

International Commodity Trading

Market Overview

Aluminium



Source: TÜV Rheinland

Beatriz Ferreira Caetano

Mingxin Ma

Virginie Gruaz

International Business Management

Haute Ecole de Gestion de Genève

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Introduction

Aluminium is an exchange commodity. It is the element that is most commonly found in the Earth's crust.¹ Its natural state is indeed not the metal form. To become one, it must first undergo a chemical process. Its physical properties are the following among others: noncorrosive, nontoxic, noncombustible, light in weight and nonsparking.²

Market Structure

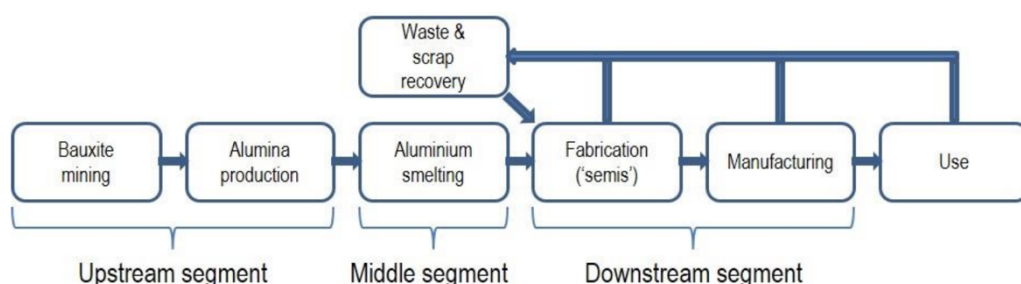
The market structure can be divided into 3 segments: upstream, middle and downstream.

The **upstream segment** is composed of bauxite mining and alumina production. Those 2 stages are operated by large international companies. It means that it is dominated by relatively big companies having most of the market shares and the segment is, therefore, concentrated. They usually take either the form of joint venture with state companies or full ownership. Because bauxite can be found in many regions, competition is still spread around the world. It is crucial to note that most Chinese and Middle East companies are entering by acquiring stakes in bauxite mining companies in Africa. This segment is dominated by vertically integrated firms that aim at reducing their costs. For practical reasons, bauxite refining is usually located near ports to facilitate the shipment to smelting companies which will transform it into primary aluminium.

The **middle segment** is composed of aluminium smelting as well as waste & scrap recovery. Smelting companies can be found in America, Europe, Middle East, Asia and Australia. However, their competitiveness is dependent on the enforcement of environmental policies. Because aluminium is relying on energy, more precisely electricity, companies are depending on local prices. While producing aluminium is dominated by companies in China, aluminium recycling is less concentrated. Aluminium is perfectly integrated into the circular economy. Companies in the middle segment recycling tend to be captive producers of secondary aluminium to be able to directly feed their downstream segments.

The **downstream segment** composed of semi's and manufacturing is definitely the less concentrated part of aluminium supply chain. Producers in semis' can be either local and specialised SMEs' feeding one customer to large, vertically integrated multinationals. Multinational companies such as Chinalco are ranked top producers in primary aluminium and semis.

Figure 2.1. The aluminium production chain: stages of processing



Note: This diagram is for illustrative purposes only as the industry may define segments differently.
Source: simplified representation adapted from (Bertram et al., 2017^[1]).

Source: OECD - *The aluminium value chain*³

¹<https://commodity.com/precious-metals/aluminium/>

²<https://www.aluminum.org/aluminum-advantage/student-educational-resources>

³[https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC\(2018\)5/FINAL&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC(2018)5/FINAL&docLanguage=En)

The main **market demand / use** actors are end user companies and consumers, typically transportation, construction building or packaging. The aluminium demand is highly correlated with the economic development of the country.⁴

Key drivers

The aluminium's market is influenced by the **demand** coming from various industries. Aerospace such as the development of new aircrafts or new rocket technologies will boost the aluminium's demand. The automotive industry is also highly dependent on aluminium as its lightweight can boost fuel economy. Building and construction uses aluminium as it is corrosive resistant. Those industries are directly linked to the **countries' economic growth** which is a major key driver and greatly affects the market.

Consumer goods such as washing machines, dryers, phones and computers represent another key industry for aluminium.⁵ Packaging is highly produced with aluminium as they are infinitely recyclable. **Consumption trends** are therefore also affecting the market. The **geopolitical situation** is impacting the market as well. For example, the US raised tariffs on metals in early 2020 and particularly targeted China, the biggest aluminium producer. While raising tariffs might benefit upstream firms by imports, downstream firms see their production costs rise. **USD's currency movement** also affects the aluminium market.

History

The first trade of aluminium occurred in the 1970s on the London Metal Exchange after global demand increased. A stable price was set at that time, and remained unchanged until the economic crisis in 2008 which caused the price of aluminium to drop.⁶

Due to the increasing demand for aluminium and its diversified uses, its demand had been gradually growing until the financial crisis of 2008. At this point in time, the world demand split into two situations. On one side, world demand is declining, metal in warehouses continues to increase. On the other side, aluminium demand has been increasing since 2000 in order to meet the needs of different investments in China. Since then, the industry has gradually recovered and now, as a result of COVID-19, the stockpile is back.⁷

Key players

The world's biggest aluminium nation producers are China, supplying more than half of the global total aluminium supply, Russia, Canada, India and United Arab Emirates.⁸ The most consuming nation of aluminium is China, using around 40% of the global annual supply. China is followed by Japan, the EU and the United States of America.

The companies key players are the following: Alcoa Corporation, Rio Tinto, CHALCO (Aluminum Corporation of China Limited), United Company RUSAL, China Hongqiao Group Limited, Shandong Xinha Aluminum Group Co. Ltd., East Hope Group Company Limited, Norsk Hydro ASA.⁹ It is important to note that some companies such as CHALCO are state-owned.

⁴https://ar.swissquote.com/afx/files/swissquote.com.afx_fc_files/Fact%20sheet_Aluminum_En_V1.2.pdf

⁵<https://www.aluminum.org/product-markets>

⁶https://www.aluminiumleader.com/history/industry_history/

⁷<https://www.bcg.com/publications/2013/metals-mining-corporate-strategy-what-caused-aluminum-crisis>

⁸<https://commodity.com/precious-metals/aluminium/>

⁹<https://www.industryarc.com/Research/Aluminium-Market-Research-503190#:~:text=The%20major%20players%20with%20major,Shandong%20Xinha%20Aluminum%20Group%20Co.>

According to the OECD, government support in the aluminium value chain is widespread. Support is mainly taking place in smelting. Governments support either in a financial manner or non-financial. However, China is the nation giving away the most financial support through subsidies.¹⁰ This had an impact, for instance, on the trade war between the US and China.

Trade flows

Aluminium isn't found in nature as a pure element, it is extracted from Bauxite. The USA used to be a major supplier during and after WWII. Nowadays, the material is primarily mined in Australia, Guinea, South America and China.¹¹¹²

According to The Observatory of Economic Complexity (OEC), the largest exporter of raw aluminium is Canada, and the largest importer is represented by the United States of America in 2018.¹³ However, in 2020, the largest importer became Germany followed by the US, probably due to the raise of tariffs from Trump's administration¹⁴. As the biggest producer, China is, however, not the biggest exporter as most of the production is for local consumption.

Compared to other goods, aluminium is present on the stock exchange but it is just a negotiation platform and gives a price benchmark, there is no possibility to buy the metal physically. Most aluminium sales consist of contracts between producers and buyers directly.¹⁵

As aluminium is in a solid and non-perishable state, primary aluminium is stored in warehouses before and after shipment. Aluminium is affected by humidity and black spots can arise from rubbing. Like all commodities, transport of aluminium is made mainly through road, rail or sea. The sea route is the most used in the case of international movements. On the contrary, road and rail routes are more convenient for inland trade.¹⁶ Aluminium can be shipped in sheets, tubes or ingots.¹⁷

The shipping transportation has evolved during the years. The number of containers that a ship can transport has drastically increased, without affecting the speed of the boat. Thanks to the improvements in the technology related to handling containers, the cost of shipping freight has decreased by 90 percent. Containers can be produced easily and cheaply.¹⁸

Specifications

Aluminium is one of the lightest metals worldwide but is simultaneously very strong, flexible and resistant to corrosion as it is covered by a layer of oxide film. It is also a good electricity conductor and it does not magnetize.

The metal can easily be mixed with other chemical elements and therefore allows for the development of a huge variety of aluminium alloys. Its properties can be changed with a small number of admixtures and it allows for the diversity of markets where you can find aluminium.

Aluminium can be processed in **sow casting** where it is poured into a mould. They are then re-melted for use in electronics and the aerospace industry. They can be done in **mould ingot casting**, used to produce automotive parts. For packaging, automotive industry and lithography they are

¹⁰[https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC\(2018\)5/FINAL&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC(2018)5/FINAL&docLanguage=En)

¹¹<https://science.howstuffworks.com/aluminum.htm#pt2>

¹²<https://tradingeconomics.com/commodity/aluminum>

¹³<https://oec.world/en/profile/hs92/raw-aluminium>

¹⁴<https://comtrade.un.org/labs/data-explorer/>

¹⁵https://www.aluminiumleader.com/economics/how_aluminium_market_works/

¹⁶<http://www.chalco.com.cn/chalco/rootfiles/2020/01/15/1501804321462873-1579055384652259.pdf>

¹⁷<https://cargohandbook.com/Aluminium>

¹⁸<https://www.airseacounters.com/blog/the-evolution-of-container-shipping-7-ways-container-shipping-has-evolved-over-the-years/>

fabricated in **sheet casting** and rolled into flat products. **Billet casting** is the process used for automotive, construction and aerospace industries.¹⁹

Price and cost curve

Aluminium is a commodity used by different industries, so it can be a good representation of the global economy. As per Commodity.com the five most important factors influencing its price are: Chinese Demand, Transportation Demand, Construction Industry Demand, Input Costs and The US Dollar. As they are the key drivers in the market.

As mentioned previously China is a big player in the industry, as a supplier and user. The country's strong growth has led to an increase of the commodity prices.

Aerospace and automobiles are the major markets for aluminium in developed countries. They are used in the construction of aircrafts, rockets as well as hoods and other parts maintaining fuel efficiency in cars.

Aluminium is also used in construction and building markets. Markets that can influence its price as around 30% of building materials in developing countries are aluminium. The demand for construction is volatile and can be influenced by each country's interest rates, unemployment and the overall economy.

Fluctuations in the cost of oil and electricity will also affect the price of aluminium because its production uses a lot of energy during the smelting.²⁰

Aluminium price (USD/Tone) throughout the years:



Source: Trading Economics²¹

Options and futures contracts for aluminium are traded on exchanges, mostly the London Metal Exchange (LME), the New York Mercantile Exchange (COMEX) and the Shanghai Futures Exchange. They are usually traded in metric tons and quoted in US dollars.

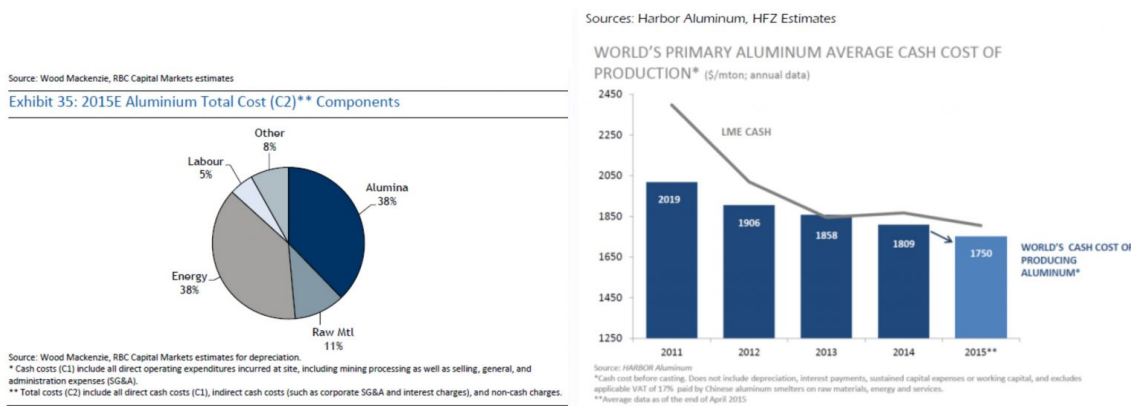
¹⁹<https://www.youtube.com/watch?v=eGdXxFjqFsg>

²⁰<https://commodity.com/precious-metals/aluminium/>

²¹<https://tradingeconomics.com/commodity/aluminum>

The highest price for the commodity was on 11th July 2008 at USD 3,291.5 per tonne on LME²². As mentioned before there was a downfall in 2008 due to the economic crisis.

We can also see a decline from 2011 to 2015. As per the OECD the fall was caused by a market fall in the profitability of aluminium producing firms in different regions of the works and lead to the closing down of smelters in the EU and North America.²³



Source: Aluminium Insider - Global aluminium smelters' production costs on decline²⁴

The main cost components for aluminium production are Aluminium and Energy. Other components are Labour and raw materials.

The costs of the commodity is mainly influenced by the costs incurred by smelters. The latter has been decreasing thanks to the implementation of new and cheaper technology consuming less electricity and becoming more efficient. Some factors incurring costs for smelters such as electricity and labour vary significantly from region to region. For example, US smelters need to sell aluminium above 2200\$/tonne to be profitable. Smelters in Russia and Canada have the lowest costs followed by the Middle East and China. The highest costs are in Europe, US and Australia. Therefore, the companies having the lowest production costs are UC Rusal and Rio Tinto followed by Norsk Hydro and Alcoa.

Costs increased in 2018 due to the cost inflation of raw materials and inputs, and as a result 40% of the global primary aluminium production was losing money. It decreased again in 2019 as major input costs such as alumina declined.

In the future the challenge will be carbon prices, it is a main input for smelters and due to the EU Emissions Trading scheme reforms for the years 2021-2030, the expected higher carbon prices will likely increase smelting costs.²⁵

COVID-19

As mentioned before, the pandemic created again surplus in warehouses. Government lockdown measures have led to the closure of most plants, however, in response to lower raw material prices and the gradual resumption of production (from countries that took earlier measures and also reopened earlier), many companies have returned to initial production or even more. Meanwhile, many factories are still facing closure. Forecasts show that excess production will still be present in a few years, as was the case in 2008, but the future of the industry remains optimistic.²⁶

²²<https://www.aluminiumleader.com/history/timeline/#2008>

²³[https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC\(2018\)5/FINAL&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC(2018)5/FINAL&docLanguage=En)

²⁴<https://aluminiuminsider.com/global-aluminium-smelters-production-costs-on-decline/>

²⁵<https://aluminiuminsider.com/explaining-global-aluminium-flows-and-smelter-costs/>

²⁶<https://www.reuters.com/article/idUSL8N2CM5H7>

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