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Steel Market developments: Q2 2022

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Note to Delegations:
This document is also available on the Steel Committee website:

oe.cd/slmktdev

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1. Executive summary

This document provides an overview of recent steel market developments - including demand, supply, and prices - and the outlook by region. The study period of this report is the second semester of 2021. Nevertheless, and in view of the significant impacts that the large-scale aggression against Ukraine by the Russian Federation (hereafter "Russia") is having on global steel markets, a section was added which discusses these developments.

Below are the key findings discussed more in-depth in this report:

- **The war in Ukraine is triggering a severe supply shock along the steel value chain.** Steel and raw material prices surged after the conflict began, though prices have eased slightly in recent weeks reflecting slower prospects for steel market growth. A key issue for many steel producers is to ensure access to raw material supplies that have been disrupted by the war.
- **The economic recovery is expected to continue, albeit at a slowing pace**. In spite of their relatively small joint share in terms of global output, Ukraine and Russia are large exporters of key minerals and energy. The movements in commodity prices and financial markets seen since the outbreak of the large-scale aggression could, if sustained, reduce global GDP growth by over 1 percentage point in 2022, resulting in a lower, 3.0% GDP growth for 2022, and increase an already high global consumer price inflation index by as much as 2.8%. The impact will be felt differently across jurisdictions.
- **The impact of the COVID-19 pandemic is gradually fading,** with most of the crude steel plants being put idled in 2020 having resumed production by early 2021 (Box 2).
- **Steel consumption recovered sharply during the first half of 2021.** Strong manufacturing activity bolstered by pent-up demand seems to have been the main contributor. In the emerging economies, especially in Asia, the recovery momentum was nevertheless interrupted by the resurgence of COVID-19 infections.
- **Steel consumption growth has slowed appreciably since then**. In its October 2021 outlook, the World Steel Association (hereafter, worldsteel) forecast finished-steel demand to grow by 4.5% and 2.2% in 2021 and 2022 respectively. In April 2022, worldsteel lowered the 2021 estimate to 2.7%, due to a sharper than anticipated deceleration in the People's Republic of China (hereafter "China"), and the 2022 forecast has been downgraded to 0.4% reflecting the impacts of the current conflict. Global steel demand growth in 2023 is forecast to increase by 2.2%.
- **Steel production has been catching up in most regions in 2021, with the exception of the Asian region.** Steel production in the Asian region, the earlier region to recover from the pandemic, has slowed down during the second half of 2021, driven by a decrease in China. According to worldsteel, global steel production decreased by 5.3% during the second half of 2021 compared to the same period in 2020 (henceforth, "year-on-year"). The largest year-on-year increases in crude steel production for the second half of 2021 were recorded in Africa (+25%), North America (+17%), European Union (henceforth EU) (+12%), South America (+10%), followed by Other Europe (+6%), Oceania (4.5%) and the Commonwealth of Independent States (CIS) (2.7%). Asian steel production decreased by 10% driven by China decreasing by 16% year-on-year. The impressive decrease was partly due to base effects, the second quarter of 2020 having been very strong in China, and to production cuts to meet Chinese authorities environmental targets, which happen to be more stringent towards the end of each

calendar year. Anecdotal evidence suggests that Chinese production is already increasing in January, as furnaces are bought back online

- **World steel trade has been steadily recovering** from the economic downturn due to the pandemic, global steel trade has shown significant improvements in 2021. Despite the sudden increase in steel prices globally and the increase in transportation costs in particular in the first part of the year, recent figures relative to the period January to November 2021 reveal a double digit increase in steel trade with respect to 2020 year-on-year. In particular, global exports have increased by about 12% year-on-year, amounting to 309 mmt and equalling the level of trade observed in 2018.
- **Steel and steelmaking raw material prices**: Steel prices peaked in July 2021 before decreasing until the end of 2021. As of December 2021, flat steel prices and rebar prices stood 13% and 2% lower than at their July 2021 peak. Nevertheless, they were still 31% and 42% higher than one year earlier. Interestingly, the sharp increase in steel prices witnessed since July 2020 did not translate into an increase in the average steel firm's profit margin. Indeed, strong increases in raw materials needed to produce steel have contributed to reduce steel firms' margins. As of December 2021, benchmark prices for coking coal and ferrous scrap are up 234% and 41%, year-on-year. On the contrary, prices for iron ore are down 26%. During the first semester of 2022 and following the start of the Ukraine crisis, both steel and raw material prices increased sharply, before reverting back quickly to their December 2021 levels.
- **Capacity increased slightly in 2021, while capacity utilisation, defined as production as a share of capacity rebounded.** Global steelmaking capacity increased to 2 454.3 mmt in 2021, i.e. by 0.2% (6.0 mmt) from the level at the end of 2020, according to the available information as of December 2021. World steel production as a share of capacity rebounded from 75.3% in 2020 to 77.8% in 2021. This is clearly the effect of the global recovery, since many plants had been put iddle during the year 2020.
- **Topical themes:** On top of the usual reporting highlighted above, this special issue presents a number of steel market related focus: i) the role of the Iranian government in the development of the steel sector in Iran, and in particular the functioning of the different government agencies that implement government policies and targets; ii) the national policies that are behind Chinese steel producer Baowu's development; iii) the heavy subsidisation of the energy sector in Iran and its evolution over the years, and, finally, iv) the particular situation of so-called "captive iron ore mines" in India. The topical themes sometimes adopt an historical approach in an attempt to explain the specificities and organisation of the steel sector in the mentioned jurisdictions.

2. Impacts of Russia's large-scale aggression against Ukraine on steel markets

The current crisis triggered a massive negative supply shock on raw materials from Russia and Ukraine, which have led to surging prices and steel production costs globally. Adjusting to the disruptions will be difficult particularly in countries for whom the main suppliers of, e.g., iron ore, pig iron, coking coal and coke are sourced mainly from Russia and Ukraine or where the availability of other important production inputs are scarce. The longer-term effects of the crisis are more difficult to predict, but may involve indirect effects on steel markets as the global economy slows and inflation increases, as well as structural changes in steel demand possibly reflecting shifts in patterns of defence spending and investments in (energy) infrastructure.

2.1. A negative supply shock along the steel value chain

The current crisis translates into a major negative supply shock along the whole steel value chain. The destruction to steelmaking plants in Ukraine and suspension of production at other plants as companies secure the safety of their employees, the disruptions in trade through the Black Sea and other routes, sanctions and bans on imports of steel from Russia, and initiatives by private companies to sever business activities in Russia and with Russian suppliers imply immediate shortages of raw materials and steel across regions, though at varying degrees depending on existing trade ties with Russia and Ukraine.

Russia is rich in natural resources and is a leading producer of many mined and processed raw materials needed by the steel industry. For example, it is the world's largest exporter of pig iron, and economies such as the United States and the EU imported more than a fourth of their pig iron imports from Russia. Demand for pig iron has shifted to other suppliers, notably Brazil, sending prices of pig iron exports much higher. Russia is also a major exporter of DRI/HBI on world markets, particularly to China and some EU countries. Russia also exported around 27 million tonnes of steel in 2020 (accounting for almost 10% of global steel exports), mainly to the EU, Chinese Taipei, the Republic of Türkiye (hereafter, "Türkiye"), and Kazakhstan. For the EU, imports from Russia and Ukraine have accounted for nearly 40% of its total steel imports in the past few years.

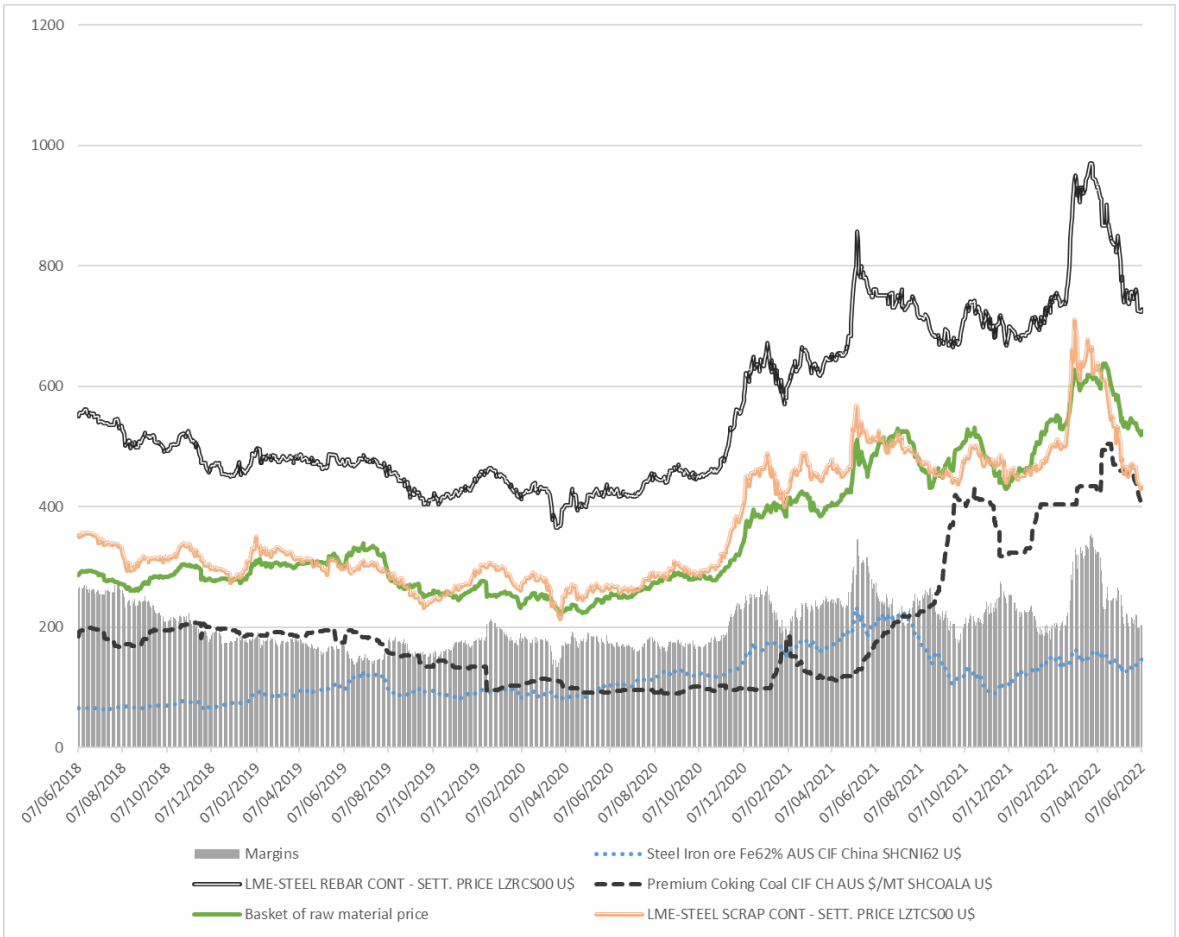
The supply shock led to an immediate surge in prices of steel and steelmaking raw materials with some easing more recently (Figure 1). The recent easing of prices may reflect growing concerns of a steel market slowdown as the economic effects of the crisis feed through to lower steel demand. In April, the World Steel Association reduced its forecast for steel demand growth in 2022 to 0.4%, down from its earlier forecast of 2.2%. The supply shock seems nevertheless to have resulted in a reduction of margins between raw material prices and steel prices, which should have negative consequences for steel firms in general (Figure 2).

Figure 1. Prices of both steel and steel raw material increased after the large-scale invasion of Ukraine by Russia

Source: James King.

Figure 2. Future prices for steel rebar and key steel-making raw materials (as of June 2022)

Steel prices and raw material prices went sharply up, then down, during the Ukrainian crisis



Note: The raw materials basket for steel production is made up of 70% of the usual quantities of iron ore (1.6 tonne) and coking coal (0.77 tonne) needed to produce steel in the integrated process and 30% of the quantity of ferrous scrap (1.07 tonne) needed to produce steel in the electric arc furnace process (see OECD, 2016). Prices used are as follows: Iron ore Fines, 62% Fe, SPOT, CFR China; Hard coking coal spot, FOB Australia; Scrap, shredded North Europe domestic price. The basket is compared against HRC world prices. The margin is defined as the per cent difference between the steel flat price and the raw materials basket price. This is consistent with

Source: Datastream (Refinitiv).

2.2. Impacts are being felt through trade and slower economic growth

The immediate impacts of the crisis are being felt through trade disruptions in raw materials. The steel industries of many countries depend closely on Russian and Ukrainian supplies of raw materials. Securing alternative sources for key raw material inputs will be a priority going forward:

- **Iron ore**: Ukraine and Russia are important exporters of iron ore, with outward shipments of 46.3 mmt (world's sixth largest) and 25.7 mmt (ninth largest), respectively, in 2020. Eastern European countries import significant amounts of iron ore from Russia and Ukraine. Poland imported 78% of its total inbound ore shipments from Ukraine. Romania imported 35% from Ukraine, while Hungary imported 42.2% from Ukraine and 41.2% from Russia. The Czech Republic imported 78.4% from Ukraine and 14.2% from Russia. Outside the EU area, Türkiye is a large importer of Russian and Ukrainian iron ore, with import shares of 12.7% and 6%, respectively.
- **Pig iron**: Russia is an export leader of this material. Several Steel Committee members are heavily dependent on Russian supplies, notably Japan (55.6% import share from Russia), Poland (42.3%), Korea (53.9%) and Türkiye (50.4%). Some economies rely on supplies of pig iron from both Russia and Ukraine, notably Italy (63.7% and 12.7%, respectively) and the United States (34.2% and 40%, respectively).
- **Coking coal**: Russia is the world's third largest exporter of coking coal. Major EU importers include: Belgium (40% imported from Russia), Bulgaria (72%), Italy (60.4%), Netherlands (43%), Germany (38.5%), and France (27.8%). The United Kingdom imports 43.6% of its coking coal from Russia. Elsewhere, Türkiye (38.1%), Chinese Taipei (21.9%), and Brazil (16.2%) are also very reliant on coking coal imports from Russia.
- **Coke**: Similar patterns emerge for coke. Russia produced 46 mmt of coke in 2020, representing a quantity that is nearly half of the production in the entire OECD area. The Netherlands, Poland and Romania are heavily dependent on Russian coke exports, with import shares of 47.2%, 34%, and 23.3%, respectively. Türkiye's import share from Russia is even higher at 50.1%.
- **Scrap**: Russia and Ukraine are not significant exporters of scrap, with Russia sending only 5 mmt of scrap abroad. Russia's export duties on scrap over the last years have reduced Russian's export volumes considerably, hence the direct impacts of the crisis on scrap export volumes were limited. However, because substitutes for scrap such as pig iron were in shortage from these countries, prices of scrap also rose substantially. Some OECD countries nevertheless rely considerably on Russian scrap, notably Korea, which imported 14.2% of its scrap needs from Russia in 2020. Scrap prices rose sharply after the war started as Turkish demand for scrap increased in order to boost EAF steel production and thus help offset steel shortages facing European steel purchasers. Moreover, difficulties in sourcing iron ore and coal from Russia and Ukraine led integrated steel producers to

increase scrap utilisation in their operations, adding further upward pressure on scrap prices.

Although steel price increases may, over time, encourage some domestic steel producers to increase the quantity they produce to meet domestic demand gaps, and shipments previously supplied from Russia and Ukraine could be diverted to other trading partners, the adjustment process will be difficult in countries for whom the main suppliers of, e.g., iron ore, pig iron, coking coal and coke are sourced mainly from Russia and Ukraine or where the availability of other important production inputs are scarce. On the raw material side, the responsiveness of supply to price is typically very limited in the short run, as the longer time necessary to ramp up production means that supply is fixed in the short run. This underscores the importance of beginning to address the challenges of raw material availability as soon as possible.

The longer-term effects of the crisis are more difficult to predict, but may involve indirect effects on steel markets as the global economy slows and inflation increases, as well as structural changes in steel demand possibly reflecting shifts in patterns of defence spending and investments in (energy) infrastructure. Russia and Ukraine consumed a combined 52 million tonnes of steel, or around 2.7 of the world's total in 2020. A drastic reduction of consumption in these economies, of say 50%, would therefore directly reduce global steel demand growth by more than a percentage point in the shorter term.

Indirect effects will also be felt through slower GDP growth across countries. A change in global GDP growth typically leads to a greater percentage change in steel demand (in the same direction) as the industry tends to be pro-cyclical. The OECD estimates global economic growth could be more than 1% lower this year than was projected before the conflict, while inflation, already high at the start of the year, could be higher than it would have been if Russia's large-scale aggression against Ukraine had not broken out by at least a further 2.5% on aggregate across countries[1]. The inflation factor is also of concern for the steel outlook. Inflation dampens household and business purchasing power, which tends to disproportionately affect spending particularly on "big ticket" durable consumer goods and equipment often made from steel. Moreover, higher inflation on construction material and higher interest rates would also reduce activity in construction, the largest end-using sector for the steel industry, as it will impact housing affordability.

2.3. The Ukrainian steel sector has been severely impacted

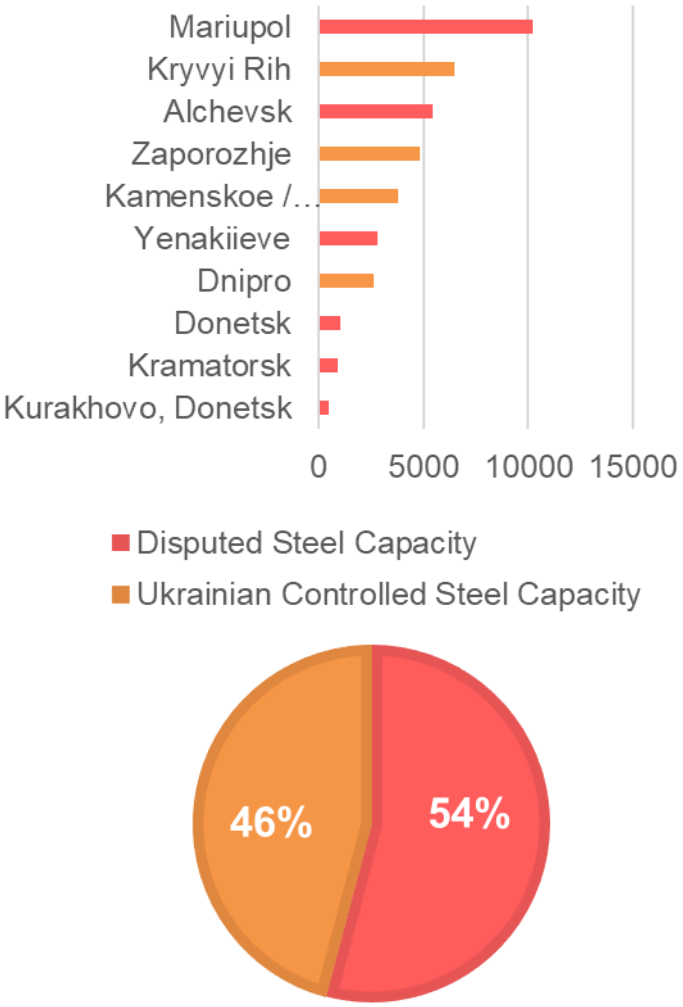
Ukraine had 15 steel plants in operation in 2021, according to the OECD's steel data, of which seven are basic oxygen furnaces (BOFs), seven are electric arc furnaces (EAFs) and one is an open hearth furnace (OHF). Before Russia's large-scale aggression against Ukraine began, the OECD estimated that Ukraine had a total of 38.7 mmt of capacity. That figure included plants not under the Government of Ukraine's effective control in Luhansk and Donetsk regions, which together accounted for 20.9 mmt of capacity in 2021.

Russia's large-scale aggression against Ukraine has rendered at least 75% of Ukraine's steelmaking capacity to be suspended, and some destroyed. Data from the World Steel Association show that production in March and April were running at only 2.5-3 million tonnes annualised, or nearly 90% below year-ago levels for those same months. Developments affecting Ukrainian steel plants since the start of the aggression include the following:

[1] https://www.oecd-ilibrary.org/sites/4181d61b-en/index.html?itemId=/content/publication/4181d61b-en

- Ukraine's biggest steel plant, ArcelorMittal Kryvyi Rih (6.5 mmt capacity), which had been operating at a third of its capacity since the Russian invasion began, fully idled operations on 3 March. However, it resumed operation of BF No.6 (1.36 mmt) on 10 April and BF No.8 (1.75 mmt) at the beginning of May. On the other hand, the company has decided to postpone the construction of a new 5 mmt pellet plant, which was originally planned to be completes in the fourth quarter of 2023.
- Azovstal (6.2 mmt capacity), the second largest plant but nearly the same size as ArcelorMittal Kryvyi Rih, has been destroyed. The plant became a symbol of Ukraine's resistance in the conflict with heavy fighting recently.
- Zaporizhstal (4.1 mmt capacity) had suspended its operations in March, but now the company is operating its facilities at 40-50% of its capacity.
- Ilyich Iron and Steel Works (3.6 mmt capacity) stopped operations completely after Russia's large-scale aggression against Ukraine started and the company still notes that it is difficult to estimate how much more time is needed for recovery.
- Interpipe Steel (1.3 mmt capacity) suspended its operation on 16 March but resumed in April.
- Dneprovsky Metallurgical Plant (1.3 mmt capacity) also idled operations on 25 March but has since been reported to be resuming operations.
- Novokramatorsky (0.3 mmt capacity) suspended its production on 28 February.
- Dneprospetsstal (0.8 mmt capacity) suspended steel smelting and hot deformation process only, but is reported to continue other operations.

Figure 3. Status of steel capacity in Ukraine as of early May 2022 (1000s tonnes)



Source: OECD Steel Capacity Database and Institute for the Study of War.

3. The OECD Economic outlook

Prior to the outbreak of the large scale aggression of Ukraine by Russia, the pace of global economic recovery had already been slowing, with many advanced economies expected to reach their pre-pandemic levels of output only in the year 2023. Manufacturing activity had been rebounding since the second half of 2020, but had started to lose momentum since mid-2021.

The most dire consequences of the war are the lives lost and the unfolding humanitarian crisis associated with record numbers of besieged and displaced people. Nevertheless, and in spite of their relatively small joint share in terms of global output, Ukraine and Russia are large producers and exporters of key minerals and energy. The moves in commodity prices and financial markets seen since the outbreak of the large-scale aggression could, if sustained, reduce global GDP growth by over 1 percentage point in 2022 and increase an already high global consumer price inflation index by about 2.5%.

Although the war had not started at the time of the writing of this paper, a section on the impacts of this crisis on the steel sector has been provided above to complement the information contained in this report with the most recent events. The estimates provided in the rest of this section are taken from the OECD's June 2022 Economic Outlook, while the main text draws on both the OECD's December 2021 and June 2022 Economic Outlooks. Further information and estimations of the effect of the aggression can be found on the OECD webpage[2].

Besides a continuation and aggravation of the war, significant risks surrounding the outlook include a resurgence of the COVID pandemic in China that could disrupt supply chains further, a downturn in the Chinese real estate sector, as well as uncertainties related to power supply, rising cost pressures, and high levels of government debt.

3.1. Global prospects

The economy has continued recovering in 2021, albeit at a slower pace: is expected to decelerate to 3.0% in 2022 and 2.8% in 2023, according to the OECD's June 2022 Economic Outlook (Table 1). Even prior to the invasion of Ukraine, the recovery had been fragile and unequal across sectors and jurisdictions, with hardest-hit, contact-intensive sectors still lagging behind. Persisting supply bottlenecks, rising input costs and the continued effects of the pandemic are weighting down on the pace of the recovery. A stronger and longer-lasting than expected inflation had emerged world-wide prior to the crisis (Figure 7), led by a strong rise in food and energy prices that only worsen once the war started. Inflation generally affects medium to low income households disproportionally, weighting on final consumers' consumption, creating uncertainties for the economic outlook and raising significant policy challenges. As production catches up with pent-up demand and the labour force participation rate increases, supply-side constraints were expected to ease in 2022 and 2023, which should have a dampening effect on inflation. Nevertheless, inflation is expected to be higher than it was prior to the pandemic in most countries. Most advanced economies should return to their pre-pandemic output path by 2023, albeit with a considerably greater debt burden. Indeed, fiscal policy has been used extensively to cushion the impact of COVID-19 restrictions on households'

[2] Please refer to https://www.oecd.org/economic-outlook and https://www.oecd-ilibrary.org/sites/4181d61b-en/index.html?itemId=/content/publication/4181d61b-en

purchasing power and on private businesses, which considerably increased public debt, while measures hurting economic activity decreased government tax collections.

The invasion of Ukraine, along with shutdowns in major cities and ports in China due to the zero-COVID policy, has generated a new set of adverse shocks that have worsen the general situation. Growth is set to be considerably weaker than previously foreseen in most economies, especially in Europe, where an embargo on oil and coal imports from Russia is incorporated in the projections for 2023. Commodity prices have continued to rise substantially, reflecting the importance of supply from Russia and Ukraine in many markets, adding to already existing inflationary pressures and hitting real incomes and spending, particularly for the most vulnerable households. In many emerging-market economies the risks of food shortages are high given the reliance on agricultural exports from Russia and Ukraine. Supply-side pressures have also intensified as a result of the conflict, as well as the shutdowns in China due to the country's zero-COVID policy.

Significant risks remain around GDP growth projections. New, more contagious or aggressive forms of COVID-19 variants may emerge, including variants more prone to escape previously acquired immunity. Outcomes in China could also disappoint if the issues related to the Chinese real estate sector and with power supply persist or intensify, which could have adverse effects on other economies through global trade linkages. Inflation could continue to surprise on the upside markets and policy makers alike, with more persistent supply pressures than anticipated or a stronger and more sustained surge in energy costs. This in turn could trigger a financial market repricing in anticipation of a more restrictive monetary policy, and expose vulnerabilities stemming from high levels of debt and stretched asset valuations. Furthermore, a pro-tracted war in Ukraine may have larger global impacts than currently assumed, especially in the case of an abrupt Europe-wide interruption of flows of gas from Russia, a further increase in commodity prices, or stronger disruptions to global supply chains. The continuing escalation of the conflict would lead to even direr consequences.

Table 1 below presents the GDP growth forecasts according to the OECD's June 2022 Economic Outlook. There is nonetheless considerable uncertainty around the projections presented in this table, due to set of challenges outlined above and the uncertainty surrounding the current war in Ukraine.

Table 1. The OECD economic projections (June 2022)

Real GDP growth (%)

	2019	2020	2021	2022	2023
World [1]	2.8	-3.4	5.8	3.0	2.8
United States	2.3	-3.4	5.7	2.5	1.2
Euro area	1.6	-6.5	5.3	2.6	1.6
Germany	1.1	-4.9	2.9	1.9	1.7
France	1.9	-7.9	6.8	2.4	1.4
Italy	0.5	-9.1	6.6	2.5	1.2
Spain	2.1	-10.8	5.1	4.1	2.2
Japan	-0.2	-4.5	1.7	1.7	1.8
United Kingdom	1.7	-9.3	7.4	3.6	0.0
Mexico	-0.2	-8.2	4.8	1.9	2.1
Korea	2.2	-0.9	4.0	2.7	2.5
Canada	1.9	-5.2	4.5	3.8	2.6
Türkiye	0.9	1.8	11.0	3.7	3.0
Australia	2.0	-2.2	4.8	4.2	2.5
China (People's Republic of)	6.0	2.2	8.1	4.4	4.9
India [2]	3.7	-6.6	8.7	6.9	6.2
Russia	2.1	-2.6	4.7	-10.0	-4.1
Brazil	1.2	-4.2	5.0	0.6	1.2
Indonesia	5.0	-2.1	3.7	4.7	4.7
South Africa	0.1	-6.4	4.9	1.8	1.3
OECD [1]	1.7	-4.6	5.5	2.7	1.6
Non-OECD [1]	3.7	-2.3	6.1	3.3	3.8
World real GDP growth	2.8	-3.4	5.8	3.0	2.8

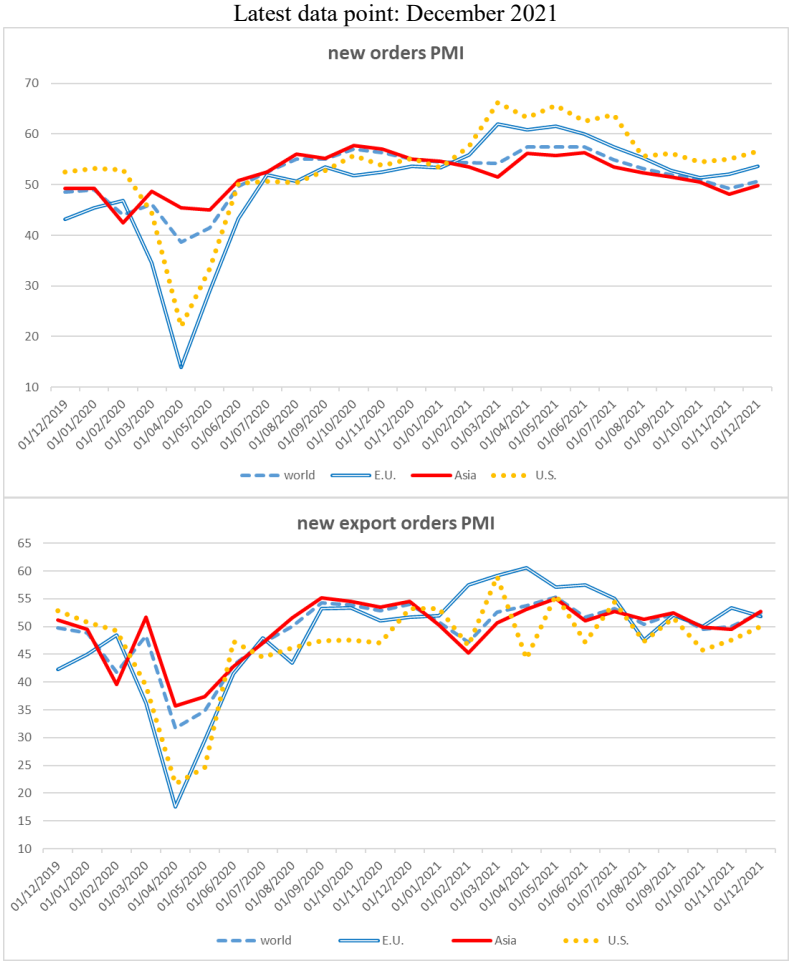
Note: 1. Moving nominal GDP weights using purchasing power parities.
2. Fiscal years starting in April.
Source: OECD Economic Outlook, June 2022, available at: http://www.oecd.org/eco/outlook/economic-outlook

Manufacturing activity has rebounded since the first impact of COVID-related lockdowns. The IHS-Markit index for new export orders of steel-intensive sectors, a forward-looking component of the overall Purchasing Managers' Index (PMI), indicated a recovery in global manufacturing activity among steel-intensive sectors had already taken started mid-2020. More precisely, in July 2020 the above-mentioned Markit indices all jumped to levels higher than 50, which indicates expectations of an increase in new orders from steel-intensive sectors over the previous month, and remained above the 50 level since, possibly reflecting better-targeted restriction measures.

Nevertheless all the indices point towards a significant loss of momentum around mid-2021. Many indices have fallen back to levels very close to the 50 level (Figure 4). A level of 50 indicates that there are as many purchasing managers forecasting a decrease of orders for the next month compared to the current month than purchasing managers forecasting an increase. Interestingly, overall purchasing managers located in Asia foresee no increase of new orders (top graph of Figure 4, index at 50) but expect an increase of their new *export* orders (bottom graph of Figure 43, index above 50), whereas managers located in the United States expect the exact opposite (increase of their total new orders yet no increase of new export orders). This could point towards a slowing down of some domestic economies in Asia, and the re-routing of Asian production to other economies. This being said, because all indices are relatively close to 50, the Markit PMI indices may not be very informative: purchasing managers remain overall split concerning the evolution of their orders.

Figure 4. Markit Steel Index: new orders and new export orders among Steel-Intensive Sectors PMI

Latest data point: December 2021



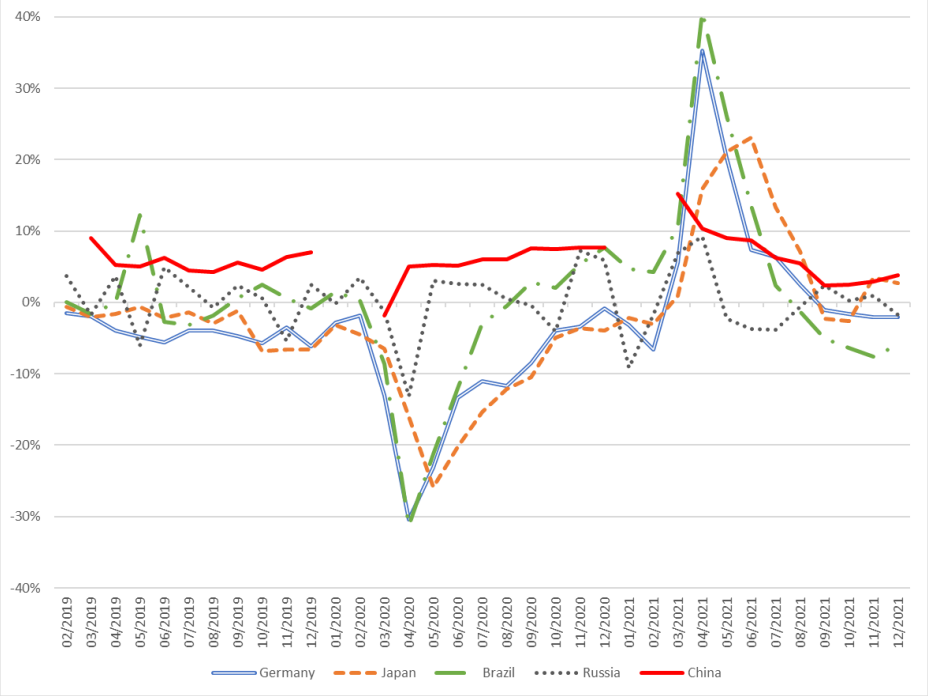
Note: An index reading of less than 50 indicates that more purchasing managers expect a decrease over the next month than an increase. The last data point represents expectations for the month of December 2021.
Source: Markit economics, via Datastream

Production data confirms, for the period elapsed, the new orders purchasing managers' expectations. Indeed, as can be seen in Figure 5, manufacturing production indices dropped significantly from February 2020 to June 2020 due to pandemic restrictions, but have regained their pre-pandemic annual growth rate[3] since, with the exception of Brazil which is experiencing a significant contraction in manufacturing production.

[3] The sharp increase in growth rate from February 2020 to June 2020 is mostly due to base effects, as this period compares the same period one year before which showed a dramatic reduction of manufacturing.

Figure 5. Industrial production has returned to its pre-pandemic levels

Indices of production for manufacturing for a few selected economies

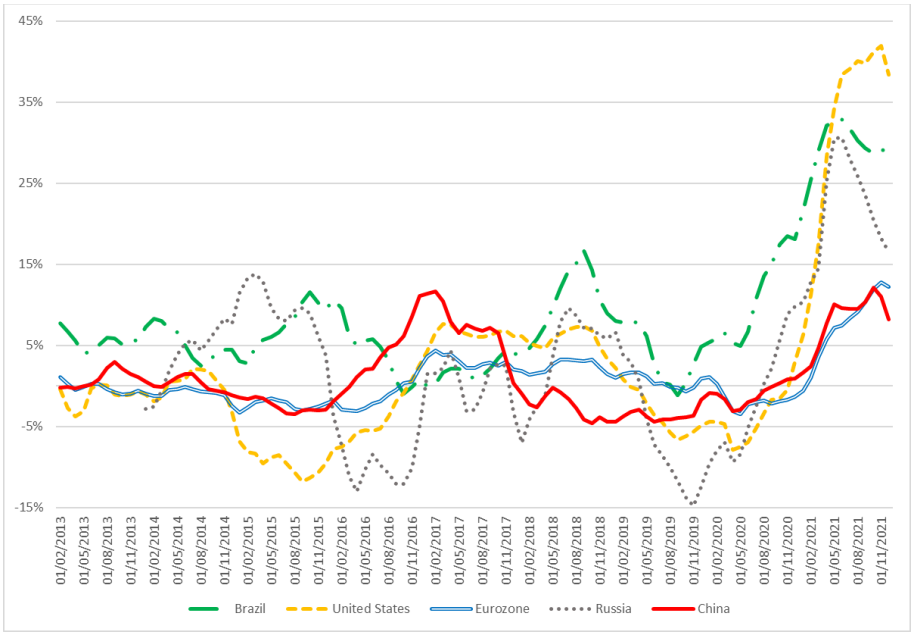


Source: national statistics of the selected economies, through Refinitiv.

A downside risk to the manufacturing sector, but also to the general economy, are the higher costs incurred by the manufacturing sector: during the second half of 2021, producer price indices stood at an all time high (Figure 5). The higher resulting price for manufacturing products can only weigh down on demand.

Figure 6. Producer price indices have increased sharply in manufacturing

Manufacturing Producer Price Indices (PPI) for a few selected economies

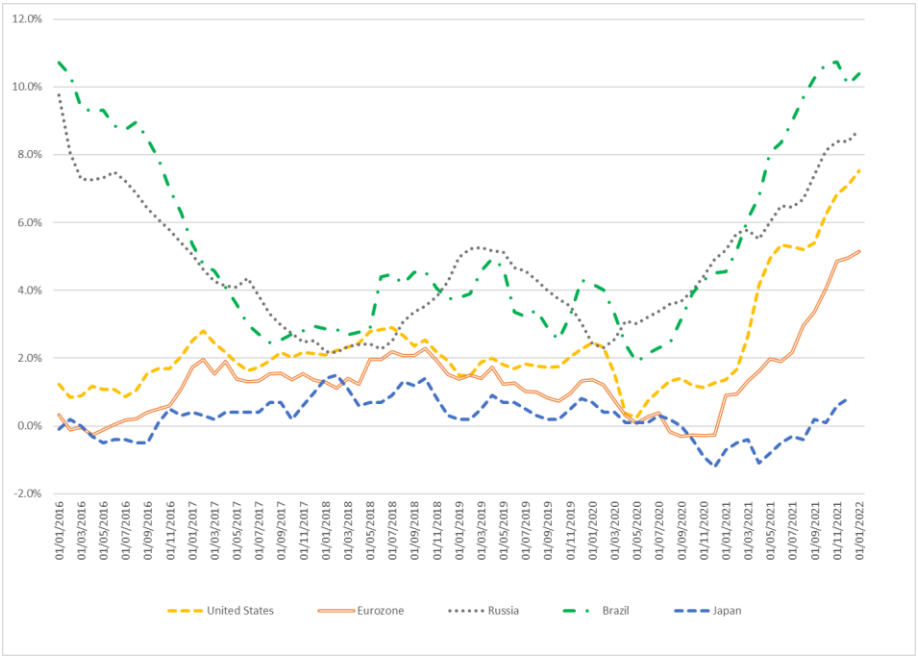


Source: Refinitiv

Figure 7 below shows that consumer price indices have significantly increased in the recent months, which as mentioned above could weigh on aggregate demand and is a risk to the economic outlook.

Figure 7. Producers are already passing part of their price increases to final consumers

Consumers Price Indices for a few selected economies



Source: Refinitiv.

3.2. Regional prospects

In the euro area, GDP is expected to grow by 2.6% in 2022 and by 1.6% in 2023, and is set to be significantly damped in the first half of 2022 by the war in Ukraine. Confinement measures have been gradually lifted, strong domestic consumption sustained by households reducing their saving rate, and higher investments owing in part to national and European recovery plans have boosted GDP growth in 2021. The ECB has maintained very favourable financing conditions for public and private borrowers through the crisis. Targeted and non-targeted longer-term refinancing operations and the bank's pandemic emergency purchase programme (PEPP) are set to continue for the time being, as well as the Public Sector Purchase Programme (PSPP). Net asset purchases from the ECB are nevertheless planned to end early in the third quarter of 2022. On July 2021 the ECB adopted a new "symmetric" inflation target of 2% over the medium term[4], which provides the central bank with more room for maintaining rates lower for longer, even when inflation moves above its official target of 2%. Nevertheless, the recent rise of inflation may call for a tighter monetary policy going forward, as inflation expectations have started to pick up. On the fiscal side, national policies provided substantial fiscal support to activity in both 2020 and 2021. On top of the operation of automatic stabilisers, governments provided discretionary stimulus amounting to about 2 percentage points of euro area GDP in 2021. A gradually less supportive stance is expected in 2022 and 2023 due to the phasing out of discretionary support measures. The medium-term fiscal outlook at the national level will depend on the precise timing and conditions for the reinstatement of the Stability and Growth Pact, which aims to prevent negative consequences of fiscal policies or to correct excessive budget or excessive public debt burdens.[5] The European Fiscal Board advised to extend the suspension [6] of the Stability and Growth Pact until the end of 2022. Unemployment has continued to decline: in April 2022, the euro area seasonally-adjusted unemployment rate was 6.8%, down from 8.6% at its recent peak in September 2020. Nevertheless, the escalation of sanctions on fossil fuels (coal, oil and possibly natural gas in the future) may have profound adverse macroeconomic effects in Europe, especially in European countries that are the most dependant on Russian energy.

In the United States, GDP is projected to grow by 2.5% in 2022 and by 1.2% in 2023. Supply disruptions may take longer to gradually ease compared to previous forecasts, due to the war in Ukraine and COVID-related lockdowns in China, impeding a rebuild of business inventories and a stronger consumption growth in the near-term. The labour market is continuing to improve, although nominal wages are not increasing quickly enough to keep pace with inflation. Increases in housing rents and shipping rates will contribute to higher consumer price growth than prior to the pandemic. Monetary policy, which has been very accommodative, is expected to tighten slightly, through the gradual increase in the federal funds rate has started and it is forecast that the Federal Funds Rate will reach 3-3.25% by the end of 2023. The Federal Reserve has also reduced its asset purchases. Fiscal policy has been very supportive: the American Rescue Plan, passed in mid-March 2021, contains spending measures which represent about 8.5% of GDP and was

[4] https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708~dc78cc4b0d.en.html

[5] The pact foresees that EU members should stay within the limits set on government deficit (3% of GDP) and debt (60% of GDP), and for those EU members having a debt level above 60%, to have each year a decline in debt level relative to their GDP consistent with the return to a sustainable debt burden.

[6] A "general escape clause" that allows a departure from the Stability and Growth Pact's budgetary requirements that would normally apply has been activated.

largely concentrated in 2021. Longer-term public spending plans related to physical infrastructure amounting to USD 1.2 billion was approved by Congress in Novemeber 2021 and will be implemented in the coming years, with new funding for transport networks, broadband upgrades and improvements to power and water systems. There is also proposed additional public spending over the next decade on education, healthcare, childcare support and measures to reduce carbon emissions. However, these initiatives will provide only modest support to aggregate economic output within the projection period, as they are expected to be largely funded by new tax measures. Risks to the growth and inflation projections are substantial. In particular, the war in Ukraine could have a more significant negative impact on real GDP growth and could also push inflation notably higher.

In Japan, GDP is projected to expand by 1.7% in 2022 and 1.8% in 2023. The re-introduction and expansion of the fourth state of emergency in July 2021 due to surging Delta variant infections, has held back the economic recovery, yet a new economic policy package will boost activity. In the face of the Omicron wave and energy price surge, the Japanese government supported vulnerable households and affected businesses. While the confinement measures have been lifted, the conflict in Ukraine and lockdowns in China have affected trade and prices. The government has also acted to address supply bottlenecks, including by supporting investment in semiconductor capacity. Monetary policy has remained accommodative, with yield curve control maintaining longer-term interest rates around zero as well. The Bank of Japan has also supported lending to businesses affected by the pandemic and its related lockdowns. In addition, the Bank of Japan has decided to introduce support for financial institutions that lend or invest in green projects, using interest rate differentials as an incentive. This scheme to provide long-term support towards climate targets started in December 2021, and will continue until early 2031. The new Japanese government has passed a new economic policy package in December 2021, which includes measures such as increasing the health care system's in-patient capacity, continued support for affected households and promotion of sectors that can help strengthen supply chain resilience. The package also features policies supporting longer-term growth and redistribution. Total additional government spending will be around JPY 50 trillion (9.2% of 2020 GDP), boosting economic activity mainly in 2022 and 2023. To address high energy prices, the government introduced a new subsidy from January 2022 for fuel wholesalers to moderate fuel price increases. In addition to the expansion of this subsidy in March 2022, the authorities announced a new policy package to counter surging prices in April 2022, whose total scale (including private sector spending) will be around 2.4% of GDP.

In the People's Republic of China (hereafter "China"), economic activity rebounded by a robust 8.1% in 2021 and growth is expected to be 4.4% in 2022 and 4.9% in 2023 in spite of mounting global headwinds. The impacts of the war in Ukraine have mostly been felt through the impact on global markets as neither Ukraine nor Russia is an important economic partner for China (unlike vice versa). The release of edible oils reserves has helped keep food inflation under control, despite price rises in international markets due to the war in Ukraine. China's large grain reserves and export restrictions in the form of quotas is expected to mitigate the impact of rising global grain prices on domestic inflation and reduce the risk of shortages. Growth will be supported by investment in the climate transition and the frontloading of infrastructure projects. During the second semester of 2022 the recovery has been driven by strong exports following the re-opening of many overseas economies as well as by investment, and trade growth has remained very strong, in spite of industrial production decelerating in the second half of 2021. Evergrande, a large Chinese real estate company, defaulted on part of its debt obligations on December 2021.This event shook Chinese financial markets and investors' confidence in the sector, thereby weakening real estate investment, which had been an important driver of growth.

Credit events in the property market led to tightened financial conditions not only for companies in the real estate sector but also for those considered high-risk borrowers such smaller private companies in other sectors. Although total bank credit growth seems to have only slightly decreased, there has been a more pronounced contraction in shadow banking credit in 2021 than in the previous years. Stringent regulations were passed to rein in real estate investment (restrictions related to banks' financial ratios as well as caps on real estate lending by bank type) and prices have tightened liquidity conditions for property companies and even pushed some other large real estate companies to default. Furthermore, temporary power cuts in some provinces also had a dampening effect on manufacturing investment during the second half of 2021. Although domestic consumption has so far proved resilient, adverse confidence effects coupled with inadequate social protection could negatively affect households' consumption going forward. On the monetary policy front, short term growth concerns arising from the impact of government lockdowns due to COVID outbreaks as well as from the credit events negatively impacting the real estate sector led to a number of rates cuts. In December 2021, the People's Bank of China (PBC) cut the one-year Loan Prime Rate (LPR) by 5 basis points (bp), the first rate cut in almost two years, and in January 2020 it cut both the one-year and five-year LPR by 10bp and 5bp, respectively, to 3.7% and 4.6%. The five-year LPR is used as a benchmark for many mortgage loans, hence decreasing it increases loan affordability for households. It also cut the Medium-Term Lending Facility (MLF) policy rate by 10 bps to 2.85%.[7] Fiscal policy is projected to also remain supportive in the coming years until the recovery is solid in most sectors. For instance, debt moratoria are being extended on a case-by-case basis and firms hit by the crisis can carry over losses for 8 years altogether. Lower-than-statutory social security contribution rates (for unemployment and work injury insurance) can be applied until end of April 2022. Furthermore, as the share of unsold properties reached the highest level in thirteen years, many cities adopted stimulus measures such as lump-sum or per-square-metre subsidies for first-time buyers, tax reductions, or broadening the definition of eligible home buyers. Frontloading of projects is also expected to boost real estate activity in the first half of 2022.

In India, GDP grew by 9.1% in the fiscal year 2021-2022, and is expected to grow by 6.9% in 2022-2023 and by 6.2% in 2023-2024 due to pent-up demand and robust external demand. Inflation, fuelled by food prices that are increasing faster than expected due to supply-chain disruptions and the increase of fuel prices, could negatively affect consumer sentiment. Long-term negative consequences of closing-down schools are among others a significant surge in the number of school dropouts, heightened child malnutrition due to the suspension of the cooked meal programme and of the mid-day school meal scheme in particular and increased child and maternal deaths. Investor sentiment is overall positive due to robust financial results for large corporates and record levels of merchandise exports and imports. Considerable foreign portfolio flows entered the country in 2021, increasing the Bank of India level of foreign exchange currencies and providing a cushion to mitigate negative effects of potential outward capital flows in the future. Monetary policy has been similarly supportive throughout 2021, through rate easing and liquidity provision. In spite of this relatively supporting stance, bank credit growth has remained subdued in India. Given the inflation rates, the Reserve Bank of India (RBI) began monetary policy tightening in May 2022, intending to anchor inflation expectations and limit second-round effects. Food and energy account for 53% of the Indian consumer price index basket, and fiscal measures have also been taken to contain domestically-generated inflation, such as cutting central excise duties on petrol and diesel and import duties on edible oils and coal,

[7] The MLF policy rate is the rate at which the PBC lends to big commercial banks. The MLF rate acts as a guide for the PBOC's new lending benchmarks, the LPRs.

as well as quotas and restricting for exports of selected agricultural produces. Many fiscal measures had already be taken in response to the pandemic, including enhanced support to informal workers, migrants and disadvantaged groups, remain in place. The privatisation of the state-run airline "Air India" in October 2021 may open the way to further deals that make public enterprises more efficient under new ownership, while improving the government's fiscal space. Railways and roads will also receive a considerable boost from the government through 50-year interest-free loans (Scheme of Financial Assistance to States for Capital Investment). Income support to vulnerable groups is set to remain contained, with fewer funds allocated to the National Rural Employment Guarantee scheme (MGNREGA) and housing spending unchanged.

In Brazil, GDP rebounded by 5.0% in 2021 and is forecast to increase by 0.6% in 2022 and 1.2% in 2023, underpinned by private consumption and investment. Rising inflation, the war in Ukraine, and tighter financial conditions have eroded business sentiment and household purchasing power, which should strongly dent domestic demand in the first half of 2022. The 2022 presidential election is adding uncertainty, which may contribute to subdued investment until 2023. The labour market recovery has been slow; the participation rate and real labour incomes remain below pre-pandemic levels. Brazilian exports benefited from the global recovery and high commodity prices, as well as from a favourable exchange rate. However, supply bottlenecks, lower purchasing power due to higher inflation, higher interest rates and policy uncertainty have slowed the pace of recovery. The labour market is recovering and unemployment is decreasing towards its pre-pandemic levels. The hydraulic crisis in Brazil, due to reduced rainfall in 2021, has resulted in lower water levels and contributed to higher domestic electricity prices, as two-thirds of the electricity supply relies on hydropower. The increased energy costs in turns contribute to inflation. Pent-up consumption, supported by generous government income transfers to the lowest-income households during the crisis, is also exerting upward pressure on services prices. The Brazilian central bank has accelerated the pace of monetary policy tightening to contain rising inflation and anchor inflation expectations. The Selic rate has reached 12.75%. In March 2021, Congress approved a new round of COVID-19 emergency support, not subject to the spending cap rule, worth 1.4% of GDP, consisting of cash transfers to poor households, employment support, credit incentives and health spending. The job preservation scheme ended in August and the emergency income support programme was withdrawn in October 2021. Fiscal consolidation has started at the end of 2021 and is expected to continue. The government has nevertheless proposed a new welfare programme, but it plans to finance through a tax reform. Strong commodity prices are supporting the government fiscal position at least in the short term. Oil revenues, coming from royalties and dividends, are benefiting both the central government and regional governments, which posted robust budget results in 2021 and early 2022. However, public expenditure is expected to increase in 2022, driven by higher social transfers with the new Auxílio Brasil programme, adjustments in civil servant wages, and higher discretionary expenses, resulting in an expansionary fiscal stance in 2022. Permanent increases in public expenditures pose a threat to the fiscal outlook in the longer term, especially given the weaker spending cap rule. In addition, debt-servicing costs continue to increase given tighter monetary policy.

4. Steel consumption

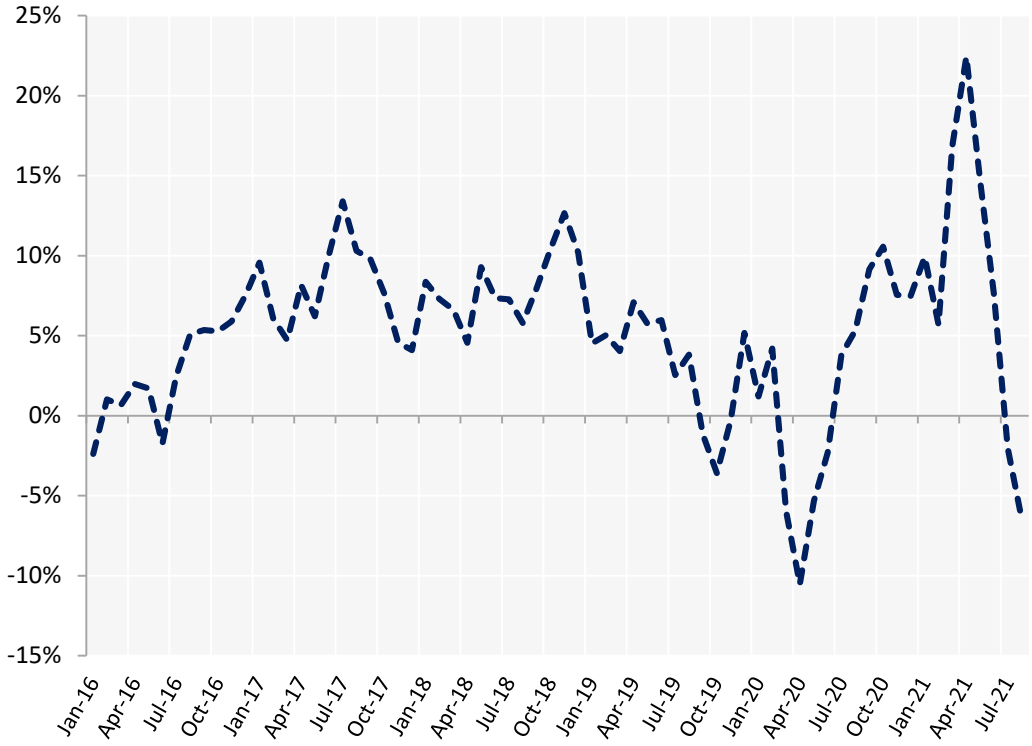
The pace of global steel consumption recovered sharply in the first half of 2021, but growth has slowed since then. All regions are expected to have recorded positive steel consumption growth on average. However, there are important divergences. Central and South America are projected to have witnessed steel consumption growth of 23% while China recorded a drop in consumption estimated at 1% due to weak real estate activity. Overall, world steel consumption is expected to have increased by 4.5% in 2021. Looking ahead, geopolitical conflicts and tighter monetary policy to address rising inflationary pressures are likely to generate significant uncertainties for steel consumption trends.

Global steel consumption increased by 4.5% in 2021, according to worldsteel's October 2021 SRO. Global steel consumption recovered sharply in the first half of 2021 compared to the same period in 2020, when it shrunk significantly due to the COVID-19 pandemic. Figure 8 below presents the monthly changes in the consumption of hot-rolled steel products for 10 of the world's largest steel-consuming economies in Asia, the CIS region, Europe, North America and South America. Together, these economies account for approximately 75% of global steel demand. Aggregate steel consumption, as measured by this indicator, increased by 8.2% in the first eight months of 2021 compared to the same period in 2020. Almost all economies except China and Russia recorded double digit increases in steel consumption during this period. However, recovery trend lost its momentum again after the summer in 2021.

In developed economies, supply side constraints caused the manufacturing recovery to level off in the second half of the year and prevented a strong recovery in 2021. Steel demand in the developing economies excluding China was supported by the recovery in commodity prices and international trade in 2021. However, new COVID waves in the second half of 2021 and a slow recovery in international tourism restrained further demand growth in developing economies (worldsteel, 2021[1]).

Figure 8. Consumption of hot-rolled steel products, major economies (aggregate)

monthly year-on-year % changes



Note: Total represents the combined consumption of hot-rolled steel products of the following economies: Brazil, China, Germany, India, Italy, Japan, Korea, Mexico, Russia and the United States.
The consumption of hot-rolled steel products is defined as the sum of production and net imports.
Source: OECD calculations based on data from ISSB (International Steel Statistics Bureau) (Platts, 2022[2])

4.1. Americas

According to worldsteel's October 2021 SRO, steel consumption in the North America region was expected to increase by 13.7% in 2021 (worldsteel, 2021[1]). Steel demand in the United States was expected to increase sharply by 15.3% in 2021. Steel demand was supported by the strong performance of the automotive and goods sectors, but shortages of some components hampered this recovery. In addition, the rise in oil prices led to a recovery in energy sector investment. At the same time, the momentum in the construction sector was not strong due to sluggish non-residential sector activities (worldsteel, 2021[1]). Construction spending increased by 8.2% in 2021; while private construction surged by 12.2%, public construction decreased by 4.2% (US Census Bureau, 2022[3]). Steel demand in Mexico was also expected to rebound by 12.9% in 2021, after shrinking by 12.1% in 2020 (worldsteel, 2021[1]). According to the Mexico National Institute of Statistics and Geography (INEGI), automotive production in Mexico declined by 2% in 2021, due to a shortage of semi-conductors (Platts, 2022[4]). Steel demand in Canada was driven by the construction sector in 2021. For instance, the total value of building permits increased by 25.6% to CAD 126.5 billion in 2021, which was the strongest annual growth rate ever recorded (Canada, 2022[5]).

Steel demand in Central and South America was expected to grow by 23.2% in 2021, the highest growth rate across regions. It was prompted by a strong recovery in the construction

and automotive sectors (worldsteel, 2021[1]). In November 2021, Alacero, the Latin American Steel Association, estimated that steel consumption in Latin America increased by 19% in 2021 and reached the highest level since 2014 due to a strong post COVID-19 economic recovery in the Latin America region (Kallanish, 2021[6]). In Brazil, steel demand rose sharply by 23.4% to 26.7 mmt in 2021, according to the local steelmakers' association Instituto Aço Brasil (IABr) (Kallanish, 2022[7]). Automotive production in Brazil also increased by 11.6% to 2.25 million units in 2021, despite global semiconductor shortages, and is expected to continue growing in 2022 (Kallanish, 2022[8]). In Argentina, construction activity grew by 34.2% in the first eleven months of 2021 compared to the same period of 2020; Strong construction demand supported steel demand (Kallanish, 2022[9]). In Chile, finished steel consumption increased by 35.9% in the first eight months of 2021 compared to the same period of 2020 (Alacero, 2021[10]).

4.2. Africa and the Middle East

Steel demand in Africa would expand by 10.4% in 2021, after shrinking by 9.7% in 2020 (worldsteel, 2021[1]). In Egypt, steel demand was negatively affected by the suspension of construction licenses in overcrowded urban areas. However, the government's major infrastructure projects supported steel demand (worldsteel, 2021[1]). In South Africa, automotive sales rebounded sharply by 22.1% to 0.46 million units in 2021 thanks to a robust demand in the vehicle rental industry as the country started to open up to overseas visitors (NAAMSA, 2022[11]).

Apparent steel consumption in the Middle East was expected to increase only by 2.0% in 2021, following a decline of 4.4% in 2020. Steel demand was below expectation on the back of reduced construction activity due to fiscal consolidation efforts (worldsteel, 2021[1]).

4.3. Asia and Oceania

Steel consumption in Asia and Oceania was expected to increase only by 1.9% in 2021, the lowest growth rate by region. In some emerging economies in Asia, the recovery momentum was interrupted by new COVID-19 waves, low vaccination rates and a slow recovery in international tourism (worldsteel, 2021[1]).

Steel demand in China would decrease by 1.0% in 2021. Real estate activity had weakened because of a regulation by China's central bank to cap property loans by banks. Owing to this regulation, China's big four banks (Bank of China, China Development Bank, Bank of Communications and Postal Savings Bank of China) cap the ratio of outstanding property loans to total loans at 40% and cap their outstanding mortgages as a proportion of total loans at 32.5% from January 2021 (worldsteel, 2021[1]) (Reuters, 2020[12]). In fact, investment in real estate increased by only 4.4% to about USD 2.3 trillion in 2021, the slowest annual growth since 2015, according to the National Bureau of Statistics (NBS) (Kallanish, 2022[13]). On the other hand, automotive production increased by 3.4% to 26.1 million units and automotive sales went up by 3.8% to 26.3 million units in 2021, according to the China Association of Automobile Manufacturers. The Chinese automotive market saw an increase for both production and sales for the first time since 2017 (Metal Expert, 2022[14]). In particular, the sales of new energy vehicles (NEVs[8]) soared by 157.5% to 3.3 million units in 2021 (Reuters, 2022[15]).

[8] NEVs mean battery electric, plug-in hybrid and fuel cell electric vehicles in China.

In India, steel demand was expected to recover by 16.7% in 2021, following 12.9% drop in 2020. From April to June 2021, India experienced a short lived second COVID-19 wave, which weighed on the output of most sectors. However, economic recovery has resumed since July 2021. As a result, India's steel demand is expected to reach 100 mmt again in 2021 (worldsteel, 2021[1]).

Steel demand in Japan was expected to increase by 10.2% in 2021, after a contraction of 16.7% in 2020, according to the October 2021 SRO by worldsteel. The manufacturing sector, especially automotive and machinery, is leading the recovery. Civil construction continues to underpin steel demand, while private construction remains subdued, with the exception of warehouses and distribution centres (worldsteel, 2021[1]). Steel consumption in Korea would rebound by around 9% in 2021, supported by improving exports and investment in manufacturing facilities (worldsteel, 2021[1]). For example, shipbuilders in Korea got new 17.44 million compensated gross tons (CGTs) orders in 2021, which was the largest order portfolio in eight years (Metal Expert, 2022[16]). However, automotive production in Korea, a key steel-using industry, shrunk by 1.3% to 3.46 million units in 2021 due to a global shortage of semiconductors (KAMA, 2022[17]).

According to the South East Asia Iron and Steel Institute (hereafter "SEAISI"), apparent steel consumption in the Association of Southeast Asian Nations region (ASEAN-6, i.e. Singapore, Philippines, Indonesia, Thailand, Malaysia and Viet Nam) expanded by 14.1% in the first half of 2021 compared to the same period in 2020. For 2021 as a whole, steel demand in each economy was forecasted to increase by 56%, 24%, 6%, 4.7%, 3.2% and 2.4%, respectively. In particular, it is expected that Singapore, Philippines and Indonesia will see their steel demand reach or exceed pre-pandemic levels during the year 2021 (SEAISI, 2022[18]). In Indonesia, automotive production surged by 62.6% to 1.12 million units in 2021, according to the Association of Indonesian Automotive Industries (GAIKINDO). This was attributed to domestic sales growth thanks to the government tax relaxation, implemented from March to December 2021 (Metal Expert, 2022[19]).

4.4. Europe and CIS Economies

In October 2021, the European Steel Association (EUROFER) forecast EU steel demand to recover by 13.0% in 2021. This is due to the exceptional growth in intra-EU trade during the second quarter of 2021 (EUROFER, 2021[20]).

However, in the automotive sector, EU passenger car sales dropped by 2.4% to 9.7 million units in 2021, a further decrease after the record low sales of 2020, according to the European Automobile Manufacturers Association (ACEA). German automotive production also sharply decreased by 12% to 3.1 million units in 2021 due to the lack of semiconductor, and this was the lowest production volume since 1975 (VDA, 2022[21]). This fall was the result of the semiconductor shortage, especially in the second half of 2021 (ACEA, 2021[22]).

In the Other Europe region, apparent steel consumption in Türkiye was predicted by worldsteel to increase by 17.0% in 2021, after growing by 13.0% in 2020. This high growth was forecast based on strong infrastructure projects and industrial activity (worldsteel, 2021[1]). Nevertheless, statistics from the Turkish steel exporter's association indicate that consumption only increased by 13.2% in 2021, below the initial worldsteel estimate[9].

9 https://www.cib.org.tr/en/statistics.html#:~:text=Turkey's%20crude%20steel%20consumption%20has,in%20the%20medium%2Dlong%20terms.

Furthermore, Turkish automotive production shrunk by 1.7% to 1.28 million units in 2021, according to the Turkish Automotive Manufacturers' Association (Metal Expert, 2022[23]).

Steel consumption in the Commonwealth of Independent States (CIS) region increased by 3.1% in 2021. By country, steel demand in Russia grew by 2.4% in 2021 thanks to a strong rebound in the automotive and construction sector (worldsteel, 2021[1]). In the construction sector, housing construction increased by 30% during the first nine months of 2021 compared to the same period of 2020. In the automotive sector, passenger car production rose by 8% to 1.4 million units and trucks production increased by 30% to 0.19 million units in 2021, with a rapid rise in the first half of 2021. In Ukraine, steel consumption increased by 7.4% in the first nine months of 2021, thanks to recovery for construction activity, machinery output and pipe production by 3.2%, 8.7% and 13.3%, respectively, compared with the same period of 2020, according to Metinvest (Metinvest, 2021[24]).

5. Steel production

Steel production has been catching up in most regions in 2021, with the exception of the Asian region. Steel production in the Asian region, the earlier region to recover from the pandemic, has slowed down during the second half of 2021, driven by a decrease in China.

Crude steel production increased in 2021 to a similar extent than steel consumption.[10] The government restrictions related to the COVID-19 pandemic triggered significant steel production reductions during the year 2020, with some jurisdictions more impacted than others, due to both direct stringent sanitary requirements that weighed on production and increased costs, and to the indirect effects on downstream sector demand. Reduction in steel demand prompted some companies to cut capacity temporarily in 2020 (Box 2). This mechanically affected the size of the rebound in steel production witnessed during the year 2021. Although the rebound affected most jurisdictions, it was most pronounced for those jurisdictions having experienced the largest drop in production in 2020. According to worldsteel, global steel production decreased by 5.3% during the second half of 2021 compared to the same period in 2020.

Table 2 below highlights steel production growth rates across regions. The largest increases in crude steel production for the second half of 2021 (year-on-year) were recorded in Africa (+25%), North America (+17%), European Union (+12%), South America (+10%), followed by Other Europe (+6%), Oceania (4.5%) and the Commonwealth of Independent States (CIS) (+2.7%). Asian steel production decreased by 10% driven by China decreasing by 16% due to a strong base year effect.

Table 2. World crude steel production developments in the first half of 2021

	Level, thousand tonnes		% change, year-on-year		
	Dec 2021	**2021**	**Dec 2021**	**Jul-Dec 2021 /Jul-Dec 2020**	**2021 / 2020**
EU 27	11,113	152,510	-1.4	12.2	15.4
Other Europe	4,258	51,243	-0.8	5.8	11.6
CIS	8,928	105,598	-3.0	2.7	5.6
North America	9,701	117,835	7.5	17.2	16.6
South America	3,452	45,596	-8.7	10.0	17.9
Africa	1,229	15,965	-9.6	25.3	26.7
Middle East	3,942	41,196	22.1	-7.1	1.2
Asia, of which:	115,593	1,373,821	-4.4	-10.2	0.6
China (People's Republic of)	86,190	1,031,049	-6.8	-15.8	-3.2
Oceania	526	6,465	-1.3	4.5	6.4
World	158,743	1,910,228	-3.0	-5.3	3.7

Source: worldsteel data, as released on 25 January 2022.
Note: Data are based on monthly production data and can differ from annual data published after December of each year. Furthermore, monthly production data can be revised at any time.

[10] As mentioned in the previous section, steel consumption increased by 8.2% during the months January to August 2021 year-on-year, while steel production increased by 9.8% over the same period, year-on-year.

5.1. Americas

In North America, total crude steel production increased by about 17.2% during the second half of 2021 year-on-year, mainly driven by the increase in the United States (+21.0%) and Canada (+14.5%). Mexico grew at a slower pace (+3.0%).

In South America, steel production increased by 10.0% during the second half of 2021, year-on-year. Production increased sharply year-on-year during the second half of 2021 in Argentina (+19.8%), followed by Colombia (+15.7%), Chile (+10.3%) and Brazil (+7.3%).

5.2. Africa and the Middle East

African steel production increased by 25.3% during the second half of 2021, year-on-year. Egypt and South Africa experienced large steel production increases of 28.5% and 21.4% respectively. According to the Department of Statistics of South Africa (stats Sa), in South Africa, utilization of production capacity of Iron and steel, non-ferrous metal products, metal products and machinery increased by 2.9% year-on-year in November 2021. Utilization of production capacity of motor vehicles, parts and accessories and other transport equipment increased by 10.1% (stats sa, 2021[25])

In the Middle East, steel production decreased by 7.1% year-on-year, due to Iran production decreasing by 12.7% after a +8% increase in the first half of 2021 in spite of international sanctions. Table 2 focuses on some specificities of the procurement for the steel sector in Iran. Steel production increased during the second half of 2021 year-on-year for the other jurisdictions in the region, with Saudi Arabia's steel production increasing the most (+7.2%).

5.3. Asia and Oceania

Steel production in Asia decreased by 10.2% during the second half of 2021 year-on-year, driven by a significant Chinese decrease of 15.8%. Other Asian economies all experienced an increase of their steel production during the second half of 2021 year-on-year: Japan increased by 17.8%, Chinese Taipei by 14.9%, India by 6.9%, and Korea by 2.2%. The decrease in China was partly due to a base effect, given the strong Chinese production numbers for the second semester of 2020. Nevertheless, the 15.8% year-on-year decrease of steel production in China during the second semester of 2021 resulted in a 3% drop of Chinese steel production for the year 2021, the first year-on-year decline since 2016, according to the Chinese National Bureau of Statistics (Staff, 2022[26]). In December 2021, China's steel production rebounded on a month-to-month basis. The increase in production is attributed to the termination of production cut requirements at the end of November. Despite the recovery, steel production continues to shows a 6.8% decrease year-on-year in the same month (Staff, 2022[26]).

In Oceania, steel production increased by 4.5% during the second half of 2021 year-on-year, with Australian steel production increasing by 5.4%.

5.4. Europe and CIS Economies

In the European Union, steel production experienced an increase of 12.2% over the second half of 2021 year-on-year. Amongst the larger steel producers, the increase was more pronounced in Spain (+23.1%), Italy (+13.6%), France (+11.5%) and Germany (+6.5%).

Steel production in the United Kingdom increased by 1.1% over the period year-on-year.

In the "Other Europe" region, steel output increased by 5.8% over the second half of 2021 year-on-year, driven by Türkiye's significant increase in steel production (+5.3%). In the CIS region, steel output increased by 2.7% due to an increase in both Russia (+3.8%), while Ukraine's steel production stagnated (-0.1%).

6. Special country focus

This section contains some special focus on the Iranian procurement of Chinese production capacity, on the increase of Iranian and Egyptian steel capacity and the link to government programmes and agencies, as well as on a history and status of captive iron ore mining in India. They are provided as background information related to the context of specific steel market questions.

6.1. Iranian procurement of Chinese production capacity

China and Iran established diplomatic relations in 1971, however, bilateral economic and military cooperation expanded mostly during the 1980s, after the foundation of the Islamic Republic of Iran. China's engineering contracting and technical co-operation with Iran followed shortly, beginning in 1982. Chinese companies in Iran were mainly involved in sectors such as transportation, energy, shipbuilding, metallurgy, communications, chemicals, automotive and household appliances (Ministry of Commerce of the PRC, 2009[27]). With the continuous development of Sino-Iranian economic and trade relations, a growing number of Chinese companies have entered Iran to expand their business. China-Iran annual trade between 2003 and 2014 increased more than nine-fold from USD 5.6 billion to USD 51.8 billion, an all-time high, before seemingly declining by 34% a year later after other countries entered the Iranian market through the Joint Comprehensive Plan of Action (JCPOA) [11] (National Bureau of Statistics of PRC, 2021[28]). After the reinstatement of sanctions by the United States in 2018 and the obvious repercussions on both Iranian and Chinese businesses in general, the cooperation between the two countries has nonetheless continued (China Briefing, 2021[29]). According to U.S.-China Economic and Security Review Commission, China topped the list of countries announcing Greenfield investments in Iran between 2003 and September 2020 with 21 Greenfield FDI projects, followed by Germany with 18 and Russia with 15 (Green and Roth, 2021[30]).

During the Sixth Five-Year Plan (2016-2020) (Islamic Republic of Iran, 2017[31]), Iran has attached great importance to the steel industry by investing in transformation and capacity expansion, which has also brought investment opportunities to Chinese steel companies. Iran has become one of China's most important markets for overseas project contracting, technology and complete equipment exports for steel producing capacity. Foreign companies working in project contracting in Iran have enjoyed preferential policies and financial support from the Iranian government (Ministry of Industry, 2017[32]). As steel-making technology in Iran was considered considerably outdated, the Iranian government implemented a series of policies to accelerate the transformation of its steel enterprises, implementing their privatisation (Sedighikamal and Talebnia, 2014[33]) and encouraging private enterprises to build steel plants. The government also incentivised foreign companies to invest in Iran by providing grants and preferential policies that eliminated restrictions on the proportion of foreign investment in joint ventures; cancelled long-term preferential loan policies for imported steel; reduced domestic steel production costs to alleviate the burden of domestic steel mills, reduced government "interferences" in the steel market, and simplified cumbersome transaction procedures (Ministry of Commerce of the PRC, 2020[34]).

[11] The Joint Comprehensive Plan of Action (JCPOA) is an agreement reached on 14 July 2015, between Iran and the five permanent members of the United Nations Security Council plus Germany, to limit Iran's nuclear activities in exchange for gradually lifting economic sanctions.

A large number of Chinese state-supported enterprises in Iran are currently engaged in the development of projects related to iron, steel and other non-ferrous metals, especially aluminium and copper (China NFC, n.d.[35]). State-owned companies drive Chinese involvement in the Iranian steel sector. These include notably Sinosteel, China Non-Ferrous Metal Mining Group (NFC), China Metallurgical Group Corporation (MCC), CITIC Group Corporation and Shandong Iron and Steel. The aforementioned companies are connected to Iranian firms, primarily the Middle Eastern Mines and Mineral Industry Development Holding Company (MIDHCO), the state-owned Iranian Mines & Mining Industries Development & Renovation Organisation (IMIDRO) and its subsidiaries such as the National Iranian Steel Company (NISCO), through agreements and contracts revolving mainly around technology provision and installation, engineering design, construction and training related to operating steel plants.

For example, in 2012, the President of MCC signed a memorandum of understanding with the Iranian Deputy Minister of Industry, Mines and Trade, aimed at expanding industrial cooperation between the two countries (The Iran Project, 2013[36]). Following this agreement, in 2014 MCC agreed to finance the construction of a 1 million metric tonne (mmt) per year steel plant in Sepid Dasht, with an overall investment of USD 350 million (China Aid Data, n.d.[37]).

In 2015, the scope of the co-operation was significantly enlarged, as MCC and IMIDRO concluded a deal for the financing of the construction of seven steel projects by the Chinese Development Bank, for a total investment of USD 1.8 billion (Steel Business Briefing, 2013[38]). In similar agreements in other parts of the world, MCC played the twofold role of technology provider and financing facilitator, while the relevant bank issued the financial facilities. It is not clear whether this was the case for the deal between MCC and IMIDRO, but the hypothesis seems feasible, given that many of the finished projects report MCC as a technology provider. The program involved the construction of steel plants in provincial areas of Iran, namely in Sepid Dasht, Sabzevar, Miyaneh, Baft, Shadegan, Ghaenat and Neyriz, with the aim of developing the steel sector in peripheral areas of the country, improve economic conditions in these areas, and increase the overall national production capacity of steel in line with the Sixth Five-Year Plan. Plans for the seven projects were initially conceived in 2006 (Iran Steel Service Center, 2015[39]) in the Comprehensive Plan for Steel and awarded to NISCO. After many delays, Chinese financing, together with the contribution of private Iranian investors, allowed the construction process to begin. The Sepid Dasht project was completed in 2016 (MME Company, n.d.[40]) and received further technology from MCC in 2019 (Sepid Dasht Steel, 2019[41]). The projects of Shadegan, Sabzevar, Myaneh and Neyriz also entered into their production phases before 2019. As for the last two projects, namely Baft and Ghaenat, they are not fully completed yet. Indeed, all the projects were often delayed by issues raised by the Chinese Development Bank and the Chinese Central Bank concerning the release of financing (Donya-e Eqtesad, 2020[42]) (Maytaal, 2014[43]).

Before the agreement with IMIDRO, MCC was expected to have financed Arfa Steel's billet production plant already in 2011, with an investment estimated at EUR 132 million (OECD, 2011[44]), and had won a contract for the Ardakan Iron and Steel Complex through one of its subsidiaries a few years before (Metal Bulletin, 2007[45]). Arfa Steel, a state-owned company, has received technology of various types from Chinese firms: MCC provided Arfa Steel with its continuous steel ingot casting machine, while the Chinese Vickers Corporation manufactured its hydraulic equipment. Furthermore, Chinese Asea Brown Boveri (ABB) procured the electrical and automation equipment of the firm, while the oxygen plant was provided by Sichuan Air Separation Group (Arfa Iron and Steel Company, n.d.[46]).

Another big project drawing Iranian and Chinese firms together was the construction of the Butia plant of Butia Iranian Steel Company (BISCO), a subsidiary of MIDHCO. In January 2013, China Non-Ferrous Metal Mining Group (NFC) signed a contract worth USD 715 million (Metal Bulletin, 2013[47]) with MIDHCO to provide engineering design, equipment supplies as well as installation, construction and training for the aforementioned plant (Chuin-Wei Yap, 2013[48]). While information on the current status of the project does not seem to be available from public sources, BISCO's website refers to the construction of a steel plant starting in 2015 and concluding in 2017 in the Butia Industry Complex, with the Italian company Danieli providing industrial machinery and services for the plant (BISCO, n.d.[49]). The same website reports that the state-owned Chinese firm Shandong Province Metallurgical Engineering (SDM) has been the technology provider for a 2.27 mmt pelletising plant, which was started in 2015 and completed in 2019 (The Iran Project, 2019[50]) (BISCO, n.d.[49]).

The Iranian holding company MIDHCO seems to be the most involved in procurement from China, especially in partnership with Sinosteel. MIDHCO owns a subsidiary in China, World Mining Industry, to facilitate co-operation with Chinese partners. Media reports mention that three recent projects carried out by Sinosteel and MIDHCO were worth EUR 700 million in investment, of which 85% was financed through Chinese-Iranian financing (Financial Tribune, 2017[51]).[12] MIDHCO owns Zarand Iranian Steel Company (ZISCO) and Sirjan Iranian Steel Company (SISCO). Sinosteel has been heavily involved with the Zarand plant, and to a lesser degree with the Sirjan one. For the latter, Sinosteel's pelletising technology was employed starting from 2017 in Sirjan's 2.27 mmt per year pelletising plant (Financial Tribune, 2017[51]). As for Zarand, the extent of co-operation is more considerable: although a project was already being planned in 2007, it was in 2010 that the two companies started to collaborate more concretely and consistently. During that year, Sinosteel was awarded a contract (valued at EUR 513 million) for the construction of a steel plant with an annual crude steel capacity of 1.36 mmt, with the final aim of producing of billets and slabs (SteelOrbis, 2010[52]) (Sinosteel Equipment & Engineering Co. Ltd., 2017[53]). In 2013 ZISCO and Sinosteel signed a contract for a 2.5 mt per year pellet plant in which Sinosteel was responsible for the installation of both mechanical and electrical equipment at the plant, in addition to staff training and operation, utilising a team of 300 Chinese workers and 50 technicians (Sinosteel Equipment & Engineering Co. Ltd., 2017[53]). Finally, in 2015 ZISCO reports having 110 specialised Chinese workers in Zarand for the installation of a lamination project procured by a Chinese firm (Iranian Students' News Agency, 2016[54]). Sinosteel is recognised as an active participant in the Iranian steel sector, to the extent that the firm was invited to the Iranian steel fair, METAFO, in 2015 (Middle East Metals, 2015[55]). In 2016 it was awarded another contract for a plant in Bafgh Kasra.[13] Furthermore, in 2017 Sinosteel presented its pelletising technology to the Iranian steel industry officials in Teheran (Financial Tribune, 2017[51]).

Finally, in 2020 state-owned Mobarakeh Steel Company awarded a contract to Sinosteel's Xi'an Heavy Equipment & Technology without holding a tender. The contract involved a large steel project worth over EUR 200 million (Radio Farda, 2020[56]), but no additional information appears to be publicly available.

[12] It remains unclear to the Secretariat if the remaining 25% stem from non-Chinese foreign demand. Hence, the 85% should be understood as a lower bound.

[13] The value of the contract is reported differently by different sources. Some sources mention an overall investment of USD 47.2 million (Green and Roth, 2021[30]), while others state that the contract was worth USD 471 million.

The cooperation instances outlined above paint a clear picture of the long-lasting relations between China and Iran in the steel domain, focusing on engineering and technology provision and installation. Such ties could potentially grow further under the 25-year China-Iran Strategic Cooperation Agreement, signed in Teheran, on March 27th, 2021. Through the deal, China commits to investing over USD 400 billion in various sectors of the Iranian economy over 25 years, in exchange for a regular supply of oil in return (Fassihi and Lee Myers, 2021[57]), and being allowed to exploit mines in Iranian territory (Iran International, 2021[58]). The agreement is also part of the Chinese Belt and Road Initiative (BRI), within which Iran is deemed a crucial link (China Daily, 2019[59]). Specifically, within BRI, the New Silk Road could significantly promote the strategic cooperation between the two countries, including in the sector of steel, given the opportunities for foreign investment in Iran and the central position of the country as a passage between Central Asia and the Middle East.

6.2. The Iranian steel capacity increases implementation in their political economy context

In 2003-2004, the National Iranian Steel Company (NISCO) conducted a comprehensive study on the steel situation in Iran (Iran Mines and Mining Industries Development and Renovation Organization (IMIDRO), n.d.[60]), as a prerequisite to design the Fourth, Fifth and Sixth Five-Year Economic, Social and Cultural Development Plan. In practice, it was in line with the objectives set by the 20-Year Vision Plan for year 2025-2026, which illustrates significant consistence in the design and goals set by the plans across time. Within the latter, the necessity of increasing crude steel production figures pre-eminently, setting a target of 55 million tons by the end of the 20-Year period. Through the study, NISCO envisioned eight provincial steel projects as a viable option to meet the increased capacity objective (Kordzadeh, 2016[61]). The projects were also considered an opportunity to enhance the condition of underdeveloped provincial areas of the country. The establishment of steel firms was assumed to create new employment opportunities, boost income and generally improve the socio-economic situation of the relevant provinces.

In 2006, the Economic Council of the Islamic Republic of Iran issued a decision to increase the national capacity of crude steel during the Fourth Five-Year Plan (Economic Council of Iran, 2003[62]) as a first step towards the 2025 target. Following such decision, in 2006-2007 the Economic Council allowed the Iranian Mines & Mining Industries Development & Renovation Organisation (IMIDRO) to invest in provincial steel projects with an overall maximum capacity of 6.4 million tons of crude steel (Economic Council of Iran, 2006[63]). IMIDRO, under the control of the Ministry of Industry and Mine, is an organisation and holding company established in 2006 with shares in over 20 Iranian companies, including some of the largest steel producers, such as Mobarakeh Steel. In the same session, the Economic Council entrusted a committee formed by representatives of the Management and Planning Organisation, governors of the relevant provinces and representatives from IMIDRO for the implementation of the projects. IMIDRO, retaining ownership of the latter until completion, was compelled to sell 51% of the projects' shares to non-governmental investors within one year from their start of production. The executive board of IMIDRO appointed the National Iranian Steel Company (NISCO), one of its wholly subsidiary, as the executive body for the projects, due to its long-lasting experience in implementing steel development projects (Kordzadeh, 2016[61]).

Initially, eight projects were involved in such framework: the Sefid Dasht project in the province of Chahar Mahal-Bakhtiari, the Neyriz project in the province of Fars, the Shadegan project in Khuzestan, the Myaneh project in East Azerbaijan, the Qaenat project in South Khorasan, the Sabzevar project in Khorasan Rezavi, the Baft project in Kerman

and, finally, the Bafgh project in the province of Yazd. The latter, however, was divested to the private sector in 2011, leaving 7 projects under IMIDRO (Kordzadeh, 2016[61]).

At first, all the projects were conceived as plants with the same annual capacity of 800 thousand tons of steel. The capacity of the plants was subject to criticism by in Iran, especially by representatives of the private steel sector and trade associations, because of the perceived unbalance between the high costs of the projects and their low final output. Construction of the seven projects were initiated in 2007 and the first ones should have been completed between 2009 and 2010. However, due to diverse issues, operations were repeatedly delayed. Problems arose on the one hand from a financial standpoint, as the funding available proved to be insufficient to cover the cost of the projects, and on the other hand from a practical standpoint, as the location of projects in remote areas did not always ensure the provision of electricity and water, and even less of transportation routes and means. Some of the projects were forced to change their product. In particular, in 2015-2016 the Baft project was converted into a pelletising plant, because the water shortage in the area rendered steel production almost impossible (Iran Mines & Mining Industries Development and Renovation Organization, 2016[64]). In the same year, the Economic Council approved a change of product for the project of Sabzevar, from steel ingots to 1.5 million tons of steel sheets per year (Economic Council of Iran, 2016[65]). Under those circumstances, the projects were stalled until 2013/2014, when IMIDRO decided to find any possible solution to complete them. One of the main accelerators was IMIDRO's decision to allow private investors to participate for up to 65% of the projects, with IMIDRO only retaining 35% (Iran Mines & Mining Industries Development and Renovation Organization, 2018[66]). The only exception to this measure was the Miyaneh project, which remained under the total control of the organisation (Iran Mines & Mining Industries Development and Renovation Organization, 2018[66]). A second catalyst was the agreement between IMIDRO and the Chinese Metallurgical Group Corporation (MCC) in 2013, which guaranteed USD 1.8 billion financing to the projects from the Chinese Development Bank (Delegation of Ministers of Iran, 2013[67]). However, the Chinese financing was also delayed by issues raised by the Chinese Development Bank and the Chinese Central Bank, which later further decelerated progress in those projects.

Starting from 2016, the projects gradually entered their production phase, except for Qaenat that was planned to start operations in the next few years. The Shadegan project entered its production phase in 2015 with its unit for the production of 800.000 tons of steel ingots (Shadegan Steel Industries, n.d.[68]). Khuzestan Steel invested IRR 3.740 billion (approximately USD 88 million) (Iran Mines & Mining Development and Renovation Organization, 2015[69]), acquiring 65% of the project shares, with IMIDRO withholding the remaining 35% (Iran Mines & Mining Industries Development and Renovation Organization, 2018[66]). Already before the start of production, Shadegan was registered as a new company, Shadegan Steel Industries Company (Shadegan Steel Industries, n.d.[68]). The company is now being expanded with a billet production plant, with a capacity of 800.000 tons.

The Sefid Dasht Steel Company (Sefid Dasht Steel Company, n.d.[70]) entered production in 2016 with its direct reduction iron (DRI) plant (Iran Mines & Mining Development and Renovation Organization, 2016[71]). The second unit producing steel slabs followed shortly. Mobarakeh Steel invested IRR 21.550 billion (approximately USD 510 million) (Iran Mines & Mining Development and Renovation Organization, 2015[69]) in the Sefid Dasht project, acquiring 65% of shares. IMIDRO continues to own 35% (Iran Audit Organization, 2019[72]).

In 2016, the Sabzevar project also entered the production phase, producing steel sheets and briquettes. The DRI unit was inaugurated in 2018 (Presidency of Iran, 2018[73]). IMIDRO

holds 15% of shares, while private investors own the remaining 85%. In particular, Opal Kani Pars Mining Processing Company used to control 85% of Sabzevar and was owned by Bank Parsian for 85% and by IMIDRO at 15%. In 2018, however, the Sabzevar Pars Steel Co. was founded and came to control the Sabzevar plant directly (Opal Kani Pars Mining Processing Company, n.d.[74]). IMIDRO retains 15% of the new company, while Opal Kani owns 85% of it (Iran Audit Organization, 2019[72]). However, in September 2021 the company publicly offered 15% of its shares (Financial Tribune, 2021[75]), but no further information seems to be available as to which shareholder's shares were being sold.

Before 2017, the Neyriz and Myaneh projects were also completed. In 2014, Ghadir Investment Company acquired 65% of Neyriz through an investment worth IRR 2680 billion (approximately USD 63.5 million) (Iran Mines & Mining Development and Renovation Organization, 2015[69]). IMIDRO still owns 35% of shares in the Ghadir Neyriz Steel Complex (Iran Audit Organization, 2019[72]). The company has DRI and billet producing plants (Neyriz Ghadir Steel Complex, n.d.[76]).

As for Myaneh, information is more ambiguous. The project was the only one realised without the participation of the private sector, i.e., solely by IMIDRO and NISCO. IMIDRO's audit reports mention that the state-owned holding company owns 100% of Myaneh (Iran Audit Organization, 2019[72]). However, the Miyaneh plant appears to be linked to Azerbaijan Steel, one of IMIDRO's subsidiaries. The company and the plant are also located in the same locality, Miyaneh, and Azerbaijan Steel's website mentions one of its plants as one of the seven provincial projects (Azerbaijan Steel Company, n.d.[77]). Reports of the participation of Azarbaijan Steel also derive from IMIDRO's reports (Iran Mines & Mining Development and Renovation Organization, 2014[78]). However, further information on the subject does not seem to be publicly available to clarify the plant's ownership at present. The Miyaneh plant comprises a DRI plant, a palletising one and an ingot producing one (Provincial Authorities of East Azerbaijan, n.d.[79]).

The DRI unit of the project in Baft was inaugurated and started working in 2019 (Presidency of Iran, 2019[80]). The second phase of Baft, which will be operational between 2022 and 2023, will aim at pelletising 2.5 million tonnes a year and producing hot briquette at a capacity of 800,000 tonnes a year (Presidency of Iran, 2019[80]). Since 2017, Baft is owned by IMIDRO (20%), the Bank for Industry and Mine (20%) and by the Mahan Industries and Mines Development Company (60%) (Mahan Industries and Mines Development Company, n.d.[81]). Before then, Sazan Novin Ayrik Steel Company owned the 60% share held by the latter (Iran Mines & Mining Industries Development and Renovation Organization, 2018[66]).

As for Qaenat, one unit was finished in 2016 (Iran Mines & Mining Industries Development and Renovation Organization, 2018[66]) and the whole project should have been terminated by 2021 (Iran Mines & Minerals Development and Renovation Organization, 2020[82]). However, the project is still in the last stages of implementation, possibly because of delays caused by the Covid-19 pandemic. Its final products should be billets and blooms. The project is owned by IMIDRO (49%) and by the Parto Pejuak Pars Shiraz Company (51%) (Iran Mines & Mining Industries Development and Renovation Organization, 2018[66]).

Overall, the seven projects signal the scope of the Iranian government's encroachment in the country's steel sector. Even though private investments played a significant role for the completion of the projects, their design and implementation were advanced by a strong political will to reinforce the sector at the national level, to the extent of accepting foreign financing from the Chinese Bank for Development. Moreover, the projects benefit the biggest steel firms in a disproportionate manner, as they were able to acquire stocks in companies that since their inceptions were ideated as state-owned, at least partially. Khuzestan Steel and Mobarakeh, for instance, drew consistent advantage from the

opportunity of participating in these projects, which, incidentally, are also located in the vicinities of their facilities.

6.3. Development and political economy of the steel sector in Egypt

In the last fifty years, the configuration of the Egyptian steel sector has been shaped by the main political and economic dynamics of the country: the liberalisation and the rise of private sector businessmen in political circles, the massive concentration of capital and, after the Revolution, the rise of the military control over the economy. Since 1974 Anwar Sadat pushed for the country's opening to a market-based economy (Adly, 2017[83]), after twenty years of almost total state-control of the economy. As for steel, before the 1970s the private sector was only involved, albeit very scarcely, in steel trading, while the government controlled steel production through its companies, such as Helwan Steel and the Egyptian Steel and Iron Company (Middle East Eye, 2021[84]). With Sadat's liberalisation policies, the private sector started investing in rolling mills which effectively ended the government control over steel (Selim, 2006[85]). By the end of the 1970s new liberalising laws further incentivised private investors, to the extent that the government granted tax exemptions with the New Urban Communities Development policy under Law No. 59 of 1979 (Government of Egypt, 1979[86]), as well as other subsidising measures such as investment incentives, generous energy subsidies and land allocation at below-market rates (Adly, 2017[83]). In this context, the private sector gained an increasing share of the Egyptian steel production, especially with the conversion of Ezz Steel, once a steel trading company, into a steel producer in 1994. Nowadays Ezz is the biggest steel producer and manufacturer in the country. Other companies established in the same years were Suez Steel, Beshay Steel, Arab Steel Factory, Kouta Steel and Aswan for iron (Selim, 2006[85]). The growth of the private sector and of the size of its investments coincided with a steady concentration of capital and output, to the point that many were increasingly referring to the steel sector as being monopolised by Ezz (Selim, 2006[85]). The company succeeded in acquiring shares of the state-owned Alexandria National Iron and Steel Company in Dekhela in 1999 (Ezz Steel, n.d.[87]), reaching around 60% of market share by the early 2000s through the newly consolidated Ezz-Dekhela Steel (EZDK) (Selim, 2006[85]). Starting from the early 2000s, the economic weight of the private sector began to be also reflected at the political level, with Ahmad Ezz, owner of Ezz Steel, being among the main personalities of the then ruling National Democratic Party as well as head of the parliamentary budget committee (Adly, 2017[83]). The continuous election of influential businessmen in Mubarak's National Democratic Party in the first decade of the 2000s resulted in the over-representation of the politically connected businessmen's interests in government circles (Adly, 2017[83]). Thus, until 2011 the steelmaking sector, much like any other profitable economic sector in Egypt, configured as highly concentrated in the hands of a few businessmen who enjoyed considerable power even in the highest political ranks. Such situation, which was observable in the majority of the economy's sectors, was one of the most determining factors for the outbreak of the 2011 uprising and Revolution and the military coup of 2013 (Teti and Gervasio, 2011[88]). The first resulted in the power takeover by the Supreme Council of the Armed Forces (SCAF) and the election of Mohammad Morsi as President. The second removed Morsi from Presidency and prompted the election of former Ministry of Defence Abd al-Fatah al-Sisi.

Since 2014, when al-Sisi became President, the steel industry's panorama significantly mutated. The transformation was mainly induced by three factors: firstly, the footprint of the Armed Forces within the economy grew considerably, encroaching on private-led civilian production, and a significant share of the steel sector was subjugated to military-related agencies and companies. Secondly, and consequently, influential businessmen from

the private sector were limited in their political activity and compelled to participate in state plans in which the military holds an uncontested primacy. Thirdly, and relatedly, the government enacted a massive push in public and private investment to foster development.

After 2011 and the power takeover by the SCAF, Egypt's military economic role grew exponentially, to the extent that reportedly nowadays the Armed Forces are controlling one fourth of total government spending (Sayigh, 2019[89]). The main military actors participating in economic activities are the Ministry of Military Production, the Ministry of Defence (MOD) with its National Service Projects Organisation (NSPO), and the Arab Organisation for Industrialisation (AOI). In this context, the steel sector was among the main destinations of military investments, both for military and civilian production. In 2016 the NSPO acquired 40% of shares of Solb Misr, the parent company to the Suez Steel Company (Sayigh, 2019[89]). After repaying all the company's outstanding debts, NSPO increased the company's capital and came to control 83% of the total shares. On the same note, in 2018 the same organisation acquired a controlling stake of Egyptian Steel through a restructuring operation (Sayigh, 2019[89]). Conversely, the AOI does not directly own a steel plant. Its activities focus more on the downstream usage of steel, through its firms committed to the production of helicopters, airplanes, railways and various military and civilian equipment and infrastructure (Arab Organisation for Industrialisation, n.d.[90]). Finally, the Ministry of Military Production owns both steel-specific firms, such as Abu Zabaal Engineering Industries Co. (Factory 100), Helwan Iron Foundries (Factory 9) and Helwan Company for Engineering Industries (Factory 99), and downstream ones, especially for the production of military equipment (FAS, n.d.[91]). Companies owned by the military enjoy enormous benefits: they are exempted from Value Added Taxes (VAT) (Presidency of Egypt, 2017[92]), income taxes (Presidency of Egypt, 2013[93]), import tariffs (Presidency of Egypt, 2020[94]) and property taxes (Presidency of Egypt, 2001[95]) which, on the contrary, recently have been considerably augmented for the private sector (Humanitarian Foresight Think Tank, 2017[96]). Moreover, under Law 89 of 1998 government ministries and agencies are allowed to award contracts up to a certain value by a "direct order", meaning through a non-competitive process free from bids, in this case presumably favouring military-owned companies (Presidency of Egypt, 1998[97]). Law 182 of 2018, aimed at cancelling the previous 1998 legislative measure, de facto crystallises the possibility of a "direct agreement". Coherently, military-owned firms have a privileged access to both state resources, especially state-owned land for investment, and public contracts. The AOI and its subsidiaries are also allowed to receive tax and fee free loans (Sayigh, 2019[89]). Finally, other general incentives are also applicable to firms owned by the military, such as the exemption from a 43% electricity price increase back in 2018 and the exclusion from external audit (Sayigh, 2019[89]). It is noteworthy that the unavailability of public annual report and financial statements considerably limits the potential for a quantitative assessment of the subsidisation benefitting steel firms owned by the military.

Secondly, the exclusion of private businessmen from political activities and their subjugation to state plans (Adly, 2017[83]), which will be further described below, prompted the gradual reduction of subsidising measures to private steel firms. For instance, before the Covid-19 pandemic energy subsidies to private steel firms were partially eliminated, although a new reduction on energy prices was granted in 2020 to mitigate the economic downsides of lockdowns and containment measures. The partial erasure of energy subsidies to private steel firms stimulated public complaints from private steelmakers, which successfully lobbied the government to impose anti-dumping duties on rebar from China, Türkiye and Ukraine in return (Reuters, 2014[98]) (Durmus, 2017[99]).

However, comprehensive investment incentive plans continue to favour Egyptian private steel firms as well as military-owned firm. For instance, some steel companies located within the Suez Canal Special Economic Zone (SCZone) and the Golden Triangle Special

Economic Zone (GTZone) benefit from tax exemptions and reductions, such as exemption from VAT, custom duties and reduction of corporate taxes from 22.5% to 10% for firms established before 2017, when the Investment Law was amended (OECD, 2020[100]). For example, Ezz Flat Steel Co., Arabian Steel and Elco Steel are all located in the SCZone, while Abd al-Wahab Metallurgical Industries is situated within the perimeter of the GTZone. Furthermore, to attract investments within the framework of national development, a New Investment Law was issued in 2017 (Presidency of Egypt, 2017[101]). The law includes many incentives, such as an investment tax allowance (ITA) deductible against taxable profits of 50% for specific regions of the country or of 35% for certain sectors of investment, among which metallurgy. Additional incentives include different kinds of grants and are available for projects eligible for ITA. Finally, general incentives applying to all projects comprise exemptions from stamp taxes and similar fees, a reduction of custom duties to 2% for the import of equipment and devices and a total exemption from custom duties for the import of casts and moulds. Thus, if generally speaking subsidisation of private steel production and manufacturing is not as systematic as it was in the past, it is still happening in large proportion but under the disguise of more horizontal programs that more selectively benefit private steel firms. The loosened political representation of private businesses' interests tangentially entailed a renewed interest on state-owned firms through the Ministry of Public Business, owner of the Metallurgical Industries Holding Company and its subsidiaries. These companies, like the military-owned ones, have preferential access to state resources, contracts and direct agreement for public procurement processes (Presidency of Egypt, 1998[97]). Once again, as state-owned firms' reports do not seem to be publicly available, an assessment of benefits and advantages for SOEs appears difficult at best. Nevertheless, information about the recent modernisation of Delta Steel Mill Co. (Daily News Egypt, 2019[102]) and the third plant for the NSPO's Suez Steel (Presidency of Egypt, 2019[103]) seem to suggest a general tendency towards more and more advantageous measures for publicly owned firms. This stands in staunch contrast with evolution of the subsidisation of private steel companies. The latter, however, continue to hold a fundamental weight in the Egyptian economy due to the crystallisation of their position granted by the strong subsidisation they enjoyed between 1990 and 2013.

The third shaping feature of the post-Revolutionary steel sector was a boost in investments and development projects. Indeed, since 2014 the Egyptian government has been undertaking massive infrastructural and development projects, named "megaprojects" or "national projects" (Presidency of Egypt, n.d.[104]). For instance, a New Administrative Capital is being constructed, as well as railways, roads and new metro lines for Cairo. The development of the Suez Canal Region and the extension of the Canal are other crucial points for the country's growth. Other projects span from the development of rural villages to education, agriculture or industry-related ones, with a total of approximately 4.000 projects worth over EGP 1.5 trillion (USD 95.5 million) in 2018 (Egypt Today, 2018[105]). The majority of the projects, especially infrastructural ones, has a significant steel requirement: the Cairo Chamber of Commerce recently reported that about 70% of steel production in Egypt was currently devoted to national projects, adding that without the latter many factories would have closed (Egypt Today, 2018[105]). The non-adhesion of Egypt with International Financial reporting Standards (IFRS) or similar high-quality standards and the resulting lack of transparency from many steel companies does not allow to assess better the role of government procurement in the steel sector. However, specialised construction companies such as ORASCOM Construction Industries and the Arab Contractors do publicly mention their role in national projects. Furthermore, ORASCOM did mention in its financial statement for Q1 of 2021 that it was dependent on the Egyptian government, which accounted for 57.4% of the company's Q1 2021 revenues (ORASCOM, 2021[106]).

6.4. Captive iron ore mining in India

6.4.1. Introduction

State governments in India can attribute a specific end use to mines, compelling companies exploiting those mines to use the minerals extracted exclusively for the specified end use. For instance, in the case of iron ore mines, the Mineral Auction Rules of 2015 (Central Government of India, 2015[107]) indicate "integrated steel plants" as the specified end use. Concretely, such a rule means that the iron ore extracted from mines under a lease with this specified end use can solely be used to satisfy the production needs of the steel plant owning the lease. This, in turn, entails that the minerals cannot be commercialised, transferred or diversely disposed of, directly or indirectly (Central Government of India, 2015[107]). Such practice is conventionally named "captive mining". On the contrary, mines with leases not tied to a specific end use are called "non-captive" or "merchant" mines, because of the possibility to commercialise and to export the minerals extracted from such mines.

Captive mining rights are not available freely or at market prices (Jairam, 2009[108]). Rather, they derive from leases issued by State governments. Licences are obtained through an auction process in which bidders are required to quote a percentage of the minerals' value to be paid to the State government as a fee for every tonne of ore mined, often called a premium (Vijay Kumar and Sinha, 2020[109]). The royalty is then calculated based on the quantity of minerals extracted each month and the iron ore price set by State governments and published every month by the Indian Bureau of Mines. State wise, royalties do not differ for captive and non-captive mines (ET Edit, 2020[110]). The various phases leading to the issuing of a lease are quite complex, and the whole process is not fully transparent. For instance, Kumar and Sinha point to the subjectivity and unevenness of the auctioning process, insisting on its non-sustainability in the long run (Vijay Kumar and Sinha, 2020[109]). Furthermore, State governments, before the most recent reforms of 2021, were allowed to reserve a mine for any specific end-use and assign it to state-owned companies without an auction process (Vijay Kumar and Sinha, 2020[109]).

Captive mines guarantee steel firms the provision of a continuous supply of iron ore, not subject to fluctuations in market prices and availability of iron ore. This particular advantage is all the more important in the Indian iron ore market, since non-captive mining firms have a tendency to favour exporting their product[14] rather than commercialising them inside the country at prices which are often lower than the international market (Hammurabi & Solomon Partners, 2020[111]). Domestic prices for non-captive iron ore are not uniformly set by non-captive mines throughout India. For instance, in Chhattisgarh iron ore producers usually follow the prices set by the National Mineral Development Cooperation, a state-owned firm, as it is the largest iron ore producer in the country. In

[14] Many Indian steelmakers have been calling on their government to impose an export ban in face of recurring iron ore shortages within the country. The state of Karnataka has actually imposed a ban on iron ore exports to outside the state in 2010. The ban should have been lifted after an adverse sentence of the Supreme Court in 2011, but it actually remained implemented until today. Similar bans were temporarily imposed between 2013-2014 on selected firms in Odisha as well. High-grade iron ore (Fe content above 64%) from Bailadila in Chhattisgarh is allowed to be exported with restrictions on quantity imposed, primarily, with a view to meet domestic demand on priority (Ministry of Steel, n.d.[120]). Since 2012, exports of iron ore with Fe grade between 58 and 62% are subject to a 30% export tax. Notwithstanding calls from iron ore producers asking to remove the tax entirely, there are some rumours about a potential increase between 5 and 10% next year. All iron ore of ferrous content less or equal to 58% are subject to a duty of 10% since 2015.Finally, the general policy for iron ore exports allows exports of iron ore with a Fe concentration up to 64%. The export of iron ore with a Fe percentage above 64% is canalized through the Metals and Mineral Trading Corporation of India (MMTC) (Ministry of Steel, n.d.[120]).

Karnataka, where an export ban has been imposed since 2010, non-captive mines sell their iron ore through auctions and only to domestic end users (Foundry Informatics Centre, 2019[112]). In general, the resulting domestic prices of iron ore from non-captive mines are lower than the international ones, partially stemming from barriers imposed on the export or iron ore. The price of iron ore extracted from captive mines, however, is even lower than the domestic price of non-captive mines (Jain, 2020[113]) (Indian Ministry of Steel, n.d.[114]).

As mentioned, operating captive mines provide considerable benefits to the steel firms from a pricing standpoint. Indeed, the sale value for iron ore set by the State governments and published by the Indian Bureau of Mines on a monthly basis is substantially lower than both domestic and international market prices. For instance, Table 3 shows that in July 2021, the international price for iron ore with a 62% Fe percentage was USD 223 per tonne. In the same month, the State of Odisha set the price for royalty calculation for iron ore fines with Fe concentration between 60 and 62% at INR 6371 (~ USD 85) per tonne. The price for iron ore lumps with Fe concentration between 60 and 62% was set at INR 8196 (~ USD 109.3) per tonne. Meanwhile, in the State of Karnataka the price used to calculate royalties on iron ore fines with Fe concentration between 60 and 62% at INR 5744 (~ USD 76.6) per tonne. The price for iron ore lumps with Fe percentage between 60 and 62% was set at INR 7084 (~ USD 94.48) per tonne. As Table 3 displays, data concerning prices used for royalties is generally stable at a twofold lower figure than the international price, with exceptions stemming from singular circumstances such as the drop in international prices of 2014. As a result, the cost benefit of having captive iron ore mines is significant, even adding mining, energy, labour and production costs. This also explains the high bids for premiums, which can often be observed at auctions, with percentages reaching 135%.

Table 3: International prices compared to prices published by the Indian Bureau of Mines for the calculation of royalties: published administrative prices seems consistently lower than comparable international prices

Month and year	Market price: Forwards / SGX 62% Fe Iron Ore cash-settled swaps (dry metric tonne) / China import CFR Tianjin port USD/t	Odisha		Karnataka	
		Fines in USD/t	Lumps in USD/t	Fines in USD/t	Lumps in USD/t
Jul-21	223	84.95	109.3	76.61	94.48
Jun-21	216	85.9	111.1	54.34	97
Jul-20	112	27.3	32.9	23.47	35.77
Jun-20	105.5	22.07	32.74	22.07	36.69
Feb-20	80.19	17.97	36.4	32.18	43.67
Jul-19	114.57	21.83	35.83	39.34	43.29
Jun-19	104.32	18.56	36.75	34.8	43.66
Jul-18	64.57	16.36	44.86	35.2	36.76
Jun-18	64.63	13.09	41.95	32.83	38.58
Dec-14	68.85	36.69	55.18	33.96	47.02

Source: Computed by the OECD Secretariat from the Indian Bureau of Mines monthly statistics and the OECD database on price data.

6.4.1. Historical background on captive mining in India

At the end of the 19th century, the mining laws in British India were very restrictive, especially for private stakeholders, hindering the development of the iron and steel industry as a whole (Shah, 2019[115]). Pushed by the ambition of establishing a modern steel plant, Jamsetji Nusserwanji Tata, founder of TISCO (today Tata Steel Ltd.), started pressuring for amendments to the law by personally engaging with Sir George Hamilton, Secretary of State for India in the British Government, and the Viceroy, Lord Curzon (K. N. P. Rao, 1963[116]). He eventually succeeded, and the law was amended in 1899. With the support of American engineer Julian Kennedy and American geologist and metallurgist Charles Page Perin, with whom Mr Tata had established long-lasting ties, TISCO started its own captive mines in the eastern city of Jharia in 1907 (Tata Group, n.d.[117]). Hence, the initial setting up of captive iron ore mines resulted from the establishment of integrated steel plants. Indeed, when the steel industry was in early development phases in India, producers needed assurance of resource supply, which was provided to them by allotting mines for end-use (Bal, 2020[118]). The idea of mining as an independent industry was not common and attractive at that time. As the benefits of captive mining for the companies became obvious, the practice became more widespread across the country.

The institutionalised difference between captive and non-captive mines is a legacy of the nationalisation of coal mines imposed by Indira Gandhi between 1971 and 1973, allegedly to improve their efficiency and development. In the Coal Mines Nationalisation Act, coal was determined to be for the exclusive use of the public sector. Starting from 1993, the private sector was allowed to access the coal sector only for captive use, the stated reason being to foster industrial development. Individuals and entities from the private sector were allocated mining blocks through an auctioning process, exclusively for captive use (Rakshit, 2019[119]). As a result, the commercial use of coal mines by the private sector was prohibited until the 1990s. The same model was exploited for iron ore mining, with the private sector initially not being allowed to exploit mines and then, from the 1990s, being permitted exclusively to exploit mines for captive use, to ensure steelmakers' mineral security (Ministry of Steel, n.d.[120]). Actually, under articles 294 and 295 of the Constitution of India, the ownership of mineral resources and mines is still vested in State governments (Government of India, 2020[121]) (Mati, 2016[122]) (Indian Ministry of Mines, n.d.[123]). In this context, the private sector is only allowed to use them as contractor, never as owner, and is always required to pay royalties to the government to extract minerals and dispose of them under the rules set by the lease and the relevant legislation. This, in turn, includes the payment of the aforementioned premium, both for captive and non-captive mines, which is calculated taking into account the amount of minerals extracted or despatched in a month, the percentage of minerals' value bid at the auction, and the sale price of minerals set monthly by the Indian Bureau of Mines (Central Government of India, 2015[107]). However, from a legal standpoint the subject of the ownership of minerals and mines is far from settled. Indeed, the matter has recently become contentious, especially after a ruling of the Supreme Court dating 2013 that vested a private landowner with mineral ownership rights (Nanda, n.d.[124]). As the constitutional phrasing related property rights over mineral resources is ambiguous and linked to pre-independence ownership practices, an evolving jurisprudence centred on the subject is emerging. In particular, the Supreme Court is currently examining the liability of private landowners to pay royalties to State governments to exploit the underground resources (Chambers and Partners, 2021[125]). Therefore, notwithstanding the customary practices and the ongoing auctioning processes, the subject of mining ownership may potentially undergo significant modifications in the future.

6.4.2. Contemporary captive mining and recent evolution

Recently, the mining sector in India has been subjected to many reforms (Central Pollution Control Board, 2007[126]). Among the main reasons behind the reforms was the export-driven nature of the country's increase in iron production in the first decade of the 2000s. Since exports are only possible for non-captive mines, this feature of the increase in production highlighted the limited contribution of captive mining to the overall growth of the sector, urging new reflections about the role of captive mining in the country's industrial development. Indeed, only a mere 10% of India's geological potential is being explored (Batra, 2021[127]). The perceived resource scarcity seems to derive from the fragmentation of the market and the management of supplies, rather than from an actual lack of mineral resources (Vijay Kumar and Sinha, 2020[109]). For instance, in the region of Odisha, there have recently been 24 auctions for iron ore mines, yet only 10 mines have begun operations, potentially obliging, in the short-term, manufacturers to import iron ore, despite the country's geological richness (Chadha and Sivamani, 2021[128]). Moreover, captive mining does not necessarily guarantee continuous activity of the leased mines. For instance, in 2014, when the steel industry witnessed reduced global steel demand and lower prices, internationally traded iron ore prices dropped. At that time, Tata Steel started to purchase its iron ore from the open market, rather than operating its own captive mines, which had higher working costs than the price of iron ore traded internationally, reflected in the high value used for royalties' calculation mentioned in the first section of this note. This caused Tata's iron ore mines to remain inactive for the first time since the establishment of the company. (Narendran and Ganeriwalla, 2020[129]).

Furthermore, steel producers that do not hold any captive mining lease are penalised within the domestic market, raising the issue of a domestic level playing field. Indeed, as mentioned above, those firms are obliged to purchase their iron ore material at a higher market price, which puts them at a cost disadvantage and does not guarantee the continuity of supplies. Additionally, the nature of the auctioning process favours a few richer and more established firms, which are able to quote higher percentages for premiums during the auction. In fact, larger firms are keener to absorb the payment of such high royalties to the government through the copious revenues from commercial transactions in the downstream sector. For example, JSW Steel recently acquired four mines committing to a premium of over 135% of the value of extracted iron ore (Iyengar, 2021[130]). The steep level of competition at auctions *de facto* excludes smaller firms from acquiring captive mines rights, which produces an uneven playing field in the domestic steel sector (Satapathy, 2017[131]). As a result, as of 2021 the majority of captive mining leases have been awarded to five large companies, namely Tata Steel, the state-owned Steel Authority of India Limited (SAIL), JSW Steel, Jindal Steel, ArcelorMittal Nippon Steel India and few smaller firms such as Jayaswal Neco Industries (Press Information Bureau, Government of India and Ministry of Mines, 2015[132]). Among them Tata Steel and SAIL entirely procure the raw material for manufacturing steel from their own captive iron ore mines (SAIL News, 2020[133]) (TATA, 2019[134]). In this respect, these companies can produce without being affected by increases of the market price and limited availability of iron ore. Other Indian companies holding captive mines' leases are still partially impacted by international iron ore prices, since extracted raw material cannot completely meet steel production requirements. This is the case of JSW Steel (who relied on captive mines for

37.35% of its iron ore in 2020-2021), Jindal (25.28% in the same year) and ArcelorMittal Nippon Steel India.[15]

Finally, the allotment of mines is also associated with concerns for corruption and even illegal mining in certain regions, fuelled by the lack of transparency that characterises the auctioning process. The Visakhapatnam Steel Plant (VSP/RINL), for instance, has been continuously asking the government for the allocation of a captive mine, which the company has not received for almost thirty years even being a state-owned firm (Jonathan, 2021[135]). On the contrary, and according to the National steel policy of 2017 (Ministry of Steel, 2017[136]), captive mining rights are concentrated in the hands of few steelmakers, who are also the main producers of iron ore in the country. Indeed, in 2020, even having an inferior number of leases compared to non-captive mines, captive mining accounted for 38.8% of total iron ore production, while non-captive mines comprised 61.2%.

6.4.3. Recent captive mining reforms

Captive mining has recently instigated noteworthy political debates. Indeed, the practice is opposed both by companies who were not allotted a captive mine and by the press and political personalities, especially because of the lack of transparency allegedly fuelling corruption in the sector (ET Edit, 2020[110]) and the disproportionate benefits enjoyed by owners of captive mines.

Reforms of the practice of captive mining have recently been undertaken. In 2019, state-owned SAIL was allowed to sell 25% of the iron ore extracted from its captive mines and to dispose of[16] 70 million tonnes of low-grade iron fines and ores stored in the company's premises. The official aim of the measure was to minimise the disruption of iron ore provision across the country potentially caused by the expiry of many non-captive mining leases on March 31st, 2020 (ArgusMedia, 2019[137]).

Moreover, the government also took significant legaslative steps. The Mines and Minerals (Development and Regulation) Act of 1957 has been amended several times in the last few years, notably in 2015, 2016 and 2020. The latest reform, dated 2021, includes the removal of the distinction between captive mines and non-captive mines to make it possible to sell the iron ore stocks of captive mines. The Amendment allows existing captive mines to sell up to 50% of their product, but only upon payment of additional charges to the States' government, in addition to pre-existing royalties and fees. The measure is reportedly aimed at increasing production and supply of minerals throughout India, as well as to generate added revenue to the States (Batra, 2021[127]).

Aside from the removal of the distinction between captive and non-captive mines, the Amendment provided for the reallocation of non-producing mines of state-owned firms and the increase of auctioned mines, in order to boost the production of the mining sector. Indeed, the Amendment was issued as part of the stimulus packages to minimise the economic impact of the Covid-19 pandemic, and was aimed at facilitating the exploration of underexploited Indian mines (Bhaskar, 2021[138]). Furthermore, the ministry of mines

[15] Data about ArcelorMittal Nippon Steel India consumption and extraction of iron ore are not publicly available yet, as the company was recently established as a new joint venture between ArcelorMittal and Nippon Steel of Japan. The two companies acquired the plant previously belonging to Essar Steel in Gujarat in 2019. In September 2021 the company began operations at the newly-leased Odisha captive mine (The Hindu Business Line, 2021[145]).

[16] The company had 70 million tonnes of low-grade iron ores and fines, which it was not using, but since this iron, ores stock came from captive mines the company was not allowed to commercialise it. In 2019, the company was allowed to dispose of them, probably through commercial transactions or other ways, i.e., transfers.

has also reportedly proposed that the lease period of existing captive mines should be terminated anticipatively, in 2025 instead of 2030 (The Economic Times, 2020[139]).

Significant controversies resulted from the aforementioned ministerial proposition. In fact, following the announcement, in May 2020 Tata Steel left the Indian Steel Association, relinquishing both its membership and its presidency mandate before the end of the term. The decision was interpreted by some market participants as a direct response to the governmental proposal of advancing the termination of captive mine leases, which would have represented a potential supply disruption for the company, fully relying on captive mines for raw materials. Ultimately, the government decided not to concretise the anticipated termination of captive leases and no further talk happened on the issue. Tata Steel re-joined the Association in April 2021, supposedly fearing the consequences of non-representation after JSW Steel added its recently acquired subsidiary, Bhushan Power and Steel, to the association (Iyengar, 2021[130]). The event illustrates the highly politicised nature of the mining and steel sectors in India, and highlights the perceptible weight of large companies in the political realm.

6.4.4. A quantitative assessment of the weight of captive mining on the overall Indian iron ore mining

This section provides some quantitative assessment of the significance of captive mining in the Indian iron ore-mining sector. It presents statistics on the number of captive and non-captive iron ore mining leases, the annual production of iron ore by captive and non-captive mines, as well as the evolution of captive mining within the overall iron ore mining sector. Finally, it will delve into specific regional data as well as into production volumes by private firms and state-owned enterprises (SOEs).

Overall, the number of captive mining leases is systematically inferior to the number of non-captive leases. However, as Table 4 and Figure 9 show, between 2011 and 2019 there has been a general increase of captive mining leases, from 27 leases in 2011-2012 to 38 in 2018-2019[17]. On the contrary, the number of non-captive leases has been decreasing, as clearly visualised in Figure 9. However, it is noteworthy that the number of total leases, reported in the third column of the table, is significantly higher than the sum of captive and non-captive mines. This is attributable to the fact that the mines included in the captive and non-captive categories are only mines that are consistently reporting to the Indian Bureau of Mines. As can be deduced from the table, in some of the years under examination non-reporting mines make up the majority of the total leases. However, the data source does not differentiate between captive and non-captive for non-reporting mines, adding a further layer of complexity to the analysis.

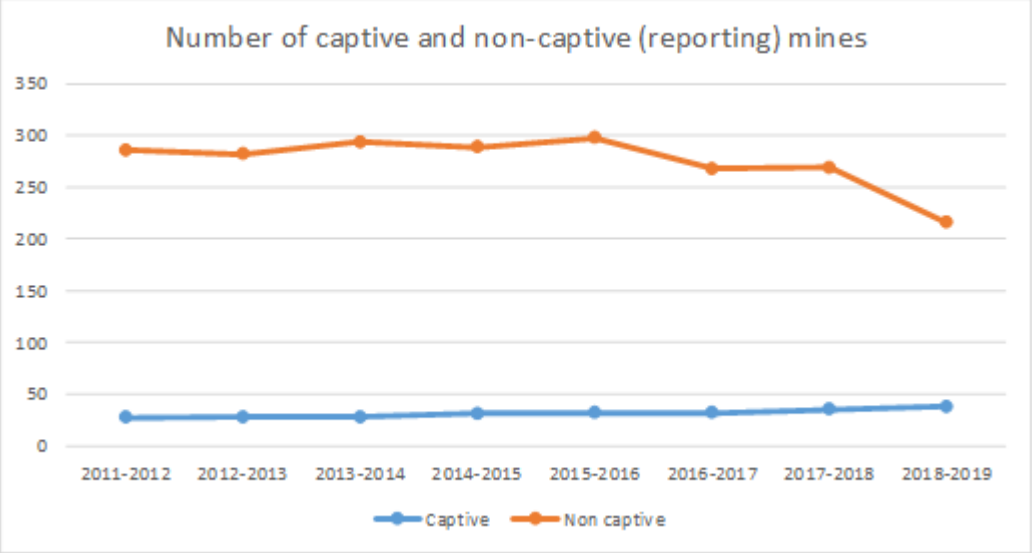
[17] Years are given in Indian years. The Indian year starts on April 1st and ends on March 31st of the following year.

Table 4. Number of captive versus non captive mines

Year	Captive	Non captive	Number of total mines
2011-2012	27	286	798
2012-2013	28	282	774
2013-2014	28	294	664
2014-2015	31	289	541
2015-2016	32	298	713
2016-2017	32	268	?
2017-2018	35	269	488
2018-2019	38	216	426

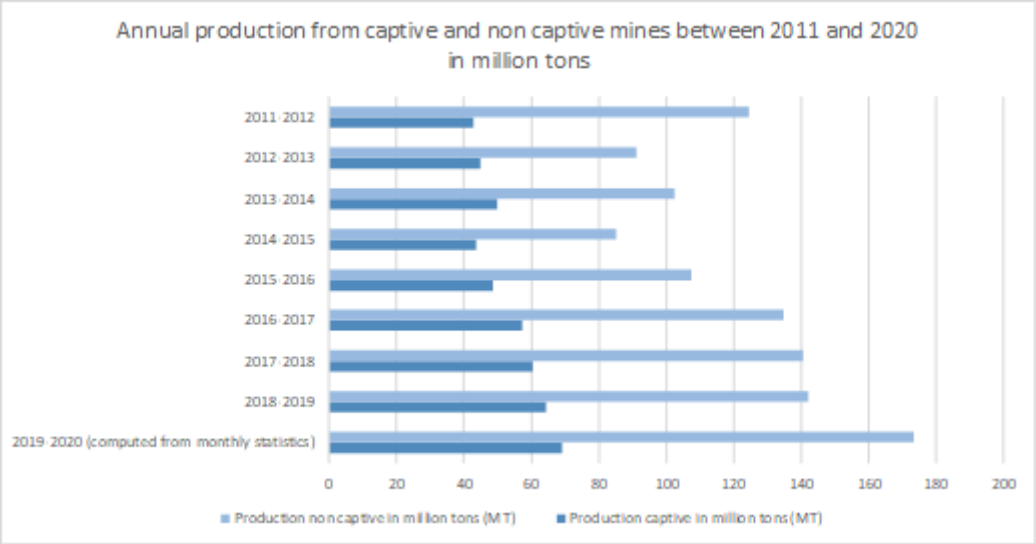
Note: years reported in Indian years. The Indian year starts on 1 April and ends 31 March of the following year.
Source: Indian Bureau of Mines

Figure 9: Number of reporting captive and non-captive mines (2011-2019)



Note: years reported following the Indian calendar. The Indian year starts on April 1st and ends on March 31st of the following year.
Source: Indian Bureau of Mines

Figure 10: Annual production from captive and non-captive mines (2011-2020)

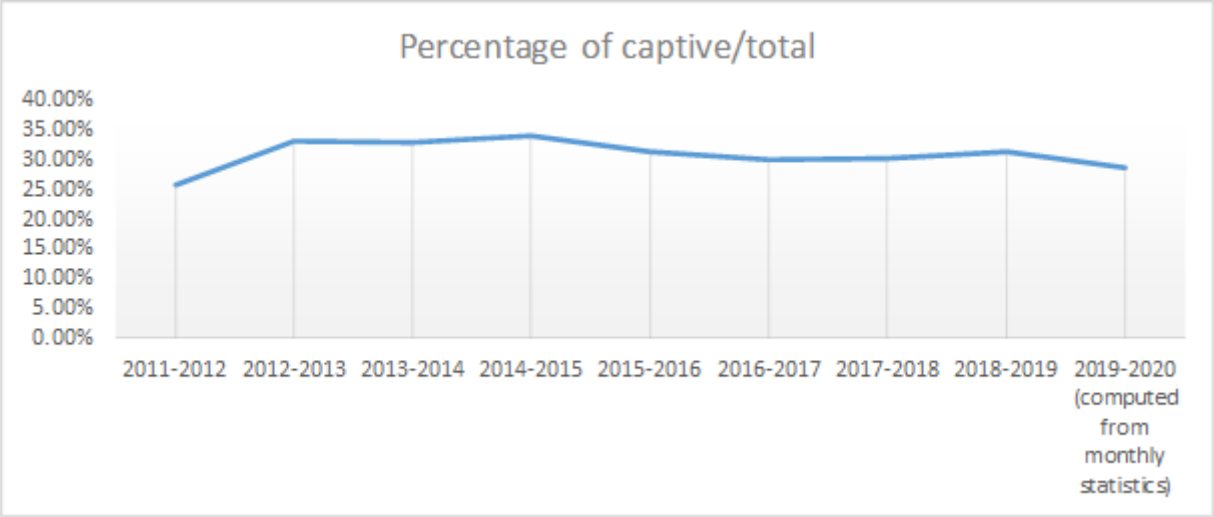


Note: years reported following the Indian calendar. The Indian year starts on 1 April and ends on 31 March of the following year.
Source: Indian Bureau of Mines

Concerning the annual production of iron ore, Figure 10 shows that the production from captive mines between 2011 and 2020 has remained consistently lower than the production from non-captive mines. In 2018-2019, captive mines reported production was of 64.23 million tonnes which makes up for about 33% of total production, while non-captive mines reported production of 142.22 million tonnes, which constitute about 69% of total production (Indian Bureau of Mines, 2020[140]). The figure, however, also showcases a general increase in captive mines' production, especially between 2014-2015 and 2019-2020, while always remaining two to three times lower than the iron ore production from non-captive mines. The aforementioned increase, however, is also observable for non-captive mines, resulting in a generalised increase in national production or iron ore.

More recent data, reporting for 2021, are only available at the monthly level. In February 2021, the latest month available at the time of this paper's writing, captive mines produced 8.33 million tonnes of iron ore, whereas non-captive ones produced 13.14 tonnes in the same period (Lohiya et al., 2021[141]).

Figure 11: Percentage of annual captive mines' production out of total annual production (2011-2020)



Note: years reported following the Indian calendar. The Indian year starts on 1 April and ends on 31 March of the following year.
Source: Indian Bureau of Mines

Relatedly, Figure 11 displays the evolution of the percentage of annual captive mines' production out of the total annual production of iron ore in India between the years 2011 and 2020. The graph shows that, after a low of 25.60% in 2011-2012, the production of iron ore from captive mines remained generally stable between 29% and 33% in the years between 2012-2013 and 2019-2020. From the monthly data for 2021, the percentage of captive mines' production out of the overall national production of iron ore in January and February 2021 was slightly higher than the average for the previous years (37.4% in January and 38.8% in February) (Indian Bureau of Mines, 2021[142]).

From a regional point of view, iron ore captive mining is not distributed evenly. Table 5 below displays captive mining regions where more than a thousand tons of iron ore were produced during the month of January 2021. In these regions, SAIL operates captive mines in Jharkhand, Chhattisgarh and Odisha (SAIL[143]); TATA Steel has captive mining ore in Jharkhand and Odisha; JSW Steel holds captive mines in Karnataka and Odisha (JSW Steel, 2020[144]); Arcelor Mittal Nippon Steel and Jindal Steel are mainly operating captive mines in Odisha (The Hindu Business Line, 2021[145]). Jindal Steel is also operating two captive mines in Rajasthan (Iyengar, 2020[146]) . The table highlights the heterogeneous distribution of mines in India: for instance, data report high iron ore production from captive mines from the states of Jharkhand and Odisha. The presence of various integrated steel plants in those states, especially owned by SAIL and Tata Steel, clearly elucidates the reasons for higher production from captive mines.

Table 5: Production of Iron Ore By Captive and Non-Captive Mines by State in January, 2021

State	Captive	Non-Captive
Rajasthan	1.06	0.7
Karnataka	0.66	0.29
Chhattisgarh	1.16	3.1
Jharkhand	2.05	0.15
Odisha	4.47	7.3

Note: Amounts reported in million metric tons
Source: Computed by the OECD Secretariat from the Indian Bureau of Mines monthly statistics

Finally, Table 6 displays how the distribution of captive mining among the public and private sectors in India has varied over the years. For recent data within the captive sub-group, captive mines owned by private steel companies are generally reporting higher production amounts than those belonging to steel SOEs. For instance, in 2019-2020 the private sector accounted for 56% of iron ore extracted from captive mines, while the steel SOEs accounted for 44% (Lohiya et al., 2021[141]). The table also showcases that the gap between captive mining production by private firms and SOEs has widened in recent years, mainly due to an increase in private production between 2018 and 2020.

Table 6: Production of iron ore by captive mines owned by private firms and steel SOEs (2016-2020)

Year	Private firms	Steel SOEs
2019-2020	38.8	30.3
2018-2019	35.9	28.3
2017-2018	30.5	25
2016-2017	30.8	26.5

Note: Amounts reported in million tons. Years reported following the Indian calendar. The Indian year starts on April 1st and ends on March 31st of the following year. Data computed by the OECD Secretariat from monthly statistics.
Source: Indian Bureau of Mines

7. World steel trade[18]

World steel trade has been steadily recovering from the economic downturn due to the pandemic, global steel trade has shown significant improvements in 2021. Despite the sudden increase in steel prices globally and the increase in transportation costs in particular in the first part of the year, recent figures relative to the period January to November 2021 reveal a double digit increase in steel trade with respect to 2020 year-on-year. In particular, global exports have increased by about 12% year-on-year, amounting to 309 mmt and equalling the level of trade observed in 2018.

As the world economy was slowly recovering during 2021 from the economic downturn due to the pandemic, global steel trade has shown significant improvements. Recent figures relative to the period January to October 2021 reveal a significant double digit increase in steel trade with respect to the previous year in y-o-y terms. In particular, global exports (see Table 7) have increased by about 12% in the last year, amounting to 309 mmt, well above the pre-Covid 19 levels. Taking into account EU internal trade, the size of global steel exports have reached the 414 mmt, which is slightly above the 2018 figures. Imports have also skyrocketed in 2021, with an increase in the first ten months of the year of 15%. Global imports have reached 260 mmt, which almost equals the 2016 global imports levels.

At the economy level, all major steelmaking economies (with exception of Korea) have seen their exports increase quite substantially in 2021. Chinese exports have risen sharply compared to 2020 figures, with an increase of about 29.4% (total 2021 figures amounted to 61.2 mmt). Chinese exports of finished steel products have risen in particular in the last months of the year due to the sharp drop in international market prices in late October and early November when most deals for December shipment had been concluded. Shipments from China remained remarkably high during the whole year, even though government instructions had ordered steel producers to maintain production volumes at 2020 levels.

EU steel exports registered only a moderate improvement vis-à-vis the previous year, rising by 2.4% (23.3 mmt). Steel shipments from India increased quite considerably, with a 20% y-o-y increase in 2021 (19.7 mmt). Japanese exports also increased by 10.2%, amid demand recovery in ASEAN economies as well as in Korea, the United States, and in the EU and despite reduced shipments to China and Middle East economies. Total Japanese outward shipments amounted to 32.7 mmt. Amongst top steelmaking economies, the United States also witnessed a significant rise in its exports, with an increase of 26.1% in 2021 (7.6 mmt).

Russia recorded an unprecedent increase of its steel exports, rising by 15.5%, and reaching 31.4 mmt, becoming the third largest global exporter after China and Japan. Amongst the largest exporters, Korea saw its exports decrease by 6.4% in 2021, with total steel exports totalling 26 mmt, while Türkiye has increased its exports by about 18.7% (21.5 mmt) in 2021. Further significant changes in steel exports in 2021 include the dramatic increase of Canadian exports (49.9%, 7.5 mmt) and the significant rise of exports from Indonesia (67.6%), which totalled 9.4 mmt.

The rise in world steel imports was driven by a significant increase in imports to the EU (see Table 8). Inward shipments of steel towards European member countries have risen by 38.8% in 2021 in the period January-November 2021, corresponding to about 46.3 mmt in annualised terms. Chinese imports contracted by 27.9% in the same period vis-à-vis 2020

[18] Note that this section is drawn from the steel trade policy document prepared for the March 2022 meeting of the Steel Committee [DSTI/SC(2022)4].

figures. Overall, total shipments to China amounted to 27.6 mmt, which is also well above pre-2020 levels. Amongst other large importers, India and the United States also saw their imports grow by respectively 10% (5.2 mmt) and 47.1% (26.9 mmt). Japanese and Russian import growth rates were more modest, increasing by 4.3% (5.2 mmt) and 1% (4.5 mmt) respectively during 2021.

Korean inbound shipments rebounded in 2021 with a 20.7% increase in annualised terms at 13.8 mmt. Türkiye also registered a significant improvement of its imports due to a significant growth in domestic consumption, in particular flat products. In 2021, Turkish imports rose by 24.8%, reaching 2016-17 levels at 15.7 mmt. Amongst the top steelmaking economies, Brazil recorded the largest increase in imports doubling compared to 2020 levels, and reaching 5 mmt in 2021.

Table 7. Steel exports, annual data

2015-21 (up to November 2021)

Economy	2015	2016	2017	2018	2019	2020	2021 (Jan-Nov)	2021 (ann.)	2021-20 (%)
CHN	103,289.9	100,510.9	68,049.4	61,621.1	56,293.6	47,301.7	56,113.8	61,215.1	29.4%
EU27	30,872.0	29,818.9	30,711.9	28,505.4	27,483.0	22,813.8	21,408.1	23,354.3	2.4%
IND	6,258.3	8,966.6	14,769.2	9,895.3	12,276.7	16,399.4	18,039.5	19,679.5	20.0%
JPN	38,563.3	38,312.4	35,247.8	33,793.5	31,111.2	29,660.4	29,970.2	32,694.7	10.2%
USA	8,895.8	8,363.8	9,469.0	7,875.0	6,607.9	6,058.0	7,003.8	7,640.5	26.1%
RUS	28,778.9	30,076.6	29,246.7	31,246.4	27,793.2	27,215.7	28,816.6	31,436.3	15.5%
KOR	30,010.5	29,696.5	30,168.2	29,055.9	29,057.5	27,725.2	23,795.8	25,959.0	-6.4%
TUR	14,505.7	14,951.7	15,985.1	19,297.1	19,122.1	18,086.9	19,687.0	21,476.7	18.7%
BRA	13,386.9	13,143.1	14,903.1	13,298.0	12,247.7	10,537.9	9,927.2	10,963.3	4.0%
TWN	11,096.0	12,165.3	12,039.5	12,209.0	11,167.0	10,506.3	10,024.8	10,936.2	4.1%
UKR	17,250.0	17,882.3	14,750.3	14,568.7	15,041.2	14,800.2	13,781.5	15,034.4	1.6%
MEX	3,168.8	3,230.9	3,773.7	4,745.1	4,354.5	4,505.2	4,772.7	5,206.6	15.6%
CAN	5,531.4	5,606.8	6,125.3	5,969.9	5,418.1	5,045.8	6,931.8	7,562.0	49.9%
SAU	836.6	805.9	823.9	2,524.7	1,946.1	1,075.4	1,225.4	1,336.8	24.3%
IDN	1,233.2	1,457.3	2,150.8	3,565.7	3,777.1	5,619.7	8,631.2	9,415.9	67.6%
EGY	452.1	803.4	1,472.2	1,449.9	1,156.9	4,128.0	1,732.6	1,890.1	-54.2%
GBR	6,830.8	4,119.4	4,399.5	4,281.1	6,361.1	3,998.3	2,899.6	3,163.2	-20.9%
MYS	1,151.6	1,274.6	1,359.1	1,560.0	5,023.6	8,354.5	7,315.1	7,980.1	-4.5%
ZAF	2,030.6	2,072.3	2,401.8	2,610.2	3,952.9	1,295.3	1,330.7	1,451.7	12.1%
AUS	768.5	700.8	926.9	939.9	1,096.9	813.8	567.8	619.4	-23.9%
Global (excluding. intra EU trade)	**341,672.7**	**343,251.2**	**319,213.5**	**311,549.4**	**296,120.3**	**276,777.8**	**284,151.6**	**309,983.6**	**12.0%**
Global (including intra EU trade)	**434,222.8**	**440,370.7**	**421,689.6**	**414,202.4**	**394,002.9**	**363,830.4**	**379,780.3**	**414,305.8**	**13.9%**

Notes: values expressed in thousand of metric tonnes. The column 2021 (Jan-Nov) reports actual trade data for the period January-November 2021. The column 2021 (ann) includes 2021 annualised trade data so as to make comparison with other years feasible.
Source: OECD based on ISSB data.

Table 8. Steel imports, annual data

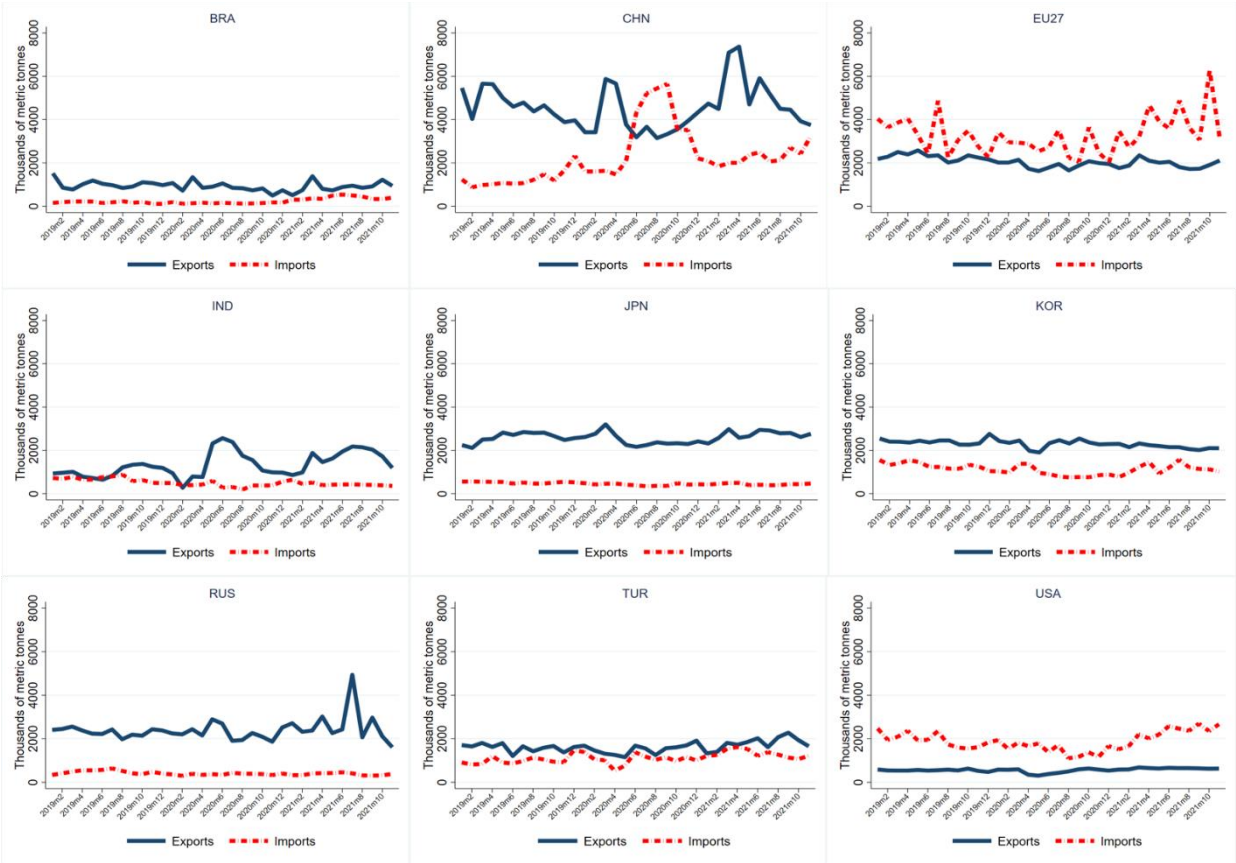
2015-21 (up to November 2021)

Economy	2015	2016	2017	2018	2019	2020	2021 (Jan-Nov)	2021 (ann.)	2021-20 (%)
CHN	12,767.1	13,211.0	13,534.8	13,953.5	15,167.9	38,324.6	25,343.2	27,647.2	-27.9%
EU27	37,979.4	40,745.2	40,357.5	44,944.8	39,995.0	33,397.1	42,506.4	46,370.6	38.8%
IND	12,734.0	9,258.7	8,379.3	8,312.2	8,139.8	4,793.8	4,834.5	5,274.0	10.0%
JPN	5,707.0	5,821.5	6,042.1	5,840.5	6,278.6	5,042.1	4,821.8	5,260.2	4.3%
USA	31,584.0	27,796.7	30,938.3	27,168.4	23,440.2	18,311.5	24,694.1	26,939.1	47.1%
RUS	3,975.5	3,971.1	5,763.2	5,734.8	5,726.3	4,434.3	4,106.7	4,480.1	1.0%
KOR	20,866.2	22,573.8	18,676.0	14,278.4	15,697.4	11,455.5	12,673.3	13,825.5	20.7%
TUR	18,137.7	16,539.0	15,342.3	13,643.8	12,030.1	12,630.9	14,444.5	15,757.6	24.8%
BRA	2,746.9	1,638.0	2,058.2	2,157.6	2,120.1	1,768.6	4,347.9	4,743.1	168.2%
TWN	7,313.3	7,654.0	7,241.9	7,478.1	7,105.7	7,207.8	8,769.6	9,566.8	32.7%
UKR	754.7	1,060.6	1,315.1	1,454.3	1,430.5	1,241.1	1,094.8	1,194.4	-3.8%
MEX	9,350.7	9,113.8	10,800.5	10,521.3	11,080.8	9,578.9	13,264.7	14,470.6	51.1%
CAN	6,816.1	6,814.9	7,471.8	7,822.6	7,978.5	5,952.0	8,100.6	8,837.0	48.5%
SAU	7,065.5	5,836.6	3,239.6	3,993.7	6,379.3	6,180.8	3,156.7	3,443.6	-44.3%
IDN	10,671.9	11,992.6	10,939.5	11,025.5	12,702.6	9,069.4	8,903.4	9,712.8	7.1%
EGY	567.6	733.5	1,558.2	302.7	512.3	155.9	867.3	946.1	506.9%
GBR	6,602.3	7,061.0	7,050.2	7,419.4	8,339.7	4,583.4	5,708.0	6,226.9	35.9%
MYS	7,441.1	8,478.7	6,941.5	7,433.1	6,990.2	5,548.1	5,519.2	6,020.9	8.5%
ZAF	1,518.1	1,265.1	1,061.5	896.1	1,011.5	1,049.6	1,502.7	1,639.3	56.2%
AUS	1,737.0	1,682.8	2,032.7	2,024.0	1,581.5	1,554.8	1,787.0	1,949.4	25.4%
Global (excluding intra EU trade)	**259,966.3**	**264,882.4**	**255,906.6**	**250,722.6**	**241,617.6**	**226,713.9**	**239,094.5**	**260,830.4**	**15.0%**
Global (including intra EU trade)	**349,508.5**	**358,775.6**	**355,323.9**	**351,842.7**	**339,472.8**	**314,147.2**	**334,851.8**	**365,292.9**	**16.3%**

Notes: values expressed in thousand of tonnes. The column 2021 (Jan-Nov) reports actual trade data for the period January-November 2021. The column 2021 (ann) includes 2021 annualised trade data so as to make comparison with other years feasible.
Source: OECD based on ISSB data.

Figure 12. Steel trade balances

Major steelmaking economies, monthly data (2019m1-2021m11)



Note: The figure reports monthly steel export and import volumes (in thousands of metric tonnes) for major steel trading economies from January 2019 to November 2021. EU data refer to external trade.

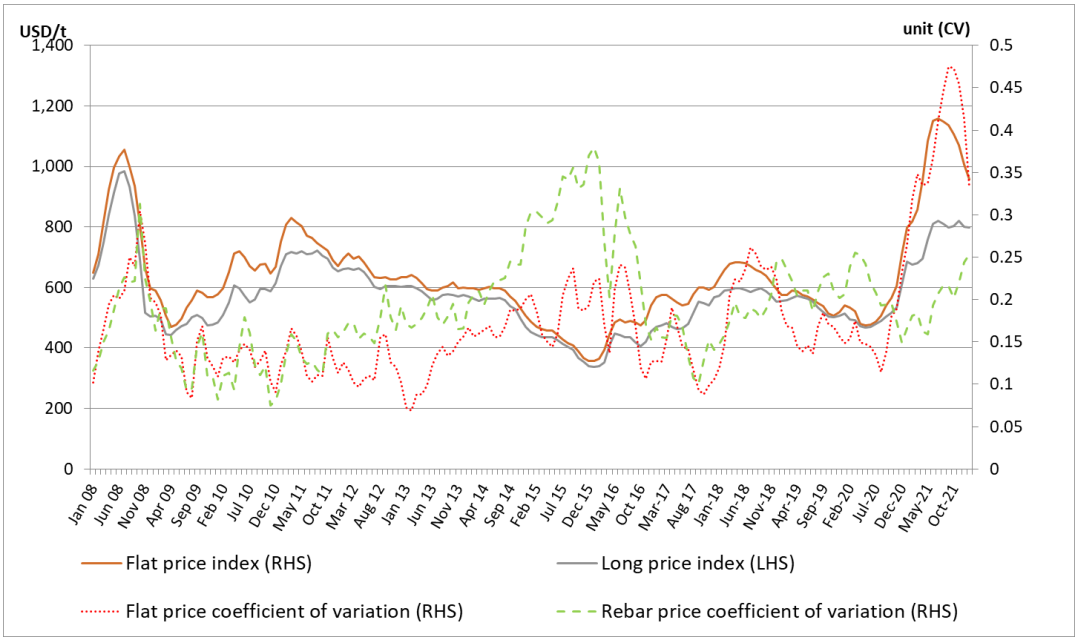
8. Steel and raw material prices

Steel and steelmaking raw material prices: Steel prices peaked in July 2021 before decreasing until the end of 2021. As of December 2021, flat steel prices and rebar prices stood 13% and 2% lower than at their July 2021 peak. Nevertheless, they were still 31% and 42% higher than one year earlier. Interestingly, the sharp increase in steel prices witnessed since July 2020 did not translate into an increase in the average steel firm's profit margin. Indeed, strong increases in raw materials needed to produce steel have contributed to reduce steel firms' margins. As of December 2021, benchmark prices for coking coal and ferrous scrap are up 234% and 41%, year-on-year. On the contrary, prices for iron ore are down 26%. For a price evolution after the study cut-off date period of end of 2021, please refer to Section 2.

8.1. Steel prices

Both flat steel prices and long prices increased sharply during the first semester of 2021, and peaked in July 2021 before decreasing again. As of December 2021, flat steel prices stood 13% lower than at their July 2021 peak, while rebar prices, which had increased at a slower pace than flat prices, only decreased by 2% compared to their July 2021 peak. Nevertheless, as of December 2021, flat steel prices and rebar prices are still 31% and 42% higher than one year earlier (Figure 13). The 2021 price upswing was sudden, and happened in conjunction with an increase of the main steel raw material prices. Initially, the rise in prices was partly explained by the vast steelmaking capacity made idle during the heights of the pandemic which could not be brought online on time to meet recovering steel demand and restocking (Fitch Ratings, 2021[147]). Government infrastructure spending, but also stronger than expected demand during COVID-19 due to unanticipated switches in household consumption patterns, with households substituting leisure and travel for equipment and housing (Fortune, 2021[148]), explained in part this sharp increase. The drop of flat prices during the second half of 2021 was sudden, rebar prices have stabilised at levels that are historically high. Flat prices may very well also stabilise at high levels, in line with elevated raw material prices. Elevated raw material prices as well as the recovery should continue to provide support to steel prices, although the reversal of the Chinese residential sector could weigh on aggregate steel demand and steel prices.

Figure 13. Aggregate flat and long steel price averages



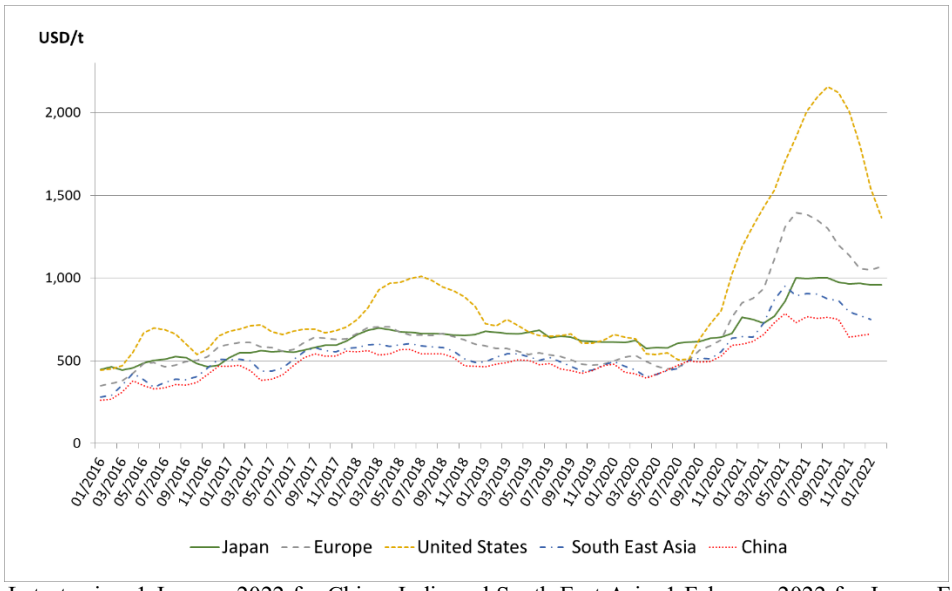
Note: The flat price and long steel price indices are defined as the arithmetic average of the individual regional Platts price series for the United States, North Europe, China, Japan, India and Russia, when available. This indicator had the closest fit to the two global Platts price indices used in Steel Market Developments reports prior to being discontinued (in September 2017). The coefficients of variation (CV) are the ratio of the standard deviation of the regional Platts price series making up the indices to their mean, thus capturing price dispersion across regions.
Source: Platts Steel Business Briefing.

Many regions displayed divergent dynamics with respect to flat and long steel prices (Figure 14, Figure 15). Flat prices in Europe and the United States were quicker to increase than in other regions, suggesting greater supply chain challenges resulting from the COVID-19 pandemic, or a more inelastic production (Figure 14). Imports of flat products started to weigh considerably on US flat prices around mid-October 2021, as US mills took into account the imports arbitrage situation and tried to clear their excess spot metal ahead of their November production (Ruggiero, 2021[149]). Lead times declined in the US while remaining at elevated levels, and US service centers were able to fill inventory gaps. US buyers have been more willing to book imports as the spread between domestic and imported Hot-Rolled Coiled (HRC) widened. Nevertheless, they seem to have pushed back the delivery of those tons to the first quarter of 2022 rather than to add to their 2021 inventories (Ruggiero, 2021[149]).

Rebar prices have had divergent dynamics after July 2021, increasing further in the United States, decreasing in Europe, and staying stable in Japan (Figure 15).

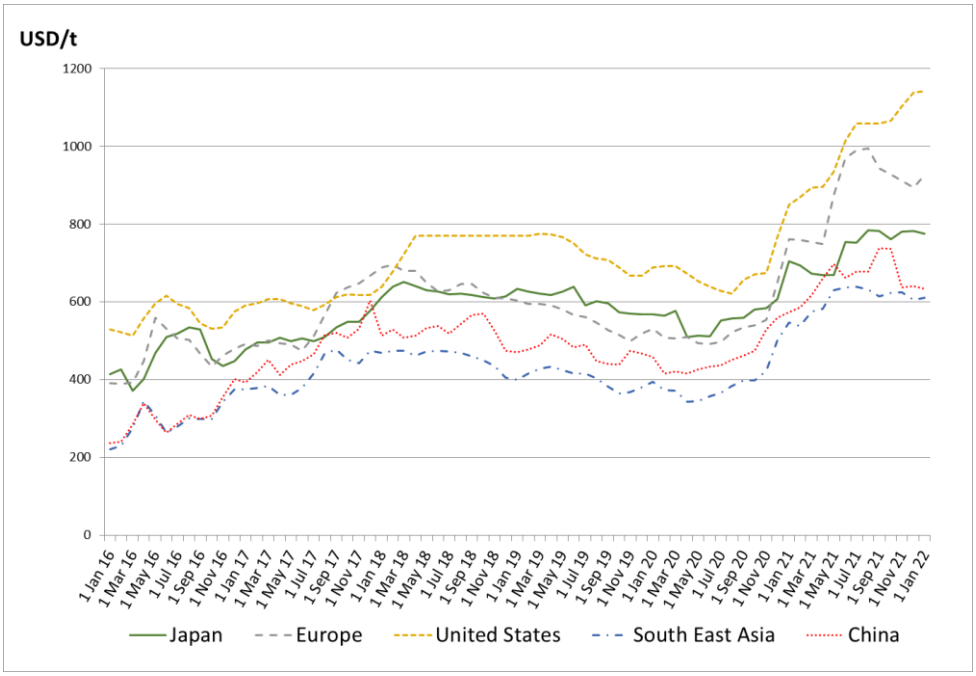
Investment bank Jefferies analysts recently cited sustained high energy prices in Europe and high coking coal prices as contributing factors for mills seeking higher flat steel prices (Forster, 2022[150]). EU carbon prices have risen further, boosting compliance costs and increasing price pressures (Forster, 2022[150]).

Figure 14. Steel price for flat products, by region



Note: Latest price: 1 January 2022 for China, India and South East Asia, 1 February 2022 for Japan, Europe and the United States
Source: Platts Steel Business Briefing.

Figure 15. Steel price for rebar, by region



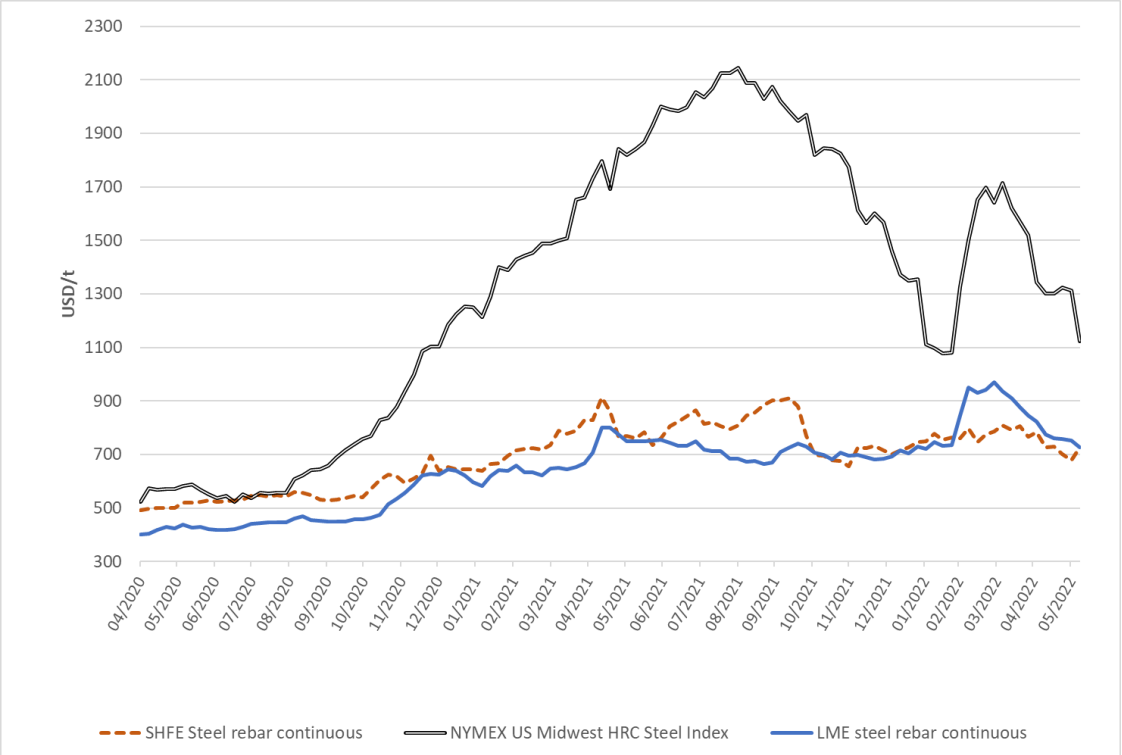
Note: The latest price is 1 January 2022.
Source: Platts Steel Business Briefing.

Steel futures prices tend to move slightly in advance of spot prices, suggesting that they are able to predict steel spot price dynamics at the daily frequency by quickly incorporating new market information. Figure 16 below shows three steel futures continuous contracts, as provided by Thomson Reuters Datastream (Refinitiv). Steel futures prices seem to have recently stabilised at their high levels on the Chinese and the European stock exchanges, while they have sharply decreased during the second half of 2021 in the United States, at a

speed even higher than the speed of their increase over the first half of 2021. US futures for HRC being lower than current spot prices may indicate that the market believes the price of US HRC steel will continue to decrease.[19]

Figure 16. Steel futures prices (as of June 2022)

Indices of three continuously rolled steel futures contract prices, USD per tonne



Note: NYMEX US Midwest futures prices were converted to correspond to metric tonnes rather than short tons. SHFE Steel rebar futures prices were converted from RMB to USD using daily exchange rates at closing. For more information on contract specifications, please refer to https://www.lme.com/en-GB/Metals/Ferrous/Steel-Rebar#tabIndex=0 for LME steel rebar contracts; to http://www.shfe.com.cn/en/products/SteelRebar/contract/9220216.html for SHFE steel rebar continuous contracts, and to https://www.cmegroup.com/education/files/hot-rolled-coil-steel-index-futures-options.pdf for NYMEX US Midwest HRC contracts. For a more detailed description of steel futures market, see (OECD, 2018[151]).
Source: Thomson Reuters, Datastream.

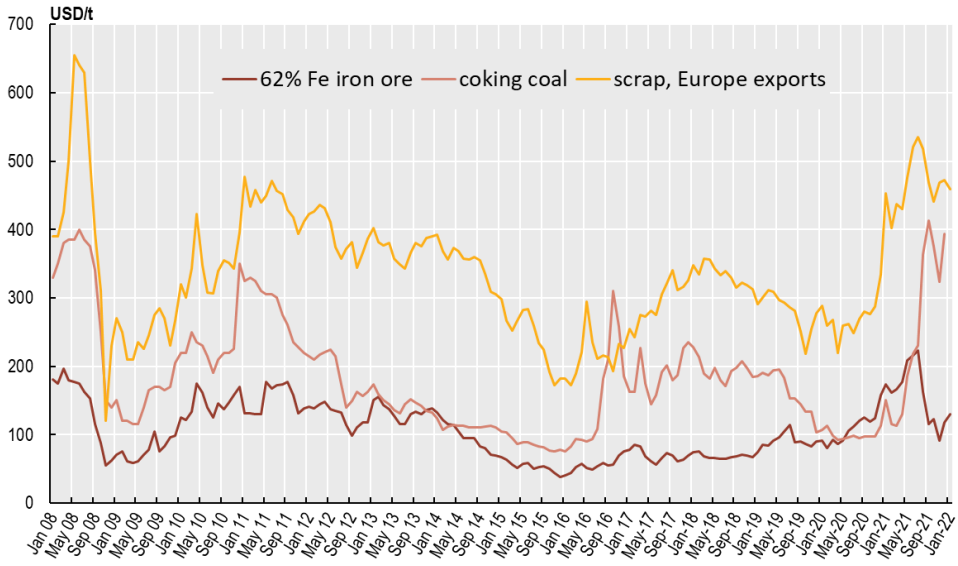
8.2. Steel raw material prices

Prices of the main steelmaking raw materials have been very volatile during the year 2021 (Figure 17). Coking coal and scrap prices increased sharply during the first half of the year and remained at elevated levels over the second half of the year, while iron ore prices also increased sharply during the first semester of 2021 only to fall back during the second semester of 2021. As of December 2021, benchmark prices for coking coal were up an astonishing 234%, while benchmark prices for ferrous scrap were up a robust 41%, year-

[19] Spot prices have increased higher than future prices is a phenomenon called backwardation (Ruggiero, 2021[306]), and would indicate a higher demand for buying steel immediately rather than for future delivery through futures or forward contracts.

on-year. On the contrary, prices for iron ore were down 26% in December 2021 compared to one year earlier.

Figure 17. Prices for key steel-making raw materials (as of January 2022)



Note: The iron ore price series is Platt's "Forwards / SGX 62% Fe Iron Ore cash-settled swaps (dry metric tonne) / China import CFR Tianjin port USD /t"; the coking coal price series is Datastream's "Premium Coking Coal Australia"; the scrap price series is Platts "Scrap / Shredded / N.Europe domestic delivered UDS /t"
Source: Platts Steel Business Briefing (SBB), Datastream.

Iron ore prices increased during the first semester of 2021 due to record demand from Chinese mills (Financial Times, 2021[152]), as well as to a range of issues that large iron ore producers were experiencing in their efforts to boost output, from labour shortages to bad weather (Financial Times, 2021[152]).[20] During the second semester of 2021, iron ore prices decreased, receding back to levels comparable to those of 2020. Two reasons may have caused the fall back of iron ore prices. First, iron ore prices were not supported by a strong steel demand from Chinese mills anymore during the second semester of 2020 (Staff, 2022[26]). Second, China's National Development and Reform Commission (NDRC), the nation's top economic planner and market regulator, and Beijing's Iron Ore Trading Center, have set as a common goal to decrease iron ore prices from what Chinese authorities believed is an unsustainable level, and launched a joint probe into the trading volume and prices of iron ore, declaring that they will monitor closely the spot price of iron ore and "identify abnormal transactions and speculation" to take action (Graham, 2021[153]). Going forward, iron ore prices will probably be determined by China's policy action concerning the reduction of steel production (Russel, 2021[154]). Consequently, in the medium term iron

[20] For example, Global miner BHP had set a "major maintenance" campaign at Port Hedland, its key iron ore loading facility in Western Australia, and had been experiencing some skilled labour shortage in the Australian market (Clarke, 2021[307]). Vale, the Rio-de-Janeiro based company, indicated delays to the start of some of its operation following the damn disaster. Anglo American owned company Kamba Iron Ore reduced its iron ore volume sales guidance citing adverse weather in South Africa as well as logistic constraints. Indeed Transnet, the state-owned freight and logistics company, reported a number of derailments this year. In addition to the low rail utilisation rate, Transnet had also reported low turnover at its various ports, partly owing to Covid-19 related absenteeism (McKay, 2021[308]). Rio Tinto, the largest iron ore producer, indicated that the replacement of some of its mines was late on schedule (Financial Times, 2021[152]).

ore prices should rebound, as a stronger Chinese steel production can be expected during the first quarter of 2022. Indeed, government requirements for steel output cuts are usually less stringent at the beginning of the year, and some market participants have already indicated that winter output cuts at steel mills in the Hebei province have been relaxed since early January (Staff, 2022[26]).

Coking coal prices rose during the year at an astonishing pace, due to a sustained demand from steel firms, and are still at elevated levels. Restocking demand, as well as higher production costs, are mentioned as reasons for the high prices of coking coal (Platts, 2022[155]). Limited spot seaborne availability for non-Australian premium hard coking coals, coupled with a surge in Chinese domestic coking coal prices due to shortages of premium grades, may also be contributing factors (Platts, 2022[155]). The price of the Canadian and US coking coal was boosted by strong buying interest from Chinese firms, following the unofficial ban on Australian coking coal from authorities (Box 1). Nevertheless, the reasons for the broad increase of metallurgical scope may be found in the global rise of energy prices, and in particular of coal in general, which reflected a sharp increase in demand for electricity generation, especially in China and India (Tema and Nagle, 2021[156]). Reduced hydroelectric power generation in Brazil, China, Türkiye, and the United States also contributed to higher fossil fuel demand from those jurisdictions, and to the increase of aggregate coal demand. Adverse weather events impacted natural gas and coal production, with flooding reducing coal production in several countries, including China and Indonesia (Tema and Nagle, 2021[156]).

A noteworthy event in the coking coal market is the pending complete disinvestment of Severstal and Evraz, two major Russian steelmakers accounting for 32% of the country's steel output, from all of their coal assets, Vorkutaugol and Raspadskaya (Bouckley, 2022[157]). The two coal companies provided 30.9 million mt or 34.5% of Russia's coking coal output in 2020. The move would bring the benefit of improving the companies' environmental, social and governance (ESG) scores, streamline their company structure, but would not decrease their expected coal consumption (Bouckley, 2022[157]).

Box 1. The Chinese unofficial ban and the disruption of the coking coal market

China, which had previously imported about 20% of its coking coal consumption, placed in October 2020 an unofficial ban[21] on Australian coking coal imports (Russel, 2020[158]). Consequently Chinese coking coal prices surged much higher than global prices, rising on June 2021 to above USD 300 per tonne for the first time since 2017, up almost 150% since October 2021 (Hume, 2021[159]), while premium Australian coking coal FOB stood at USD 200 per tonne (Lu and Li, 2021[160]). Although Chinese coke producers were relying mostly on domestic coking coal, they were still making use of higher grade coking coal from imports to reduce the ash and sulfur in their coke blend (Lu and Li, 2021[160]) (The South China Morning Post, 2020[161]). As exports from North America have been diverted to meet higher Chinese bids, Australian exports have replaced them in some of their traditional markets such as Europe (Lu and Li, 2021[160]),

[21] On 18 November 2020 the foreign ministry spokesperson Zhao Lijian officially confirmed that "many" Australian coal shipments had "failed to pass environmental standard tests" (Muju, 2020[439]). China's coking coal imports from Australia slumped in October 2020 to 1.53 million tonnes, or about 26% of its total imports of the fuel, according to customs data, down from 78% in March.

reflecting a global redistribution of global coking coal supplies. As a further sign of the global disturbance caused by the Chinese ban, the coking coal market witnessed an historical reversal in recent months of the relative value of the premium hard coking coal with low volatile matter (PLV) and the premium mid-volume coking coal (PMV) (Lu, 2021[162]). PLV has historically been the best type of coking coal, as it contains a lower percentage of volatile matter than PMV[22], but it was the main export from Australia (Lu, 2021[162]), and thus in over-supply globally after the Chinese ban. This reversal, considered a new normal by some experts and as temporary by others, has affected both spot and long-term contract volumes, even though it can be observed more readily in the spot market. A challenge in utilising the now cheaper PLV is the lower resulting wall pressure, which can require some coke producers to blend it up with more volatile matter. This adds a further step in the processing and can thus increase the overall cost of production (Lu, 2021[162]).

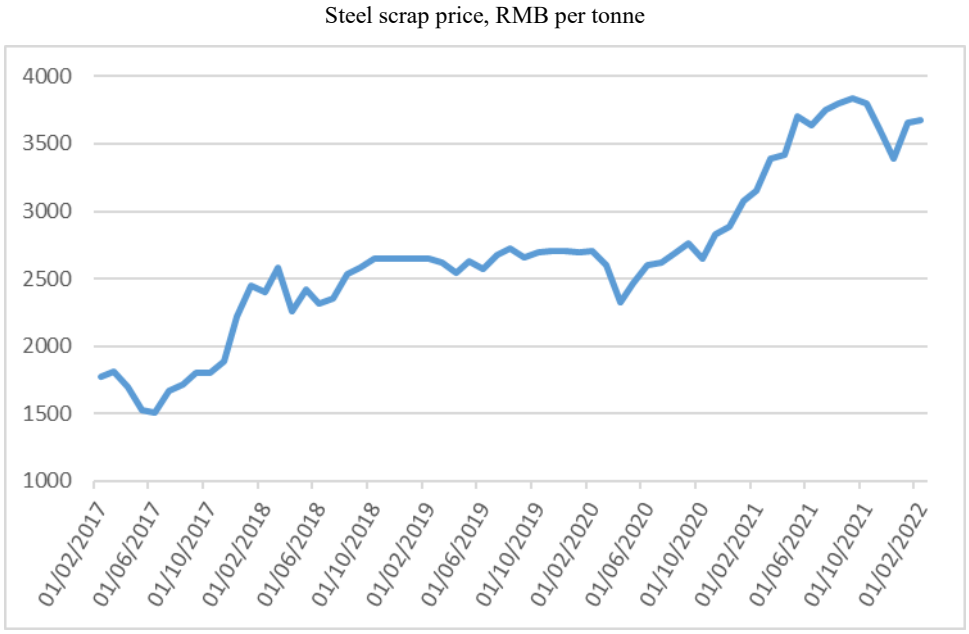
Scrap prices have risen considerably; prices of European scrap are even standing at their highest level since 2008. Strong EAF demand through 2021 saw new scrap tighten and become more valuable compared with iron ore, due to its lower usage of energy and carbon footprint properties. Hence, the market expects higher growth in future scrap consumption from EAF capacity expansions and the push to decarbonise and utilise more scrap in basic oxygen furnaces (Ruggiero, 2021[149]). Furthermore, high coking coal prices also make the EAF processes more attractive (Forster, 2021[163]). This partly explains why the ratio of iron ore prices to scrap prices has declined. Furthermore, new regulations enacted in China on January 2021 classified scrap as a recycled raw material and thus permitted Chinese scrap consumers to import their scrap from the rest of the world again (BIR, 2020[164]; BIR, 2021[165]). A Chinese target of increasing steel scrap use by 23% to 320 million tonnes by 2025, with the stated purpose of meeting the country's climate commitments of bringing its greenhouse gas emissions to a peak before 2030 and becoming "carbon neutral"23 by 2060 (Zhang, 2021[166]), should also sustain scrap prices in the long-run, while reducing China’s demand for iron ore. Domestic Chinese scrap prices have remained stable during the second half of 2021 (Figure 18), which may be due to the role of scrap imports, as well as to the increase in the number of approved Chinese domestic scrap processors24 to 478 (American Metal Market, 2021[167]).

[22] Coals within a narrow range of volatile matter (from 20% to 25%) are preferred by most coke makers as it allows for an optimal flame stability in the oven. Besides being more wasteful as more coal is lost as gas, coals with higher volatile matter content may be associated with spontaneous combustion. Furthermore, low-volatile matter can cause wall pressure that damages the coke oven.

[23] The ferrous sector contributes about 15% to China's total carbon emissions (Zhang, 2021[166]).

[24] The companies obtaining those new permits are located mainly in steel production hubs such as the provinces of Hebei, Shandong and Jiangsu. Others are in provinces that typically have a high output of ferrous scrap such as Guangdong and Hubei (American Metal Market, 2021[167]).

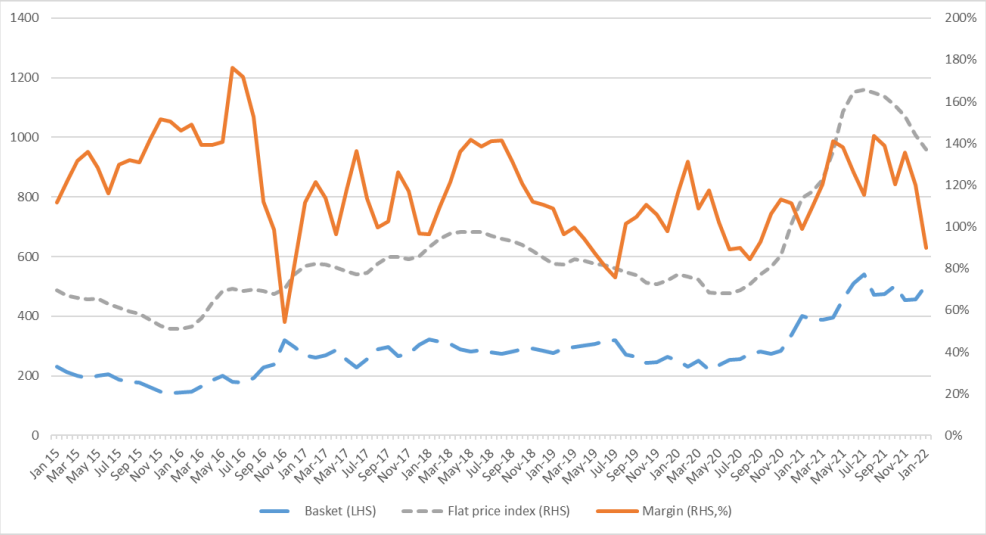
Figure 18. The upward trend in Chinese scrap prices has recently stabilised (last data point is February 2022)



Source: Datastream price series "Steel Scrap Price Index SHCNFSI - PRICE INDEX", originally sourced from Home Steel.

The steel raw material price margin, measured by the difference between the price of steel and a generic basket of steel inputs, decreased significantly during the second semester of 2021 due to the conjugated effects of persistent high raw material prices and decreasing steel prices (Figure 19). Overall, and in spite of the increase in steel price witnessed during the first semester of 2021, margin as of January 2022 are 9% lower year-on-year. Producers of higher-grade steel products may be less exposed to steel raw materials costs volatility than those who produce lower-grade steel products (Forster, 2022[150]). Transportation and logistics costs, which are not taken into account here, are also impacting negatively steel producers margins (Foster, 2021[168]). Because higher costs are sometimes mentioned as an explanation for elevated steel prices (Forster, 2022[150]), high steel price levels could persist, making steel products price increase similar to price increases seen in other sectors of manufacturing worldwide (Figure 20).

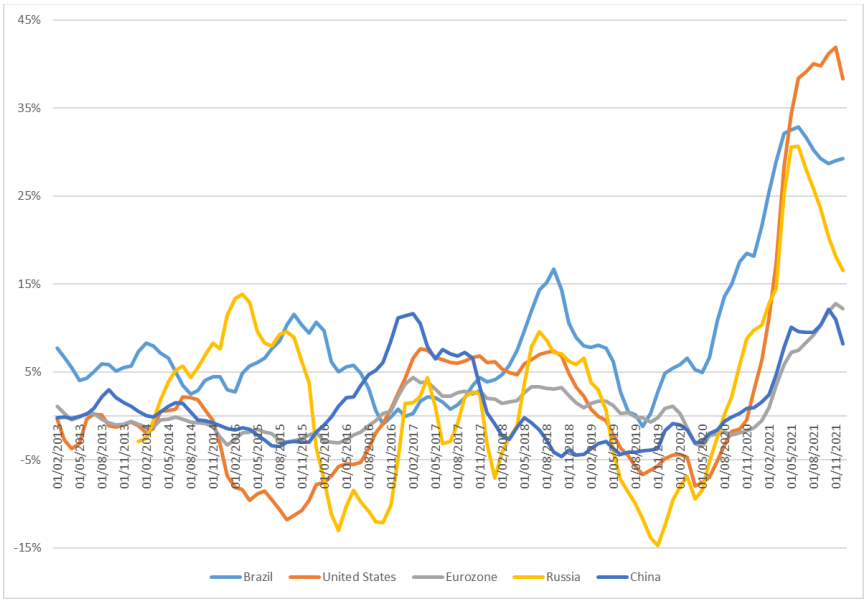
Figure 19. Margin between steel and raw material prices



Note: Last data point is January 2022. The raw materials basket for steel production is made up of 70% of the usual quantities of iron ore (1.6 tonne) and coking coal (0.77 tonne) needed to produce steel in the integrated process and 30% of the quantity of ferrous scrap (1.07 tonne) needed to produce steel in the electric arc furnace process (see OECD, 2016). Prices used are as follows: Iron ore Fines, 62% Fe, SPOT, CFR China; Hard coking coal spot, FOB Australia; Scrap, shredded North Europe domestic price. The basket is compared against HRC world prices. The margin is defined as the per cent difference between the steel flat price and the raw materials basket price.
Source: OECD based on data from Thomson Reuters, Platts Steel Business Briefing (SBB), and Datastream.

Figure 20. Price have increased in the manufacturing sector in general

Percentage increase, year-over-year, of Manufacturing Price Indices (all manufacturing sectors) for a few selected economies



Note: Price increases indicated do not factor in transportation costs of the products, they only represent at the gates output prices.
Source: Refinitiv.

9. The global steelmaking capacity situation

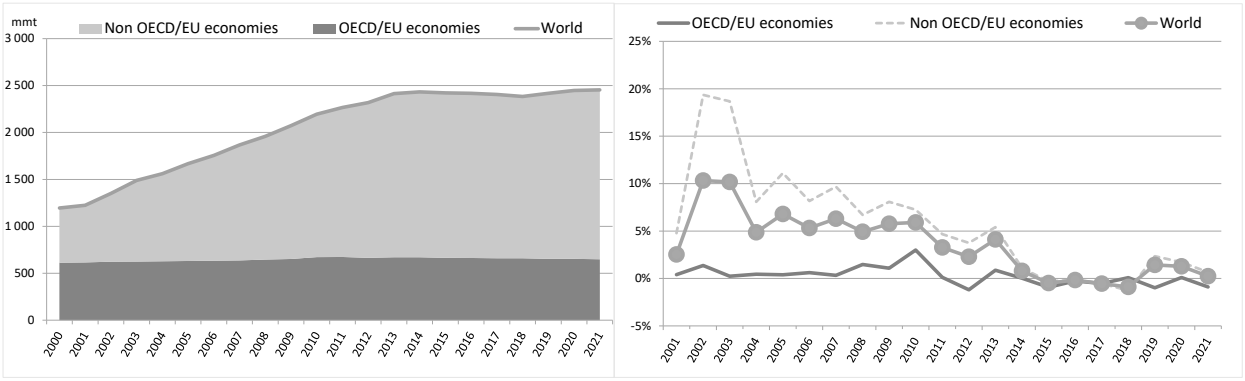
Capacity increased slightly in 2021, while capacity utilisation, defined as production as a share of capacity rebounded. Global steelmaking capacity increased to 2 454.3 mmt in 2021, i.e. by 0.2% (6.0 mmt) from the level at the end of 2020, according to the available information as of December 2021. World steel production as a share of capacity rebounded from 75.3% in 2020 to 77.8% in 2021.

The latest available information (as of December 2021) suggests that global steelmaking capacity increased in 2021 for the third year in a row (Figure 21). The net capacity change in 2021, taking into account new capacity additions and closures, brings current global steelmaking capacity up to 2 454.3 mmt, representing a 0.2% increase from the level at the end of 2020.

As discussed in document [DSTI/SC(2022)3], most of the capacity additions in 2021 took place in the Middle East, where an additional 4.9 mmt of capacity was deployed. In 2021, steelmaking capacity also increased in the CIS (by 1.3 mmt, i.e. 0.9% over the previous year), Latin America (by 0.5 mmt, i.e. 0.7% over the previous year), North America (0.3 mmt, i.e. 0.2% over the previous year) and Asia (0.2 mmt, i.e. 0.01% over the previous year). On the other hand, steelmaking capacity decreased in Africa by 1.2 mmt in 2021, i.e. by 2.7% compared to its level in 2020. In Oceania and Europe, no new investments or permanent closures were registered in 2021, according to the sources used to update the OECD's capacity database.

Figure 21. Evolution of crude steelmaking capacity in OECD/EU economies and non OECD/EU economies

A. Level (mmt) B. Annual % change

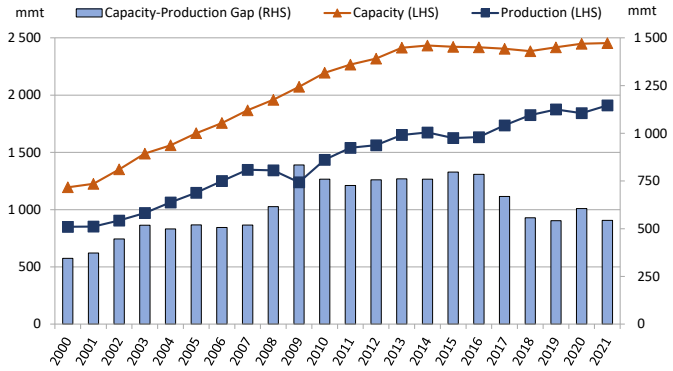


Note: Capacity data reflect information available to December 2021.
Source: OECD

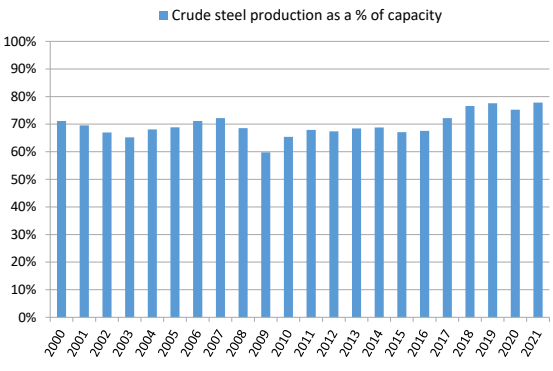
Where global steelmaking capacity rose to 2 454.3 mmt in 2021, crude steel production also increased to 1 910.2 mmt in 2021. As a result of this, the gap between the two decreased to 544.1 mmt in 2021, from 605.9 mmt in 2020. (Figure 22 A). Global steel production as a share of capacity, as a rough indicator of the global utilisation rate, rebounded from 75.3% in 2020 to 77.8% in 2021 (Figure 22 B). The year 2021 witnessed the end of the temporary closure of steel plants witnessed in 2020 (Box 2), with most of temporary steel production capacity being bought back online.

Figure 22. Global crude steelmaking capacity and crude steel production

A. Capacity-Production gap (mmt)



B. Crude steel production as a % of capacity



Note: Capacity data reflect information up to December 2021. Annual production data for 2020 and 2021 are based on worldsteel (released on 25 January 2022). Annual production data from 2000 to 2019 are from "Steel Statistical Yearbook 2020", published by worldsteel (World Steel Association, 2020[169]).
Source: OECD for capacity and worldsteel for production.

Box 2. The impact of the COVID-19 pandemic on steel plants

Steel mills around the world were impacted by the Covid-19 crisis, with production activity affected directly by lockdowns and other containment measures or indirectly as mills begin to suspend production in response to lower (or expectations of lower) steel demand.

The impacts of Covid-19 became visible in China particularly in late January 2020 and through February 2020, for example in falling capacity utilisation rates and significant increases in steel inventories, but the spread of the pandemic has resulted in a number of temporary production shutdowns and idling of steelmaking furnaces in many countries during the spring. Nevertheless, as of December 2021, most of those companies have resumed their operations at their mills, partially or fully.

In Europe, Italy experienced suspensions of steel production at a very large number of facilities in March 2020. In the earlier part of the month, this included several electric-arc furnaces (EAF) facilities located in the northern part of the country, with a number of steel producers such as Alfa Acciai, Ferriera Valsabbia, Duferdofin-Nucor, and Tenaris Dalmina, all stopping production. Since then, the Italian government has issued a new decree allowing steel manufacturing and major steel consuming sectors to resume operations from 4 May 2020 onwards. For example, ArcelorMittal Italia has restarted some operations in Taranto works since 11 May 2020. Some companies have also announced the resumption of production elsewhere in Europe. For example, Greece's Sidenor resumed its EAF-based steel plants at Thessaloniki and Almyros in early May 2020.

In Ukraine, Dnipro Metallurgical Plant (a part of DCH Steel) restarted its idled plants in May 2020.

In the United States, U.S. Steel resumed production at BF No.1 at the Edgar Thomson Plant in Pennsylvania in late May, which was stopped in late April. Also, Cleveland-Cliffs (formerly AK steel) resumed their operations. Liberty Steel USA planned to idle

its Georgetown steelworks, in South Carolina, for an initial period of three months as of late April.

In Brazil, production has resumed relatively slowly. For example, Gerdau restarted BF No. 2 in Ouro Branco, Minas Gerais, during the second half of 2020. Usiminas stopped operation of two BFs at the Ipatinga steelworks in April 2020 without a concrete resumption schedule, leaving only one operational BF. CSN announced that it shut down its No. 2 BF at Usina Presidente Vargas in Volta Redonda, Rio de Janeiro on May 29, without announcing the duration of its idling period.

In India, JSW Steel started to gradually resume operations in early May 2020 after receiving approvals from central and local governments. For example, Monnet Ispat's plant in Raigarh restarted steel production on 2 May 2020.

In Japan, Nippon Steel Corporation restarted No. 2 blast furnace at the Kimitsu area in November 2020, which was halted in June 2020. The company also resumed No. 2 BF operation at the Muroran Works in Hokkaido Island in November 2020, which was stopped in July 2020. The company also announced in January 2021 that it resumed operation of No. 1 BF in Kashima which was stopped in April 2020. On the other hand, the company stops No. 2 BF at the Kyushu Works (Yawata) in Kitakyushu since July 2020 and decided to change its status from temporary closure to permanent closure regarding the No. 2 BF in Setouchi Works (Kure Area) and No.1 BF in Wakayama Works in September 2021. JFE Steel resumed one blast furnace operation at Fukuyama plant in September 2020, which was stopped in June 2020. The company also restarted one blast furnace operation at Kurashiki plant in December 2021, which was halted in April 2020.

In Korea, POSCO postponed the restart of its No. 3 BF at the Gwangyang steelworks, which was stopped for repairs in the first quarter of the year. Hyundai Steel has also partially suspended operations at its Dangjin Works.

The difficulties facing the steel sector as a result of the crisis had a negative impact on employment. Announcements were made in 2020 by some companies regarding permanent and temporary layoffs in anticipation of the long term threat that a drop in demand entailed for their industry.

In the NAFTA region, 2,700 workers at U.S. Steel have already been laid off. ArcelorMittal USA laid off a total of nearly 400 employees in some plants. Canada's Algoma steel began temporary layoff procedures affecting approximately 70 full-time employees. In Europe, Arcelor Mittal Italia decided to lay off 1,000 workers, which has led to protests. Also, Arcelor Mittal Spain proposed layoffs between 50 to 100 employees at a recent meeting with the unions. In Latin America, Brazil's Usiminas announced 960 planned layoffs at the Cubatao unit, Sao Paulo, however the Brazilian court rejected a decision to lay off workers and determined that negotiations between the company and the union must resume.

Note: Please note that the above should not be considered to represent an exhaustive list of production disruptions, operation resumptions or complete information about the employment effects during the Covid-19 crisis, but represents what the Secretariat managed to collect using media sources. The same remark holds for lay-offs.
Source: OECD Secretariat.

10. The steel market outlook

10.1. Global steel market outlook

In its April 2022 SRO, worldsteel forecasts steel consumption to increase by 2.7% and 0.4% in 2021 and 2022 respectively, a sharp downward revision compared to its prior, October 2021 SRO due to the impact on global steel demand of the Russian war against Ukraine. The impact will be felt around the world but it will affect some regions disproportionally. Many steelmaking economies are expected to face challenges such as steel raw material shortages, higher energy prices, financial market volatility and growing inflation (worldsteel, 2022[170])

Overall, steel demand is expected to grow at a significantly slower pace than previously projected. China has experienced a deceleration in the steel using sector's activities since July 2021. Despite the government support measures to boost infrastructure investments, steel demand is expected to remain flat throughout 2022. Developed economies outperformed early forecast and managed to reduce the negative impact of the new variants in 2021, however the challenges brought by the war in Ukraine are expected to slow down the recovery. Developing economies continue to struggle with disruptions caused by the pandemic and tighter monetary policies. Rising inflation and political instability and uncertainties caused by the events in Ukraine poses substantial risks to the forecast (worldsteel, 2022[170])

10.2. Regional steel market outlook

10.2.1. Americas

In Central and South America, worldsteel forecasts finished-steel demand to rebound by a robust 30.7% in 2021 before decreasing by 4.4% in 2022 respectively. In most countries across South America, both construction and automotive sectors continued to support the recovery of steel demand in 2021 (worldsteel, 2022[170]) (worldsteel, 2021[1]). Raising prices could affect economic growth in the region (Oxford Economics, 2022[171]). Mounting inflation could impact the automotive and construction sectors (Bloomberg Linea, 2021[172]).

In Argentina, steel demand was supported by construction activity which grew by 34.2% year-on-year in 2021. The country's consumption of rebar and wire rod, increased by 14.1% year-on-year in November (Kallanish, 2022[9]). The recovery of the automotive industry, the agricultural sector and the energy sector have supported demand for steel products. According to the Argentine Chamber of Commerce Steel (ACERO), during the first 11 months of 2021, the fast recovery in the energy market supported the export of steel tubes which showed volumes similar to those prior to the pandemic (Acero Argentino, 2021[173]).

In Brazil, steel demand is expected to contract by 8.5% in 2022. Finished-steel consumption increased by 30.1% in the first 8 months of 2021, however in 2022, increasing inflation, currency volatility and political instability is expected to reverse past trends and negatively impact steel demand. The redirection of steel trade flows in the midst of the events in Ukraine could result in growing Brazil's steel export share (Alacero, 2021[10]). (Kallanish, 2022[174]) Rising demand for wind and solar energy infrastructure and equipments and the construction sector are all expected to support Brazil's steel demand in the coming months (Platts, 2022[175]). The automotive sector is expected to rebound in 2022 after shortages in

semiconductors impeded a strong recovery in 2021. According to the Brazilian National Association of Automotive Vehicles Producers (ANFAVEA), automotive productions and exports are forecast to increase by 9.4% and 3.6% respectively during 2022 (Anfavea, 2022[176]). The strong demand could push steel prices up in the next months which in the context of the presidential election could bring further uncertainty to economic growth (Platts, 2022[177]).

In Chile, apparent finished steel consumption increased by 35.9% in the first 8 months of 2021 (Alacero, 2021[10]). Investments in the construction sector increased by 12.8% in 2021. However, investments in the sector are expected to slow down in 2022 impeded by growing inflation and the consequential rise in the Monetary Policy rate (TPM) that the central bank imposed to control the prices increase (Banco Central, 2021[178]) (Camera Chilena de la Construction, 2022[179]). Greater liquidity among Chilean consumers has increased spending in the automotive sector that registered a 60% year-on-year increase in sales in 2021. According to the National Automotive Association of Chile (ANAC), 2021 has registered the second-best year of automotive sales since 2018 (El Economista, 2021[180]) (ANAC, 2022[181]).

In Colombia, the National Administrative Department of Statistics (DANE) noted that the number of construction licenses has grown steadily since the end of 2020 (DANE, 2021[182]). However, the Colombian mining information system points out to a sharp decrease in construction material production, which could negatively affect the sector in the coming months (Colombian Mining Information System, 2021[183]).

In North America, worldsteel expects a steel-demand growth of 20.5%% and 2.9% in 2021 and 2022 respectively (worldsteel, 2022[170]) Despite logistic issues and supply chain interruptions, the automotive production is expected to increase by 17% in 2022. The Alliance for Automotive Innovation forecast an improvement in light vehicles production and sales as inventory increases and issues in the supply chains become less disruptive (Alliance for Automotive Innovation, 2022[184]).

In Canada, shortages of construction workers and building material have affected the sector. According to Deloitte, construction costs soared 16.8% in the first 3 quarters of 2021 and high prices may continue throughout 2022 (Deloitte, 2022[185]). In November the total value of building permits has also increased by 6.8%. Despite growing prices, construction intention for the residential sector and investments in building construction has surged by 12% and 1.2% respectively in November (Statistics Canada, 2021[186]). In the energy sector, the Canadian association of energy contractors (CAOEC) expects drilling activity to increase by 26.8% in 2022 as energy usage continues to rebound due to economic reopening (CAOEC, 2021[187]).

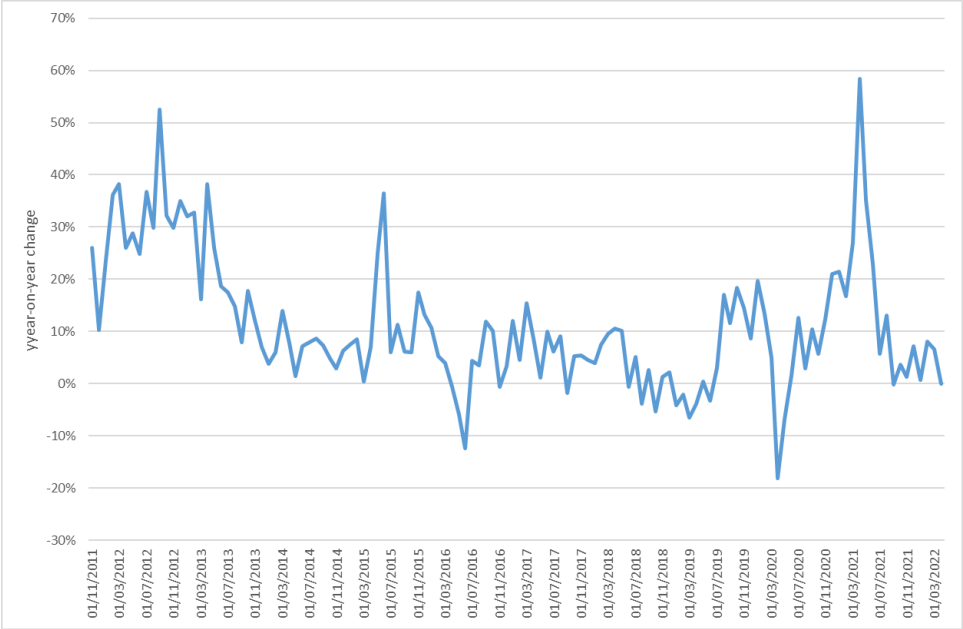
In Mexico, worldsteel forecasts finished steel to grow by 12.9% and 4.3% in 2021 and 2022 respectively (worldsteel, 2021[188]). According to Alacero, apparent finished steel use increased by 20.9% during the first 9 months of 2021 (Platts, 2022[4]). Increased activities in the petrochemical industry, irrigation, transportation, and urbanization supported the construction sector which grew by 9.4% in November reaching its highest record in history (Mexican Government, 2021[189]). The automotive sector experienced a 2% drop in production caused by logistic issues and semiconductors shortages. Despite the slowdown in production, the automotive sector is showing signs of recovery as car sales increased by 6.8% in 2021 (Cluster Industrial, 22[190]).

In the United States, worldsteel forecasts steel demand to increase by 21.3% and 2.8% in 2021 and 2022 respectively (worldsteel, 2022[170]). Construction spending increased by 9.3% in November compared to 2020 (The U.S. Census Bureau, 2021[191]). Infrastructure investments and the Jobs Act are expected to support the construction sector throughout

2022. Residential Building fell in January 2022 as many states in the United States experienced freezing temperature, However a surge in permits suggests a recovery of the sector amid severe shortages of housing (Reuters, 2022[192]) Figure 23. Overall, the biggest challenges for the sector are expected to be supply chain disruptions and supply material volatilities, although the implementation of new sourcing strategies will likely limit pitfalls and support growth (Deloitte, 2022[193]).

Figure 23. US new private housing permits

(Year-on-year changes in the number of new permits delivered for the private housing units)



Source: US Bureau of Census, through Refinitiv.

To mitigate disruption in the supply of semiconductors American automakers are asking Congress to look into the local production of these components (AAPC, 2022[194]). The US sales volumes of vehicles are expected to ramp up during the second semester and reach a 2.6% year-on-year increase in 2022 (IHS Markit, 2021[195]). The U.S Energy Information Administration (EIA) expects oil and petroleum production to increase in the coming years. Demand is projected to increase as well driven by consumption in China and the United States which are expected to account for 43% of the total consumption growth in 2023 (EIA, 2021[196]).

10.2.2. Africa and the Middle East

According to worldsteel's April 2022 SRO, African steel demand is expected to grow by 6.4% and 4.6% respectively in 2021 and 2022.

Africa's construction sector is expected to improve starting in 2022. The African Development Bank is set to implement a framework of public and private partnerships to address the investments gap in infrastructure (African Development Bank, 2022[197]). According to UNCTAD, foreign direct investments towards Africa rose by 147% in 2021 compared to 2020, with a large share of the increase due to a USD 46 billion share swap between the South African multinational Naspers and its Dutch-listed investment unit, Prosus. The flow of investments is particularly strong in the infrastructure sector. In contrast, investor confidence in the industry sector remains weak (UNCTAD, 2022[198]).

In South Africa, steelmaking minerals exports remain strong (Kallanish, 2021[199]). In October the automotive sector has been affected by shortages in supply as workers' strikes shut down operations (Kallanish, 2021[200]). Despite supplies disruption and ramping inflation, according to the National Association of Automobile Manufacturers of South Africa (NAAMSA), in January 2022, cars sales and production have increased by 19.5% and 11.78% year-on-year respectively (Naamsa, 2022[201]). In 2022 the construction sector is expected to be supported by large government spending and more investments from the private sector (Engineering News, 2021[202]). Positive trends in the mining industry continue to support the construction sector (WHBO, 2022[203]).

In the Middle East and North Africa (MENA), steel demand is expected to increase by 3.2% and 4.3% in 2021 and 2022 respectively (worldsteel, 2022[170]). In North Africa, steel demand is expected to experience moderate growth as energy and food prices continue to rise. Increasing finished steel export from the MENA region is ramping up demand for raw materials (Metal Expert, 2021[204]).

In Algeria, a large portion of the national budget will be allocated to national defence spending, which accounts for 21% of the total budget, while steel-support sectors such as construction, transportation and industry will receive only a marginal part of the total budget (Metal Expert, 2022[205]).

In 2021 Morocco became Africa's largest passenger car manufacturer. Morocco's automotive industry is expected to contribute 24% of the total Moroccan GDP in 2022. Morocco's sales of new vehicles increased by 5.7% in 2021 compared to 2020 (MLN, 2022[206]). According to the Association of Vehicle importers in Morocco (AIVAM) last year's increase in car sales is explained by the rise in consumers saving during the pandemic (Archyde, 2022[207]).

In Egypt, despite new regulations that forbid construction in overcrowded urban areas, the construction sector continues to show signs of recovery as the government invests in mega infrastructure projects (worldsteel, 2021[188]). The construction industry is expected to grow at a CAGR of approximately 6% between 2022 and 2027 (Research and Markets, 2022[208]). Capacity expansion and improvements in steel production in Egypt are expected to largely contribute to the demand for raw components (Metal Expert, 2021[209]).

In its April 2022 SRO, worldsteel forecast steel consumption to increase by 2.9% in the Middle East in 2021 and 3.8% in 2022. (worldsteel, 2022[170]). Saudi Arabia's steel demand is expected to increase 4-5% in 2022. The increase in energy prices significantly improves the prospects of the construction sector in countries that exports oil. Large infrastructure projects will continue to support the demand for long products, particularly rebar and wire rod (Kallanish, 2021[210]). According to Metal expert, some of the projects for the 2030 vision strategy will prioritise the use of domestic steel (Metal Expert, 2022[211]). In Bahrain, the government increased VAT by 10% in order to improve fiscal balance. However, the impact on the steel sector is not yet ascertained (Metal Expert, 2021[212]). The United Arab Emirates shifted weekend to the internationally common Saturday-Sunday. The change is expected to boost productivity in the steel sector and improve access to foreign markets (Kallanish, 2021[213]).

In Iran, power shortages and severe weather have affected the steel sector in January 2022. Some steelmakers in the country have had to limit their output because of disruptions in the energy supply (Metal Bulletin, 2022[214]). Steelmakers and iron plants have seen production limited by at least 40% (Kallanish, 2022[215]). The construction sector continues to experience a sluggish recovery. According to the Tehran Chamber of commerce, high cost, slow pace of construction and long period returning investments are negatively affecting the construction sector (Financial Tribune, 2022[216]). Although steel production

and steel using sectors are expected to suffer disruption in the short term, Chinese investments in the framework of the BRI are expected to support the industry in the long term.

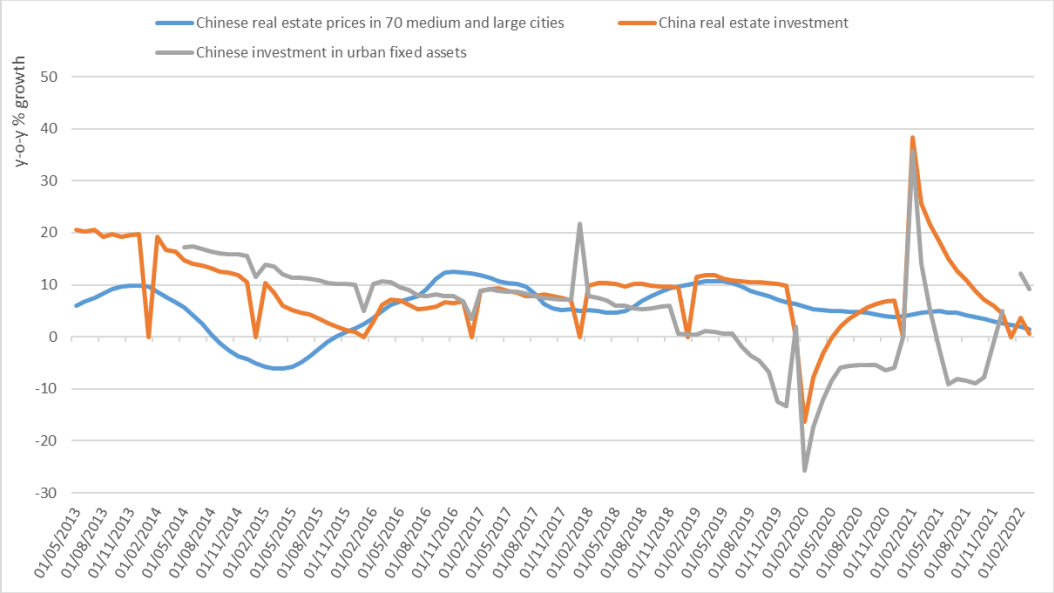
10.2.3. Asia and Oceania

In worldsteel's April 2022 SRO, steel consumption in Asia and Oceania is forecast to increase by 2.7% and 0.4% in 2021 and 2022 respectively. (worldsteel, 2022[170])

In China, steel demand is expected to decrease by 5.4% in 2021 and remain stable in 2022. The slowdown in steel consumption had started in July 2021 when the construction sector experienced a deceleration. Low trade dependence with Russia and Ukraine are expected to limit the impact of Russia's large-scale aggression against Ukraine, however the sluggish global economic situation may undermine China's steel exports (worldsteel, 2022[170]). Although the Chinese economy is expected to slow to 5.4% in 2022, infrastructure spending is expected to remain constant as the government issues special bonds to support the sector (Kallanish, 2022[217]). The construction sector was declared a strategic sector for the 14th five-year plan. The proportion of the construction industry (residential and infrastructure) added value in the total GDP is expected to remain around 6% in the next 5 years (Ministry of Housing and Urban-Rural Development of the People's Republic of China, 2022[218]). Market sources expected infrastructure construction, which accounts for 15%-20% of total steel consumption, would continue to show improvement in early 2022 due to accelerated fiscal spending since December 2021 (Staff, 2022[26]). China's total social financing, which represents the aggregate volume of funds provided by China's domestic financial system to the private sector, increased in January due to the strong stimulus packages implemented to support the infrastructure sector (Platts, 2022[219])Figure 25. Nevertheless, recent government's rules in the real estate segment are expected to affect the residential sector. New regulations have constricted property developers' capacity to continue accumulating debts while banks have tightened lending (Atradius, 2021[220]).

Figure 24. Real estate and infrastructure indicators for the Chinese economy

Chinese new house prices, capital flows investment into real estate, and fixed urban asset investments (year-on-year % change)



Note: The series of Chinese investment in urban fixed assets refers to construction projects involving a total planned (or required) investment of 500,000 Yuan and over by urban enterprises and institutions of various types of ownership, by urban enterprises and institutions of various types of ownership, by administrative units and by individual, and investment in real estate development.
Remark: The series is not published for the month of January of each year, hence the missing data points on the graph.
The last data point represents April 2020.
Source: www.stats.gov.cn, through Refinitiv

Figure 25. China Total Social Financing

Note: The graph shows the volume of financing provided by the financial system to the real economy. In January of 2022 the volume of financing jumped to a record high of CNY 6.17 trillion indicating that steel demand from infrastructure and property construction activities is likely to soar in the coming months.
Source: BoC

The Chinese automotive sector has registered a 1.6 decline in cars sales in 2021 while production has increased by 2.4% (China Association of Automobile Manufacturers, 2021[221]). In December 2021 domestic sales of passenger cars returned to pre-pandemic levels. In 2022, the production and sales of new energy vehicles is expected to increase as the government implements a series of regulations to support the market. Lithium mines in Qinghai, Sichuan, Jiangxi and other provinces are transformed and improved to guarantee domestic supplies while the construction of charging facilities has been extended to rural areas (Chinese Government, 2022[222]).

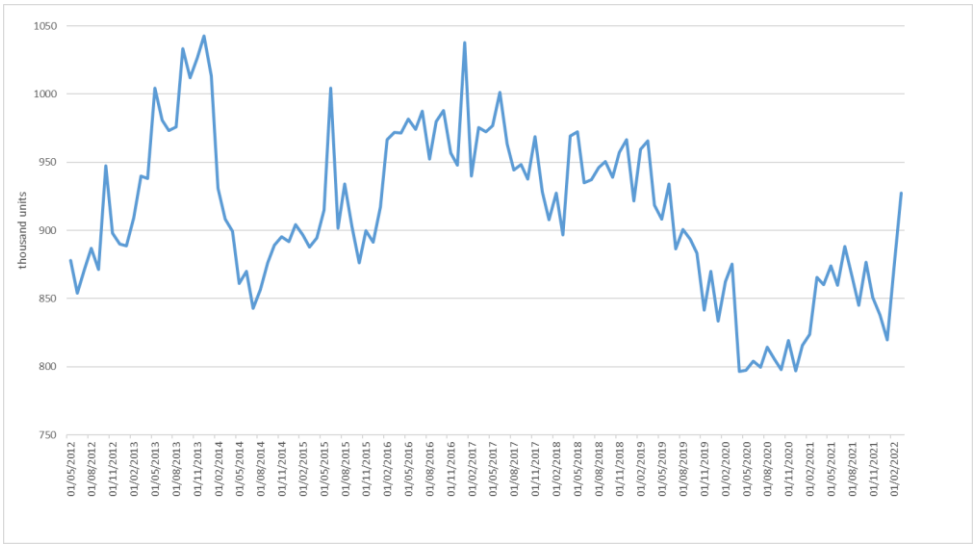
In India steel demand is expected to increase by 18.8% in 2021 and by 7.5% in 2022 (worldsteel, 2022[170]). Despite the war in Ukraine and a third Covid wave in early 2022, Indian steel demand is expected to rise significantly in 2022 (Kallanish, 2022[223]). Government infrastructure spending and consumer demand are keeping steel prices elevated (Kallanish, 2022[224]). Despise high costs, the construction sector in India is expected to expand in the next years. The construction sector is expected to grow on average by 7.5% each year e and become the third-largest globally by 2025 (Invest India, 2022[225]). In the automotive sector, government investments in electric vehicles are growing. Central and state government have approved a series of fiscal incentives to support the sector which is expected to reach a 30% sale share by 2030 (Randheer Singh et al., 2022[226]).

In Japan, steel demand is expected to increase by 9.3% and 1.2% in 2021 and 2022 respectively (worldsteel, 2022[170]). According to the Ministry of Economy, Trade and Industry of Japan (METI), restrictions on the supply of semiconductors and the events in Ukraine are expected to impact Japanese steel demand. In the first quarter of the new financial year that runs from April to June, demand for Japanese steel products is expected to decrease by 0.5% year-on-year to 20.98 million t (METI, 2022[227]). Residential construction fell in November after registering a sharp increase in October

Figure 26. In December 2021, The Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) implemented a series of policies aimed at supporting the real estate sector and reduce tax burdens for homeowners (MLIT, 2021[228]).

Figure 26. New housing trends in Japan

Seasonally-adjusted series of new housing constructions for Japan



Source: National statistics, through Refinitiv.

In South Korea, steel demand is expected to rebound by 13.5% in 2021 and by 1.2% in 2022 as investments in construction and manufacturing increase (worldsteel, 2022[170])According to the Korea Ministry of Trade, automobile export value increased in November 2021, although production decreased by 6.6% due to logistic issues (Ministry of Trade, 2021[229]). South Korean crude steel production decreased over the first quarter of 2022 due to the weaker automotive sector and the transformation of a large BOF local mill that is currently switching to more eco-friendly steelmaking process (Metal Expert, 2022[230]). Despise the recent slowdown, automotive production is forecasted to grow by 3.6% in 2022. Construction investment is expected to recover and grow by 2.4% in 2022 (Metal Expert, 2021[231]).

Steel demand in the ASEAN-5 region (Indonesia, Malaysia, Philippines, Thailand and Viet Nam) is expected to rebound by 3.5% in 2021 and by 4.8% in 2022. The region has shown slower recovery trends due to lower vaccinations rates and disruption in the construction sector. Despite COVID cases remaining high, countries are gradually opening up, and a visible recovery in construction projects is expected in 2022. (worldsteel, 2022[170])

In Thailand, steel demand is expected to increase by 4.7% in 2021 (Seaisi, 2022[232]). The steel sector shows signs of recovery as 2021 registered an increase in production, imports and exports (Metal Expert, 2022[233]). Growing international demand has supported the automotive sector which registered an 18.1% increase in car production in 2021. Following positive production trends car exports is expected to grow by 4.54% in 2022 (Metal Expert, 2022[234]).

Indonesia's economy is forecasted to recover in 2021 with a GDP increase of 3.7% (Indonesian Government, 2022[235]). Steel consumption in Indonesia is projected to reach pre-pandemic levels with a 6% increase in 2021 (Seaisi, 2022[232]). According to the Ministry of Finance, the construction sector has returned to pre-pandemic levels in 2021 and it is expected to continue the recovery as the government provides tax incentives to support the housing sector (Ministry of Finance, 2022[236]). In 2021, car production surged by 62.2% year-on-year. The increase is attributed to sales growth in the domestic market connected to tax relaxation initiatives implemented by the government (Metal Expert, 2022[237]).

In Malaysia, steel demand is expected to increase by 3.2% in 2021 (Seaisi, 2022[232]). According to the Malaysian Automotive Association, automotive production experienced a moderate 0.99% decline in 2021 compared to 2020. Car sales decrease in 2021 is expected to continue in January as supply disruption caused by floods in certain regions may affect the sector (Malaysian Automotive Association, 2022[238]).

In Viet Nam, steel consumption is forecasted to increase by 2.4% and 5% in 2021 and 2022 respectively (worldsteel, 2021[188]). According to the ASEAN Automotive Federation, automotive production declined by 1.4% in 2021. To support the sector the government announced in December 2021 a decrease in registration fees for cars, trailers and similar vehicles manufactured or assembled domestically (Metal Expert, 2020[239]).

10.2.4. Europe and CIS economies

In the EU and the UK[25], worldsteel forecasts finished-steel consumption to rebound by 16.3% in 2021 and then decrease by 1.3% in 2022 The Russian aggression against Ukraine is expected to weigh on the European steel industry (worldsteel, 2022[170]). Disruption in

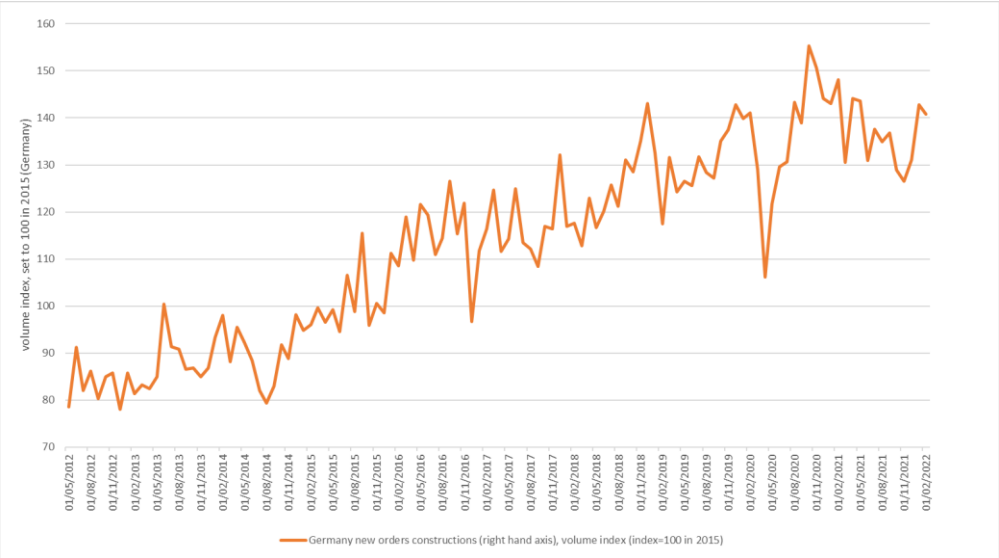
[25] worldsteel and Eurofer's forecasts refers to the EU 27 + UK (worldsteel, 2021[260]) (EUROFER, 2021[390]).

the global supply chain and rising energy prices represent the main challenges faced by EU steel makers. Many of the electric furnace in Europe could introduce temporary stoppages or expand short working hours due to rising energy costs[26] (Kallanish, 2022[240]). In addition to increasing energy prices, shortages in steel and raw material supply are expected to impact European steel production as Russian and Ukraine combined account for a fifth of imports to the EU (Reuters, n.d.[241]).

In November 2021, production in construction increased by 0.5% year-on-year in the euro area and by 1.3% year-on-year in the EU (Eurostat, 2021[242]). However, confidence in the EU construction sector experienced a moderate decline in January 2022 (Eurostat, 2022[243]). The increase in steel prices induced by Russia's large-scale aggression against Ukraine are expected to further exacerbate European business confidence. A current poll by German association Bauindustrie shows that 70% of member construction companies see delays to projects, and 30% report effective cancellations (Bauindustrie, 2022[244]). Construction output in Eastern Europe is set to fall by 3.4% due to inflationary pressure, rising energy prices and construction costs in the midst of the events in Ukraine (GlobalData, 2022[245]) New residential construction in Germany has experienced a slowdown since the second quarter of 2021 Figure 27..

Figure 27. New housing trends in Germany

Seasonally-adjusted series of new housing constructions in Germany (index)



Source: Refinitiv

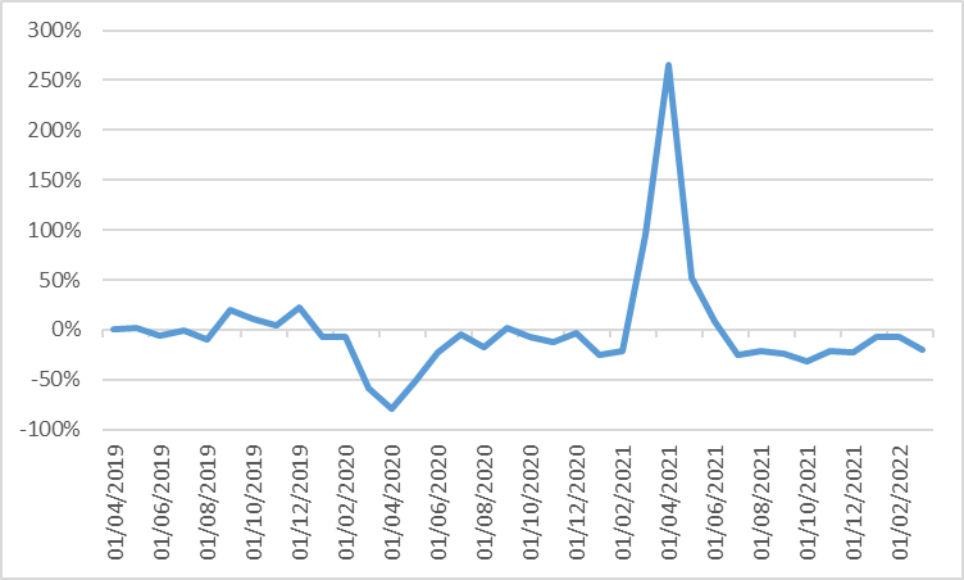
According to the European Automobile Manufacturers' Association (ACEA), in 2022 the automotive sector is not expected to recover yet to its pre-crisis level. Supply chain disruptions further exacerbated by the Russian invasion of Ukraine impacted car production across Europe. During the first quarter of 2022, passenger car registrations in the EU declined by 12.3% compared to the same period last year. All four of the major EU markets experienced decreases: Italy (-24.4%), France (-17.3%), Spain (-11.6%) and Germany (-4.6%) (ACEA, 2022[246]). In March 2022, the last data point, was the ninth consecutive month of year-on-year decline of passenger car registration, with 20.5% percent decline year-on-year. Data from January 2022 suggests that the number of electric cars sold in

[26] Electric furnaces account for over 40% of Europe's steel output.

Europe is nevertheless increasing steadily, however, the sector's high reliance on incentives to compensate for the higher costs of those vehicles, as well as the lack of charging infrastructure in some places could halt the momentum (ACEA, 2022[247]). Figure 28 below indicates Eurozone new car registration year-on-year growth as reported by the European Automobile Manufacturer Association (ACEA), which fell 20% on March 2022, year-on-year.

Figure 28. Eurozone new car registration

Monthly, year-on-year growth



Source: European Automobile Manufacturer Association (ACEA).

In Other Europe, worldsteel forecasts growth rates of 12% and 5.2% in 2021 and 2022 respectively. Steel consumption in Türkiye is expected to grow by 13.2% in 2021 and by 6.4% in 2022 (worldsteel, 2022[170]). The weakening of the Turkish Lira accelerated and reached its lowest point ever in December 2021 following the Central Bank's decision to lower loans rates (Kallanish, 2021[248]). Rising construction costs, deteriorating balances sheets and delays in construction projects may impact the sector in the coming months (Reuters, 2021[249]). The depreciation of the Turkish lira has also affected the automotive sector as sales of passenger cars and light commercial vehicles fell by 4.6% (Steelorbis, 2022[250]). According to the Automotive Manufacturers Association (OSD), Turkish cars production decreased by 12.4% year on year in the first quarter of 2022 (OSD, 2022[251])

In its April 2022 SRO worldsteel forecast, steel demand in the CIS region, which includes Russia and Ukraine, is set to grow by 1.5% in 2021 and decrease significantly by 23.6 in 2022 (worldsteel, 2022[170]). The current situation makes it difficult to forecast how steel markets will develop in the region. Assuming that the military conflict will end during 2022, Russian steel demand is expected to decrease by 20% in 2022 and register zero growth in 2023 (worldsteel, 2022[170]) According to The Automobile Manufacturers Committee of the Association Of European Business (AEB), In March 2022 Russia's sales of new cars and light commercial vehicles decreased by 62.9% (AEB, 2022[252]). The automotive sector is expected to be under pressure due to inflation, rising political tensions with neighbouring countries, supply chain shortages, consumer patterns shifting to secondary markets and financial constraints caused by the sanctions (Metal Expert,

2022[253]) (Reuters, 2022[254]). Since February 2022, many Russian trading partners started to seek alternatives to Russian steel and steelmaking raw materials supplies (Platts, 2022[255]) In April, EU countries introduced a ban on the passage of vehicles registered in Russia and Belarus on the territory of the EU further exacerbating trade relations with Russia (Kallanish, 2022[256]). Increasing trade restrictions from Western countries could push Russian steel companies to redirect export volumes to Asia (Kallanish, 2022[257]).

In Ukraine, major ports were affected by the conflict and steel raw materials were largely unavailable because of shipping problems (Platts, 2022[255]). Despite these challenges, most Ukrainian steelmakers resumed production in April and some companies plan to restart exports in May (Kallanish, 2022[258]). The EU market is expected to support Ukrainian steel exports in the coming months, however logistic adjustments will need to be made as borders between Ukraine and the EU have different railway standards and road are not designed for large goods transfer (Kallanish, 2022[259]).

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