TRADE & INDUSTRIAL POLICY STRATEGIES

MANUFACTURING SUBSECTORS

Basic chemicals and petroleum refineries

March 2021

Industrial policy interventions aim to promote structural transformation and structural change in pursuit of economic growth. The effectiveness and efficiency of these interventions depends to a crucial extent on the ability of policymakers to tailor interventions to the specific needs of individual manufacturing subsectors.

To support evidence-based policymaking, TIPS has completed a series of notes on the various manufacturing subsectors in South Africa. The aim is to provide synthesised data on the dynamics of the South African manufacturing subsectors, specifically in their contribution to the GDP, employment, earnings, investments, productivity, markup, profitability and assets, market structure and dominant producers, major inputs and international trade. The main data sources are Statistics South Africa, Quantec, Who Owns Whom, and the International Trade Centre.

This note provides an overview of the South African basic chemicals and petroleum refineries subsector as of December 2020.

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Executive summary

Production in basic chemicals and refined petroleum products has grown steadily over the past 25 years. In constant rand terms, production grew from around R24 billion in 1994 to just under R68 billion in 2019. As a result of this growth, basic chemicals and refined petroleum products grew its share of manufacturing value add, from around 7% 1994 to just under 12 % in 2019. Employment has, however, remained steady in the subsector despite the growth in production. Reliable employment data from 2008 to 2020 points to a constant or steady trend, with employment averaging around 64 000 in the period under analysis.

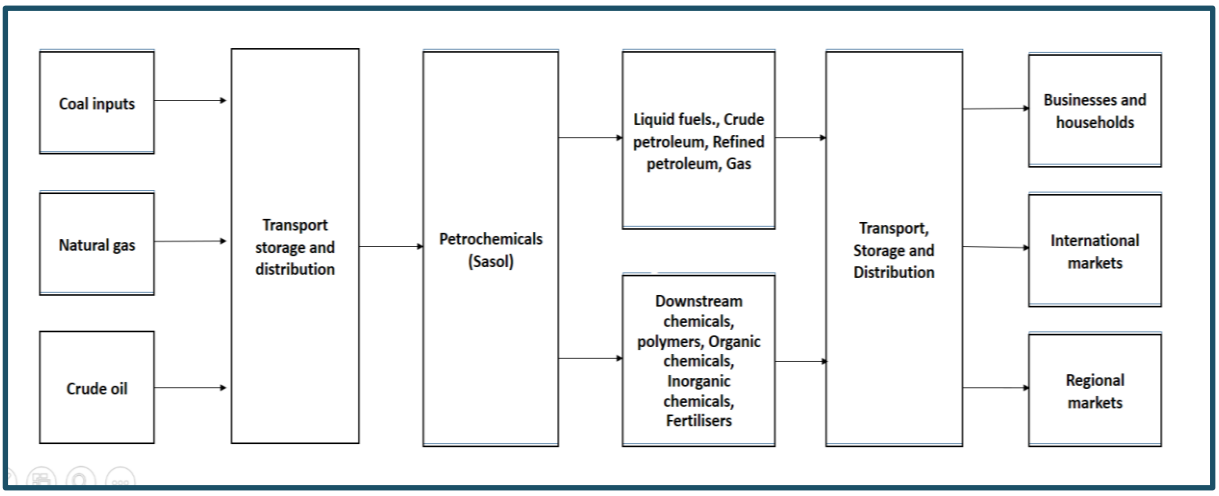
Production in basic chemicals and refined petroleum products grew 9% a year from the opening of the economy in 1994 to the early 2000s, then levelled at around R44 billion. However, growth in production was particularly clear from 2010. Between 2011 and 2019, production grew 6% a year, reaching a peak of R74 billion in 2018. Consequently its share in total manufacturing value added rose from 11% in 2011 to 12% in 2019. Growth in production within this period was driven by a revival in demand and general surge in industrial activity.

Basic chemicals and refined petroleum products were major exports for South Africa and accounted for 6% of total exports in 2020. Demand for South Africa's basic chemicals and refined petroleum was driven by petroleum, specifically crude petroleum which accounted for two fifths of South Africa's basic chemicals and refined petroleum exports. Other major exports were organic and inorganic chemicals, which jointly accounted for two fifths of total basic chemicals and refined petroleum exports. Most refined petroleum exports went to Botswana, other neighbouring countries and the rest of Africa. Botswana accounted for two fifths of total exports to African countries and around a fifth of total refined petroleum exports.

However, imports of basic chemicals and refined petroleum products were somewhat higher than exports. Imports were driven by refined petroleum, specifically crude petroleum, which were mainly sourced from Saudi Arabia and the Middle East. South Africa imported a substantial share of crude petroleum from other African countries such as Nigeria, Angola and Mozambique.

Basic chemicals and petroleum refineries value chain

The basic chemicals and petroleum refineries industry comprises polymers, bulk petrochemicals and intermediates, other basic industrial and inorganic chemicals, and fertilisers. It forms part of the broader chemicals industry, which also encompasses household chemicals, pharmaceuticals, cosmetics, and products of plastic and rubber, most of which are downstream from basic chemicals and petroleum refineries. In contrast to international competitors, in South Africa coal formed an important feedstock, based on Sasol's coal-to-liquid fuel plants.



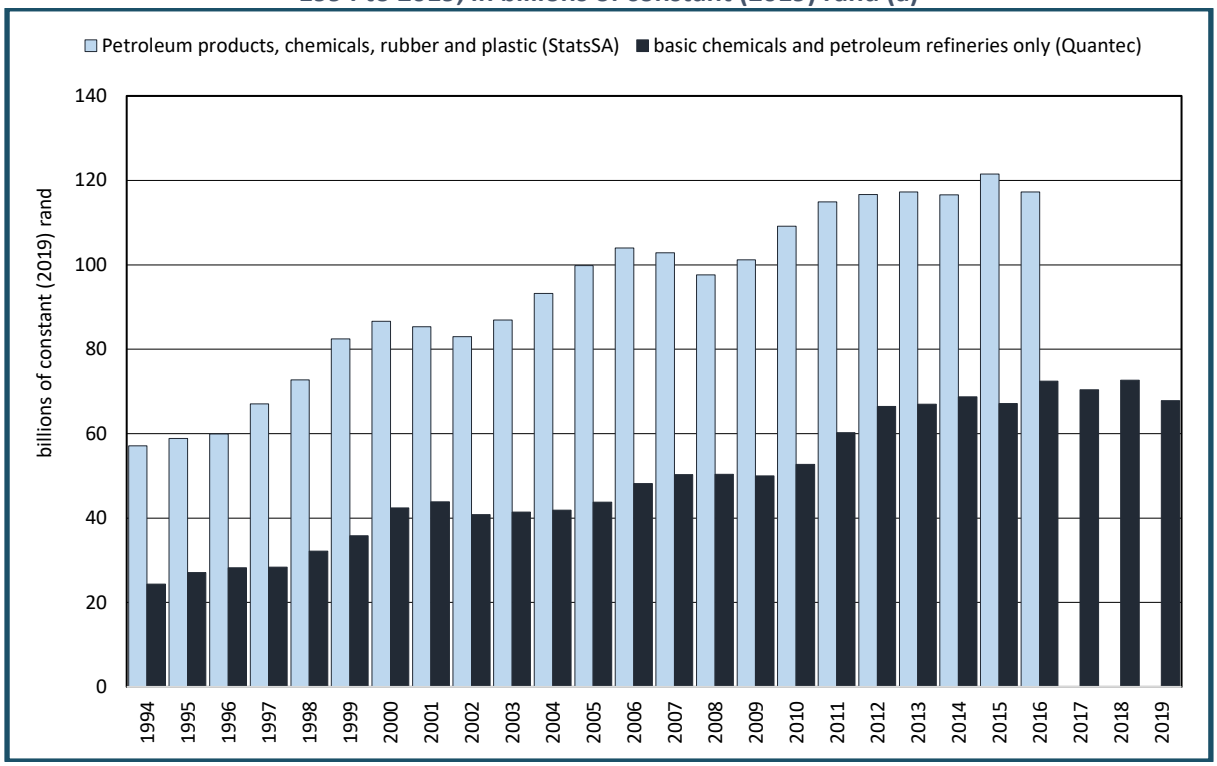
1. Contribution to GDP

Data for the contribution of manufacturing industries to gross domestic product (GDP) (that is, for value add by subsector) comes from two sources: the GDP data published by Statistics South Africa, and Quantec, which develops estimates based on the Statistics South Africa figures for sales, production and employment by industry and sub-industries. The figures are not identical, although they typically show the same trends. This note provides both.

Statistics South Africa provides data only for the entire chemicals industry, including plastics, pharmaceuticals and downstream chemical products. Quantec estimates separate out basic chemicals and petroleum refineries, but its annual figures for the entire chemicals industry diverge by between 1% and 2.5% from the Statistics South Africa data.

Gross value added in basic chemicals and petroleum refineries mainly followed the trends of the commodity boom from 2002. According to Quantec estimates, it climbed 2% a year from 2002 to 2008; dropped 1% from 2008 to 2009; recovered at 10% a year from 2010 to 2012; then slowed to an annual average growth rate of only 3% a year from 2012 to 2019 as commodity prices plummeted. The Statistics South Africa data for the industry suggest a similar trend for petroleum products, chemicals, rubber and plastic, as Graph 1 shows.

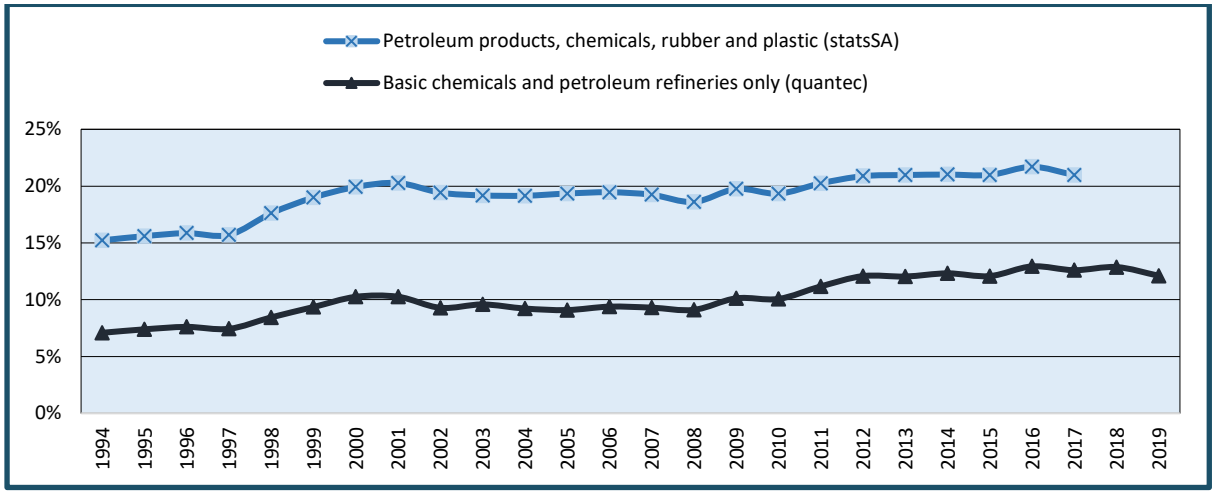
Graph 1 . Value added in basic chemicals and petroleum refineries, 1994 to 2019, in billions of constant (2019) rand (a)



Note: (a) Deflated by calculating the deflator used in the sources from figures in current and constant rand, and then rebasing to 2019. Source: Statistics South Africa, GDP P0441. Excel spreadsheet. Series on manufacturing subsectors in current and constant rand. Downloaded from www.statssa.gov.za in January 2021; and Quantec EasyData. Standardised regional data. Database in electronic format. Series on value added in current and constant rand. Downloaded from www.quanis1.easydata.co.za in January 2021.

According to Quantec estimates, the share of basic chemicals and petroleum refineries in total manufacturing value added climbed from 7% in 1994 to 12% in 2019. According to Statistics South Africa, the total chemicals industry increased its share in manufacturing value add from 15% in 1994 to 21% in 2017.

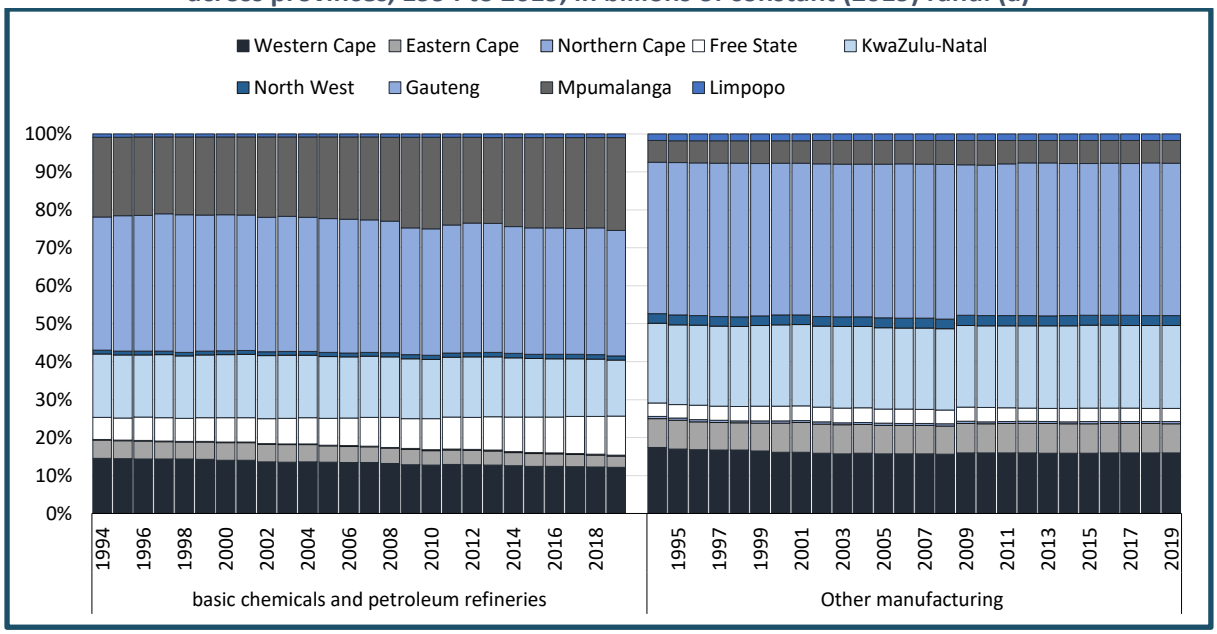
Graph 2. Basic chemicals and petroleum refineries share in manufacturing value added



Source: Calculated from Statistics South Africa, GDP P0441. Annual quarter and regional revisions. Q4 2016. Excel spreadsheet. Series on manufacturing subsectors in current rand. Downloaded from www.statssa.gov.za in January 2021; and Quantec EasyData. Standardised regional data. Database in electronic format. Series on value added in current rand. Downloaded from www.quanis1.easydata.co.za in January 2021.

Gauteng province had a disproportionate share of value added in basic chemicals and refined petroleum products (see Graph 3), followed by Mpumalanga and Western Cape. Mpumalanga's dominance in heavy chemicals and refined petroleum products reflected the importance of Sasol for the subsector.

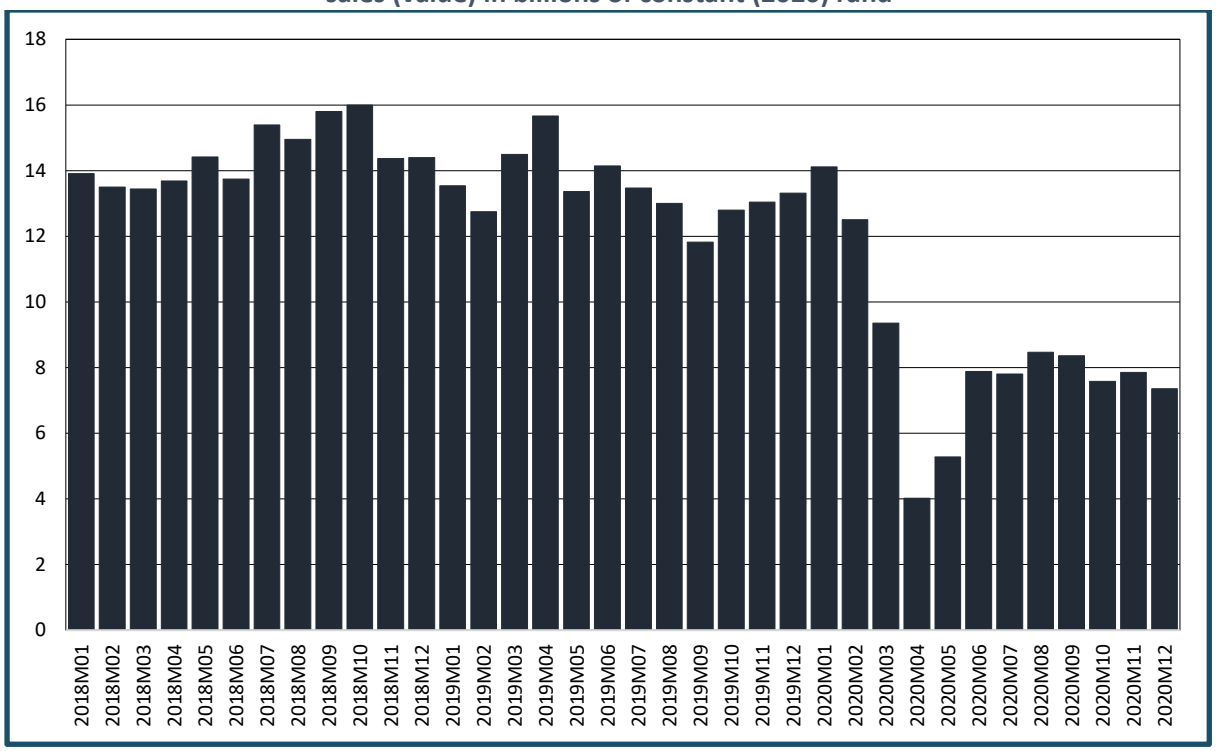
Graph 3. Distribution of value added in basic chemical and petroleum refineries across provinces, 1994 to 2019, in billions of constant (2019) rand. (a)



Note: (a) Deflated by calculating the deflator used in the sources from figures in current and constant rand, and then rebasing to 2019. Source: Quantec EasyData. Standardised regional data. Database in electronic format. Series on value added in current and constant rand. Downloaded from https://www.quantec.co.za/easydata/ in January 2021.

In April 2020, basic chemicals and refined petroleum's sales in constant, seasonally adjusted rand dropped 57% (R5 billion) month-on-month and by 73% (R9 billion) year-on-year. However, sales in constant, seasonally adjusted rand appeared to pick up from May 2020, they grew at an average rate of 9% a month between May 2020 and December 2020 due to a revival in demand in key market segments, general relaxation of trading restrictions and gradual revival in industrial activity. However, by December 2020, seasonally adjusted sales were 46% below pre-COVID-19 pandemic levels (see Graph 4). This is probably linked to the global price of petrol which crashed in March 2020 and has not recovered like other commodities, partly due to jet fuel demand being low.

Graph 4. Seasonally adjusted basic chemicals and petroleum refineries sales (value) in billions of constant (2020) rand

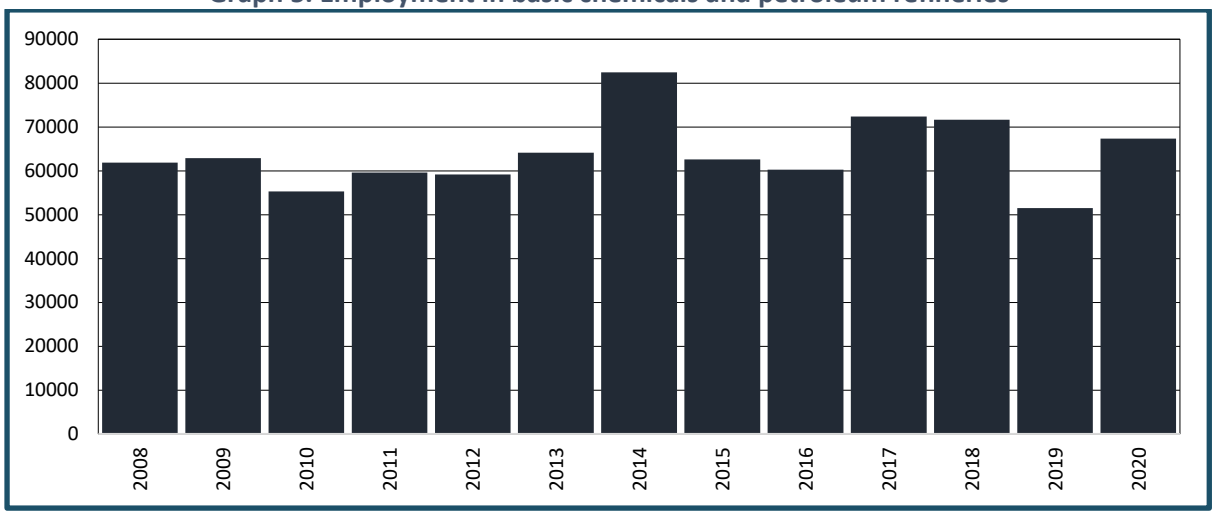


Note: (a) Deflated with CPI, debased to December 2020. Source: Calculated from Statistics South Africa. Manufacturing Production and Sales for December 2020 Excel Table from 1998. Downloaded from www.statssa.gov.za in March 2021.

3. Employment

Employment in basic chemicals and petroleum refineries contracted 0.3% a year, down from 62 000 in 2008 to approximately 51 000 in 2019 (see Graph 5). However the data indicate that employment in basic chemicals and refined petroleum increased by 30% year-on-year in 2020. The data probably reflect a sampling error as the sample for basic chemicals is quite small. The data for 2019 probably reflect a sampling error as there is no visible economic explanation for the substantial decline in 2019. Moreover the long-term trend of employment in basic chemicals and petroleum refineries is quite flat from 2008 to 2020.

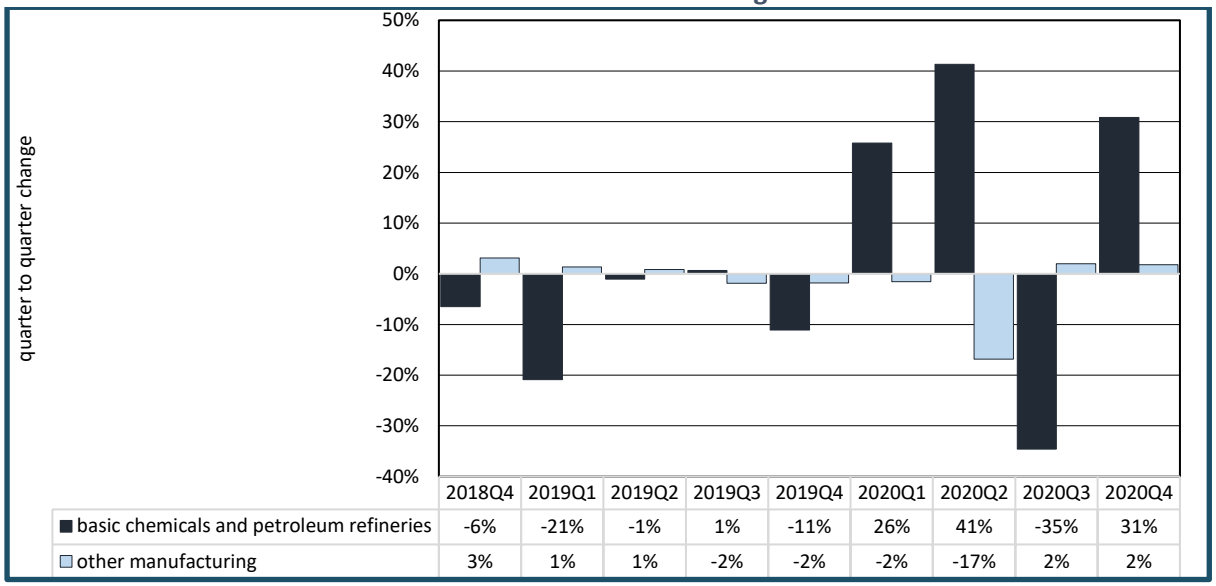
Graph 5. Employment in basic chemicals and petroleum refineries



Source: Calculated from Statistics South Africa. Labour Market Dynamics. 2008 to 2019. Series on employment by industry. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2021; and Quarterly Labour Force Survey (QLFS). Q1 2020 to Q4 2020. Series on employment by industry. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2020.

The QLFS data indicate that on a quarter-to quarter-basis, employment in basic chemicals and petroleum refineries was down 35% in the third quarter of 2020, compared to the second quarter of 2020. In contrast, other manufacturing grew 2% (quarter-on-quarter) in the same period. However, in the final quarter of 2020, employment in basic chemicals and petroleum refineries grew 31% quarter on quarter, higher than other manufacturing which was 2% quarter-on-quarter (see Graph 6).

Graph 6. Changes in employment in basic chemicals and petroleum refineries and other manufacturing

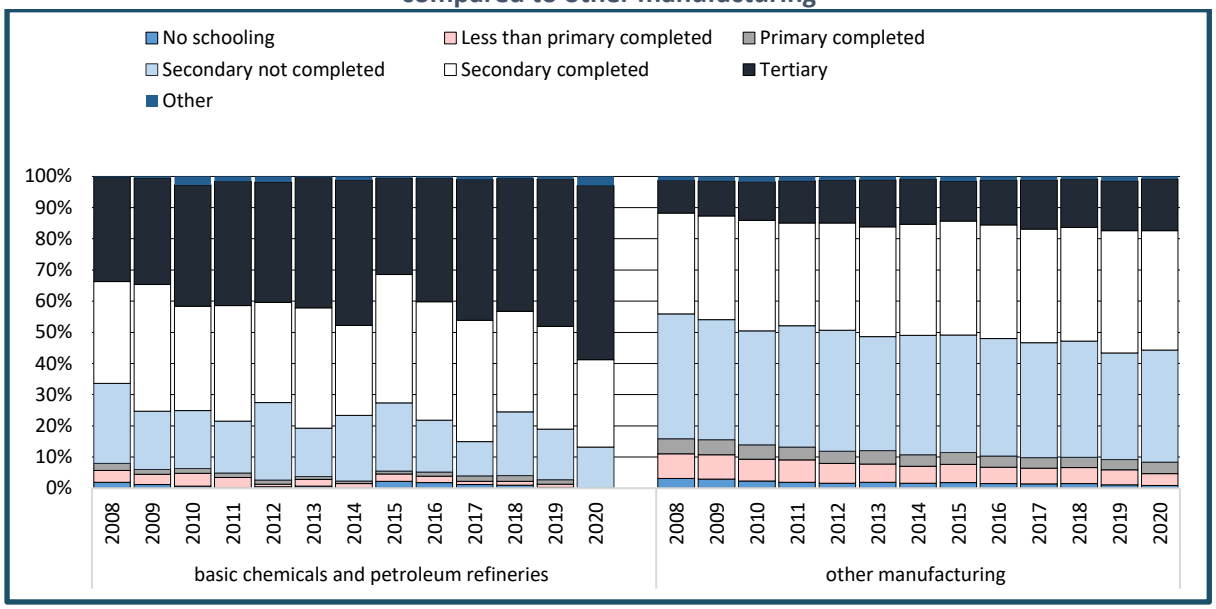


	2018Q4	2019Q1	2019Q2	2019Q3	2019Q4	2020Q1	2020Q2	2020Q3	2020Q4
basic chemicals and petroleum refineries	-6%	-21%	-1%	1%	-11%	26%	41%	-35%	31%
other manufacturing	3%	1%	1%	-2%	-2%	-2%	-17%	2%	2%

Source: Calculated from Statistics South Africa. QLFS. Q4 2018 to Q4 2020. Series on employment by industry. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2021.

Education levels in basic chemicals and petroleum refineries were significantly higher than in the rest of manufacturing. In 2019, 13% of workers in the subsector did not have matric, compared to 40% in the rest of manufacturing. Almost 47% had a post-secondary degree in 2019, compared to 16% in the rest of manufacturing.

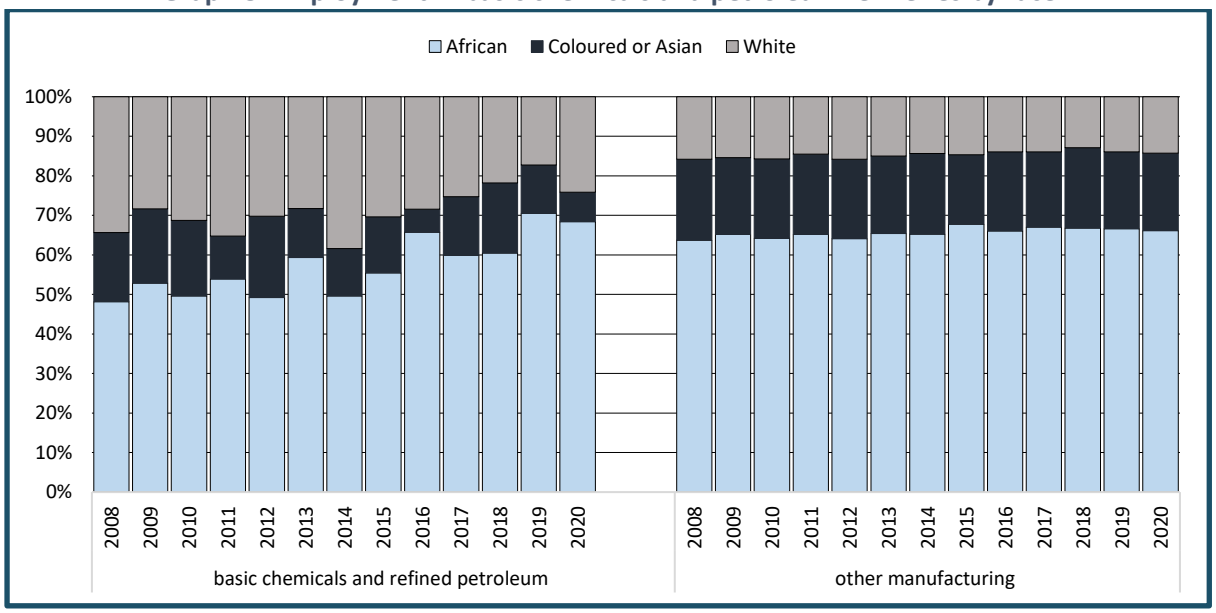
Graph 7. Employment by education level in basic chemicals and petroleum refineries compared to other manufacturing



Source: Statistics South Africa. Labour Market Dynamics. Relevant years. Series on employment by industry and education. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2021.

Between 2008 and 2016 workers in basic chemicals and petroleum refineries were less likely to be African than in the rest of manufacturing. However, the share of Africans in basic chemicals and petroleum refineries increased steadily from 2014, while that of whites, Coloureds and Asians declined. In 2019, Africans comprised 70% of employment in basic chemicals and petroleum refineries, compared to 66% in other manufacturing. Whites comprised 17% of total employment in the subsector, compared to 13% in the rest of manufacturing.

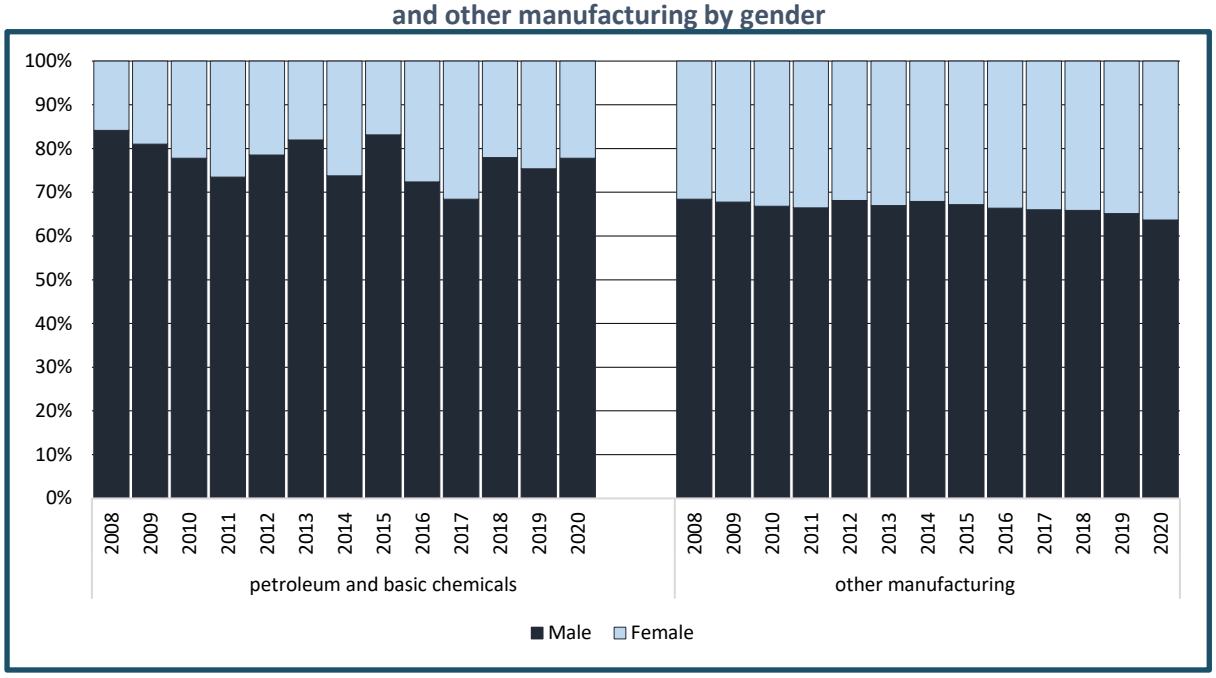
Graph 8. Employment in basic chemicals and petroleum refineries by race



Source: Statistics South Africa. Labour Market Dynamics. Relevant years. Series on employment by industry and education. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2021.

Women made up less than 20% of the labour force in basic chemicals and petroleum refineries, significantly lower than for the rest of manufacturing.

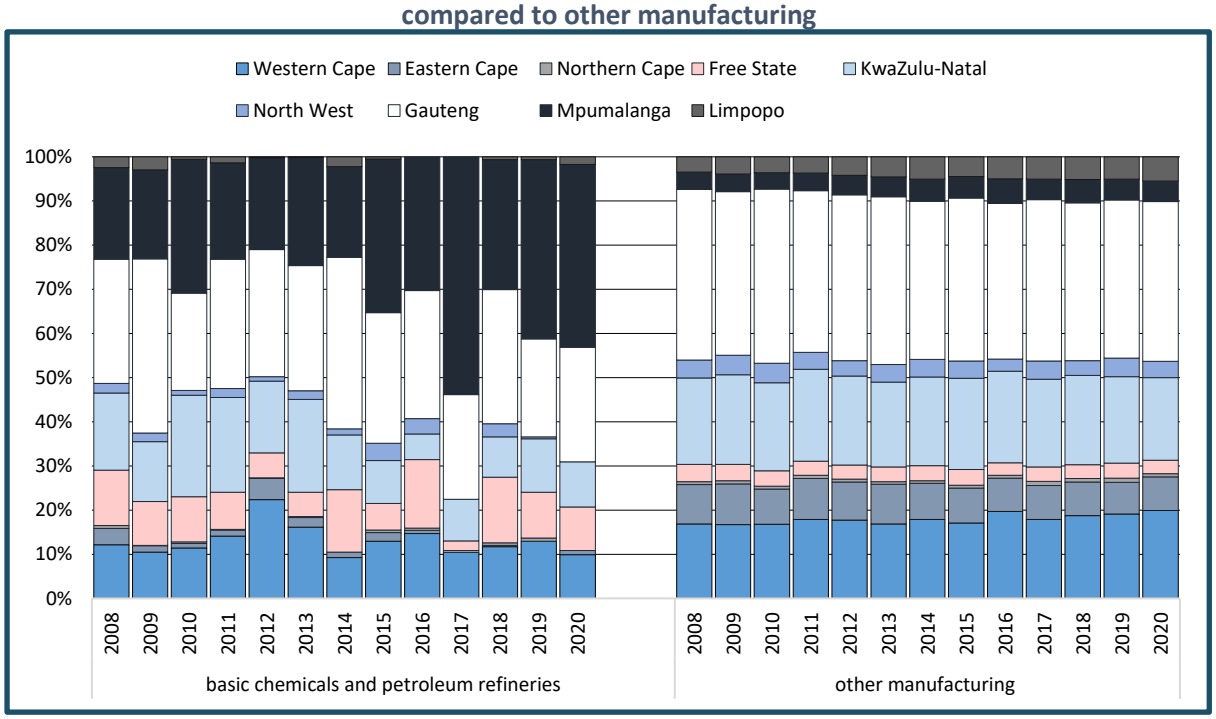
Graph 9. Employment in basic chemicals and petroleum refineries and other manufacturing by gender



Source: Statistics South Africa. Labour Market Dynamics. Relevant years. Series on employment by industry and population group. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2021.

Statistics South Africa provides information on employment by province. As Graph 10 shows, Mpumalanga's share in basic chemicals, at around two fifths of total employment, was far higher than in other manufacturing, where it accounted for only around 5% of employment. Mpumalanga's dominance reflected the importance of Sasol in the value chain. Gauteng, the Western Cape and KwaZulu-Natal were the next most important provinces for the industry, but they were less dominant than in other industries.

Graph 10. Employment by province in chemicals and petroleum refineries compared to other manufacturing

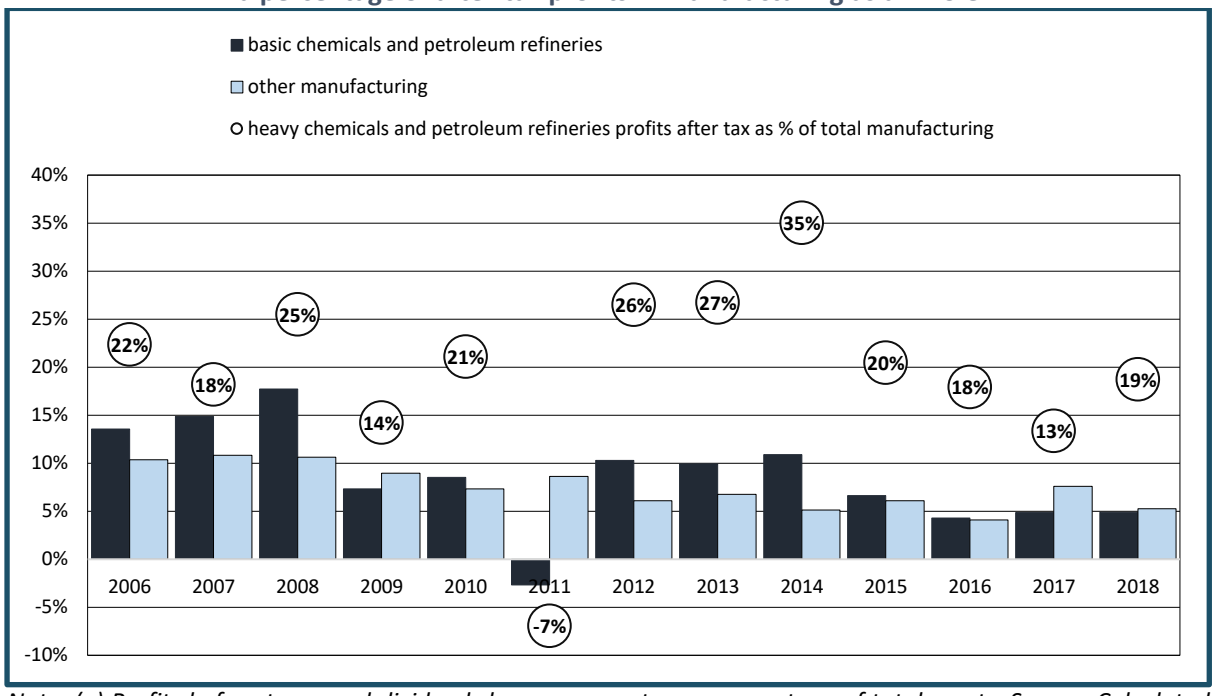


Source: Statistics South Africa. Labour Market Dynamics. Relevant years. Series on employment by industry and population group. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in January 2021.

4. Profitability and assets

From 2008, the after-tax return on assets in basic chemicals and petroleum refineries averaged 9% a year. That was higher than in the rest of manufacturing, where returns averaged 8% a year. Basic chemicals and petroleum refineries provided around 19% of all manufacturing profits.

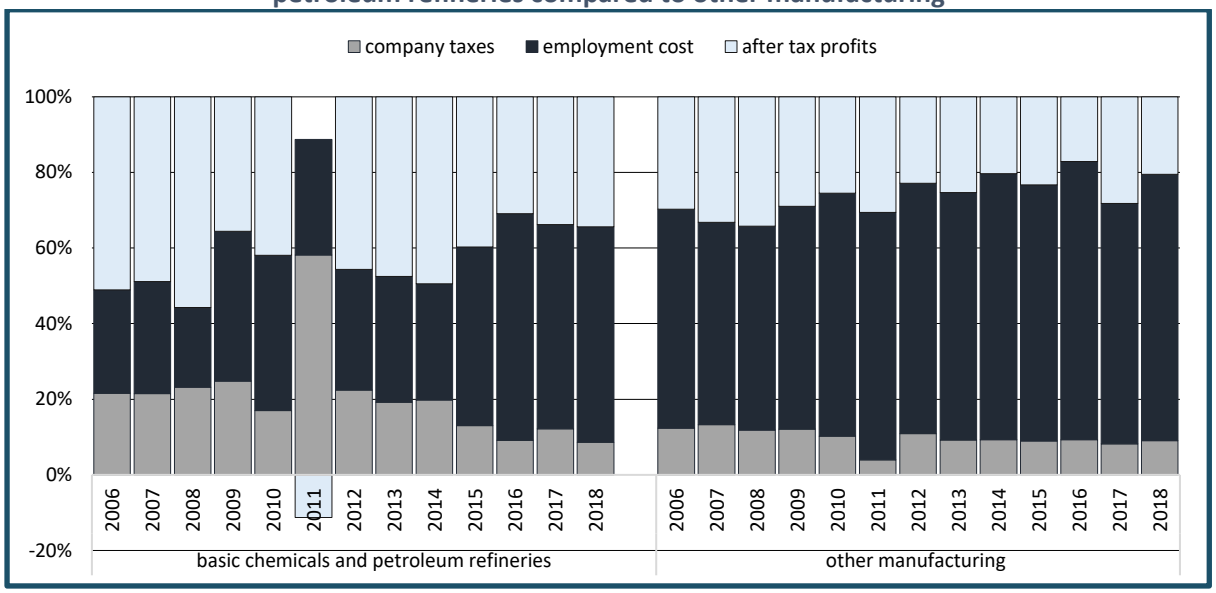
Graph 11. Return on assets (a) in heavy chemicals and petroleum refineries and other manufacturing, and after-tax profits in basic chemicals and petroleum refineries as a percentage of after-tax profits in manufacturing as a whole



Note: (a) Profits before taxes and dividends less company tax as percentage of total assets. Source: Calculated from Statistics South Africa. Annual Financial Statistics. Disaggregated Industry Statistics for relevant year. Excel spreadsheet. Downloaded from www.statssa.gov.za in January 2021.

Between 2008 and 2018, employment costs averaged 40% of income in basic chemicals and petroleum refineries, compared to 65% in the rest of manufacturing. In the same period, after-tax profits averaged 36% of total income in basic chemicals and refined petroleum. The comparable figure was 25% for other manufacturing. The average rate for company taxes in basic chemicals and petroleum refineries was 22% between 2008 and 2018. In contrast, company taxes in other manufacturing averaged 9% in the same period.

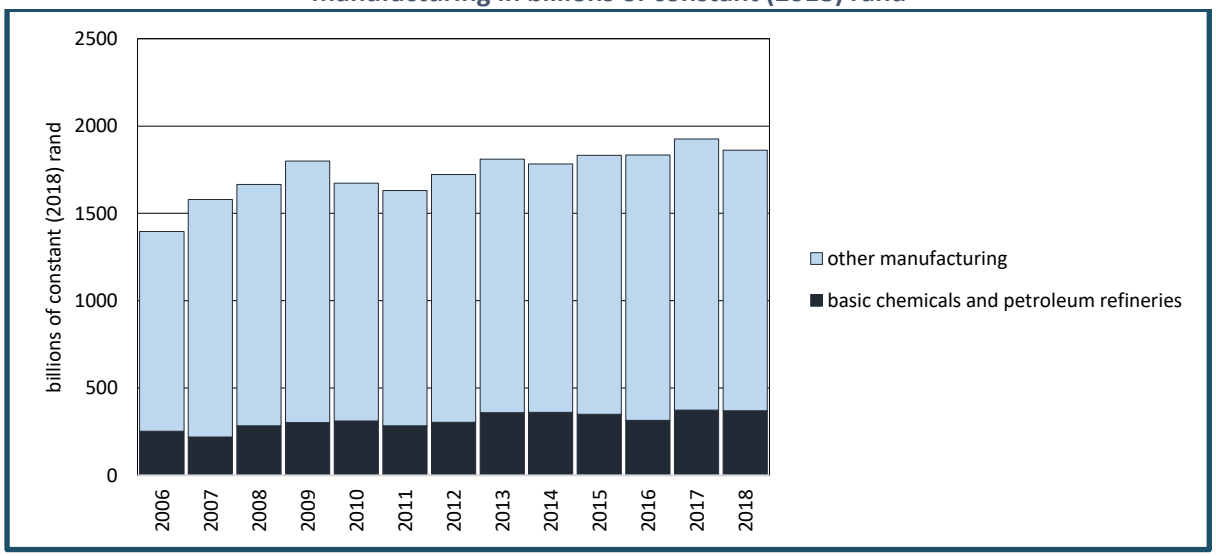
Graph 12. Share of remuneration, profits and taxation in income from basic chemicals and petroleum refineries compared to other manufacturing



Source: Calculated from Statistics South Africa. Annual Financial Statistics. Disaggregated Industry Statistics for relevant year. Excel spreadsheet. Downloaded from www.statssa.gov.za in January 2021.

Because of the large scale of production, the value of basic chemicals and petroleum refineries processing assets tended to move in step changes. Overall, they climbed 20% from 2008 to 2018, while the assets in the rest of manufacturing rose 12%. As a result, the share of basic chemicals and petroleum refineries of total manufacturing assets climbed from 18% to 20% over this period.

Graph 13. Value of total assets in basic chemicals and petroleum refineries processing and other manufacturing in billions of constant (2018) rand

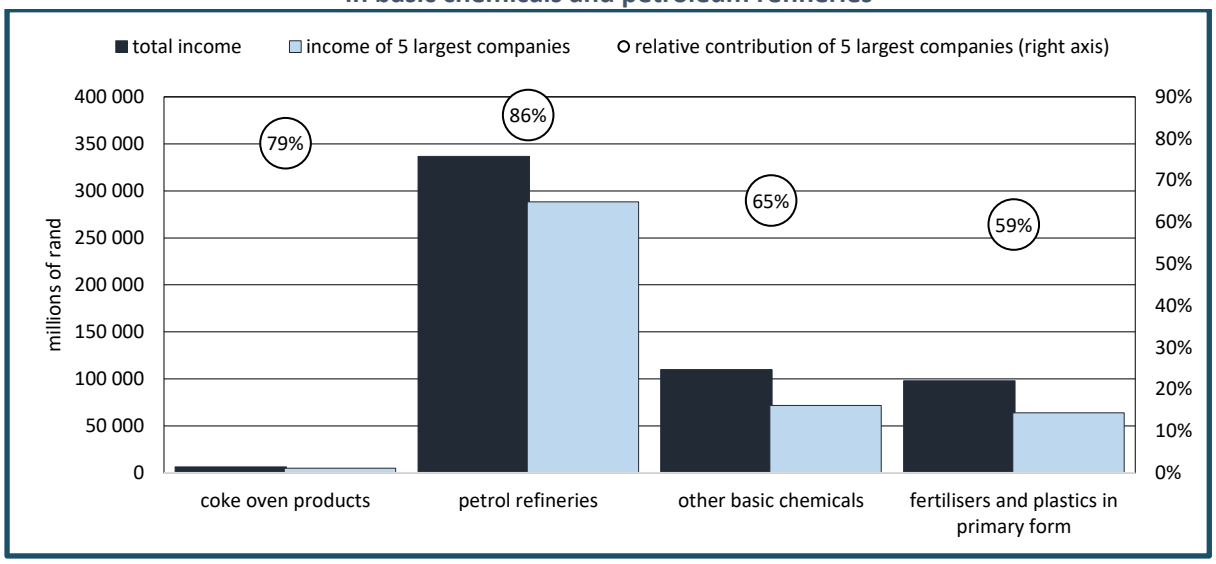


Source: Calculated from Statistics South Africa. Annual Financial Statistics. Disaggregated Industry Statistics for relevant year. Excel spreadsheet. Downloaded from www.statssa.gov.za in January 2021.

5. Market structure and major companies

According to Statistics South Africa's Manufacturing Financial Statistics, in 2017 the share in total income of the largest five companies in basic chemicals and petroleum refineries was over 60%. That was substantially higher than the norm for major manufacturing industries, where the figure fell between 30% and 40%.

Graph 14. Share of top 10 companies in total income in subsectors in basic chemicals and petroleum refineries



Source: Calculated from Statistics South Africa. Manufacturing Industry: Financial, 2019. Pretoria. Table 9, p33 ff.

The largest companies in basic chemicals and petroleum refineries are described in Table 1. In basic chemicals, Sasol was by far the dominant producer. In petroleum refining, international investors and the state-owned company PetroSA also had a significant market share. In contrast, downstream chemicals producers (covered in the note on other chemicals, plastics and rubber) were generally substantially smaller, and ended up as price takers for basic chemicals suppliers. South Africa has historically also had strong producers of fertilisers and mining chemicals, including compressed gases.

Table 1. Major producers of basic chemicals and petroleum refineries

A. Petroleum products

Company	Employees	Operations
Sasol	31 001 (Group) (30 670 — permanent; 331 — non-permanent)	Integrated production of coal mining and coal-based chemicals, including liquid fuels, pipeline gas, waxes, petrochemicals, plastics, fertilisers, mining explosives, and crude tar acids. Exports technology internationally. Seeking to increase gas-based production based primarily on imports from Mozambique. About 45% of turnover was in South Africa in 2015, with around 22% in Europe and 13% in the United States.
Engen Petroleum	4 000 (Group) (740 — refinery)	Core operations include refining crude oil and related products, as well as retail sales from 1 500 franchised service stations across Africa. Operates the ENREF refinery and a bitumen plant as well as a tanker fleet.
Southey Holdings	3 000	Subsidiaries service major onshore and offshore oil and gas discoveries; provide industrial painting, thermal and corrosion insulation and fire proofing; manufacture insulation panels and gas tanks and pressure vessels; and manufacture pre-expanded polystyrene moulded and/or cut for industry and retailers.
Petroleum Oil and Gas Corporation of South Africa (PetroSA)	1 424	Involved in the exploration and production of oil and natural gas; the production and marketing of synthetic fuels from offshore gas; and the development of South African refining capacity, infrastructure and technology.
BP Southern Africa	1 200	Manufactures and sells oil, petroleum, liquefied petroleum gas and franchises approximately 515 service stations.

Chevron South Africa	1 100	Refines and distributes petroleum products such as petrol, diesel, power paraffin, oils, and grease under the Caltex brand. Operates the CHEVREF refinery. Franchises around 845 service stations. Botswana and other African countries.
Total South Africa	740	Manufactures and distributes petroleum products and lubricating oils and grease under Total brand, with franchised service stations.
Shell and BP South African Petroleum Refineries (Pty) Ltd (SAPREF)	740	SAPREF operates as an oil refinery, producing leaded and unleaded fuels, low sulphur diesel, lubricants, asphalt product slate, aliphatic hydrocarbon solvents and industrial processing oils and sulphur. Jointly owned by BP and Shell.
Natref Refinery	626	Refines crude oil on behalf of Sasol and Total for a processing fee. Crude oil is transported to Sasolburg by means of a pipeline which runs from Durban. Owned by Sasol Oil; Total South Africa has a 36% share.
enX Group	503 (Group) (131 — petrochemicals; 1 830 — equipment)	Among others, subsidiaries manufacture, market and distribute oil and lubricating products, and hold the Exxon distributorship for automotive and industrial lubricants in southern Africa.
Shell Downstream South Africa	400	Retails and manufactures petroleum products, such as oil, lubricants and fuel as well as industrial chemicals, such as detergents, solvent blends, lacquer thinners and hydrocarbons.
Fuchs Lubricants South Africa	250	Manufactures and distributes specialised automotive and industrial lubricants and greases for the automotive industry and mining.
Tosas	274	Processes and supplies road binding materials such as bitumen, rubber, RB3 and emulsions. Has several bitumen processing and storage facilities in South Africa with substantial operations also in Namibia and Botswana.
Spanjaard	97	Manufactures and distributes specialised lubricants, allied chemical products, and metal powders for industrial, automotive, marine, mining, electrical, and household application locally and internationally.

B. Diverse basic chemicals

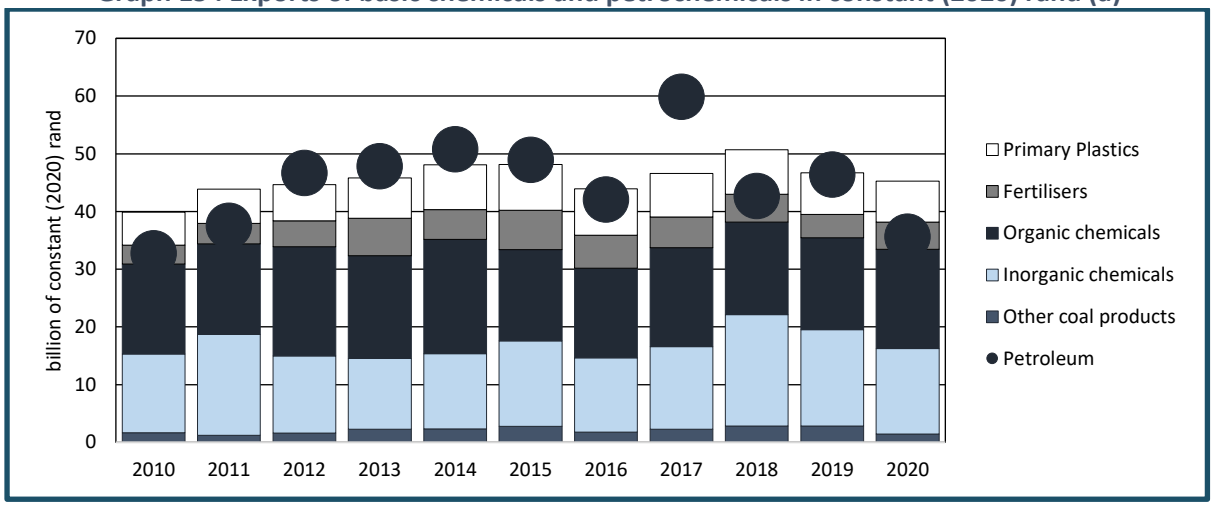
Company	Employees	Operations
AECI	7 600	Manufactures commercial explosives and specialty chemicals for customers in mining, manufacturing and agricultural; operates in Africa, Southeast Asia, the United States and Australia.
Omnia Group	4 755	Produces and distributes granular, liquid and speciality fertilisers; specialty chemicals and polymers sold throughout Southern and Eastern Africa; and for mining, supplies bulk emulsion and blended bulk explosives formulations, electronic delay detonators and shock-tube initiating systems, as well as handling services.
African Oxygen	1 733	Produces gases and welding products including gaseous oxygen, nitrogen, and argon; liquid petroleum gas (LPG) in cylinders; and arc equipment, gas equipment and welding consumables. Manufactures and fills cylinders at 48 sites, of which 16 are automated. Exports regionally.
BASF South Africa	1 600	Manufactures and distributes chemicals for agriculture and manufacturing; industrial coatings for metal, coil, wood and foil surface finishes; styrenes, engineering plastics and polyurethanes. Has one manufacturing facility but most chemicals are imported.
Improchem	630	Provides hydrocarbon and chemical process solutions, water treatment, water optimisation, total water management and hygiene and sanitation process solutions for the industrial and public sectors in Southern Africa.

Source: Who Owns Whom, 2021

6. International trade

Basic chemicals and refined petroleum were major exports and accounted for 6% of total exports in 2020. Demand for South Africa's basic chemicals and refined petroleum products was driven by refined petroleum, specifically crude petroleum which accounted for two fifths of South Africa's basic chemicals and refined petroleum exports. Other major exports were organic and inorganic chemicals which jointly accounted for two fifths of total basic chemicals and refined petroleum exports.

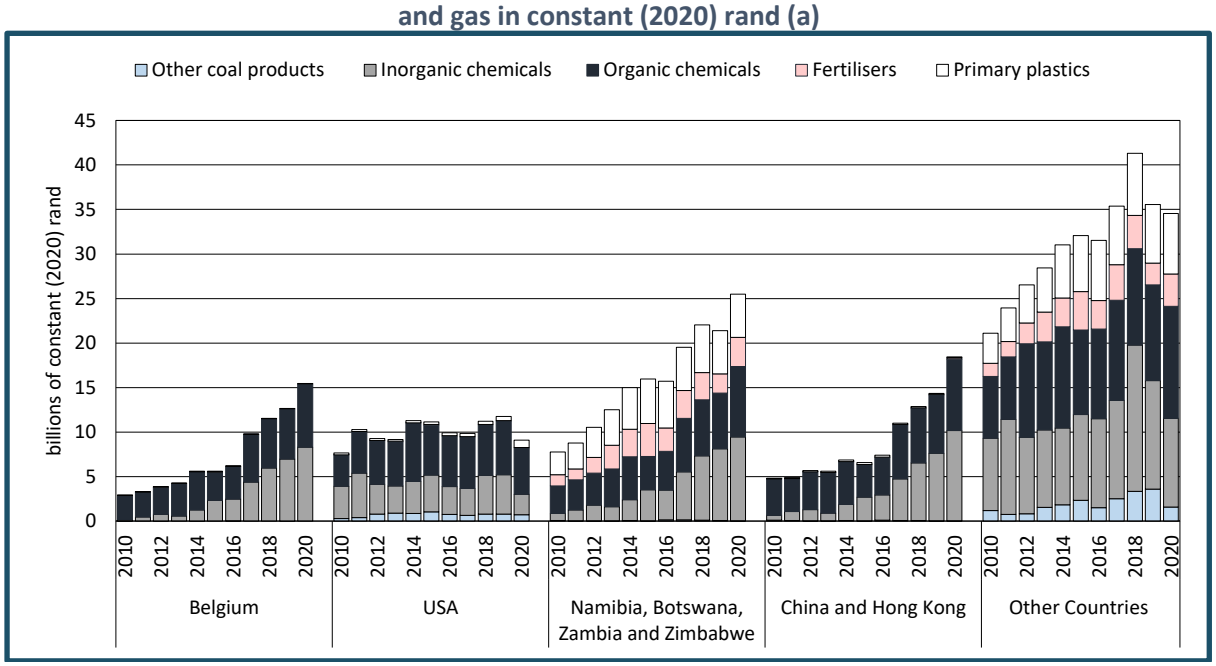
Graph 15 . Exports of basic chemicals and petrochemicals in constant (2020) rand (a)



Notes: (a) Deflated using CPI. Source: Calculated from ITC. Trade Map. Electronic database. Series on South African exports of organic chemicals, inorganic chemicals, fuels, fertilisers and plastics. Downloaded from www.trademap.org in January 2021.

Most exports of basic chemicals and petrochemicals, excluding crude, refined petroleum and gas went to Namibia, Botswana, Zambia and Zimbabwe, which accounted for more than two fifths of South Africa's exports in 2020.

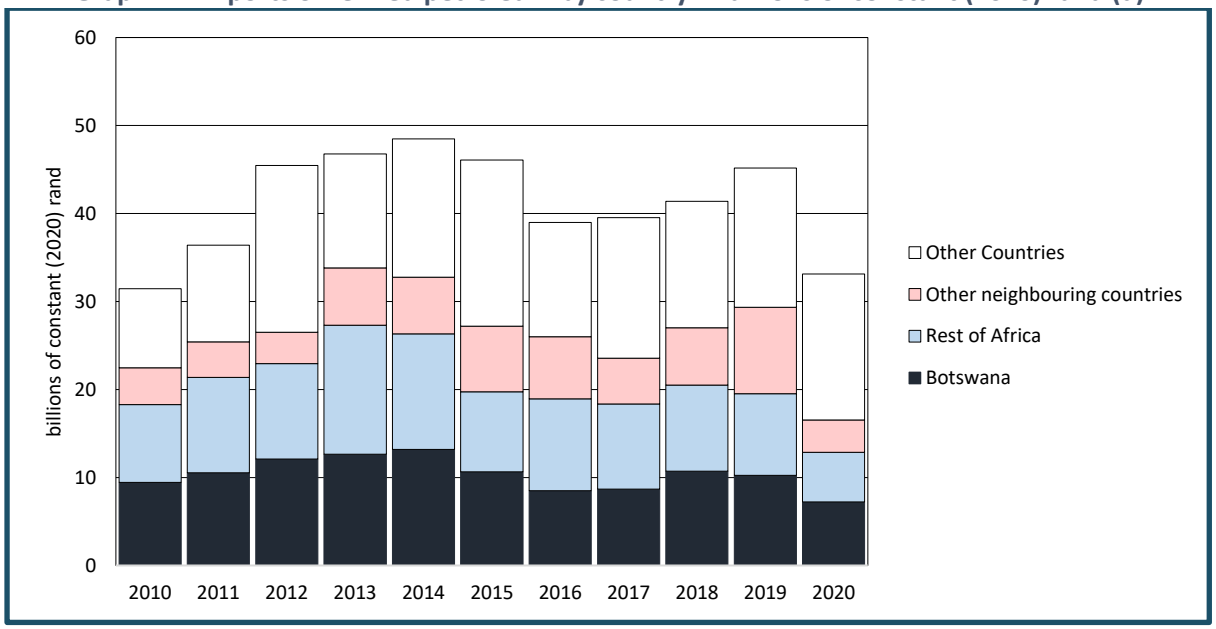
Graph 16. Exports of basic chemicals, excluding crude, refined petroleum and gas in constant (2020) rand (a)



Notes: (a) Deflated using CPI. Source: Calculated from ITC. Trade Map. Electronic database. Series on South African exports of organic chemicals, inorganic chemicals, fuels, fertilisers and plastics. Downloaded from www.trademap.org in January 2021.

A significant proportion of South Africa's exports of refined petroleum went to Botswana, other neighbouring African countries and the rest of Africa. Botswana, in particular accounted for two fifths (R10 billion constant 2020 rand) of South Africa's total exports to African countries and around a fifth of South Africa's total exports of refined petroleum. Exports to neighbouring and other African countries averaged around two fifths from 2010 to 2020. With other countries accounting for the rest.

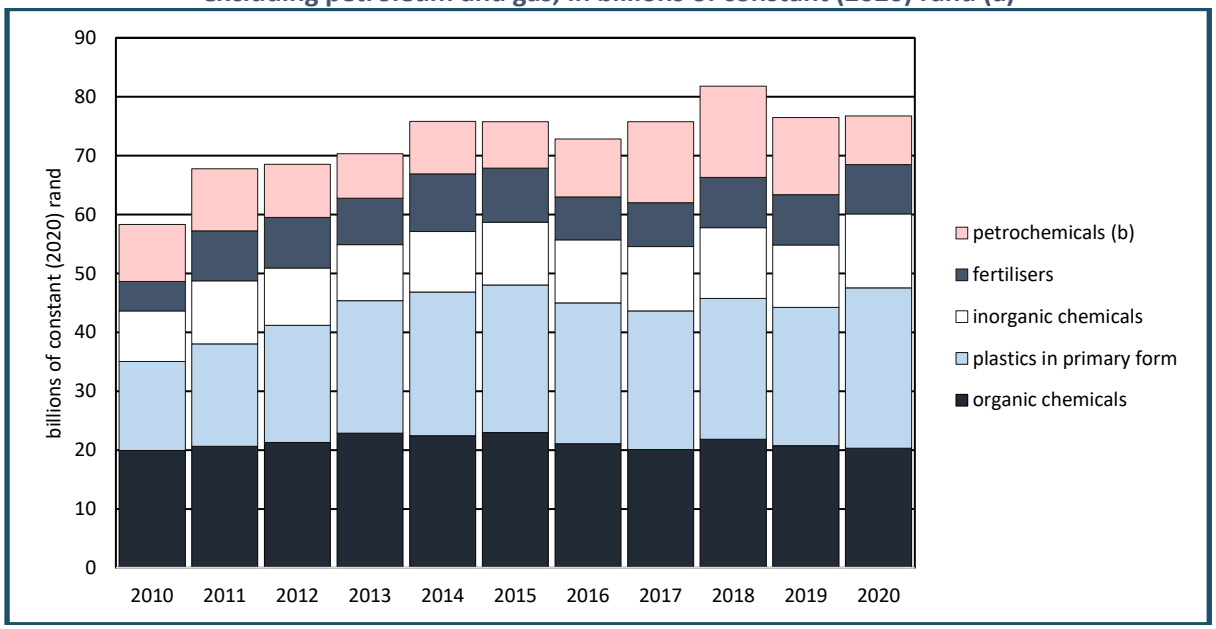
Graph 17. Exports of refined petroleum by country in billions of constant (2020) rand (a)



Note: (a) Deflated with CPI. Source: Calculated from ITC. TradeMap. Electronic database. Downloaded from www.trademap.org in January 2021.

Imports of basic chemicals and petrochemicals, excluding crude and refined petroleum and gas, were somewhat higher than exports. In constant rand, they remained fairly stable from 2011 to 2020.

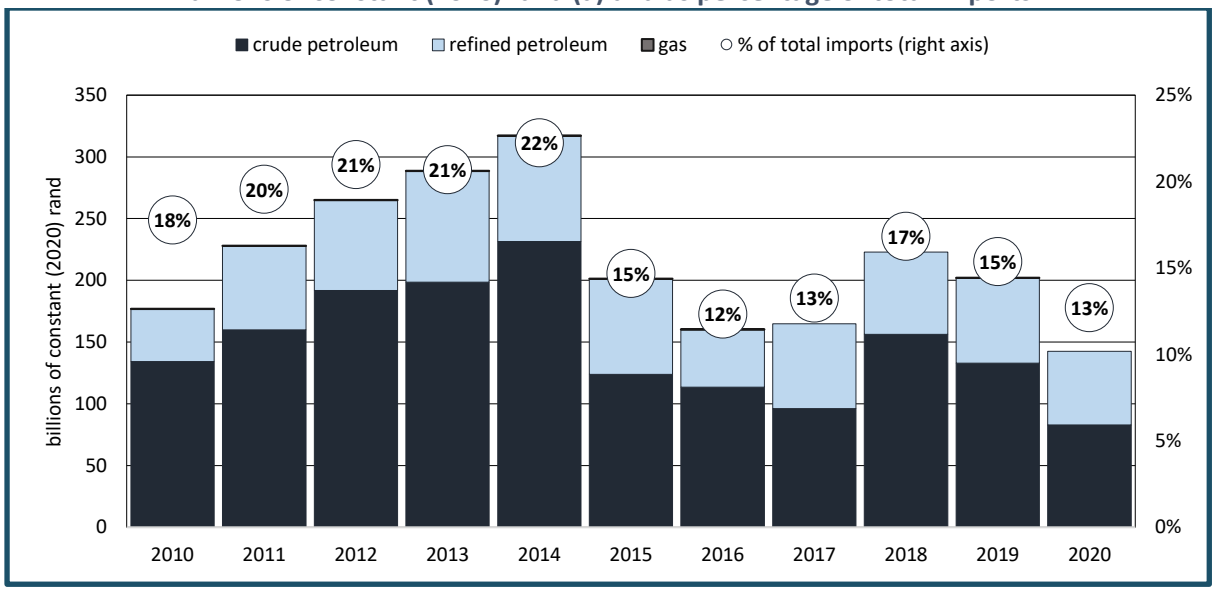
Graph 18. Imports of basic chemicals and petrochemicals, excluding petroleum and gas, in billions of constant (2020) rand (a)



Notes: (a) Deflated using CPI. (b) Excludes refined and crude petroleum and gas. Source: Calculated from ITC. Trade Map. Electronic database. Series on South African imports of organic and inorganic products, plastics, fertilisers and petrochemicals. Downloaded from www.trademap.org in January 2021.

Imports of petroleum were far larger than either imports or exports of other chemical products. They declined rapidly in value terms, however, as the price dropped sharply in dollar terms from 2014 to 2015. For South Africa, the unit cost of imported crude petroleum fell by 48% in dollars, and by 42% in constant rand. As a result, petroleum and gas imports declined by half in rand terms, shrinking from a high of 22% of total imports in 2014 to just 13% in 2020.

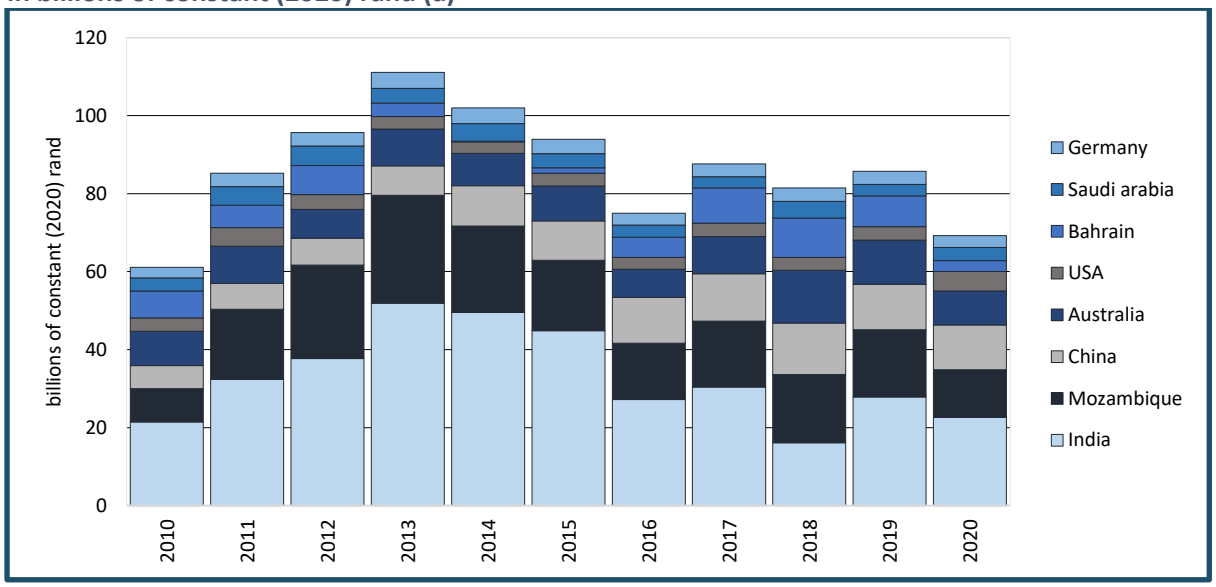
Graph 19. Imports of crude and refined petroleum and of gas in billions of constant (2020) rand (a) and as percentage of total imports



Notes: (a) Deflated using CPI. Source: Calculated from ITC. TradeMap. Electronic database. Series on South African imports of crude and refined petroleum and gas and total imports. Downloaded from www.trademap.org in January 2021.

South Africa's sources of imports of basic chemicals and petrochemicals other than petroleum were fairly diverse. China's share climbed from 12% to 21% of the total between 2010 and 2020. Organic chemicals accounted for around 40% of the imports from China in 2016. Most imports of basic chemicals and petrochemicals other than petroleum were sourced from India**.**

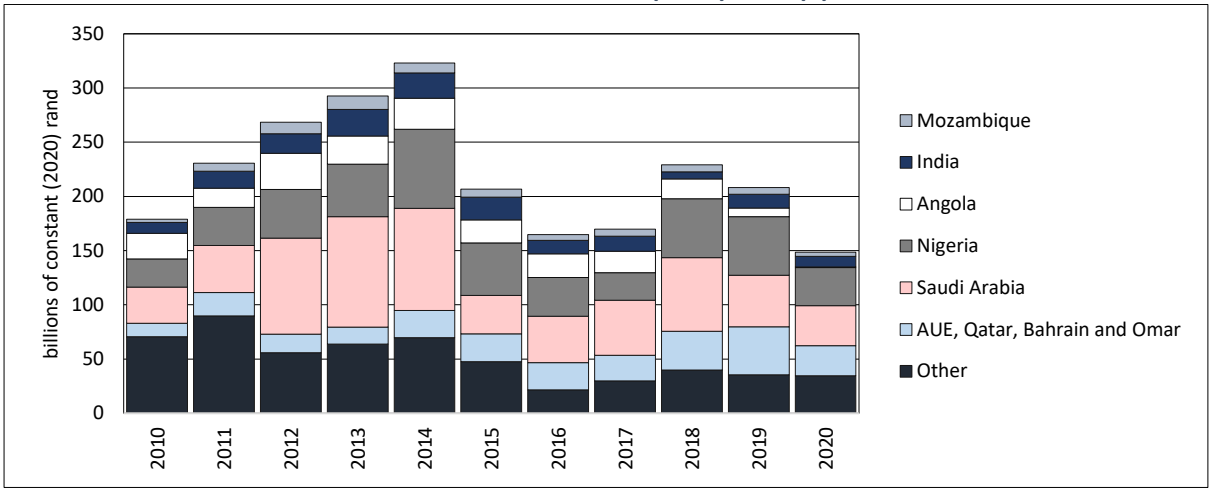
Graph 20. Imports of chemicals and petrochemicals, excluding petroleum and gas by country, in billions of constant (2020) rand (a)



Note: (a) Deflated with CPI. Data from trading partners for 2020. Source: Calculated from ITC. Trade Map. Electronic database. Downloaded from www.trademap.org in January 2021.

Imports of crude petroleum are sourced primarily from the Middle East, Angola and Nigeria. Gas has been bought principally from Mozambique. India supplies around a quarter of refined petroleum, with the rest coming mostly from the Middle East.

Graph 21. Imports of crude and refined petroleum and of gas by country in billions of constant (2020) rand (a)



Notes: (a) Deflated using CPI. Source: Calculated from ITC. Trade Map. Electronic database. Series on South African imports of crude and refined petroleum and gas and total imports. Downloaded from www.trademap.org in January 2021.