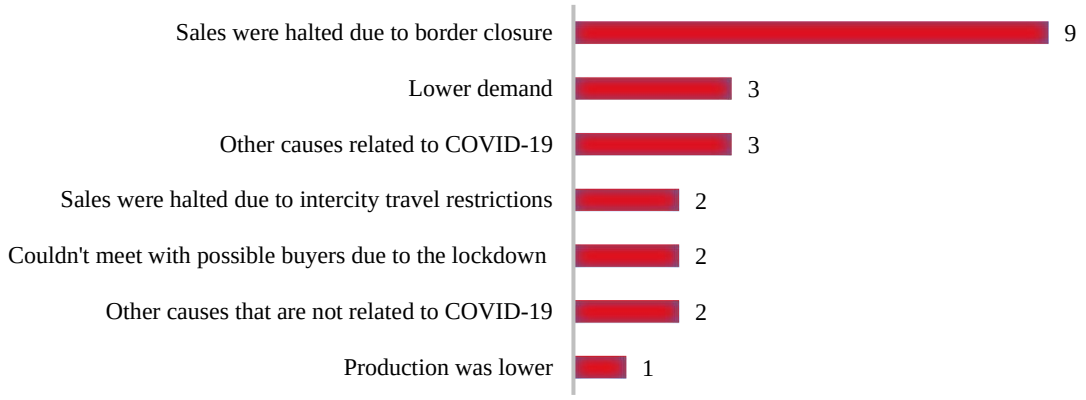
In 2020, exporting companies were more vulnerable than companies that sold coal domestically. This can be seen from the figure below. For instance, 10 (58.8%) of the 17 exporting companies experienced a year-on-year decrease in sales in 2020 while sales were relatively stable for companies that sold coal domestically (see Figure 29).

Figure 29. Year-on-year change of sales volume by sales market



Containment measures such as border closures, inter-city travel bans, and the imposition of lockdown measures were the main causes behind the fall in coal sales volumes (see Figure 30). Due to these measures, coal companies were not able to transport coal to consumers and could not meet potential buyers. Exporting companies, in particular, reported a significant drop in sales volumes. Additionally, some coal companies attributed the lower sales to decreased production and restricted employee movement. One company responded that sales activity was restricted by an operational ban by the State Inspection Agency.

Figure 30. Causes of year-on-year decrease of sales volume (n=18)



The selling price of coal was relatively stable compared to sales volume. For instance, 71% of the surveyed companies' selling price was stable in 2020 (see Figure 31). This was related to the methods used by coal companies to set selling prices (see Figure 32). The selling prices of companies that sold to the domestic market were relatively stable as prices are decided by contract beforehand. Additionally, some coal companies sold their coal to domestic SOEs for public usage with a selling price set by the Energy Regulatory Commission or purchasing local government. The only company that set its selling price by auction was Erdenes Tavan Tolgoi JSC. The export prices were relatively stable as well. In particular, the selling prices of 9 out of the 17 coal exporting companies were stable as they were set by contract beforehand. For some companies, the selling price were adjusted according to market price movements.

Figure 31. Year-on-year change of average selling price of coal

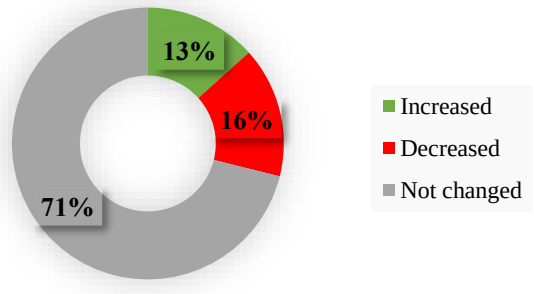
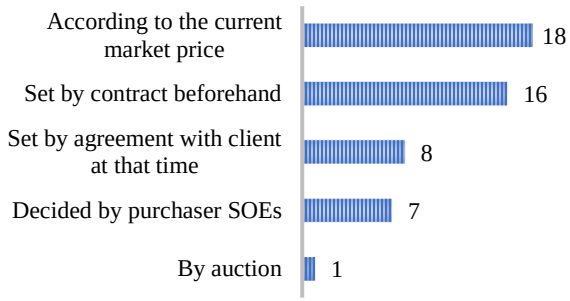


Figure 32. Methods of setting coal selling prices by frequency (n=45)



As with production, coal companies had a generally positive outlook on future sales expectations. For instance, 65% of the surveyed coal companies had optimistic expectations about future sales after COVID-19 with 11 of the 17 companies that experienced a reduction in sales in 2020 expecting sales to recover (see Figure 33). Further, 10 of the 11 companies with positive expectations think sales will recover within half a year while one expects recovery within a year. In terms of selling price, one-fourth

of the surveyed mining companies expect the selling price to increase in 2021 (see Figure 34) while companies that set prices beforehand and sell to SOEs expect prices to remain stable.

Figure 33. Expectation about future sales recovery of coal mining companies that experienced sales decrease in 2020

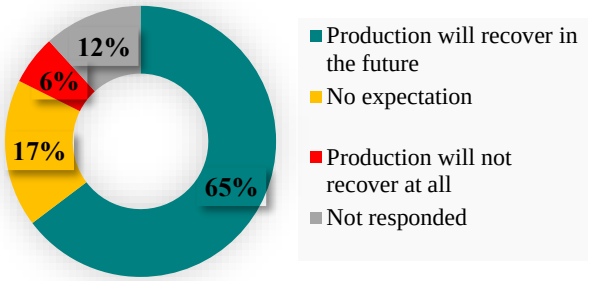
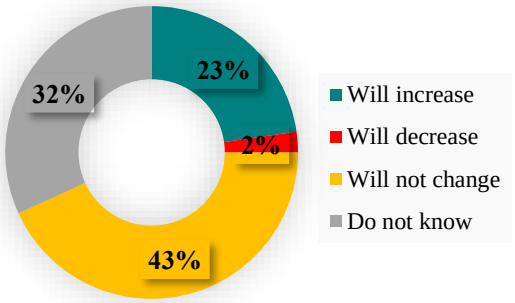


Figure 34. Expectation of coal selling price in 2021

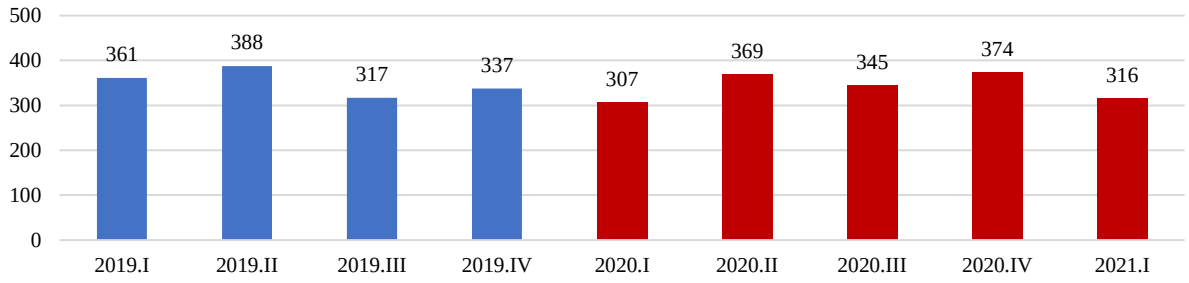


Overall, coal companies were affected by a negative shock in sales volume rather than by a shock in prices, implying that the COVID-19 containment measures were the main bottleneck. It should be noted that coal transportation to China through the Gashuun Sukhait port has been halted since the beginning of 2021 due to cases of COVID-19 among truck drivers. China closed its border to prevent the infection of COVID-19 associated with the increased outbreak in Mongolia. This might put pressure on the coal sales and production in 2021 as well.

3.1.2 Copper market

Copper concentrate is a key export product that constitutes more than 30% of total mineral exports per annum. In the domestic copper market, there are two major suppliers based on large copper deposits, EMC and OT. In 2020, these two companies jointly exported a total of 1,395.1 thousand tonnes of copper concentrate, 0.6% down from 2019. The export volume was relatively stable in 2020. The impact of COVID-19 on the Mongolian copper market was through changes in world market prices rather than through changes in export volumes.

Figure 35. Copper concentrate export volume, thousand tonnes



Source: NSO

In total, 6 copper mining companies took part in the survey. With the exception of EMC, the other surveyed companies were minor companies that have no significant impact on the domestic market. Unfortunately, the survey quality of the aforementioned companies was poor as they did not have steady operations. Thus, in this section, we analyzed the impact of COVID-19 on EMC and OT. The impact on

EMC's operation was analyzed based on the survey response while the impact on OT was analyzed based on their published annual report.

Impact on production and sales of copper mining companies

Total copper concentrate production increased 1.1% year-on-year in 2020 (see Table 9). This increase can be attributed to 2.7% year-on-year growth of OT's production. On the other hand, EMC's copper concentrate production decreased 0.8% year-on-year in 2020. The production changes of both companies were due to changes in ore grade rather than due to the effects of COVID-19. The main cause of the decrease in EMC's production was worsened geological conditions coupled with decreased copper grade in ore. In contrast, OT moved to operate in higher grade areas of its open pit mine resulting in a growth in production.

Table 9. Copper concentrate production, thousand tonnes

	2019	**2020**
Total production	1,262.4	1,275.7
1. OT	674.6	693.1
Average concentrate grade	21.7	21.6
(Cu)	146.3	149.6
2. EMC	587.8	582.6
(Cu)	132.7	131.5

Source: Oyu Tolgoi Quarterly report, NSO

According to the Chairman of the Board of Directors of OT, its operations and underground development faced disruptive challenges associated to COVID-19. However, the company successfully managed its operations and workforce schedule with support from the GoM, mitigating the negative impact.

In terms of sales, total exports of copper concentrate were relatively stable. According to OT's annual report, OT's copper concentrate sales decreased by 7.6% in 2020 compared to 2019, in line with lower transportation and customer collections due to border closures and the implementation of COVID-19 restrictions in February and November 2020. Meanwhile, according to the NSO, EMC's copper concentrate exports increased 6.9% year-on-year and the company reported no transportation issues in 2020.

The impact of COVID felt by the copper sector was mainly through FDI and employee's rotation schedule. For instance, OT's capital expenditure for underground development was USD 1,010 million in 2020, USD 184 million lower than 2019 due to lower spending resulting from COVID-19 related restrictions of in-country expatriate rotations.

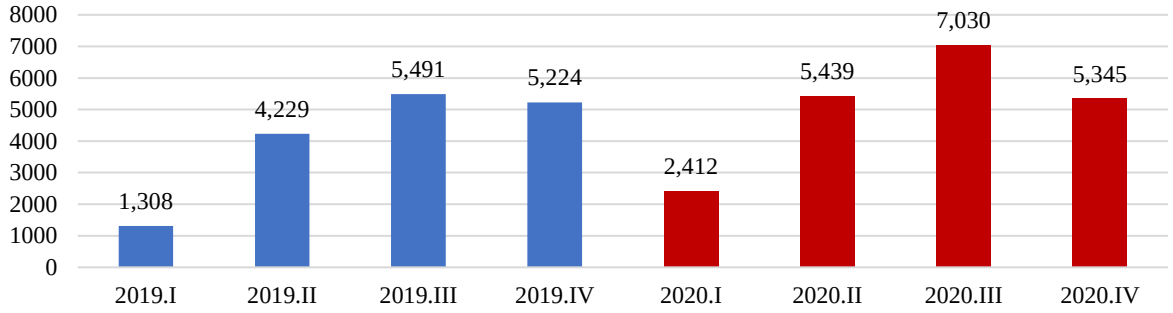
However, OT is quite optimistic about future production recovery after COVID-19. In particular, access to higher copper and gold grades is expected to continue throughout 2021. Easing of GoM regulations such as border closures are also expected to boost exports as the lifting of the international travel ban will facilitate FDI and operations. Meanwhile, EMC have no specific expectation about future production and sales volume after COVID-19. The copper concentrate production of EMC is expected to reduce in upcoming years as grade ore and geological conditions worsen.

3.1.3 Gold market

The impact COVID-19 on gold companies was relatively small compared to other commodities. This is because the gold trading procedure is quite different from other commodities and most gold is sold directly to the BoM.

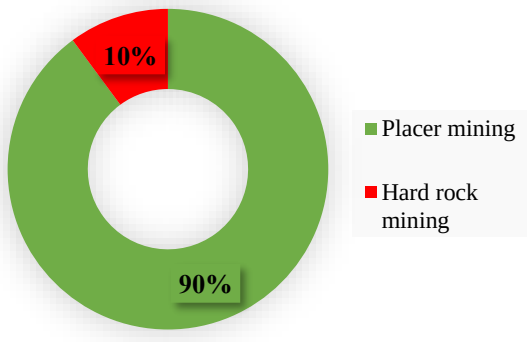
Total gold production was lower in 2019 due to changes in mining legislation that increased gold royalties paid by producers. The royalty rate change disincentivized producers who were unsure if the legislation would be repeal or continue. However, as producers got used to the legislative changes, gold production rose again. Amidst this, the outbreak of the pandemic in late 2019 heightened overall global instability, increasing the global price of gold. This in turn prompted the BoM to increase its buying price, supporting domestic gold production. As a result, gold production recovered with Mongolia producing 20.2 tons of gold in 2020 as producers took advantage of high gold prices.

Figure 36. Quarterly gold production, kg



A total of 79 gold mining companies were included in the survey. More than 80% of the surveyed gold companies were small and medium companies that produce less than 100 kg of gold per annum. Out of the 79 companies, 8 (10%) were hard rock mining and 71 were placer mining[6] (see Figure 37).

Figure 37. Surveyed gold companies by mining method type



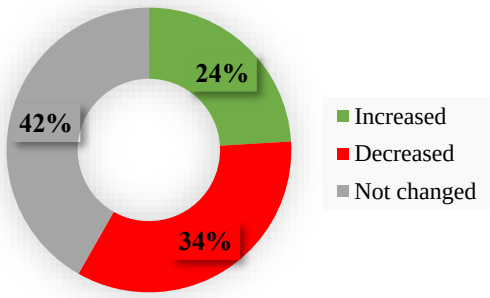
Impact on production of gold mining companies

Although total gold production increased in 2020, more than half (44 companies) of the surveyed gold companies reported lower than anticipated gold production while 34% observed a year-on-year decrease

[6] Gold is either mined via placer mining or hard rock mining. Unfortunately, Mongolian gold production data is not disaggregated by mining type. However, the Mineral Resources and Petroleum Authority of Mongolia does release monthly statistics that details the mineral resource reserves registered in the state's integrated registration. According to this, 11 hard rock mining gold deposits with an estimated 80 tonnes of gold reserves and 24 placer mining gold deposits with almost 3 tonnes of gold reserves were registered in 2020 (MRPAM, 2021). In general, all gold producers in Mongolia engage in some level of processing before selling their gold to the Bank of Mongolia. The research team found no discernable difference in the impact of COVID-19 on the 79 gold companies included in the survey based on their type of mining and level of processing.

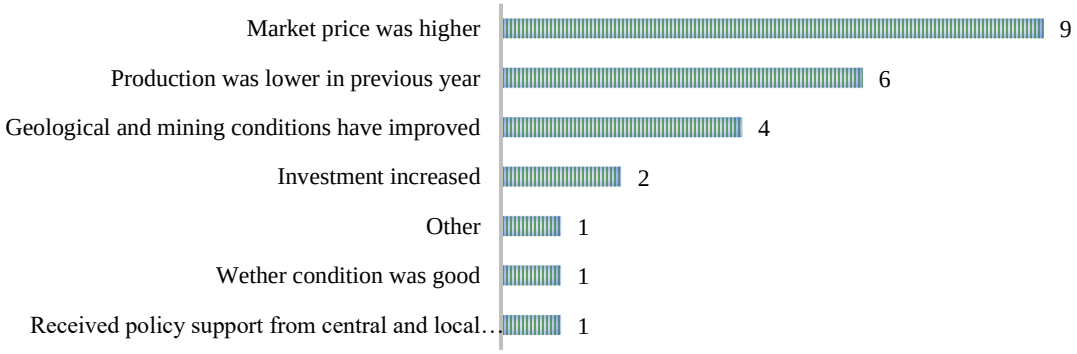
in production (see Figure 38). The output of large companies, on the other hand, was likely to increase more than that of small and medium companies, suggesting that larger companies were better able to take advantage of higher market prices.

Figure 38. Year-on-year change of production of gold mining companies



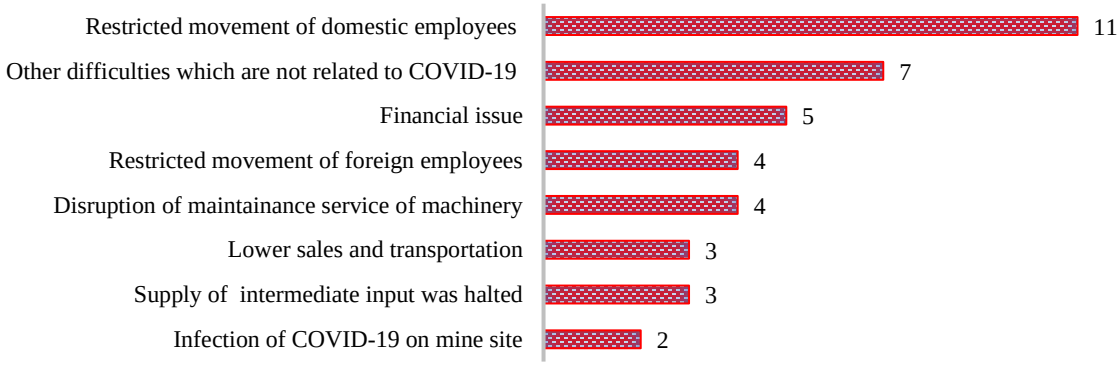
According to the survey results, the leading cause of production growth was the spike in gold prices. The second leading factor was lower than normal production in 2019 (see Figure 39). These findings are in line with the literature review based on secondary data results.

Figure 39. Causes of year-on-year gold mining companies' production growth, frequency (n=19)



As for gold mining companies that experienced a decrease in production in 2020, the main obstacles were restricted movement of domestic and foreign employees and disruptions in machinery maintenance services and supply of intermediate inputs (see Figure 40). Other reasons not related to COVID-19 include the cancellation of mining licenses and difficulties due to local government restrictions. The production of 2 companies were temporarily halted due to positive cases of COVID-19.

Figure 40. Causes of year-on-year gold mining companies' production decrease by frequency, (n=27)



In terms of future production expectations, 16 gold mining companies that experienced a decrease in output in 2020 expect production recovery within a year while 11 companies expect recover within half a

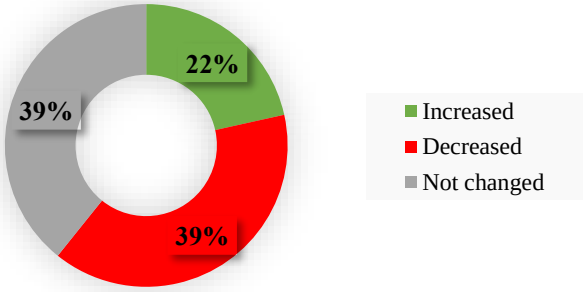
year. On the other hand, 3 companies that reported lower output in 2020 responded that they do not have specific expectations about future production.

Impact on sales of gold mining companies

Gold trading is quite different from other commodities as the main purchaser is the BoM and the selling price is set according to the global market price. The BoM purchases all domestically produced gold that is not directly exported at its branches in local areas. Thus, transportation is not big concern for gold miners.

In terms of year-on-year sales volume change, 61% of surveyed gold mining companies' production was stable or increased in 2020 compared to 2019 (see Figure 41). In contrast, 31 companies (39%) reported an average of decrease of 30%. Out of these 31 companies, 14 companies stopped gold sales completely in 2020.

Figure 41. Year-on-year change of sales of gold mining companies



As for companies that experienced a growth in sales, the main incentive was higher market prices. In particular, 61% of the surveyed gold companies reported an average selling price increase. Moreover, some gold companies had previously stored their gold in 2019 due to uncertainties related to the royalty rate changes. Several mining companies reported that increased ore grades and improved geological conditions supported the production and sale of gold in 2020. On the other hand, the leading factors behind a drop in sales include decreased production and difficulties caused by domestic travel restrictions. 4 mining companies also mentioned licensing issues unrelated to COVID-19.

In terms of future expectations, out of the 31 gold companies that experienced a decrease in sales, 19 (61%) were optimistic about future production with 13 expecting output to recover within half a year (see Figure 42). 7 companies (23%) had no particular expectations about the future while one company did not expect production to recover at all.

Companies were more mixed about their 2021 price expectations (see Figure 43). While 27% think prices will be stable, 25% think prices will fall in the near future.

Figure 42. Expectation about future production recovery from gold mining companies that experienced production decrease

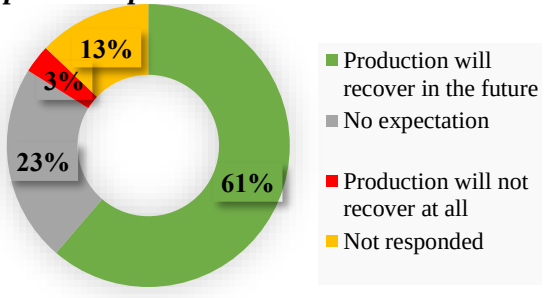
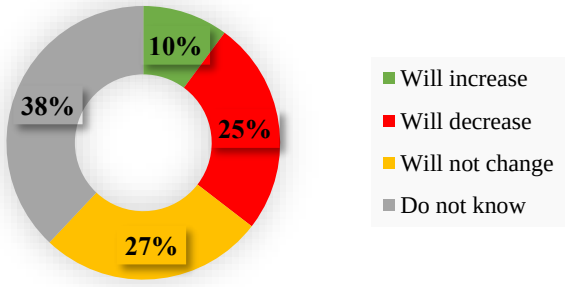


Figure 43. Expectation of gold selling price in 2021

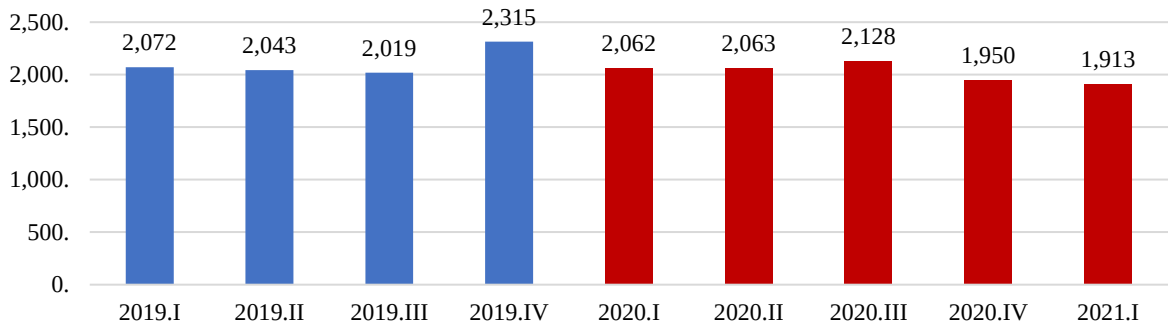


Overall, the negative impact of COVID-19 on gold companies was relatively minor thanks to the spike in prices coupled with certainty of purchaser. In particular, large gold companies were able to take advantage of the gold price hike. However, travel restrictions caused some difficulties for gold mining operations due to employee movement restrictions as well as disruptions in the supply of necessary goods. It is also worth noting that border restrictions and travel bans limited the ongoing problem of gold smuggling, increasing the amount of gold sold to the BoM.

3.1.4 Iron Ore market

In 2020, iron ore production was 13.6 Mt, increasing 16.6% year-on-year. Meanwhile, iron ore exports fell 2.9% year-on-year, reaching 8.2 Mt. However, owing to increases in global market prices, the export revenue of iron ore rose 10.9%. The decline in iron ore export volumes was mainly due to transportation bottlenecks caused by border closures.

Figure 44. Iron ore exports volume, thousand tonnes



Source: NSO

A total of 15 iron ore mining companies were included in the survey. The following table shows the companies by production interval. As shown in Table 11, most of the iron ore companies surveyed were export oriented.

Table 10. Annual average production of surveyed iron ore companies by production interval

Production interval	Frequency	Percentage share, %
Less than 1,000 tonnes	6	40.0
1,001-10,000 tonnes	4	26.7
10,001-100,000 tonnes	3	20.0
More than 100,000 tonnes	2	13.3
Total	**15**	**100.0**

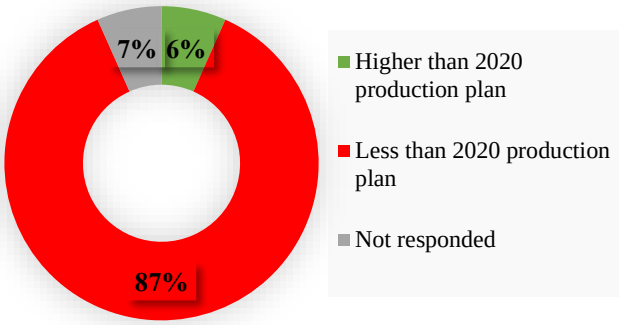
Table 11. Sales market of iron ore mining companies

	Frequency	Percentage share, %
Domestic market	3	20.0
Foreign market	10	66.7
Both	2	13.3
Total	**15**	**100.0**

Impact on production of iron ore companies

As shown in the production indicators below, iron ore companies were more severely impacted by COVID-19 compared to other surveyed mining companies. Almost all companies, except two, reported lower than anticipated production with an average 2020 production plan execution of only 39.9% (see Figure 45).

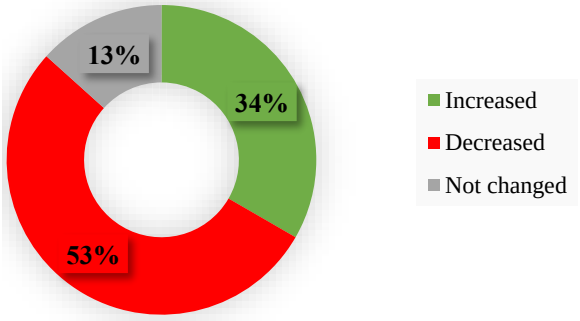
Figure 45. Performance of production 2020 plan of iron ore mining companies



Moreover, more than half (8) of the surveyed iron ore companies experienced a year-on-year decrease in output (see Figure 46). The dominant reasons behind the fall in production include disruption of foreign direct investment (4 cases), restrictions on employee movement (3 cases) and the ban on entry of foreign workers (2 cases). Other reasons include disruption of machinery maintenance services and equipment, financing issues and border closures. Moreover, according to the Minister of Construction and Urban Development, 15 metallurgical plants did not operate in 2020 (Ministry of Construction and Urban Development, 2021).

Only 5 (34%) iron ore mining companies included in the survey experienced production growth in 2020. Within this, Darkhan Metallurgical Plant experienced a year-on-year production growth of 30%. The factors of production growth include higher market prices, increased investment, and good geological conditions. One iron ore company's production grew due to good weather while 2 iron ore companies had comparatively higher output as a result of lower than normal production levels in 2019.

Figure 46. Year-on-year change of production of iron ore mining companies

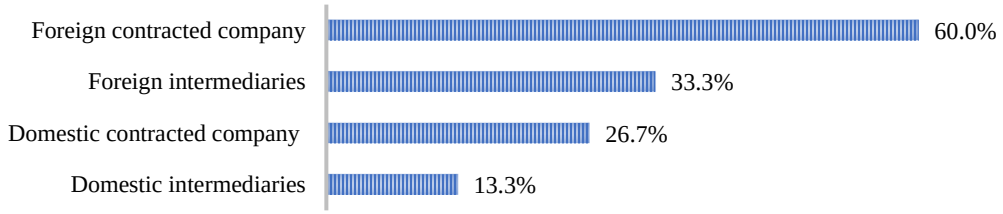


In terms of the future expectation of companies that experience a negative production shock, 6 (75%) out of 8 had the positive expectation that production will recover within a year after COVID-19. On the other hand, 2 iron ore companies have no clear expectations about future production levels.

Impact on sales of iron ore mining companies

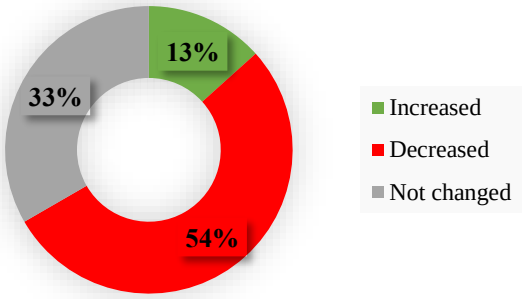
As mentioned above, most of the surveyed iron ore companies were export-oriented and mainly sold their products to foreign contracted companies and intermediaries. In comparison to other commodities where major purchasers included public institutions, iron ore was mainly purchased by the private sector (see Figure 47).

Figure 47. Main consumer of iron ore mining companies (n=15)



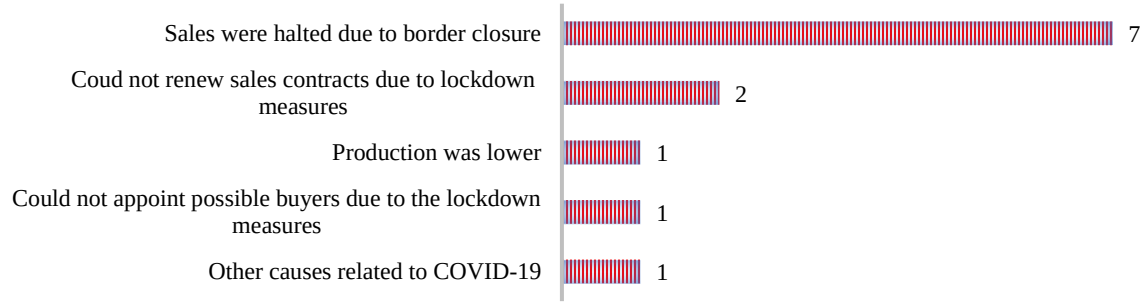
In 2020, iron ore sales were greatly diminished owing to the aforementioned decreases in production. The average execution of 2020 sales plans were only 36% with more than half of the surveyed iron ore companies reporting a year-on-year decrease in sales (see Figure 48). Only 2 companies boasted a year-on-year increase in sales volumes. The 2 companies supplied iron ore to the domestic market and cited higher market prices and increased number of buyers as the main cause of growth. It is worth noting that of the iron ore companies included in the survey, none of the companies that exported iron ore reported an increase in sales volumes with 6 of the 10 exporting companies experiencing a decrease in sales volumes.

Figure 48. Year-on-year change of sales of iron ore mining companies



The sales decrease of the surveyed iron ore companies was fully attributed to difficulties caused by restrictive measures related to COVID-19. For instance, the leading causes of the decrease in sales include border closures and the expiration of sales contracts due to lockdown measures (see Figure 49). As mentioned in the Marketing and Trading study conducted by the Economic Research Institute, around 80% of Mongolian iron ore is transported by the Altanbulag-Zamiin-Uud railway for export (ERI, 2018). Iron ore companies stated that wagon availability for the railways was poor in 2020.

Figure 49. Causes of year-on-year sales decrease by frequency (n=8)



As for the selling price, price is set via contract beforehand and according to the market price (see Figure 50). One company mentioned selling according to the Ereen-DAP price. 7 iron ore companies experienced a drop in average selling prices in 2020 while 4 companies had a year-on-year increase (see

Figure 51). Again, the companies that experienced an increase in prices were large companies. This again shows how large companies were able to take advantage of higher prices while small companies could not.

Figure 50. Forms of setting selling price of iron ore (n=15)

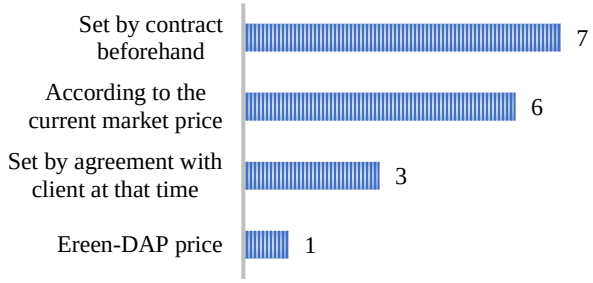
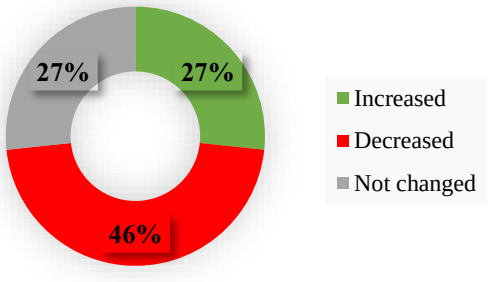


Figure 51. Year-on-year change of average selling price of coal



As for the future expectations, out of the 8 iron ore mining companies that experienced a reduction in year-on-year production and sales, 6 (75%) were optimistic and 5 expected recovery within half a year after COVID-19 (see Figure 52). The remaining 2 iron ore companies have no clear expectations about future production or sales levels. As for the price of iron ore in 2021, one third expected prices to increase in 2021 while more than half have no clear outlook on future prices (see Figure 53).

Figure 52. Expectation about future production and sales recovery of iron ore mining companies with negative production and sales shock

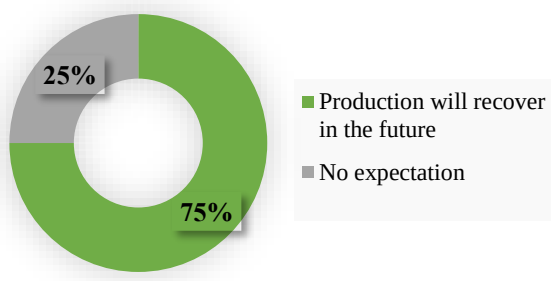
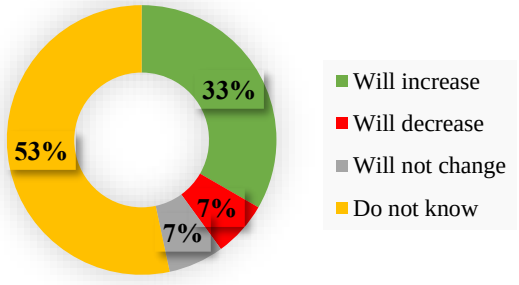


Figure 53. Expectation of iron ore selling price in 2021



Overall, iron ore companies were more adversely impacted by COVID-19 compared to gold and copper companies. The major difficulty faced by iron ore companies was a transportation bottleneck caused by border closures. Moreover, several companies lost customers as they could not meet potential buyers nor renew sales contracts due to the travel ban. As such, it seems that most iron ore producers were unable to take advantage of the recent price increase, especially small companies.

3.2 Companies' response to and perception of measures taken by the GoM

The COVID-19 pandemic and its associated measures challenged mining companies and required the adoption of new ways of operating. These include a shift to work-from-home arrangements, the implementation of preventive procedures such as social distancing rules, the suspension of group meetings, limited interaction with outsiders, work-place sanitation and hygiene procedures and frequent staff testing. Moreover, in 2020, mining, processing, and transportation operations in rural areas were required to comply with emergency plans approved by regulators.

As mines are mainly located in rural areas, mining employees work in rosters away from home. Thus, COVID-19-related limitations around the movement of people brought forth uncertainty about the work schedule of employees. Furthermore, many mining companies were required to take human resource management measures to continue their operations with 47% (119) of the surveyed mining companies implementing some themselves (see Figure 54

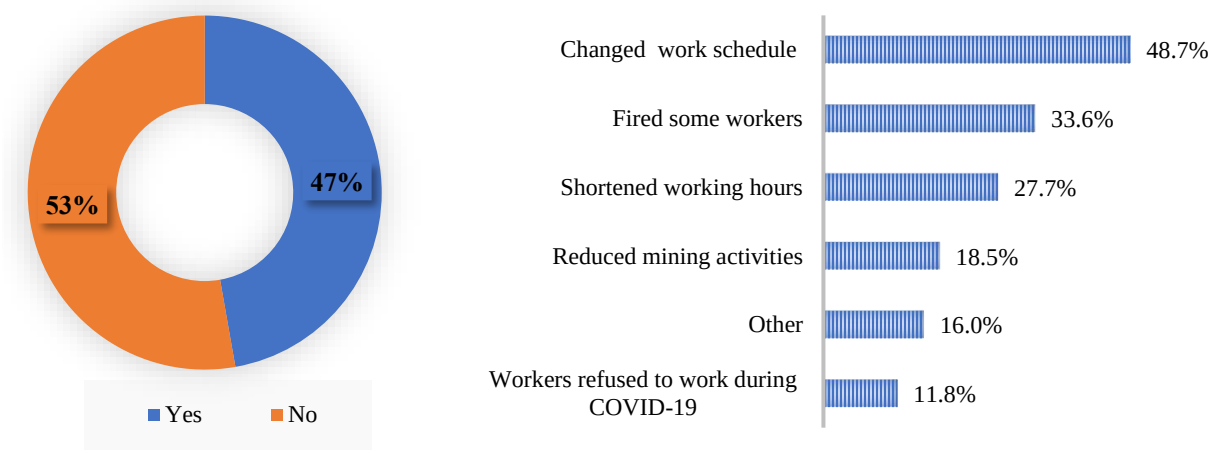
Figure 54. Whether human resources management measures were implemented during COVID-19

Figure 55. Human resource management measures implemented by mining companies during COVID-19, % (n=119)

). Figure 55 shows the human resource management measures implemented by mining companies in 2020. Most of these companies changed their work schedule by changing roster schedules and extending roster periods. While some mining companies reduced operations, others laid off workers and stopped mining operations altogether. For instance, according to OT, its total project workforce decreased from 7,100 to 2,960 people, reflecting project progress, completion of work packages, employees' transition into operation teams, productivity optimization, as well as work delays impacted by COVID-19 conditions. There were also several cases where workers refused to work to decrease their chance of infection. Some companies replaced foreign workers with domestic workers due to the international travel ban. Others implemented measures to increase wages and provide bonuses to keep workers at mine sites for longer periods of time.

Figure 54. Whether human resources management measures were implemented during COVID-19

Figure 55. Human resource management measures implemented by mining companies during COVID-19, % (n=119)



As mentioned previously, one of the most difficult challenges raised as a result of COVID-19 were the financial issues faced by mining companies. As such, 78% (196) of all surveyed companies reported facing some financial problems due to COVID-19. The revenues of mining companies dropped due to decreased sales and limited operations while operational costs rose due to the arrangements made to comply with government measures. These include implementing preventive measures such as increasing work-place sanitation and hygiene procedures as well as providing staff testing and screening on a regular basis.

In response to these financial challenges, 42% (106) of the surveyed mining companies implemented financial management measures to continue their operations (see Figure 56). As shown in the Figure 57, most mining companies implemented measures to cut operational expenditure by postponing investment and mine development, decreasing mine activities, cutting unnecessary operational costs and reducing labor cost by lowering salaries and bonuses. Several mining companies took out new loans to finance

their operational costs. There were even instances where companies sold their office space, machinery and equipment to continue operating during the pandemic. One company reported that they stopped paying taxes during the pandemic.

Figure 56. Whether financial measures were implemented during COVID-19

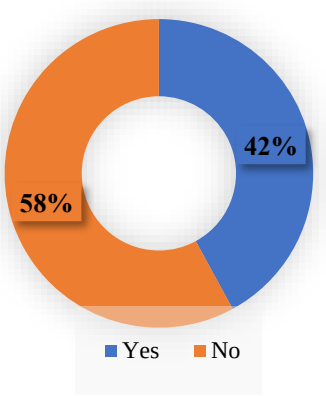
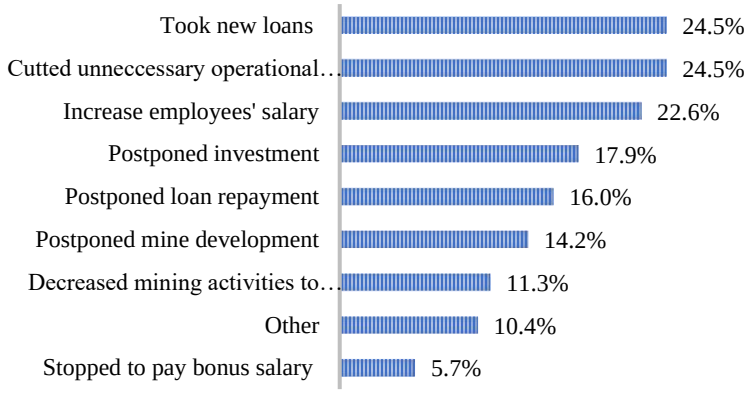


Figure 57. Financial management measures implemented by mining companies during COVID-19, % (n=106)



Meanwhile, only 14% (35) of the surveyed mining companies implemented sales promotion measures (see Figure 58). This might be associated with features of the marketing and trading process of Mongolian mining companies. As a result, only a few companies participated in online exhibitions, changed price strategies, and renewed sales contracts to promote their sales in 2020 (see Figure 59).

Figure 58. Whether sales promotion measures were implemented during COVID-19

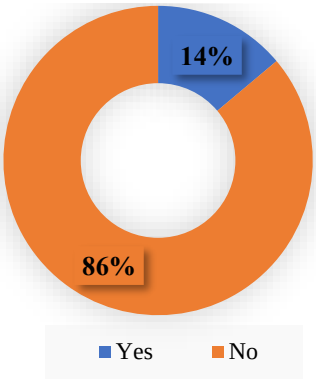
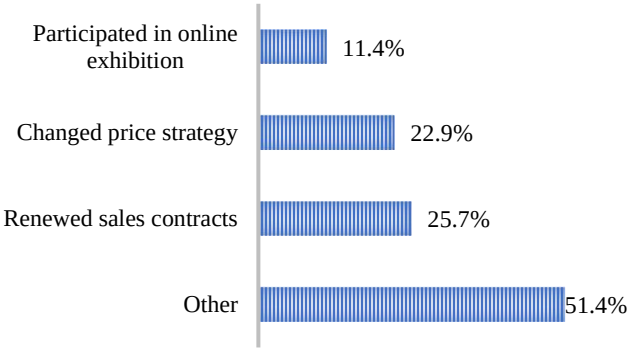


Figure 59. Sales promotion measures implemented by mining companies during COVID-19, % (n=35)



Although many of the surveyed mining companies experienced significant financial challenges, the majority were excluded from the stimulus packages implemented by the GoM with more than half reporting that they did not receive financial support from the GoM (see Figure 60). Some, however, seemed to benefit from some kind of tax exemption. According to the Law on Exemption from Social Insurance Contributions and Support from the Unemployment Fund adopted on April 9 2020 ("Social Insurance Measure Law"), legal entities whose operations were impacted by COVID-19, but preserved their job positions and reported social insurance contributions to relevant authorities, were exempt from social insurance contributions from April 1 2020 to October 1 2020, except for the portion attributable for

health insurance levied at a rate of 2% of the salary income. Out of 117 companies that enrolled in government measures, 101 (86.3%) were enrolled in this social security exemption. 78 (66.7%) and 22 (18.8%) mining companies were also enrolled in PIT and CIT exemptions (see Figure 61).

Figure 60. Whether mining companies were enrolled in any government measures during COVID-19

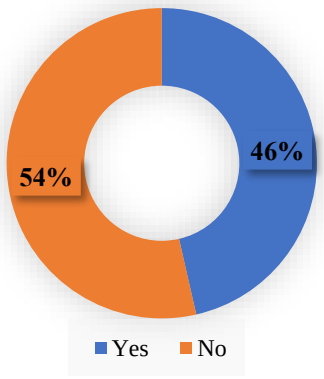
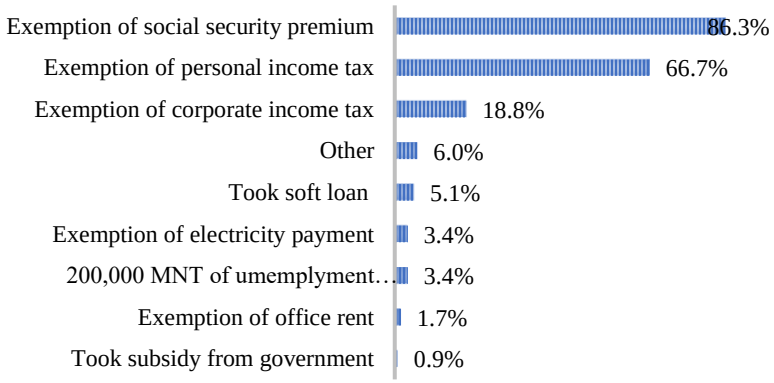
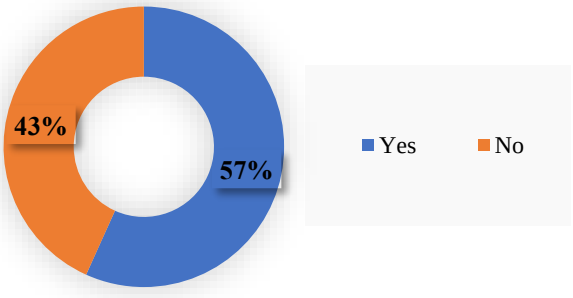


Figure 61. Government measures that mining companies enrolled in during COVID-19, % (n=117)



As mentioned above, the GoM has not implemented any COVID-19 related relief measures aimed at aiding the mining sector. Thus, while many mining companies are unlikely to be enrolled in any government support measures, the government expects mining companies to finance relief measures with the overall mining sector acting as the foundation for near-term economic recovery. In addition to the funding mentioned in Section 2 of this report, mining companies provide significant assistance and donations to local and central governments within the framework of social responsibility. For instance, more than half of the surveyed mining companies made donations towards COVID-19 relief (see Figure 62), providing on average, MNT 273.8 million in assistance. The largest donation was MNT 1 billion. SOEs were especially likely to donate more to help the government overcome the negative impacts of COVID-19.

Figure 62. Whether any assistance or donations related to COVID-19 were given



Difficulties faced in following regulations and measures during COVID-19

The research team clarified the perceptions of mining companies on the ease of following regulations imposed by authorities in 2020. Mining companies evaluated the difficulty of implementing government measures on a scale of 0-10 (0 being very easy and 10 being very difficult).

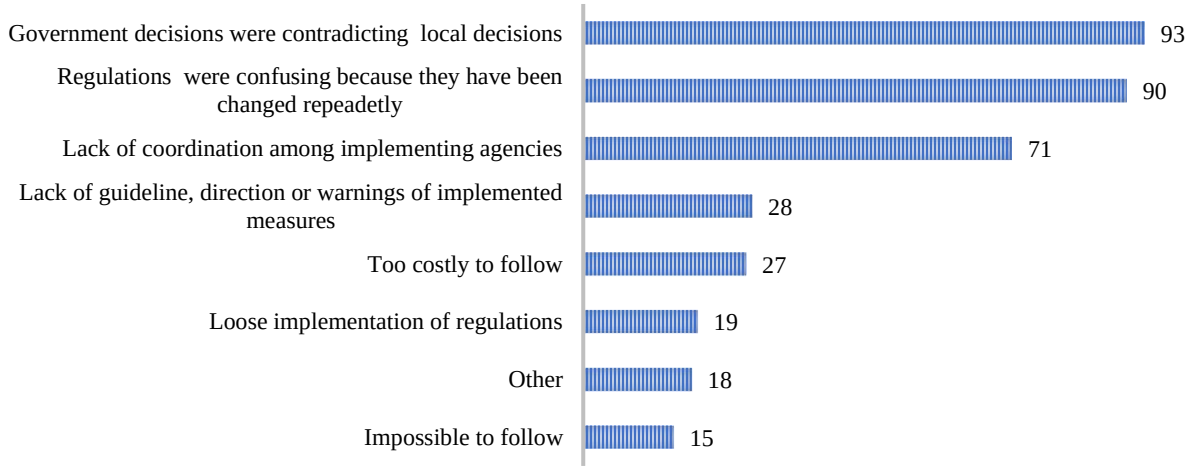
The majority of mining companies included in the survey found the regulations and measures somewhat difficult to follow with 64.7% of companies ranking the ease of following COVID-19 regulations 5 points and above (see Table 12). This suggests that the regulations implemented during the pandemic were fairly difficult to abide by.

Table 12. Assessment of easiness to follow rules and decisions implemented by authorities

Level of ease	Points	Frequency	Percentage share, %
Easy	0 to 4	89	35.3
Difficult	5 to 10	163	64.7
Total		252	100.0

The major challenges associated with following regulations seem to stem from the fact that decisions made by central and local governments were contradicting, regulations were frequently changed, confusing and wrought with coordination failure among implementing agencies (see Figure 63). Moreover, the lack of guidelines, directions or warnings on measures, loose implementation, and high cost of abiding were other reasons that made the regulations hard to follow.

Figure 63. Difficulties faced to follow regulations implemented by GOM, % (n=163)



In general, the measures imposed by the GoM and local authorities were difficult to enforce and did not take into account the specifics of the mining sector. Border closures led to transportation challenges, inter-city travel restrictions caused labor difficulties, and other restrictive measure led to operational disruptions. As a result, mining companies reported declining production and sales, stagnations in investment and delayed developments. Even with these challenges, mining companies are usually excluded from government support measures while simultaneously financing many measures themselves.

Despite the negative shocks mining companies faced, many are optimistic about future recovery, expecting normalization with a year after COVID-19. As the mining sector is a strategically important sector for Mongolia, the sectors development will impact how the overall economy recovers. Therefore, in the following section, we will consider how macroeconomic indicators are affected in different scenarios of mining sector recovery.

4. Near-term Macro Economic Outlook Under Alternatives of Mining Sector Recovery

Negative shocks in the mining sector were a significant driving force behind Mongolia's economic slowdown in 2020. For instance, as previously mentioned in the report, the mining sector contracted 9.4% year-on-year in 2020, directly accounting for a 2% decline in total GDP.

The Mongolian economy has recovered since the beginning of 2021 as a result of higher mineral commodity prices, strong Chinese economic growth, fiscal and monetary easing, the GoM's attempts to increase mining exports and vaccination efforts. However, border restrictions on mineral exports to China were subsequently imposed in April and May 2021 as a containment measure following an outbreak of COVID-19 cases among border crossing truck drivers. This put pressure on mineral exports, ultimately leading to economic slowdown. Authorities, on the other hand, reported a resumption of border crossings and customs traffic after health enhancements such as increased vaccinations and testing capacity at the border. Moreover, Umnugovi province, where the Zamiin Uud and Shivee Khuren ports are located, restricted entry from other provinces and Ulaanbaatar until June 15. This decision was aimed at preventing a possible outbreak of COVID-19 from other provinces in order keep border operations stable. With the help of these measures, exports are expected to revive in near-term.

Considering the importance of the mining sector, post-COVID-19 economic recovery will be closely tied to near-term mining sector growth. However, as the mining sector is highly dependent on external factors and is susceptible to the ongoing COVID-19 pandemic, many uncertainties remain. To get a better understanding of how the economy may develop, the research team simulated the near-term economic outlook under alternative scenarios of mining sector recovery for the upcoming two years. To model the near-term outlook, the research team deployed an in-house recursive Dynamic CGE model calibrated to Mongolia's 2020 Social Accounting Matrix (SAM). The research team built a new 2020 SAM to stimulate the economic structure during COVID-19.

4.1 Methodology - Dynamic CGE model

The research team used an extension of the dynamic CGE model used in Galindev et al., (2019) as the main analytical tool.[7] The dynamic CGE model is a general equilibrium model where a change in one part of the economic system affects all other parts.

The model has the following basic features:

- The production side of the model is divided into different activities/industries. Each activity has a nested structure, and each level uses a production function with constant returns to scale. Specifically, the first level of production is a Leontief function of value added and intermediate consumption. At the next level, the value-added function in an activity is a constant elasticity of substitution (CES) function of labor augmented with technical changes and capital (which is the total factor productivity) is estimated using the conventional growth accounting method as the Solow residual. As in the Solow growth model (1956), the stock of capital in each sector increases by investment but decreases by depreciation. Investment in public services, mining activities and the livestock sector are exogenous while investment into other sectors are endogenous depending on the return (ratio between the rental rate and user cost of capital - the depreciation and interest rate). Total labor supply grows at an exogenous rate equal to population growth. In each period, labor is mobile between activities.

[7] This model is an extension of the PEP-1-t model which is described fully in Decaluwé et al. (2013).

- The intermediate consumption of each commodity, on the other hand, is proportional to sectoral production. Each sector may produce multiple commodities, which are aggregated by a constant elasticity of transformation (CET) function. Finally, quantities to sell domestically or to export are governed by a CET function and relative prices.
- On the demand side, the consumption of a commodity is a CES function of domestic and imported quantities. A representative household allocates its disposable income from capital, labor,, and transfers between consumption and savings. Its demand for commodities is governed by a linear-expenditure system. Demand for commodities for investment and government spending purposes are proportional to the respective total expenditure. Investment demand distinguishes between gross fixed-capital formation and changes in inventories. Export demand for domestic commodities is a constant elasticity function of relative prices (foreign price expressed in domestic currency divided by domestic price).
- Government revenue from income tax, indirect taxes (production, commodities, and foreign trade) and transfers from other agents are divided between savings, current expenditure and transfers to other agents. Government spending and transfers to other agents are exogenous.
- The model specifications also include public debt dynamics which change according to the budget deficit.
- The model is a savings-driven-investment model – i.e., total investment is the sum of savings of all agents and net changes of wealth funds.
- The current account balance in the balance of payments is determined by the amount of exogenous foreign savings. Private savings and government savings are endogenous.

4.2 Main database of the model – Social Accounting Matrix 2020

The main database of our CGE model is the 2020 Mongolian Social Accounting Matrix (SAM) the research team built for this study using national account, balance of payment and government budget data published by the National Statistical Office.

The Micro SAM is a square matrix with 63 columns and rows. Its accounts consist of the 19 sectors; 16 commodities; two production factors; three types of institutions; three types of taxes; and saving (investment) accounts divided into private investment, public investment, and changes in inventories (see Table 13).

Table 13. Accounts in the SAM 2020

Sectors	Commodities	Production factors
Agriculture	Agriculture	Capital (CAP)
Mining	Mining	Labor (LAB)
Manufacturing	Infrastructure	
Electricity	Manufacturing	**Institutions**
Water Supply	Construction	Private sector (H)
Construction	Trade	Public sector (GVT)
Trade	Transportation	Rest of the World (ROW)
Transportation	Accommodation	
Accommodation	Postal services	**Tax elements**
Information	Finance	Direct taxes (TD)
Finance	Real Estate	Import duties (TM)
Real State	Public administration	Indirect taxes (TI)

Professional services	Education	
Administrative services	Health	**Saving/investment**
Public administration	Art	Private investment (INV_PRI)
Education	Other services	Public investment (INV_PUB)
Health		Change in inventories (VSTK)
Art		
Other services		

As the most recent Supply and Use Table, the main source used to construct a SAM, has not been published yet, the research team used parts of the structure of the 2017 Macro SAM to disaggregate the Macro SAM into the Micro SAM.

Table 14 shows the Macro SAM with 14 accounts as a share of 2020 nominal GDP (MNT 37.13 trillion). The spending of each account is shown along the rows. The receipts of each account, on the other hand, are shown along the column. Household consumption and government expenditure made up around 71.8% of GDP (57.1% and 14.7%, respectively). Gross fixed capital formation (both public and private) and inventory changes accounted for 23.9% of GDP. The values of both exports and imports were more than half of GDP (58.3% and 53.9% respectively). The economy was equally intensive in capital and labor—i.e., the values of payments to capital owners and the compensation of employees were 45.4% and 44.2% of GDP, respectively. Value added was 89.6% of GDP while the remaining 10.4% came from indirect taxes on commodities (8.0%), import duties (2.0%), and net taxes on production (0.4%).

Table 14. Macro SAM 2020 (% of GDP)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**Labor**								2.4	45.4					47.8
2	**Capital**								0.1	44.2					44.4
3	**Households**	47.3	32.1		13.1				2.5						95.1
4	**Government**			3.4		12.5	2.0	8.0	1.8	0.4	0.0				28.0
5	**Direct taxes**			12.5											12.5
6	**Import duties**										2.0				2.0
7	**Indirect taxes**										8.0				8.0
8	**ROW**	0.4	12.3	0.7	1.5						53.9				68.8
9	**Sectors**										178.1				178.1
10	**Commodities**			57.1	14.7				58.3	88.2	19.9	20.1	8.3	-4.5	261.9
11	**INV_PRI**			12.9					2.6						15.6
12	**INV_PUB**			8.5	-1.3				1.1						8.3
13	**VSTK**											-4.5			-4.5
14	**TOTAL**	47.8	44.4	95.1	28.0	12.5	2.0	8.0	68.8	178.1	261.9	15.6	8.3	-4.5	

For more details on the structure of the SAM, please refer to the Appendix.

4.3 Scenarios

The research team considered the following three alternative scenarios for the upcoming two years with each simulating mining sector growth alternatives.

- **Baseline scenario – "Smooth recovery":** The mining sector grows smoothly in 2021 and 2022 as the outbreak of COVID-19 is kept under control with vaccinations, Chinese demand remains strong and global market prices increase.
  - Mineral commodity export volumes increase 20% year-on-year in 2021, reaching 2019 levels, and 10% year-on-year in 2022.
  - Mineral commodity prices increase 10% year-on-year in both 2021 and 2022.

- **Scenario 1 – "U" shaped recovery:** Mining sector production remains constant between 2020 and 2021, due to the challenges caused by an increased outbreak of COVID-19, before recovering significantly in 2022.
  - Mineral commodity export volumes remain the same as 2020 in 2021 but increase 20% in 2022.
  - Mineral commodity prices remain stable year-on-year in 2021 but increase 10% in 2022.
- **Scenario 2 – "Inverse-U" shaped recovery:** Mining sector production grows rapidly in 2021 but slows down in 2022, reflecting a decrease in Chinese demand following strong post-COVID-19 recovery coupled with a ban on coal.
  - Demand for all export commodities increase 20% year-on-year in 2021, reaching 2019 levels, but does not grow in 2022.
  - Mineral commodity prices increase 10% year-on-year in 2021 but fall 6% in 2020 due to lower demand.

There are no policy shocks included in the model other than mining sector related price and export shocks. The following dynamic parameters are true for all scenarios:

- Population growth is 1.8% per annum.
- The TFP of the economy grows 2% year-on-year.

4.4 Results

This section compares the simulation results generated from the three scenarios. The following two figures show the research team's assumptions about mineral commodity exports and their prices under the three scenarios.

Figure 64. Mineral export, trillion MNT

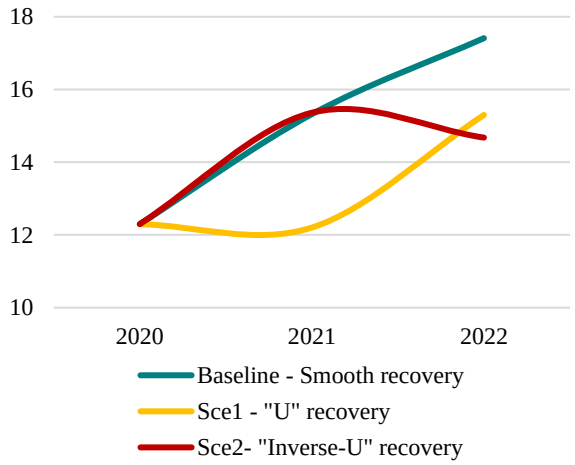
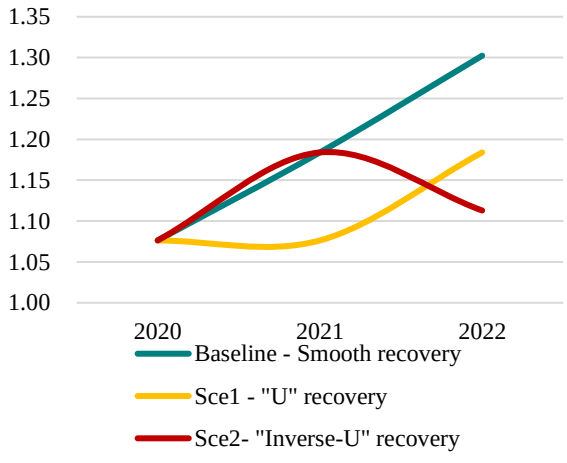


Figure 65. Mineral price index



Macroeconomic results

In the baseline "Smooth recovery" scenario, we look at how the economy develops if the the mining sector grows smoothly in 2021 and 2022. In this scenario, the demand for mineral commodities recovers in 2021, reaching 2019 levels, and continues to grow in 2022. In addition, the rise in global mineral commodity prices continue, reflecting favorable external conditions in the upcoming two years.

As mineral commodity exports make up a majority of total exports, real exports increase 13.7% and 8.3% reaching MNT 24.6 trillion and MNT 26.7 trillion in 2021 and 2022, respectively (see Table 15). Additionally, the mining sector's increased intermediate consumption and use of production inputs boost total economic demand. In particular, household income increases 10% per annum and government consumption increases by around 2% per annum in the upcoming two years. Similarly, real total investment rises 14.2% and 13.3% in 2021 and 2022, respectively. As a result of the rise in demand, total imports reach MNT 26.5 trillion by 2022. Overall, in the baseline "Smooth recovery" scenario, the economy grows 8.2% and 7.3%, respectively, in the upcoming 2 years due to mining sector growth.

Table 15. Baseline scenario - "Smooth recovery" - Macroeconomic indicators, trillion MNT

		Real GDP	Real private consumption	Real government spending	Real Investment	Real exports	Real imports
Value at market price	2020	37.13	21.19	5.44	8.87	21.63	20.00
	2021	40.17	23.27	5.56	10.13	24.61	23.40
	2022	43.11	25.82	5.67	11.46	26.66	26.50
Y-o-y growth, %	2021	8.19	9.82	2.21	14.21	13.78	17.00
	2022	7.32	10.96	1.98	13.13	8.33	13.25

In the first "U" recovery scenario, we consider the impact of a severe outbreak of COVID-19 in 2021 while the mining sector operates as in 2020. In other words, mining sector recovery is postponed by a year due to continued containment measures related to a new outbreak of COVID-19. Thus, in 2021, the economy grows by around 2%, only supported by growth in total TFP (see Table 16). However, starting from 2022, the economy recovers as mining sector expansion is fueled by external demand and a spike in global mineral commodity prices (see Table 16). As a result, real GDP grows 8.85% in 2022.

Table 16. Scenario 1 – "U" recovery - Macroeconomic indicators, trillion MNT

		Real GDP	Real private consumption	Real government spending	Real Investment	Real exports	Real imports
Value at market price	2020	37.13	21.19	5.44	8.87	21.63	20.00
	2021	37.86	21.56	5.64	8.85	21.84	20.03
	2022	41.21	23.77	5.79	10.21	25.01	23.57
Y-o-y growth, %	2021	1.97	1.75	3.68	-0.23	0.97	0.15
	2022	8.85	10.25	2.66	15.37	14.51	17.67

Relative to the baseline "Smooth recovery" scenario, the whole economy is about 4.4% smaller by 2022 under the "U" recovery scenario due to a severe outbreak of COVID-19 (see Table 17). Real investments and imports are also more than 10% lower than in the baseline scenario. This illustrates that the longer COVID-19 lasts, the worse economic conditions will be.

Table 17. Scenario 1 – "U" recovery: Macroeconomic indicators, percentage change compared to baseline "smooth recovery" scenario

	Real GDP	Real private consumption	Real government spending	Real Investment	Real exports	Real imports
2021	-5.75	-7.35	1.44	-12.64	-11.26	-14.40
2022	-4.41	-7.94	2.12	-10.91	-6.19	-11.06

In the second "Inverse-U" recovery scenario, we consider a possible demand curb following strong Chinese economic recovery after COVID-19. Although Chinese demand is high in the near-term, especially in 2021, the demand for mineral commodities (particularly for coal and iron ore) is expected to dwindle in association with recent deindustrialization trends and the ban on coal use. Thus, the results of the second alternative "Inverse-U" recovery scenario shows the impact of reduced demand following the strong growth in 2021.

As shown in the following table, if the demand for mineral commodity exports increases 20% and the price index of mineral commodities rise 10%, economic growth is expected to be around 8.2% in 2021. This is the same as in the baseline "smooth recovery" scenario. However, the growth rate drops to 1.54% in 2022 if mining sector growth dwindles due to a decline in export demands. In this case, real investment decreases by 3.16% while real exports and imports fall 0.2% and 4%, respectively (see Table 18).

Table 18. Scenario 2 – "Inverse-U" recovery - Macroeconomic indicators, trillion MNT

		Real GDP	Real private consumption	Real government spending	Real Investment	Real exports	Real imports
Value at market price	2020	37.13	21.19	5.44	8.87	21.63	20.00
	2021	40.17	23.27	5.56	10.13	24.61	23.40
	2022	40.79	23.13	5.76	9.81	24.55	22.46
Y-o-y growth, %	2021	8.19	9.82	2.21	14.21	13.78	17.00
	2022	1.54	-0.60	3.60	-3.16	-0.24	-4.02

In 2021, as the identical shock is introduced into the simulation, the economy as a whole is the same as in the baseline "smooth recovery" scenario. However, in 2022, real GDP is 5.4% lower due to a decline in mineral commodity exports coupled with a negative price shock (see Table 19). Thus, the "Inverse-U" recovery scenario shows that it is essential to support other sectors and diversify the economy using the opportunities gained by the near-term mining sector boom after COVID-19. If the demand for mineral commodities falls more than the initial surge, the negative impact of COVID-19 on the economy could persist in the long-term.

Table 19. Scenario 2 – "Inverse-U" recovery: Macroeconomic indicators, percentage change compared to baseline "smooth recovery" scenario

	Real GDP	Real private consumption	Real government spending	Real Investment	Real exports	Real imports
2021	0.00	0.00	0.00	0.00	0.00	0.00
2022	-5.38	-10.42	1.59	-14.40	-7.91	-15.25

The following table shows the budget deficit generated under the three scenarios. As the mining sector constitutes more than one-fourth of total budget revenue, the impact of the boom-and-bust cycle of the mining sector on budget indicators is enormous. As shown in the table below, the budget deficit decreases from MNT 3.56 trillion to MNT 3.24 trillion in the "Smooth recovery" scenario. In the "U" recovery scenario, the budget deficit is more than 20% higher than in the "Smooth recovery" scenario, reaching MNT 4.1 trillion and MNT 3.9 trillion in 2021 and 2022, respectively. As for "Inverse U" recovery scenario, budget deficit is the same as in the "Smooth recovery" scenario in 2021 but increases up to MNT 4.17 trillion in 2022, 28.6% higher than the baseline scenario.

Table 20. Budget deficit, trillion MNT

Year	Baseline "Smooth recovery" scenario	Sce 1 - "U" recovery	Difference baseline and Sce 1, %	Sce 2 – "Inverse-U" recovery	Difference between baseline and Sce 2, %
2020	3.56	3.56	-	3.56	-
2021	3.39	4.12	21.6	3.39	0.00
2022	3.24	3.91	20.7	4.17	28.6

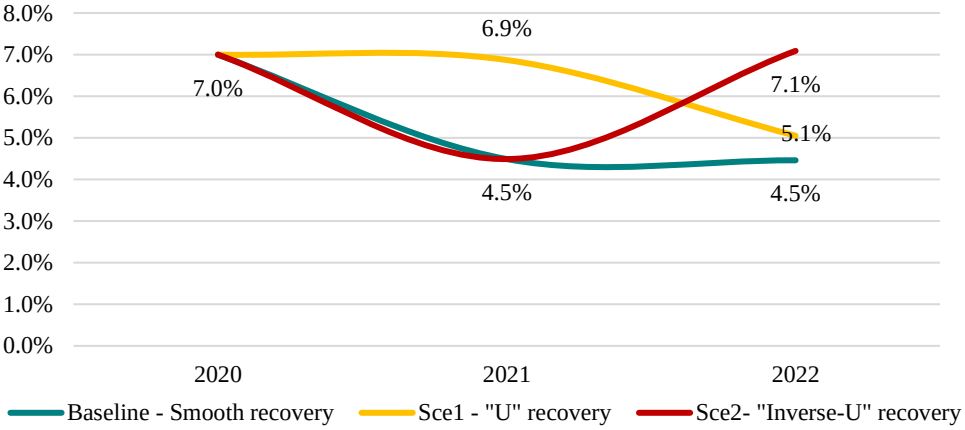
The budget deficit expanded, causing government debt to increase as a result. For instance, the debt to GDP ratio is expected to be around 10 percentage points higher in the 2 alternative scenarios compared to the baseline "Smooth recovery" scenario (see Table 21). It is important to note that the growing budget deficit will also increase the government's debt pressures as the GoM is expected to make bond repayments in the near future.

Table 21. Debt to GDP ratio, %

Year	Baseline "smooth recovery" scenario	Sce 1 - "U" recovery	Difference baseline and Sce 1, %	Sce 2 – "Inverse-U" recovery	Difference between baseline and Sce 2, %
2020	76.93	76.93	-	76.93	-
2021	72.96	81.99	9.03	72.96	0
2022	69.18	77.43	8.25	79.13	9.95

Meanwhile, the unemployment rate drops as the economy grows. In the "Smooth recovery" scenario, for instance, the unemployment rate decreased from 7% in 2020 to 4.5% in 2022 as total economic production increased (see Figure 66). In the "U" recovery scenario, the unemployment rate falls to 5.1% by 2022, considerably higher than in the baseline "Smooth recovery" scenario. As for the "Inverse-U" scenario, the unemployment rate falls to 4.5% in 2021 but increases to 7.1% in 2022, the same level as in 2020.

Figure 66. Unemployment rate, %



Overall, the three scenarios show how highly dependent the Mongolian economy is on the mining sector. The results of the scenarios highlight how mining sector growth plays an essential role in post-COVID-19 economic recovery. The sector's revival will determine how the economy recovers up to its normal level. However, as the mining sector is highly dependent on external factors and the risks associated with a new outbreak of COVID-19 persist, there are still many uncertainties in the near-term. Policy makers should consider these risks as well as possibilities of a subsequent fall in external demand following a short-term surge in mineral commodity prices and demand after COVID-19.

5. Conclusions and Recommendations

In this report, the research team tried to provide a comprehensive analysis of both the current and near-term effects of the impact of the COVID-19 pandemic on Mongolia's mining sector.

In addition to analyzing secondary data and documents, the research team conducted a phone survey among mining companies in order to analyze the impact of COVID-19 on the Mongolian mining sector in more detail. Moreover, the research team also provided a near-term economic outlook under alternative scenarios of mining sector recovery via the use of an in-house CGE model calibrated to SAM 2020.

The secondary data analysis implied that the impacts on the mining sector were a significant driving force behind Mongolia's economic slowdown in 2020. As for the mining sector, the leading external factors of slowdown were fluctuations in Chinese demand, a drop in FDI inflow into the mining sector and global price shocks. Internal shocks include production and transportation disruptions as well as labor regulations and restrictions caused by measures implemented by the GoM.

As for the phone survey, a total of 252 mining companies were included in the survey. The main purpose of the survey was to analyze the impact of the COVID-19 pandemic on mining companies, near-term expectations, and policy perceptions of mining companies. Based on the survey results, the research team was able to come to the following conclusions.

Overall, the containment measures implemented by the GoM, such as restrictions on people's movement, border closures and inter-city travel restrictions, caused significant difficulties in maintaining stable operations. Smaller companies were especially affected by these measures and many mining companies also reported facing employment and financial challenges. Most of the mining companies included in the survey reported experiencing a decrease in production in 2020, largely caused by the aforementioned restrictive measures. The majority of mining companies included in the survey sold their mineral products to the domestic market and 186 companies reported lower than anticipated sales volumes in 2020. Companies attributed the decrease in sales to lower production levels, diminished demand for mineral products, lower prices as well as transportation challenges.

On one hand, the revenues of mining companies dropped due to decreased sales and disruptions in mining operations. On the other hand, operational costs also increased due to COVID-19 related preventive measures such as increased work-place sanitation and hygiene procedures as well as regular staff testing and screening. As a result, the majority of mining companies included in the survey experienced some kind of financial problems due to COVID-19. Several could not pay wages to employees, cover operating expenses, make loan repayment nor purchase inputs involved in the production process. A significant portion of the mining companies included in the survey also reported a decrease in or delay of FDI into their projects and most had no clear expectations of how FDI will develop in the future.

In terms of specific commodities, coal companies were mainly affected by a negative shock in sales volumes rather than by a shock in prices, implying that containment measures implemented by the GoM, especially border closures, were the main factors behind reduced sales. As for copper, the negative impact of COVID-19 was felt mainly through FDI and employee's rotation schedules. Gold was not as negatively affected due to price increases and its differing trade mechanisms. However, gold companies still mentioned obstacles in the form of labor disruptions. Iron ore companies seemed to be the most negatively impacted by COVID-19 and its related restrictions. Despite price increases, iron ore production and sales dropped due to transportation bottlenecks and a loss of customers. Smaller companies were impacted the most and could not take advantage of the increase in prices.

Despite these negative impacts, mining companies were optimistic about future production and sales recovery. In fact, the companies that experienced a fall in production and sales in 2020 expect their operations to recovery in 8 to 9 months after COVID-19.

Moreover, many mining companies took appropriate action in response to the pandemic, implementing numerous human resources and financial measures. Almost half of the surveyed mining companies mentioned implementing human resource management measures to cope with regulations. These measures mainly included changing work schedules and extending roster periods. They also implemented financial management measures to continue their operations during the pandemic. Most focused on reducing operational expenditure by postponing investment and mine development, decreasing mining activities, cutting unnecessary operational costs and reducing labor cost by lowering salaries and bonuses. In addition to measures implemented by mining companies themselves, some took part in government relief measures such as social security payment, PIT and CIT exemptions. However, despite the challenges they faced, the majority of mining companies said they did not receive any financial support from the GoM. Conversely, more than half of the mining companies included in the survey said they made donations to the local and central government within the framework of social responsibility. SOEs donated the most to help overcome the negative impacts of COVID-19.

Overall, companies found COVID-19 related regulations implemented by the GoM fairly difficult to comply with. Companies found the regulations contradicting, confusing, frequently changed, and their implementation riddled with coordination failure among government agencies. In general, mining companies were unlikely to benefit from government support but were expected to finance them.

Considering the importance of the mining sector, post-COVID-19 economic recovery will likely be closely tied to mining sector growth. Thus, the research team simulated the near-term economic outlook under 3 alternative scenarios of mining sector recovery in the upcoming two years using an in-house recursive dynamic CGE model. In the baseline "Smooth recovery" scenario, steady growth in the mining sector will lead to higher total demand and the overall economy is forecasted to grow 8.2% and 7.3%, respectively, in the upcoming 2 years. In the first "U" recovery scenario, the overall economy will be 4.4% smaller than in the "Smooth recovery" scenario owing to low growth in 2021. Finally, in the second "Inverse-U" recovery scenario, economic growth will be high in 2021 before dropping to only 1.54% in 2022 due to dwindling demand. In both alternative scenarios, the debt to GDP ratio is considerably worse than the baseline scenario. The first alternative scenario illustrates the detrimental economic effect of continued pandemic conditions while the second alternative scenario highlights the importance of diversifying the Mongolian economy beyond mining.

Overall, the mining sector is integral to Mongolia's economic recovery post-COVID-19. However, the sector is also highly dependent on external factors and susceptible to COVID-19 related risks. Thus, policy makers should consider the consequences of preventative measures on the mining sector and balance mining sector growth with containing the COVID-19 pandemic.

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7. Appendix

Comprehensive plan to protect health and revive economy (2021- 2024)

	Measure	Sub-measure	Funding (MNT) and source
1	Loans to support job	○ Provide a 3-year loan with an interest rate of 3% and grace period of 1 year to support jobs	○ 2 trillion: ▪ Putting the gold from the Kharmagtai gold deposit into economic circulation – 1 trillion ▪ Government guarantee – 1 trillion
2	Youth employment support program	○ Launch electronic exchange ○ Provide scholarship of MNT 1 million for 2 months ○ Psychological and physical training ○ One month of immersive training ○ Give priority for housing programs implemented by government ○ 5000 people per month across the country will be provided training ○ Government will provide some assistance to employers ○ Provide medical checkups	○ 500 billion ▪ Source of funding is unclear at the moment
3	Housing program	○ Construction sector support: ▪ State will provide free land ▪ Uniform blueprint ▪ State connected infrastructure ▪ Supply mortgage loans ○ Citizen support: ▪ 30-year mortgage loans with 6% interest rate ▪ MNT 100 billion in loans will be provided every month	○ 3 trillion ▪ Bank of Mongolia ▪ In 2020, the average monthly mortgage loan disbursement was about MNT 35 billion under the "Sustainable Mortgage Financing Program." This will be increased to MNT 100 billion.
4	Bank of Mongolia refinancing (repo) program	○ 2-year loans with 10.5% interest rate will be provided to individuals and enterprises ▪ Up to MNT 300-500 million will be provided to individuals and enterprises ▪ Up to MNT 1-3 billion will be provided to non-mining export companies	○ 2 trillion ▪ Bank of Mongolia ▪ Repo is a financing instrument of short-term borrowing for dealers in government securities.
5	Loan support for agriculture	○ Spring planting loan (financing amount: MNT 100 billion) – 3% interest rate, 1-year ○ Cashmere preparation loan (financing amount: MNT 200 billion) – 3% interest rate, 1-year ○ Herder loan (financing amount: MNT 200 billion) – 3% interest rate, 3-year ○ Provide seeds to farming household – 10.5 thousand tons of food seeds	○ 500 billion ▪ Source of funding is not clear (Perhaps the Credit Guarantee Fund?)
6	Strategically important projects	○ Oil refineries and crude oil supply pipelines ○ Erdeneburen 90 MW hydropower plant ○ Natural gas pipeline ○ Renovation of Altanbulag and Zamiin-uud port ○ Solongo I, II, and other residential apartments in Bayangol ○ Tavan Tolgoi 450 MW power plant ○ Ulaanbaatar public water supply project and central treatment plant	○ 2 trillion ▪ Erdenes Tavan Tolgoi LC bond
	Total		**10 trillion**

SURVEY RESULTS

Figure A 1. Share of survey respondents' position

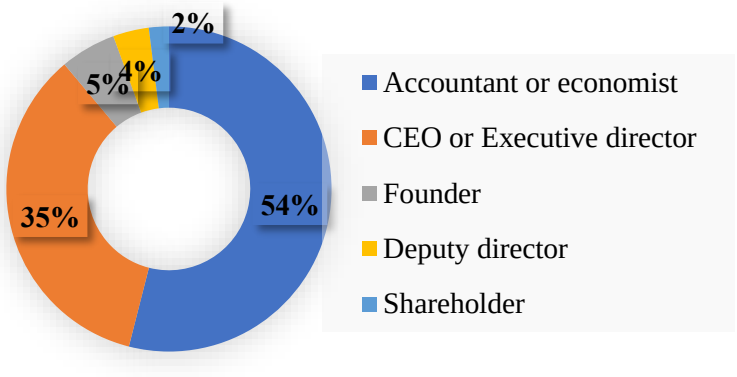


Table A 1.Surveyed companies by ownership type

Ownership type	Frequency	Percentage share, %
Company with domestic investment	182	72.2
Company with foreign investment	41	16.3
Domestic and foreign joint	23	9.1
Publicly owned	6	2.4
Locally owned	-	0.0
	252	100.0

Table A 2. Mineral processing level by mineral types, frequency

	No processing	Crushes	Washes/Sluices	Refines	Other
Coal	33	8	3	1	2
Copper	1		3	2	1
Iron Ore	4	1	5	1	4
Fluorspar	19	7	12	1	3
Zinc			1		1
Crude Oil	1				
Limestone	6	3			4
Tungsten	2		4	1	
Gravel	8	18	11	3	6
Other minerals	3	8	3	1	3

Figure A 2. Causes of year-on-year production growth

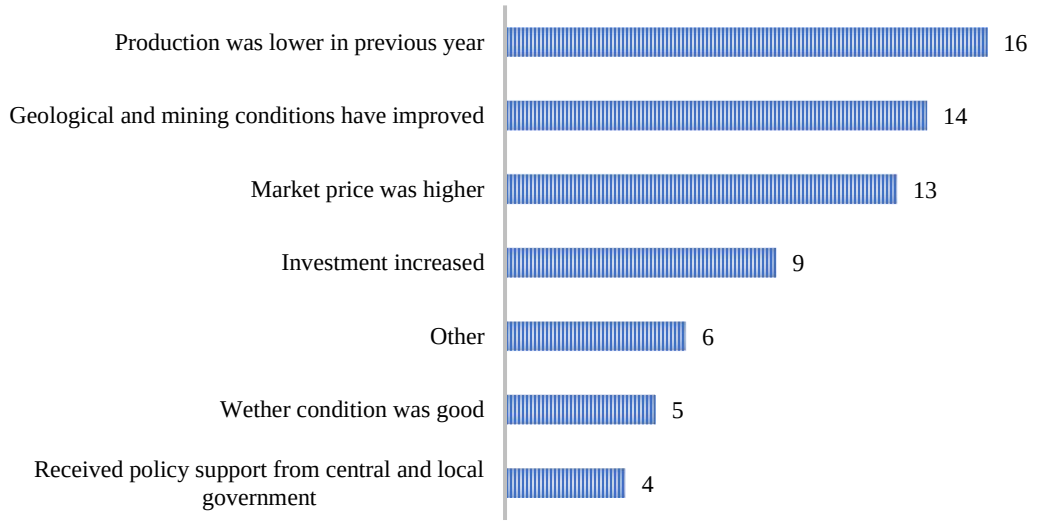
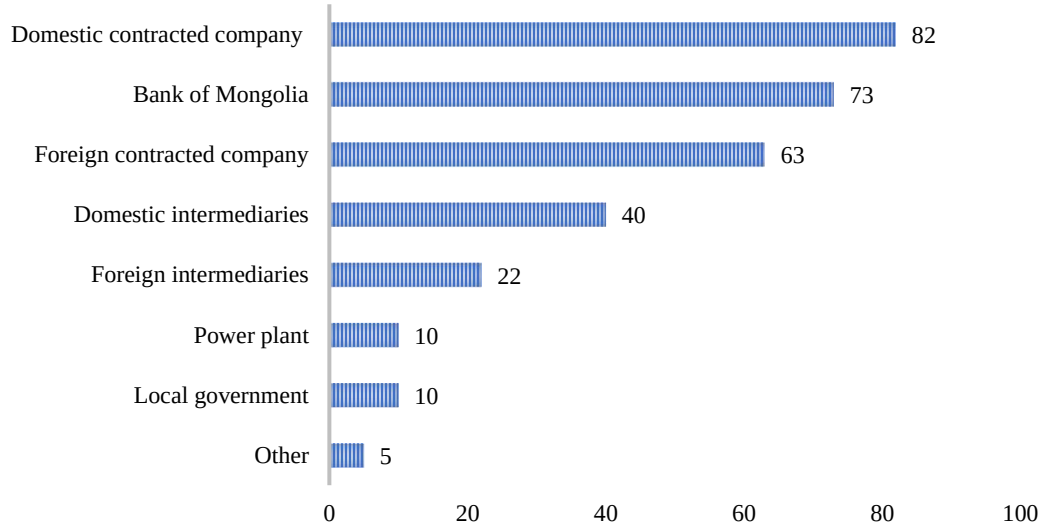


Figure A 3. Main consumer of all surveyed companies



Other consumers include individuals and company by themselves.

Figure A 4. Year-on-year change in sales by sales market

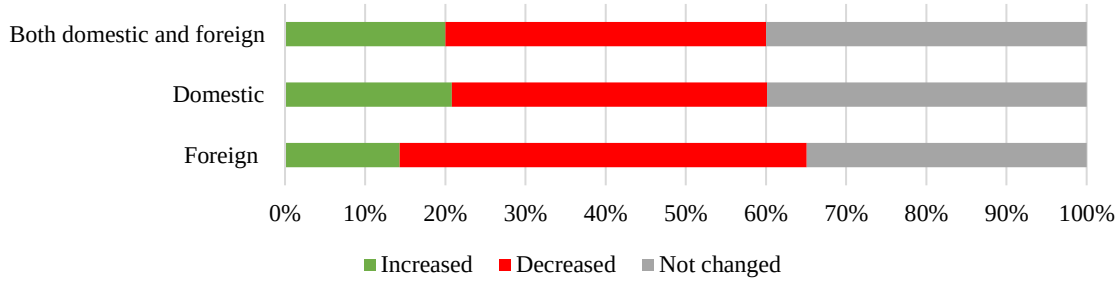


Figure A 5. Causes of year-on-year sales growth

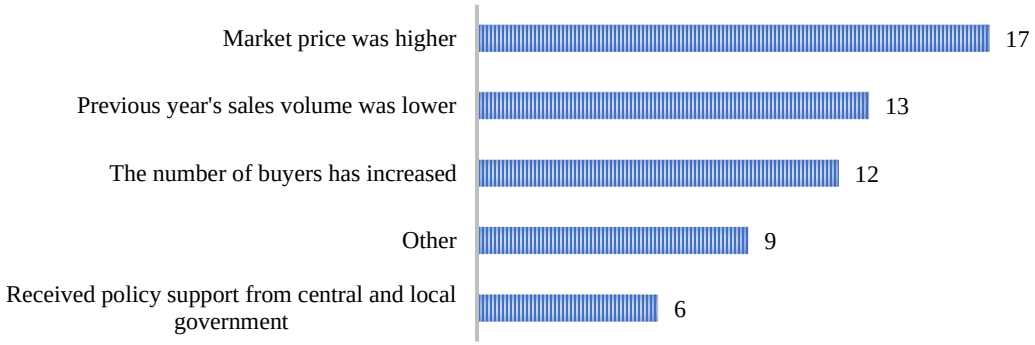


Figure A 6. Year-on-year change of average selling price

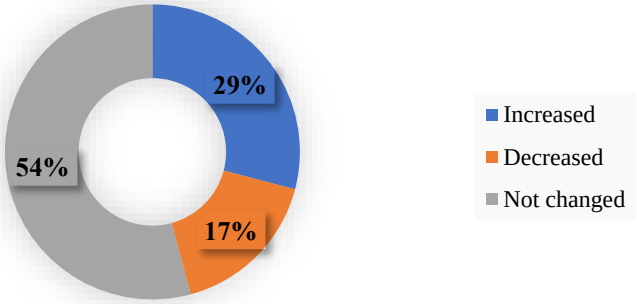
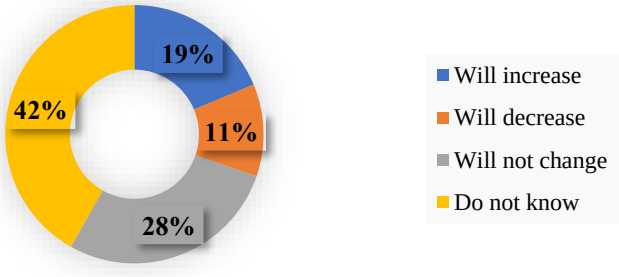


Figure A 7. Expectation of minerals selling price in 2021



Transportation

We excluded the transportation of gold companies from this section as gold companies sell their products to the Bank of Mongolia. There are no transportation issues as gold is not produced in large volumes.

Out of 174 mining companies (excluding gold mining companies), 32% (55 companies) transport their minerals themselves. The remaining 68% (117 companies) do not transport minerals themselves.

Table A 3. Transportation of minerals

	Frequency	Percentage share
Transports by company itself	55	32.0%
Do not transport - directly sell on mine gate	53	30.8%
Do not transport - contracted with subcontractor	53	30.8%
Do not transport - Other	11	6.4%
	172	100%

For 55 companies that transport minerals themselves:

Figure A 8. Shipping destination

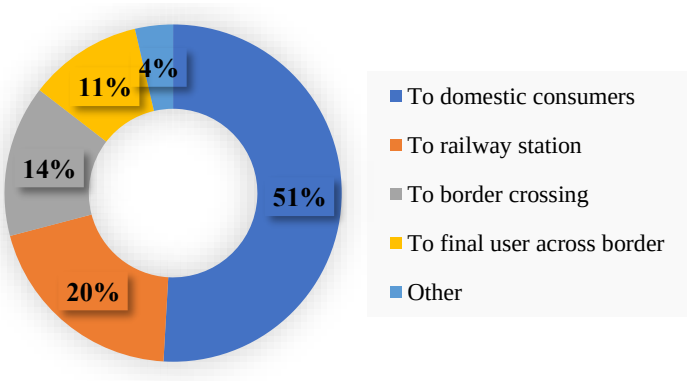


Figure A 9. Transportation vehicle

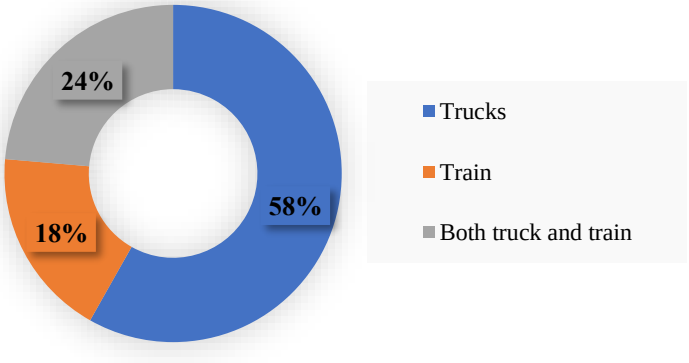
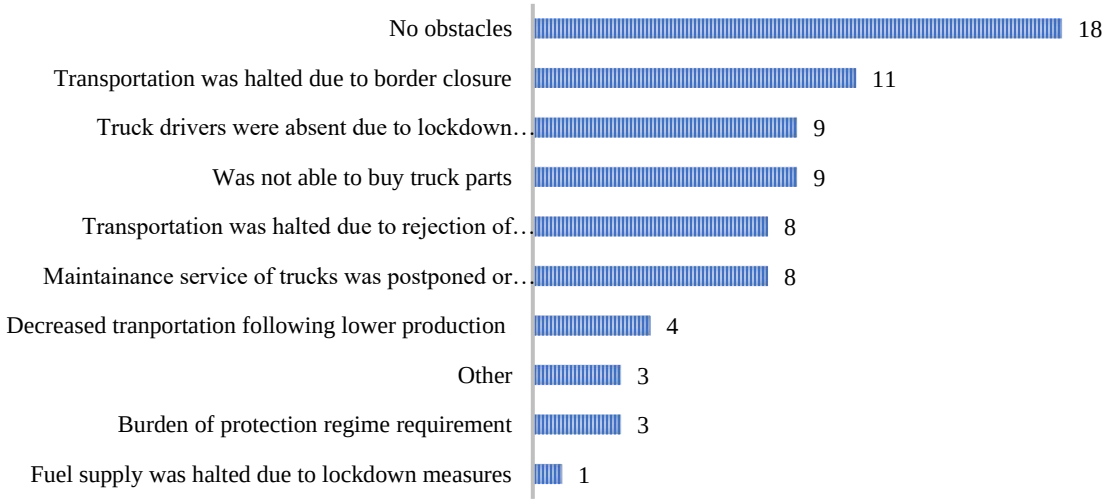
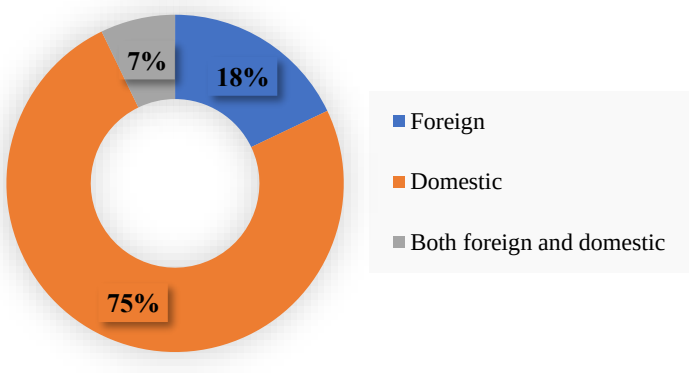


Figure A 10. Obstacles in mineral transportation



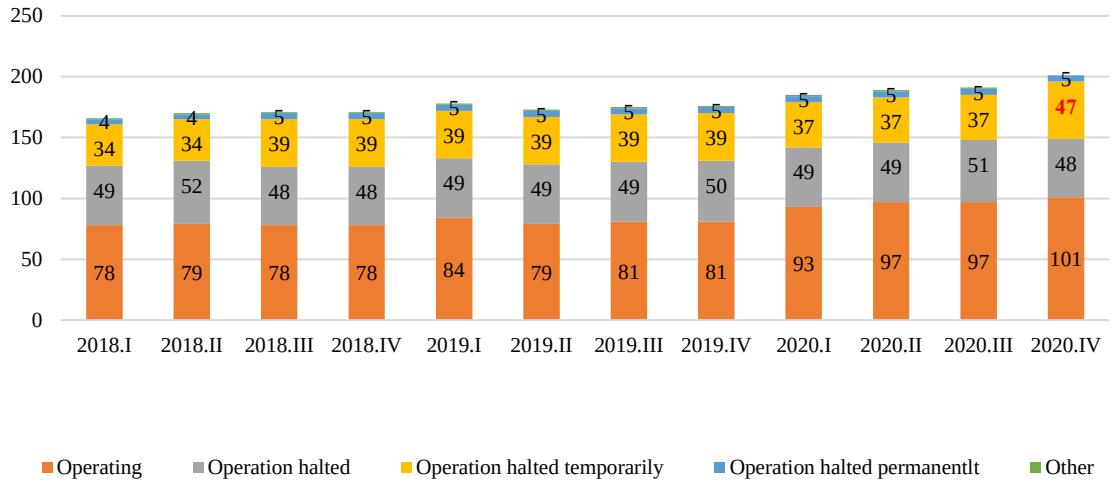
Other obstacles faced in transportation include the shortage of railway wagons.

Figure A 11. Investment source



Coal mining companies

Figure A 12. Coal companies in business register database



Source: NSO

Figure A 13. Annual average production quantity of surveyed coal companies (n=45)

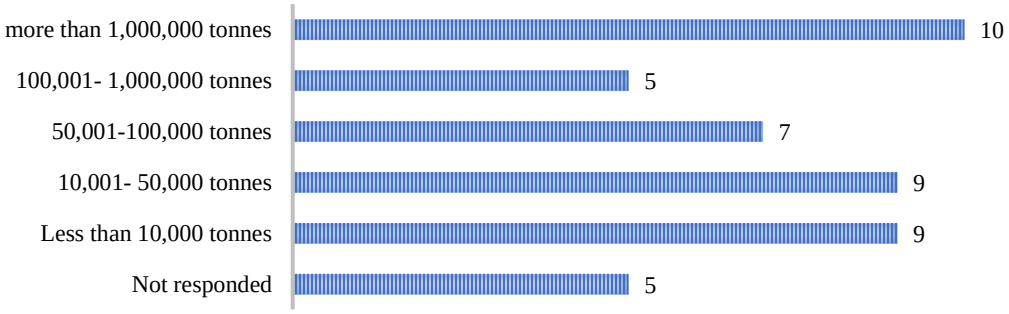


Figure A 14. Coal processing level

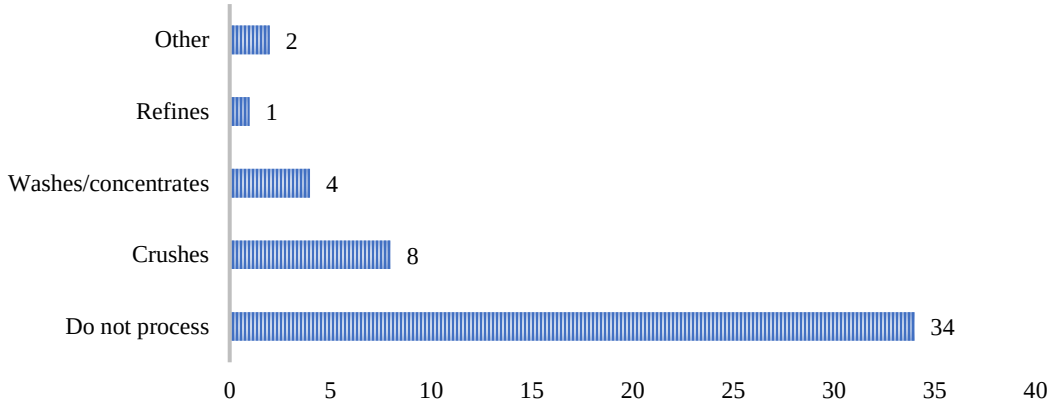


Figure A 15. Causes of year-on-year growth, frequency

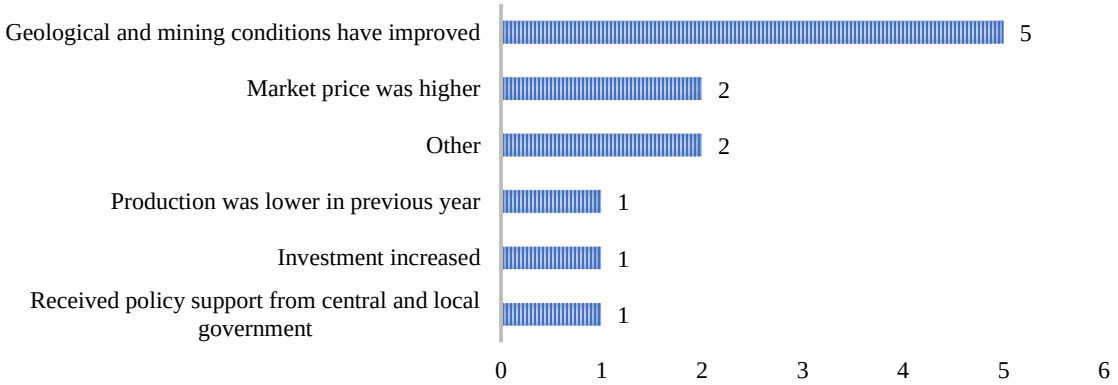


Figure A 16. Causes of year-on-year coal mining companies' production decrease by frequency

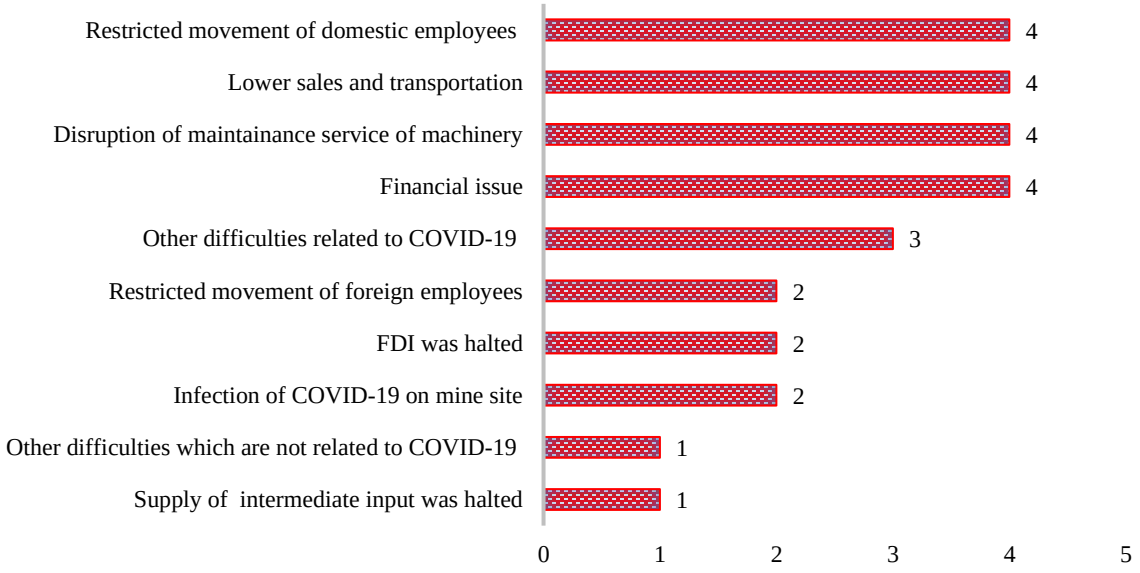


Figure A 17. Annual average sales quantity of surveyed coal companies, tonnes

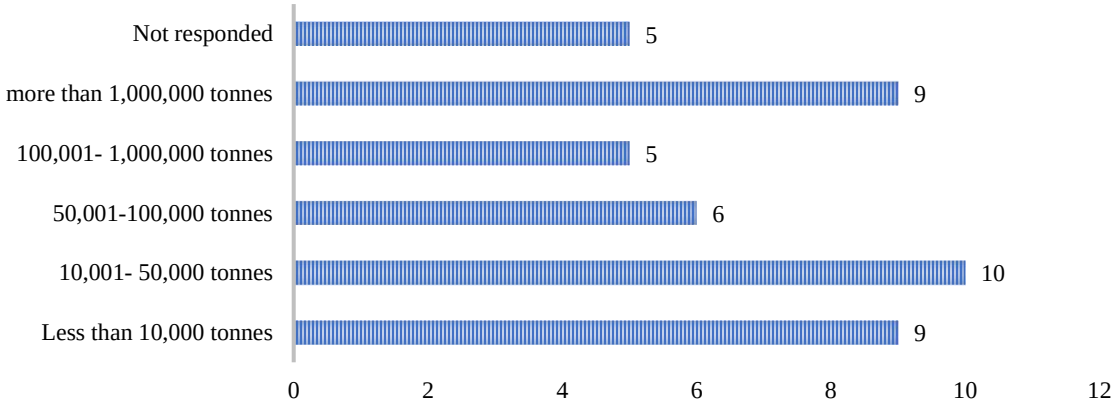
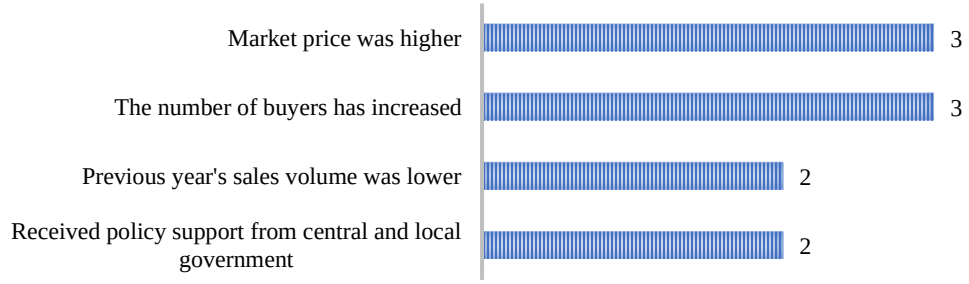
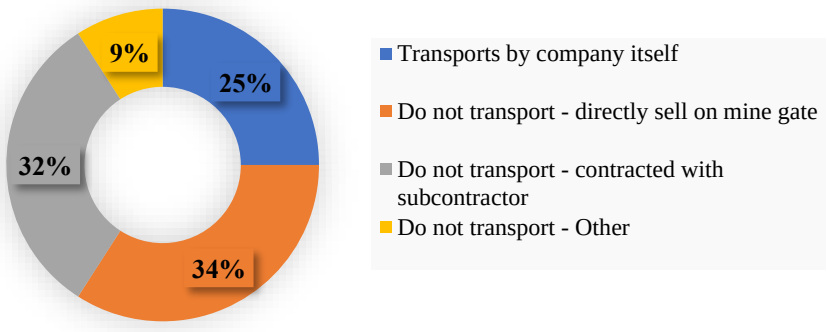


Figure A 18. Causes of year-on-year sales growth



Transportation of coal companies

Figure A 19. Transportation of coal mining companies



25% (11 companies) of surveyed coal companies transports coal themselves. Out of the 11 coal companies, 8 (72.7%) transport their produced coal to domestic consumers.

Table A 4. Transportation destination of coal companies

	Frequency	Percentage share
To domestic consumers	8	72.7%
To railway station	1	9.1%

To border crossing	1	9.1%
To final user across border	1	9.1%
Total	**11**	**100.0%**

Only one company transports its coal until the end user across the border.

Figure A 20. Transportation vehicle

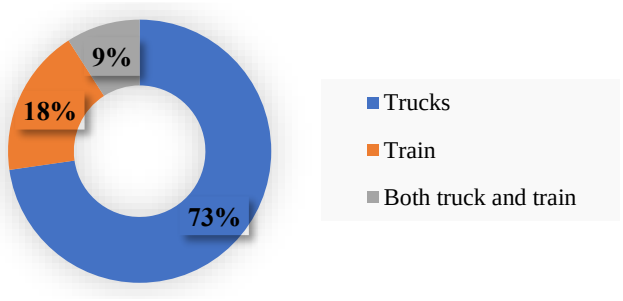
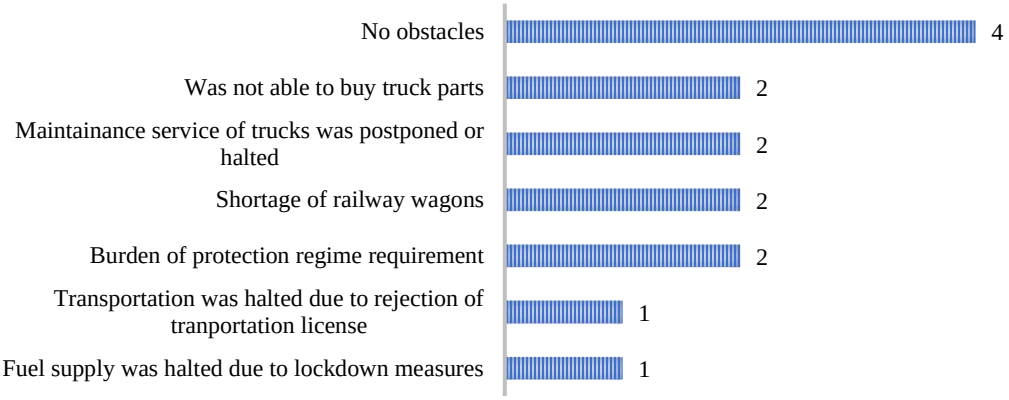
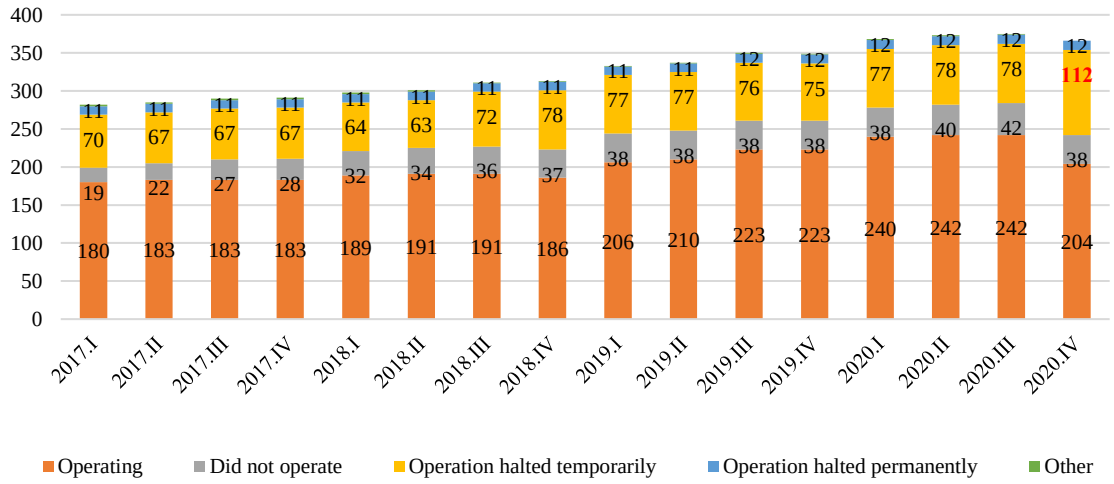


Figure A 21. Obstacles faced in coal transportation



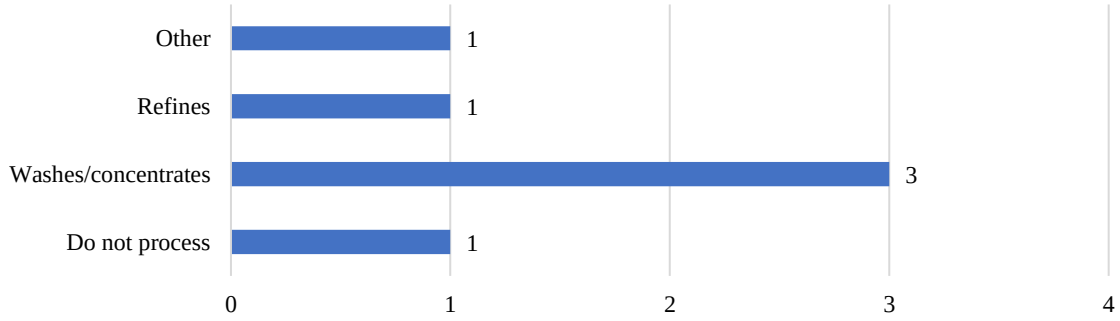
Copper market

Figure A 22. Metal companies in business register database



Source: NSO

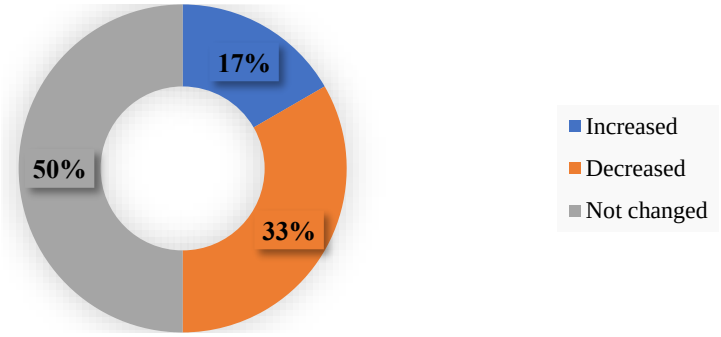
Figure A 23. Copper processing level



2 companies refused to report their annual production quantity.

Only one company experienced an increase in productio. However, this was because the company did not operate in 2019. 2 copper mining company experienced a decrease in production in 2020. The production of 3 copper companies remained stable year-on-year.

Figure A 24. Year-on-year change of production of copper mining companies



One copper company's production decreased 50% in 2020. This was mainly due to inter-city travel restrictions. In particular, the supply of intermediate inputs and machinery maintenance service were disrupted.

Both copper mining companies have positive expectations that production will recover in future. However, the recovery duration is 3 years, much longer than the average recovery duration cited by other mining companies.

Table A 5. Sales market of copper mining companies

	Frequency	Percentage share
Domestic market	3	50.0%
Foreign market	2	33.3%
Both	1	16.7 %

The main consumers of the surveyed copper mining companies were contracted domestic (4 cases) and foreign companies (2 cases).

Table A 6. Sales of copper mining companies

Sales, tonnes	Frequency
15	1
20	1
700	1
582,817	1
Not responded	2

Table A 7. Year-on-year sales change of copper mining companies

Sales, tonnes	Frequency
100%▲	1
9%▼	1
Not changed	4

EMC SOE and one other company sold their products to foreign markets. One company began sales in 2020, causing annual sales to increase 100% in 2020.

Selling price

Table A 8. Selling prices and target market of copper mining companies

Selling price	Target market	Year-on-year change
Set by contract	Foreign market	■
Current market price	Foreign market	■
Current market price	Domestic market	▲
Not responded	Domestic market	■
Current market price	Domestic market	■
Set by agreement at that time	Both foreign and domestic	■

The surveyed copper mining companies had no specific 2021 price expectations. Only one company expects the average annual copper price to increase 15% in 2021.

Transportation

Other surveyed copper mining companies did not transport copper – 2 of them sold copper at the mine gate and another 2 transported copper via a subcontractor transportation company.

One company transported copper to its domestic customers via paved road. EMC SOE transported its copper concentrate until the border via railway. EMC mentioned having no transportation issues in 2020. Another company reported that the process to obtain a transportation license took a long time and truck drivers were not able work due to the restrictive measure implemented in 2020.

Gold market

Figure A 25. Annual average production quantity of surveyed gold companies

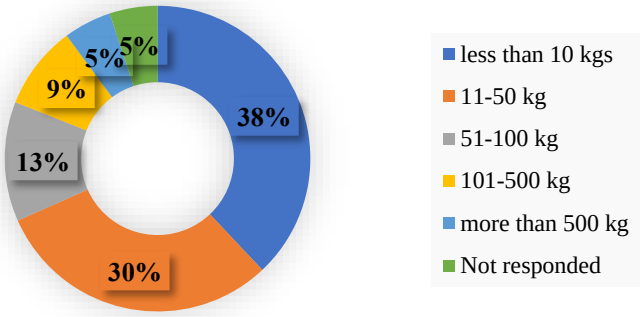


Figure A 26. Year-on-year change in production by production level

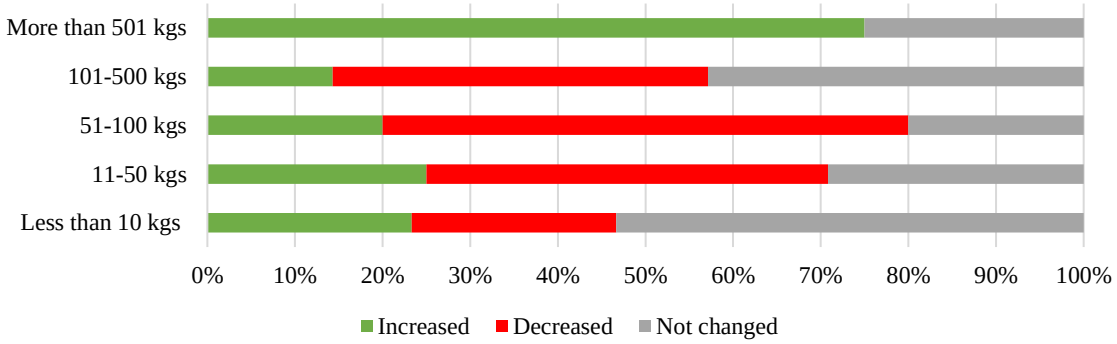


Table A 9. Sales market of gold mining companies

	Frequency	Percentage share
Domestic market	78	98.7%
Both	1	1.3%

Figure A 27. Main consumer of gold mining companies

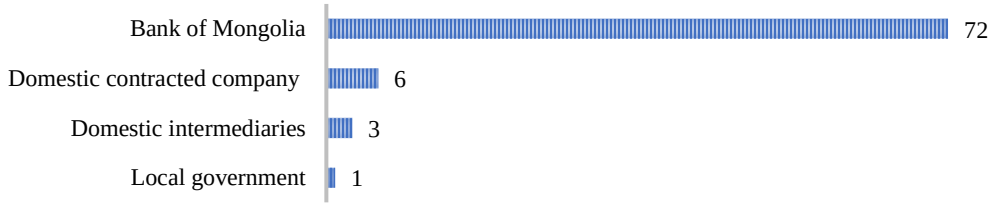


Figure A 28. Annual average sales quantity of surveyed gold companies

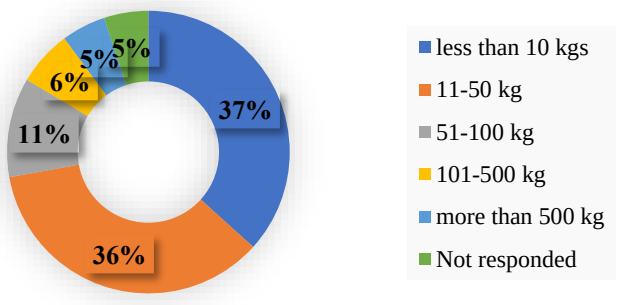


Figure A 29. Year-on-year change in sales by sales market

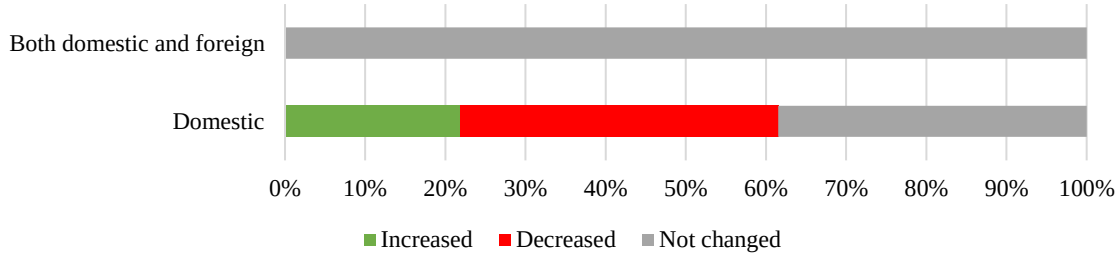
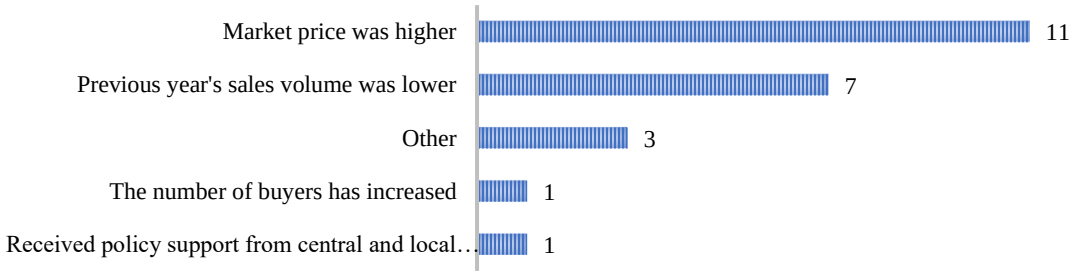


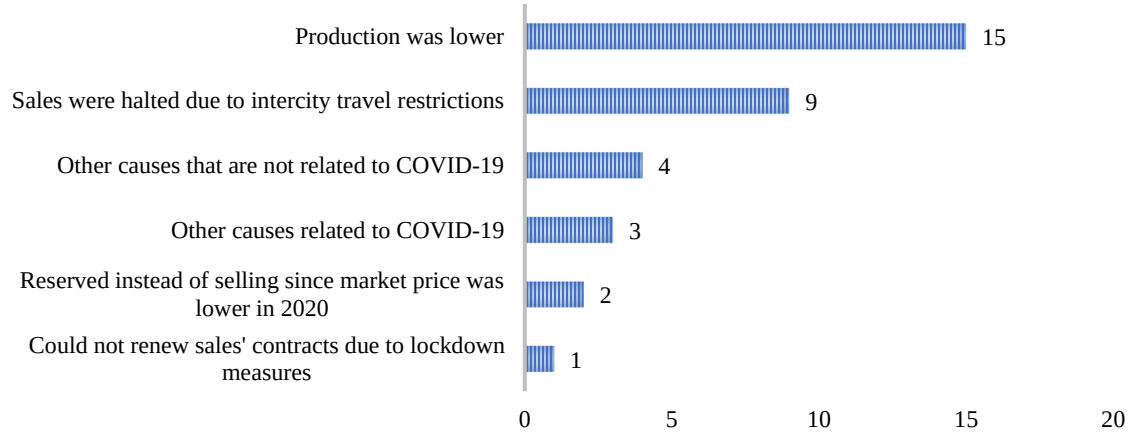
Figure A 30. Causes of year-on-year sales growth of gold mining companies



Other causes of year-on-year growth of sales in 2020 include:

- Gold ore grade was higher
- Geological conditions were better compared to the previous year
- Production ramped up in 2020

Figure A 31. Causes of year-on-year sales decrease of gold companies



Other causes of year-on-year decrease of sales in 2020 include:

- Could get loans due to lockdown measures
- Gold reserves were depleted
- Decreased number of employees

- Could not deliver mine plan on time due to restrictive measures implemented by the local government

Figure A 32. Forms of setting selling price of gold

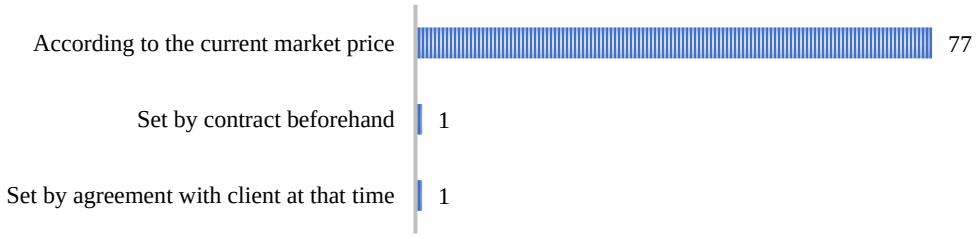
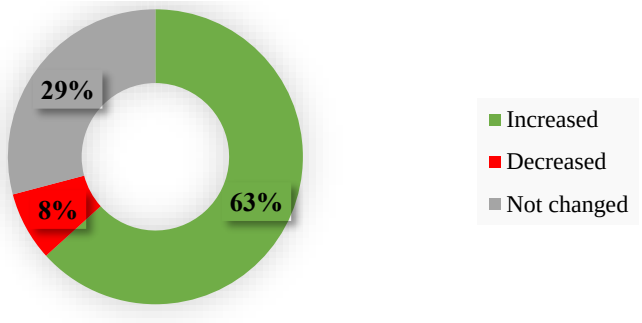


Figure A 33. Year-on-year change of average selling price of gold



Iron ore market

Figure A 34. Processing of iron ore

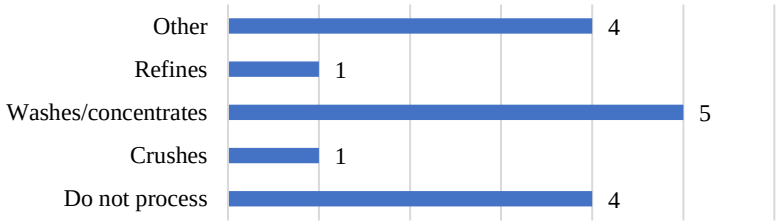


Figure A 35. Year-on-year change in production by production level

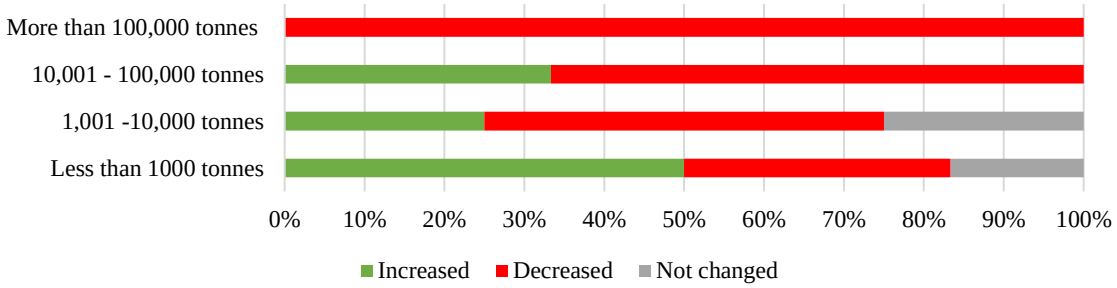


Figure A 36. Annual average sales quantity of surveyed iron ore companies

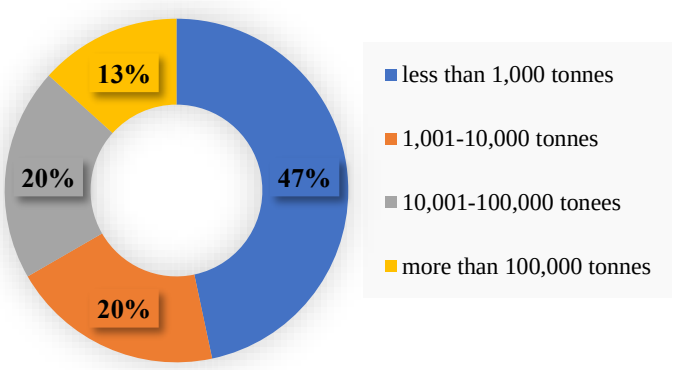
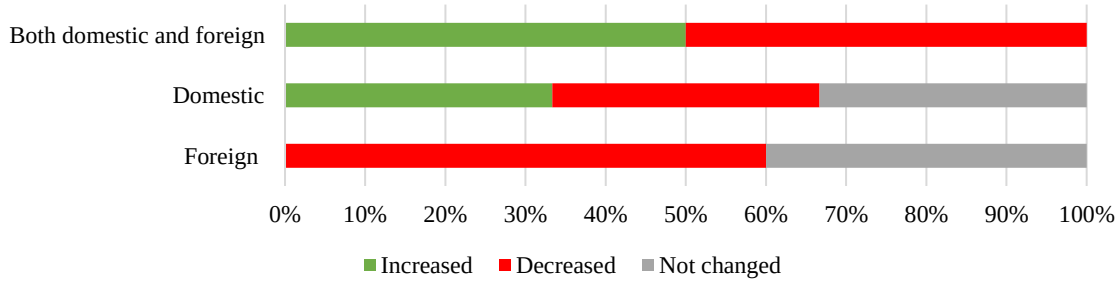
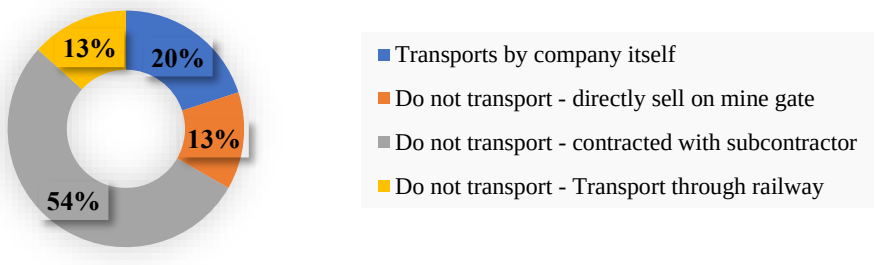


Figure A 37. Year-on-year change in sales by sales market



Transportation of iron ore

Figure A 38. Transportation of iron ore mining companies



3 surveyed iron ore companies transported iron ore by itself.

Table A 10. Transportation destination of iron ore companies

	Frequency	Percentage share
To railway station	1	33.3%
To border crossing	2	66.7%
Total	**3**	**100.0%**

Figure A 39. Transportation vehicle

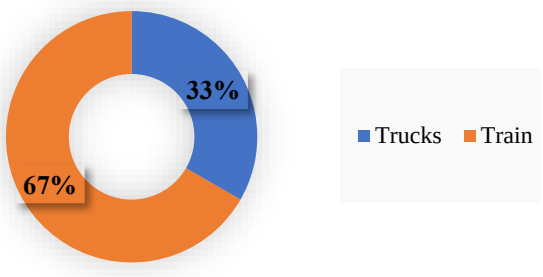
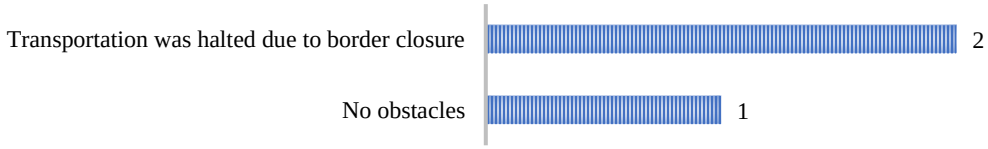


Figure A 40. Obstacles faced in iron ore transportation



SAM 2020

Production structure: The agriculture, trade services and public services sectors contributed the most to labor income while the mining, manufacturing, real state and finance sectors contributed the most to capital income. The economy as a whole was equally intensive in both labor and capital.

Table A 11. Production structure (%)

Sectors	Labor	Capital	Value added	Value added/ Total output	Factor intensity	
					Labor	Capital
Agriculture	23.3	3.3	13.4	67.1	87.9	12.1
Mining	8.1	40.0	23.8	53.7	17.2	82.8
Manufacturing	6.6	17.1	11.8	36.9	28.2	71.8
Electricity	2.2	1.7	1.9	27.1	57.6	42.4
Water Supply	0.9	0.2	0.6	37.6	78.5	21.5
Construction	4.8	3.3	4.1	24.3	59.7	40.3
Trade	16.9	2.9	10.0	58.1	85.5	14.5
Transportation	7.6	0.7	4.2	41.0	91.9	8.1
Accommodation	0.8	0.8	0.8	36.5	51.3	48.7
Information	1.6	2.4	2.0	41.1	40.8	59.2
Finance	2.9	8.2	5.5	76.3	26.4	73.6
Real Estate	0.5	11.4	5.9	77.4	4.6	95.4
Professional services	2.5	0.8	1.7	42.8	76.6	23.4
Administrative services	0.9	0.8	0.8	35.8	55.6	44.4
Public administration	7.3	2.8	5.1	61.0	72.8	27.2
Education	8.1	2.0	5.1	74.4	80.9	19.1
Health	3.9	0.9	2.4	54.1	81.4	18.6
Art	0.6	0.3	0.4	59.1	69.0	31.0
Other services	0.6	0.5	0.5	43.8	56.1	43.9
Total	**100.0**	**100.0**	**100.0**	**50.3**	**50.6**	**49.4**

Trade structure: The export of mineral commodities made up more than half of total exports (61.2%), while import of manufacturing, transportation and accommodation services made up 78% of total imports. Mineral commodities were almost completely exported while more than 60% of manufacturing products were imported.

Table A 12. Trade structure (%)

	Export	Import	Export intensity	Import penetration
Agriculture	4.4	1.6	13.0	5.3
Mining	61.2	0.1	98.9	7.4
Infrastructure	0.0	2.1	0.0	12.6
Manufacturing	21.6	67.5	31.3	61.2
Construction	0.4	3.7	1.4	11.8
Trade	0.0	0.0	0.0	0.0
Transportation	3.5	5.0	100.0	100.0
Accommodation	5.1	5.4	33.0	32.6
Postal services	0.0	0.0	0.0	0.0
Finance	0.5	1.0	4.2	8.3
Real Estate	0.0	0.0	0.0	0.0
Public administration	0.0	0.1	0.3	0.7
Education	0.1	1.5	1.2	12.1
Health	0.0	0.5	0.7	6.4
Art	0.0	0.5	0.0	31.6

Other services	3.2	10.9	13.8	33.7
Total	**100.0**	**100.0**		

Demand structure: Table A 13 shows the demand structure for each commodity. The majority of real estate services, transportation services and art services were used by households. In contrast, more than half of public services products were used by the government.

Table A 13. Domestic demand structure, %

	Household	**Government Consumption**	**Intermediate Consumption**	**Margin**	**GFCF**	**VSTK**
Agriculture	24.5	0.0	42.4	0.0	21.7	11.3
Mining	18.8	0.0	360.5	0.0	0.0	-279.3
Infrastructure	6.8	2.2	90.0	0.0	0.0	1.0
Manufacturing	36.4	0.1	44.2	0.0	13.9	5.3
Construction	0.1	0.0	35.6	0.0	73.5	-9.2
Trade	0.0	0.0	0.0	115.0	0.0	-15.0
Transportation	89.1	0.1	34.2	0.0	0.0	-23.5
Accommodation	23.1	0.2	69.9	34.4	0.0	-27.5
Postal services	6.4	0.0	132.6	0.0	0.0	-39.0
Finance	25.9	0.0	77.7	0.0	0.0	-3.6
Real Estate	94.8	0.0	21.5	0.0	0.0	-16.3
Public administration	5.0	93.6	6.2	0.0	0.0	-4.7
Education	42.0	54.6	3.2	0.0	0.0	0.1
Health	29.5	58.3	4.5	0.0	0.0	7.7
Art	57.1	45.3	10.1	0.0	0.0	-12.6
Other services	24.1	3.7	71.2	0.0	4.8	-3.8

Structure of government income and expenditure: The government received 56.6% of its revenue from households as direct taxes (44.6%) and transfers (12.0%). Other sources of income were relatively small. More than half of the budget was spent on purchasing goods and services while 46.7% was received by households as transfers. Government debt was 4.5 % of its total budget.

Table A 14. Government Budget (%)

Government revenue		**Government expenditure**	
Transfers from households	12.0	Transfers to households	46.9
Direct taxes /TD/	44.6	Transfers to ROW	5.4
Import duties /TM/	7.1	Public consumption	52.3
Export taxes	0.0	Savings	-4.5
Net taxes on products /TI/	28.7	**Total**	**100.0**
Transfers from ROW	6.2		
Net taxes on production	1.3		
Total	**100.0**		

Structure of household (private sector) income and expenditure: Capital ownership and labor were the main sources of income for households as they jointly constituted about 83.6% of household total income (Table A 15).

Table A 15. Household Income and Expenditure (%)

Household income		**Household expenditure**	
Wages	49.8	Consumption	60.0
Capital income	33.8	Direct taxes	13.2
Transfers from government	13.8	Transfers to the government	3.5

Transfers from ROW	2.6	Transfers to ROW	0.8
Total	**100.0**	Savings	22.5
		Total	**100.0**

Investment/Savings structure: The majority of total investments (89.6%) were financed by household savings while rest of the world contributed 15.7% to total investment (Table A 16). 84.2% of the total investment budget was dedicated to private investments (gross fixed capital formation). Public investments and changes in inventories made up 34.8 % and -19 % of total investments, respectively.

Table A 16. Investment/Savings Structure (%)

Source		**Allocation**	
Household	89.6	Private investment	84.2
Government	-5.3	Public investment	34.8
Rest of the world	15.7	Change in inventories	-19.0
Total	**100.0**	**Total**	**100.0**