The Global Steel Industry

Market Analysis - 2020-2023 Trends - Stakeholder strategies

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The 5 phases of Xerfi Global's Global Markets and Competition reports

Identification of the playing field

At Xerfi Global, we believe that international classifications are not the only valid definition of a market. It is the companies that make the sector and not vice-versa. During our first brainstorming session, we strive to give a clear-cut definition of the scope of the report.

Identification of market leaders

During the second phase, Xerfi Global's analysts identify the companies who will be studied in the report. Our aim is not only to classify by total sales, but also to detect tomorrow's movers and shakers, especially those from emerging markets.

Identification of the main market indicators

Using the best and most up to date international sources, Xerfi Global's experts handpick the most relevant indicators pertaining to both supply and demand.

Identification of corporate strategies

During a further brainstorming session, the Xerfi Global team aims to decipher the main corporate strategies and key future trends.

Identification of the key conclusions

Thanks to a final brainstorming session, drawing on the knowledge of all the members of Xerfi Global, the main conclusions are debated and ultimately summed up in no more than a dozen slides. Concision, precision and accurate forecasts are our main aims.

This is a collective report written under the supervision of:
Carine Berbon

Other contributors include: **Olivier Lemesle**
Luc Brunet

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1. Conclusions

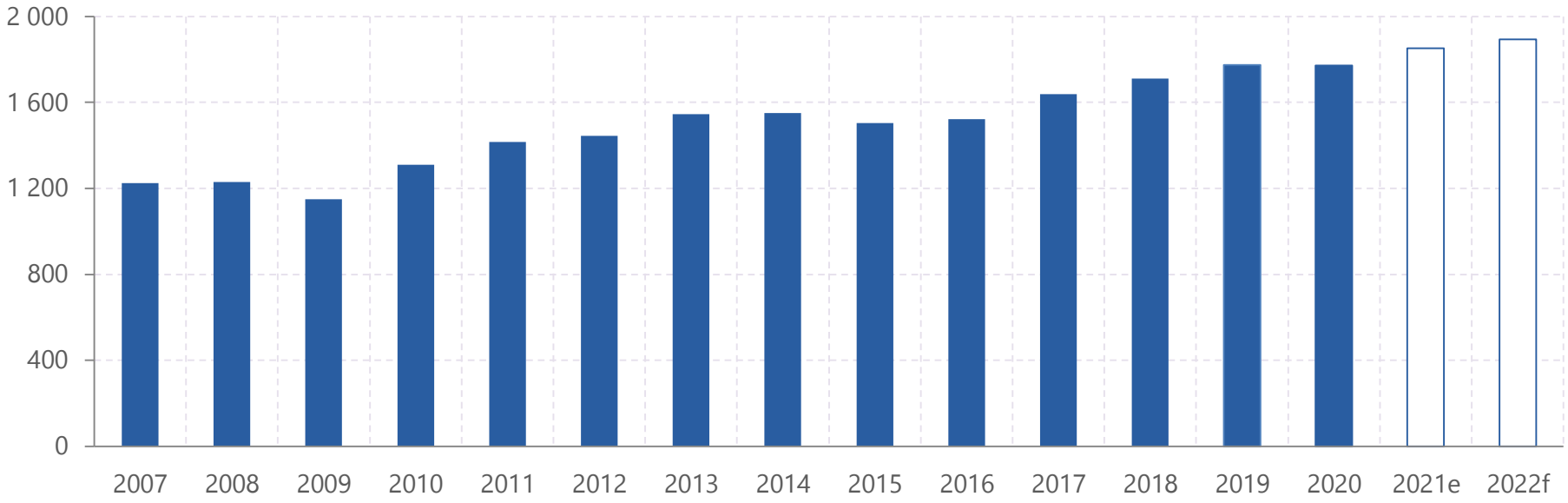
Current situation and major trends for 2020-2023

- The Covid-19 crisis was a shock of unprecedented magnitude for the global steel industry. It led to a sudden drop in demand for steel products in volume terms in the first half of 2020 due to the measures to tackle the spread of the virus, leading to delays and temporary closures in building sites (the construction industry is the main outlet of the steel industry) and a drop in factories' production rates (particularly in the automotive sector). Nevertheless, overall, steel consumption only fell by 0.2% in 2020, with major disparities between continents. Thus, in America and the European Union, steel demand contracted by more than 5%, while it increased by 3.6% in Asia.
- Amidst a sluggish demand, global steel production only slightly increased in 2020 (+0.3%). The indicator did not fall essentially thanks to the strong increase in Chinese production (+7%), which represents more than half of global production.
- Despite these issues, the operating performance of the 10 leaders selected by Xerfi improved in 2020, after a year in which they fell to a low level, notably due to the significant decline in steel prices and the slowdown in global economic growth. This is linked to the strong decrease in the cost of energy and certain raw materials (scrap metal, coal).
- According to the WSA (World Steel Association), global demand for steel clearly recovered in 2021 (+4.5%) to exceed pre-crisis levels, with Europe and America as driving forces. In 2022, still according to the organisation, it should continue to increase (+2.2%). Operators' revenue will also jump in 2021 and 2022 thanks to a surge in steel prices due to the Chinese economy's recovery and tensions on supply.
- Contrary to popular belief, the steel industry is relatively fragmented. In volume, the 10 leaders manufacture just over a quarter of the world's crude steel. Steelmakers are at a disadvantage towards the suppliers of iron ore and coking coal, the two main raw materials for steel production. In order to have a greater bargaining power, operators tend to increasingly concentrate their activity and integrate upstream (mining).
- The steel industry, which is responsible for 6% to 7% of anthropogenic greenhouse gas emissions, is in the crosshairs of environmental regulations, which are becoming increasingly stringent. Hence, more than ever, leaders strive to reduce emissions, pollution and energy consumption.

Global demand is not slowing down, quite the opposite in fact

Global steel demand (*)

Unit: million tonnes



Estimate, forecast and source: World Steel Association
(*) Apparent steel consumption (finished products)

Global steel demand has been on an upward trend since 2007 (+2.9% on average per year), despite declines in 2009, 2015 and 2020. Between 2017 and 2019, it rose sharply in line with the recovery in global economic growth (automotive industry, construction, etc.). Most this increase comes from China.
In 2020, apparent steel use slightly decreased (-0.2%), mainly from America and Europe. It continued to rise in Asia, particularly in China (+9.1%). It then recovered significantly in 2021 (+4.5%) to exceed the level reached before the crisis. The World Steel Association forecasts a further increase in 2022 (+2.2%).

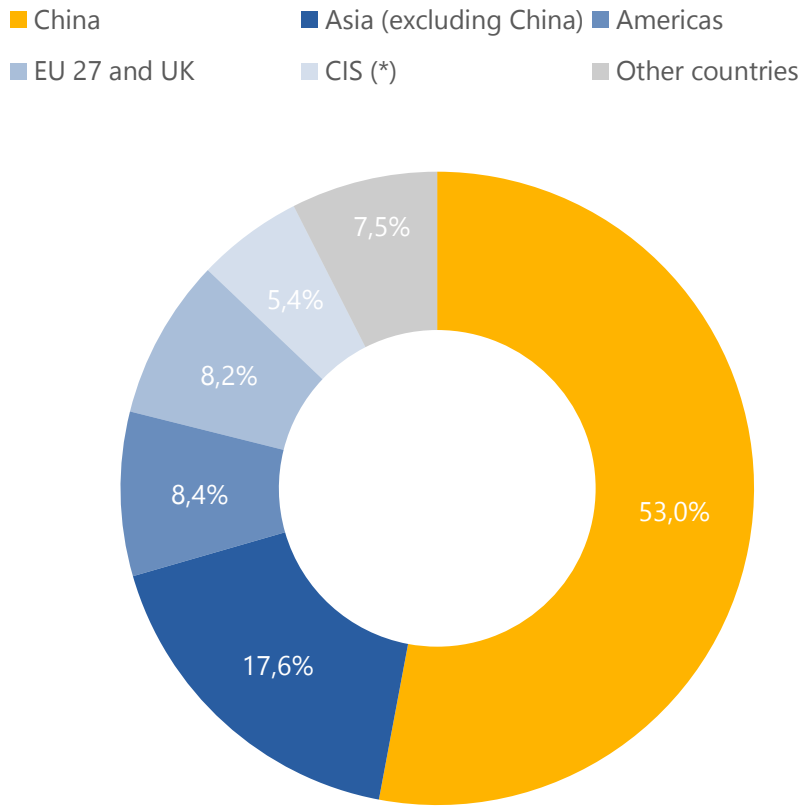
China accounts for more than half of global production

China accounts for more than half of the world's crude steel production with 1,032.8 Mt in 2021.

The rest of the Asian countries account for a significant share of global steel production (17.6% in 2021), ahead of the Americas (8.4%), the European Union (8.2%, UK included), and the CIS (5.4%).

Crude steel production by region (2021)

Unit: % of global production



(*) CIS = Commonwealth of Independent States consisting of 11 countries of the former USSR: Russia, Ukraine, Kazakhstan, Armenia, etc.)

Source: World Steel Association, 2021 data

Steel prices to soar in 2021

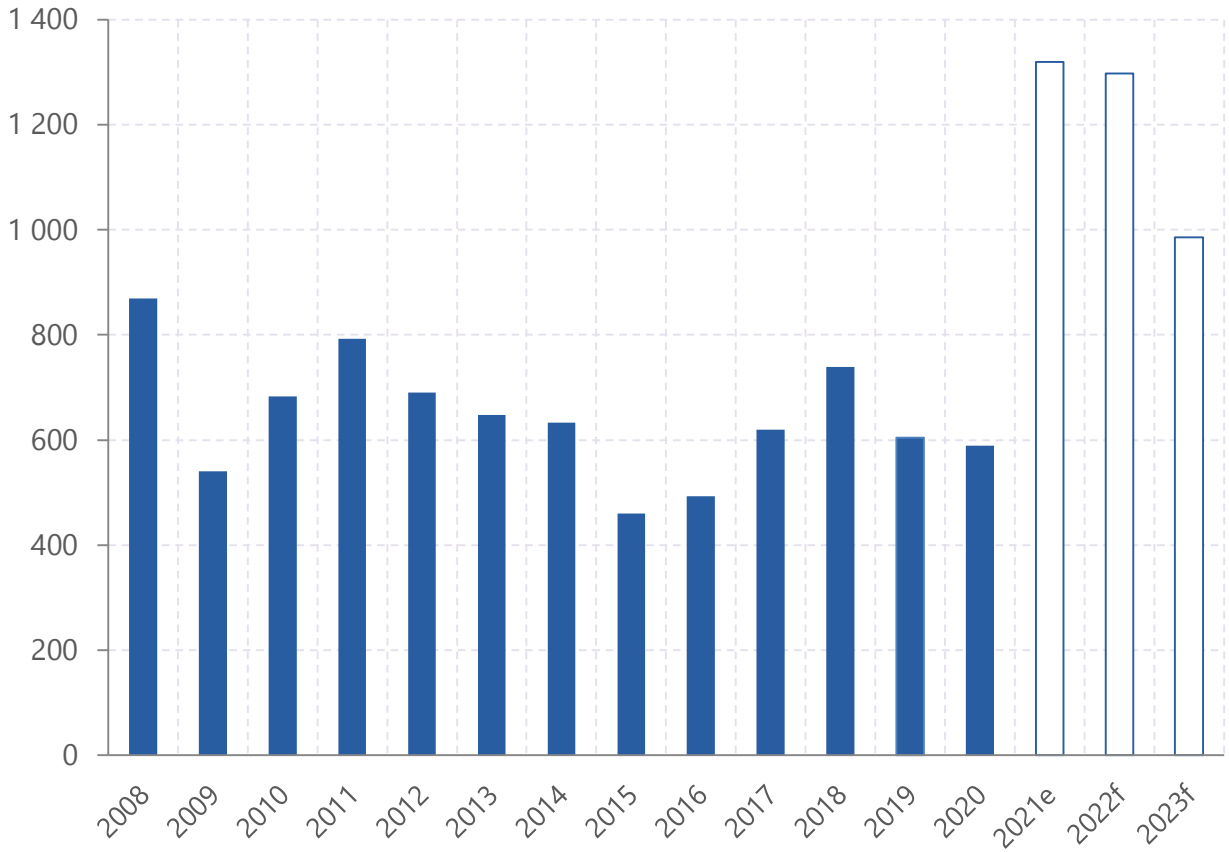
Even before the health crisis, steel prices fell in 2019 as a result of the global economic slowdown and threats of further protectionist measures. In early 2020, with the outbreak of the Covid-19 epidemic, prices fall. But the downturn is short-lived.

From mid-2020, steel prices recover, followed by an unprecedented overheating in 2021. This surge is due to a strong global demand (particularly from China) following the recovery, but also to supply difficulties due to the continued disruption of international value chains.

With the normalisation of mining activity and the downturn in Chinese production, the momentum in steel prices is likely to slow down in upcoming months, mirroring the sharp decline in iron ore since last summer. Nevertheless, given the strong growth throughout last year and the very high levels reached at the beginning of 2022, steel prices will hardly decline year-on-year.

Hot rolled coil (steel) prices

Unit: US dollar / tonne



Estimates, forecasts and source: Feri

Steelmakers' revenues follow the price of steel

- **2015 -2016 :**

Leaders' cumulative revenue fell significantly in 2016 (-6.1%). The issue of global overcapacity and the avalanche of Chinese steel products on the markets at rock-bottom prices hindered the price of steel in 2015. In addition, the customer markets of the steel industry were facing sluggish growth.

- **2017-2018 :**

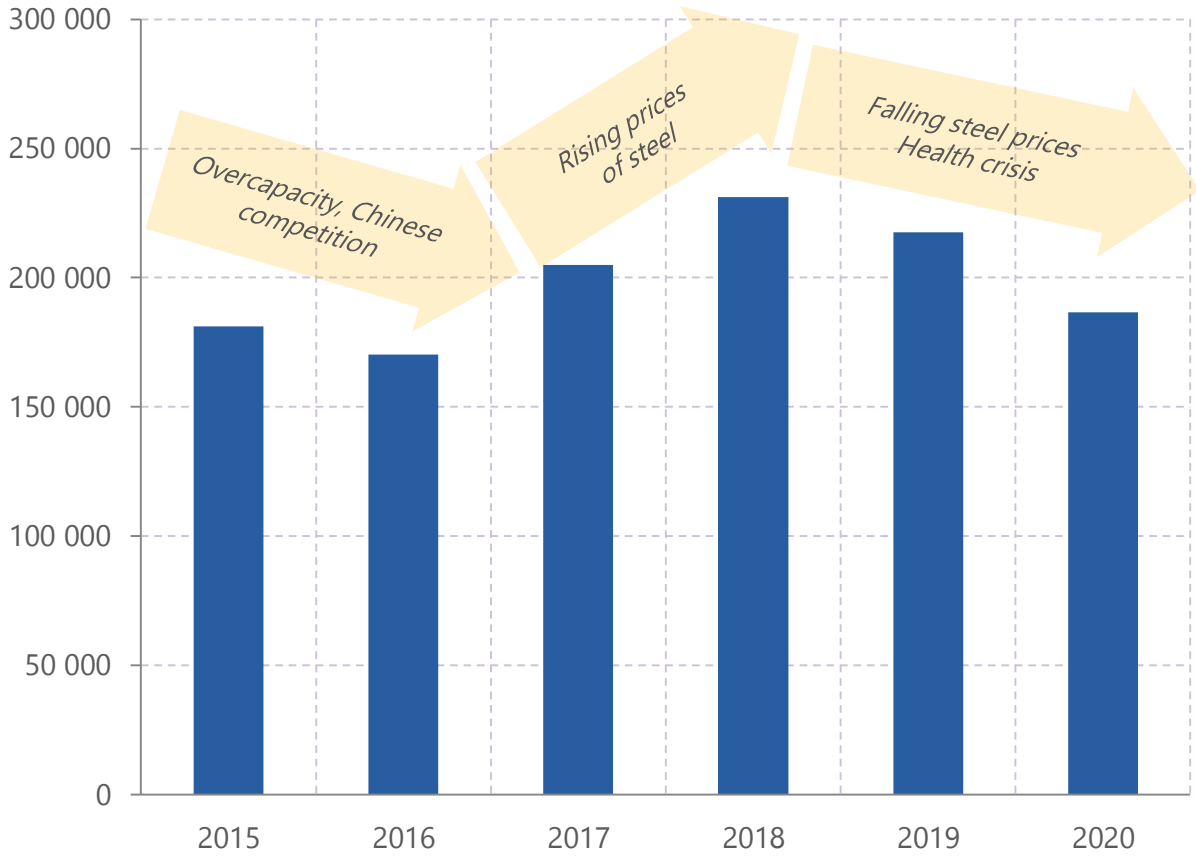
The reduction in Chinese capacity and the recovery in production in customer markets (construction in particular) led to an increase in demand for steel and a rebound in prices.

- **2019-2020 :**

The revenue of the leading steel companies fell in 2019 due to the fall in steel prices and the slowdown in global growth, particularly in China. In 2020, operators' revenue fell by 14.2%. The outbreak of the Covid-19 crisis led to a sluggish demand. Meanwhile, steel prices contracted sharply at the beginning of the year, which led to a decline in the price of steel products.

Combined consolidated sales of the world's leading steel companies

Unit: million euros



Note: It should be noted that the closing period for Nippon Steel, Tata Steel and SAIL occurs in March. The decline in panel sales in 2020 may be underestimated as the 1er quarter 2020 sales of 3 groups, the period of the Covid-19 crisis outbreak, are not taken into account for 2020 sales.

Xerfi Global processing / Source: group financial reports

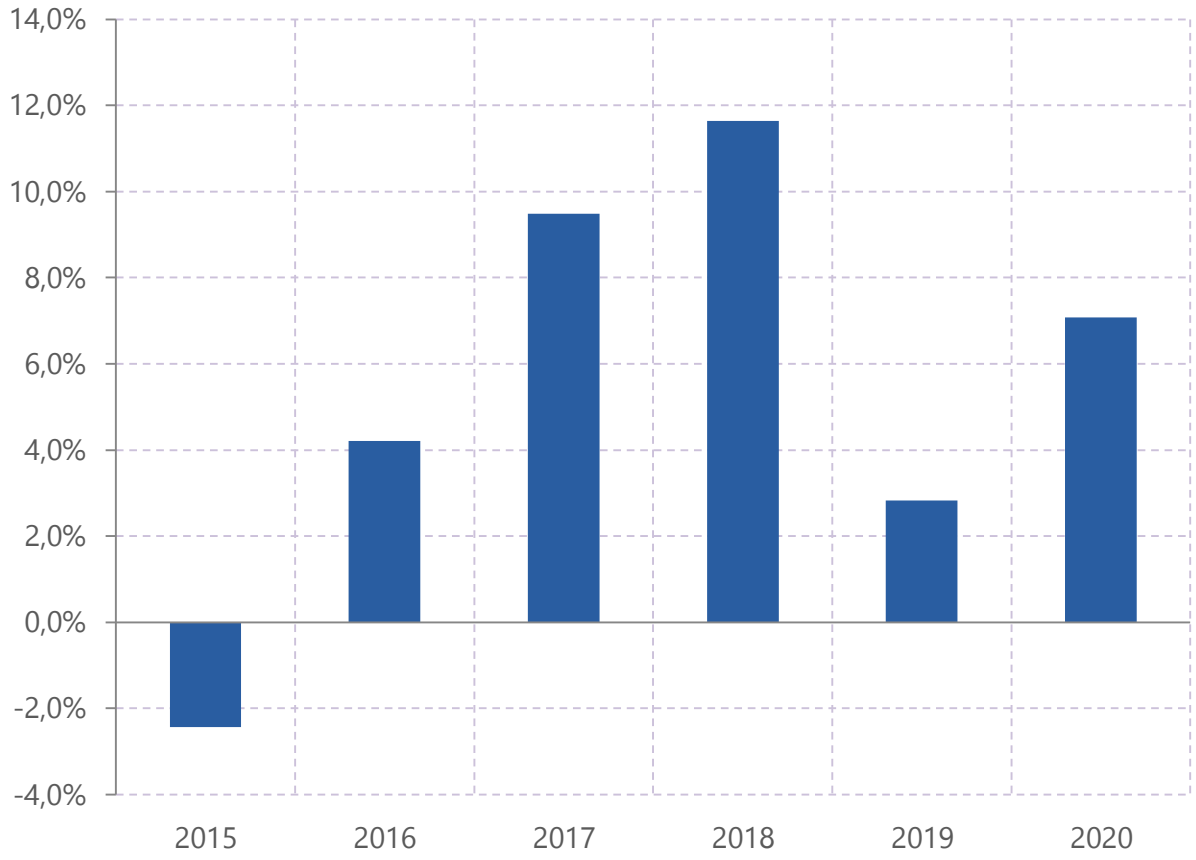
Profitability highly depends on steel price fluctuations

In 2019, leaders' aggregate EBIT ratio fell to 2.8% from 11.6% in the previous year. The decline of activity in volume combined with the fall in steel prices (and therefore, in steelmakers' selling prices) and the surge in iron ore prices (and ultimately, in production costs) led to a contraction of leaders' margins.

In 2020, despite the outbreak of the Covid-19 crisis, the drop in revenue and the collapse of steel prices, the EBIT ratio improved to 7.1% of revenue. The improvement in the steelmakers' margins is linked to the rebound in steel prices from the last quarter of 2021. In addition, energy costs fell sharply, along the costs of certain raw materials (coal, scrap). The leaders' EBIT ratio has yet to return to its pre-crisis level.

Leaders' aggregate EBIT ratio of the world leaders in the steel industry

Unit: % of aggregate revenue

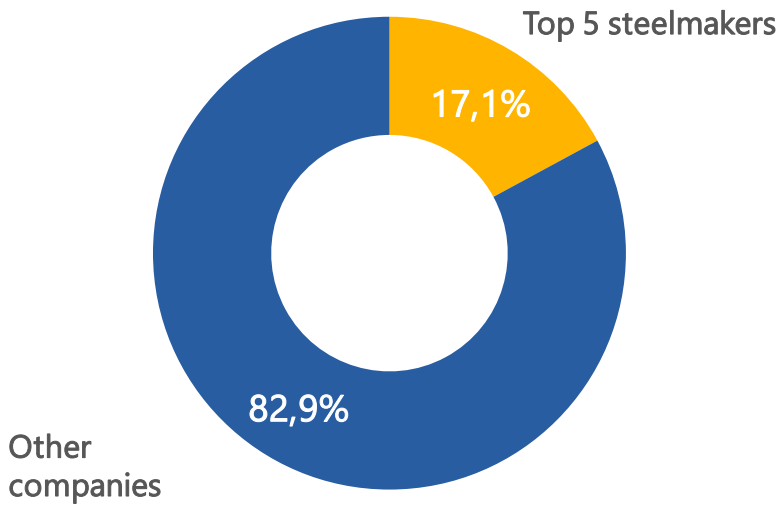


Xerfi Global processing / Source: group financial reports

Despite some partnerships, the steel industry remains fragmented

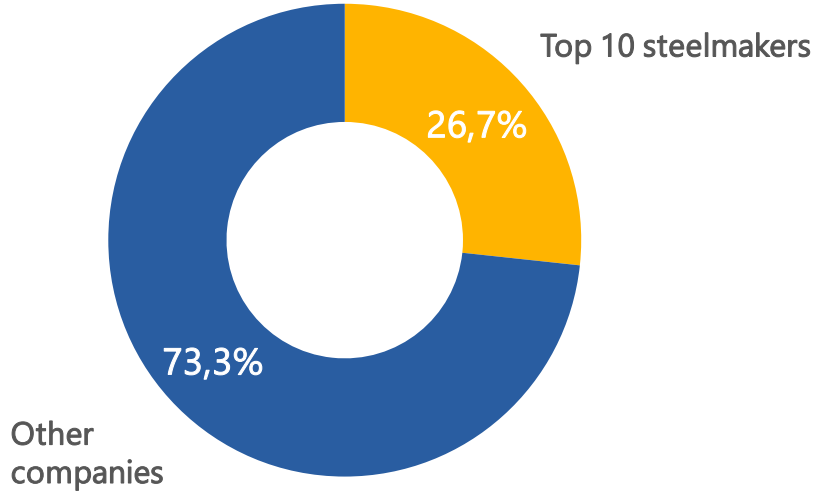
Share of the top 5 steelmakers in global crude steel production (2020)

Unit: % of global crude steel production



Share of the top 10 steelmakers in global crude steel production (2020)

Unit: % of global crude steel production



Source: **Xerfi Global** based on World Steel Association, 2020 data

Leaders' key performance indicators

Company	Consolidated revenue (2020)	CAGR over 6 years (2014-2019)	EBIT ratio (2020)	Average EBIT ratio (2014-2019)
ARCELORMITTAL	46 676 M€ (2020)	-2.3%	4.0%	3.5%
NIPPON STEEL	39 046 M€ (31/03/2021)	1.1%	0.2%	2.4%
POSCO	21 480 M€ (*) (2020)	0.1% (*)	3.5% (**)	4.8% (**)
TATA STEEL	18 153 M€ (31/03/2021)	1.5%	8.8%	9.1%
NUCOR	17 647 M€ (2020)	1.4%	4.9%	7.9%
ANGANG STEEL	12 820 M€ (2020)	7.4%	3.2%	0.6%
SAIL	8 081 M€ (31/03/2021)	5.9%	14.3%	4.7%
US STEEL	7 680 M€ (2020)	-8.1%	-12.3%	0.7%
EVRAZ	7 665,1 M€ (***) (2020)	-6.4% (***)	17.1% (****)	10.9% (****)
GERDAU	7 438,8 M€ (2020)	-1.4%	11.9%	2.6%

(*) Sales of the "Steel" division / (**) Consolidated EBIT ratio / (***) Combined sales of the "Steel" and "Steel - North America" divisions
(****) EBIT ratio as a percentage of consolidated sales / **Xerfi Global** processing / Source: **Xerfi Global**, based on operators and trade press

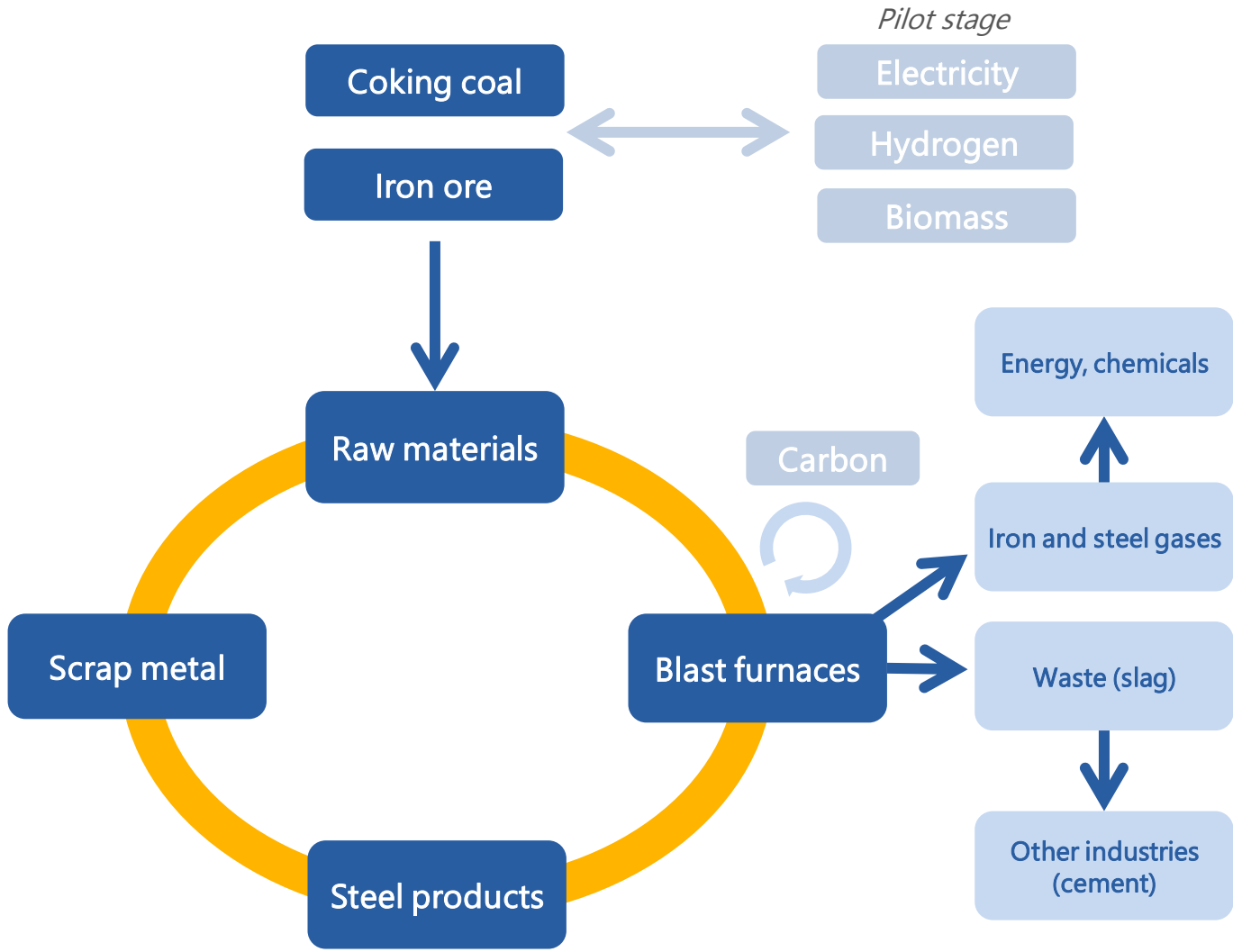
Opportunities for reducing the environmental impact of the steelmaking process

The steel industry includes sustainable practices in its process. In particular, steel is recycled at 90%. The use of scrap metal to replace iron ore and coke reduces greenhouse gas emissions (semi-finished steel products are made with less metallurgical coal).

In addition, some process waste is reused. Blast furnace slag is used in the manufacture of cement, for instance.

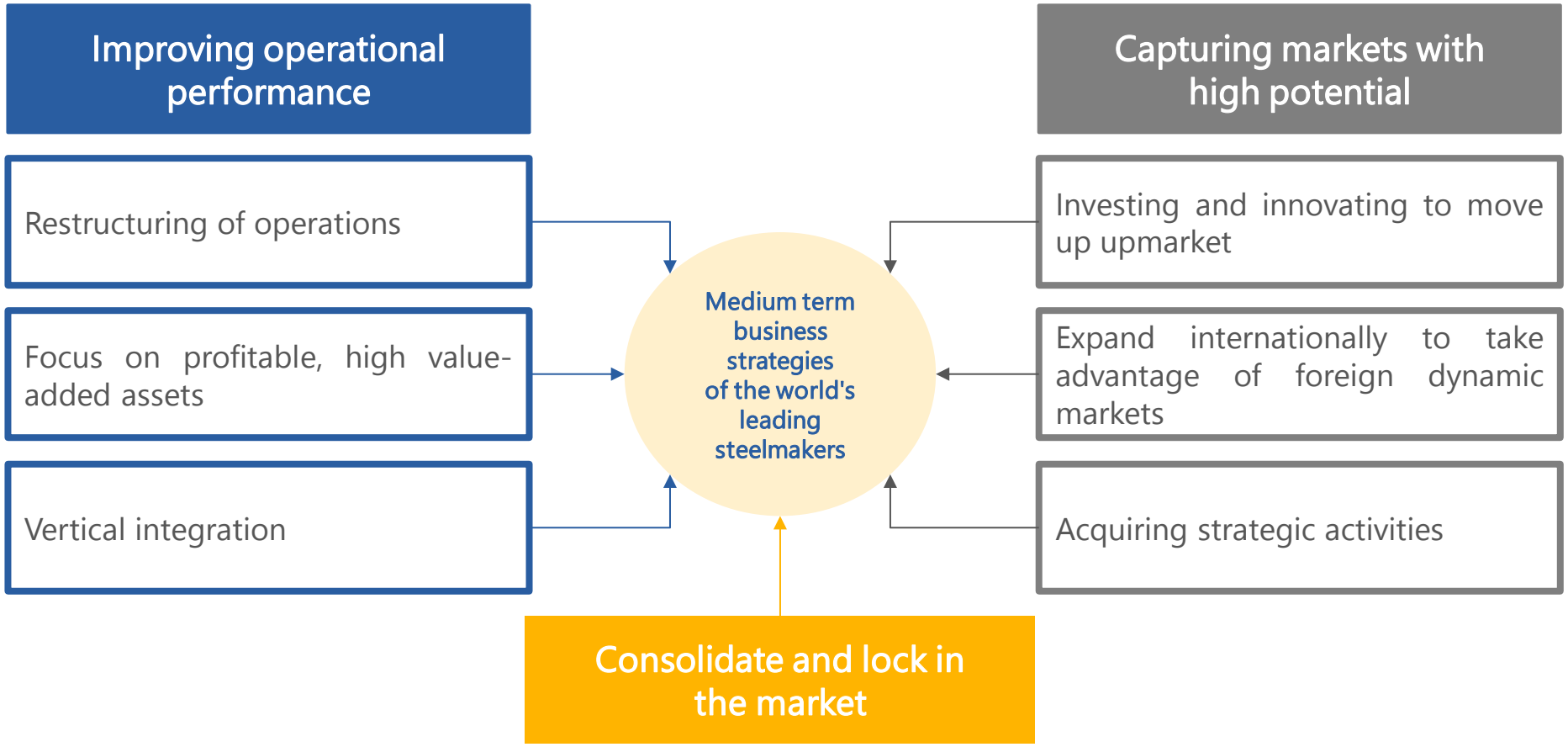
Other solutions are also being developed:

- Replacement of coking coal by hydrogen, biomass (charcoal) or electricity (electrolysis)
- Carbon capture and reuse
- Re-use of iron and steel gases to produce fuels or inputs for the chemical industry.



Leaders optimise their business portfolios and target markets with high growth potential to regain shareholder value

Main business strategies of the world's leading steel companies



Source: **Xerfi Global**

2. Market fundamentals

Steel is the basic raw material for many industries

Activities concerned	World crude steel production is estimated at 1,951 million tonnes in 2021, more than half of which was produced in China. The steel industry comprises a relatively large number of operators, although large international groups dominate the market. Many of them are vertically integrated, from the extraction of iron ore and metallurgical coal to the manufacture and distribution of finished products (sheets, coils, beams, rails, plates, etc.). However, the investments linked to this activity (blast furnaces, coking plant, electric arc furnace, etc.) are very heavy and create significant barriers to entry. There are more operators downstream, concerning the manufacture of finished steel products (flat and long products), with rolling mills representing a lower investment.
Scope of the report	The report conducted by **Xerfi** focuses on the world leaders in the steel industry, i.e., the metallurgists of iron and its alloys, such as steel and cast iron (mainly made from iron ore and carbon, but also from manganese, silicon and chromium). In addition to the production of semi-finished steel products (slabs, billets and blooms), the report also includes the manufacture of finished products (using various processes such as rolling, drawing, profiling, etc.). These include both long and flat products. The outlets of the sector are very varied: construction, automobile, consumer goods (household appliances), machinery and equipment, etc.
The steel industry suffers from global production overcapacities	The steel industry has been suffering from global overcapacity for several years due to the sharp increase in steel production growth in emerging countries (especially China) in parallel with a slowdown in demand from the main markets. In this difficult context, the world's leading steel companies adopted asset restructuring and cost-cutting strategies in recent years to reduce their debt and lower production capacities. In order to keep their margins afloat, some are also developing their offer, notably in higher value-added steels (electrical steels, coated steels, advanced high-strength steels, etc.), to differentiate themselves from low-cost products from China.

Source: **Xerfi Global**

Apparent steel use	Apparent steel use allows to measure the demand for steel at the national or global scale. To calculate it, steel production and net steel trade (imports minus exports) must be added together.
Steel billets, bloom	Billets and blooms are semi-finished steel products obtained by continuous casting for the rolling of long products.
Slab	Slabs (400 to 2,500 mm wide and 40 to 500 mm thick) are semi-finished, continuously cast products for the rolling of flat products.
Rolling	Semi-finished products are heated and then rolled (width reduction, size adjustments), trimmed, cut, etc. to obtain finished products.
Coke	Coke is a fuel obtained from coking coal (or metallurgical coal) from which impurities have been removed to obtain a high carbon content. Coke is one of the main inputs to steelmaking.
Upstream	The upstream part of the steel industry refers to operations prior to steelmaking, notably mining (iron ore or coking coal).
Downstream	The downstream part of the steel industry refers to steel processing operations for the production of more finished products. For example, long products are transformed into profiles, bars, wire rod, etc. The downstream industries refer to the customer markets: automotive, household appliances, machinery and equipment, etc.

Galvanisation	Galvanising is a group of anti-corrosion treatment processes for steel that involve applying a layer of zinc to the metal.
Iron ore	Iron ore is extracted from rocks and minerals. It is the basic raw material for the manufacture of steel.
Semi-finished products	Semi-finished products include slabs, billets, blooms, ingots, profile blanks, etc.
Flat steel products	Flat steel products are semi-finished steel products, delivered in the form of plates, sheets or coils. Made from slabs, they have a high added value and are intended for the automotive, household appliance and consumer goods industries.
Long steel products	Long steel products are semi-finished steel products made from blooms or billets. They include bars, sections, rails, reinforcing bars and tubes. They are mainly used in the mechanical industry, heavy industry (shipbuilding) and construction. They come from the electrical industry (scrap metal) and have a lower added value.
Overcapacity	Phenomenon when production capacity is higher than actual production. Changes in demand can lead to cyclical overcapacity, while excess investment leads to structural overcapacity.
Utilisation rate	Proportion of production capacity actually used.

China dominates the steel industry

1 772 Mt	Global apparent steel use (finished products) reached 1,772 million tonnes in 2020, of which 56% was absorbed by China.
1 880 Mt	Global crude steel production reached 1,880 million tonnes in 2020.
56.7%	56.7% of global crude steel production came from China, i.e. more than half, in 2020.
2 335.7 Mt	2,335.7 million tonnes of iron ore were mined in 2019 worldwide.
1/4	The 10 leading steelmakers accounter for more than a quarter of the world's crude steel total production in 2020 (26.7%). Seven of these operators were Chinese groups.

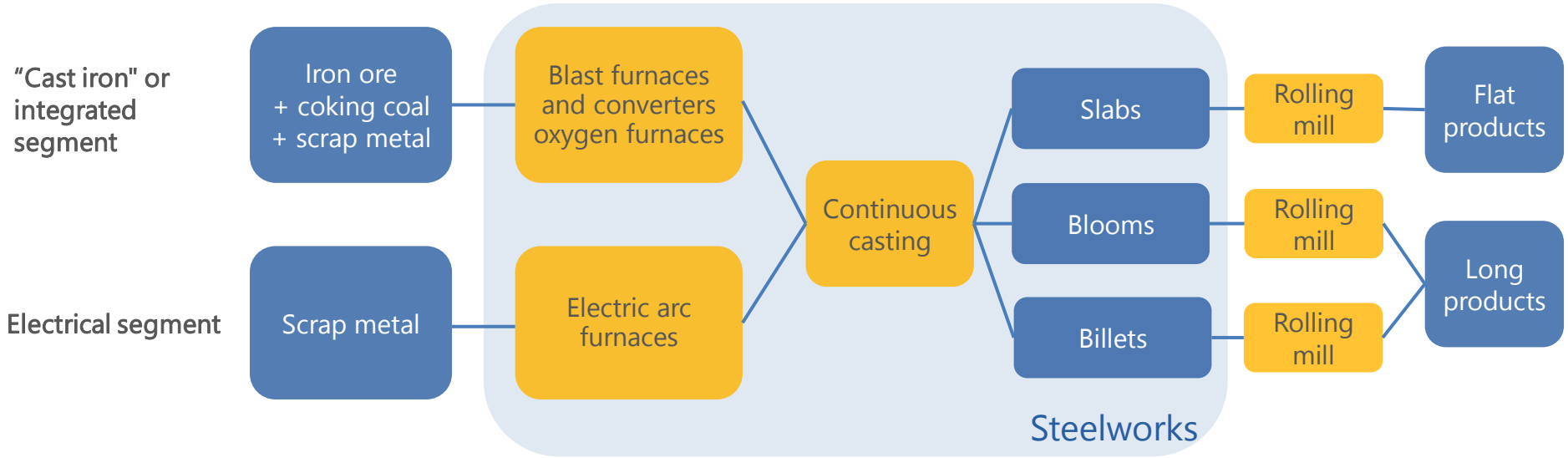
Source: **Xerfi Global**, based on World Steel Association

Steel is a basic raw material for many sectors	Iron and its alloys (including steel) can take many chemical and physical forms and thus offer a wide variety of characteristics and properties. Steel is a basic material used in many sectors, from construction to the automotive industry, and from household appliances to packaging. Steel manufacturers can therefore adapt their products to certain markets and differentiate themselves by specialising, although to a certain extent, as the supply remains rather homogeneous. Construction accounts for about half of the demand for steel products.
The demand for steel is closely correlated with the economic situation	Most often, the demand for steel is directly linked to the global economic situation. For instance, after the economic crisis in 2008, steel demand fell. In 2017 and 2018, the recovery of major economic sectors boosted the demand for steel. The fall in prices in 2019 reflects the global economic slowdown. In 2020, the outbreak of the pandemic led to a significant downturn in global economic activity, causing steel prices to decline, while the recovery in 2021 was accompanied by a sharp rebound in prices.
Emerging markets drove steel demand	Emerging countries have been significantly driving steel demand over the past decade. Indeed, economic development is metal-intensive. Urbanisation, industrialisation, the emergence of a middle class and strong growth in consumption, which are common characteristics of developing countries, require a lot of steel. As the growth in these countries slowed down in recent years, the steel industry suffered from overcapacities, which weighed on the price of steel.
China dominates the steel industry	In 2018, China consumed 48.8% of finished steel products, compared to 36.3% ten years ago. This significant growth is also reflected in production: China produced 51.3% of the world's crude steel in 2018, compared to 38.1% ten years ago. Thus, China represents the main market for the entire steel industry, and the slowdown in Chinese economic growth is hindering the industry.
Dependence on a handful of raw material suppliers	Iron ore production is carried out by a limited number of mining groups at the global scale, unlike the steel industry, which is more fragmented. Despite a consolidating trend, there are quite a lot of individual steel producers, especially downstream (manufacture of finished steel products). Steelmakers therefore have little bargaining power with their suppliers. Vertical integration is increasingly used by industrialists to control the cost of supplies, particularly through the acquisition and operation of mines.

Source: **Xerfi Global**

70% of the world's steel comes from the "cast iron" segment

The two main segments of the steel industry



Sources: **Xerfi Global**, World Coal Association, ArcelorMittal

The "cast iron" segment accounts for the majority of global steel production (70%). Blast furnaces produce liquid iron from iron ore and coking coal. This is then poured into an oxygen converter with a quantity of additional scrap (about 15% to 20% of total material). After oxygen is blown in, cast iron becomes liquid steel. This is then cast to solidify into semi-finished products (slabs, blooms or billets). These are then reheated and hot and/or cold rolled to produce flat and long products.
The "electrical" segment(30% of global steel production) allows the transformation of scrap into steel using electric arc furnaces (or more rarely induction furnaces). This equipment has the advantage of being easier to switch on and off. Production capacities can thus be adjusted according to demand. The fixed costs of this process are also lower than those for cast iron. It is notably used for the production of long products (blooms and billets) and special steels (such as stainless steels).
Almost 40% of the world's steel production comes from recycled materials.

Long products for construction, flat products for higher value-added products

The differences between long and flat products

Long products

Construction
Mechanical industry

Main products: Rails, beams, profiles, sheet piling, reinforcing bars, steel cables, etc.

Use: Steel frame, main building framework, roofing support, foundations (steel combined with concrete), bars and wires used as reinforcement for welded wire mesh.
These products come from the electrical sector (scrap metal) and have little added value.

Flat products

Cars
Shipbuilding
Household appliances
Other consumer goods

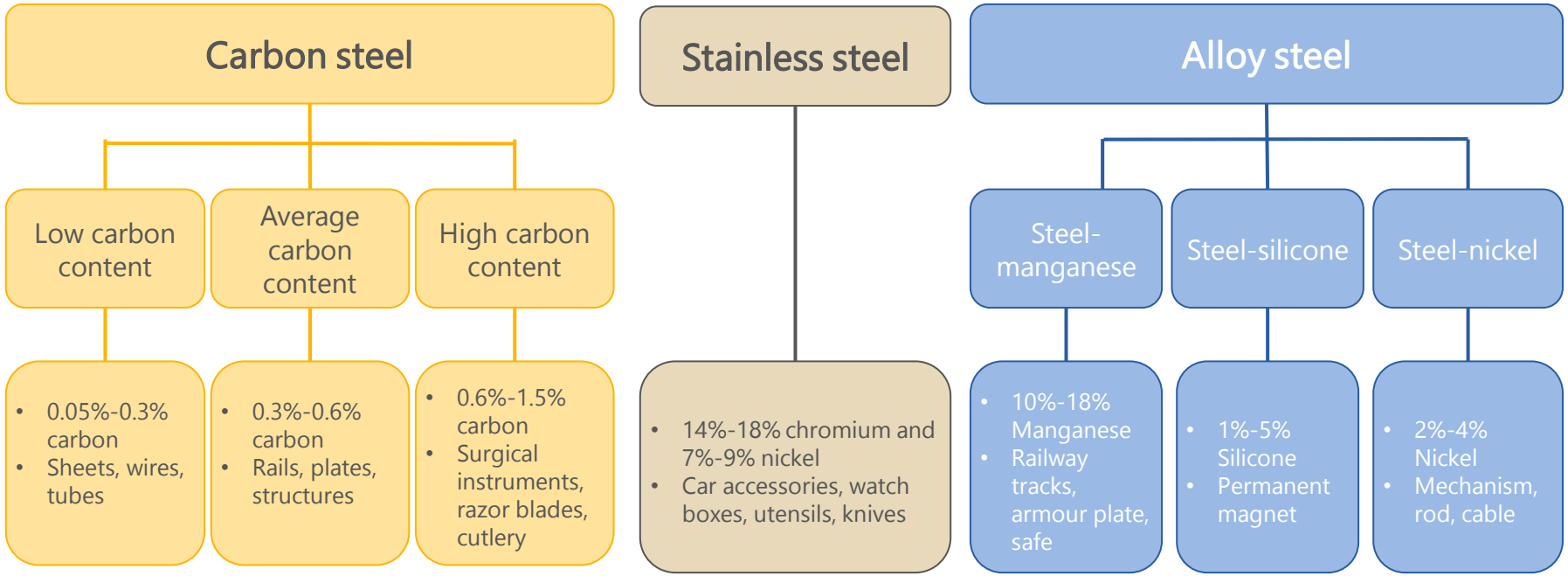
Main products: Plates, sheet, coil, strip, etc.

Use: the plates are used in capital goods, ships, offshore drilling platforms, pipeline tubes, wind turbine masts, etc.
Hot rolled sheet metal is used in boiler making, energy, wheel rims, chassis parts, domestic gas cylinders, etc.
Cold rolled flat products, possibly coated, are raw materials for consumer goods (packaging, household appliances), the automotive industry and the construction industry.
These are higher value-added products.

Steel products are also produced by other processes, such as casting, forging and stamping.

The major markets (automotive and construction) mainly use carbon steel

Main categories of steel products and their characteristics



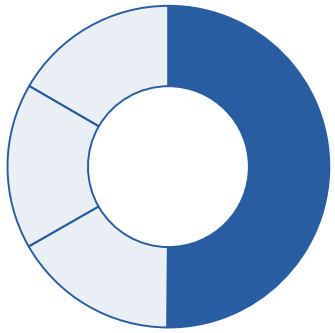
Source: **Xerfi Global**

There are 3,500 types of steel with different chemical, physical and environmental properties.
Carbon steel accounts for almost 90% of all steel production. It is used to make long products (rods, bars and sections) for construction and railways. It can also be processed into flat products, either in the form of strip (thinner flat products used for car manufacturing, household appliances and packaging) or sheet (thicker flat products used for shipbuilding).

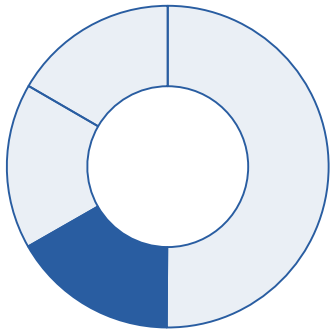
The construction industry accounts for half of steel sales

Main customer markets

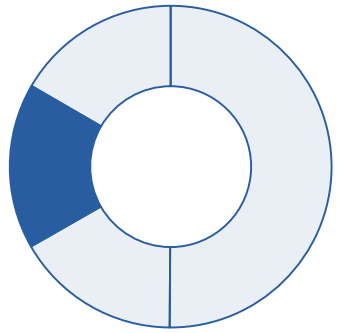
Construction	Automotive	Industry	Other



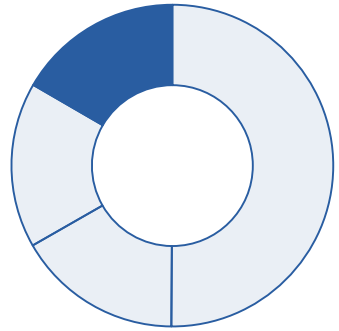
- Bridges
- Railways
- Electrical networks
- Power plants
- Skyscrapers
- Pipelines
- Building



- Car body
- Steel products for tyre reinforcement
- Powertrains
- Gearboxes



- Machinery and equipment
- Equipment for the mining industry
- Heavy vehicles
- Bulldozer
- Tools
- Shipbuilding
- Household appliances

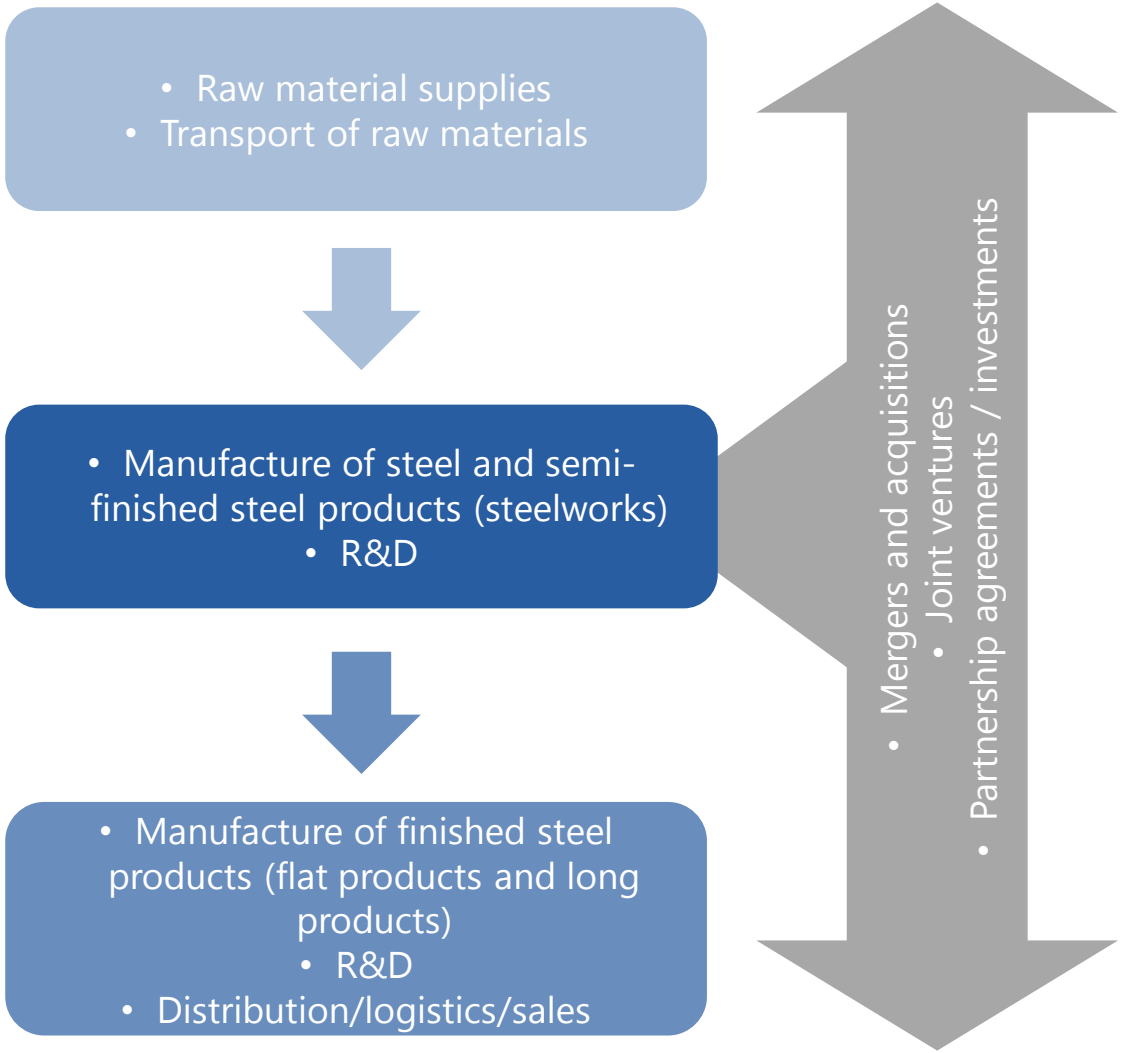


- Packaging (food, beverages, aerosols, paints and chemicals, bottle caps)
- Consumer items (pens, scissors, paper clips, cutlery)

Source: **Xerfi Global**

Steelmakers integrate both upstream and downstream

The key activity of the leaders is the manufacture of steel and steel semi-finished products (steelworks).
The supply of raw materials (mainly iron ore, coal and scrap) is essential for steelmakers to protect themselves against shortages and strong price fluctuations.
The supply of these materials is concentrated among a few mining companies and in a few limited regions, which increases the risk of shortages or price fluctuations in the event of natural disasters, accidents, political crises, etc. The mines can also be located far away from the place of production, implying high transport costs. Integrating the upstream part of the sector implies costs on transport infrastructure (particularly railways), in addition to the heavy investment required to operate a mine.
The leading steelmakers are also increasing their R&D investments in order to optimise their processes and adapt their products to the market, especially for finished products.
Many steel groups are integrating the upstream and downstream parts of the industry through a number of means, including mergers and acquisitions, joint ventures, partnership agreements and investments (internal growth).

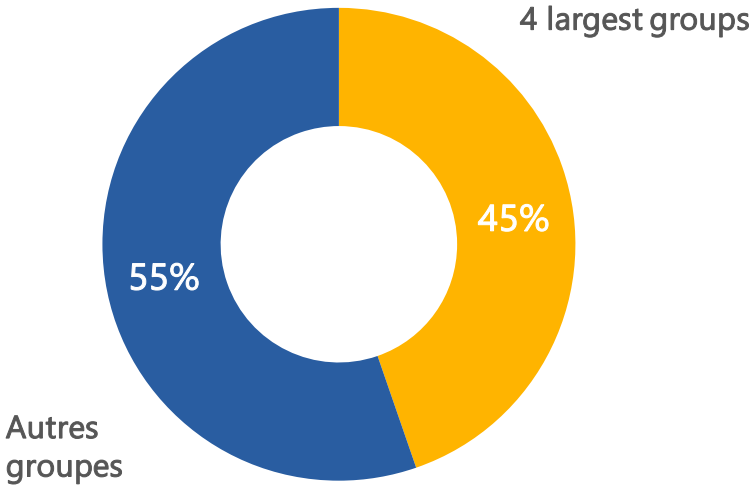


Source: **Xerfi Global**

Resources are split among just a handful of suppliers

Share of the top 4 iron ore producing groups in global production (2019)

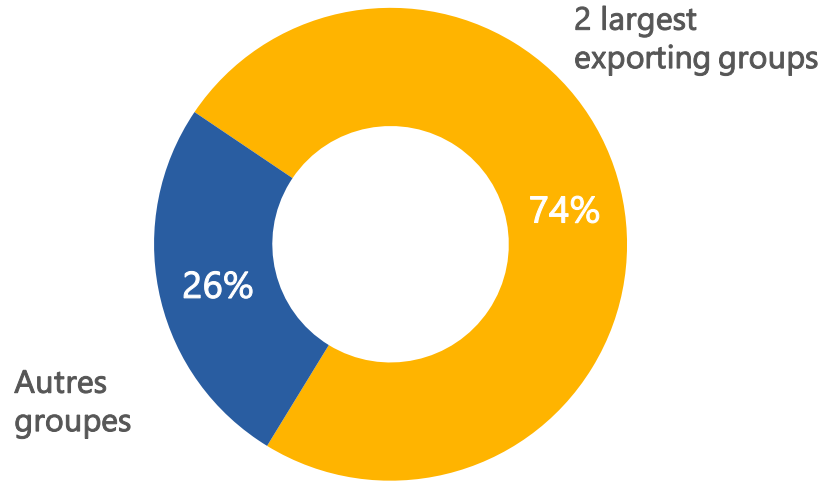
Unit: % of total iron ore production



Source: Group financial reports

Share of metallurgical coal exported by the 2 largest exporting groups (Q1 2016)

Unit: % of exported metallurgical coal



Source: **Xerfi Global** after Platts

Vale, Rio Tinto, BHP Billiton and Fortescue Metals, four mining groups, accounted for almost half of global iron ore production in 2019. This share went down compared to 2017 (49%). Following the collapse of the Brumadinho dam in Brazil in January 2019, Vale did shut down ten other dams, which led to a drop in production. BHP Billiton and Peabody dominate the global metallurgical coal market.

This high concentration of the raw materials market gives mining groups considerable bargaining power in setting prices and contractual terms. Moreover, given the geographical concentration of production, a natural disaster, a climatic event or a political crisis can have a strong impact on the sector (shortages, variations in raw material prices, etc.).

The vast majority of leaders are vertically integrated

The steel industry is less concentrated than the iron ore or coal industry, which gives operators less bargaining power. The 10 leading steelmakers accounted for only a quarter of the world's crude steel in 2020. However, the industry welcomes few new entrants in the manufacture of semi-finished products due to heavy investment requirements (blast furnaces, electric arc furnaces, converters, etc.).
The process of transforming steel into finished steel products is more fragmented due to less significant investment requirements (rolling mills).

In recent years, the largest steel groups became more integrated upstream. This strategy enabled steelmakers to better control their supplies and raw material purchases and to reduce their dependence on the (oligopolistic) suppliers of iron ore and coal.

Overview of the steel industry leaders analysed in the report

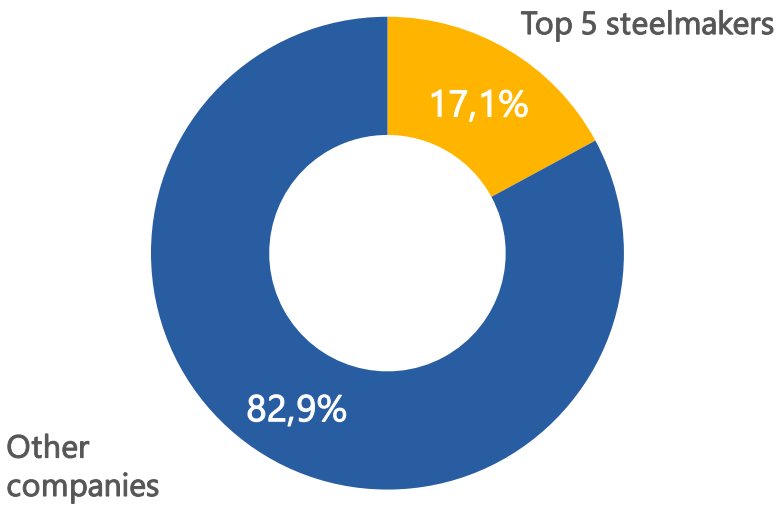
Company	Country	Consolidated revenue (year)	Revenue in the industry (year)	Main activities (*)
ARCELORMITTAL		46 676 M€ (2020)		Iron & steel industry (strong vertical integration: iron & coal)
NIPPON STEEL		39 046 M€ (03/2021)	33 892 M€ (03/2021)	Steel industry
POSCO		42 723 M€ (2020)	21 480 M€ (03/2021)	Iron and steel industry, raw materials trading
TATA STEEL		18 153 M€ (03/2021)		Iron and steel industry (strong vertical integration: iron and coal)
NUCOR		17 647 M€ (2020)		Iron and steel industry (vertical integration: scrap metal)
ANGANG STEEL		12 820 M€ (2020)		Steel industry (vertical integration)
SAIL		8 081M€ (03/2021)		Steel industry (vertical integration)
U. S STEEL		7 680 M€ (2020)		Steel industry (vertical integration)
EVRAZ		8 547 M€ (2020)	7 665 M€ (2020)	Steel industry (vertical integration)
GERDAU		7 439 M€ (2020)		Steel industry (low vertical integration)

Source: **Xerfi Global**, based on group financial reports

Despite some partnerships, the steel industry remains fragmented

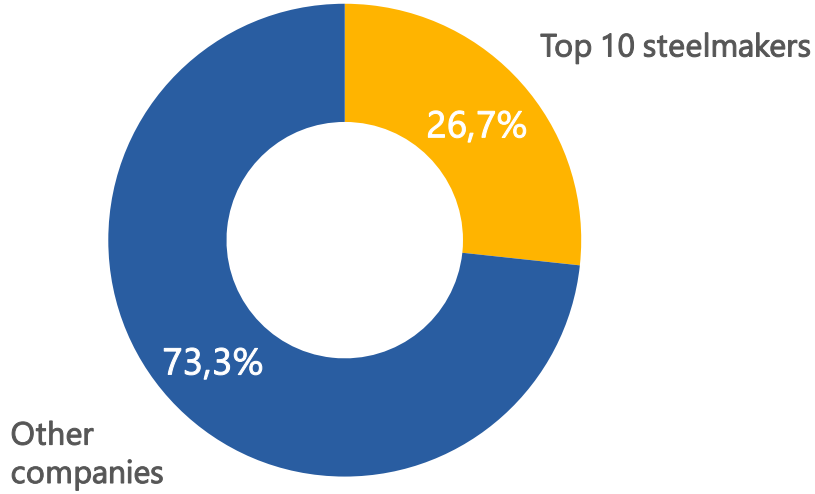
Share of the top 5 steelmakers in global crude steel production (2020)

Unit: % of global crude steel production



Share of the top 10 steelmakers in global crude steel production (2020)

Unit: % of global crude steel production

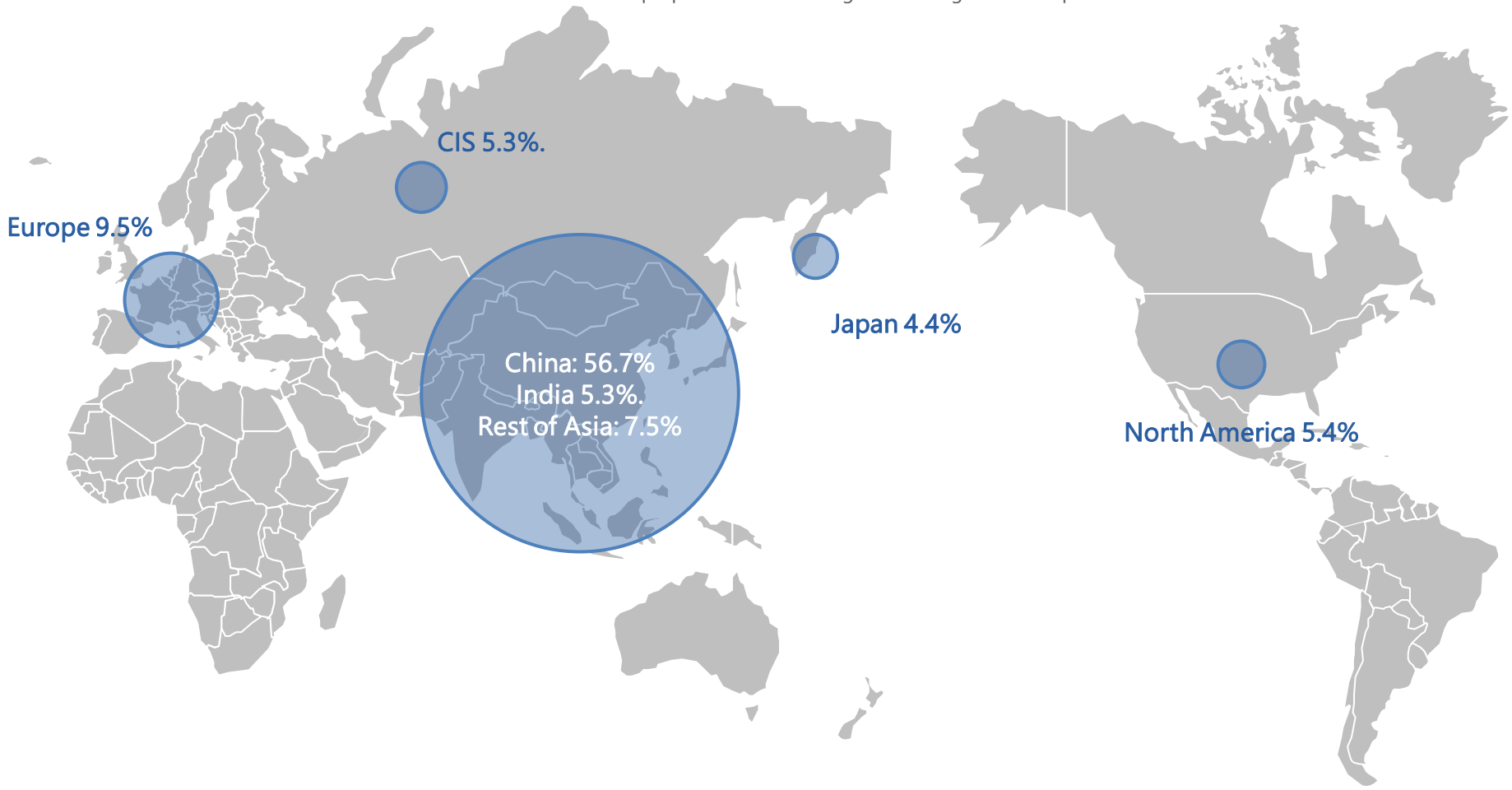


Source: **Xerfi Global** based on World Steel Association, 2020 data

China accounts for more than half of the world's steel production

Distribution of crude steel production by region

Unit: diameter of the circle proportional to the weight of the region in total production



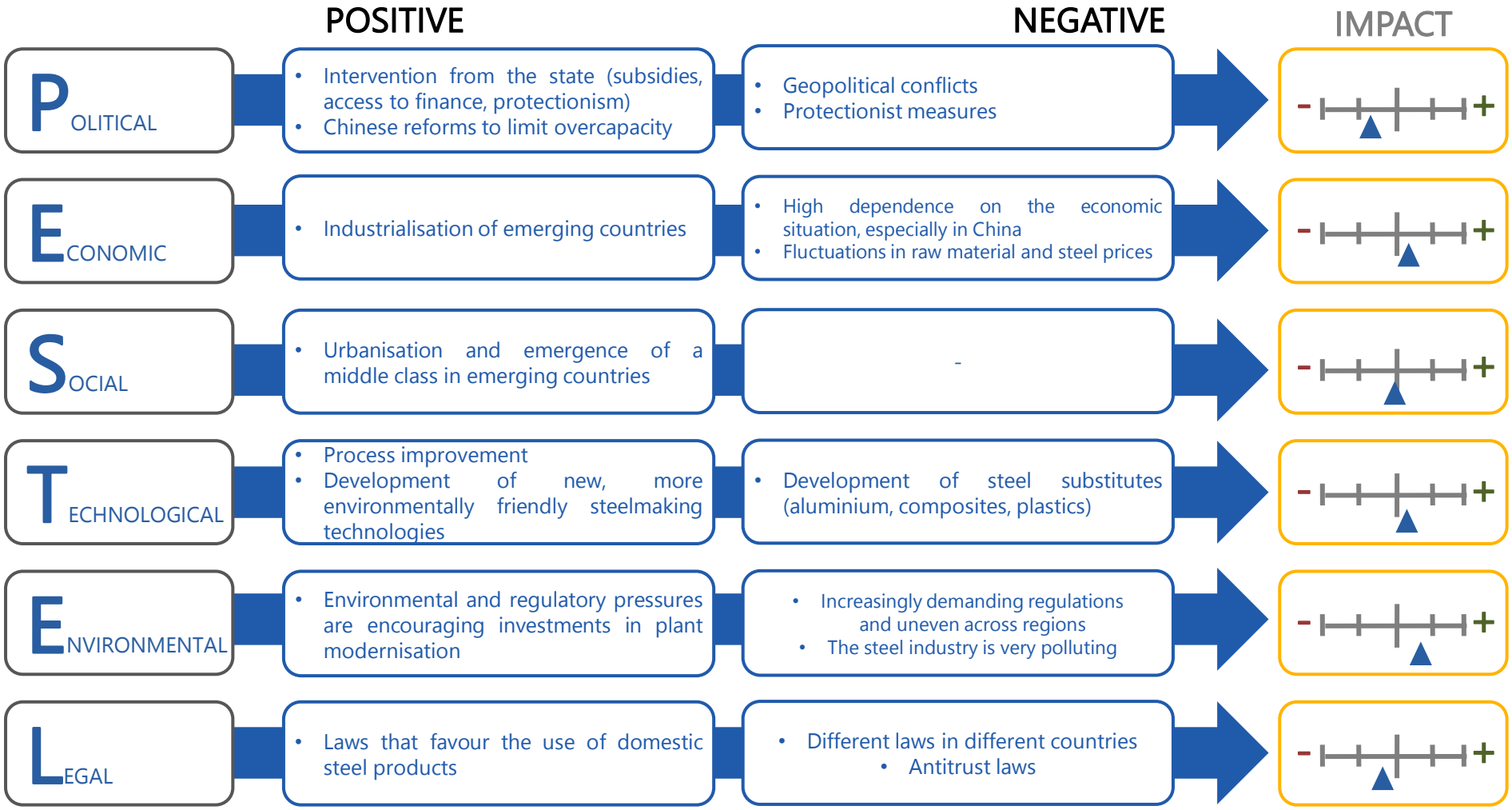
Source: **Xerfi Global** based on World Steel Association, 2020 data

3. The market and leaders' activity

3.1. Sectoral environment

Environmental pressures are increasing for the steel industry

PESTEL analysis of the global market environment of the steel industry



State intervention is common in the steel industry

Steel plays a fundamental role in countries' economies

The steel industry is a very important industry for states. It employs a large number of workers and steel plays a fundamental role in many areas of the economy (industry and construction) and is strategic (from a defence point of view). For these reasons, governments tend to intervene with steelmakers by supporting investments, implementing protectionist measures or intervening as a "fireman" (the Ascoval case in France), all the more so amidst a deteriorated economy (weak demand). During the difficult years of 2015 and 2016, production overcapacities, particularly from China, weighed heavily on steel prices, which worsened the financial performance of steelmakers. Many countries accused China of dumping and have carried out certain threats (customs duties in particular). China developed strategies to circumvent the European Union's anti-dumping and anti-subsidy measures, in particular by encouraging groups to implement themselves outside China (North Africa, South-East Asia or India).

China reduces overcapacity

Hindered by its steel production overcapacities and being the target of numerous customs measures from major steel markets (United States, India, Europe), the Chinese government implemented a major plan in 2016 to restructure the steel industry in China. Thus, the world's largest steel producing country significantly reduced its production overcapacity between 2016 and 2020. In particular, the government encouraged mergers and acquisitions, prohibited the construction of new projects and eliminated "zombie" companies (highly indebted, unprofitable structures under state subsidy). Meanwhile, the production of Chinese steel plants increased significantly. China's 14th five-year plan is coming forth and aims to concentrate steelmakers and stabilise production capacities.

The trade war for steel

Since 2017, the US and the EU significantly increased anti-dumping taxes on steel imports. Recently, the EU adopted taxes on stainless steel imports from China, Indonesia and Taiwan in October 2020.

States frequently intervene in the steel industry

Since 2017

The European Union has been increasing anti-dumping tariffs on foreign steel products since 2017, particularly from China, in order to protect its domestic market and therefore the steel industry in the Old Continent. In October 2020, it adopted a series of taxes on stainless steel from China, Indonesia and Taiwan.

2017

As part of the 'Make in India' movement, the Indian central government is committed to sourcing only Indian-made steel for local project development.
The government also implemented the "National Steel Policy" in 2017 to increase crude steel production capacity by 300 Mt by 2030-2031.

2018

The US government implemented significant tariffs on imported steel products from many exporting countries including China and Europe.

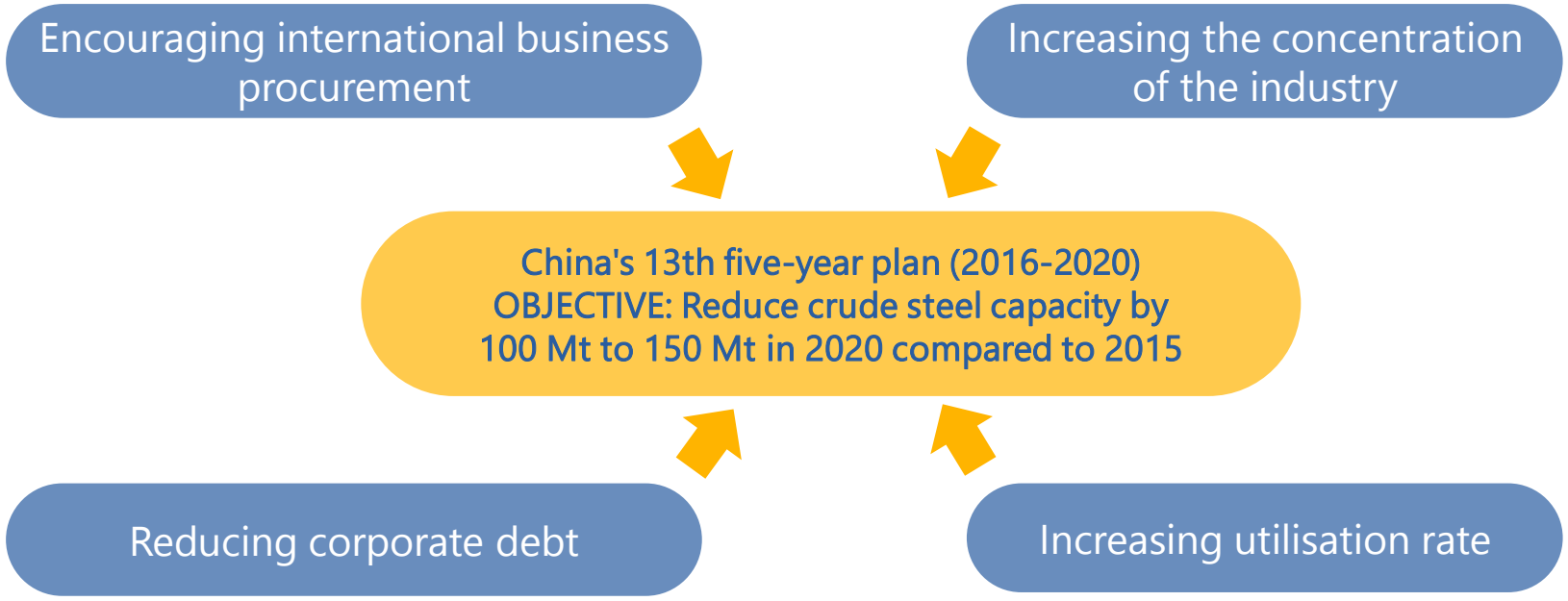
The steel industry is characterised by strong state intervention. The industry is one of the pillars of the economy, employs a large number of people (145,000 people in the US were employed in the steel industry in 2018 according to the USGS in blast furnaces, steel mills and foundries) and is strategic from a military perspective. Since the 1970s, Europe and the US have been particularly aggressive in protecting their domestic steel markets through capacity investment subsidies, favourable trade policies and labour hiring and training schemes. Although measures have been implemented at the global scale to promote the globalisation of trade in steel products, governments maintain a protectionist bias towards their domestic industries by applying import duties, supporting domestic purchases or subsidising steel producing companies.

China aims reduce its overcapacities

Main objectives and strategies of China's 13th five-year plan for the steel industry

Encourage steelmakers to transfer their production capacities abroad, particularly on the New Silk Roads

Target of 60% of production by 10 companies, compared to 15% in 2015 to reduce competition and halt the rise in production capacity



Encouraging provincial governments to implement debt restructuring plans

Target of 80% (compared to 70% in 2015) by eliminating "zombie" companies (kept afloat by subsidies but not economically viable). Ban of obsolete technologies such as induction furnaces.

China aims to stabilise production capacity

Main objectives and strategies of China's 14th five-year plan for the steel industry

Recude carbon emissions.

In particular, this would give the industry greater bargaining power against foreign iron ore producers.

Increasing the share of steel produced in the "electrical" sector

Increasing the concentration of the industry

China's 14th five-year plan (2020-2025)

Stabilising steelmakers' production capacities

Reducing the dependence of the industry on maritime iron ore

The 13th five-year plan removed millions of tonnes of obsolete production capacity. The 14th plan aims to maintain capacity at this level. In 2021, China notably stopped export VAT exemptions for more than 250 references of steel products manufactured in China in order to keep Chinese steel production below the 2020 level.

China's dependence on iron ore imported by sea increased significantly over the last 20 years (reaching 80% in 2020).

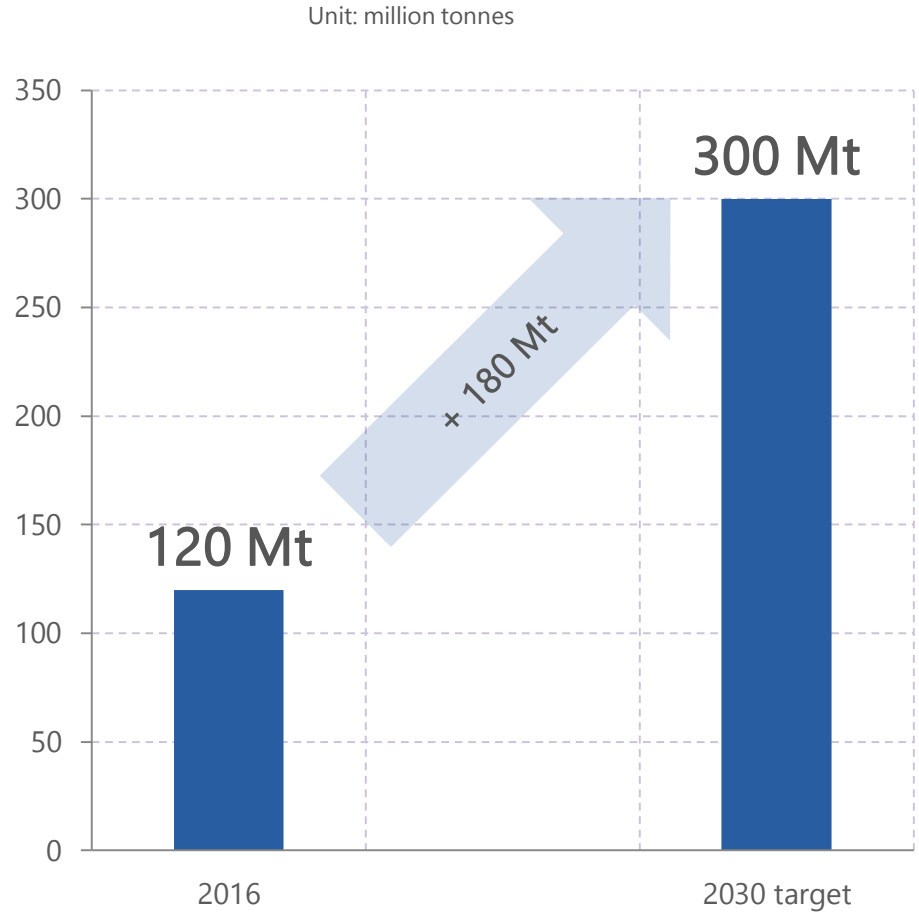
India will increase its steel production capacity and focus on high value-added products

As part of the 'Make in India' movement, which mandates the use of domestically produced steel in government projects, the Indian government unveiled the National Steel Policy 2017. The programme plans to increase the country's domestic production capacity by 180 million tonnes and per capita steel consumption to 158 kg by 2030 (from 60 kg in 2016).

These two objectives will represent a €13.4bn investment. The government will also encourage companies to increase their production capacities and foreign investors to implement themselves in India.

The Indian government's policy also aims to increase domestic production of high value-added steel products used in the defence, aerospace, energy and nuclear industries. As of now, these products are still mainly imported. The goal is to reduce India's dependence on exports and increase consumption for its domestic production.

Steel production capacity in India



Sources: **Xerfi Global**, National Steel Policy 2017, trade press

Recent examples of steel tariffs

2017- 2018

EU : Following several anti-dumping investigations against China, the European Commission imposed measures against the country, including tariffs on Chinese exports of certain types of steel and iron products (notably pipes).

March 2018

United States: The US government introduced tariffs of 25% on imports of steel products and 10% on imports of aluminium products from all countries except the European Union, Australia, Canada, Mexico, etc.

June 2018

United States: Exports of steel products from the EU, Canada and Mexico to the US are also subject to the duties introduced in March.

July 2018

EU : Provisional safeguard measures imposed by the European Commission on imports of 23 categories of steel products. The measures were under the form of tariff quotas: a 25% customs duty applies if imports exceed the average of imports over the last 3 years.

February 2019

EU : The European Union's safeguard became definitive.

May 2019

United States: The US lifted tariffs on Canadian and Mexican steel and aluminium.

July 2019

China: China imposed taxes on certain stainless steel products imported from the EU, Japan, South Korea and Indonesia.

October 2020

European Union : The European Union adopted a new round of anti-dumping duties on imports of stainless steel hot rolled coils and sheets from China (19% duty), Indonesia (17.3%) and Taiwan (7.5%).

October 2021

United States: In a bilateral agreement, the US lifted additional tariffs on European steel imports.

The steel industry is very dependent on the economic situation

Post-crisis economic recovery boosts steel demand

Global steel demand is highly dependent on the global macroeconomic environment, including changes in GDP, business cycles or periodic shocks to the manufacturing and construction industry. Prior to the Covid-19 crisis, favourable economic conditions boosted global steel demand, which had slightly deteriorated in 2019, with the first signs of China's growth slowing down. The Covid-19 crisis brought a significant halt to global economic activity, with health measures to combat the spread of the virus. Activity in industry and construction therefore contracted and this affected the global steel demand, which fell back very slightly in 2020 (-0.2%). With the resumption of economic growth in 2021, demand for steel products rebounded.

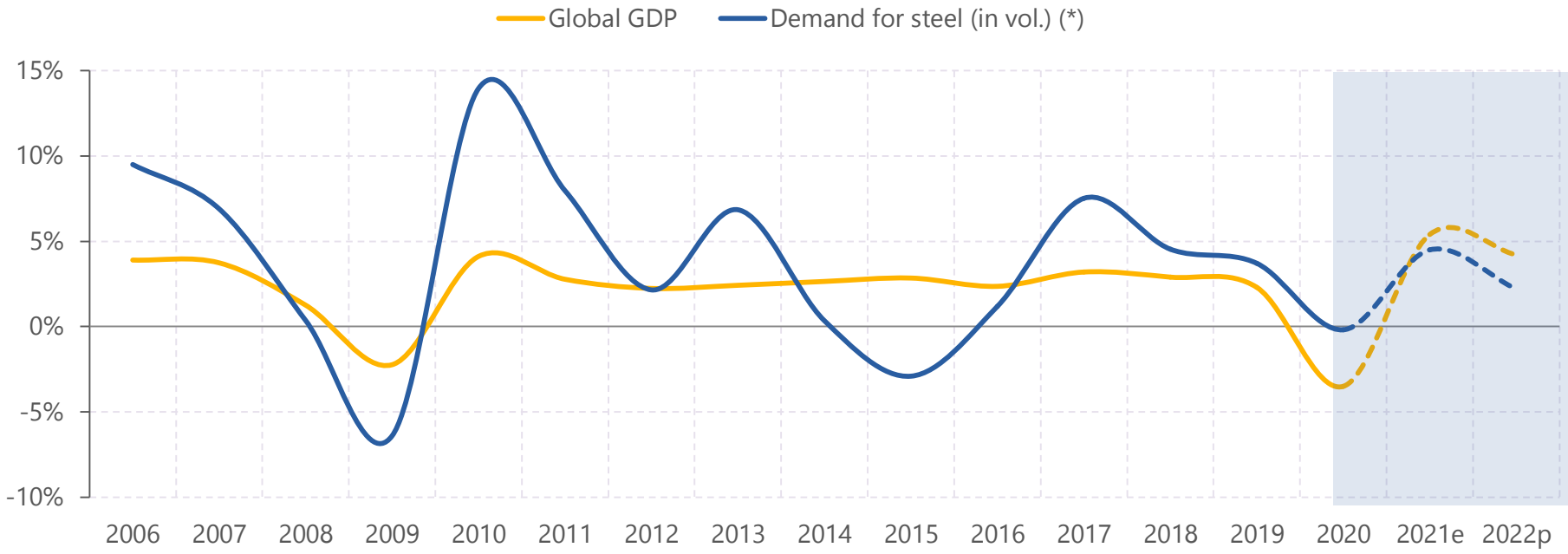
Growing urbanisation and the emergence of the middle classes ensure structural upward demand for steelmakers

Although the demand for steel is closely linked to the economic situation, some demand factors are structural and remain dependant on steel even in a deteriorating macroeconomic context. The emerging countries are currently catching up and their economies are characterised by very rapid urbanisation and therefore by huge construction needs. The population living in cities will increase by 30% between 2015 and 2030, especially in emerging continents (Asia and Africa). In addition, the growth of the middle class is synonymous with an increased need for consumer products: cars, packaging, household appliances, etc. This segment of the population will represent 64.2% of the world's population in 2030, compared to only 41.4% in 2015.

Global steel demand is sensitive to economic conditions but other factors must be taken into account

Global gross domestic product (GDP) and steel demand

Unit: % annual change in value and volume

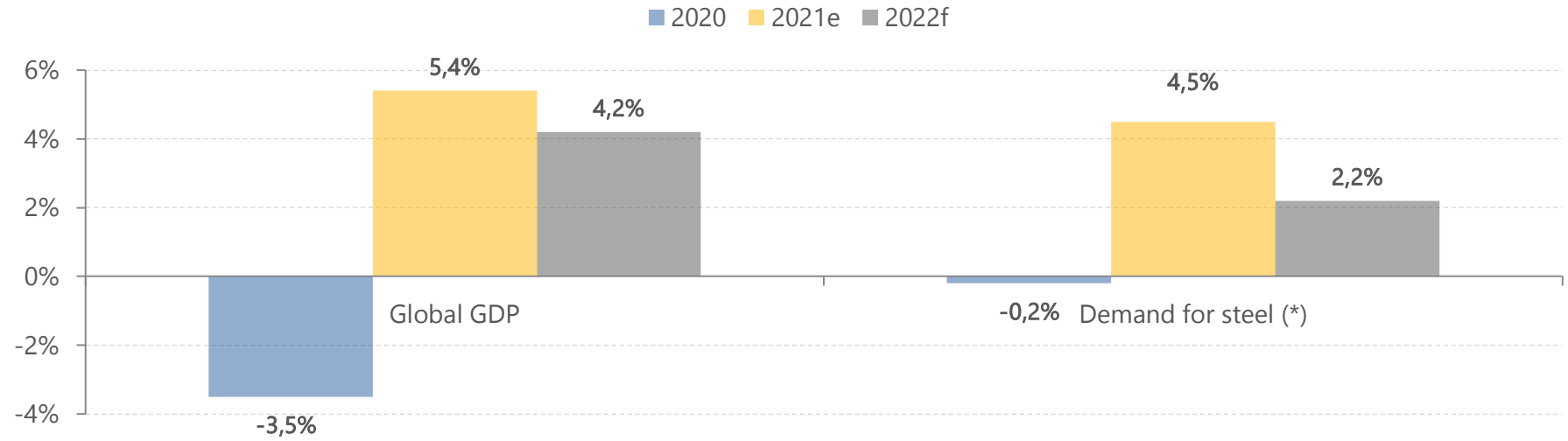


Sources, estimate and forecast: Feri (World GDP, **Xerfi** estimate and forecast) and World Steel Association (steel demand)
(*) Apparent steel use (by volume)

Global steel demand is very sensitive to the economic situation. The main customer markets of the steel industry (construction, automotive, machinery and equipment, consumer goods, etc.) are highly dependent on global macroeconomic fluctuations. Generally, global GDP and steel demand move in the same direction. In 2015, however, steel demand fell abnormally as China flooded the world market with low-cost steel, further accelerating the deflationary spiral. In this context, steelmakers' customers favoured destocking and thus postponed their purchases in order to benefit from more advantageous prices. In 2020, global steel demand stabilised despite the outbreak of the Covid-19 pandemic. Although the measures to combat the spread of the virus had a significant impact on economic activity, Chinese demand quickly recovered and supported this indicator.

Steel demand bounced back strongly after the crisis

Global gross domestic product (GDP) and steel demand



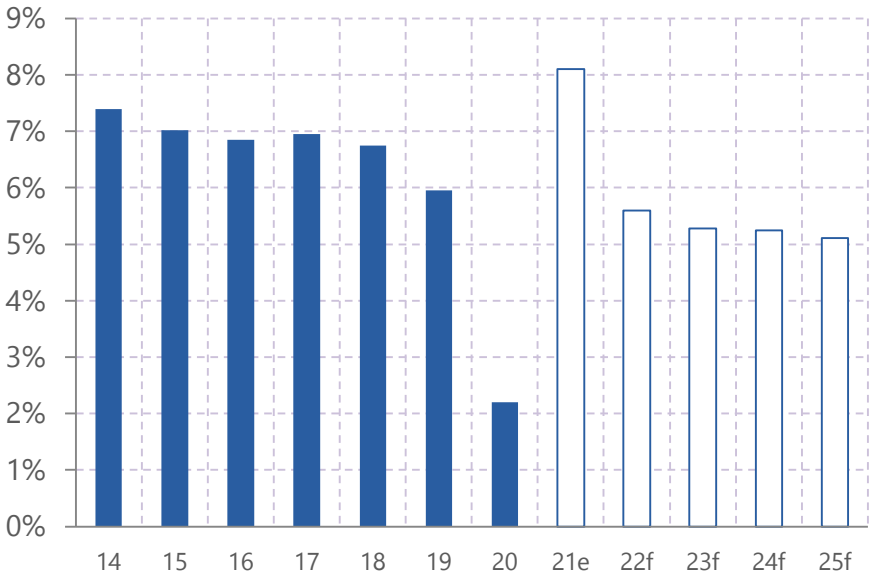
Sources: Feri (World GDP, **Xerfi** estimate and forecast) and Worldsteel (steel demand)
(*) Apparent steel consumption (by volume)

After a slight decline in 2020, global steel demand increased by 4.5% in 2021 due to the recovery in global economic growth. Volumes consumed in the developed economies rose sharply (after a sharper decline than elsewhere in 2020). In China, too, needs have risen, but the country's zero-covid strategy is causing production to slow down with each new case of infection. Steel supply difficulties, due to the slower restart of blast furnaces, have nonetheless hindered the growth of global steel demand.
The World Steel Association forecasts that demand will grow by 2.2% in 2022. The persistent rise in inflation, the slow increase in the rate of vaccination in developing countries and the continued slowdown in Chinese growth are all factors that will hinder the growth of steel demand in 2022.

China's slowing growth hampers steelmakers

China's GDP growth (2014-2025f)

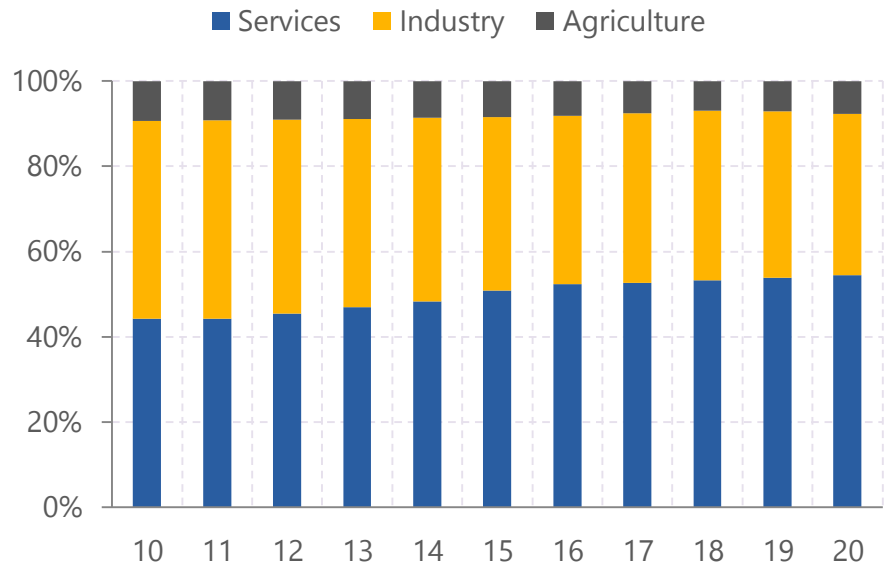
Unit: % annual change in value



Source and estimate: Chinese National Statistics / Forecast: IMF

Distribution of China's GDP by sector (2010-2020)

Unit: share of GDP in %.



Source: National Statistics of China

China, which consumes and produces more than half of the world's steel, plays a very important role in the steel industry's market. The Chinese economic slowdown and the reduction in the weight of industry in its GDP (in favour of services) are leading to a structural slowdown in the demand for steel.

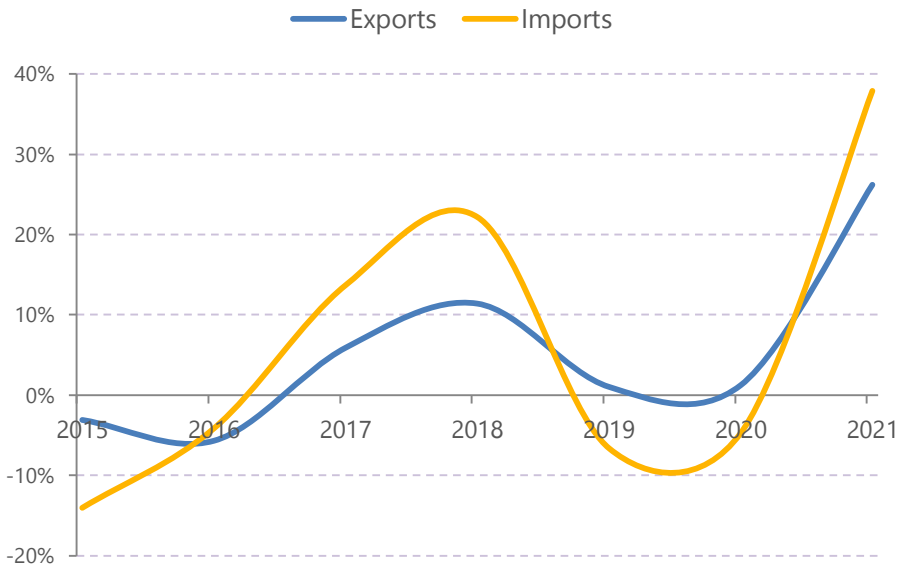
However, the strong rebound of the country's GDP growth in 2021 (+8.1%) largely stimulated global steel consumption. In the 4th quarter of 2021, Chinese GDP was already more than 10% above its pre-pandemic level (that of Q4 2019). Yet, growth slowed down considerably, falling to 4% year-on-year this past quarter, below China's pre-crisis level of around 6%. The V-shaped rebound from the health crisis in 2020 gradually faded, as shown by the further contraction in manufacturing activity recorded in January 2022 by the Caixin China PMI (industrial purchasing managers' survey).

By 2025, China's GDP growth rate is expected to continue to slow down.

Signals of a slowdown in China are multiplying

China's foreign trade

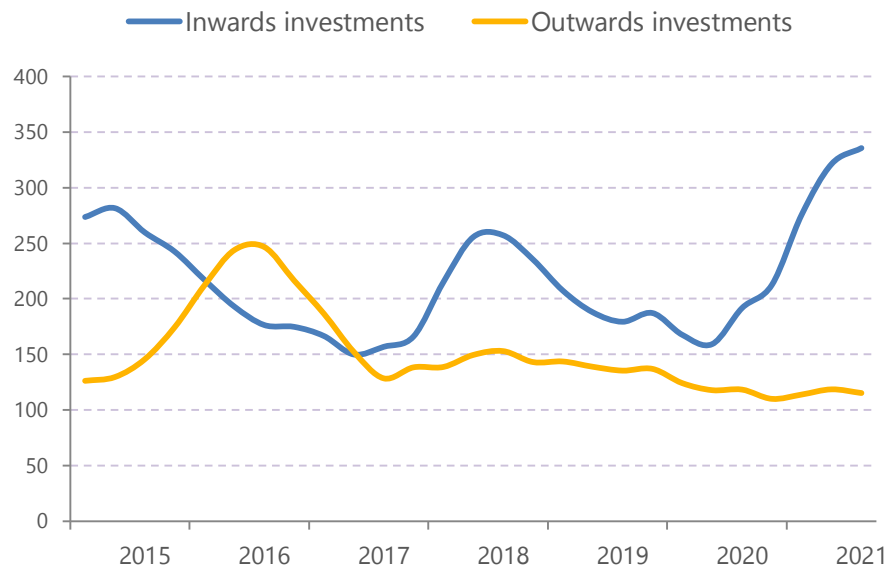
Unit: % change (average of the last 12 months compared to the previous 12 months) in value (dollars)



Source: General Administration of Customs of the People's Republic of China (latest data: **12/2021**)

Foreign direct investment

Unit: billion dollars, rolling annual data (sum of last 4 quarters)



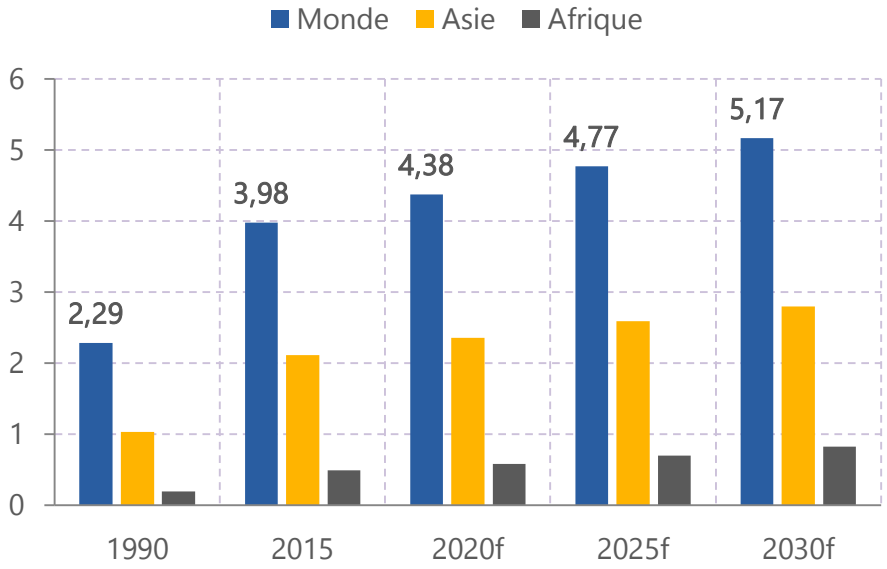
Source: State Administration of Foreign Exchange (latest data **3e quarter 2021**)

In 2021, the growth in exports slowed down significantly, and it has been the case since spring 2020. The near-universal continuation of global health measures in the first half of last year prolonged the windfall effect on exports of medical and IT goods (two areas of specialisation in Chinese industry), but demand for these sectors began to fade as health restrictions were progressively being lifted. The strong recovery in China has thus been dependent on demand from the rest of the world, while the process of transition to a more self-sufficient economy stalled with the pandemic. This is shown by car registrations that plateaued at a level below their 2019 average, as well as the sluggish recovery in retail sales, still well below their pre-crisis levels. Thus, after a strong rebound, growth prospects for the Chinese economy are being revised downwards, as public support for the economy is being reduced and the private sector is being subjected to regulatory tightening and increased environmental constraints.

The increasing urbanisation and the growth of the middle class is supporting demand for steel

Number of people living in the city

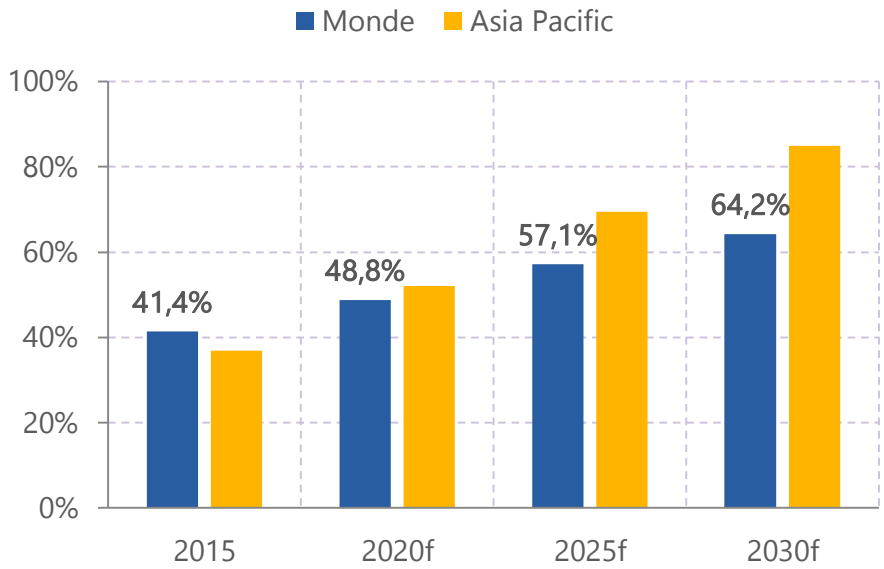
Unit: billion inhabitants



Source and forecast: UN World Urbanization Prospects, 2018 Revision

Share of middle class

Unit: % total population



Source and forecast: Brookings (Global Economy and Development Working Paper 100, 2017)

In 2015, 3.98 billion people lived in urbanised areas, representing 53.9% of the world's population. An increase in the rural exodus coupled with an increase in population growth will lead to an increase in the number of people living in urbanised areas. In 2020, there will be 4.38bn of them and more than 5bn in 2030. This development will lead to an increase in the need for infrastructure (roads, buildings, housing, commercial areas, etc.) which requires a lot of steel (construction is the main outlet for the steel industry). The expansion of the middle class, i.e. people with more purchasing power, will also lead to an increase in consumption, particularly of cars, consumer goods, household appliances, etc.

Technological developments are pushing steelmakers to differentiate themselves

Maintaining a competitive production process

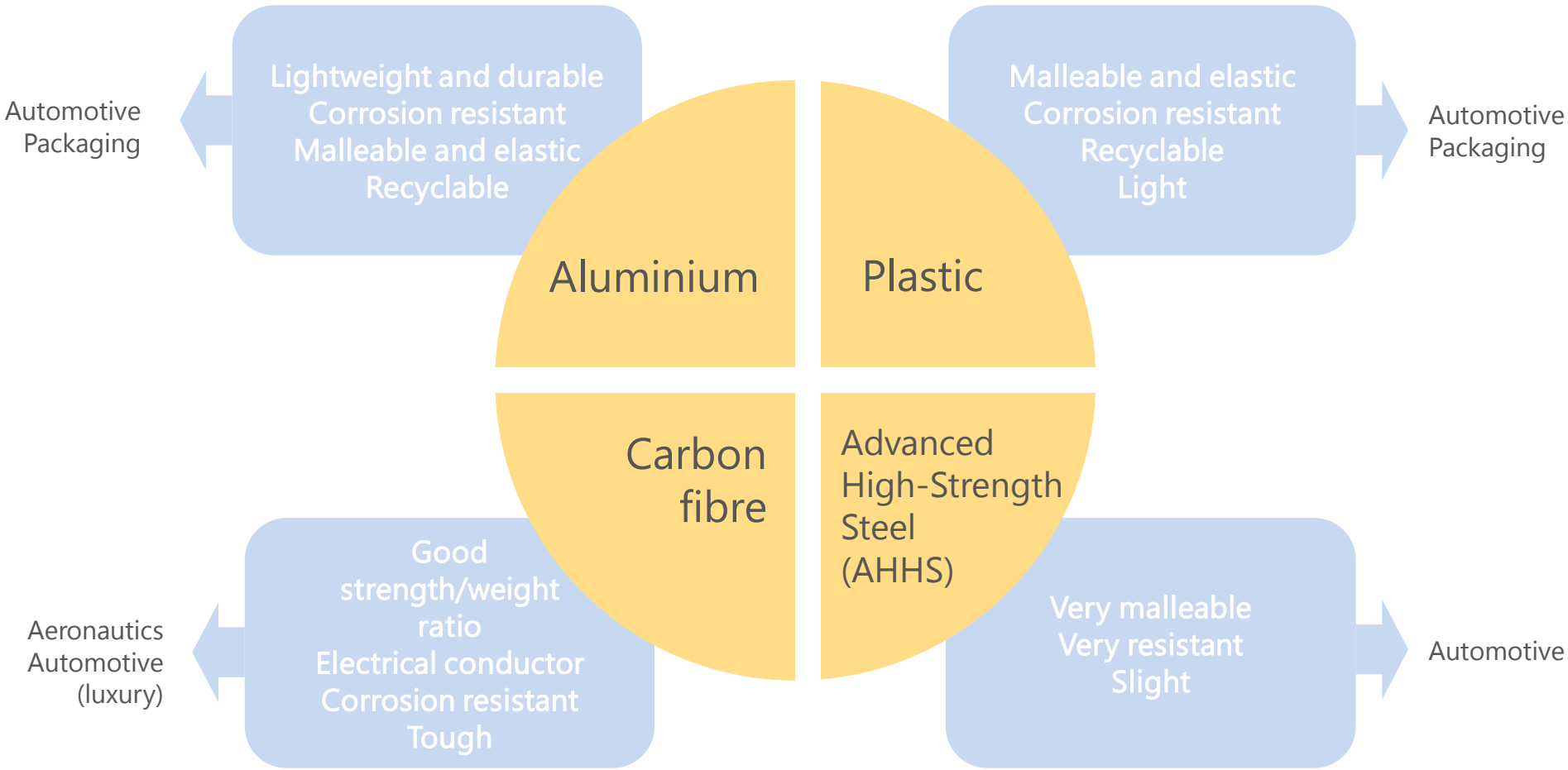
Technological innovations in industry are usually one of the key growth factors in the steel market. In particular, they allow companies to improve their production processes, making them more productive and energy efficient. Therefore, it is important for steelmakers to invest in modern production equipment in order to remain competitive.

Innovation drives growth in the steel industry

Eco-design and the reduction of the quantity of materials used are particularly important issues for the customers of steelmakers (especially in the transport industry). In order to reduce vehicle fuel consumption, manufacturers are looking above all for lighter parts. In this respect, aluminium and plastics metallurgists innovated in order to develop car parts capable of competing with those made of steel.

These changes are having a major impact on demand and are forcing steel manufacturers to innovate and adapt. Steel manufacturers are trying to compete with aluminium by developing, for example, high-strength steel (AHSS) for the automotive sector.

The threat from substitute materials is significant



The reduction of energy consumption and greenhouse gas emissions are increasingly important concerns for the future

The steel industry in the crosshairs of the energy transition

The steel industry is one of the most polluting industries, emitting 6-7% of anthropogenic greenhouse gas emissions, according to the CDP. Increasing environmental concerns, tightening regulations and energy efficiency policies encouraged steel manufacturers to implement industrial modernisation programmes. These large-scale investment plans may affect the financial performance of the groups in the short term and consequently that of the industry as a whole. However, they are essential as environmental policies will inevitably strengthen and will affect the steel industry, forcing it to adapt.

Environmental regulations are becoming more and more restrictive for steelmakers

The strengthening of environmental measures, especially in developed countries, represents very important changes for the steel industry. In order to meet the objectives of the Paris Agreement, adopted in 2015, the sector must reduce its greenhouse gas emissions by over 70% by 2050. In parallel, carbon tax systems are being developed in several countries. The 4e phase of the European Union Emission Trading Scheme (EU-ETS) came into force in 2021 for 10 years. It provides for an acceleration in the rate of reduction of the emission ceiling, which will have an impact on the steel industry. The European system is particularly restrictive and may compromise the competitiveness of steelmakers in Europe compared with Asian, Russian or American countries, where legislation is more flexible. However, energy consumption remains an area where everyone can make a difference in order to reduce costs and remain competitive. Some companies are developing projects to reduce their emissions, such as reusing steelmaking gases, increasing the proportion of scrap metal in the process, etc. Yet, the majority of steel manufacturers agree that the targets of the Paris Agreement are too ambitious with the production technologies currently available. In particular, the industry needs disruptive innovation to meet this target, while the financial performance of the sector is fragile and it is considered to be high risk. It is therefore difficult to obtain the necessary financing for large innovation projects that are not profitable in the short term. A few projects are under development and are still far from the commercialisation stage, such as HYBRIT, carried out by three Swedish companies which are developing a solution to replace coking coal with hydrogen in the reduction of iron ore.

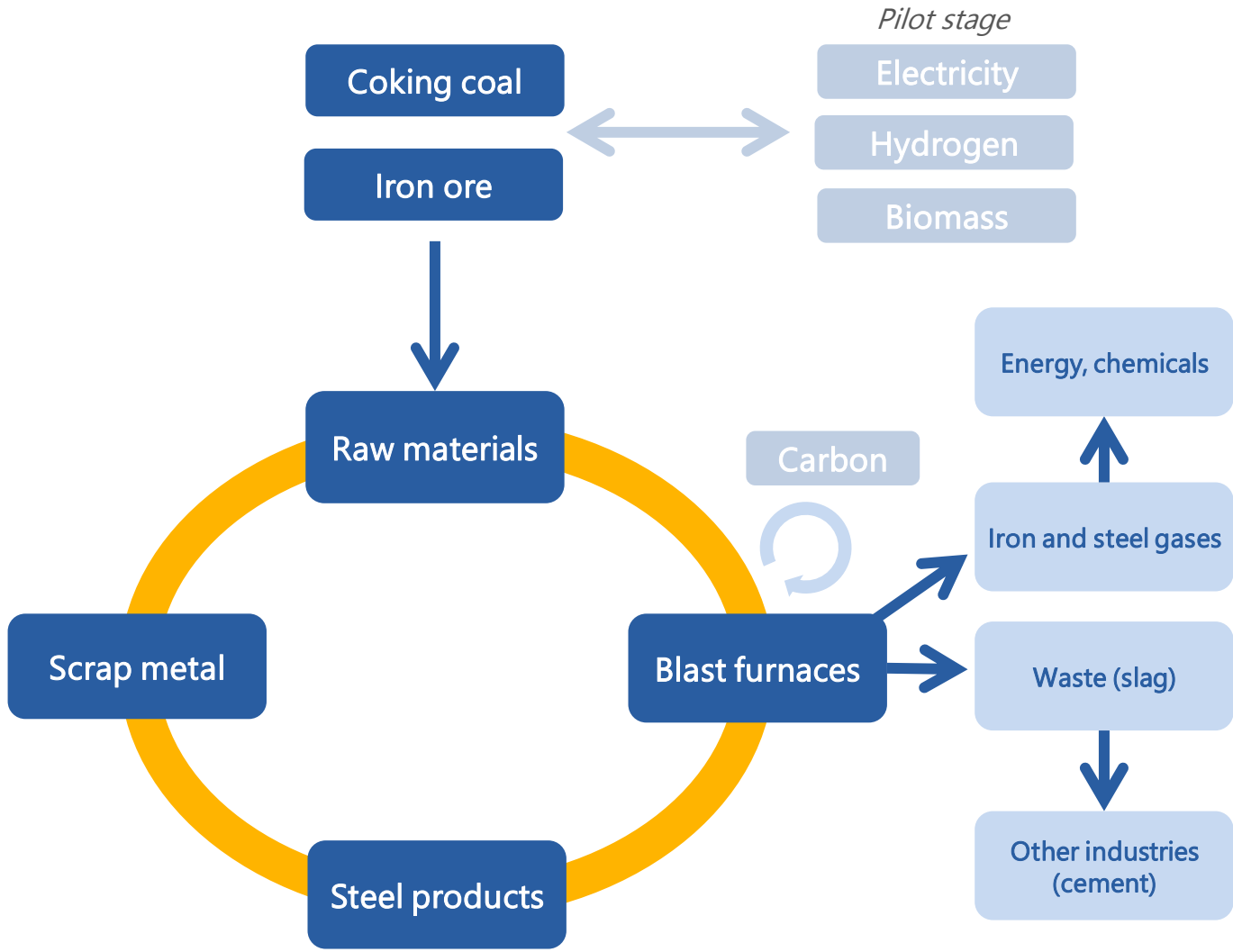
Options available to reduce the environmental impact of the steelmaking process

The steel industry includes sustainable practices in its process. In particular, steel is recycled at 90%. The use of scrap metal to replace iron ore and coke reduces greenhouse gas emissions (semi-finished steel products are made with less metallurgical coal).

In addition, some process waste is being reused. Blast furnace slag is used in the manufacture of cement, for example.

Other options are also being investigated:

- Replacement of coking coal by hydrogen, biomass (charcoal) or electricity (electrolysis)
- Carbon capture and reuse
- Re-use of iron and steel gases to produce fuels or inputs for the chemical industry.



Growing environmental pressures on steelmaking

Paris Climate Agreement :
Adopted in 2015, the Paris Climate Agreement aims to keep the rise in global temperature well below 2°C.

According to the CDP, the industry needs a technological transformation that will reduce its emissions per tonne of steel produced by 70% by 2050 in order to meet the Paris Agreement targets.

EU ETS (European Emissions Trading Scheme) :
Companies receive or buy an emission allowance which they can trade with other companies according to their needs. A cap is set to limit the total level of certain greenhouse gases that can be emitted. This limit decreases from year to year (the price of carbon is thus supposed to increase). The 4th phase of the EU ETS came into force in 2021. It provides for an increased rate of decrease in the total quantity of allowances issued each year (2.2% per year compared to 1.74% currently). These allowances must be purchased, except for industrial sectors exposed to carbon leakage (*) in order to maintain their competitiveness in the European Union (the steel industry falls into this category). The allocation of allowances free of charge is maintained but will be progressively removed after 2026.

China's anti-pollution measures :
China implemented important measures to limit the country's pollution. In November 2017, a measure required metalworkers in industrial cities in 4 provinces to cut steel production by half and aluminium production by a third for 4 months during the winter season. The country also introduced a series of pollution inspections of factories from 2018 for 3 years. The government announced in 2018 that it would close a thousand factories by 2020 to combat pollution.
At COP26 in Scotland, China committed to reach its peak CO_2 emissions in 2030 and achieve carbon neutrality by 2060. The steel industry accounts for 15% of China's emissions. Regulatory pressure on this sector is set to increase in the coming years in China.

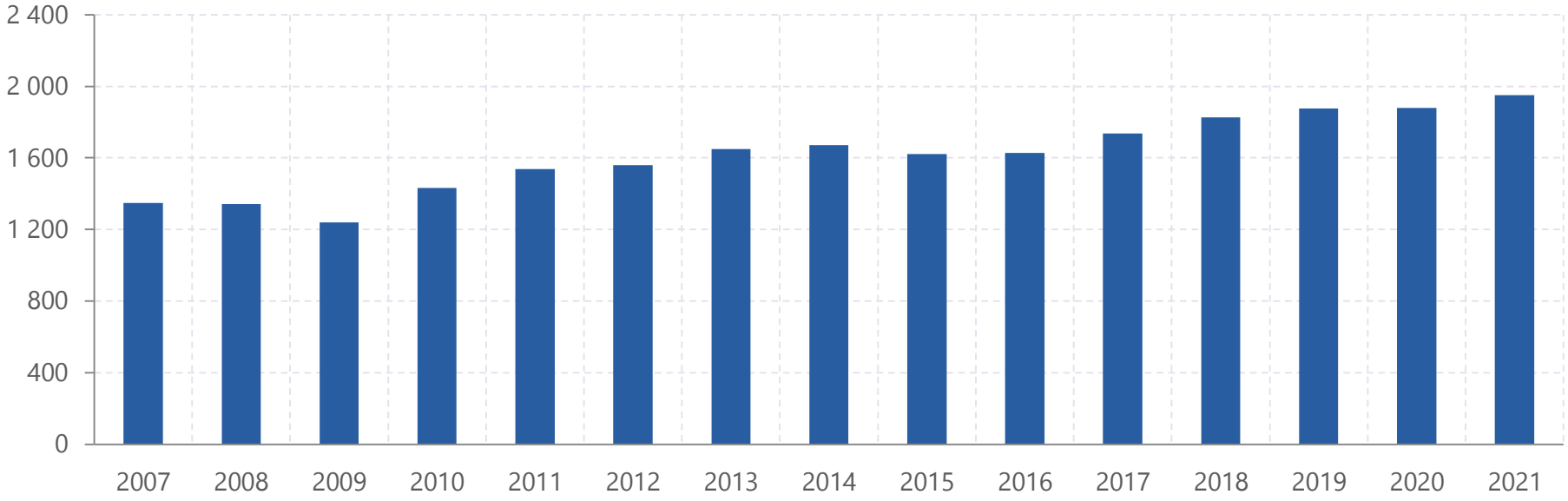
(*) Carbon leakage refers to situations in which companies relocate their production to a country with less stringent CO_2 emission constraints.

3.2. The global steel market

Crude steel production continued to grow despite the outbreak of the Covid-19 crisis

World crude steel production

Unit: million tonnes



Source: World Steel Association

Global crude steel production increased on average over the medium term. The amount of steel produced increased by an average of 2.6% from 2007 to 2021, from 1,348 Mt to a record 1,951 Mt. However, this growth was marked by two downturns. In 2009, the economic crisis led to a drop in steel production (-7.8%) and in 2015-2016, production fell by 2.9% due to a weak global demand. Since then, production has risen again, driven by the recovery of the various customer markets. China and India significantyl contributed to this increase.

In 2020, when the Covid-19 crisis broke out, the pace of growth slowed but remained strong (+0.3%). While the measures to combat the epidemic led to a decline in economic activity and a postponement of major construction projects, and thus to a drop in demand for steel, the strong increase in Chinese production that year (+7%) prevented a downturn in the indicator at the global scale. After this slowdown, global steel production increased more strongly in 2021 (+3.7%) in line with the global economic recovery.

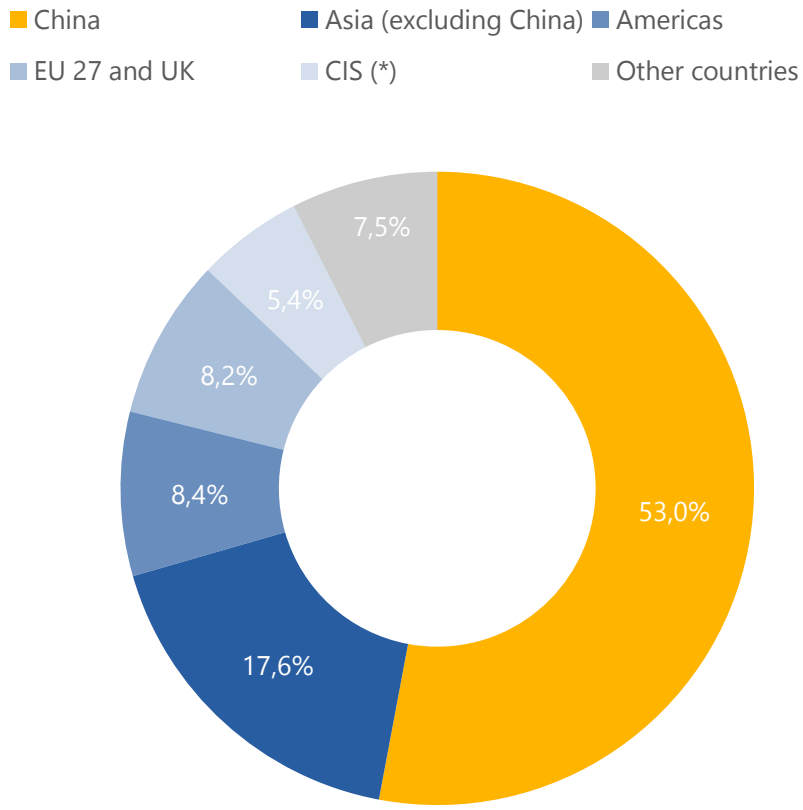
China accounts for more than half of global production

China accounts for more than half of the world's crude steel production with 1,032.8 Mt in 2021.

The rest of the Asian countries account for a significant share of global steel production (17.6% in 2021), ahead of the Americas (8.4%), the European Union (8.2%, UK included), and the CIS (5.4%).

Crude steel production by region (2021)

Unit: % of global production



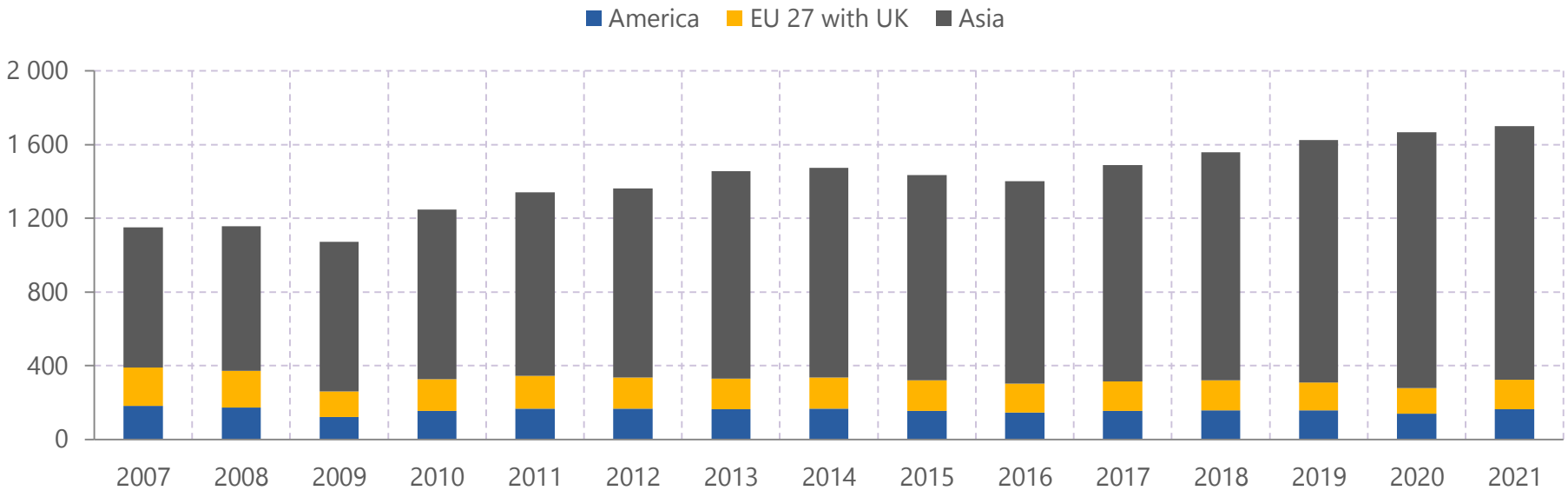
(*) CIS = Commonwealth of Independent States consisting of 11 countries of the former USSR: Russia, Ukraine, Kazakhstan, Armenia, etc.)

Source: World Steel Association, 2021 data

The dynamism of Chinese steelmakers helped to avoid a drop in global steel production in 2020

Global steel production in the three main regions

Unit: million tonnes



Source: World Steel Association

Rapid urbanisation and population growth on the continent (particularly in China but also in India) led to a large need for construction, infrastructure and manufacturing products, which drove up the need for steel in emerging countries. In addition, the steel industries in these countries grew in strength over the medium term, in particular thanks to government support. Between 2007 and 2019, Asian steel production rose by 4.7% on average per year, compared with -2.7% for America, due to the maturing of their industries. However, US crude steel production increased sharply in 2017 and 2018, boosted by the government's protectionist measures.

In 2020, American and European production fell sharply, while Asian production increased significantly, mainly driven by China, which quickly revived its industry after the outbreak of the Covid-19 crisis. In 2021 however, the rebound in global production came mainly from the Americas and Europe, with Asian production falling slightly (-0.9%).

Global production overcapacities decreased

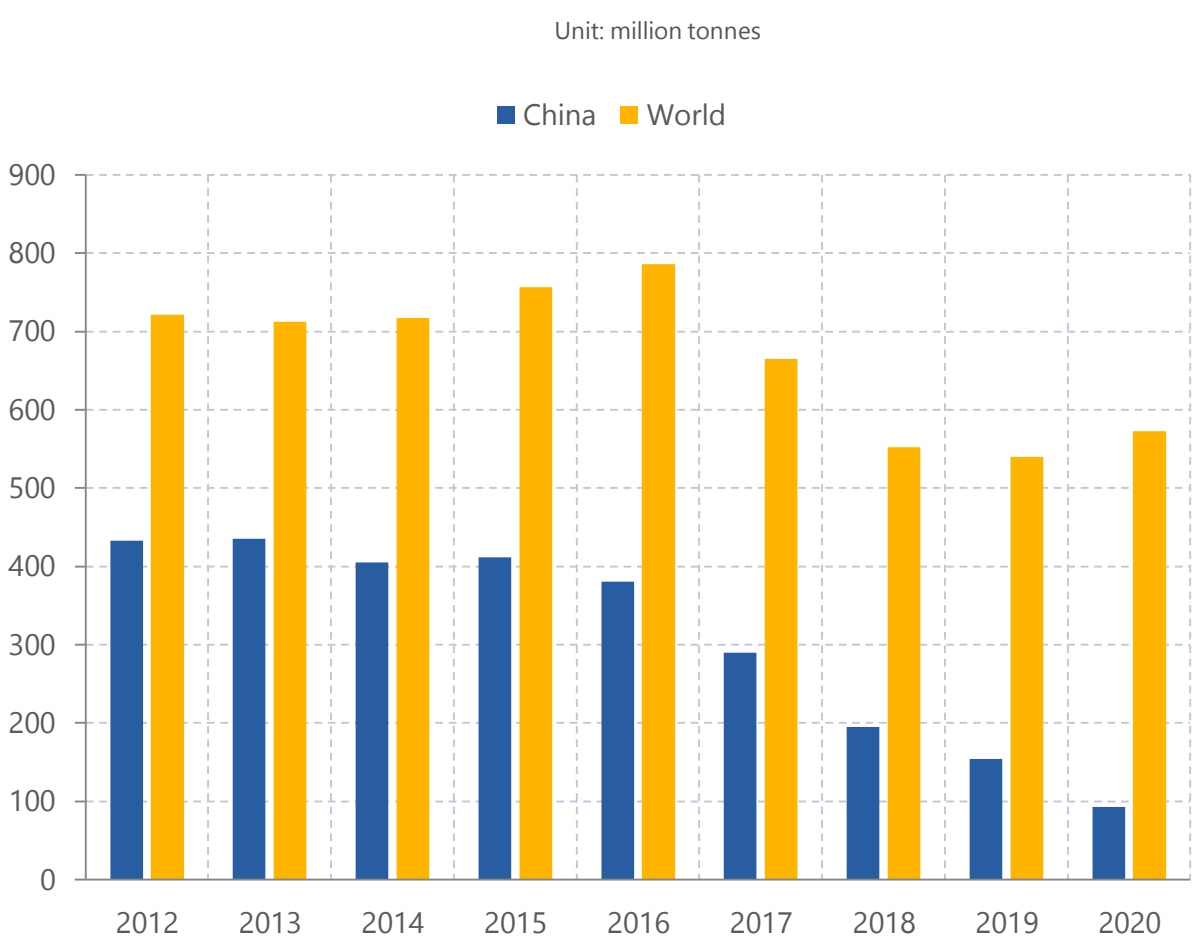
By 2016, steel production overcapacities rose sharply, to 786 Mt. Most of this increase came from China, the largest steel producing country, whose government had strongly supported production growth.

The saturation of the domestic market and production overcapacities led Chinese steelmakers to dump their low-cost products on the global market. The international community reacted and accused China of dumping. In 2016, China introduced measures aimed at eliminating between 100 Mt and 150 Mt of production capacity in 2020 compared to 2015, in particular by encouraging concentration in the sector and eliminating "zombie" companies.

Between 2015 and 2020, China's production overcapacities has been cut by 320 Mt. While it represented 54% of global overcapacity in 2015, it fell to only 16% in 2020.

Declining since 2017, global production overcapacities increased slightly in 2020 as production slowed down (and declined in most areas except China).

Global steel production overcapacities

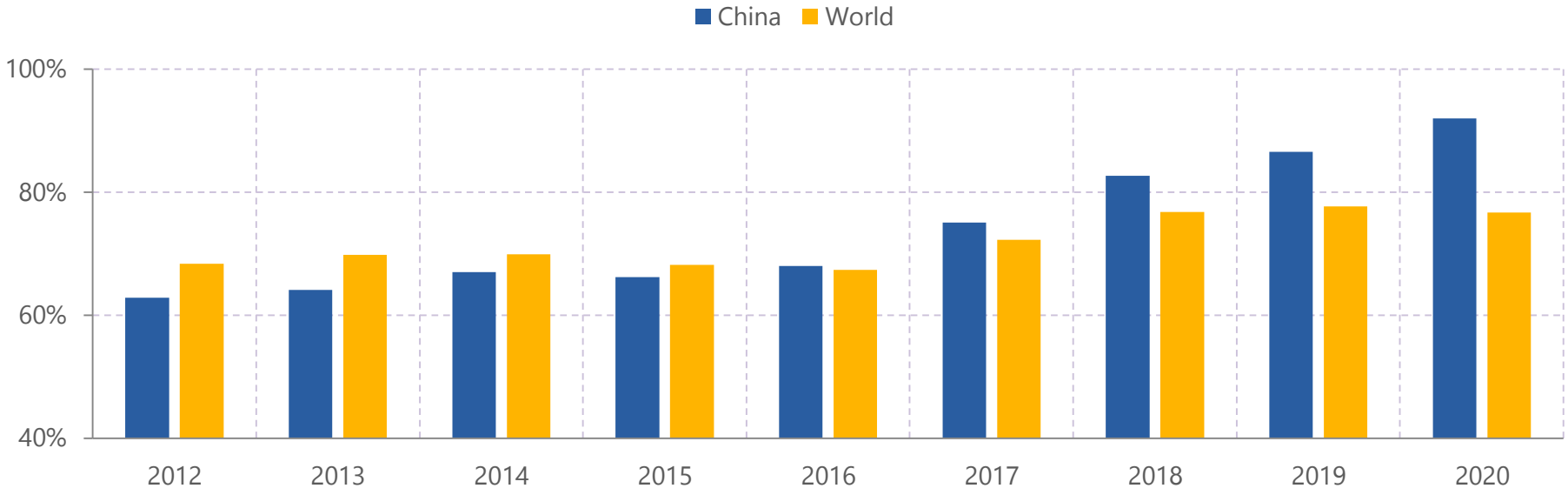


Sources: OECD (production capacity) and World Steel Association (production)

Business profitability driven by rising utilisation rates

Capacity utilisation rate (2012-2020)

Unit: % of production capacity



Sources: OECD (production capacity) and World Steel Association (production)

From 2016 onwards, steel capacity utilisation rates rose sharply at the global scale and particularly in China. Since 2015, the country's capacity utilisation rate rose by 26 percentage points, to 92% in 2020. China's efforts to reduce production capacities paid off. Thus, the improvement at the global scale is due in particular to the Chinese results, the country being the origin of more than half of the world's steel production.
The profitability of Chinese steelmakers improved as steel plants are considered profitable from a utilisation rate of 80%.

Mineral prices soar

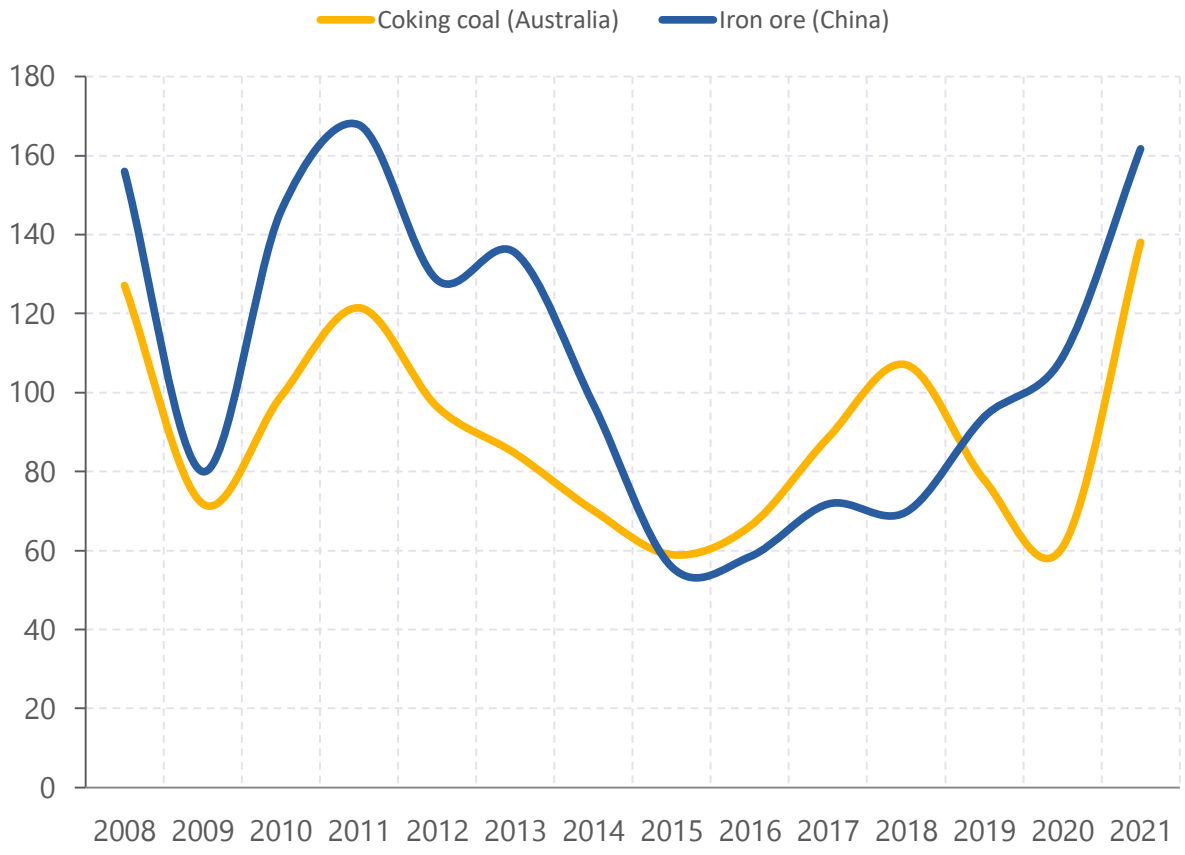
The prices of the main raw materials of the steel industry fluctuated greatly in recent years. They are in fact very dependent on the economic situation. Prices vary according to economic crises (2007-2008 in particular), the growth in global demand or the evolution of supply (especially from large suppliers such as Vale or Rio Tinto).

In 2019, following the global economic slowdown, prices of the main minerals temporarily decreased. Iron ore is the exception, however, following a supply shock in January 2019. The collapse of Brumadinho's dam in Brazil, the world's 2nd largest supplier of iron ore, led to a surge in prices.

Prices also rose sharply in 2020 and 2021 due to the rapid resumption of Chinese growth in 2020 alongside limited supply in Brazil due to the outbreak of the pandemic and as political and trade tensions arose between Australia, the world's 1st iron supplier, and China.

Iron ore prices (China) and coking coal prices (Australia)

Unit: US dollar / tonne



Source: World Bank (Coking coal and iron ore, December 2021 data)

Steel prices have soared during 2021

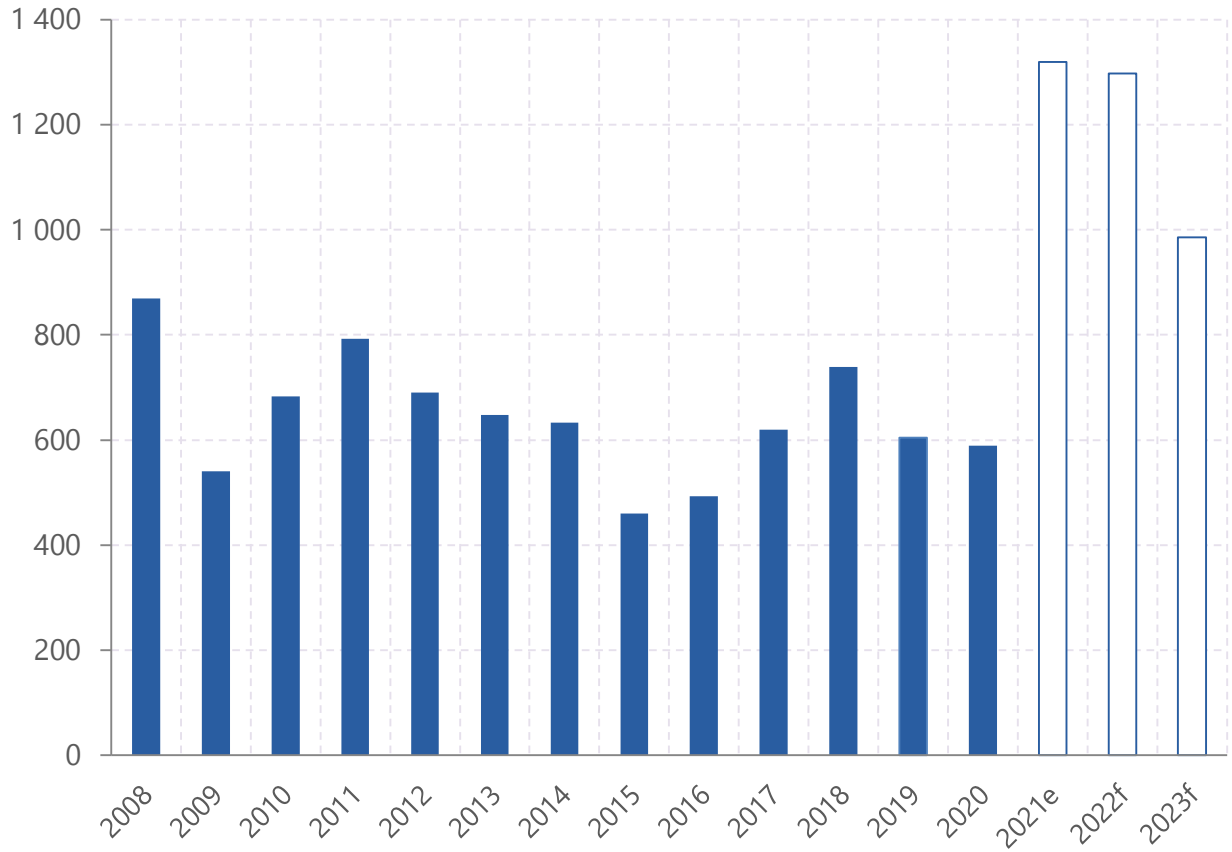
Even before the health crisis, steel prices fell in 2019 as a result of the global economic slowdown and threats of further protectionist measures. In early 2020, with the outbreak of the Covid-19 epidemic, prices fall. But the downturn is short-lived.

From mid-2020, steel prices recover, followed by an unprecedented overheating in 2021. This surge is due to a strong global demand (particularly from China) following the recovery, but also to supply difficulties due to the continued disruption of international value chains.

With the normalisation of mining activity and the downturn in Chinese production, the momentum in steel prices is likely to slow down in upcoming months, mirroring the sharp decline in iron ore since last summer. Nevertheless, given the strong growth throughout last year and the very high levels reached at the beginning of 2022, steel prices will hardly decline year-on-year.

Hot rolled coil (steel) prices

Unit: US dollar / tonne

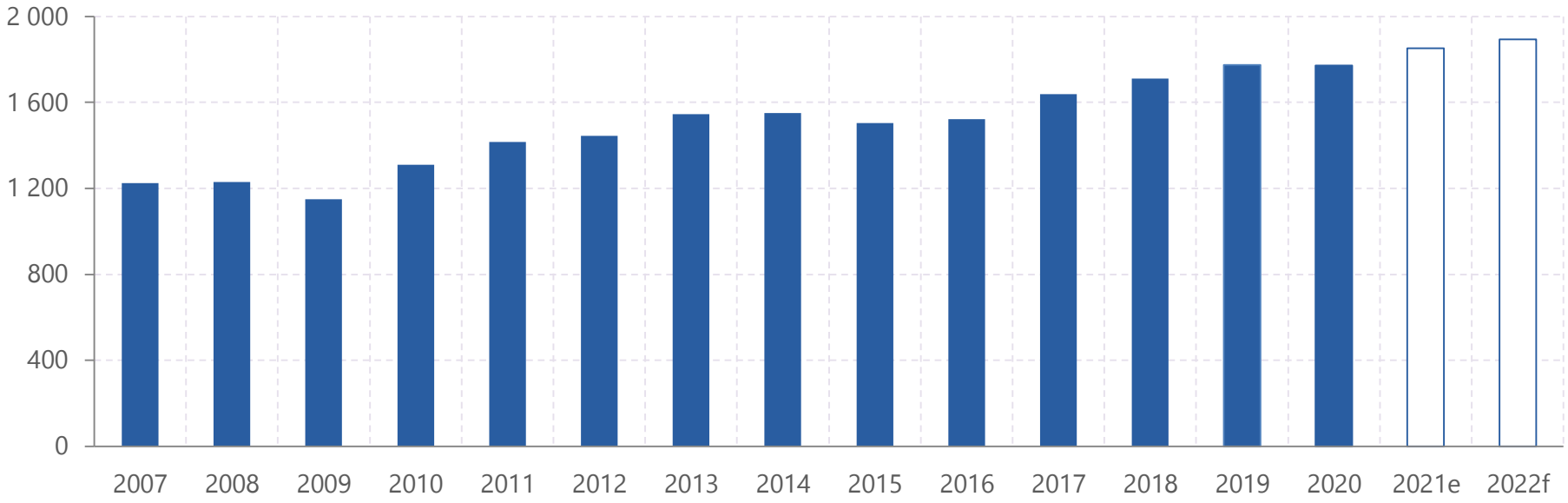


Estimates, forecasts and source: Feri

Global demand is not slowing down, quite the opposite in fact

Global steel demand (*)

Unit: million tonnes



Estimate, forecast and source: World Steel Association
(*) Apparent steel consumption (finished products)

Global steel demand has been on an upward trend since 2007 (+2.9% on average per year), despite declines in 2009, 2015 and 2020. Between 2017 and 2019, it rose sharply in line with the recovery in global economic growth (automotive industry, construction, etc.). Most this increase comes from China.
In 2020, apparent steel use slightly decreased (-0.2%), mainly from America and Europe. It continued to rise in Asia, particularly in China (+9.1%). It then recovered significantly in 2021 (+4.5%) to exceed the level reached before the crisis. The World Steel Association forecasts a further increase in 2022 (+2.2%).

The pandemic have strengthened China's dominant position in global steel consumption

China is by far the largest consumer of steel worldwide. Consequently, the price of steel is highly dependent on the economic situation in that country.

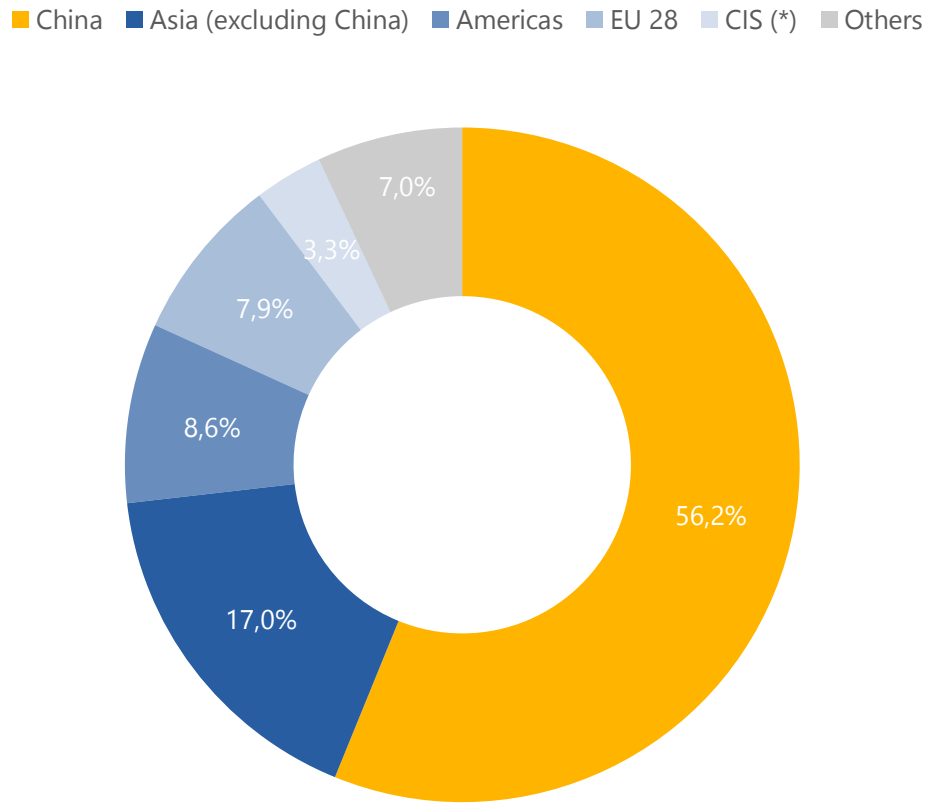
In 2020, China even captured 56.2% of global demand, a significantly higher share than in previous years (51% in 2019 and 49% in 2018) because Chinese demand grew strongly that year, unlike that of the other world powers.

The rest of the Asian continent absorbed 17% of the steel needs in 2020.

The Americas and the European Union consumed 8.6 and 7.9% of world steel in 2020 respectively.

Distribution of steel demand in 2020 (*)

Unit: % of world steel demand

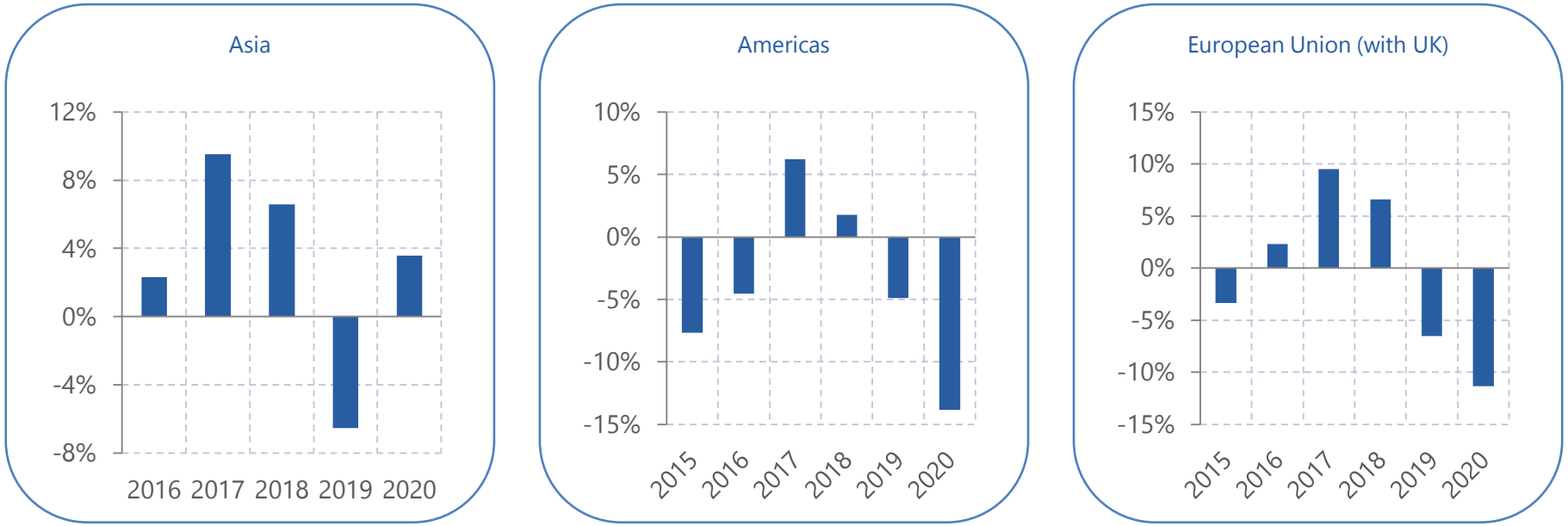


Source: World Steel Association, 2020 data
(*) Apparent steel consumption (finished products)

Steel demand dropped strongly in 2020

Steel demand by region

Unit: % annual change in volume



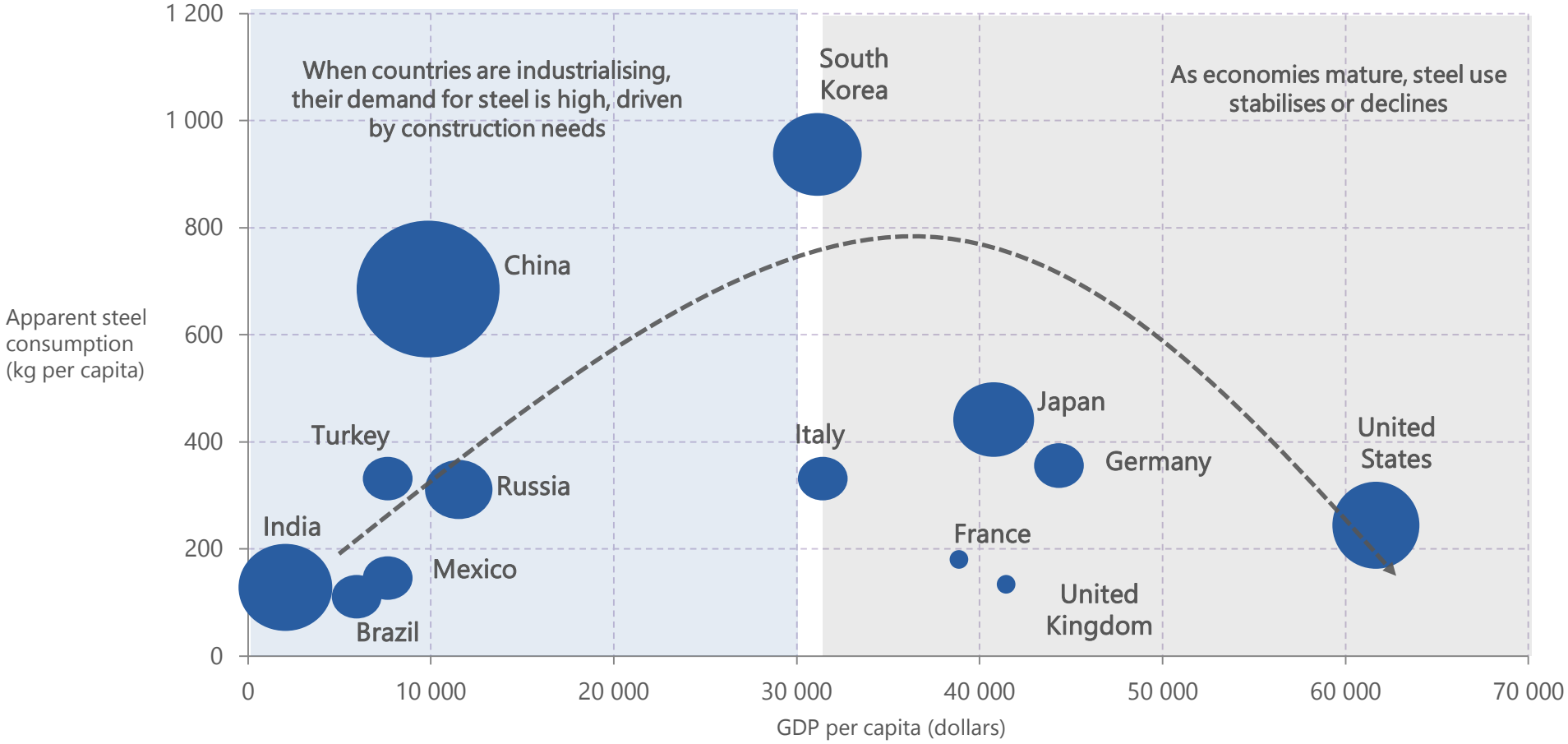
Source: World Steel Association

In 2019, steel demand in Asia, the Americas and the European Union (including the UK) declined significantly as global economic growth, particularly in China, slowed.
In 2020, the year of the Covid-19 pandemic, demand collapsed in the Americas and the European Union, where lockdown measures were strong and brought the economy to a halt in the first half of the year, followed by a slow recovery over the rest of 2020. In Asia, steel consumption increased, but almost all of this increase came from China, where the recovery in activity was rapid.
However, it should be noted that emerging economies have been more vulnerable to the pandemic due to stricter lockdown measures, falling commodity prices (on which they are more dependent), a halt in tourism and weak government financial support.

Steel use decreases as economies reach maturity

Comparison of steel demand per capita with GDP per capita in 2020

Units: kg per capita, current US dollars, the size of the bubble is proportional to the country's steel demand in 2020

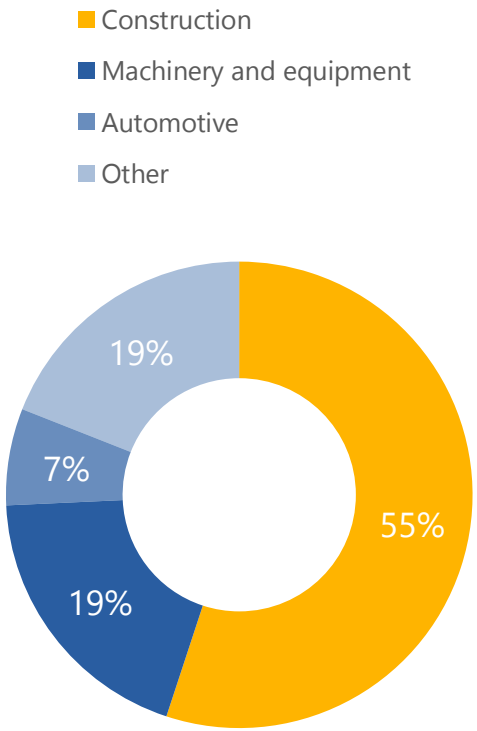


Sources: World Steel Association and World Bank, 2020 data

Construction is the main outlet for the steel industry

Sales of steel products by market outlet in China (2013)

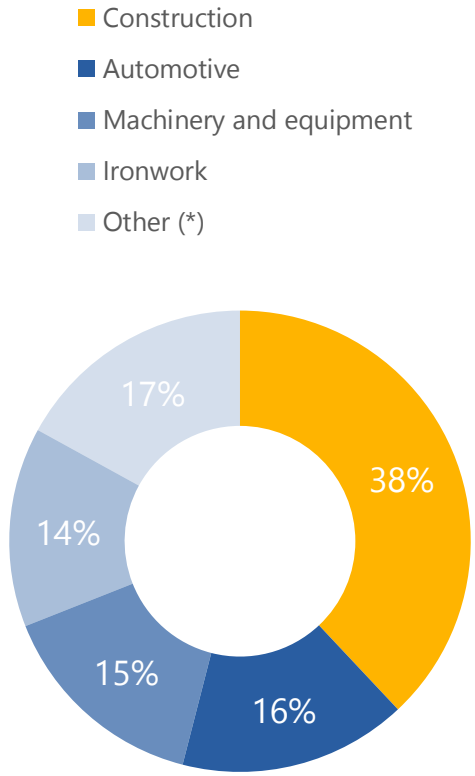
Unit: % of sales



Source: French Embassy, 2013 data

Sales of steel products by market outlet in Europe (2020)

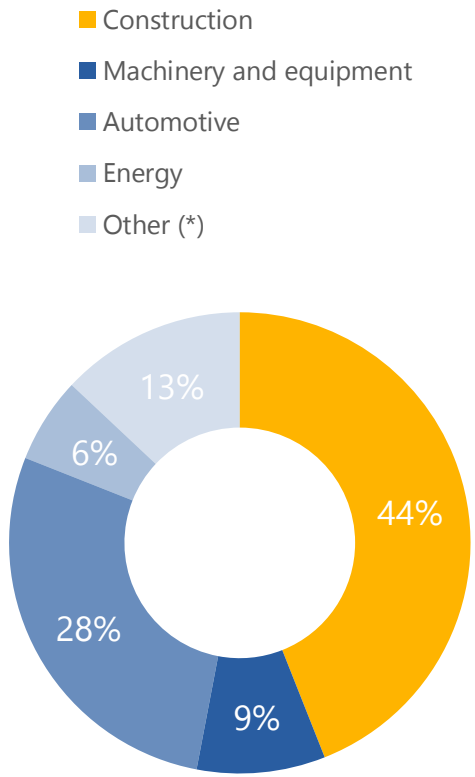
Unit: % of volumes



Source: Eurofer, 2020 data
(*) household appliances, other transport vehicles, etc.

Sales of steel products by market outlet in the United States (2018)

Unit: % of sales



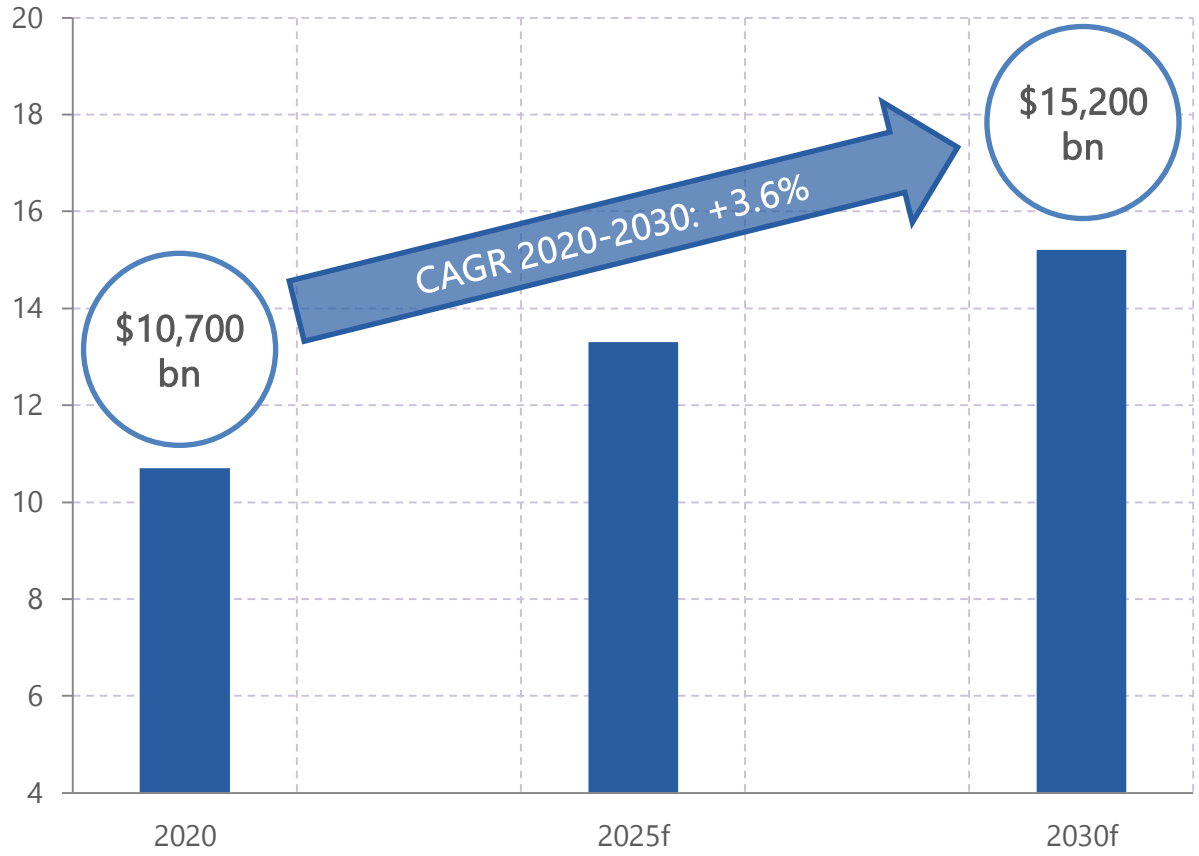
Source: American Iron and Steel Institute, 2018 data
(*) includes containers, equipment, defence, etc.

Revenues generated by the construction industry are expected to reach $15,200bn by 2030

The construction industry is a powerful engine for the recovery of global economic growth after the Covid-19 crisis. Between 2020 and 2030, revenue of the global construction industry should therefore rise from $10.7bn to $15.2bn. This dynamism can be explained by the catch-up effect following the lockdown measures that led to postponements of building sites, the intervention of public authorities and the accumulation of household savings.

Global construction revenue (2014-2030)

Unit: billion US dollars



Source and forecast: Oxford Economics

China will be the main driver of the global construction activity in the medium term

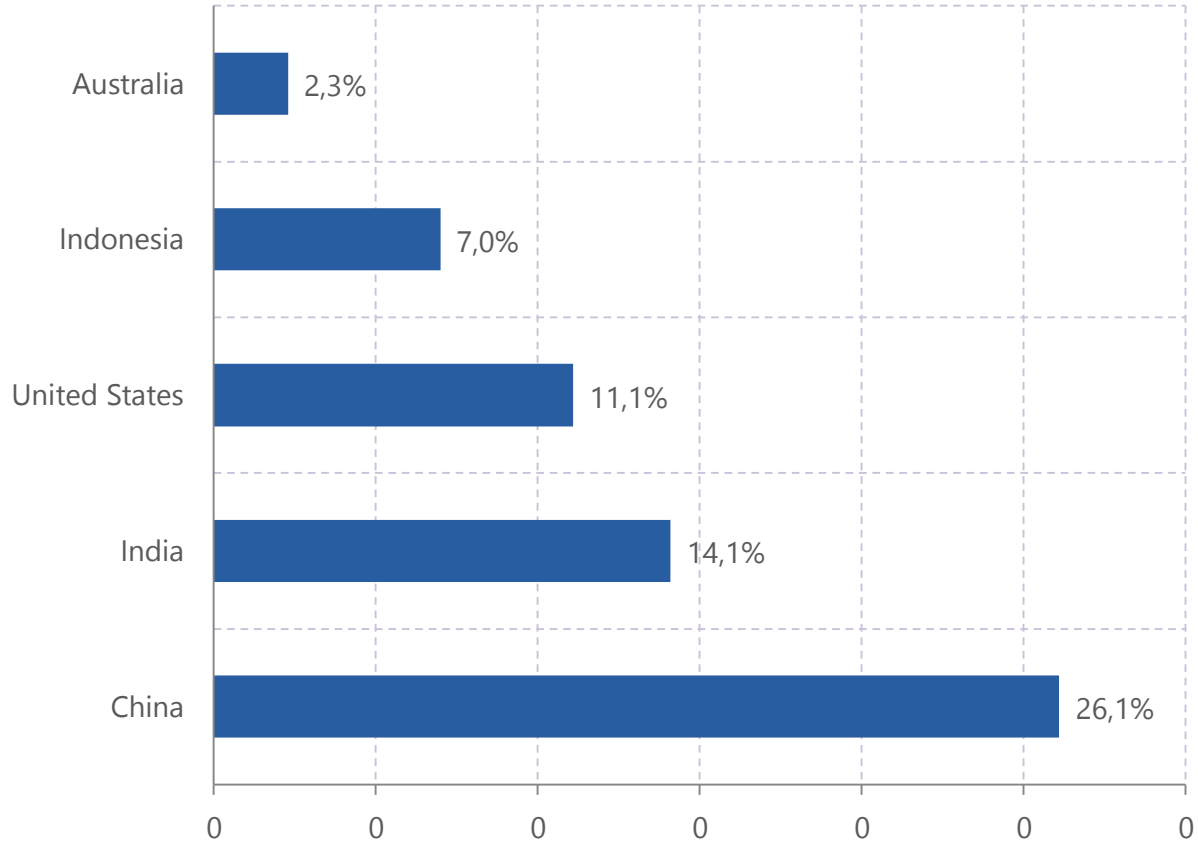
China, India, the United States and Indonesia will account for more than half the global construction industry's growth between 2020 and 2030.

China alone is expected to contribute more than a quarter of the growth. Investment efforts in China's construction industry will be directed mainly towards the non-residential sector (e.g. retail, health and education) as the country's economy moves away from a heavy industry and infrastructure-based growth model towards a consumption model.

India's construction needs will mainly be driven by the rising demand for new housing and infrastructure (transport, power grids, etc.) to meet the high population growth, urbanisation of the population and the emergence of the middle class.

Contribution to the growth in global construction expenditure between 2020 and 2030

Unit: % of global construction revenue growth between 2020 and 2030



Source: Oxford Economics

Car production will not return to pre-crisis levels for several years

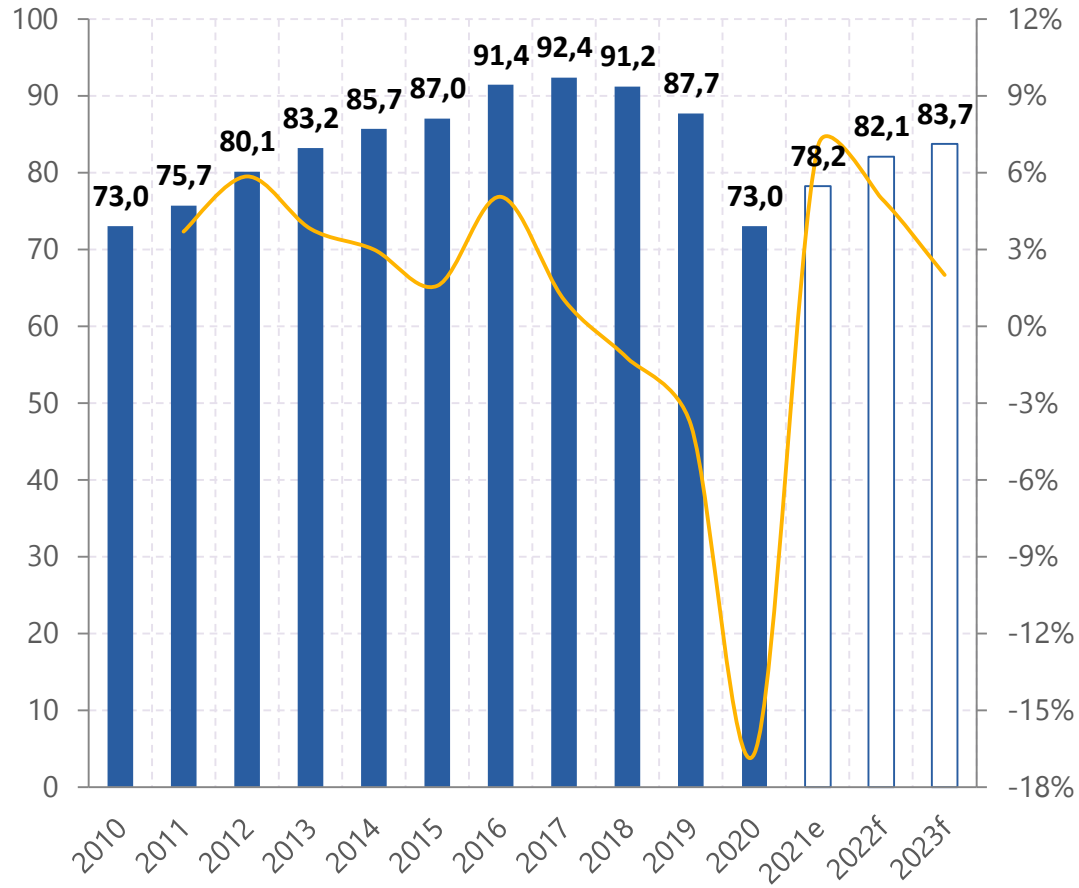
The automotive industry is an important outlet for the steel industry (especially flat products, with higher added value) and particularly for mature economies (27% of US steel sales were destined for this outlet in 2018).

Vehicle production grew continuously between 2012 and 2017 (+2.9% each year on average) until an inflection point in 2018.

In 2020, global car production fell (-15.8%) mainly due to factory closures during lockdown periods (China and then Europe and the US) as well as a drop in demand for cars in a context of uncertainty (households have been holding back).
Automotive production rebounded in 2021 but did not return to its pre-crisis level. The shortage of semi-conductors strongly affected the recovery and led to the temporary closure of factories throughout the year. In particular, car production in Europe fell by 3% in 2021 according to estimates by C-Ways. Semiconductor supply difficulties are expected to continue until 2023.

Global vehicle production (2010-2023f) (*)

Units: million vehicles, annual % change

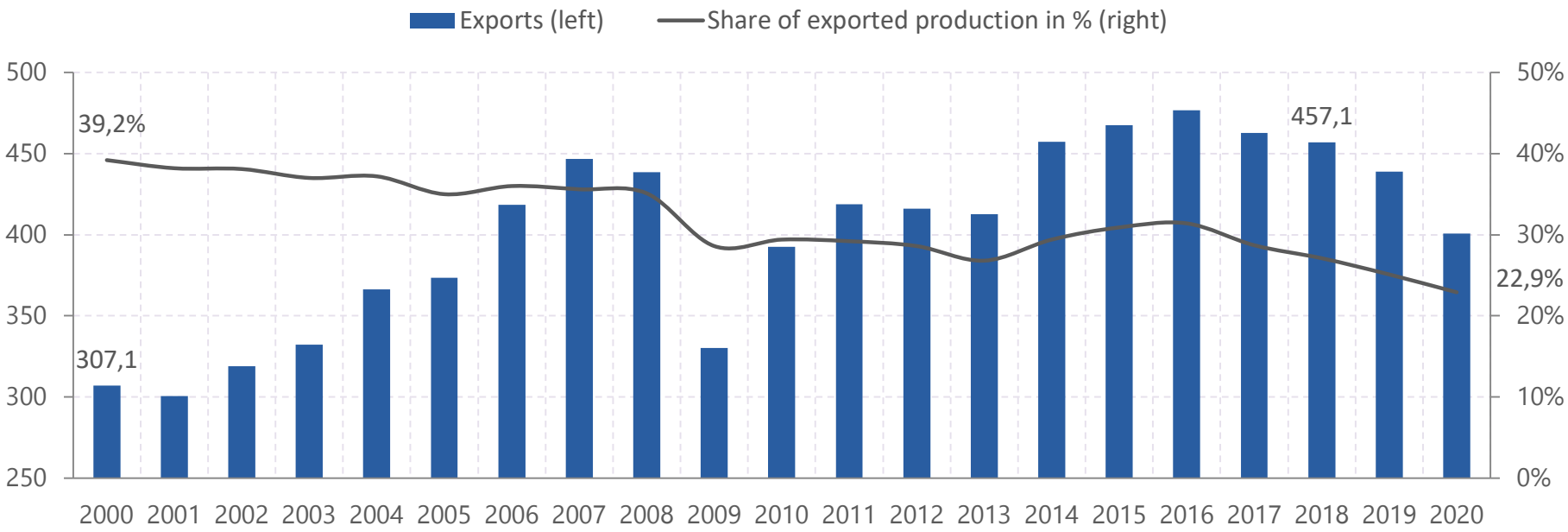


(*) Private vehicles and light commercial vehicles
Processing, estimation and forecasts **Xerfi Global** / Source: OICA

About a quarter of steel production is exported

Global exports of finished and semi-finished steel products (2000-2020)

Unit: million tonnes, % of exported production



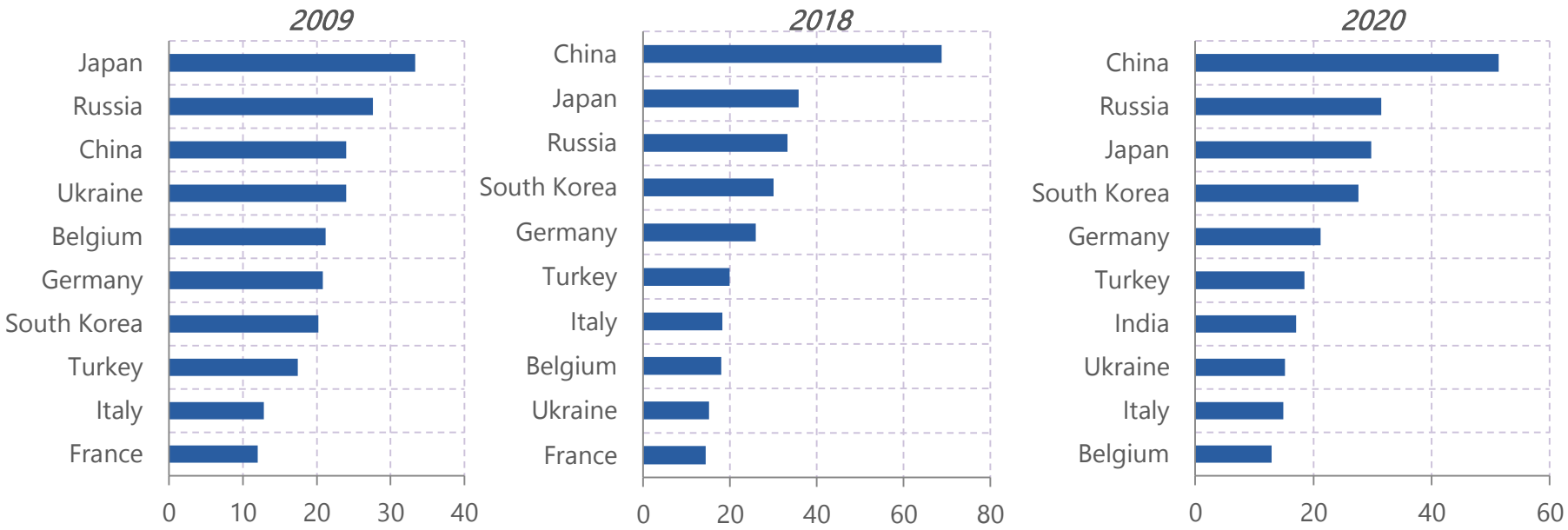
Source: World Steel Association

More than a quarter of steel products are traditionally exported. However, this share varies according to the global macroeconomic context. Before the 2008 crisis, which marked a downturn in international trade and an exacerbation of protectionist tensions, the share of steel production exported was much higher than today (over 35%). Since 2016, the amount of steel exported and its share of total production declined as the drop of production in China and rising protectionist tensions led to a contraction in global trade. In 2020, the share of exported production fell to 22.9% due to the effects of the Covid-19 crisis. It should be noted, however, that unlike other industrial metals, steel markets are more broadly regional (split between US, European and mainly Asian markets). This means that disruptions in one region would not necessarily affect the rest of the markets to the same extent.

China is the world's largest exporter

World's largest exporters of steel products

Unit: million tonnes



Source: World Steel Association

China is by far the world's largest exporter with 51.4 Mt of steel products shipped abroad in 2020, although a large part of its production is destined for the domestic market with the launch of major infrastructure projects such as the New Silk Roads.
China's position in steel exports is relatively recent. In 2009, it ranked 3rd . At that time, the country's steel production was severely affected by the economic crisis of 2008-2009. It then recovered, thanks in particular to the government's investment policies. The majority of Chinese steel outflows are destined for Asia (62.8% in 2020) but the country gained market share in Africa, the Middle East and Latin America.
The United States and India, among the world's leading steel producing countries, export only a small part of their production. Finally, 4 European countries are represented in the top 10 exporting countries.

Chinese steel exports decreased in recent years

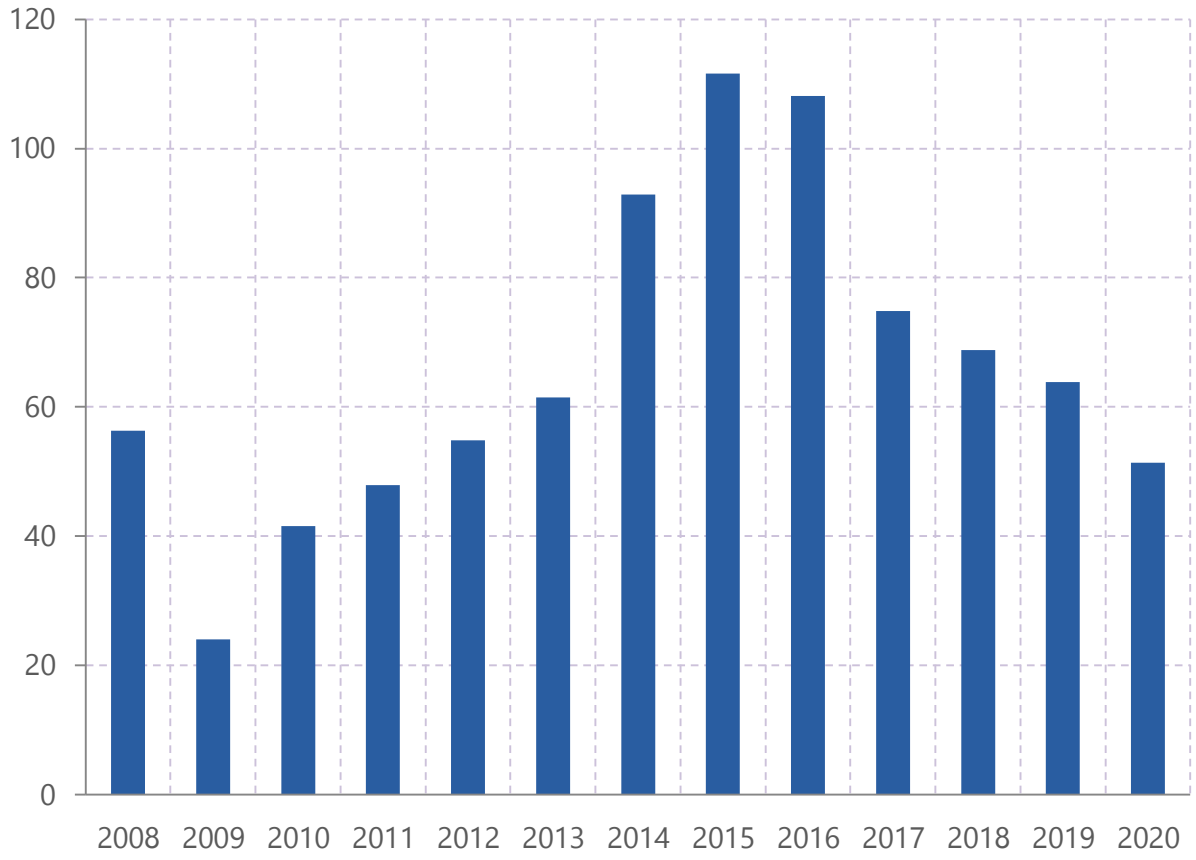
After the economic crisis of 2008-2009, Chinese steel exports rose sharply, to peak in 2015 (111.6 Mt).

From 2016 onwards, these started to decline as a result of China's (successful) efforts to reduce its production capacity and the various protectionist measures implemented around the world (United States, European Union and India) to protect themselves from Chinese steel products exported at low cost.

In 2020, Chinese exports of steel products fell even more (-19%) due to the significant downturn in the global economy, affected by restrictive measures to combat the Covid-19 epidemic.

Evolution of Chinese steel products exports

Unit: million tonnes

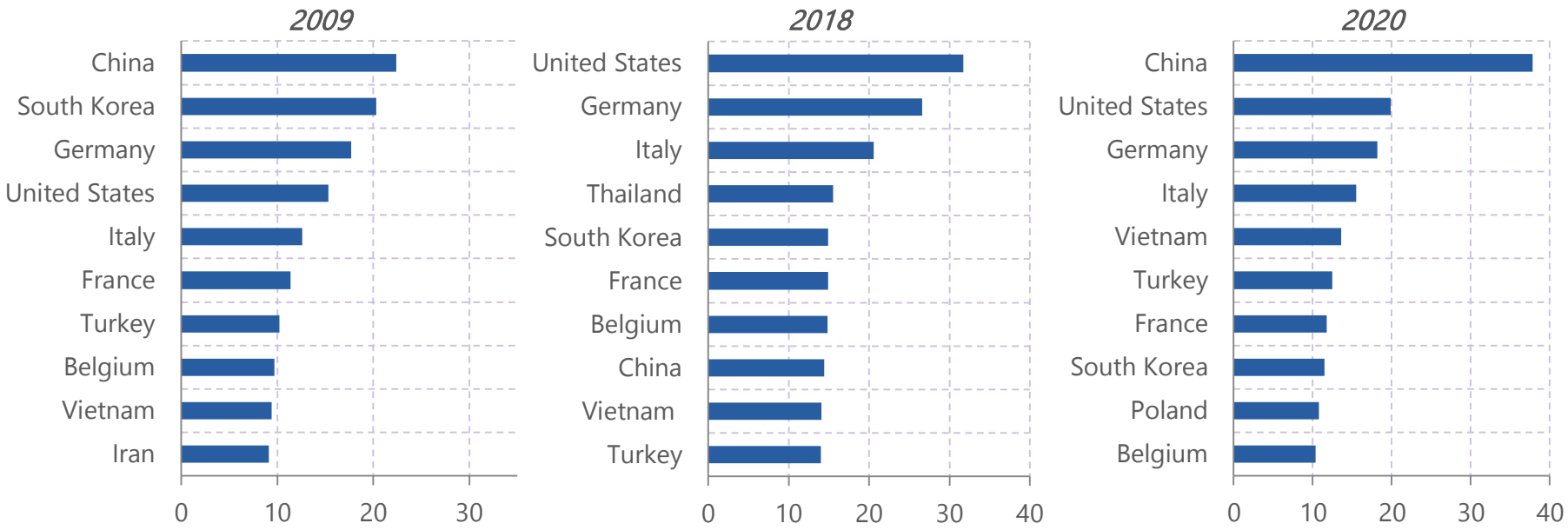


Source: World Steel Association

China has once again become the largest importer of steel

World's largest importer of steel products

Unit: million tonnes



Source: World Steel Association

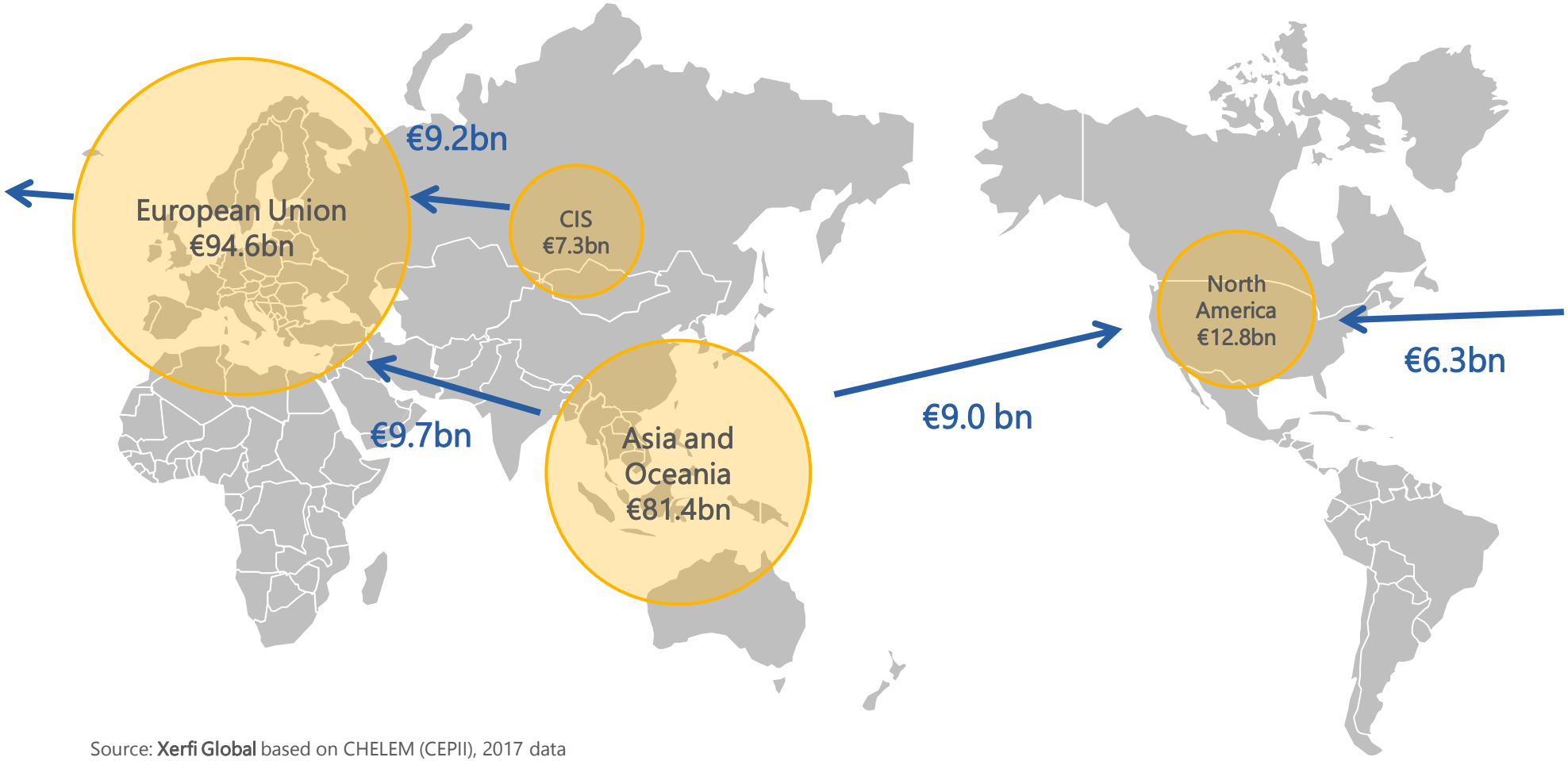
Although the US government implemented numerous protectionist measures on steel imports, the US, which was the world's 4th importing country in 2009, ranked first in 2018 with inflows of around 32 Mt in 2020. The United States' main trading partners are Canada, Brazil, Russia and Mexico. In May 2019, the United States eliminated customs duties (introduced in March 2018) on imported steel products from Canada and Mexico. Conversely, China, which was the leading importer in 2009, fell to 8th in 2018. The exponential development of steel mills and production overcapacities in China led to a saturation of the domestic market.

2020 appears to be an atypical year, as China rose back to the top with 38 Mt of steel imports, well above previous years. The country, whose economic growth picked up quickly in 2020, took advantage of low-cost steel products on the global market.

The steel trade is dominated by intra-regional trade

Major steel and iron trade in 2019

Unit: billion euros



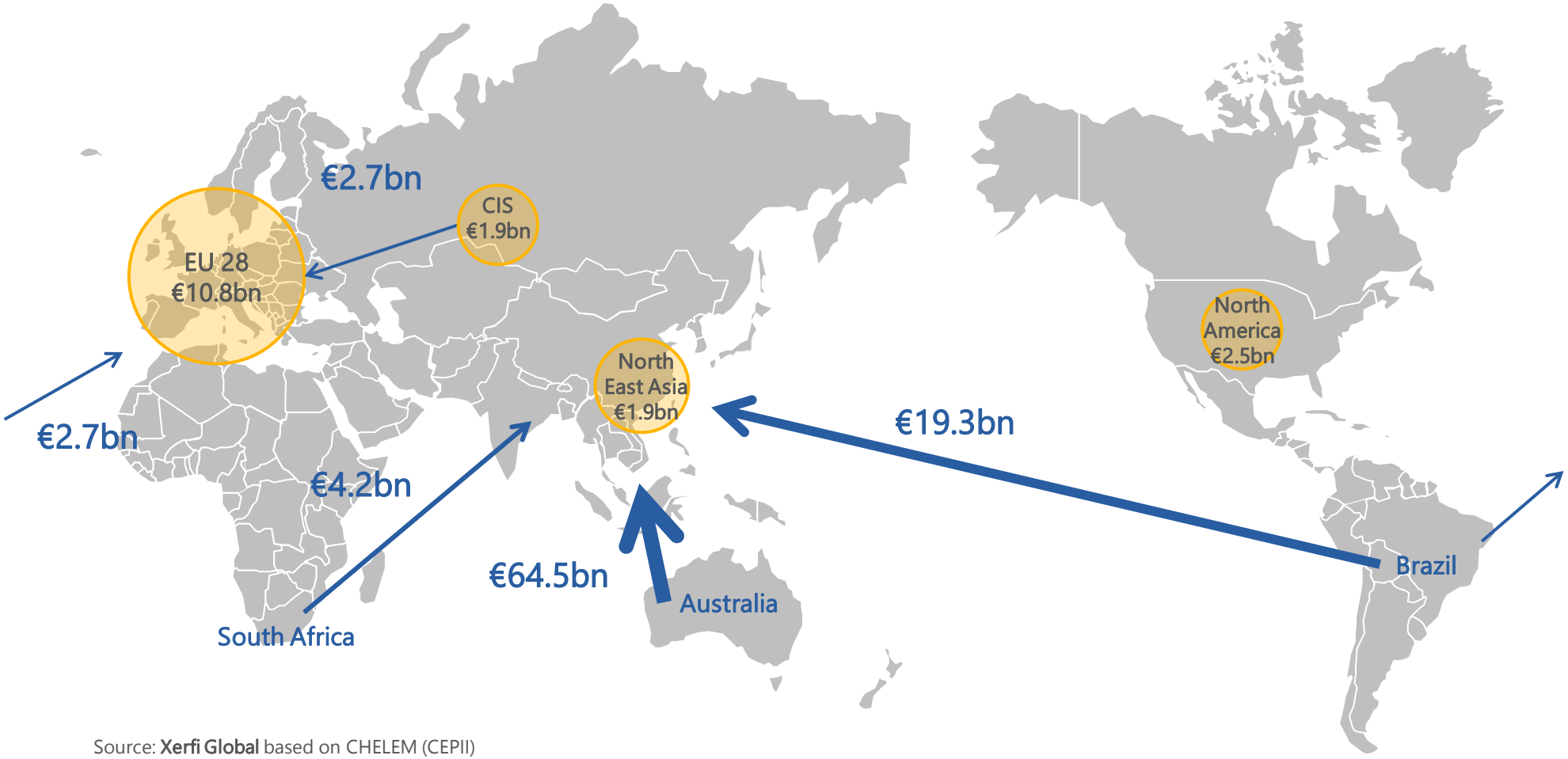
Source: **Xerfi Global** based on CHELEM (CEPII), 2017 data

Note: The number inside the circle represents the amount of internal trade. The size of the circle refers to the order of magnitude of the value of intra-area trade. The arrows represent inter-area trade and the direction of the arrow illustrates the direction of the flows.

Australia is the world's largest exporter of iron, followed by Brazil

Major iron ore trade in 2019

Unit: billion euros



Source: **Xerfi Global** based on CHELEM (CEPII)

Note: The number inside the circle represents the amount of intra-zone trade. The size of the circle refers to the order of magnitude of the value of intra-area trade. The arrows represent inter-area trade and the direction of the arrow illustrates the direction of the flows.

3.3. Leaders' activity and performances

Steelmakers' revenues follow the price of steel

- **2015 -2016 :**

Leaders' cumulative revenue fell significantly in 2016 (-6.1%). The issue of global overcapacity and the avalanche of Chinese steel products on the markets at rock-bottom prices hindered the price of steel in 2015. In addition, the customer markets of the steel industry were facing sluggish growth.

- **2017-2018 :**

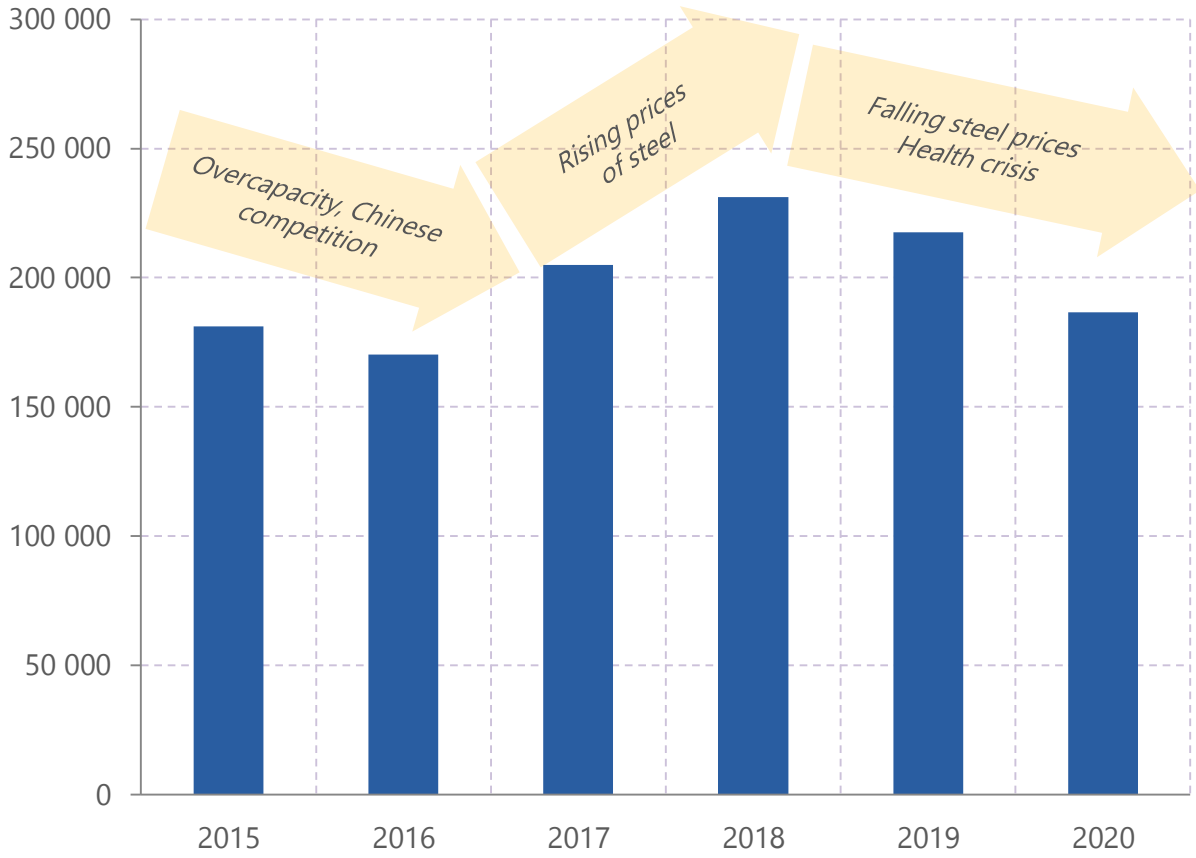
The reduction in Chinese capacity and the recovery in production in customer markets (construction in particular) led to an increase in demand for steel and a rebound in prices.

- **2019-2020 :**

The revenue of the leading steel companies fell in 2019 due to the fall in steel prices and the slowdown in global growth, particularly in China. In 2020, operators' revenue fell by 14.2%. The outbreak of the Covid-19 crisis led to a sluggish demand. Meanwhile, steel prices contracted sharply at the beginning of the year, which led to a decline in the price of steel products.

Combined consolidated sales of the world's leading steel companies

Unit: million euros



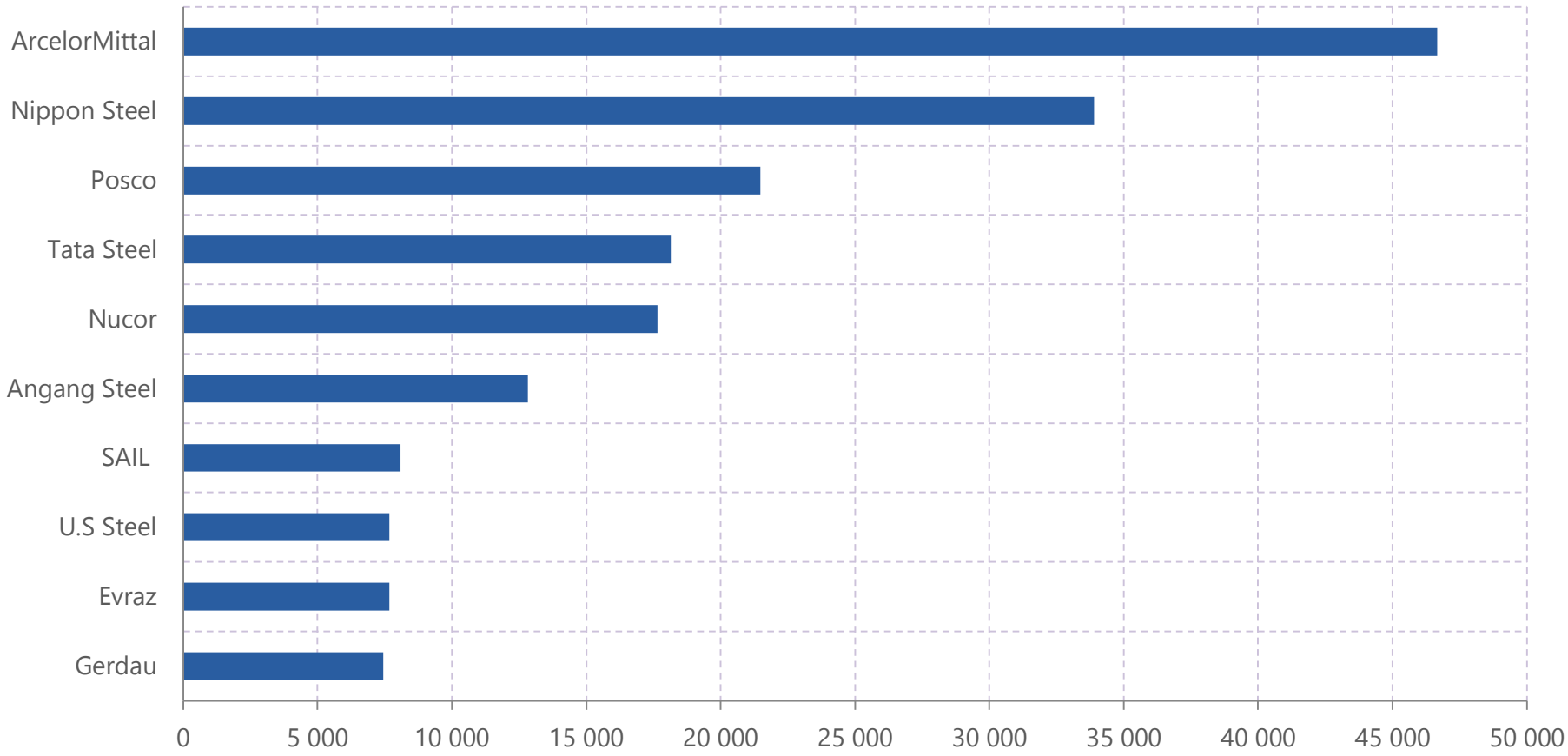
Note: It should be noted that the closing period for Nippon Steel, Tata Steel and SAIL occurs in March. The decline in panel sales in 2020 may be underestimated as the 1er quarter 2020 sales of 3 groups, the period of the Covid-19 crisis outbreak, are not taken into account for 2020 sales.

Xerfi Global processing / Source: group financial reports

ArcelorMittal is the leader in terms of revenue...

Ranking of the groups analysed according to steel revenue in 2020

Unit: million euros

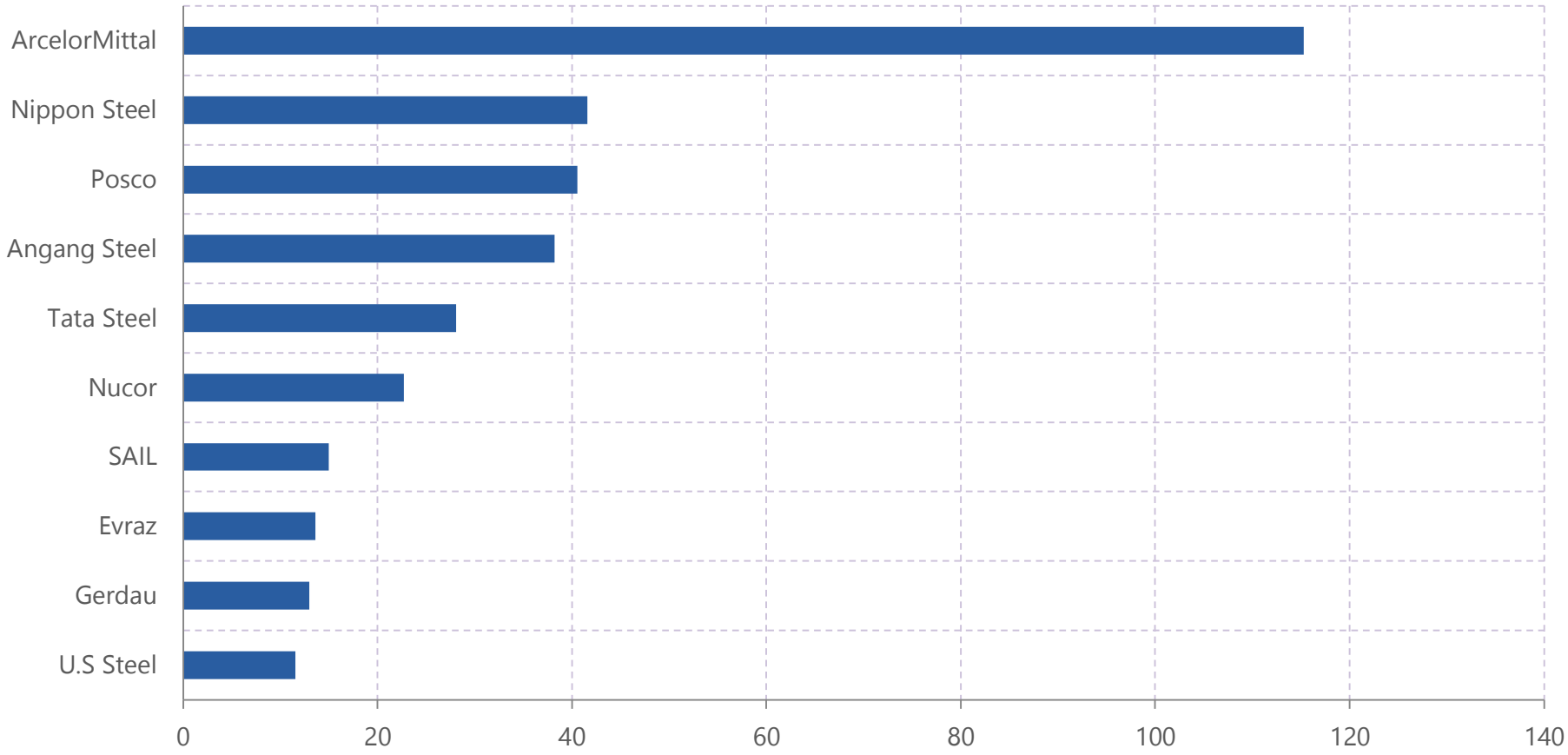


Xerfi Global processing / Source: group financial reports

... and weighs as much in volume as the following 3 operators analysed

Ranking of the groups analysed according to crude steel production in 2020

Unit: million tonnes



Source: World Steel Association

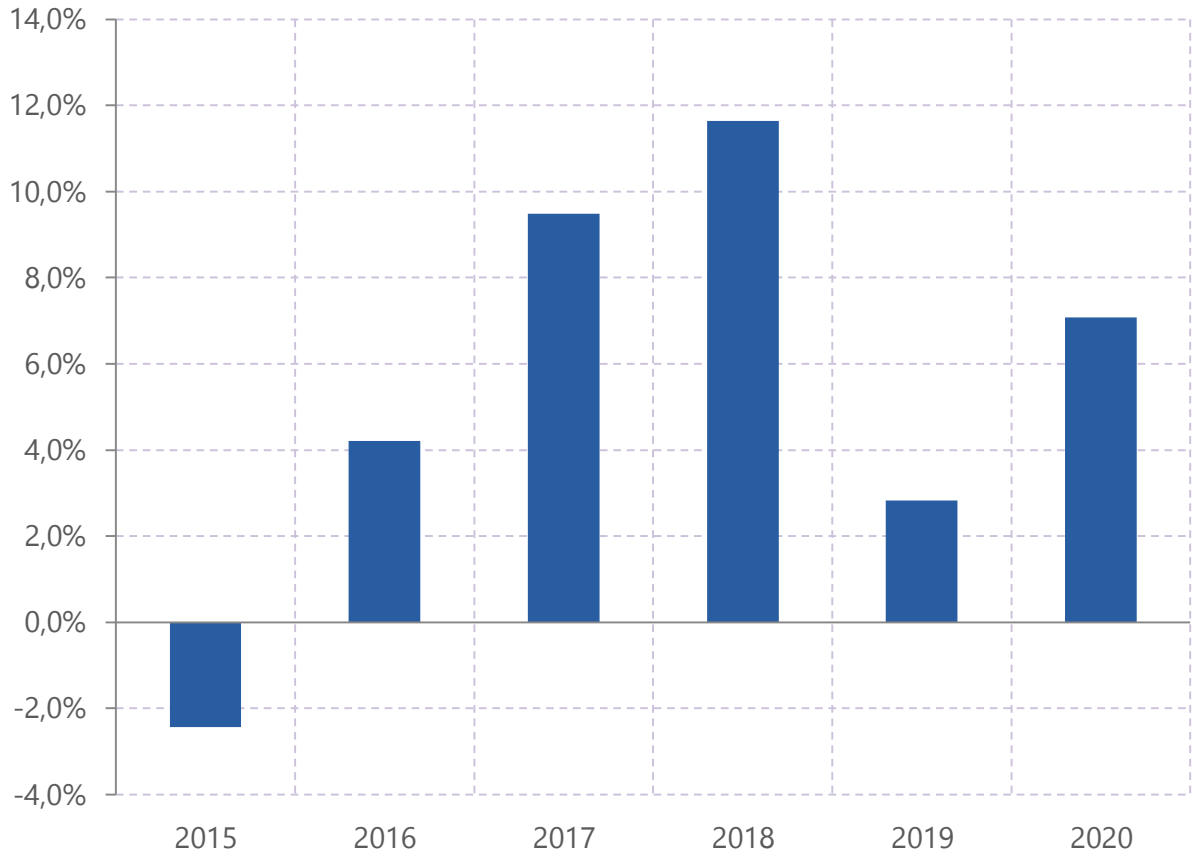
A level of profitability highly dependent on the fluctuation of steel prices...

In 2015, the aggregate EBIT ratio of the leading steelmakers went into negative territory. This year was a turning point for steel prices, which were hit by overcapacities in China, price pressures and a slowdown in demand from the sector's main customer markets.

Between 2016 and 2018, the recovery in steel prices allowed the leaders to increase their selling prices and margins. In addition, asset restructuring (e.g. divestment of unprofitable activities) and cost reduction policies contributed to boost leaders' margins. In particular, the margins of ArcelorMittal, Tata Steel and Gerdau improved.

Aggregate EBIT ratio of the leading steelmakers

Unit: % of aggregate revenue



Xerfi Global processing / Source: group financial reports

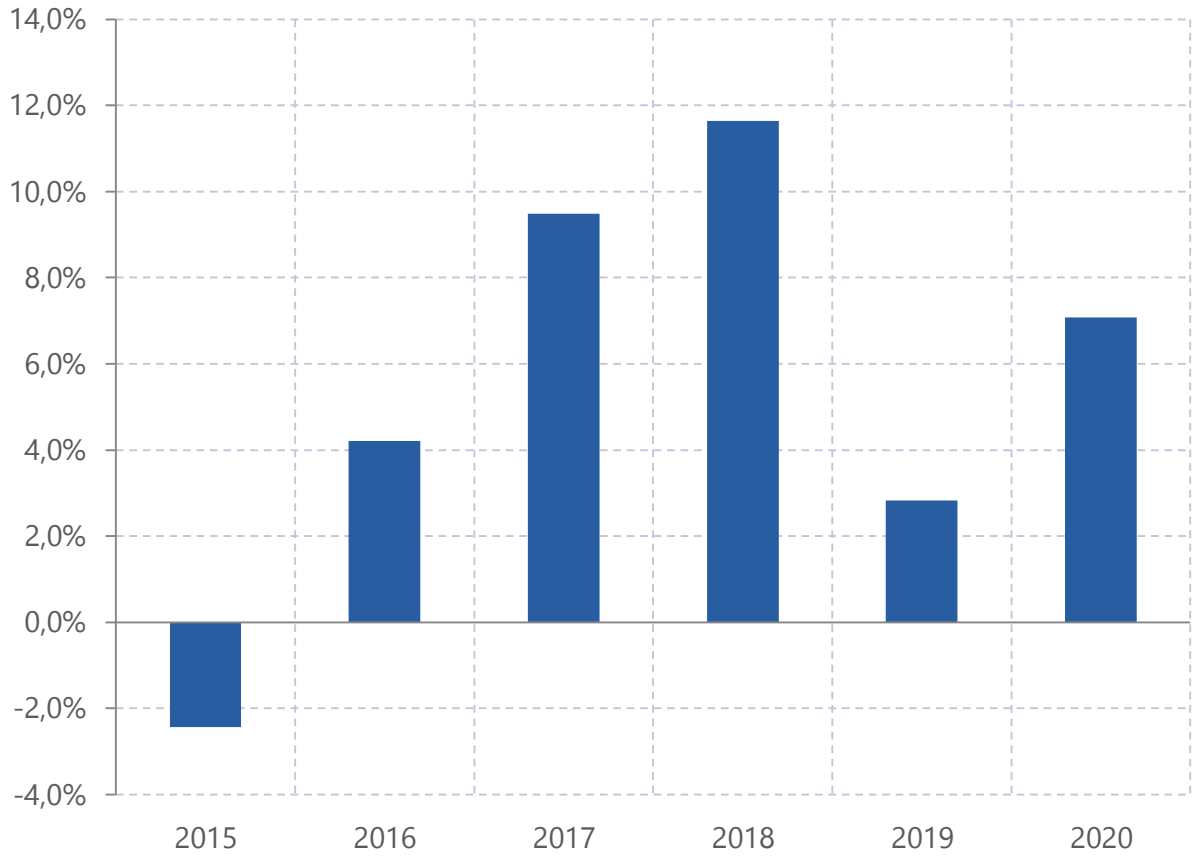
...and which held up well despite the health crisis

In 2019, the aggregate EBIT ratio of the leaders fell to 2.8%, from 11.6% in 2018. The decline in volume activity combined with the fall in steel prices, and therefore in the selling prices of steelmakers, and the surge in iron ore prices, and ultimately in production costs, led to a contraction in margins.

In 2020, despite the outbreak of the Covid-19 crisis, the drop in revenue and the collapse of steel prices, the EBIT ratio improved to 7.1% of revenue. This improvement in steelmakers' margins is linked to the rebound in steel prices from the last quarter of 2021. In addition, energy costs fell sharply, along the costs of certain raw materials (coal, scrap). Leaders' EBIT ratio has not yet returned to its pre-crisis level.

Aggregate EBIT ratio of the leading steelmakers

Unit: % of aggregate revenue



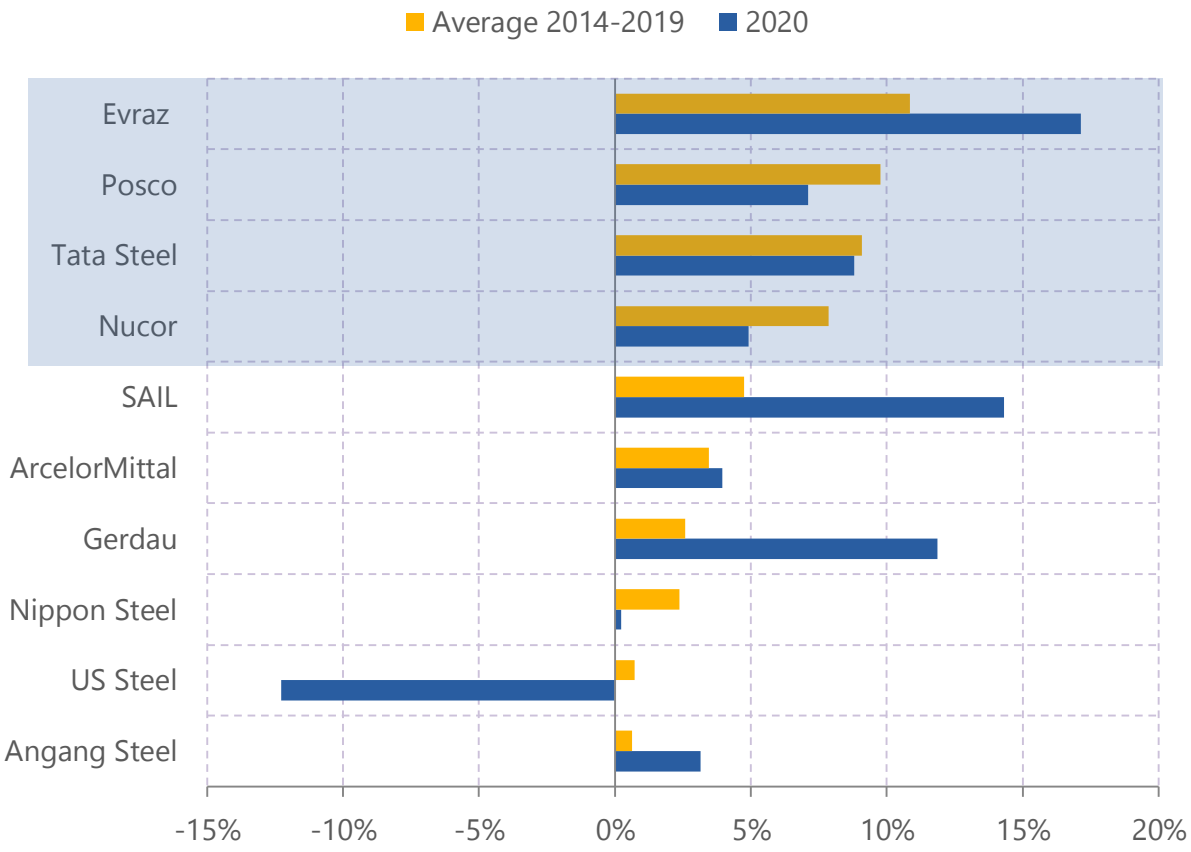
Xerfi Global processing / Source: group financial reports

Vertically integrated groups positioned in high value-added markets have higher EBIT ratios...

The leading steelmakers with the highest EBIT ratios are mostly positioned in high value-added markets, such as Evraz, the most profitable group, with an average EBIT ratio of 10.9% between 2014 and 2019. The Russian company is particularly well positioned in the rail market. It also has strong control over its supplies (self-sufficient for 63% of iron ore needs and 236% of coal needs in 2020), thus ensuring higher margins. Posco and Tata Steel, respectively the 2nd and 4th most profitable groups, are strongly positioned on the automotive market for high value-added products. Nucor, in 3rd place, is a manufacturer of low-cost steel products for construction. However, the group increasingly diversified into the automotive industry. Its business model allows it to be very profitable: its products are manufactured from scrap metal (supplied through its collection network) in small electric steelworks, allowing it to drastically reduce its costs compared to integrated steelworks.

Leaders' rankings by EBIT ratio

Unit: % of revenue



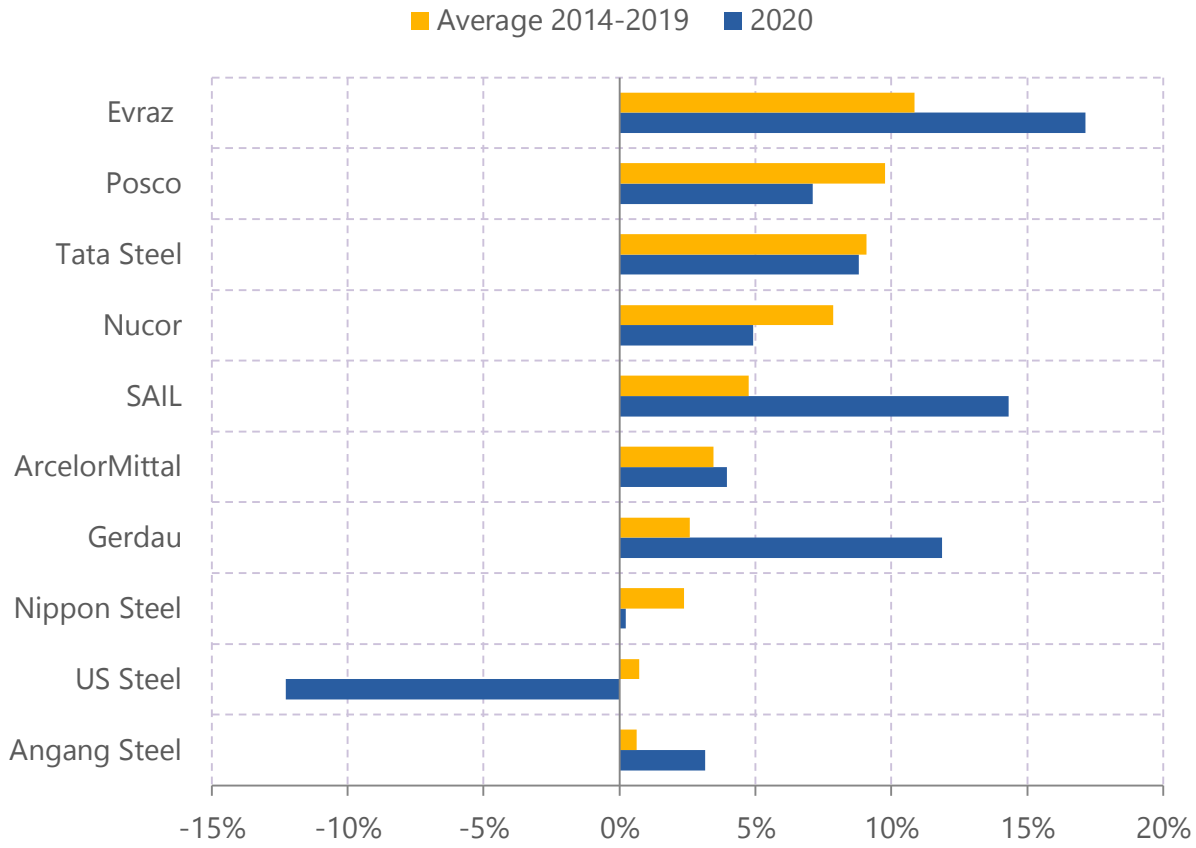
Xerfi Global processing / Source: group financial reports

… while the less successful ones remain for the most part highly dependent on foreign supplies

The less successful groups, such as US Steel, are mostly more dependent on foreign supplies (coking coal in particular).
US Steel has also been particularly affected by the decline in demand in the energy market (for its tubular products representing 6.6% of its revenue in 2020).

Leaders' rankings by EBIT ratio

Unit: % of revenue



Xerfi Global processing / Source: group financial reports

Most groups are mainly present in their country of origin

Revenue of the groups analysed by region (2020)

Unit: a "+" represents a 10% share of revenue, blue colour when the country of origin is the group's largest market

Group	Country of origin	North America	Europe	Asia	South America	Russia & rest of the world
ArcelorMittal		++++	+++++	+		
Nippon Steel				+++++++++		+
Posco				+++++++++		
Tata Steel				+++++		+++++
Nucor		++++++++++				
Angang Steel				++++++++++		
SAIL				+++++++++		
U.S. Steel		++++++++	++			
Evraz		++		++		++++
Gerdau		++++			+++++	

Source: Financial reports

Leaders' revenue fell in 2020, mainly due to lower steel sales prices

Key performance indicators and main growth drivers of the leaders of the steel industry

COMPANY	REVENUE IN THE INDUSTRY IN 2020	CAGR (2014-2019)	EBIT RATIO 2020	AVERAGE EBIT RATIO (2014-2019)	KEY DRIVERS OF GROWTH AND PROFIT
ARCELORMITTAL	46 676 M€ (2020)	-2.3%	4.0%	3.5%	•Revenue fell by 24.6% in 2020 due to the sharp decline in global demand in H1 as a result of the health crisis. •The EBIT ratio improved in 2020 compared to 2019 to 4% of revenue thanks to cost reductions (labour, maintenance expenses, etc.).
NIPPON STEEL	33 892 M€ (31/03/2021)	1.1%	0.2%	2.4%	•Nippon Steel's sales fell by 18.4% in 2020 due to the slowdown in demand from Japanese car manufacturers in H1 2020 as a result of the health crisis. •The group's EBIT ratio increased compared to 2019 due to the rebound in global steel demand in H2 2020 (financial year ends in March 2021) and a cost reduction strategy.
POSCO	21 480 M€ (*) (2020)	0.1%	3.5% (**)	4.8% (**)	•Revenue in Posco's steel division fell by 9.9% in 2020 due to lower sales prices for steel products and a decline in steel orders, particularly in H1. •Posco's consolidated EBIT ratio declined in 2020 compared to 2019, mainly due to the deterioration of margins in the Steel division. Steel prices fell more than that of raw materials (iron ore prices rose).
TATA STEEL	18 153 M€ (31/03/2021)	1.5%	8.8%	9.1%	•Tata Steel's revenue increased by 4.2% in the fiscal year ending in 03/2021, mainly due to higher sales in the Indian business, which helped to offset weaker results in Europe. •After a decline in the year ended 03/2020, the group's EBIT ratio improved significantly to 8.8% of sales in 03/2021. This was due to higher steel prices during the period and lower costs.

(*) Revenue of the "Sidérurgie" division / (**) EBIT ratio of the group as a whole / **Xerfi Global** processing / Sources: operators and professional press

Meanwhile, the margins of most leaders improved due to the significant decline in raw material costs (iron and coal)

Key performance indicators and main growth drivers of the leaders of the steel industry

COMPANY	REVENUE IN THE INDUSTRY IN 2020	CAGR (2014-2019)	EBIT RATIO 2020	AVERAGE EBIT RATIO (2014-2019)	KEY DRIVERS OF GROWTH AND PROFIT
NUCOR	17 647 M€ (2020)	1.4%	4.9%	7.9%	•Nucor's revenue fell by 10.8% in 2020 due to the sharp slowdown in the US economy in the first half of 2020 as a result of the health crisis. The group's revenues were notably affected by the fall in steel prices. •The 2020 EBIT ratio was 3.5 percentage points lower than in 2019. This deterioration is due to the fact that steel prices fell more sharply than scrap (raw material) costs.
ANGANG STEEL	12 820 M€ (2020)	7.4%	3.2%	0.6%	•Angang Steel's revenue fell by 4.4% in 2020 due to the contraction of the Chinese economy in the first half of 2020 due to the health crisis. •The group's EBIT ratio increased in 2020, from 2.9% of sales in 2019 to 3.2% in 2020. The group managed to reduce its costs over the period.
SAIL	8 081 M€ (31/03/2021)	5.9%	14.3%	4.7%	•Revenue increased by 11.8% in 2020 thanks to strong sales of steel products to the Indian export market in the second half of the year and the beginning of 2021 (year ending March). •The EBIT ratio improved significantly in 2020 compared to the previous year, reaching 14.3%. In particular, the cost of coking coal imports decreased while the sales prices of steel products increased.

Xerfi Global processing / Sources: operators and trade press

However, groups that were not integrated vertically were affected by the rise in iron ore prices

Key performance indicators and main growth drivers of the leaders of the steel industry

COMPANY	REVENUE IN THE INDUSTRY IN 2020	CAGR (2014-2019)	EBIT RATIO 2020	AVERAGE EBIT RATIO (2014-2019)	KEY DRIVERS OF GROWTH AND PROFIT
US STEEL	7 680 M€ (2020)	-8.1%	-12.3%	0.7%	•US Steel's revenue fell by 23.8% in 2020 due to a decline in demand for steel products in the US market, which accounts for the bulk of the group's business (79.8% of revenue). The decline in steel prices also contributed to this. •The EBIT ratio deteriorated in 2020, to -12.3% of revenue, mainly due to the rolled steel business. Lower energy and raw material costs did not compensate for the decline in business, both in volume and value.
EVRAZ	7 665,1 M€ (*) (2020)	-6.4% (*)	17.1% (**)	10.9% (**)	•Evraz's steel business revenue contracted by 17.8% in 2020 due to falling prices (particularly strong in the vanadium segment). The increase in volumes sold over the period was not enough to compensate. Moreover, sales volumes in the US market fell sharply. •The group's consolidated EBIT ratio increased significantly in 2020 to 17.1% (compared to 10.2% in 2019).
GERDAU	7 438,8 M€ (2020)	-1.4%	11.9%	2.6%	•Gerdau's revenue increased by 10.8% in 2020 thanks in particular to the group's performance in the third quarter of the year. The group's steel sales benefited in particular from the depreciation of the Brazilian real at the end of the year. •The group's EBIT ratio increased from 8% to 11.9% of revenue between 2019 and 2020.

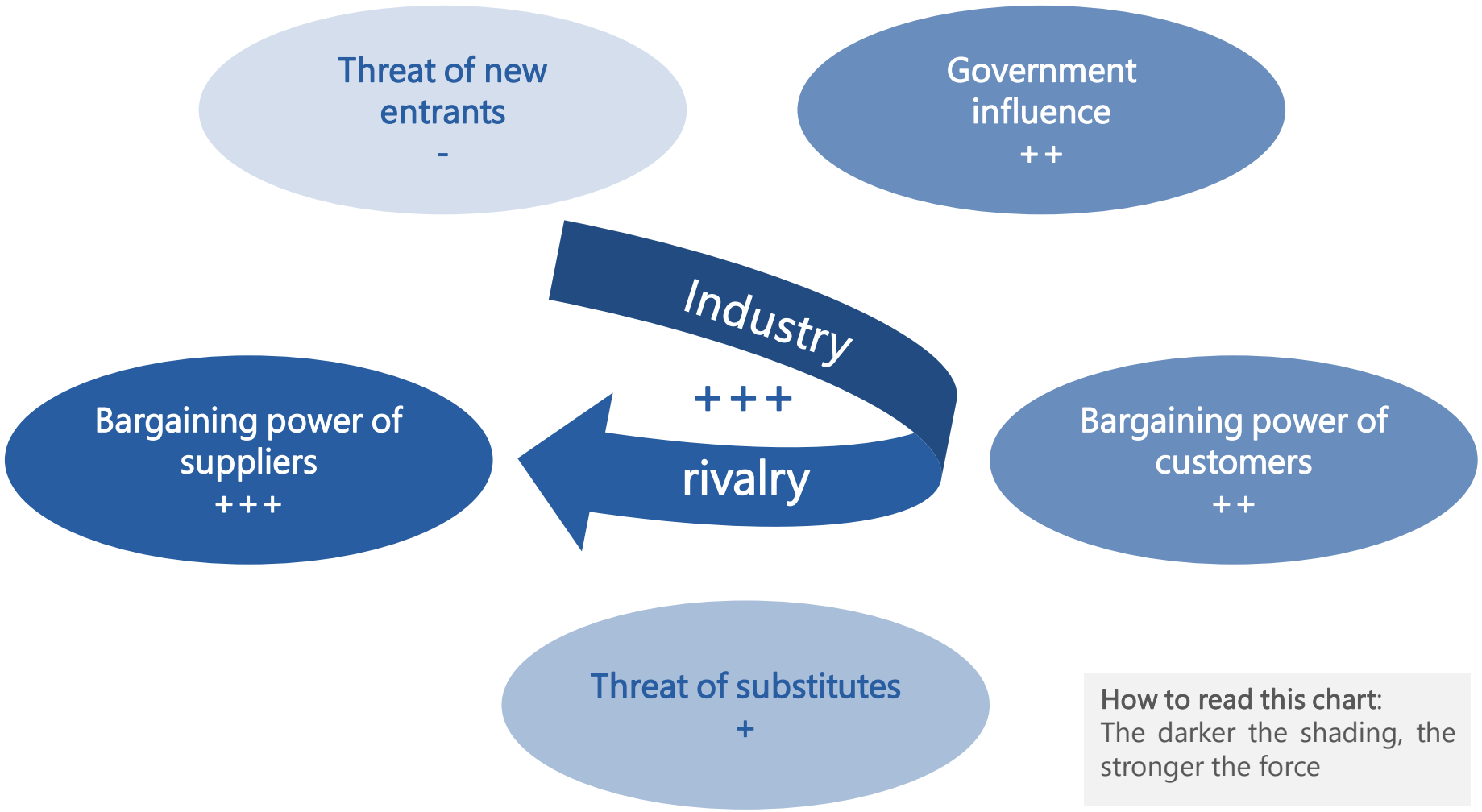
(*) Cumulative sales of the "Steel" and "Steel - North America" divisions / (**) EBIT ratio of the group as a whole

Ranking by EBIT ratio/ **Xerfi Global** processing / Sources: operators and trade press

4. Competition and leaders' strategies

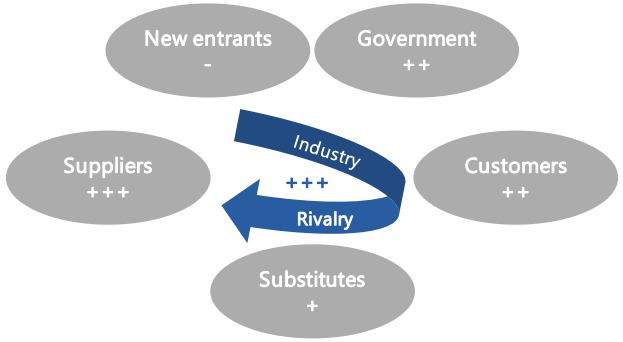
Competitive pressure is strong, particularly from Chinese steelmakers

Competitive forces in the global steel industry



How to read this chart:
The darker the shading, the stronger the force

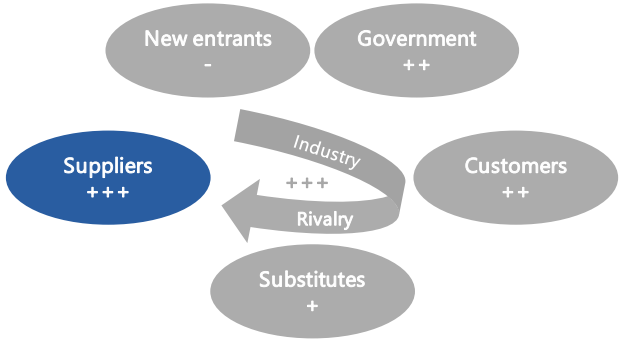
Strong competition from low-cost Chinese steel



- Steelmakers operate in a highly competitive environment, which can be explained in particular by the relative atomisation of the steel industry (the top 10 groups produce a quarter of the world's crude steel). This generates strong sales competition, especially as the differentiation of steel products is rather weak (especially for semi-finished steel products). Conversely, there is also competition for access to raw materials due to a high concentration of suppliers (of iron ore and coking coal).

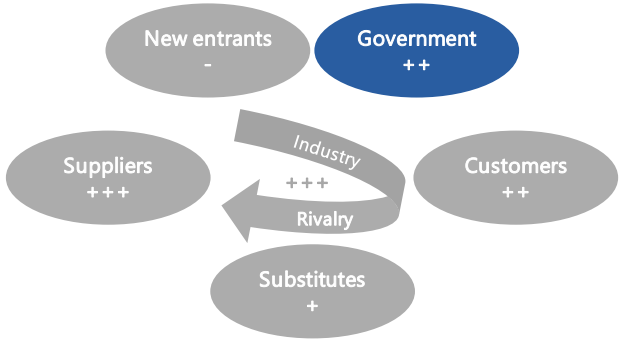
- Since the end of the 1990s, Chinese steel groups grew in importance, supported in particular by their government's measures to increase domestic steel production. These groups are indeed closely linked to the Chinese government. Of the world's 20 largest steel producers (crude steel), 12 are Chinese, half of which are state-owned. The government grants the groups numerous financial aids and privileged access to the banking system. The economic slowdown in China and the country's production overcapacity pushed Chinese groups to massively export their production abroad. The strong growth in exports of low-cost Chinese steel products also did put pressure on global prices and inteisified international competition. European and American groups have been particularly hard hit. In response to this Chinese offensive, steelmakers in other countries carried out external growth operations in order to generate economies of scale and be able to lower their prices. As for the Chinese groups, they too have consolidated, encouraged by the Chinese government, aiming to significantly increase the market share of the leaders by 2025 through the 14th five-year plan. In addition, Chinese steel exports may decline further in the coming months as the government seeks to voluntarily restrict them in order to limit production growth, notably for environmental reasons. In 2021, the government notably suspended the VAT exemption on Chinese exports of around 150 steel product references.

Steelmakers' bargaining power undermined by suppliers



- Steel groups are highly dependent on suppliers of raw materials (iron ore and coking coal) who enjoy very favourable bargaining power due to the high concentration of the market. In 2019, Vale, Rio Tinto, BHP Billiton and Fortescue Metal produced almost half of the world's iron ore. This allows mining groups to determine contractual conditions to their advantage (e.g. prices, quantities, delivery times, etc.).
- Moreover, these raw materials are located in a very limited number of regions. For example, iron ore is mainly mined in Australia, Brazil, India and China. In this context, a political crisis, a natural disaster or an accident can have global consequences on the availability of raw materials and prices. Following the collapse of the Brumadinho dam in Brazil in January 2019, Vale shut down ten other dams. These decisions resulted in a drop in production representing around 4% of global output. This led to a surge in iron ore prices at the beginning of the year and this has continued throughout 2019, while most other metals have been on a downward trend with the global economic slowdown. As another example, the price of nickel reached an 11-year high in January 2022, in part due to tensions between Ukraine and Russia, which raised fears of potential supply disruptions from Russia, one of the largest nickel producers along with Indonesia.
- Steelmakers are therefore trying to integrate the upstream part of the sector in order to achieve greater autonomy in their supplies. For example, ArcelorMittal recently invested $800m in Liberia to strengthen its iron ore mining operations. There is also a tendency for steel manufacturers to consolidate in order to gain leverage. For instance, Chinese company Ansteel acquired the Ben Gang Group, aiming to create the 3rd global steel producer (2021) and Nucor also made several acquisitions (Cornerstone Building Brands, Hannibal Industries, California Steel, etc.).

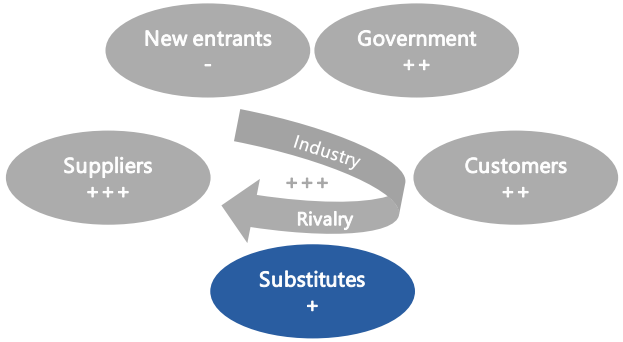
Steel is strategic for states



- Given the importance of the steel industry (the sector is a major employer and steel is a basic material for the economy and is strategic for defence), it is common for states to intervene through trade policies, investment participation or anti-trust laws.

- Since the 1970s, governments in Europe and the United States took action to protect their markets through major investments, support for hiring and trade policies favourable to the industry. These practices are still relevant, especially in times of crisis (2008-2009 and 2015-2016). Recently, the US government implemented import tariffs on steel products to protect and develop its domestic industry. In response, the European Union also implemented tariff quotas on imports of 26 steel products to protect its own market. Indeed, the US measures could lead to a massive transfer of flows to the European market. Since the late 1990s, the Chinese government also adopted measures favourable to foreign investment and aimed at increasing the country's production capacity, which made China the world's largest producer of crude steel (53% by 2021).
- Other government measures may also indirectly affect the steel industry if they concern important customer markets in the industry (particularly construction or automobile manufacturing), or directly if they are aimed at regulatory constraints, particularly environmental ones. For example, the Chinese government imposed the closure of many steel plants in recent years to reduce air pollution.

Aluminium and plastic compete with steel



- Steelmakers face strong competition from alternative materials, notably aluminium and plastics. Aluminium is particularly popular for automotive parts because of its light weight, corrosion resistance and lower environmental impact.
- However, steel remains competitive for some parts because it is cheaper for the same properties, especially in terms of strength to weight ratio.

- Steelmakers have made significant R&D efforts to develop innovative steel products with specific characteristics (lightness, strength, recyclability, flexibility, etc.), mainly for sectors requiring high value-added parts (the automotive and offshore industries, for example). Advanced *high strength steel* (AHHS) can compete directly with aluminium for automotive parts.
- For example, ArcelorMittal launched the second generation of *iCARe ®* electrical steels for use in electric car motors in 2017, and Baosteel recently introduced its new *QP1500* product, a high-strength cold-rolled steel specially developed for the automotive industry.

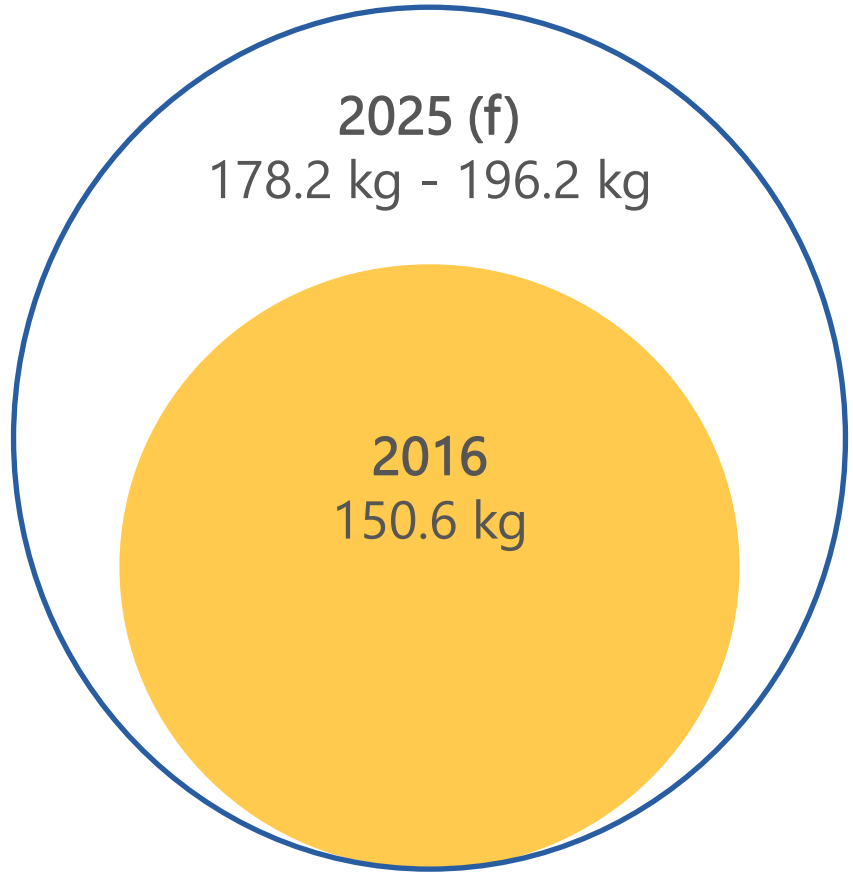
Aluminium is increasingly used by car manufacturers, but steel remains essential

Steel has long been the material of choice in the automotive industry because of its strength and malleability. However, aluminium is increasingly replacing cast iron parts due to its light weight, high corrosion resistance and low environmental impact. Aluminium is mainly used for the body, but also for powertrain parts and wheels. The increase in the manufacture of electric cars also favours the use of aluminium, mainly for the casing of battery packs (thermal qualities).

However, steelmakers are investing in R&D to develop high value-added steels with specific properties for the automotive industry. As steel remain cheaper than aluminium, it still represents an essential component for the automotive industry.

Weight of aluminium in vehicles (2016 vs. 2025)

Unit: volume of aluminium in a vehicle in kg



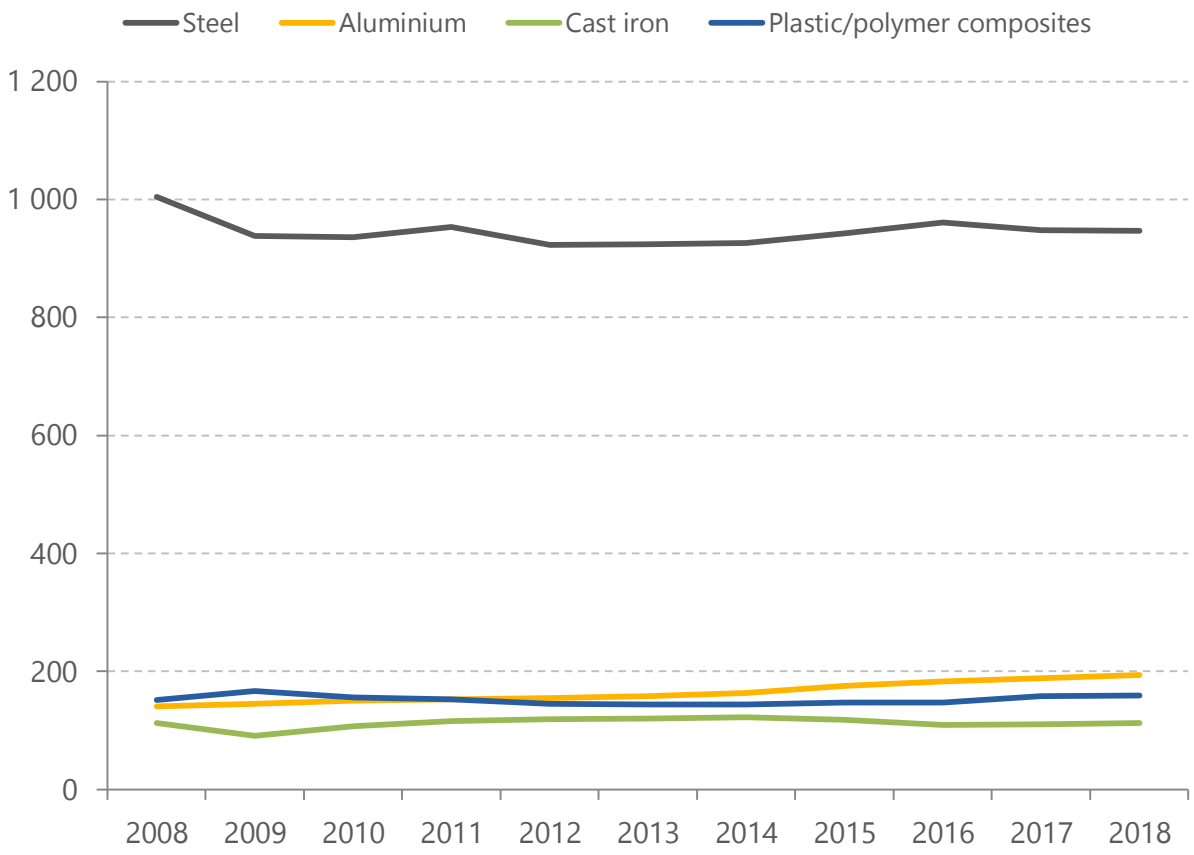
Source: **Xerfi Global** with Ducker Worldwide

Polymers are the 3rd most used material in vehicles

In recent years, engineering plastics such as thermoplastic polyester, polyphenylene ether and high-performance resins continued to gain share on metals in automotive parts. In 2018, plastic-based products were the third largest material category in lightweight cars, behind steel and aluminium (also increasingly popular for its light weight). The average weight of plastic/polymer composites in lightweight cars was of 159 kg in 2018. The increased need for lightness (mostly to reduce fuel consumption) will provide growth opportunities for advanced plastics producers. Vehicle weight can be further reduced through an increased use of low-density plastic additives and the substitution of more metal parts with plastics and polymer composites.

Main materials used in light vehicles in North America

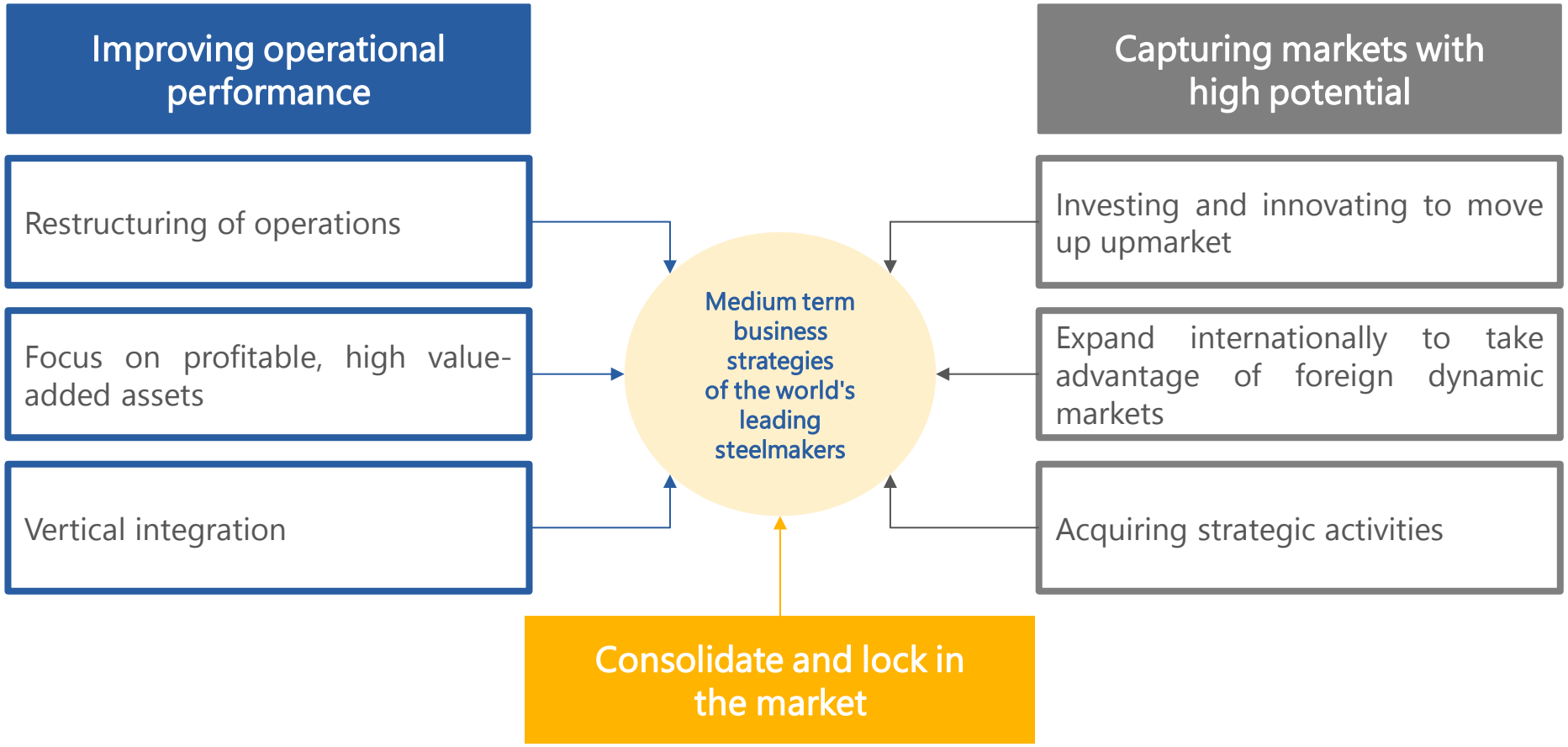
Unit: kilo per vehicle



Source: The American Chemistry Council, Plastic and Polymer Composites in Light Vehicles, 2019

Leaders optimise their business portfolios and target markets with high growth potential to regain shareholder value

Main business strategies of the world's leading steel companies



Source: **Xerfi Global**

Leaders seek to improve their financial performance to regain investor's trust

The industry faces various risks that can undermine investor confidence (exposure to changes in the economy and commodity prices, etc.)

To obtain more financial guarantees, steelmakers optimise the management of their business portfolio

Disposal of unprofitable assets	Modernisation of production facilities	Targeted investments in higher value-added activities
Reducing debt Straightening margins Adapting supply to demand Increasing available cash Increasing utilisation rate of production facilities	Improving the profitability of strategic activities Reduce costs through more efficient processes and economies of scale	Increasing margins Finding growth drivers

Improve the group's financial performance

Divestment continues

Recent examples of business divestitures

vallourec	November 2020	Vallourec announced the loss of 1,050 jobs worldwide, in addition to the 900 in April. This decision followed the sharp decline in global oil and gas demand and an explosion in Vallourec's debt.
ArcelorMittal	July 2019	ArcelorMittal completed the **sale of a series of steel plants** in the Czech Republic, Romania, Macedonia, Italy, Luxembourg and Belgium to the Liberty House Group (a subsidiary of GFG Alliance).
ArcelorMittal	June 2021	Announced in September 2020, ArcelorMittal finalised the sale of its entire US business to iron ore group Cleveland-Cliffs for $1.9bn.
	May 2021	Gerdau sold its steel recycling assets in the Minnesota area of the US to Alter Trading.
GERDAU	June 2021	US Steel sold its rail freight subsidiary Transtar for $640m to US companies Fortress Transportation and Infrastructure Investors. Based in the United States, Transtar specialised in the transport of industrial goods linked to the group's steel business.
United States Steel	September 2021	US Steel announced that it reduced its debt by $2.7bn since January 2021. It stood at $7bn at the beginning of the year.
EVRAZ	December 2021	Evraz announced the spin-off of its coal assets. The group's coal assets will be transferred to the Russian mining group Raspadskaya.

Aiming for economies of scale

Nucor

NUCOR®

Nucor is pursuing a strategy of investment and capacity acquisitions to consolidate positions and generate economies of scale

March 2019	Nucor built a state-of-the-art steel plate plant in Kentucky, USA. The steel mill, which is expected to come online in 2022, will have a production capacity of 1.2 Mt of steel plate. The project will require an investment of nearly $1.35bn.
September 2021	Nucor unveiled its largest construction project, a $2.7bn sheet metal plant in the northeastern US. With an annual production capacity of 3 Mt, it is expected to be commissioned in 2024.
June 2021	Nucor acquired the American company Cornerstone Building Brands, which specialises in the manufacture of insulated metal panels, for $1bn.

Modernisation of the industrial tool

Evraz

2021	Evraz planned to spend almost $1bn in capital expenditure during 2021 to modernise its sites and improve its production processes. In 2020, the group spent $900m on capital expenditure, including the modernisation of its No. 6 and No. 7 steel plants in Russia. In addition, Evraz modernised equipment at two of its steel production sites in Canada in the Alberta and Saskatchewan regions.
June 2021	Evraz announced the construction of a $650m steel mill in the Kemerovo region of Russia to produce rolled steel and other high-value steel products. Scheduled for completion in 2025, the steel mill will have an annual production capacity of 2.5 million tonnes of steel.
July 2021	Evraz planned to build a $500m steel mill in Pueblo, Colorado, USA, specialising in the production of railroad rails. The plant, which will be entirely solar-powered, will come online in 2023.

EVRAZ

Evraz focuses on improving existing industrial processes and building modern plants

The potential of the automotive industry

The automotive market became strategic for the leaders in the steel industry for its growth potential and because it requires high value-added parts. To meet the requirements of CO_2 emission reduction, car manufacturers are indeed looking for parts that are both light and resistant. Steelmakers are therefore tending to develop innovative, higher-performance steels.

For instance, Nippon Steel developed several types of steel with specific characteristics for the automotive industry (lightness, water resistance, etc.) such as *Nsafe-AutoConcept*, *COR-TEN* or *Smart BEAM*.
In January 2022, Posco and the Chinese steel group HBIS launched a joint venture to build a plant in China to produce automotive steel plates.

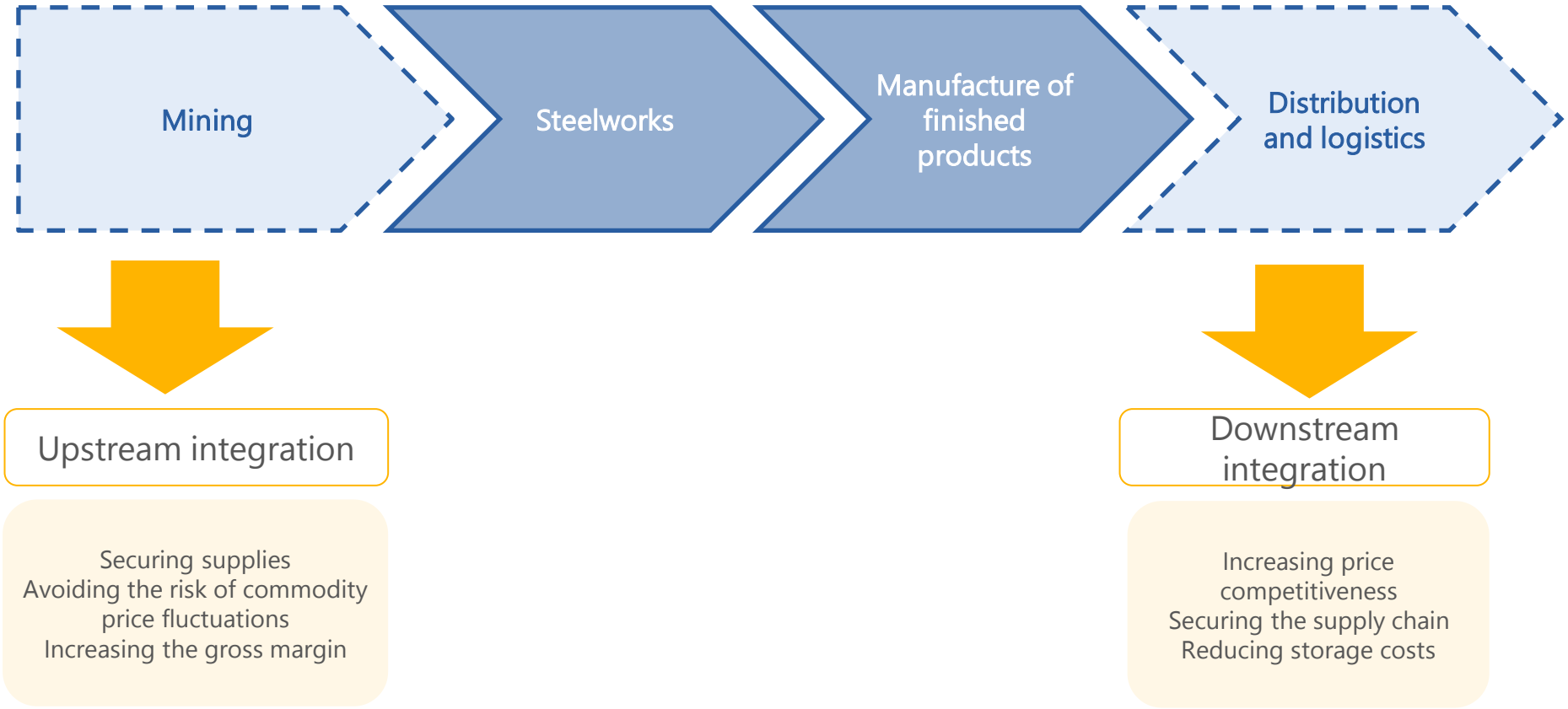
To a lesser extent, the market for electric and hybrid vehicles is also a strategic outlet for steelmakers. In the current context of a generally depressed global automotive market, sales of electric and hybrid vehicles are soaring worldwide, particularly since the Covid-19 crisis.
In particular, ArcelorMittal launched the second generation of *iCARe ®* electrical steels for use in electric car motors in 2017.

Examples of operations by steelmakers to strengthen their presence in automotive outlets

October 2021	Nucor is launching a brand of zero-emission steel products called Econiq. The group's first customer will be the American car manufacturer General Motors.
January 2022	Posco and the Chinese steelmaker HBIS Group launched the construction of a joint venture plant in China to produce steel plates for the automotive industry. The project involves an investment of $600m and is scheduled to come online in 2023. The site is expected to have a production capacity of 900,000 t.

Leaders try to integrate both upstream and downstream of the steel industry

The value chain of the steel industry



For example, 65% of ArcelorMittal's iron ore requirements and 15% of its coke requirements were covered by the group's own production in 2020.

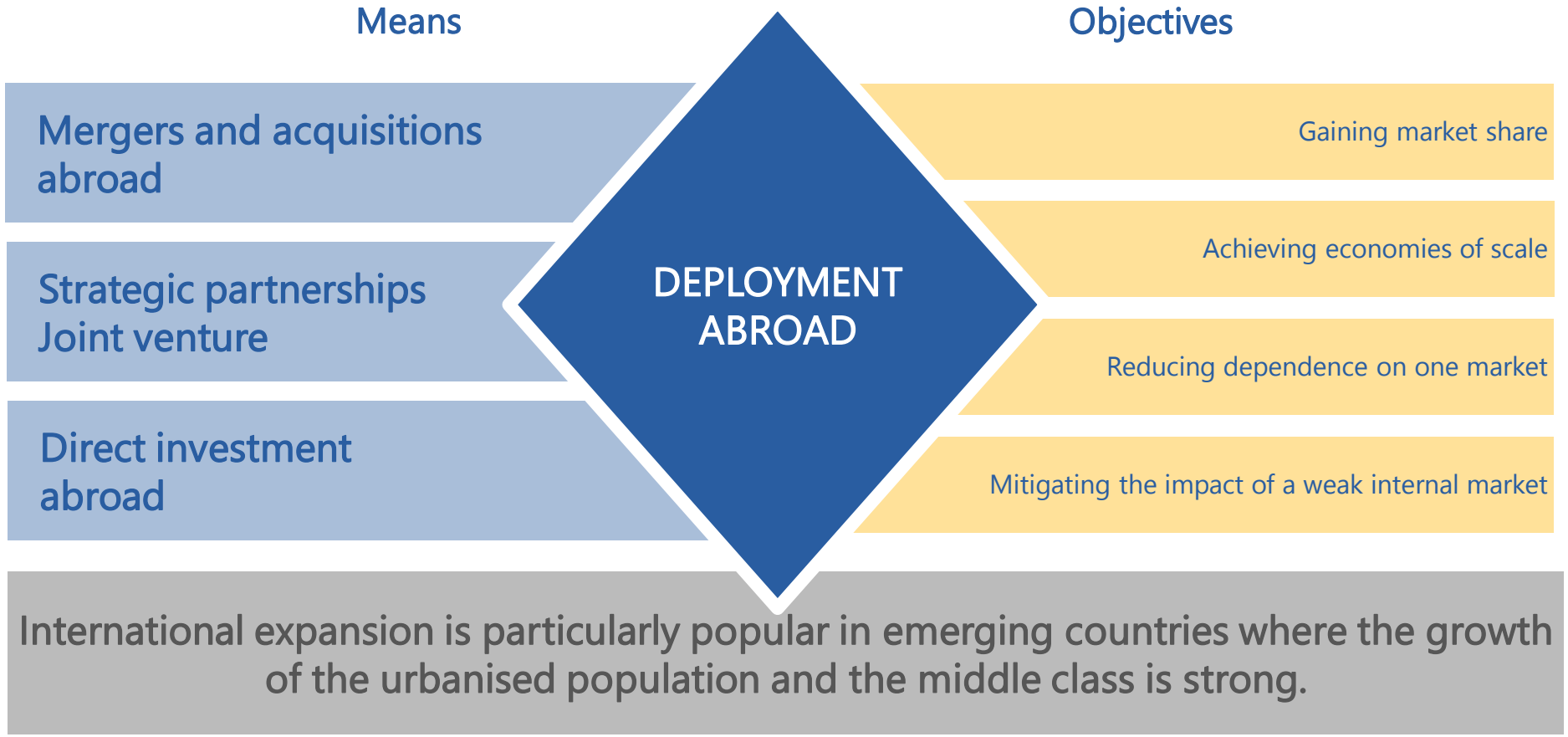
Leaders strengthen in mining production

Examples of vertical integration transactions

NIPPON STEEL	October 2018	Through its subsidiary Robe River Iron Associates, jointly owned with Rio Tinto, Nippon Steel invested in the development of iron ore mining at the West Angelas mine in Australia. The project is expected to be operational in 2022.
GERDAU	April 2019	Gerdau planned to open a new iron ore mine in Itabirito to feed the Ouro Branco plant in Brazil. The facility has a production capacity of 30 Mt per year for two decades.
EVRAZ	2020	In 2020, Evraz carried out investment projects to increase iron ore and coking coal production at the Tashtagol, Osinnikovskaya, Ushovskaya, Alardinkaya and Esaulskaya mines in Russia.
HOA PHAT	May 2021	The Vietnamese steel group Hoa Phat Group announced the upcoming acquisition of an iron ore mine in Australia with estimated reserves of 320 Mt. The mine has a capacity of 4 Mt per year. Reportedly, Hoa Phat is also considering buying coal mines in Australia; importing this raw material from Australia would cost about a third of the price of steel.
HBIS GROUP	August 2021	Chinese steelmaker HBIS announced the signing of a project to develop an iron ore mine in Peru alongside the current licensee Zhongrong Xinda, another Chinese operator. The cooperation includes the construction and operation of mines and ports.
Severstal	June 2021	Russian steelmaker Severstal planned a major investment to develop an iron ore mine in Russia's Kola Peninsula. Production is expected to start in 2025.
ArcelorMittal	September 2021	ArcelorMittal invested $800m in Liberia to strengthen its iron ore mining operations to feed its steel production. In 2005, the group signed a 25-year mining contract with the Liberian government.

Steelmakers try to penetrate high-potential markets

Main means and objectives of the internationalisation of the steel industry leaders



International expansion is particularly popular in emerging countries where the growth of the urbanised population and the middle class is strong.

Leaders strengthen their presence in strategic markets

Recent examples of international development

NIPPON STEEL

In early 2022, Nippon Steel acquired Thai steelmakers G/GJ Steel. These are the only integrated flat steel producers in Thailand with electric arc furnaces and hot rolling mills.

posco

At the beginning of 2022, Posco and the Chinese steel group HBIS Group launched the construction of a joint venture plant in China to produce steel plates for the automotive industry. The project involves an investment of $600m and is scheduled to come online in 2023.

EVRAZ

Russia's Evraz Group seeks to gain ground in North America. In July 2021, it unveiled plans to build a 500 million steel mill in Pueblo, USA, specialising in the production of railway rails. The site, which will be entirely solar-powered, will be commissioned in 2023.

Mergers and acquisitions increased significantly before the crisis and will likely rise again

Although the global steel industry remains rather fragmented and the market "nationalised", it was consolidating before the health crisis happened. The M&A market in the sector had reached €80bn by 2019.

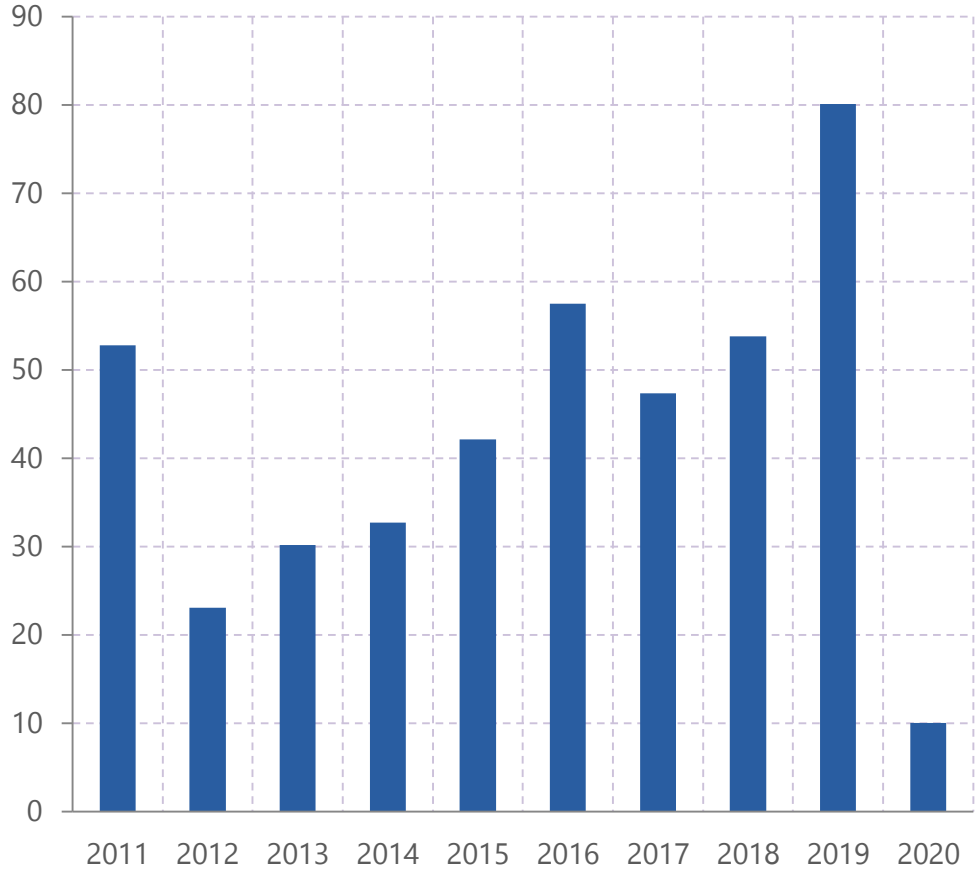
As a result of the crisis, external growth operations have logically been less common. The value of steel groups also fell due to the unfavourable economic context and the decline in steel prices. However, this is only temporary and M&As will rebound.

PwC identified several trends in mergers and acquisitions in the metals industry. Targets are mainly located in emerging or developing countries (especially Asia), where the potential for growth in demand for steel is very high (in infrastructure, cars, consumer goods, etc.). Chinese steel groups are often in the lead, but their external growth operations are still largely limited to the Asian market.

The Chinese government is encouraging steel groups (many of them public) to implement themselves abroad to circumvent protectionist measures or find new sources of growth (given the sluggishness of the domestic market). As part of the "New Silk Roads« project, Chinese authorities are encouraging steel manufacturers to relocate to third-party countries to facilitate their positioning on public infrastructure markets. They are also encouraging domestic steel groups to concentrate in order to increase their bargaining power.

Value of steel M&A transactions

Unit: billion euros



Source: IMAA analysis *via* Thompson Financials and Capital IQ

Major mergers between Chinese groups

Value of the transaction	Target	Purchaser	Year
€650m	G Steel and GJ Steel	Nippon Steel	2022
Nd	Ben Gang Group	Ansteel	2021
€1.2bn	ArcelorMittal	Cleveland Cliffs	2021
Nd	Baowu	Shandong, Kumming Steel (90%)	2021
Nd	Baowu	Tisco (51%), Chonggang (40%), Winjiang Yili Iron & Steel	2021
€190m	Liberty Steel	Ascoval & Hayange, Huta Czestochowa, Adhunik Metaliks	2020
€650m	Big River Steel	US Steel	2020
€110m	Siderurgica Latino-Americana (Silat)	Gerdau	2020
€5.8bn	Essar Steel	ArcelorMittal and Nippon Steel	2020
nd	Magang Group	Baowu Steel Group (*)	2019

Leaders seek to increase their size to protect themselves from competition

What are the general objectives behind this race for size?

- Opportunities to buyout companies in difficulty
- Increase bargaining power towards suppliers
- Achieving economies of scale
- Diversifying

Chinese companies

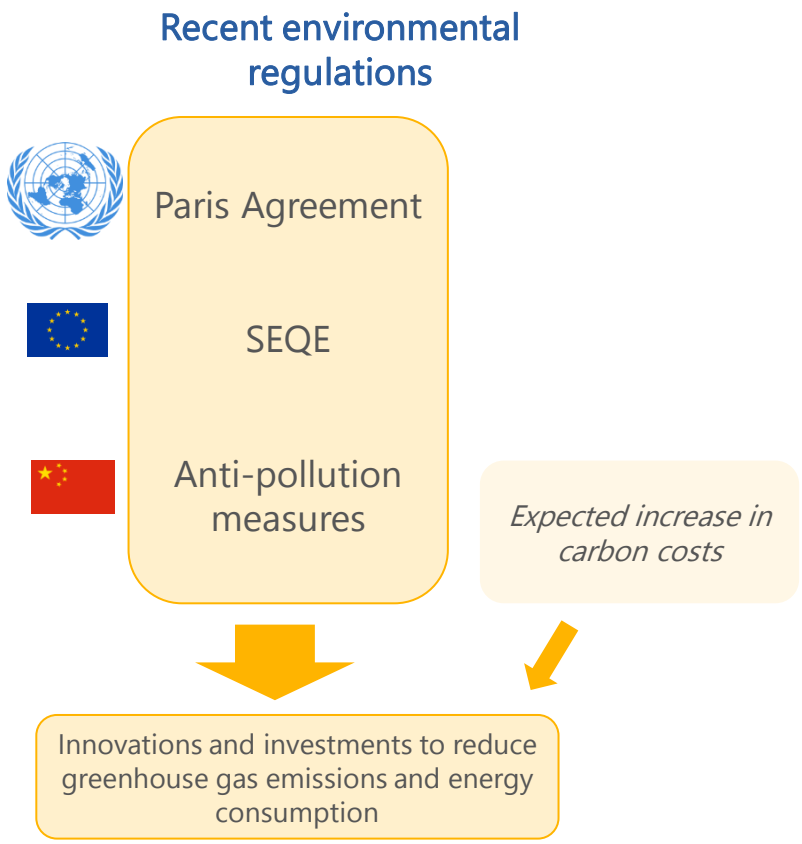
Meeting the requirements of the Chinese government

As part of the 14th five-year plan, the Chinese government announced the consolidation of steel companies (for the most part state-owned) as a priority, notably to strengthen their bargaining power towards raw materials (and especially iron ore) suppliers who are mostly foreign.

Other companies

Resisting Chinese low cost product competition (defensive strategy)

The reduction of emissions is becoming a key concern for steelmakers



Date	Examples of operations by steelmakers to reducing the carbon footprint
October-November 2021	Posco signed a cooperation partnership with mining groups BHP and Vale to develop technologies to reduce CO_2 emissions from coal used in steel production.
September 2020	Tata Steel signed a partnership with the Council of Scientific & Industrial Research (CSIR) to work on the development of carbon capture technologies for the steel industry.
November 2021	Angang Steel joined an alliance of global steel groups launched by Chinese steel giant China Baowu Group to encourage the reduction of carbon emissions from steel production.
March 2021	US Steel launched a range of green steel products called *verdeX*.

As part of the Paris Agreement, adopted in 2015, which aims to keep the rise in global temperature well below 2°C, environmental regulatory pressure on steel companies is high. The European Emissions Trading Scheme is particularly restrictive and has been tightened up with the entry of the 4th phase in 2021. It may compromise the competitiveness of European steelmakers compared to companies operating in countries with less stringent regulations (notably developing countries or the USA). In addition, the price of CO_2 allowances are expected to rise to €100/t in the medium term.

ArcelorMittal, which operates mainly in Europe, is particularly active in greenhouse gas reduction

Case report on ArcelorMittal's CO_2 reduction strategy

Case report : ArcelorMitttal

ArcelorMittal, which has a strong presence in the EU, where environmental regulations are among the strictest in the world, implemented several measures to reduce its greenhouse gas emissions. It committed to reduce its CO_2 emissions by 30% from its European operations by 2030 and to become carbon neutral by 2050. To achieve this, it intends to use several levers:

- Increasing the use of **scrap metal** in the process. In Dunkirk and Fos-sur-Mer, the share of scrap metal already in use is expected to double from 15% to 30% in the processes by the end of 2022.
- **IGAR project** (cost: €21m, half of which funded by ADEME): capture CO_2 and reuse it in the process instead of coking coal. An industrial pilot should be implemented in 2022.
- **Steelanol / Carbalyst** (cost: €180m): a project to develop industrial gas recovery solutions for the manufacture of chemical products, based in Ghent, Belgium. It aims to reduce the site's CO_2 emissions by 125,000 t per year and to produce 80 million litres of bioethanol per year. The project is expected to start in 2022.
- **3D project** (consortium bringing together 11 European operators including ArcelorMittal, IFPEN and Total): innovative process enabling a 30% reduction in the cost of CO_2 capture. Preparation for the implementation of a first industrial unit from 2025 began on the ArcelorMittal site in Dunkirk. In January 2022, Arcelor Mittal received the first CO_2 capture modules at its Dunkirk site for the 3D project. The group plans to move to the industrial stage by 2025.
- **Carbalyst project (partnership with Lanzatech)**: project to capture CO_2 gases from the Ghent steel plant in Belgium for reuse in the manufacture of chemicals.
- **10 billion investment plan**, announced in July 2021, to reduce its CO_2 emissions from steel production by 25% by 2030. In September 2021, ArcelorMittal launched an initial €1.1bn plan to build a direct reduced iron (DRI) unit and two new electric furnaces at its Ghent site in Belgium. In February 2022, it announced a €1.7bn investment in Dunkirk and Fos-sur-Mer in France to install electric arc furnaces and a hydrogen direct reduction unit to replace two of the three blast furnaces at these sites by 2027.

Sources: ArcelorMittal and press

Leaders anticipate the expiry of the next regulations

According to the CDP, the steel industry is responsible for 6% to 7% of anthropogenic greenhouse gas emissions and 31% of industrial emissions. In order to meet the Paris objectives, the steel industry must innovate to reduce its environmental footprint. However, the financial fragility of companies in the industry limits their capacity for innovation. A few projects have been set up and are currently in the pilot stage. These innovations are not yet economically profitable. The SIDERWIN and HYBRIT projects aim to develop a breakthrough technology.

SIDERWIN project

European project in the framework of Horizon 2020 and the SPIRE initiative, carried out by 11 European partners (including ArcelorMittal). The objective of this project is to develop a disruptive innovation to achieve electrolysis of iron ore. Coking coal would be replaced by electricity to reduce the iron. A reduction of 87% in CO_2 emissions and 31% in direct energy consumption is expected.

HYBRIT

Launched in 2018, the HYBRIT (*Hydrogen Breakthrough Ironmaking Technology*) project is the brainchild of three Swedish companies LKAB, SSAB and Vattenfall. It consists of reducing iron through hydrogen, replacing coking coal. The aim of the project is to decarbonise the entire steel production process by 2035, which would reduce Sweden's greenhouse gases by 10%. The pilot phase of the project will be completed in 2024.

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6. Annexes

ITEM	DEFINITION
Assets	Assets encompass all the economic resources owned by a company. They are commonly divided into short term (cash, trade receivables, etc.) and long term assets.
CAGR	Acronym for Compound Annual Growth Rate.
Capex	Short for "Capital Expenditure", an item of the cash-flow statement used as a proxy for investment in property, plant and equipment (PPE). Generally entails physical assets used to maintain or increase operation capacities.
Capex ratio	The percentage ratio between capital expenditures and net sales.
Current ratio	The current ratio is found by dividing current assets by current liabilities and indicates whether the company has enough resources to pay its short term debt (12 months).
Debt-to-equity	The ratio between total liabilities and total equity, reflecting the company's relative amount of debt.
Free cash flow	The cash that a company is able to generate after subtracting expenses needed to maintain its asset base.
Gross profit	Gross profit is the result of the difference between total sales and the cost of making products or providing services. Payroll and interest costs as well as taxes are not taken into account.
Impairment charge	Impairment charges occur when a company has found that the value of its goodwill has been overestimated and needs to be revised.
Interest coverage	Interest coverage is calculated by dividing operating income by net interest expenses and reflects the company's debt burden, i.e. its ability to pay interest on outstanding debt. The lower this ratio, the more the company is burdened by interest expenses.
Liabilities	Liabilities encompass all obligations arising from a company's past operations and which will result in an outflow of resources in the future. Liabilities are divided into short term and long liabilities, and represent the debt a company owes to its creditors.

ITEM	DEFINITION
Net debt	Net debt is calculated by subtracting a company's cash from its total debt.
Net profit/ net margin	Net profit refers to a company's total earnings. It is the result of the difference between net sales and all operating and non-operating expenses such as taxes, interests, depreciation and amortisation expenditures.
Operating profit/ operating margin	Operating profit refers to the earnings generated by the normal business operations of a company. Operating profit is the result of the difference between sales and total operating expenses. Operating margin is expressed in % and is computed by dividing operating profit by net sales.
R&D expenditure	Expenses associated with the research and development process of creating new products or services; it is often used as a proxy for innovation.
Return on assets (ROA)	Return on assets is calculated by dividing a company's net income by its total assets. It measures the ability of the company to generate profits from its assets.
Return on equity (ROE)	Return on equity is calculated by dividing a company's net income by its shareholder equity. It measures the ability of a company to generate profits from its investment funds.
Sales	Earnings made from the sales of goods and services, excluding VAT and other taxes. Reflects, total volumes sold, selling prices, exchange rates and product mixes.
Quick ratio	The quick ratio is calculated by dividing current assets net from inventories by current liabilities and measures the company's immediate capacity to repay its short term debt.
Working capital	Working capital is the difference between currents assets and current liabilities. When positive, working capitals means a company would able to pay its short term debt.