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**BIG BUSINESS, MARKET POWER AND SMALL NATIONS,
THE NORWEGIAN ALUMINIUM AND NICKEL INDUSTRY 1920-39**

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Besides traditional Norwegian export staples such as fish and timber products, metals and other electro-metallurgical products rapidly gained significance after 1905. The most important were aluminium, carbide, ferro-alloys, nickel, sulphur, zinc and chemical fertilisers. Growth continued in the 1930s. Whereas total exports in 1938 barely exceeded the 1929 level, exports of metals and fertilisers was increased by 50% during this period. In 1938 these products constituted 25% of Norwegian commodity exports.¹ How could this happen? Why did these exports grow so fast in a decade mostly associated with ‘deglobalisation’?

To explain this phenomenon one must analyse the global market structures and the specific Norwegian conditions. The metallurgical industry had some distinctive features: most plants were foreign owned and were parts of vertically integrated multinational companies. The markets were organised by cartels or oligopolies. Furthermore, as the plants almost exclusively produced for exports, they were vulnerable to rising protectionism and autarchy in foreign markets.

This article focuses on the aluminium and nickel industry in the interwar years. Originally developed by domestic investors, the Norwegian nickel production boomed during World War I, failed disastrously in the early 1920s, and did very well under Canadian ownership from 1929 with yearly increases in production. The aluminium industry also experienced dramatic shifting fortunes. In this case, production peaked in 1929 and stable growth never resumed before the war.

By comparing and contrasting the aluminium and nickel industries we hope to gain new insights in the development of the Norwegian metallurgical sector – and in the interwar economy. What were the implications of foreign ownership? How did cartel agreements and oligopolies influence production and price levels of aluminium and nickel? To what extent did rising protectionism and autarchy affect production levels in Norway?

¹ Morten Tuveng, ”Norges ytre handelspolitikk i den senere tid”, *Statsøkonomisk Tidsskrift*, 1939, p. 219. NOS, Historisk Statistikk 1968, Table 153 and 154. NOS, Norges Handel 1935-37, Table 3.

The Norwegian aluminium and nickel industries

The interwar Norwegian aluminium and nickel industries both came to be dominated by large, foreign owned, vertically integrated firms. In the nickel industry this happened as a result of a Canadian acquisition in 1929, in aluminium this was the case from the start.

Whereas Norway had no commercially viable bauxite ores, she had abundant and cheap hydroelectric power. This attracted the power-hungry international aluminium industry that needed electricity for its smelting activities. By 1920 Norway was one of the world's largest producers of primary aluminium. Six smelters came on stream 1908-1927, only one of them was established by domestic investors.

The first two smelters in Norway both came to be owned by The British Aluminium Company (BACO). The French aluminium company Pechiney operated two fairly large smelters (built in 1912 and 1916) through its Norwegian subsidiary DNN.² In 1923 BACO and Aluminum Company of America (Alcoa) each purchased a one third interest in DNN.

Norsk Aluminium Company (NACO) was established in 1916, wholly financed by Norwegian capital. Like BACO and Pechiney, NACO aimed at vertical integration. The company secured control over bauxite mines in France and Suriname and built an alumina factory in France. In Norway, NACO operated a smelter and a fabricating plant. But as NACO got into financial difficulties in the post WWI-crisis it had to seek outside capital and Alcoa bought 50% of shares in the company. In 1928 Alcoa transferred most of its foreign investments to the Canadian based Aluminium Limited (Alted, the later Alcan). This also included the NACO investment. Alted was formally an independent company, but retained close ties to Alcoa until 1951.

The last aluminium smelter that was established in Norway during the interwar years was Haugvik Smelteverk, in 1927. This smelter was owned by a small independent firm, the International Aluminium Company from Great Britain. This firm was not a part of the international aluminium cartel and therefore not bound by intra-industry regulations.

At the onset of the 1930s the aluminium industry in Norway was thus dominated by three large foreign companies: BACO, Pechiney and Alted, who all took part in the international cartel agreements. One smelter was in the hands of an independent company, while NACO was co-owned by Alted and Norwegian interests.

² The company was originally called "Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges and Camargue" but changed its name to Pechiney in 1950.

The capacity of the Norwegian smelters was expanded during the 1920s, and in 1929 Norway produced a total of 29,100 tons of primary aluminium.³ This amounted to over 10 % of the total world production, and Norway was the second largest producer of aluminium in Europe. But in the early 1930s Norway lost rank. By 1936 the production had been nearly halved, now constituting slightly over 4 % of total world production, and the country was now only the sixth largest producer in Europe. This development is striking in comparison with the situation in the Norwegian nickel industry during the 1930s.

Modern nickel production started in 1910 when Kristiansand Nikkelraffineringsverk (KNR) developed a world class refining process.⁴ Since the domestic nickel ores proved insufficient for large scale expansion, KNR invested heavily in Canadian nickel industry during and right after World War I. Canada had the world's major nickel deposits. However, the financial losses incurred in the Canadian venture ruined the company. In the mid-1920s a new Norwegian nickel company Raffineringsverket A/S was established. The firm met the same barriers to growth with regard to domestic nickel ore as its predecessor KNR. In the vertically integrated industry, it was difficult, if not impossible, to buy nickel ore on the world market. As a result, the potential of the refinery in Kristiansand was never exploited and production never exceeded 1.000 metric tons.

The next stage followed in 1929 when the Canadian company Falconbridge acquired the Kristiansand refinery from Raffineringsverket. The latter company continued its small-scale mining and smelting activities in Norway and was allowed to continue refining in Kristiansand on a custom basis. With its large nickel mine in Sudbury, Ontario, Falconbridge had solved the Norwegian nickel industry's perennial problem, namely the lack of raw materials. Production increased to 8.000 tons of refined nickel in 1938. As in the aluminium industry foreign ownership – and thereby vertical integration and a secure raw material supply – was almost a prerequisite for growth.

³ Data taken from Metallgesellschaft: *Statistische Zusammenstellungen*, Frankfurt a. M. 1939, volume 40, p. 4. Ernst Rauch claims that the Norwegian production in 1929 amounted to 24,434 tons (Ernst Rauch, *Geschichte der Hüttenaluminiumindustrie in der westlichen Welt*, Düsseldorf 1962, p. 313). He does not give any data for 1936.

⁴ The following is based on Pål Thonstad Sandvik, *Falconbridge Nikkelverk 1910-1929-2004, Et internasjonalt selskap i Norge*, Kristiansand 2004, p. 15ff and 85ff.

Cartels and market power in the international aluminium and nickel industry

The international aluminium and nickel industries were both dominated by vertically integrated firms with substantial market power. But as we will see, there were also significant differences between the two industries – differences that had important implications also for the Norwegian development.

Two features helped shape the rather peculiar structure of the nickel industry. First: in the early 1930s more than 90% of world nickel originated from two mining areas. The largest was around Sudbury in Ontario, Canada, and the other was located in French New Caledonia in the Southern Pacific. In the late 1930s a huge ore body in Petsamo in northern Finland was developed, but the Petsamo-mine did not come on stream until 1943. Second: nickel is a complicated metal to extract. The production consists of three stages, mining, smelting and refining, whereof refining is the most costly and technically challenging.

Successful firms had to control all three stages of production. It wouldn't normally be possible for a refinery to buy raw materials. Similarly, it would not be possible to run a nickel mine or smelter on a profitable basis without having a refinery and the necessary patent rights to refine nickel. Small un-integrated firms could easily be squeezed by the sheer market power of the larger vertically integrated players.

This combination of few and somewhat inaccessible ore resources, difficult extraction processes and the need for vertical integration brought about a quasi-monopoly structure. In the mid-1890s, competition was more or less eliminated when the leading nickel producers established a cartel. Except for a short price war in the early 1920s the official nickel price remained almost unchanged from 1896 to 1948!⁵

The business leader was the American owned International Nickel Company (INCO). The two other large players were the British-based Mond Nickel and the French Le Nickel. In 1929 Mond was merged with INCO.⁶ The Rothschild-dominated Le Nickel controlled for its part much of the ore deposits on New Caledonia. Together INCO and Le Nickel produced more than 95% of world output in 1929.⁷ As we will see, this market power had important repercussions for Falconbridge and the Norwegian nickel industry.

⁵ Matt Bray, "Eliminating the Competition: Price-fixing and Market-sharing in the Nickel Industry 1895-1929", Ulf Olsson (ed.), *Business and European Integration since 1800*, Göteborg 1997.

⁶ Matt Bray and Angus Gilbert, "The Mond-Inco Merger in 1929, A Case Study in Entrepreneurial Failure", *Canadian Historical Review* LXXXVI, March 1995, p. 19-42.

⁷ O. W. Main, *The Canadian Nickel Industry*, Toronto 1955, p. 109 and 111.

It must first be said that interwar demand fluctuated wildly. In 1932, the US consumption was only 20% of what it had been in the peak year of 1929. The main reason was the virtual stand still in the American car industry, which had been the world's most important nickel consumer in the 1920s. The European and Japanese consumption was much smaller, but more stable during the depression. In these countries a much smaller percentage of nickel was used for civilian purposes. Probably due to rearmament, nickel consumption outside the US increased by almost 10% from 1929 to 1932. However, this was not enough to compensate for the collapse in the American demand. World consumption fell from 63.000 metric tons in 1929 to only 26.500 tons in 1932. Thereafter it rebounded to 108.000 tons in 1937.⁸

In spite of these fluctuations, nickel prices remained stable. The market fixing agreements proved robust enough to smooth out the business cycles of the interwar era. Cartel agreements and market regulations were widespread, of course, and were not by any means limited to the nickel industry. George Stocking and Myron Watkins calculated that 87% of the metal trade in the US was organised by cartels.⁹ The British board of trade calculated that 34% of total world trade in the mid-1930s was controlled or influenced by cartels.¹⁰ Other contemporaries put the percentage between 30 and 50%.¹¹ However, many of the cartels and price agreements broke down during periods of excessive demand or contraction. This happened for instance with copper, where the price-level was reduced by almost two thirds from 1929 to 1931, leaving only the most efficient producers afloat.¹² In this regard the nickel industry offers an interesting example of relative stability. This stability has important implications for our story.

Following the severe contraction of nickel consumption, INCO took the burden as swing producer. In order to protect the price level, INCO utilised less than 20% of its capacity in 1932.¹³ The paradox is that INCO's market dominance and its self-interest in high and stable prices helped Falconbridge achieve rapid growth. As INCO cut back production, Falconbridge made new investments. In 1932 the firm expanded its capacity by more than

⁸ Main 1955, p. 109. Main's figures are given in short tons.

⁹ George W. Stocking and Myron W. Watkins, *Cartels in Action*, New York 1947, p. 3-13.

¹⁰ Harm Schröter, "Kartellierung und Dekartellierung 1890-1990", *Vierteljahrshchrift für Sozial- und Wirtschaftsgeschichte* 1994, Heft 4, p. 482.

¹¹ Clemens A. Wurm, "Politik und Wirtschaft in den internationalen Beziehungen", in Clemens Wurm (ed.), *Internationale Kartelle und Aussenpolitik*, Stuttgart 1989, p. 10.

¹² Main 1955, p. 112-113.

¹³ Calculated on the basis of: INCO's annual reports 1931 and 1932. Metallgesellschaft, *Statistische Zusammenstellungen 1929-1938*, Frankfurt a. M. 1939, p. 21. Main 1955, p. 111.

30% to 4.000 metric tons. Because of Falconbridge's increased activity, mass unemployment was significantly reduced in Kristiansand, home to Falconbridge's Norwegian refinery.

In an industry with such concentrated market power one would normally have thought that an upstart would be prevented from gaining foothold during a severe business downturn. Instead the upstart was allowed to expand. INCO's board and managers probably viewed the costs of a price war as too high. They may also have feared American anti-trust authorities, making owners and managers careful about crushing a small upstart. As Falconbridge did not compete too vehemently on price, it could therefore act as a free rider in the nickel markets. Interestingly, a similar pattern is discernible in the aluminium industry.

Whereas the nickel industry was dominated by a single firm, the aluminium business was dominated by a number of vertically integrated firms cooperating in an international cartel. This created a somewhat different industrial logic from the one we have seen in the nickel business.

The structure and organisation of the international aluminium industry was firmly established by the end of the 1920s. The industry was dominated by two groups of aluminium producers, one consisting of the major European companies and the other of Aluminum Company of America (Alcoa) and its sister company Alted from Canada. Alcoa was the largest aluminium producer in the world, but only served the American market where it had a virtual monopoly. The major European companies were BACO of Great Britain, Aluminium-Industrie-Aktiegesellschaft (AIAG) of Switzerland, Pechiney and Société d'Electrochimie of France, and the German group consisting of Vereinigte Aluminium Werke (VAW) and Aluminium Werke Bitterfeld. The European companies established a cartel in 1926, but Alcoa did not participate due to American anti-trust regulations. It did nevertheless cooperate with the cartel on numerous occasions.¹⁴

During the second half of the 1920s world production capacity was greatly expanded, but demand fell drastically with the onslaught of the depression. The market dried up and the aluminium producers found themselves with large stocks on their hands. It has been calculated that world stocks exceeded sixteen month's consumption at the rate prevailing in July 1931.¹⁵ To meet the crisis the major producers in July 1931 set up a new international cartel, the agreement this time comprising Alted as well as the European majors.¹⁶ Alcoa was

¹⁴ Stocking and Watkins 1947, p. 253.

¹⁵ Louis Marlio, *The Aluminum Cartel*, Washington D. C. 1947, p. 36.

¹⁶ Stocking and Watkins 1947, p. 261.

a “silent partner”.¹⁷ As we will see the new cartel had significant consequences for the Norwegian industry.

To monitor and regulate the production of the cartel members, a new company, the Alliance Aluminium Compagnie, was set up in Switzerland.¹⁸ The members were allotted production quotas according to their capacity. In addition the cartel obliged all the participants to remove excess stocks from the market by selling the metal to the Alliance. One of the major aims of the cartel was to reduce the risk of price fluctuations. The Alliance directors periodically fixed minimum prices for aluminium. To make these prices effective, the Alliance was authorised to buy and sell metal. If a member didn't manage to sell his full quota at the minimum price, the Alliance bought the unsold portion at that price. The policy proved to be successful; between 1932 and 1937 the official aluminium prices in Britain did not fluctuate at all.¹⁹

The major companies originally meant to include the small, independent aluminium producers in the cartel in order to stop leaks in the Alliance control system, but no agreement was reached. However the production capacity of the outsider companies was relatively small. There was only one important threat against the cartel's price policy; The International Aluminium Corporation and its smelter in Norway.

The British-owned International Aluminium Corporation was a fully vertically integrated company: it controlled some bauxite ores in France, produced alumina in a plant near Newcastle-upon-Tyne, ran an aluminium smelter in Wales and fabricated finished products in a factory near Manchester. The corporation was one of the few newcomers that had managed to stay independent of the major producers, and could draw on two decades of experience in the business when Haugvik smelteverk was established in Glomfjord in the north of Norway in 1927.

The capacity of the Haugvik smelter was increased from 4,000 tons of aluminium a year to 8,000 tons in 1929. The alumina was delivered by the German firm Gebrüder Giuliani. Giuliani had been one of the original suppliers of alumina to the pioneer aluminium companies, but after these companies had integrated vertically, Giuliani had been forced to find other outlets.

¹⁷ See Charlotte F. Muller, *Light Metals Monopoly*, New York 1946, pp. 129-131, and Stocking and Watkins 1947, p. 265.

¹⁸ The 1931 cartel is thoroughly described in Rauch 1962., pp. 184-193, Marlio 1947, pp. 30-43 and Stocking and Watkins 1947, pp. 260-264.

¹⁹ Marlio 1947, p. 64.

The International Aluminium Corporation had steady supplies of high quality alumina, and due to the cheap Norwegian waterpower the company was very cost efficient. In addition to this, it had a huge potential for further expansion. The hydro-power resources in Glomfjord could supply a smelter with a yearly capacity of over 40,000 tons of primary metal, something which would have made it the largest aluminium smelter in the world.²⁰ The cartel was aware of this potential, and learnt late in 1931 that Giulini was planning to buy shares in the International Aluminium Corporation with the intention of expanding the Glomfjord plant. The Alliance acted swiftly, and secured control over the International Aluminium Corporation at the beginning of 1932. The shares in the company were divided among the members of the cartel. The threat of Giulini entering heavily into the aluminium business was thus successfully diverted. Later, in 1934, the cartel entered into an agreement with Giulini.²¹ From then on it was almost impossible for independent and non-vertically integrated companies to compete.

By 1932 all the aluminium smelters in Norway was under the control of cartel members, and consequently they were affected by the production quotas set by the cartel. During this period the production was dramatically cut in Norway. The question is why the Norwegian plants were 'singled out'? The economist Dag Tresselt has argued that Norway was harder hit than the rest of the aluminium producing world, and that this was a result of the foreign ownership.²²

Under the cartel regulations each member company was given a production quota and the producers decided for themselves where to cut production. The first place to start the investigation would therefore be to look at the production capacities of the different smelters in Norway, and how the production evolved during the crisis years.

According to Ernst Rauch the Norwegian aluminium smelters had a total production capacity of 34,200 tons a year during the 1930s whereof DNN had a capacity of 15,000 tons, NACO 7,000 tons, BACO's two Norwegian smelters 4,200 tons and Haugvik smelteverk in Glomfjord 8,000 tons.²³ Actual production developed as seen in the table below.²⁴

²⁰ Rauch 1962, p. 196.

²¹ Marlio 1947, p. 52.

²² Dag Tresselt, *Strategi og kontroll i norsk aluminiumindustri*, Oslo 1968, p. 13-14.

²³ Rauch 1962, p. 312-313. Svendsen and Rikter-Svendsen estimates the total production capacity to be 37,200 tons a year in 1940 (Bjørn Svendsen and Kristin Rikter-Svendsen, *Et konkurransedyktig Norge*.

Aluminiumsindustrien, SNF-Rapport nr. 60/1992, Bergen 1992, p. 17). Marlio 1947, p. 53 sets the production capacity of Haugvik smelteverk to 10,000 tons a year.

²⁴ Rauch's data doesn't always coincide with the data given by Metallgesellschaft in their *Statistischen Zusammenstellungen*, but Rauch, who was a director of the leading German producer, VAW, and a member of the board of directors of the cartel, had access to source material from VAW and AIAG when he wrote his book. The data are therefore probably accurate.

| | DNN (Tyssedal and Eydehavn) | NACO(Høyanger) | Haugvik smelteverk (Glomfjord) | BACO (Vigeland and Stongfjord) |
|----------------------------|-----------------------------|----------------|--------------------------------|--------------------------------|
| Estimated capacity in 1932 | 15,000 | 7,000 | 8,000 | 4,200 |
| Production in 1929 | 12,808 | 5,367 | 6,000 | 3,900 |
| Production in 1932 | 5,550 | 5,586 | 5,696 | 1,000 |

Source: Figures for DNN from the Pechiney archives, Paris, Relations Etrangères – DNN, fond 001/14/20487. Figures for NACO from Norsk Hydro archives, Notodden, NACO, fond 40, file 1168-60, figures from the smelters in Glomfjord, Vigeland and Stongfjord taken from table in Ernst Rauch, p. 312-313.

The table shows that NACO actually produced more metal in 1932, in the midst of the crisis, than it did in 1929. The Glomfjord smelter produced slightly less in 1932 than it did three years earlier, while output at DNN's two plants had been more than halved. Production at BACO's two smelters in Norway was reduced to a minimum. Although the output of the Norwegian aluminium stagnated in the first half of the 1930s, there was not stagnation all around. The firms developed very differently.²⁵

It is interesting to compare the production cuts in foreign owned aluminium smelters in Norway with the development in the home countries of the investors. If you look at Great Britain, aluminium production numbers rose until 1931, when the country produced 14,200 tons.²⁶ The following year it dropped to 10,300 tons, but the production rates started to rise

²⁵ During negotiations in 1932 with the Norwegian state concerning the delivery of power in Glomfjord, the cartel representatives claimed that Haugvik smelteverk would not be given a production quota exceeding 50-60 % of total capacity (St.prp. nr. 77, 1932, p. 4), Fasting claims that the production rates were set at 4,000 tons a year. Kåre Fasting, *Norsk Aluminium gjennom 50 år*, Oslo 1965 p. 159.

²⁶ Metallgesellschaft, 1939, p. 4. The following data is taken from the same place.

again from 1933. In 1935 Great Britain produced more aluminium than it had ever done before.

In France the picture is more similar to the overall Norwegian experience. Production peaked at 29,100 tons in 1929, and sunk to a low of 14,500 tons in 1932. However, in 1934 the production rates started to rise again, and by 1937 the country produced significantly more primary aluminium than it had done in 1929. In Canada production fell from 42,000 tons in 1929 to only 15,600 tons in 1934. The following years the production rose, at first slowly but then more rapidly, to a record level of 64,500 tons in 1938.

These figures indicate that the British Aluminium Company mainly adhered to the cartel quotas by cutting production at their Norwegian smelters. The cuts at their British plants were less extensive and less permanent. In France and Canada output of aluminium was dramatically reduced and followed the same pattern as in Norway. However, the recovery was slower in Norway. By 1938 both France and Canada produced considerably more metal than they did in 1929, while the production in Norway had not yet reached the 1929 level. To explain the slower recovery of the Norwegian aluminium industry we have to look at the expansion of protectionism and autarchy in the 1930s.

Norwegian aluminium and nickel exports in face of rising protectionism and autarchy

In an attempt to cope with the worldwide depression of the 1930s there was a general drive towards protectionism in the industrialised world. As the metallurgical industry in Norway almost exclusively produced for exports, the rising trade barriers could potentially be very harmful.

In the aluminium industry some important markets were already sheltered by protective tariffs by the end of the 1920s. The United States, the largest consumer of aluminium, had installed a substantial tariff protection in 1922. The tariff levels in France and Italy were even higher, only small amounts of aluminium were imported to these countries.²⁷

Great Britain had traditionally been the main purchaser of Norwegian aluminium, but as a result of the Ottawa-agreement in 1932 a tariff of 10 % ad valorem was imposed on aluminium. Commonwealth-states were exempted from this tariff, and consequently Canadian aluminium took over the British market. Harald Rinde has shown that the Norwegian share of the British market fell from 63% in 1929 to 0,7% in 1933, while the Canadian share increased

²⁷ Rauch 1962, pp. 166-168.

from 20% to 85%.²⁸ The Commonwealth preference came into effect at approximately the same time as the cartel decided to reduce production. For BACO, who mainly served the British and Commonwealth markets, the new tariff made it natural to carry out the production cuts decreed by the cartel at the company's Norwegian smelters. The Norwegian export of aluminium to Great Britain only resumed from 1937.²⁹

In the 1920s Germany used to import considerable quantities of Norwegian aluminium, but tariffs were introduced in 1930. In the following years Germany only imported 11 tons of aluminium from Norway.³⁰ From 1934 export increased, as aluminium was needed for the rearmament. Demand outstripped the German domestic output, even though the latter was dramatically expanded. One might therefore conclude that German autarchic policies reduced, but did not hinder import of aluminium.

In the 1920s Japan became a large importer of aluminium, nearly 12.000 tons in 1929.³¹ During the 1920s, Norway annually supplied between 500 and 1,000 tons. The major aluminium producers divided the Japanese market in July 1930. Alted got 52 % of the Japanese market, while the Europeans got 48 %.³² Alted was to be exclusive sales agent, and was empowered to fix prices and terms of sale. However, as a part of the drive towards self-sufficiency, Japan developed an aluminium industry of its own in the 1930s. Production started in 1934, but could not cover the country's needs. From 1937 to 1939 Norway exported significant amounts of aluminium to Japan.

During the late 1920s the Soviet market became important for the Norwegian aluminium producers. In 1931 Norway exported over 12,000 tons of aluminium, half of its total exports that year, to the Soviet Union. Because of rising domestic production the Soviet market temporarily dried up in 1935, but just like in Germany and Japan, demand soon outstripped domestic production. Seen from Norway, this was rather fortunate, as the aluminium cartel in 1935 reserved 50 % of the Soviet market for the partly Norwegian owned NACO.³³ As we shall see, this preferential treatment is probably best explained by the Norwegian government's issue of state securities for exports to the Soviet Union.

One may therefore conclude that Norwegian export of aluminium did not suffer badly neither from the autarchic policies adopted by Germany and Japan in the 1930s, nor from the

²⁸ Harald Rinde, *Utenlandske interesser i norsk aluminiumindustri 1908-1990*, Arbeidsnotat, Handelshøyskolen BI; 1996/10, p. 30.

²⁹ Metallgesellschaft, *Statistische Zusammenstellungen*, Frankfurt a.M. 1939, p. 34.

³⁰ *Ibid.*, p. 31.

³¹ *Ibid.*, p. 36.

³² Muller 1946, p. 129-130. The European companies divided their share as following: AIAG 50 %, French group 25 %, VAW 25 % and BACO 5 %.

³³ Marlio 1947, p. 57.

Soviet Union's drive for self sufficiency. Although all three countries rapidly expanded domestic output, imports were still needed. Protectionism proved more troublesome. The important British market was in reality closed to Norwegian aluminium after the Ottawa accord. This is probably the major reason why Norwegian production stagnated in the 1930s.

Trade barriers and autarchy mattered less in the nickel markets. Falconbridge's Norwegian refinery expanded its production from 3.000 tons of nickel in 1931 to 9.000 tons in 1939. Nearly everything went for export. Raffineringsverket's nickel production also increased, from around 400 tons in 1929 to 1.100 tons ten years later. Whereas Raffineringsverket mainly depended on the German and the Soviet market, Falconbridge divided its much larger production on a wider range of customers.

In the 1920s, there were low political barriers to trade with nickel metal. Since a small number of vertically integrated firms controlled the two major deposits, most countries had to import nickel. With the exception of Canada, France and Norway, all other countries were net importers. There were no (large) domestic industries to protect. Most tariffs had therefore only fiscal objectives and hit all producers almost equally.³⁴ This was indeed the case for a number of non-ferrous metals, including copper, lead and zinc.

In the early 1930s the political economy of nickel started to change. One reason was the general tendency towards increased protectionism. More important was the technical qualities and the end uses of the metal and its alloys. Nickel makes steel alloys stronger and more heat resistant. Speciality steels containing nickel was used to harden armour plates as well as in machine tools, auto parts, engines, artillery barrels and a wide range of military equipment. This strategic importance of nickel had two implications: as rearmament gained pace, the consumption increased spectacularly. The second implication – which will be further explored here – was that a number of countries tried to foster their own nickel industries.

The most important country in this regard was Germany. The small and low-grade deposits of nickel ore within the German borders were developed, but could not cover more than a fraction of the demand. The 'Vierjahresplan' of 1936 aimed at a self-sufficiency for nickel of only 12%.³⁵

³⁴ Metallgesellschaft, *Statistische Zusammenstellungen* Frankfurt a. M. 1930. The only important exception was the US which had a 10% tariff on refined nickel. INCO therefore shipped the intermediate product nickel matte to its refinery in Bayonne, New Jersey. This refinery served the US market. Since no other producers had nickel refineries in the US, this gave INCO an obvious advantage.

³⁵ Dietmar Petzina, *Autarkiepolitik im Dritten Reich, Der nationalsozialistischen Vierjahresplan*, Stuttgart 1968, p. 88.

In addition to the exploitation of domestic ores, Krupp also imported some minor quantities of ore.³⁶ In 1933 the German conglomerate IG Farben tried to secure deliveries of the intermediate product nickel matte from Falconbridge³⁷ and from INCO. A deal was made with the latter company. INCO provided IG Farben with nickel metal and with some nickel matte and let IG Farben do the refining.³⁸ This enabled the Germans to produce 600 tons of nickel in 1936.³⁹ For Falconbridge the IG Farben – INCO deal had dramatic consequences: from now on it had to play second fiddle in the German markets. In 1935 Falconbridge only sold 700 tons of nickel to Germany, i.e. just 12% of its production.⁴⁰

The Japanese endeavours towards self-sufficiency were also important as this had been one of the major markets for Falconbridge's nickel. Although domestic as well as Korean low-grade ores were developed they could not satisfy the country's needs. Mitsubishi therefore approached Falconbridge in 1937 to buy nickel matte and to use its refining technology, but was rebuffed.⁴¹ The Falconbridge management was well aware of its market power. Other partners were more forthcoming. The following year Mitsubishi negotiated for the entire output from a new nickel mine in British Columbia, Canada. However, refining problems prevented completion of the deal. According to the Canadian historian O. W. Main, only trial shipments were made.⁴² The Soviets opened nickel mines north of Leningrad. They were probably more technically successful with regard to refining than the Japanese, but were not self sufficient by the end of the 1930s.

The effects of the autarchic tendencies should not be exaggerated. In 1938, 95.000 metric tons (of primary nickel) was mined in Canada (Sudbury). New Caledonian production is calculated to alternatively 7.000 and 12.000 tons. Only 6.000 tons or ca. 5% was mined elsewhere.⁴³ Around 1.000 tons was mined in Norway, 1.500 tons in Greece, leaving only 3.500 tons to the autarchic states. It is also clear that the Germans did not achieve their production targets from the 'Vierjahresplan' of 1936.⁴⁴ As late as in 1940-41, the IG Farben's

³⁶ Mineral Industry XLVI, New York 1937, 447. Minerals Yearbook, Washington DC 1940, p. 608.

³⁷ Letter from G. Hardy to T. Lindsley 1 November 1933 and letter from Grønningsæter and Steen to G. Hardy 4 November 1933. Folder "Nikkelsalg 1932-33", Falconbridge archive, Kristiansand, Norway.

³⁸ Main 1955, p. 112. The agreement was technically speaking between INCO's British subsidiary Mond and IG Farben. In return for the deliveries of nickel matte IG Farben promised not to buy nickel from any other source or to develop any nickel mines.

³⁹ Letter from G. Hardy to Brandeis & Goldschmidt 10 February 1937. Folder "Salg av nikkel 1936-37", Falconbridge archive, Kristiansand, Norway.

⁴⁰ Folder "Nikkelsalg 1936-37", Falconbridge archive, Kristiansand, Norway.

⁴¹ Letter from G. Hardy to Brandeis & Goldschmidt 7 December 1937. Folder "Salg av nikkel 1936-37", Falconbridge archive, Kristiansand, Norway.

⁴² Main 1955, p. 112.

⁴³ Ibid., p. 109-111. Metallgesellschaft, Statistische Zusammenstellungen 1929-1938, Frankfurt a. M. 1939, p. 21.

⁴⁴ Petzina 1968, p. 193. In 1940 Germany only produced 9% of her consumption of nickel.

refining capacity was less than 4.000 tons.⁴⁵ The fact therefore remains that the Canadian and French firms still controlled around 95% of the mining and more than 90% of the refining.

Besides the autarchic policies in Germany, Japan and the Soviet Union, protective tariffs also became an issue. While the US customs on refined nickel went back to the 19th century, British customs were new. As a part of the Ottawa-agreement in 1932 and the creation of Imperial trade preferences, Great Britain imposed a tariff of 10% on refined nickel. Falconbridge tried - to no avail - to gain acceptance that the customs should only be calculated on the basis of the company's production costs at the refinery in Norway, i.e. outside the British Empire, and not on the costs incurred at the mine and smelter in Sudbury.⁴⁶ The tariff placed Falconbridge at a clear disadvantage and sales were therefore directed to markets where the firm could compete on equal terms.⁴⁷ However, in this case, Falconbridge could enlist the support of the Norwegian government.

A small country in world markets: Aluminium, nickel and Norwegian trade policies

Rising protectionism created a great challenge for a small export-oriented country like Norway. She tried in vain to defend the principles of free trade, for instance through the League of Nations. Three strategies can be identified in the Norwegian endeavours to safeguard the exports. The so-called Oslo-agreement, a multilateral trade agreement between the Scandinavian and the Benelux countries, was negotiated in 1930. The idea was that if small states banded together, protectionism could be kept in check. However, nothing much came of this.

The second strategy was to conclude bilateral trade agreements. In our case Great Britain was the most important. Norway was one of the countries worst hit by the new British protectionism and the Imperial preferences. In May 1933 a new trade agreement was concluded. Norway pledged to buy 70% of its coal from Britain instead of cheaper Polish coal. While Norwegian authorities did not succeed in their primary objective – gaining better market access for fish products – British tariffs were dropped on a number of items, including

⁴⁵ The Metal Bulletin 12.02.1946. See also J. Jäger, *Die wirtschaftliche Abhängigkeit des Dritten Reiches vom Ausland*, Berlin 1969. Jäger states that the wartime capacity never surpassed 4.000 tons of nickel.

⁴⁶ Letter from Gordon Hardy to Brandeis & Goldschmidt 10 May 1932, Folder "Nikkelsalg 1929-1932", Falconbridge Archive, Kristiansand, Norway.

⁴⁷ Letter from Falconbridge top manager G. Hardy to plant manager Sverre Steen, Kristiansand 11 January 1934. Folder "Salg av Nikkel 1934-1935", Falconbridge Archive Kristiansand, Norway.

refined nickel.⁴⁸ As a result, Falconbridge's exports to the British market increased rapidly. In the following years up to half of Falconbridge's nickel was sold in the UK. However, British preference for Canadian aluminium was upheld. As a consequence, Norwegian exports of aluminium to the UK were not revived until the late 1930s.

The third strategy was to issue state securities for exports. This had started in 1922 in order to resume fish exports to the Soviet Union. From 1929 the scheme also included industrial exports. Subsequently Raffineringsverket was able to sell most of its nickel production to the Russians. The government justified this policy by pointing out that Raffineringsverket's production was solely based on Norwegian nickel ore. Later however, even Falconbridge was included in the scheme.⁴⁹

In aluminium exports the state securities played an even more important role. The Soviet Union started to import large amounts of aluminium from 1927.⁵⁰ In 1928 Alted and the French aluminium producers entered into an agreement dividing the Soviet market between them.⁵¹ Other European producers were to be excluded from this market. Because both of these companies had Norwegian subsidiaries, they could benefit from the state securities by supplying the Soviet market with production from their Norwegian smelters. The government seems to have expanded the state security scheme under pressure from the aluminium producers. The companies had warned that one of the smelters would be shut down if they could not find an outlet for the production.⁵² The following years Norwegian exports of aluminium to the Soviet Union expanded significantly: in 1929 it was 4,720 tons, in 1931 it peaked at 12,280 tons, but it remained significant until 1934.

The Norwegian government in other words attempted to secure her export industries through the crisis years. Priority was given to fisheries, not because of the export value per se, but primarily due to the livelihood (and votes) of the coastal population. However, the interests of the metallurgical industry were also defended – albeit with mixed success as the examples of British tariffs on nickel and aluminium amply show. The state securities for industrial exports were very important for selected firms during the worst years of depression, and hindered that plants were shut down.

⁴⁸ Hans Otto Frøland, "Between Germany and Britain, Norwegian trade policies in the 1930s". (Draft)

⁴⁹ Prop. 78, Stortingsforhandlingene 2a, 1932

⁵⁰ Rauch 1962, p. 194.

⁵¹ Muller 1946, p. 129.

⁵² Parliamentary debate, contribution from statsråd Oftedal, 19th of February, 1929, *Stortingstidende 1929*, p. 382.

Conclusions

We have reviewed four aspects concerning the Norwegian aluminium and nickel industries in the interwar era; the effects of foreign ownership, cartels / oligopolies, rising protectionism and government support.

Both industries were dominated by vertically integrated multinational firms. The Norwegian attempts at integrating backwards during the latter stages of World War I were unsuccessful, partly due to bad timing and partly to mismanagement. As Norwegian investors did not manage to secure raw material supply, domestic ownership was not a viable option. Our understanding is therefore that foreign ownership was a necessary but not a sufficient precondition for growth in these two industries. We disagree with Tresselt's somewhat nationalistic explanation of the disappointing development in the Norwegian aluminium industry after 1929, namely that this was due to foreign corporations using Norwegian smelters as swing producers in times of sagging demand.

The important questions to be asked when discussing the effects of ownership are who these owners were, what their relationship to the cartels (or producer oligopoly) was and where they found their primary markets. The nickel industry is the most straightforward. As INCO dominated world nickel markets it took the burden of being a swing producer in 1931-32 when demand collapsed. It curtailed its own production by approximately 80% in order to keep prices high. Falconbridge thereby managed to act as a free rider, enjoying high prices and expanding in the midst of the depression. This meant that production in Kristiansand, Norway, increased every year. If INCO had owned the Norwegian plant, output would probably have been much lower during the early 1930s. We can find a somewhat similar example in the aluminium business. The International Aluminium Corporation stayed outside the cartel and could therefore uphold production at its smelter in Glomfjord, at least until the plant was bought by the aluminium cartel in 1932.

Firms that stayed outside the cartels and other kinds of market rigging arrangements – and got away with it – could obviously profit. But if too many firms opted out, cartels collapsed. To avoid this most companies had to adhere to the rules. The question is therefore how the cartels functioned? Members had to share the pain during contractions. How production quotas were distributed differed. In the aluminium industry cartel members were given production quotas according to their capacity. It was up to the different companies to decide in which plants to cut production. The British Aluminium Company seems to have adhered to the cartel quotas by cutting production at their Norwegian smelters. The cuts at the

British plants were less extensive and less permanent. The reason for this was not – as Tresselt suggested – the nationality of the owners, but quite simply a question of tariffs. In other cases, cartel agreements had the opposite effect; the distribution of Russian and Japanese sales came to favour the Norwegian smelters. The point is quite simply that in order to understand industrial development – even in a peripheral country like Norway – one must take the international cartels into account.

The next aspect to be reviewed was the effects of protectionism and autarchic policies. While rising trade barriers diverted and in many cases strangled international trade altogether, trade in most non-ferrous metals were not as affected. As all major industrial countries bar the US were net importers of most non ferrous-metals protectionism in this field was curtailed.

Again nickel is the most straightforward. In the 1930s large scale nickel mining only found place in Sudbury, Canada and in New Caledonia. Furthermore, the major deposits were controlled by only three companies. This left little possibility of fostering national industries behind tariff walls. Therefore protectionism and autarchic policies did not have much effect. This pattern was not limited to nickel, there were no important obstacles to trade in for example copper, lead and zinc.

The situation in the aluminium business was more complex. Although the best known bauxite fields were in France, Suriname and the Unites States, aluminium could be extracted from a number of ore deposits all over the world. This made it possible to promote domestic aluminium production, and during the 1930s both Japan and Russia started to produce the metal. Japan continued to rely heavily on imports, but the Russian market, which was so lucrative for the Norwegian aluminium exporters from 1929 to 1934, temporarily dried out as imports where substituted by domestically produced aluminium.

As the Norwegian aluminium plants almost exclusively produced for exports, the rising protectionism of the 1930s proved troublesome. Germany and Great Britain introduced tariffs on aluminium, thereby effectively closing two of the most important markets for metal from Norway.

While a small state like Norway could not halt interwar protectionism, she had some leverage in trade negotiations, even with large countries. We have shown that she was able to secure toll free access to Great Britain for nickel and some other metals after the introduction of Imperial tariffs in 1932. However, British tariffs on aluminium were not abolished. The Norwegian government was also able help some beleaguered firms with de facto export subsidies. This was the case in both the aluminium and nickel business. Although one should

be careful not to overestimate the effects of government support, it decidedly had some impact during the worst part of the depression 1931-32.