DuPont Decomposition for Fertilizer Companies

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Abstract
The case focuses on analysing the top two Indian fertilizer companies’ performance in terms of revenue and income for 2019–2020, Coromandel International Limited (CIL) and Gujarat State Fertilizers & Chemicals Limited (GSFC). Based on performance appraisal, students are expected to select the better company for investment to get a better return. To make such a decision, students must analyse DuPont decomposition, modified (also known as additive or alternate) DuPont approach and Altman Z-score. The case aims to teach analysis of companies’ financial statements using financial ratios. It explains how the DuPont method and Altman Z-score can recognize the factors that affect a company’s performance through assessment of profitability, efficiency and leverage.

The case is appropriate for financial accounting courses, audit and assurance, financial modelling, accounting practice and regulations. After studying the issues, students should analyse the business models of CIL and GSFC by reviewing their history since incorporation, product and service offerings, revenue, margins, assets, borrowings and market capitalization (Bodie & Merton, 2000, Finance, Prentice-Hall). We are particularly interested in assessing the current financial position, market position and strategies of the companies and their peer group and evaluating the role of gatekeepers, such as business analysts, audit committees, external auditors, institutional investors and regulators, in enhancing the quality of financial reporting.

Keywords
Financial ratio, DuPont decomposition, Altman Z-score, performance evaluation, financial modelling

Teaching Purpose and Audience
The case aims to teach analysis of companies’ financial statements using financial ratios (Johnston & Johnston, 2015). It explains how the DuPont method can recognize the factors that affect a company’s performance through assessment of profitability, efficiency, and leverage (Anthony et al., 2016).

The traditional DuPont method can capture the performance of a company. Yet, it has some drawbacks, like the inability to differentiate between operating assets and liabilities and financing assets and liabilities. The modified DuPont framework removes such limitations and depicts efficient results, making it easy for students to understand the differences between operating and financing activities (Penman, 1996).

The case study can be used in undergraduate or graduate courses in the area of accounting and finance, and MBA courses as well. This case study can be used to analyse financial statements and other subjects related to this topic. It can also be used in different classes to show the other DuPont framework’s implication and applicability and in other courses involving financial ratio analysis.

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Questions
1. Which company, Coromandel International Limited (CIL) or Gujarat State Fertilizers & Chemicals Limited (GSFC), was the better performer?
2. Based on this ratio analysis, which company would you recommend as a better investment option?
3. Based on NOPAT (net operating profit after tax) and DuPont decomposition, which company performed better and why?
4. Analyse the Altman Z-score for selecting the better company.

Teaching Plan
The case study can be divided into four segments to understand the concepts better, followed by a concluding remark at the end. The session can be of 80 minutes, comprising the following in order:
1. Financial ratio analysis (15 minutes);
2. NOPAT and traditional DuPont decomposition (15 minutes);
3. Computation of modified DuPont for CIL or GSFC (10 minutes);
4. Analysis of performance using the traditional and alternate DuPont methods (20 minutes);
5. Analysis of Altman Z-score (15 minutes); and
6. Concluding remark (5 minutes).

Top 10 Largest Fertilizer Companies in India
Many private and government companies hold significant shares in India’s leading stock markets, that is, the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). We present a list of the highest-earning fertilizer companies among all the fertilizer companies in India in 2020:

1. CIL
2. GSFC
3. Chambal Fertilisers and Chemicals Limited
4. Rashtriya Chemicals & Fertilizers Limited
5. Fertilisers and Chemicals Travancore Limited
6. Deepak Fertilizers & Petrochemicals Corporation Limited
7. Gujarat Narmada Valley Fertilizers & Chemicals Limited
8. Zuri Agro Chemicals Limited
9. Liberty Phosphate Limited
10. Mangalore Chemicals and Fertilizers Limited

Coromandel International Limited
Versus Gujarat State Fertilizers and Chemicals Limited

Industry and Company Overview
India’s economy has been based on agriculture, which provides resources for many industrial sectors, like fast-moving consumer goods (FMCG), and jobs for farmers. India is the second-largest country by population in the world after China. The majority of the Indian community has been dependent on agriculture for their source of income. As India’s population increased, the demand for consumer goods, foods and grains also rose. The Green Revolution was started in India around the 1960s, so that India could become independent to fulfil the demand for food and grains in the Indian market. Extensive use of high-yielding variety (HYV) seeds, modern irrigation techniques, fertilizers and pesticides was started, which improved India’s agriculture. The contribution of agriculture to India’s GDP was 15% as of 2019. India was the second-largest consumer of overall fertilizers and the third-largest producer of nitrogenous fertilizers in the world (after China and the United States) as of 2019.

Various production units were installed to meet the increasing demand for fertilizers. The Indian fertilizer industry started in 1906 with a capacity of 6,000 MT per year. It started operating on a large scale in the 1940s; many players were involved in producing fertilizers, from the private, public and cooperative sectors. Among these, CIL and GSFC were the top two companies with the highest revenue and income for 2019–2020. The growth of the Indian fertilizer market could be massive. It has been forecasted that it would be worth ₹11,116 billion by 2024, at a compound annual growth rate (CAGR) of 12.3% during 2019–2024 (Brealey et al., 1999). Fertilizers have enhanced the growth of plants through additives that provide nutrients to plants and improve their effectiveness. Increased demand for agricultural products and food grains led to an increase in the production of these products. The need arose for fertilizers to make the soil fertile so that the land’s productivity could be increased. Tables 1 and 2 show the total installed capacity of various fertilizers in India. In 2018–2019, India’s total production of all fertilizers was

Table 1. Installed Capacity of Various Fertilizers During the Reporting Year 2019–2020 (in million metric tonnes).

| Product        | No. of Units | Total Installed Capacity |
|---------------|-------------|--------------------------|
| Urea          | 31          | 200.3                    |
| DAP           | 12          | 72.99                    |
| SSP           | 0           | 0.00                     |
| Complex Fertilizers | 21         | 52.28                    |

Source: Department of Fertilizers, Ministry of Chemicals and Fertilizers, Government of India.
Table 2. Production and Import of Fertilizers from 2011–2012 to 2023–2024.

| Year      | Production | Imports |
|-----------|------------|---------|
|           | Urea       | Non-urea| Total | Quantity | Value | Realization |
|           | Per 1,000 tonnes |         |       | USD million | USD/tonne |         |
| 2011–2012 | 21,984.90  | 16,632.80 | 38,617.70 | 18,095.10 | 9,370.00 | 517.8     |
| 2012–2013 | 22,574.90  | 14,826.50 | 37,401.40 | 15,950.20 | 7,412.50 | 464.7     |
| 2013–2014 | 22,715.40  | 15,399.50 | 38,114.90 | 14,890.90 | 5,380.80 | 361.4     |
| 2014–2015 | 22,586.10  | 16,083.40 | 38,669.50 | 18,368.70 | 6,380.50 | 347.4     |
| 2015–2016 | 24,475.60  | 16,940.20 | 41,415.80 | 20,543.70 | 7,007.90 | 341.1     |
| 2016–2017 | 24,189.00  | 17,323.90 | 41,512.90 | 16,065.80 | 4,265.80 | 265.5     |
| 2017–2018 | 24,022.90  | 17,520.00 | 41,542.90 | 17,051.90 | 4,648.50 | 272.6     |
| 2018–2019 | 23,999.60  | 17,721.20 | 41,720.80 | 19,503.80 | 6,619.90 | 339.4     |
| 2019–2020 | 24,508.40  | 18,404.80 | 42,913.20 | 22,733.50 | 6,812.10 | 299.7     |
| 2020–2021 | 24,952.30  | 18,495.20 | 43,447.50 | 23,409.10 | 6,861.90 | 293.1     |
| 2021–2022 | 25,260.70  | 18,813.60 | 44,074.30 | 24,193.80 | 7,214.30 | 298.2     |
| 2022–2023 | 25,489.00  | 19,024.90 | 44,513.90 | 24,818.60 | 7,517.20 | 302.9     |
| 2023–2024 | 25,788.90  | 19,332.60 | 45,121.50 | 25,901.20 | 7,975.50 | 307.9     |

Source: CMIE database, Industry Outlook, created by the case writers using data from CMIE Industry Outlook database. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK&icode=0101012015000000

Table 3. Annual Survey for the Manufacture of Fertilizers and Nitrogen Compounds from 1994–1995 to 2017–2018.

| Year      | Number of Factories | Number of Total Employees | Total Emoluments (₹ million) | Number of Workers | Wages to Workers (₹ million) | Fixed Capital (₹ million) |
|-----------|---------------------|---------------------------|------------------------------|-------------------|-------------------------------|----------------------------|
| 1994–1995 | 646                 | 101,361                   | 7,891.30                     | 64,820            | 3,964.20                      | 126,587.20                 |
| 1995–1996 | 765                 | 104,554                   | 9,626.00                     | 66,805            | 4,905.30                      | 136,166.90                 |
| 1996–97   | 686                 | 104,783                   | 9,232.80                     | 67,330            | 4,606.10                      | 137,669.10                 |
| 1997–1998 | 679                 | 103,949                   | 10,315.90                    | 66,816            | 5,213.90                      | 165,125.90                 |
| 1998–1999 | 465                 | 65,967                    | 7,897.10                     | 41,291            | 4,172.90                      | 170,923.60                 |
| 1999–2000 | 421                 | 89,967                    | 12,520.00                    | 52,950            | 5,868.60                      | 198,547.90                 |
| 2000–2001 | 441                 | 84,379                    | 11,551.20                    | 50,860            | 5,104.00                      | 193,839.90                 |
| 2001–2002 | 396                 | 70,282                    | 11,151.80                    | 42,113            | 4,932.70                      | 189,047.90                 |
| 2002–2003 | 427                 | 62,668                    | 11,182.80                    | 39,398            | 4,930.30                      | 156,728.10                 |
| 2003–2004 | 411                 | 58,571                    | 10,885.90                    | 36,297            | 4,662.30                      | 173,920.50                 |
| 2004–2005 | 421                 | 58,288                    | 11,492.30                    | 37,263            | 4,883.50                      | 185,609.50                 |
| 2005–2006 | 388                 | 54,005                    | 11,489.10                    | 35,293            | 4,843.80                      | 202,602.70                 |
| 2006–2007 | 469                 | 64,450                    | 13,272.80                    | 41,820            | 5,699.50                      | 210,102.60                 |

(Table 3 Continued)
Classification of Fertilizers

Organic fertilizers: These fertilizers consist of animal waste, plant wastes from agriculture and worm castings.

Inorganic fertilizers: These fertilizers consist of chemicals and include nitrogen fertilizers, phosphate fertilizers and potassium fertilizers.

Single-nutrient (straight) fertilizers: These fertilizers consist of only one nutrient component, such as urea, rock phosphate, ammonia, ammonium sulphate, etc.

Multi-nutrient fertilizers: These fertilizers consist of two or more nutrient components. They provide plants with more than two nutrients.

Coromandel International Limited

CIL is the largest fertilizer company operating in India, and it ranks second in terms of the manufacture of Malathion. It was established in early 1961 by two companies of the United States—Chevron Chemical Company and International Minerals and Chemicals Corporation—and is operated by its parent company, Murugappa Group. It has established manufacturing units at Gujarat, Andhra Pradesh, Maharashtra, Tamil Nadu, Jammu and Kashmir. Gromor, Godavari, Pyramox, Parry Gold and Parry Super were the products of the company. The company diversified its products by manufacturing fertilizers, pesticides, insecticides and weedicides. The company also introduced one more product to its business, named Specialty Nutrients, to help crops grow.

The company operates its business all over India through its more-than-800 own retail outlets, named Mana Gromor Center in Telangana and Andhra Pradesh, Namma Gromor Center in Karnataka and Aapla Gromor Center in Maharashtra. The distribution channel includes 13 marketing offices and a group of 7,000 dealers. These centres also provide advice to customers, farmers, to decide which crop they should produce, what type of fertilizers they should use, what should be done to make the soil efficient, etc. The company installed interactive kiosks at these centres to help farmers manage plant nutrition better. Another initiative taken by CIL involves providing soil testing through its Gromor centres. Under this initiative, a soil health card is provided by an expert about the soil’s composition, which helps advise farmers regarding supplements and nutrients for the soil and plants. The company has also taken the initiative for a green and sustainable environment. Its surroundings were made adaptive for different species of birds and reduced the negative impact of the production plant. It has also been working for school children’s growth and development through providing scholarships to deserving candidates. It has taken initiatives in the area of healthcare and provides medical facilities through medical centres and mobile vehicle vans. In the international market, the company has a presence in 62 countries. It produces various products, such as insecticides, fungicides and herbicides, and exports them to South America, Western Africa, the Middle East and Southeast Asia. The gross revenue and earnings (see Table 4) of the company were ₹13,240 and ₹714 (in ₹10 million),

| Year      | Number of Factories | Number of Total Employees | Total Emoluments (₹ million) | Number of Workers | Wages to Workers (₹ million) | Fixed Capital (₹ million) |
|-----------|---------------------|---------------------------|-------------------------------|-------------------|-------------------------------|---------------------------|
| 2007–2008 | 448                 | 59,411                    | 15,227.60                     | 38,433            | 6,116.50                      | 208,557.40                |
| 2008–2009 | 542                 | 66,156                    | 23,437.30                     | 43,468            | 8,248.20                      | 212,052.50                |
| 2009–2010 | 573                 | 65,823                    | 20,914.10                     | 43,797            | 8,387.20                      | 238,450.00                |
| 2010–2011 | 741                 | 80,148                    | 25,664.50                     | 53,814            | 10,688.30                     | 259,716.20                |
| 2011–2012 | 727                 | 83,962                    | 29,223.70                     | 60,190            | 11,485.50                     | 278,665.00                |
| 2012–2013 | 703                 | 82,155                    | 30,153.30                     | 54,064            | 11,634.70                     | 350,654.40                |
| 2013–2014 | 716                 | 76,804                    | 33,071.30                     | 53,734            | 13,789.20                     | 348,882.50                |
| 2014–2015 | 769                 | 73,114                    | 35,106.50                     | 49,896            | 14,387.80                     | 341,458.30                |
| 2015–2016 | 772                 | 74,643                    | 37,411.70                     | 53,988            | 15,965.10                     | 367,132.80                |
| 2016–2017 | 738                 | 76,542                    | 39,211.50                     | 53,729            | 17,416.00                     | 384,683.00                |
| 2017–2018 | 751                 | 74,394                    | 44,699.50                     | 52,376            | 19,173.30                     | 531,543.50                |

Source: CMIE database, Industry Outlook. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK&icode=0101012015000000

(Table 3 Continued)
respectively, for the financial year ended on 31 March 2019. For CIL’s financial statements see Table 5, and for its cash flow accounts see Table 6.

A wide range of products and services are provided by the company, such as farm inputs, including fertilizers, seeds, organic manure, agrochemicals, animal feed and insurance, farm advisory services, which include soil testing in labs or through mobile kits, farmer seminars and touchscreen kiosks, and farm mechanization services, which include nursery operation, land preparation and transplanting and spraying services.

### Table 4. Income Statements of Coromandel International Limited for 2015–2019 (all numbers in ₹10 million).

| Income                                      | 30/3/2019  | 30/3/2018  | 30/3/2017  | 30/3/2016  | 30/3/2015  |
|---------------------------------------------|------------|------------|------------|------------|------------|
| Revenue from operations (net)              | 13,159.10  | 11,026.71  | 9,976.64   | 8,111.49   | 8,079.18   |
| Other operating revenues                    | 65.46      | 56.21      | 54.11      | 3,369.93   | 3,227.25   |
| Total operating revenues                    | 13,224.56  | 11,082.92  | 10,030.75  | 11,481.42  | 11,306.43  |
| Other income                                | 37.08      | 59.69      | 54.82      | 66.49      | 56.6       |
| **Total revenue**                           | **13,261.64** | **11,142.61** | **10,085.57** | **11,547.91** | **11,363.03** |

**Expenses**

|                        | 30/3/2019  | 30/3/2018  | 30/3/2017  | 30/3/2016  | 30/3/2015  |
|------------------------|------------|------------|------------|------------|------------|
| Cost of materials consumed | 7,965.30 | 6,517.29 | 5,585.23 | 6,767.41  | 7,109.30  |
| Purchases of stock in trade    | 2,159.43 | 1,244.22 | 1,230.13 | 2,069.01  | 1,921.50  |
| Changes in inventories and stock in trade | −785.15 | −152.12 | 305.6 | −113.36  | −408.34  |
| Cost of revenue            | 9,339.58  | 7,609.39  | 7,120.96  | 8,723.06  | 8,622.46  |
| **Gross profit**           | **3,922.06** | **3,533.22** | **2,964.61** | **2,824.85** | **2,740.57** |
| Employee benefit expenses | 411.07     | 361.87     | 310.84     | 291.87     | 277.94     |
| Depreciation and amortization expenses   | 113.84    | 99.13      | 100.71     | 106.12     | 104.57     |
| Other expenses             | 2,030.86  | 1,855.22  | 1,616.27  | 1,699.68  | 1,552.55  |
| Total operating expenses   | 2,555.77  | 2,316.22  | 2,027.82  | 2,097.67  | 1,935.06  |
| **Operating income or loss** | **1,366.29** | **1,217.00** | **936.79** | **727.18** | **805.51** |
| Finance costs/interest expenses | 250.7    | 178.31     | 223.78     | 220.94     | 209.59     |
| Income before tax          | **1,115.59** | **1,038.69** | **713.01** | **506.24** | **595.92** |
| Total expenses             | 12,146.05 | 10,103.92 | 9,372.56  | 11,041.67 | 10,767.11 |
| Exceptional items          | −23.85    | 0.00       | 0.00       | 25.00      | −3.94      |
| **Profit/loss before tax** | **1,091.74** | **1,038.69** | **713.01** | **531.24** | **591.98** |
| Tax expenses—continuing operations |          |            |            |            |            |
| Current tax                | 387.37    | 353.9      | 243.17     | 187.76     | 187.85     |
| Deferred tax               | −15.27    | −7.12      | −7.83      | −16.14     | 2.34       |
| Total tax expenses         | 372.1     | 346.78     | 235.34     | 171.62     | 190.19     |
| **Profit/loss for the period** | **719.64** | **691.91** | **477.67** | **359.62** | **401.79** |

**Source:** CMIE database, Industry Outlook. Created by the case writers using data from CMIE Industry Outlook database. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK&code=0101012015000000
### Table 5. Financial Statements of Coromandel International Limited for 2015–2019 (all numbers in ₹10 million).

|                        | 30/3/2019 | 30/3/2018 | 30/3/2017 | 30/3/2016 | 30/3/2015 |
|------------------------|-----------|-----------|-----------|-----------|-----------|
| **Assets/current assets** |           |           |           |           |           |
| Cash and cash equivalents | 159.32    | 555.42    | 167.83    | 197.78    | 317.58    |
| Other short-term investments | 428.05    | 407.77    | 522.25    | 480.00    | 2,487.75  |
| **Total cash**          | 587.00    | 963.00    | 690.00    | 678.00    | 2,805.00  |
| Net receivables         | 1,824.42  | 1,577.70  | 1,621.67  | 1,641.85  | 1,446.38  |
| Current investments     | 0.14      | 0.14      | 0.13      | 0.27      | 0.20      |
| Inventory               | 3,241.39  | 2,262.49  | 1,724.61  | 2,345.76  | 2,259.22  |
| Other current assets    | 3,099.58  | 3,358.34  | 2,800.20  | 2,581.71  | 3.58      |
| **Total current assets**| 8,752.90  | 8,161.86  | 6,836.69  | 7,247.37  | 6,514.71  |
| Non-current investments | 200.68    | 221.27    | 388.35    | 476.91    | 351.97    |
| Long-term loans and advances | 0.00      | 0.00      | 0.00      | 0.00      | 68.91     |
| Other non-current assets| 120.02    | 89.80     | 70.50     | 96.19     | 0.00      |
| **Property, plant and equipment** |         |           |           |           |           |
| Net property, plant and equipment | 1,301.19 | 1,315.92 | 1,315.88 | 1,310.11 | 1,366.14 |
| Intangible assets       | 7.97      | 11.1      | 11.34     | 9.43      | 13.45     |
| Capital work in progress| 175.6     | 37.8      | 13.67     | 30.89     | 38.61     |
| Intangible assets under development | 15.56 | 10.62 | 8.57 | 10.77 | 7.89 |
| **Total non-current assets** | 1,821.02 | 1,686.51 | 1,808.31 | 1,934.30 | 1,846.97 |
| **Total assets**        | 10,573.92 | 9,848.37 | 8,645.00 | 9,181.67 | 8,361.68 |
| **Liabilities/current liabilities** |         |           |           |           |           |
| Short-term borrowings   | 2,954.47  | 2,728.44  | 2,228.38  | 2,582.63  | 2,039.28  |
| Trade payables          | 3,762.47  | 3,378.61  | 2,934.54  | 3,232.93  | 3,087.98  |
| Other current liabilities| 343.47    | 684.21    | 401.47    | 482.19    | 625.30    |
| Short-term provisions   | 18.10     | 10.04     | 14.74     | 7.88      | 105.97    |
| **Total current liabilities** | 7,078.51 | 6,801.30 | 5,579.13 | 6,305.63 | 5,858.53 |
| Long-term debt          | 0.00      | 0.00      | 0.00      | 44.06     | 66.81     |
| Deferred tax liabilities| 112.29    | 125.38    | 149.47    | 167.92    | 187.54    |
| Long-term provisions    | 13.97     | 14.39     | 14.17     | 17.79     | 16.78     |
| Other long-term liabilities | 10.76    | 11.03     | 11.46     | 12.31     | 30.01     |
| **Total non-current liabilities** | 137.02 | 150.80 | 175.10 | 242.08 | 301.14 |
| **Total liabilities**   | 7,215.53  | 6,952.10  | 5,754.23  | 6,547.71  | 6,159.67  |
| **Stockholders’ equity**|           |           |           |           |           |
| Common stock            | 29.25     | 29.24     | 29.17     | 29.13     | 29.13     |

(Table 5 Continued)
(Table 5 Continued)

|                  | 30/3/2019      | 30/3/2018      | 30/3/2017      | 30/3/2016      | 30/3/2015      |
|------------------|----------------|----------------|----------------|----------------|----------------|
| Reserves and surplus | 3,329.14       | 2,867.03       | 2,861.60       | 2,604.83       | 2,172.88       |
| Total stockholders' equity | 3,358.39       | 2,896.27       | 2,890.77       | 2,633.96       | 2,202.01       |
| Total liabilities and stockholders' equity | 10,573.92      | 9,848.37       | 8,645.00       | 9,181.67       | 8,361.68       |

Source: CMIE database, Industry Outlook. Created by the case writers using data from CMIE Industry Outlook database. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK&code=0101012015000000

Table 6. Cash Flow Statements of Coromandel International Limited for 2017–2019 (all numbers in ₹10,000).

| Particulars                                              | 30/3/2019      | 30/3/2018      | 30/3/2017      |
|----------------------------------------------------------|----------------|----------------|----------------|
| Cash flows from operating activities                     |                |                |                |
| Net income                                               | 72,04,800      | 66,36,200      | 47,69,600      |
| Depreciation and amortization                            | 1138400        | 975900         | 1007100        |
| Stock-based compensation                                 | 70,000         | 86,300         | 16,900         |
| Change in working capital                                | −46,00,500     | −73,19,600     | 18,70,400      |
| Inventory                                                | −97,89,000     | −50,25,200     | 62,11,500      |
| Other working capital                                    | 25,33,500      | 13,14,900      | 82,40,900      |
| Other non-cash items                                     | 21,41,400      | 12,43,300      | 17,58,900      |
| Net cash provided by operating activities                 | 52,64,000      | 25,55,500      | 91,52,400      |
| Cash flows from investing activities                      |                |                |                |
| Investments in property, plant and equipment             | −27,30,500     | −12,40,600     | −9,11,500      |
| Acquisitions (net)                                       | −33,00,000     | 0.00           | −40,000        |
| Purchases of investments                                 | −9,30,500      | −42,62,500     | −12,00,000     |
| Sales/maturities of investments                          | 7,52,900       | 41,14,000      | 12,38,700      |
| Other investing activities                               | −2,02,800      | 11,44,800      | −4,10,300      |
| Net cash used for investing activities                   | −59,70,600     | 4,06,300       | −7,86,000      |
| Net change in cash                                       | −31,47,700     | 29,52,000      | −2,77,600      |
| Cash at the beginning of the period                       | 44,65,200      | 14,67,100      | 17,44,800      |
| Cash at the end of the period                            | 13,21,300      | 44,19,000      | 14,67,100      |
| Free cash flow                                           |                |                |                |
| Operating cash flow                                      | 5264000        | 25,55,500      | 91,52,400      |
| Capital expenditure                                      | −2730500       | −12,40,600     | −9,11,500      |
| Free cash flow                                           | 2533500        | 13,14,900      | 82,40,900      |

Source: CMIE database, Industry Outlook. Created by the case writers using data from CMIE Industry Outlook database. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK
**Gujarat State Fertilizers and Chemicals Limited**

Vadodara (Gujarat)-based GSFC was established in the year 1962. The company diversified its products in various segments, such as fertilizers, bio-fertilizers and methanol. It established state-of-the-art manufacturing units to achieve faster growth. These units were installed at multiple locations, such as the Vadodara unit at Vadodara, Sikka unit at Jamnagar, nylon unit at Surat and polymer unit at Nandesari (Vadodara). The company manufactures different fertilizers, such as urea, ammonium sulphate, diammonium phosphate (DAP) and ammonium phosphate sulphate under the brand name of Sardar, with an average production of 1,800,000 tonnes per annum. It also produces water-soluble fertilizers, banana tissue culture plants and biotechnological products to make farmers hi-tech and progressive. It also provides a wide range of industrial products, such as caprolactam, melamine, nylon VI, engineering plastics, nylon filament yarn, acrylics, ammonia, acids and industrial gases. The company uses a wide range of distributors to reach its customers and timely deliver its products, with an advanced online reporting system across India. The marketing network of the company has spread all over India. In the 1990s, the company faced financial troubles due to internal and external factors. With the help of the state government of Gujarat, it was able to recover its growth rapidly. For its financial statements see Table 7, and for its cash flow accounts see Table 8.

**Table 7. Financial Statements of Gujarat State Fertilizers & Chemicals Limited for 2015–2019 (all numbers in ₹10 million).**

| Particulars | 30/3/2019 | 30/3/2018 | 30/3/2017 | 30/3/2016 | 30/3/2015 |
|-------------|-----------|-----------|-----------|-----------|-----------|
| **Assets/current assets** | | | | | |
| Cash and cash equivalents | 68.36 | 69.8 | 58.54 | 41.73 | 358.36 |
| Other short-term investments | 174.64 | 161.05 | 149.06 | 16.76 | 148.75 |
| **Total cash** | 243.00 | 231.00 | 208.00 | 58.00 | 507.00 |
| Net receivables | 811.62 | 935.01 | 799.88 | 3,289.61 | 1,972.37 |
| Inventory | 1,655.24 | 873.08 | 704.58 | 586.10 | 634.02 |
| Other current assets | 1,892.92 | 2,108.94 | 2,040.36 | 102.66 | 68.76 |
| **Total current assets** | 4602.78 | 4147.88 | 3752.42 | 4036.86 | 3182.26 |
| **Non-current assets** | | | | | |
| Non-current investments | 2,376.39 | 2,789.51 | 2,529.61 | 1,739.84 | 897.92 |
| Long-term loans and advances | 0.00 | 0.00 | 0.00 | 109.74 | 239.29 |
| Other non-current assets | 476.43 | 506.13 | 513.51 | 443.33 | 38.40 |
| **Property, plant and equipment** | | | | | |
| **Net property, plant and equipment** | 2,817.69 | 2,104.02 | 2,015.09 | 1,646.24 | 1,948.60 |
| Intangible assets | 3.11 | 3.95 | 6.89 | 9.46 | 9.53 |
| Capital work in progress | 187.23 | 763.08 | 273.02 | 404.78 | 261.24 |
| **Total fixed assets** | 3,008.03 | 2,871.05 | 2,295.00 | 2,060.48 | 2,219.37 |
| **Total non-current assets** | 5,860.85 | 6,166.69 | 5,338.12 | 4,353.39 | 3,394.98 |

(Table 7 Continued)
The company has taken up the clean-environment initiative to reduce greenhouse gases through various projects, like windmill and energy conservation.20 The market capitalization of the company was ₹2,424.74 million as of 1 March 2020.21 The company’s total revenue and earnings were ₹8,679.44 million and ₹493.86 million, respectively, for the financial year ended on 31 March 2019 (see Table 9).22

Theoretical Background and Literature

Studying the movement of stock prices and identifying the right stock or company to invest in is considered to be the most challenging task in the financial market. Many academicians, analysts and researchers have been trying to identify the indicators moving the value of a stock (Kothari & Shanken, 1997), and investors are very interested in identifying the right stocks or companies for their investment. Investment should be based on some theory or fundamental factors for getting a better return at low risk. These factors could be accounting ratios, financial statements and other accounting information (Ross et al., 2019).

Dimitropoulos and Asteriou (2009) analysed specific financial ratios and their influences on the stock returns of 101 non-financial firms listed on the Athens Stock Exchange from 1995 to 2004. The results demonstrate that the ratios of working capital to total assets and net profit to
sales negatively affect returns. Financial ratios work as indicators related to the selection of stocks. Filip and Raffournier (2010) examined the relation between accounting incomes and stock returns of companies listed on the Bucharest Stock Exchange and found a substantial effect of accounting ratios on stocks identification. Barnes (1987) explored the actual relationship between financial ratios and stock returns, since ratios are perceived as helpful in predicting future returns and impacting the returns and useful for creating an optimal portfolio. Trejo et al. (2015) explained that the financial ratios are used by equity analysts that have predictive power on future stock returns. Analysists use financial ratios as an effective tool for analysing companies’ performance and recommending the best companies to invest in (Bodie & Merton, 2000). 

They found that EPS is positively related to stock returns. Arkan (2016) investigated the financial ratios derived from financial statements to predict stock returns using a data sample of 15 firms of the Kuwaiti Financial market over a period from 2005 to 2014. He found that some ratios show robust and significant positive associations with stock returns. Katchova and Enlow (2013) evaluated Du Pont ratios to compare the return-on-equity components of agribusinesses and all companies (Penman, 2010).

### Altman Z-Score

The Z-score formula may be used to predict the probability that a firm will go into bankruptcy within 2 years. The Z-score expects corporate defaults and is an easy-to-calculate control measure for assessing companies’ financial-distress status in academic studies. It uses multiple corporate-income and balance-sheet values to measure a company’s financial health (see Table 10).

### Table 8. Cash Flow Statements of Gujarat State Fertilizers & Chemicals Limited for 2015–2019 (all numbers in ₹10,000).

| Particulars                                | 30/3/2019    | 30/3/2018    | 30/3/2017    |
|--------------------------------------------|-------------|-------------|-------------|
| Cash flows from operating activities       |             |             |             |
| Net income                                 | 49,31,329   | 4,737,675   | 42,44,640   |
| Depreciation and amortization              | 35,598      | 35,598      | 10,72,949   |
| Change in working capital                  | −20,90,484  | −2,031,434  | 41,11,107   |
| Inventory                                  | −78,21,582  | −1,685,059  | −11,84,745  |
| Other working capital                      | 20,92,695   | −1,414,275  | 66,21,452   |
| Other non-cash items                        | 5,77,721    | 476,105     | 6,32,723    |
| **Net cash provided by operating activities** | 50,83,693   | 3,575,105   | 91,12,540   |
| Cash flows from investing activities        |             |             |             |
| Investments in property, plant and equipment | −29,90,998  | −49,89,380  | −24,91,088  |
| Purchases of investments                   | −2,20,275   | −1,66,432   | −81,600     |
| **Net cash used for investing activities**  | −28,06,029  | −48,44,721  | −23,82,108  |
| Net change in cash                         | −1,45,226   | 70,958      | 1,68,495    |
| Cash at the beginning of the period         | 5,53,447    | 4,82,489    | 3,13,994    |
| Cash at the end of the period               | 4,08,220    | 5,53,447    | 4,82,489    |
| Free cash flow                             |             |             |             |
| Operating cash flow                        | 50,83,693   | 35,75,105   | 91,12,540   |
| Capital expenditure                        | −29,90,998  | −49,89,380  | −24,91,088  |
| **Free cash flow**                         | 20,92,695   | −14,14,275  | 66,21,452   |

Source: CMIE database, Industry Outlook. Created by the case writers using data from CMIE Industry outlook database. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK&icode=0101012015000000
### Table 9. Income Statements of Gujarat State Fertilizers & Chemicals Limited for 2015–2019 (all numbers in ₹10 million).

| Income                                      | 30/3/2019     | 30/3/2018     | 30/3/2017     | 30/3/2016     | 30/3/2015     |
|---------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Revenue from operations                     | 8,490.67     | 6,265.87     | 5,264.53     | 5,936.78     | 5,324.57     |
| Other operating revenues                    | 0.00         | 0.00         | 0.00         | 171.56       | 0.00         |
| Total operating revenues                    | 8,490.67     | 6,265.87     | 5,264.53     | 6,108.35     | 5,324.57     |
| Other income                                | 107.53       | 98.95        | 56.3         | 65.13        | 101.2        |
| Total revenue                               | 8,598.20     | 6,364.82     | 5,320.83     | 6,173.48     | 5,425.77     |
| Expenses                                    |              |              |              |              |              |
| Cost of materials consumed                  | 4,903.09     | 3,755.72     | 3,169.16     | 3,641.06     | 3,420.80     |
| Purchases of stock in trade                 | 2,105.46     | 840.7        | 472.86       | 700.07       | 324.44       |
| Changes in inventories of FG, WIP and stock in trade | −645.95  | −108.39      | −59.67       | −34.81       | 21.46        |
| Cost of revenue                             | 6,362.60     | 4,488.03     | 3,582.35     | 4,306.32     | 3,766.70     |
| Gross profit                                | 2,235.60     | 1,876.79     | 1,738.48     | 1,867.16     | 1,659.07     |
| Employee benefit expenses                   | 530.68       | 513.12       | 511.43       | 478.87       | 389.86       |
| Depreciation and amortization expenses      | 126.25       | 119.45       | 103.62       | 97.47        | 100.68       |
| Other expenses                              | 848.73       | 699.87       | 681.7        | 666          | 575.78       |
| Total operating expenses                    | 1,505.66     | 1,332.44     | 1,296.75     | 1,242.34     | 1,066.32     |
| Operating income or loss                    | 729.94       | 544.35       | 441.73       | 624.82       | 592.75       |
| Finance costs/interest expenses             | 61.02        | 51.35        | 64.93        | 31.31        | 18.01        |
| Income before tax                           | 668.92       | 493.00       | 376.80       | 593.51       | 574.74       |
| Total expenses                              | 7,929.28     | 5,871.82     | 4,944.03     | 5,579.97     | 4,851.03     |
| Profit/loss before exceptional, extraordinary items and tax | 668.92  | 493.00       | 376.80       | 593.51       | 574.74       |
| Exceptional items                           | −23.85       | 0.00         | 0.00         | 25           | −3.94        |
| Profit/loss before tax                      | 645.07       | 493.00       | 376.80       | 618.51       | 570.80       |
| Tax expenses—continuing operations          |              |              |              |              |              |
| Current tax                                 | 118.72       | 69.83        | 33.46        | 188.43       | 159.32       |
| Deferred tax                                | 54.81        | 50.69        | 15.55        | −3.3         | 14.49        |
| Total tax expenses                          | 175.82       | 19.21        | −42.5        | 185.13       | 173.81       |
| Profit/loss for the period                  | 493.10       | 473.79       | 419.30       | 408.38       | 400.93       |

**Source:** CMIE database, Industry Outlook. Created by the case writers using data from CMIE Industry outlook database. https://industryoutlook.cmie.com/kommon/bin/sr.php?kall=wshreport&nvdt=20200207180424573&nvpc=055000000000&nvtype=ANALYSIS+%26+OUTLOOK&ico de=0101012015000000
When Z is 3.0 or more, the firm is most likely safe based on the financial data. When Z is below 1.8, the company is highly likely to be bankrupt. If a company is generating a Z-score lower than 1.8, serious studies must be performed to ensure the company can survive. A low Z-score indicates that a firm is gradually approaching insolvency or bankruptcy. Thus, firms with low scores are higher-risk investment options.

The Altman Z-score is based on five financial ratios that can be calculated from data found on a company’s annual report. It uses profitability, leverage, liquidity, solvency and activity to predict whether a company has a high probability of becoming insolvent. DuPont analysis uses three variables—profitability, leverage and liquidity—(with the Altman Z-score) for getting better results. A company that has a high ROE would be able to achieve a high Z-score, and a high Z-score for a company indicates that it is a good investment option.

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### Notes

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2. See https://www.worldometers.info/world-population/
3. See http://statisticstimes.com/economy/sectorwise-gdp-contribution-of-india.php
4. See http://www.careratings.com/upload/NewsFiles/SplAnalysis/Fertilizer%20Industry%20Update%20July%202019.pdf and https://industryoutlook.cmie.com/kommon/bin/sr.php?call=wsreport&ndt=20200207180424573&nvpc=055000000000&ntype=ANALYSIS%26OUTLOOK&icode=0101012015000000
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