TRADE & INDUSTRIAL POLICY STRATEGIES

MANUFACTURING SUBSECTORS

Basic chemicals and petroleum refineries

December 2017

Industrial policy aims to promote diversification and tailor interventions to the needs of individual manufacturing industries. To support evidence-based policymaking, TIPS has completed a series of notes on the main manufacturing subsectors in South Africa. These notes provide information on the contribution to the GDP, employment, profitability and assets, the market structure and dominant producers, major inputs and international trade. They bring together data from Statistics South Africa, Quantec and Who Owns Whom to provide a more detailed overview of each sector.

This note summarises key data and information on the basic chemicals and petroleum refineries subsector as of December 2017. It will be updated as information becomes available.

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.

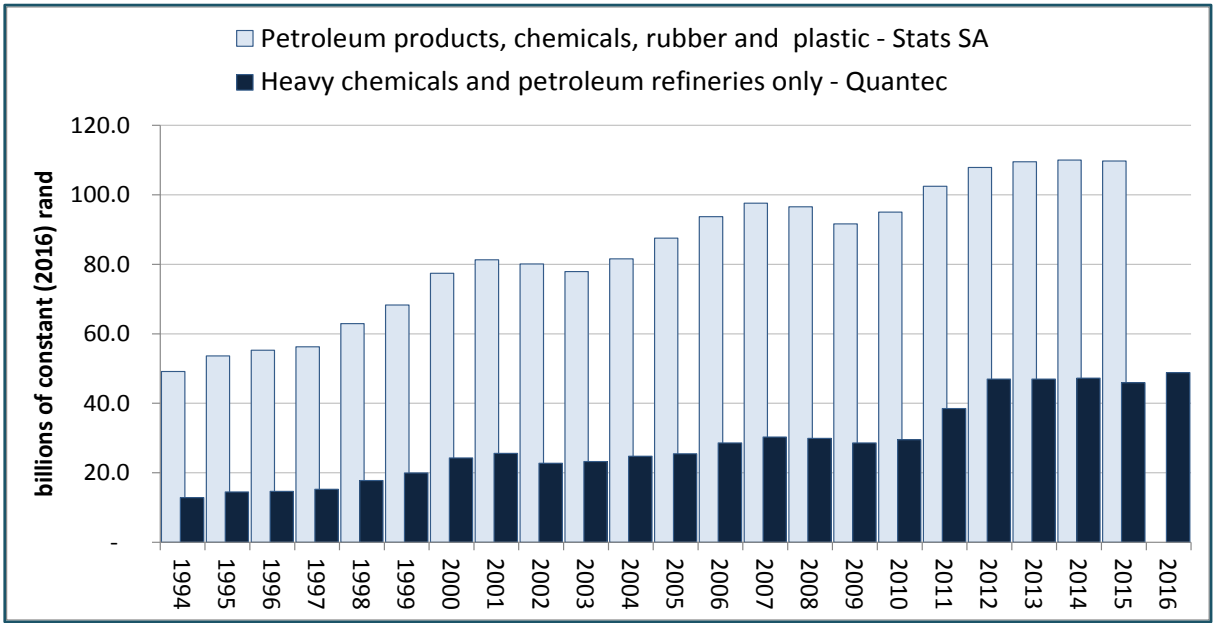
1 Contribution to GDP

Data for the contribution of manufacturing industries to the GDP (that is, for value add by industry) 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 only provides data 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. According to Quantec, basic chemicals accounted for over 40% of total chemicals value added, up from 26% in 1994.

Gross value added in basic chemicals and petroleum refining mainly followed the trends of the commodity boom from 2002. According to Quantec estimates, it climbed 4,7% a year from 2002 to 2008; dropped 1,5% from 2008 to 2010; recovered at 12,5% a year from 2010 to 2012; then slowed to growth of only 1% a year from 2012 to 2016 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.

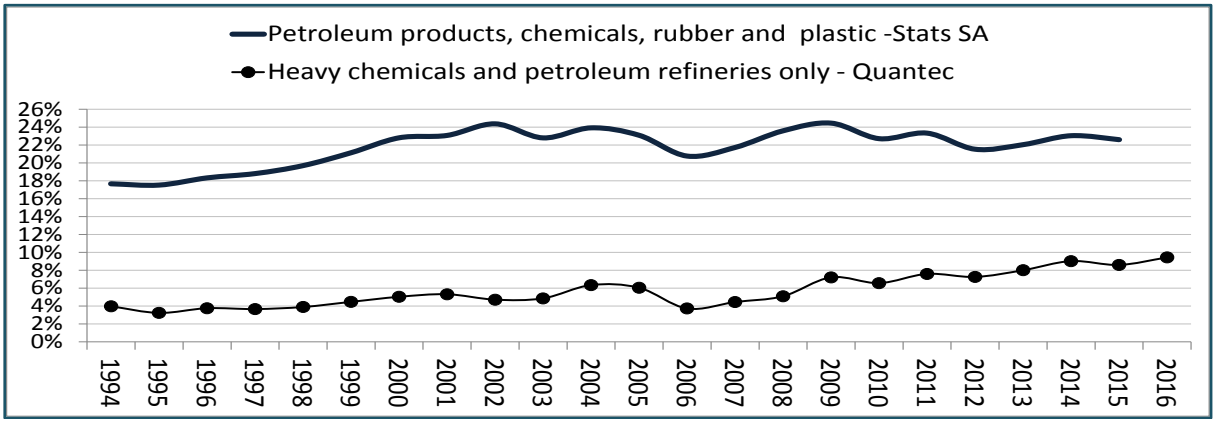
Graph 1. Value added in basic chemicals and petroleum refineries, 1994 to 2016, in billions of constant (2016) rand (a)



Note: (a) Deflated by calculating the deflator used in the sources from figures in current and constant rand, and then rebasing to 2016. Source: Statistics South Africa, GDP P0441. Annual quarter and regional revisions. Q4 2016. Excel spreadsheet. Series on manufacturing subsectors in current and constant rand. Downloaded from www.statssa.gov.za in September 2017; 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 September 2017.

According to Quantec estimates, the share of basic chemicals and petroleum refineries in total manufacturing value added climbed from 4% in 1994 to just under 10% in 2016. According to Statistics South Africa, however, the total chemicals industry increased its share in manufacturing value add only from 1994 to 2002, reaching a high of 24%, after which it more or less levelled out.

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



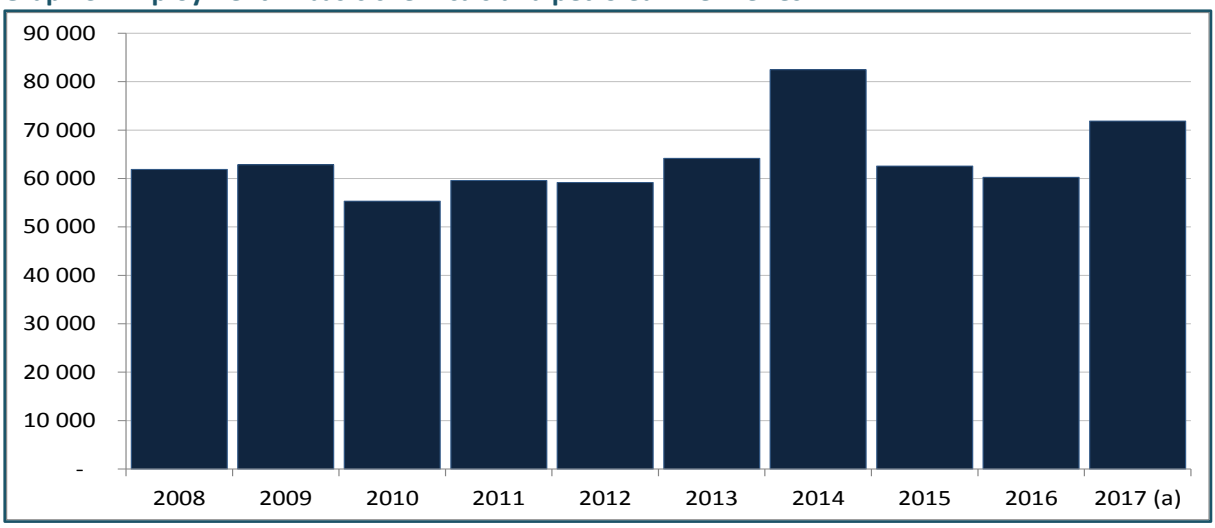
Source: Calculated from Statistics South Africa, GDP P0441. Annual quarter and regional revisions. Q4 2016. Excel spreadsheet. Series on manufacturing subsectors in current rand. Downloaded from www.statssa.gov.za in September 2017; and Quantec EasyData. Standardised regional data. Database in electronic format. Series on value added in current rand. Downloaded from www.quanis1.easydata.co.za in September 2017.

2 Employment

Employment data in this section draw on Statistics South Africa's Quarterly Labour Force Survey, which was introduced in 2008. Its annual figures, in the Labour Market Dynamics, are averages of the quarterly findings. This methodology is used to derive annual data for total employment by industry in 2016 and the year to the third quarter of 2017.

Employment in basic chemicals and petroleum was essentially unchanged from 2008 to 2016, with a reported jump in the year to the third quarter 2017. The 2014 figure likely reflects an anomaly in the survey.

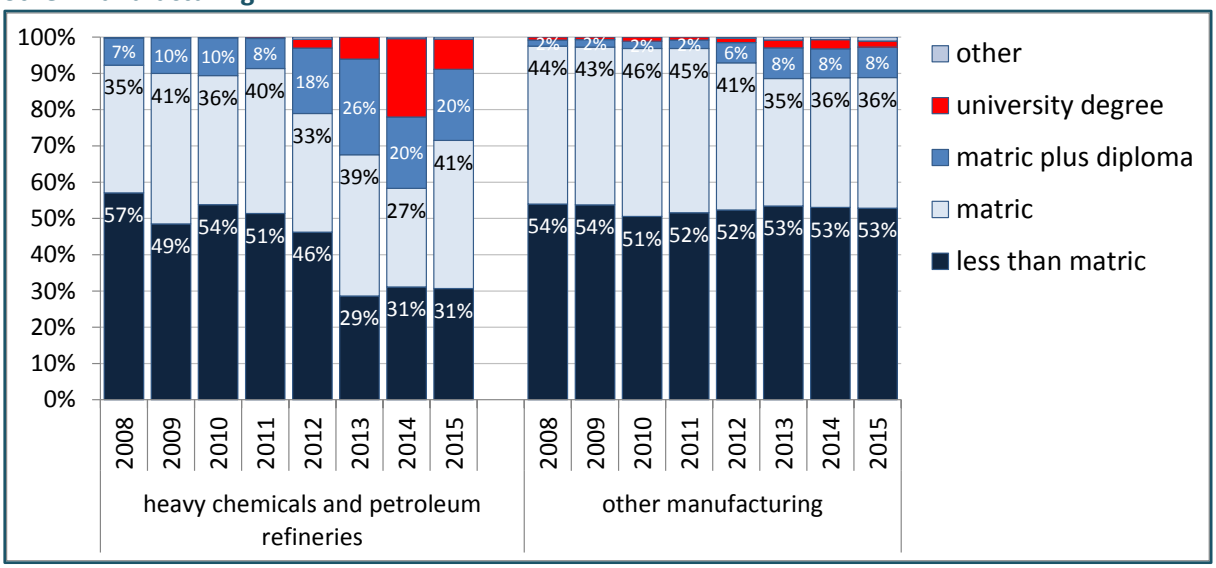
Graph 3. Employment in basic chemicals and petroleum refineries



Note: (a) Calendar years except for 2017, which is the year to the third quarter. Source: Calculated from Statistics South Africa. Labour Market Dynamics. 2008 to 2015. Series on employment by industry. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in September 2017; and Quarterly Labour Force Survey. Q1 2016 to Q3 2017. Series on employment by industry. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in December 2017.

Education levels in basic chemicals and petroleum refineries were significantly higher than in the rest of manufacturing. In 2015, only 31% of workers in the industry did not have matric, compared to 55% in the rest of manufacturing. Almost 10% had a post-secondary degree in 2015, compared to 3% in the rest of manufacturing.

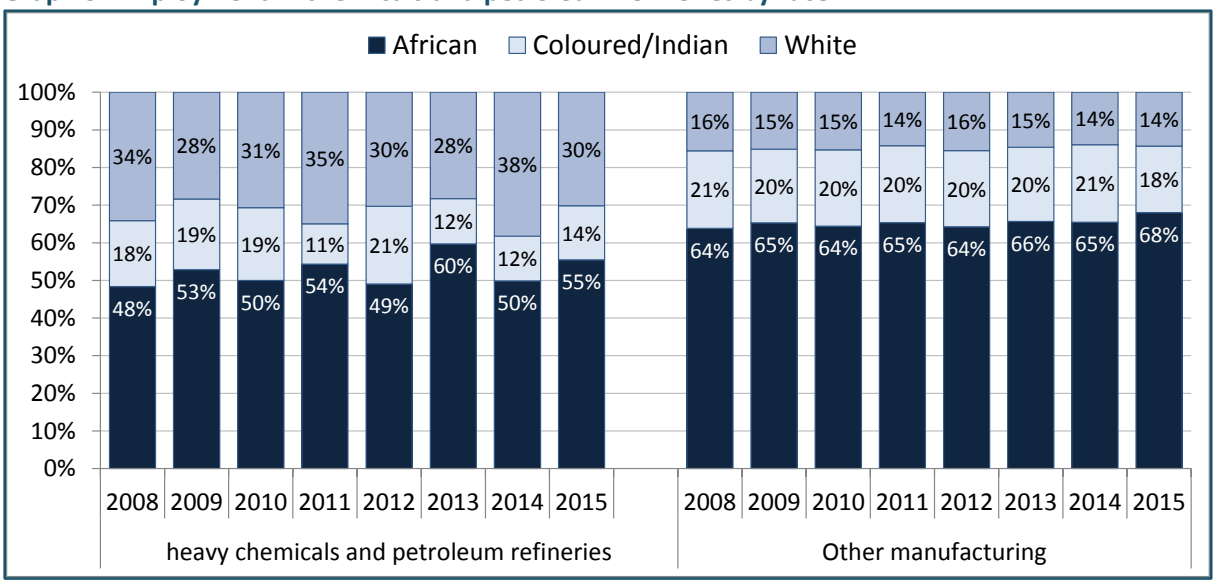
Graph 4. Employment by education level in basic chemicals and petroleum refineries compared to other manufacturing



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 September 2017.

Workers in basic chemicals and petroleum refineries were less likely to be African than in the rest of manufacturing. In 2015, Africans comprised 55% of employment in basic chemicals and petroleum refineries, compared to 68% in other manufacturing. Whites constituted between a quarter and a third of total employment in the industry, compared to a seventh in the rest of manufacturing.

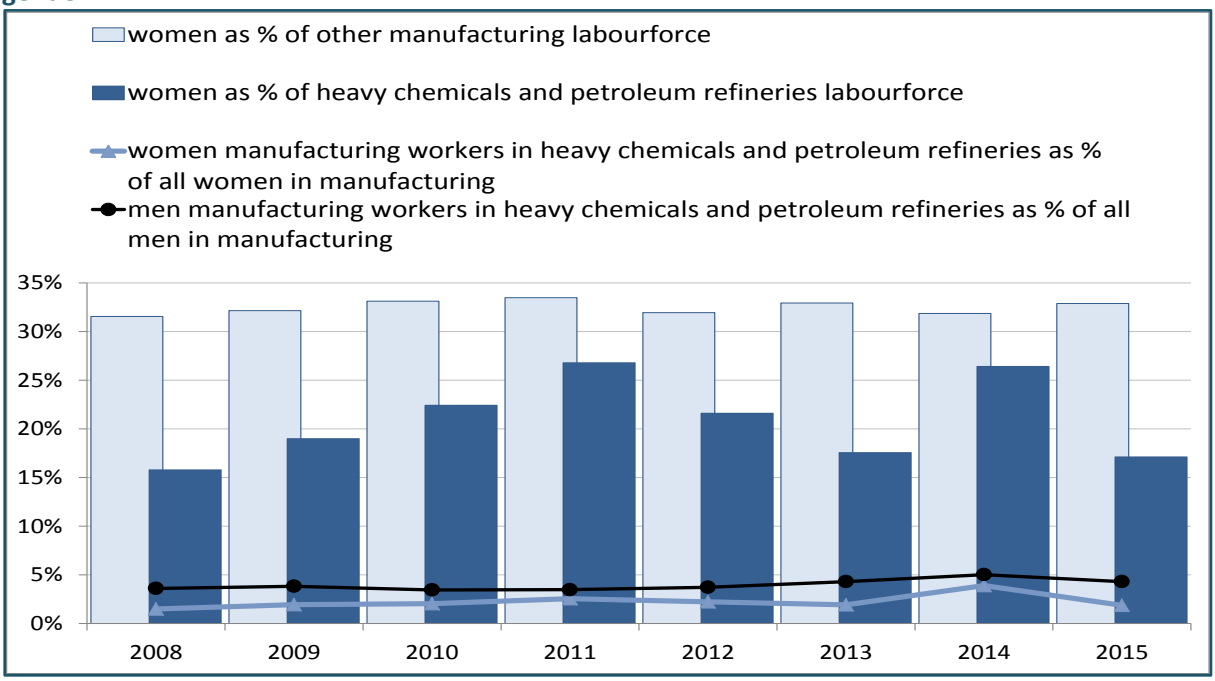
Graph 5. Employment in chemicals and petroleum refineries by race



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 September 2017.

Women made up less than 20% of the labour force in basic chemicals and petroleum refineries, significantly lower than for the rest of manufacturing. Only one in 50 women manufacturing workers was employed in the industry, compared to one in 25 for men manufacturing workers.

Graph 6. Employment in basic chemicals and petroleum refineries and other manufacturing by gender

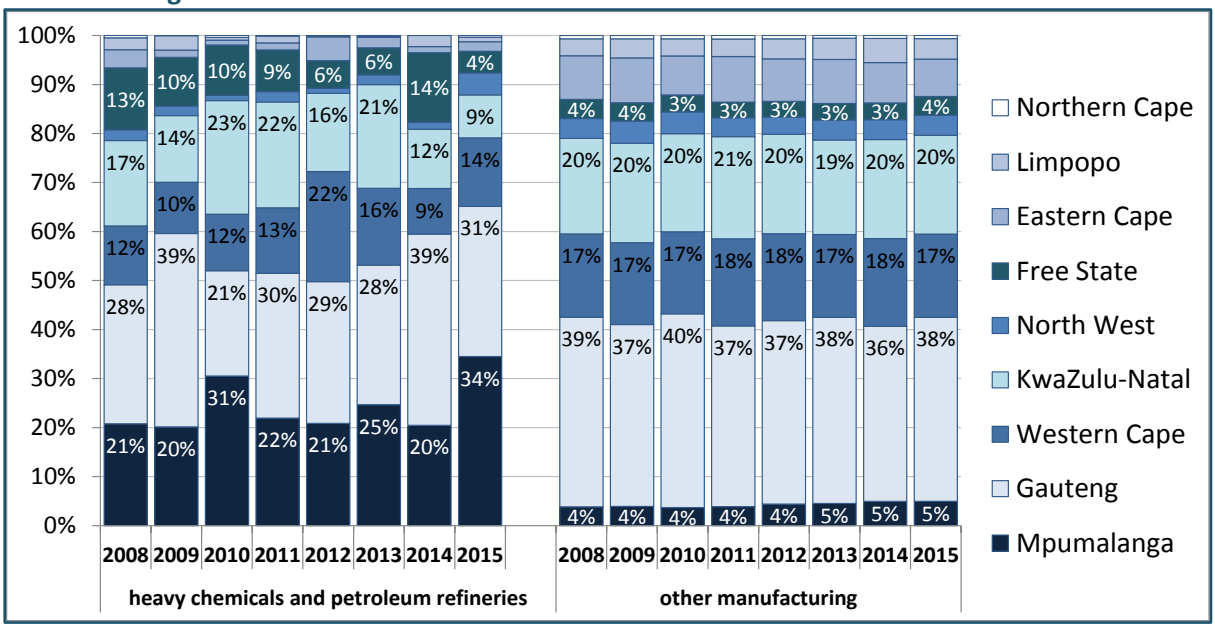


Source: Statistics South Africa. Labour Market Dynamics. Relevant years. Series on employment by industry and gender. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in September 2017.

3 Location

Statistics South Africa provides information on employment by province. As the following graph shows, Mpumalanga's share in basic chemicals, at between a quarter and a third of total employment, was far higher than in other manufacturing, where it accounted for only around 4% of employment. 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 7. Employment by province in chemicals and petroleum refineries compared to other manufacturing



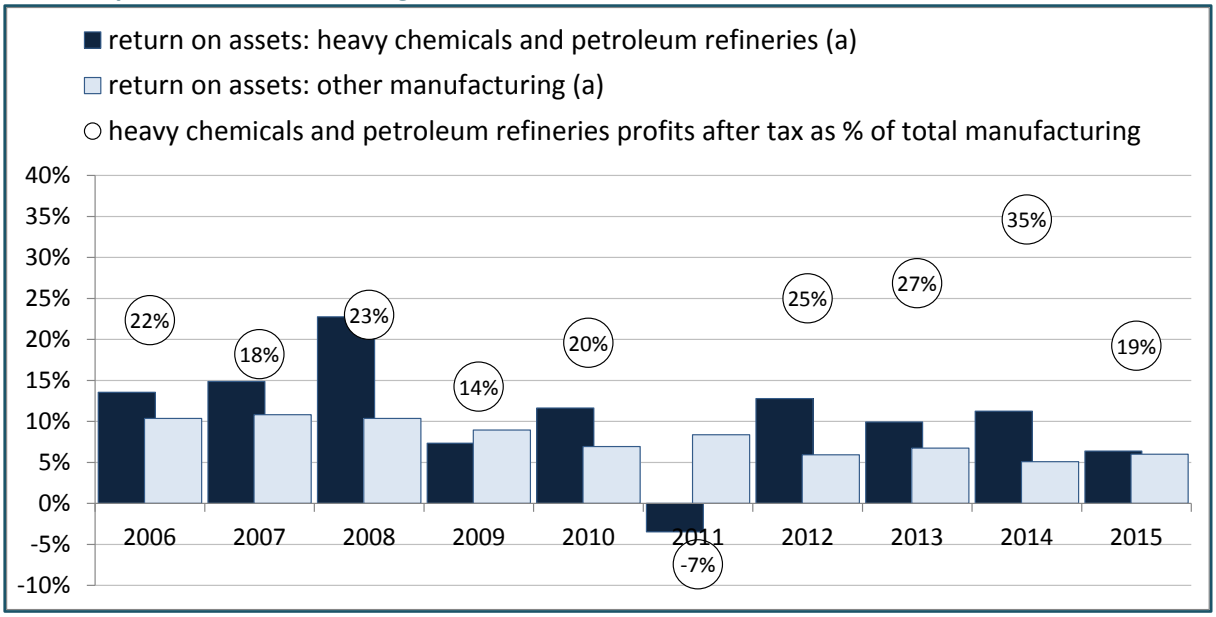
Source: Statistics South Africa. Labour Market Dynamics. Relevant years. Series on employment by industry and province. Electronic databases. Downloaded from www.statssa.gov.za Nesstar facility in September 2017.

The location of manufacturing can also be understood in how it was embedded in apartheid geography. To this day, only a tenth of manufacturing employment is in the former so-called "homeland" regions, where around a quarter of the population lives. In the case of basic chemicals and petroleum refineries, around 4% of total employment was in the former "homeland" regions from 2008 to 2015, less than half of that for manufacturing as a whole.

4 Profitability and assets

From 2008, the after-tax return on assets in basic chemicals and petroleum refineries averaged 10% a year. That was a higher than in the rest of manufacturing, where returns averaged 7% a year. Basic chemicals and petroleum refineries provided around 19% of all manufacturing profits.

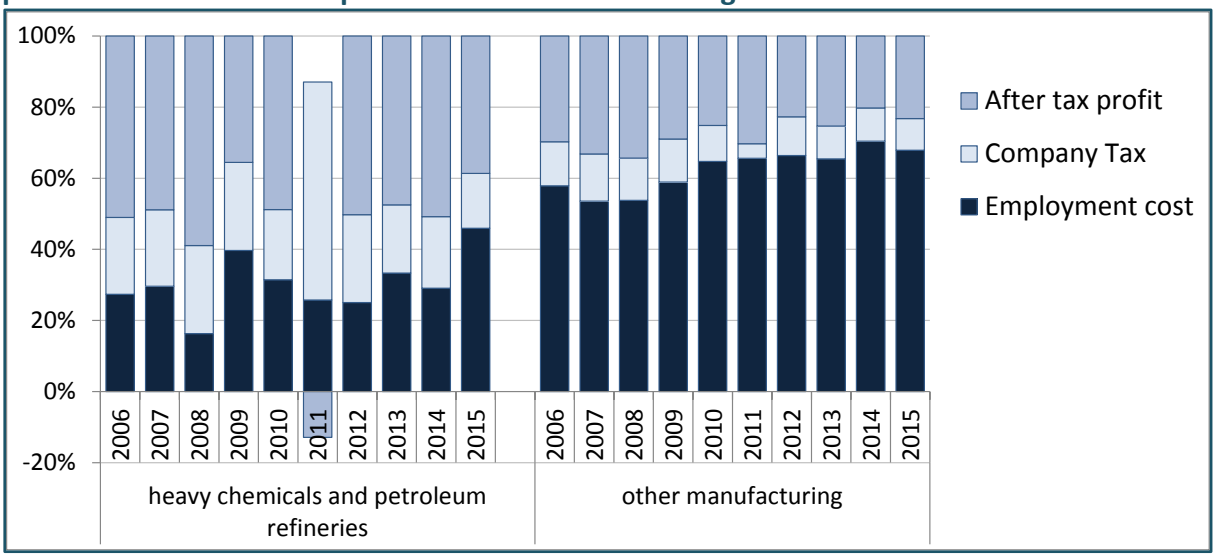
Graph 8. Return on assets (a) in heavy chemicals and petroleum refineries and other manufacturing, and after-tax profits in basic chemicals and petroleum refineries as percentage of after-tax profits in manufacturing as a whole



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 September 2017.

Between 2008 and 2015, employment costs averaged 32% of income in basic chemicals and petroleum refineries, compared to 64% in the rest of manufacturing. After-tax profits averaged 39%, contrasted to 26% in other manufacturing. Taxes were 29%, three times as high as in other manufacturing.

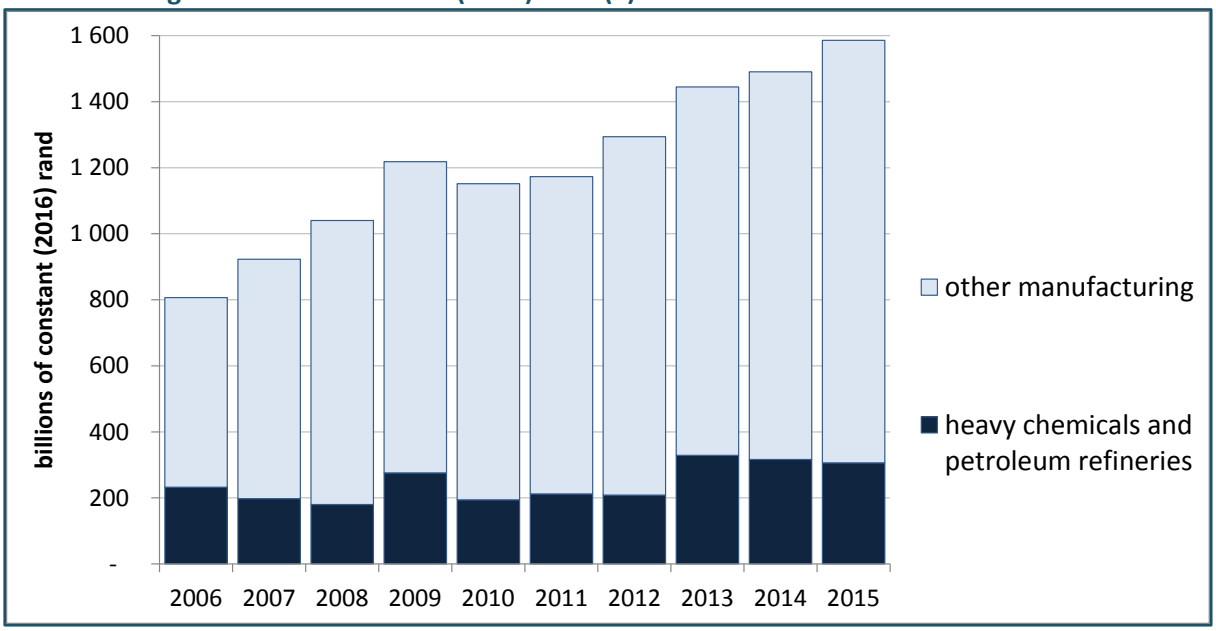
Graph 9. Share of remuneration, profits and taxation in income from basic chemicals and petroleum refineries compared to other manufacturing



Source: Calculated from Statistics South Africa. Annual Financial Statistics. Disaggregated Industry Statistics for relevant year. Excel spreadsheet. Downloaded from www.statssa.gov.za in September 2017.

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 70% from 2008 to 2015, while the assets in the rest of manufacturing rose 49%. As a result, the share of basic chemicals and petroleum refineries total manufacturing assets climbed from 17% to 19% over this period.

Graph 10. Value of total assets in basic chemicals and petroleum refineries processing and other manufacturing in billions of constant (2016) rand (a)



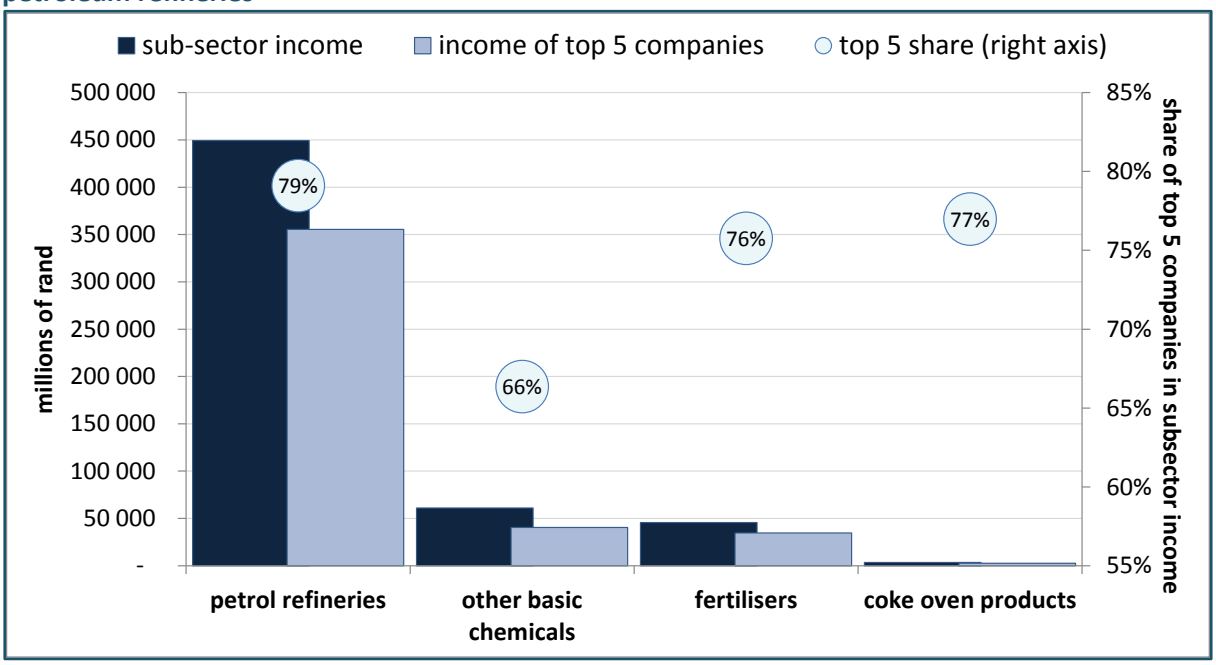
Notes: (a) Deflated with CPI. Source: Calculated from Statistics South Africa. Disaggregated Industry Statistics for relevant year. Excel spreadsheet. Downloaded from www.statssa.gov.za in September 2017.

5 Market structure and major companies

According to Statistics South Africa's Manufacturing Financial Statistics, in 2014 the share in total income of the largest five companies in basic chemicals, fertilisers and petroleum refineries was over

60%. That was substantially higher than the norm for major manufacturing industries, where the figure generally fell between 30% and 40%.

Graph 11. 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, 2014. Pretoria. Table 9, p 33, ff.

In 2015, the Labour Market Dynamics Survey found around 1 000 formal enterprises (that is, employers and self-employed) in formal basic chemicals and petroleum refineries, compared to a total of around 60 000 in manufacturing as a whole, and 671 000 for the entire economy. The figure was too small to permit a meaningful analysis of trends.

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

Company	Employees	Activities
Petroleum products		
Sasol	30 900 (26 000 in SA)	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. Approximately 45% of turnover was in SA in 2015, with around 22% in Europe and 13% in the US.
Engen Petroleum	3 900	Core operations include refining crude oil and related products, as well as retail sales from 1500 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.

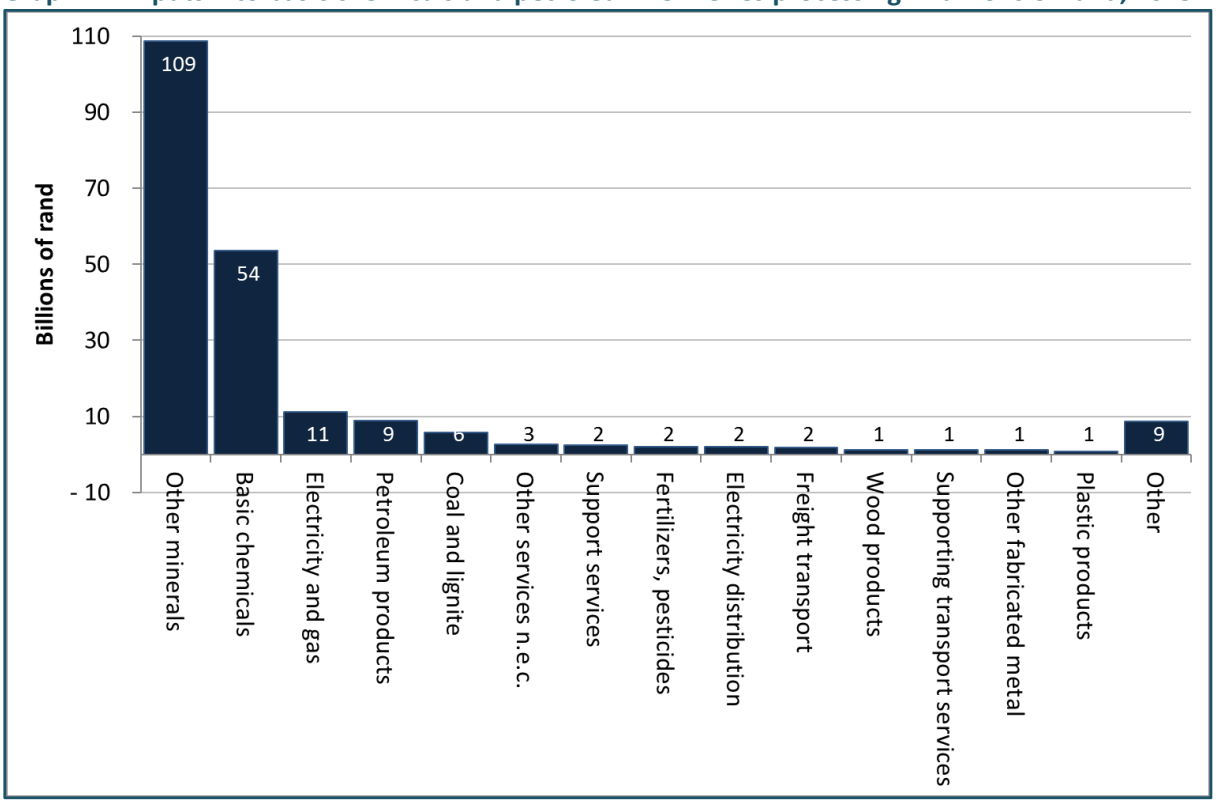
Company	Employees	Activities
Petroleum Oil and Gas Corporation of SA	1 418	Involved in the exploration and production of oil and natural gas, the production and marketing of synthetic fuels from offshore gas, and the development of South African refining capacity, infrastructure and technology.
BP Southern Africa	1 200	Manufactures and sells oil, petroleum, liquefied petroleum gas and franchises approximately 515 service stations.
Chevron SA	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 SA	781	Manufactures and distributes petroleum products and lubricating oils and grease under Total brand, with franchised service stations.
SAPREF	700	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.
NAPREF	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 SA has a 36% share.
enX Group	519	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 SA	500	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 SA	258	Manufactures and distributes specialised automotive and industrial lubricants and greases for the automotive industry and mining.
Tosas	247	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	107	Manufactures and distributes specialised lubricants, allied chemical products, and metal powders for industrial, automotive, marine, mining, electrical, and household application locally and internationally.
Diverse basic chemicals		
AECI	6 630	Manufactures commercial explosives and specialty chemicals for customers in mining, manufacturing and agricultural; operates in Africa, South East Asia, the US and Australia.
Omnia Group	4 105	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 shocktube initiating systems, as well as handling services.
African Oxygen	2 280	Produces gases and welding products including gaseous oxygen, nitrogen, and argon; 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 SA	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	800	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.

Company	Employees	Activities
Air Liquide	672	Manufactures and distributes industrial gases, such as oxygen, nitrogen, argon, carbon dioxide, hydrogen and speciality gas mixtures, for the steel, mining, oil refining, chemical, glass, electronics, paper, metallurgy, food processing, construction and wine industries.
Rolfes Holdings	529	Manufactures and distributes speciality chemical and organic products for the industrial, agricultural, food and water sectors in South Africa as well as regional and overseas exports.
Air Products SA	525	Manufactures and distributes industrial and speciality gas as well as producing gas regulating, control and handling equipment including flow control equipment and BIP cylinders.
NCP Chlorchem	420	Manufactures, sells and distributes chlorine, caustic soda, water treatment chemicals and other chlor-alkali products for the mines, municipalities, water boards, paper refiners and chemical companies.
Sealed Air Africa	304	Produces packaging, food pads, trays, cook-in bags, pouches and related products for the food industry.
PBD Holdings	300	Manufactures and supplies limestone, fertiliser and related products, including mining and fertiliser production.
RARE Holdings	280	Designs, distributes and services plastic and metal piping and related products for petroleum, chemical, mining, electricity-generating, and water engineering. Sales in South Africa, Zambia, Ghana, Botswana, Angola and the Democratic Republic of Congo.
Chemical Initiatives	210	Manufactures and distributes sulphur and sulfuric acids and other bulk chemicals for mining, paper, water treatment, metallurgical, automotive, food and detergents production.
LANXESS	200	Manufactures and distributes basic chemicals, fibres, rubber, butyl rubber, pigments, fine and functional chemicals as well as chrome chemicals. Has two plants and a chrome mine.
Pelchem	179	Manufactures and markets hydrogen fluoride, hydrofluoric acid, fluoride salts, fluorine gas, speciality fluoride containing gases and fluoro-organic monomer locally and internationally.
Isegen SA	130	Sole producer in Africa of anhydrides and plasticisers; manufactures food acidulants. Has three factories.
Fertilisers		
Africom	2 500	Owns Triomf, which manufactures organic and non-organic fertilisers.
Foskor	2 003	Produces phosphate ore, phosphoric acid and granular fertiliser from phosphate rock in an integrated operation. Has one granulation, two phosphoric acid and three sulphuric acid plants as well as the mine, supported by various storage amenities. 59% owned by the Industrial Development Corporation (IDC).
Profert	387	Imports, blends and distributes fertiliser for sale through the region.
Efekto Care	135	Manufactures, packages and wholesales garden products, organic and chemical fertilisers and accessories.
Culterra	105	Manufactures fertilisers, composts, potting mixtures and lawn dressings for nurseries, agriculture and landscapers.
Farmisco	83	Imports, blends and sells granular and liquid fertilisers.
Sugar-based products		
Illovo Sugar	12 838	Manufactures furfural, furfuryl alcohol, the nematicide Agriguard, 2.3-pentanedione, ethyl alcohol and lactulose from sugar.
Tongaat Hulett	31 230	Produces agricultural products, animal feeds, sorbitol and biofuels as well as starch and glucose from sugar. Produces ethanol in Zimbabwe for blending with petroleum there.

6 Major inputs

The main inputs into basic chemicals and petroleum refineries are other and basic chemicals, electricity, petroleum products and coal and lignite. In constant rand, the value of inputs remained almost unchanged from 2012 to 2015. Other and basic chemicals constituted around three quarters of all inputs.

Graph 12. Inputs into basic chemicals and petroleum refineries processing in billions of rand, 2015



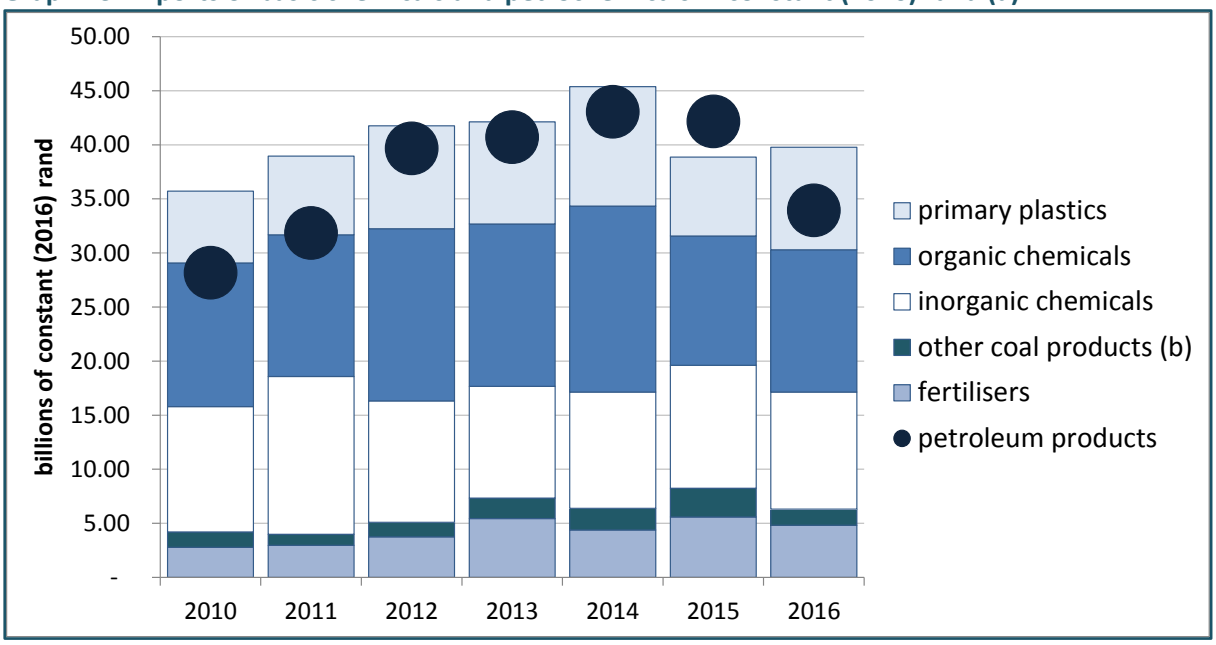
Source: Calculated from Statistics South Africa. Statistics South Africa, GDP data in excel format, Fourth Quarter 2017. Use Tables. Downloaded from www.statssa.gov.za in October 2017.

7 Trade

Basic chemicals and refined petroleum products were major exports for South Africa, accounting for around 7% of the total in 2016. Refined petroleum, however, was derived mainly from imported crude, which was South Africa's second largest import in 2016, although Sasol also produced petroleum locally from coal. In contrast, most other exports of basic chemicals and petrochemicals were derived from coal and other local mining products.

Excluding refined petroleum products, exports of coal-based and other basic chemicals climbed 33% from 2010 to 2014, then fell 13% in the following two years. Growth over the entire period, from 2010 to 2016, was driven by fertilisers and primary plastics, mostly polymers. Petroleum products comprised between 45% and 55% of exports by the industry. These sales equalled 23% of the value of crude petroleum imports in 2016, up from between 18% and 15% between 2010 and 2014.

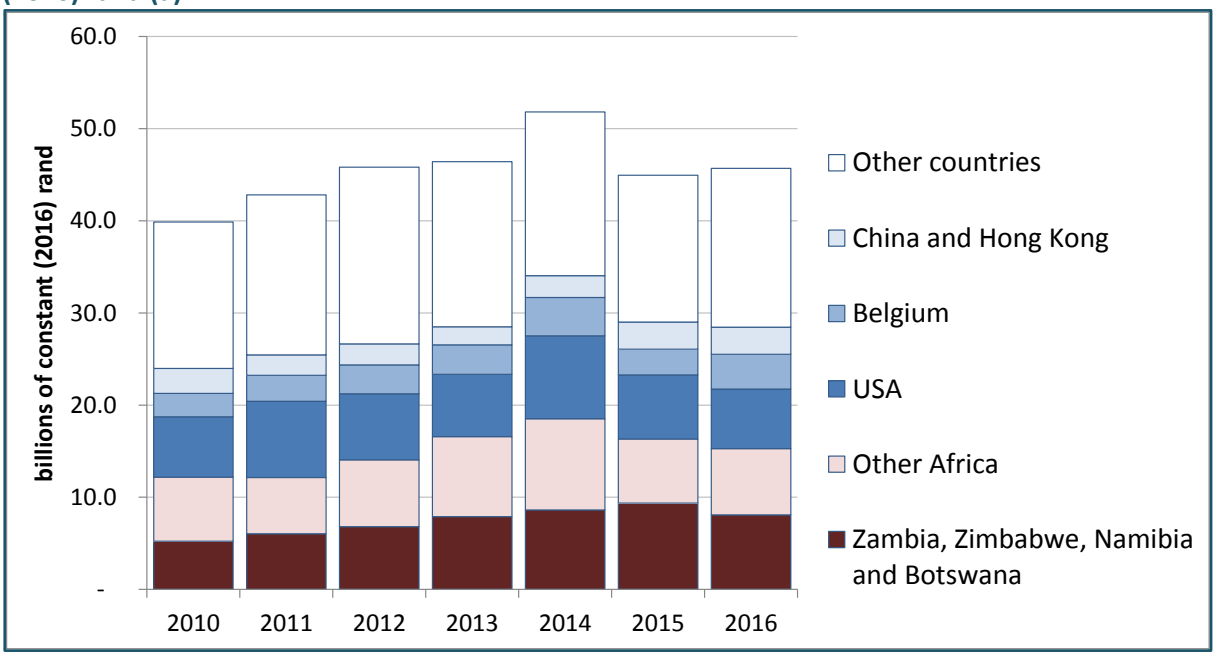
Graph 13. Exports of basic chemicals and petrochemicals in constant (2016) rand (a)



Notes: (a) Deflated using CPI. (b) Includes coke, tar, coal gas, oils, etc. Source: Calculated from ITC. TradeMap. Electronic database. Series on South African exports of organic chemicals, inorganic chemicals, fuels, fertilisers and plastics. Downloaded from www.trademap.org in February 2017.

A third of exports of basic chemicals and petrochemicals, excluding refined petroleum, went to other African countries. The US, Belgium and China (including Hong Kong) together absorbed almost as much.

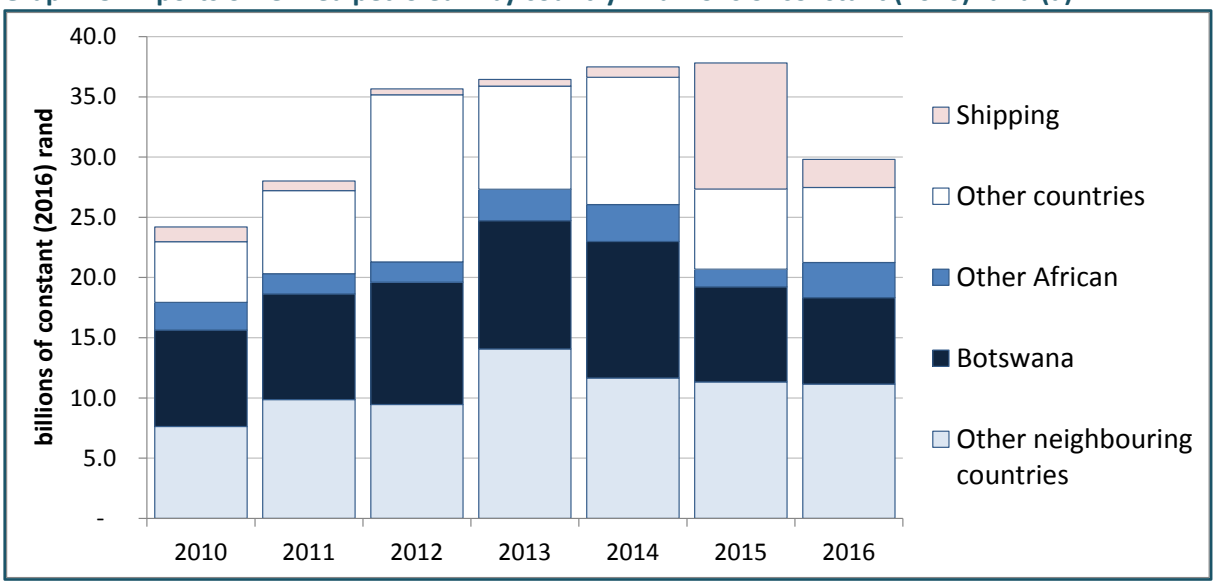
Graph 14. Exports of basic chemicals and petrochemicals, excluding refined petroleum, in constant (2016) rand (a)



Notes: (a) Deflated using CPI. The figures include petroleum products other than refined petroleum and are therefore not comparable to the totals in Graph 13. Source: Calculated from ITC. TradeMap. Electronic database. Series on South African exports of organic chemicals, inorganic chemicals, fuels, fertilisers and plastics. Downloaded from www.trademap.org in February 2017.

Most refined petroleum exports from South Africa went to the rest of Africa. The largest single market by far was Botswana, followed by other neighbouring countries.

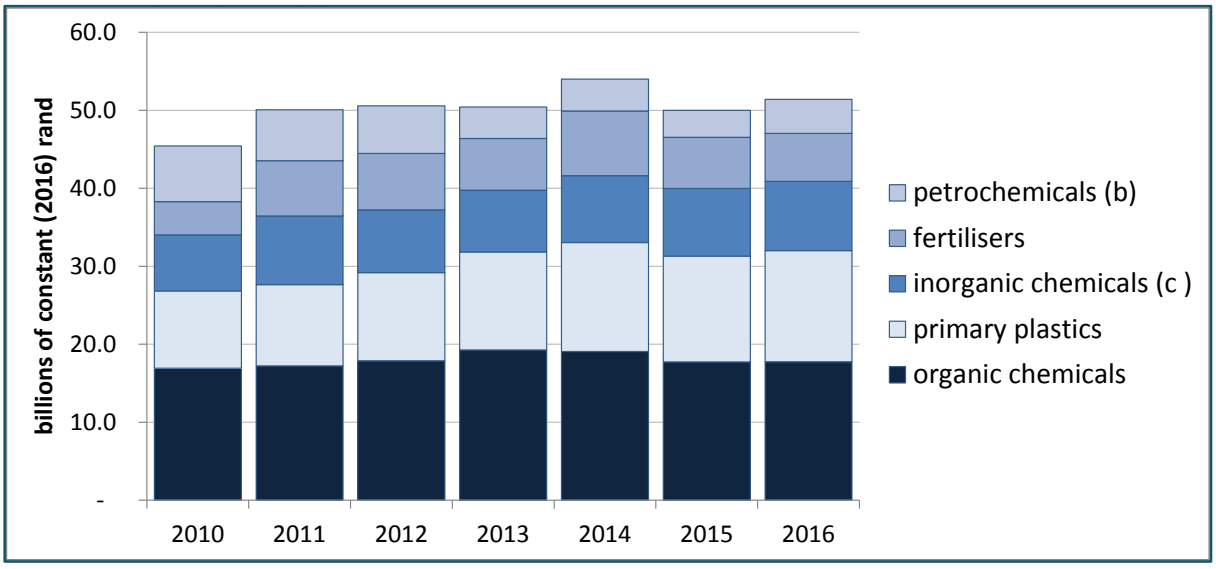
Graph 15. Exports of refined petroleum by country in billions of constant (2016) rand (a)



Notes: (a) Deflated using CPI. Source: Calculated from ITC. TradeMap. Electronic database. Series on South African exports of refined petroleum products. Downloaded from www.trademap.org in February 2017.

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 2016. Growth in primary plastics was offset by a fall in other products, especially organic chemicals, fertilisers and petrochemicals.

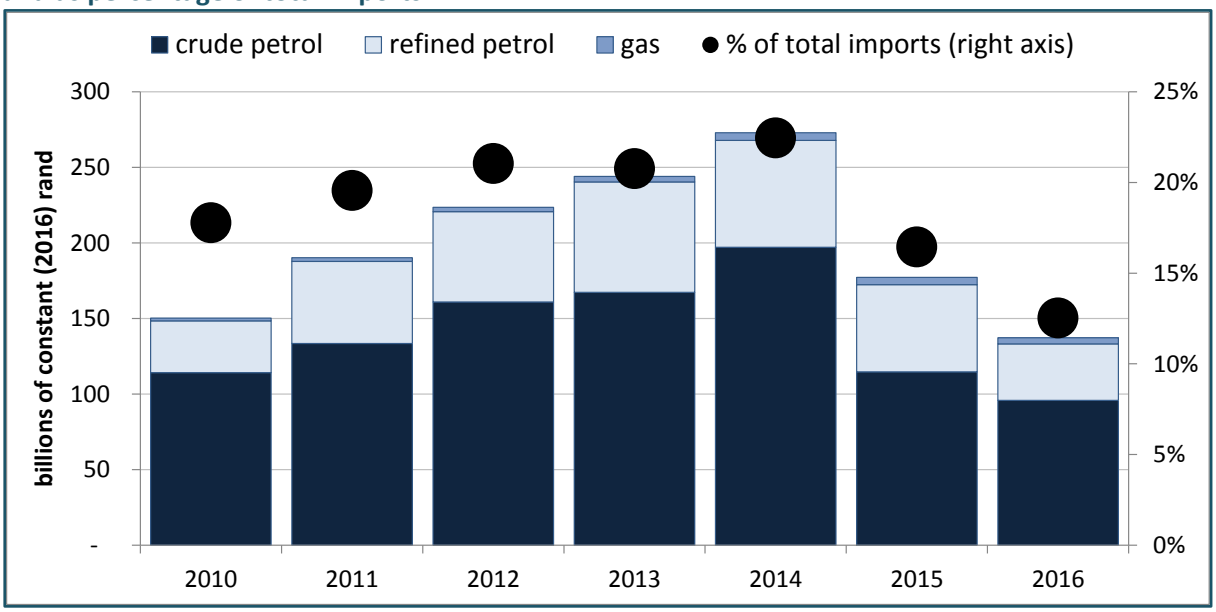
Graph 16. Imports of basic chemicals and petrochemicals, excluding petroleum and gas, in billions of constant (2016) rand (a)



Notes: (a) Deflated using CPI. (b) Excludes refined and crude petroleum and gas. (c) Excludes aluminium oxide, which was used as an ore in aluminium refining. Source: Calculated from ITC. TradeMap. Electronic database. Series on South African imports of organic and inorganic products, plastics, fertilisers and petrochemicals. Downloaded from www.trademap.org in February 2017.

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 2016.

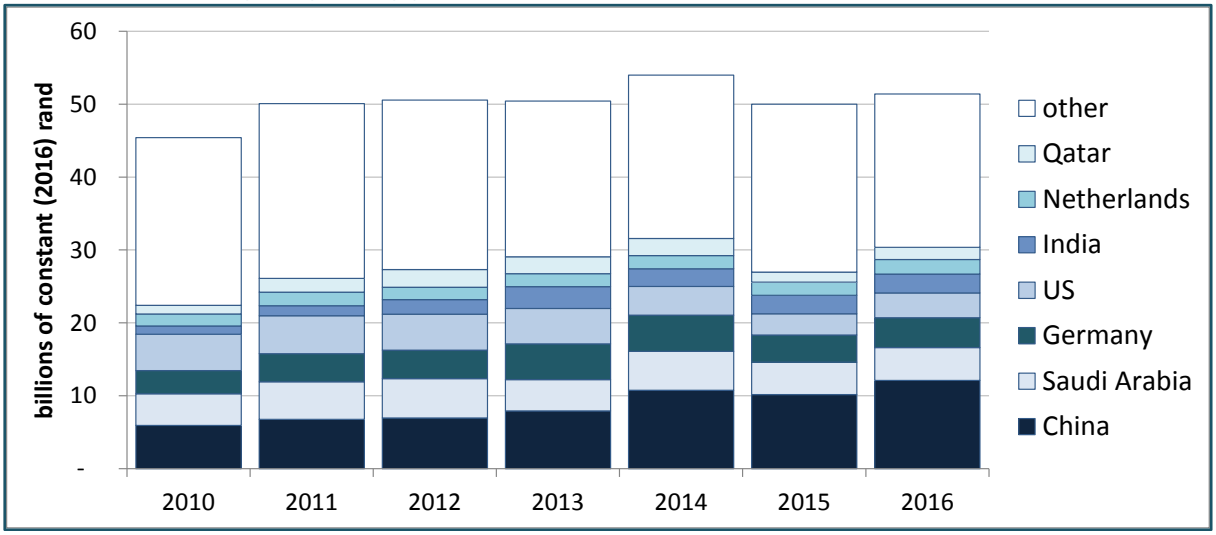
Graph 17. Imports of crude and refined petroleum and of gas in billions of constant (2016) rand (a) and as percentage of total imports



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 February 2017.

South Africa's sources of imports of basic chemicals and petrochemicals other than petroleum were fairly diverse. China's share climbed from 13% to 24% of the total between 2010 and 2016. Organic chemicals accounted for around 40% of the imports from China in 2016.

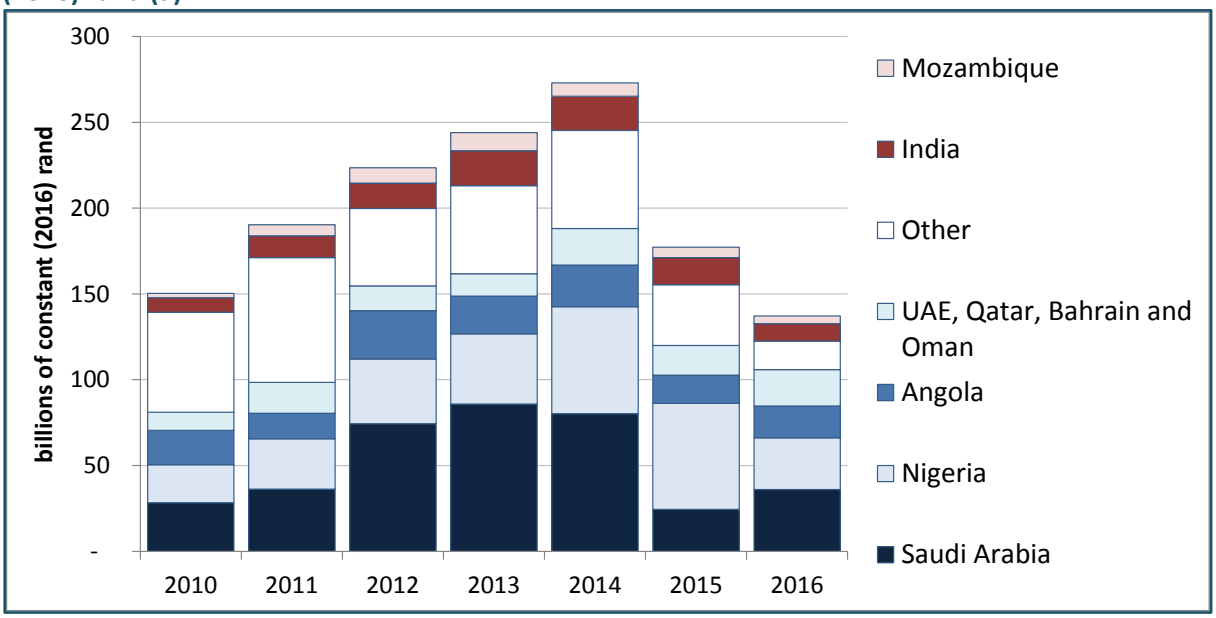
Graph 18. Imports of chemicals and petrochemicals, excluding petroleum and gas by country, in billions of constant (2016) rand (a)



Notes: (a) Deflated using CPI. (b) Excludes refined and crude petroleum and gas. (c) Excludes aluminium oxide, which was used as an ore in aluminium refining. Source: Calculated from ITC. TradeMap. Electronic database. Series on South African imports of organic and inorganic products, plastics, fertilisers and petrochemicals. Downloaded from www.trademap.org in February 2017.

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 and Europe.

Graph 19. Imports of crude and refined petroleum and of gas by country in billions of constant (2016) rand (a)



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 February 2017.