# Financial management of the dairy manufacturing SME in Colombia (2014 - 2019)[1]

## Gestión financiera de la pyme manufacturera de productos lácteos en Colombia (2014- 2019)

Rivera-Godoy, Jorge Alberto

Jorge Alberto Rivera-Godoy 2
jorge.rivera@correounivalle.edu.co
Universidad del Valle, Colombia

**Abstract:** *Introduction*: This article presents the results of a research aimed at evaluating the financial performance of small and medium-sized enterprises in the dairy processing industry in Colombia during the period 2014-2019. *Methodology*: using as a methodology the analysis of accounting and value management inductors that measure their growth, efficiency, efficacy and effectiveness. *Results*: The study revealed that, on average, the SME in this industry achieves an accounting performance in the six-year period, while the medium-sized enterprise reaches it higher, as this one is more effective in the management of costs and expenses, even though it is not that efficient in the use of assets, nor the one that uses a higher financial leverage. Similarly, the SME destroys economic value added (*EVA*) because the cost of financial resources is higher than the return on net operating assets, while in the medium-sized enterprise this difference is smaller.

**Keywords:** EVA, market value added (MVA), return on assets (ROA), return on equity (ROE), SME, dairy processing industry, administration..

**Resumen:** *Introducción*: Este artículo presenta los resultados de una investigación que tiene como objetivo evaluar el desempeño financiero de la pequeña y mediana empresa del sector elaboración de productos lácteos en Colombia en el período 2014-2019. *Metodología*: se emplea como metodología el análisis de indicadores contables y de gestión del valor que miden su crecimiento, eficiencia, eficacia y efectividad. *Resultados:* Se pudo determinar que la pyme de este sector logra, en promedio, un rendimiento contable en el sexenio, siendo superior en la mediana empresa por ser más eficaz en la gestión de costos y gastos, así no sea más eficiente en el uso de activos, ni la que utilice un mayor apalancamiento financiero. Sin embargo, la pyme destruye valor económico agregado (*EVA*) porque el costo de los recursos financieros es superior al rendimiento del activo neto operacional, aunque en la mediana empresa esta diferencia es menor.

**Palabras clave:** EVA, valor de mercado agregado (VMA), rendimiento del activo (ROA), rendimiento del patrimonio (ROE), pyme, sector elaboración de productos lácteos, administración..

## INTRODUCTION

Studies on the financial performance of the dairy processing industry in recent years are very limited, and even more limited when it comes to SMEs. In this research, the only study found for the entire dairy processing industry was the one carried out by Rivera and Samboní (2021). In order to cover these information gaps in studies (necessary for entrepreneurs, the State and the academy), this research has been developed. It aims at evaluating and comparing the financial management of the small and medium-sized enterprises in the period 2014-2019, through the measurement and analysis of their effectiveness in generating returns for their investors, their efficiency in the use of the assets and their efficacy in controlling costs and expenses, in addition to their economic value added and market value added.

The results show that the SME's assets grew; returns were also obtained, being higher for the medium-sized enterprise which achieved greater operational efficacy. However, economic value added was destroyed because returns did not exceed their cost of capital. These findings are contrasted with those of Rivera and Samboní (2021) for the entire dairy processing industry in Colombia.

The structure of the article is organized as follows: First, the theoretical framework; it includes the classification and measurement of financial inductors appropriate for this research. Second, the methodology, approach and technique to be used, along with the sources of information used to meet the objective of the research. Third, the main results of this research; these include the identification of some general aspects of SMEs focused on the production of dairy products in Colombia, the presentation of a study of this entire industry at the national level and the separate financial analysis of the small and medium-sized enterprise. Fourth, the comparison and analysis of results. Finally, some conclusions from the main findings of this study.

## THEORETICAL FRAMEWORK

Growth, asset turnover, profit margins and return are the main accounting-based inductors that measure specific aspects of companies' financial performance. To measure and manage the value generated by the enterprise, inductors of value management, such as the economic value added (EVA) and market value added (MVA) are frequently used.

Inductors of growth measure the development of the SME in the industry, according to the behavior of its assets, sales and net profits (Dumrauf, 2017). For its part, asset turnover inductors measure "*the efficiency with which an enterprise uses its resources, especially operational assets, according to the speed of recovery of the money invested in each of them*" (Anaya, 2018, p. 223). Some of them are: portfolio turnover, inventory turnover, fixed asset turnover, and total asset turnover (Rivera, 2017).

To determine each of these inductors, the quotient resulting from sales and type of asset is calculated, except in the case of inventories where the numerator is the cost of sales, since inventories are recorded at cost value. The quotient represents the number of times assets rotate in the period in which sales occurred. The profit margins allow measuring the efficacy in the management of costs and expenses and its effect on profit, as happens with those that influence on the gross profit margin, the operating profit margin, the after-tax operating profit margin and the net profit margin (Rivera, 2017). To obtain each of these inductors, each

AUTHOR NOTES

2    Distinguished Doctor "Cum Laude" in Economics and Business Administration, Universidad Autónoma de Madrid, Spain. Specialist in Finance, Universidad del Valle, Cali, Colombia. Full Professor, Faculty of Business Administration, Universidad del Valle, Cali, Colombia. Contact: jorge.rivera@correounivalle.edu.co

of the profits is divided among the sales; the quotient refers to the type of profit provided by a monetary unit of sales, which can be expressed as a percentage.

Inductors of effectiveness measure the benefits received by all investors and their owners for the investment made; a benefit achieved by all investors through the return on assets (ROA), and the one received by owners through the return on equity (ROE), (Ross, Weterfield and Jordan, 2019). ROA is calculated by dividing the operating profit after-tax by the assets, and its ratio is interpreted as the profit left to investors (lenders and owners) for each monetary unit invested in assets; while ROE is calculated by dividing the net income by equity, whose ratio shows the profit received by the owners for each unit invested. Both ROA and ROE can be expressed in percentages.

DuPont's system states that the ROA *"depends on two factors: the sales that the company generates from its assets (asset turnover) and the profit it makes on each dollar of sales (operating profit margin)"* (Brealey, Myers and Allen, 2015, p.715) and is calculated by multiplying them. An extended version of this system states that the ROE depends on the combination of three factors: asset turnover, net profit margin and the stockholders' equity multiplier[3] (Brigham and Ehrhardt, 2018). That is to say that the effectiveness measured by the ROA is equal to the product of efficiency by efficacy, while the effectiveness obtained by the ROE is equivalent to the product of efficiency, efficacy and financial leverage (Rivera, 2017).

The accounting inductors used to evaluate companies' performance, including the best-known as ROA, ROE and earnings per share (EPS), have been questioned because they do not reveal the risk or the cost of equity (Stern and Willet, 2014), are being influenced by the accounting policies adopted (Atrill, 2017), exclude the value of money over time (Arnold & Lewis, 2019), and are exposed to manipulations (Salaga, Bartosova and Kicova, 2015). This has led to the emergence of new value-based management (VBM) models, which seek to measure performance by calculating residual income, EVA being the best known (Worthington and West, 2001). In this way, it can be determined whether economic value is created or destroyed, since "VBM advocates argue that accounting data prepared under generally accepted accounting principles (GAAP) are not designed to reflect value creation" (Martin and Petty, 2001, p. 62).

EVA is the residual income resulting from subtracting the finance charge (which is the weighted average cost of capital multiplied by the capital invested) from the net operating profit after tax (Stewart, 2000, p. 164), and can be formulated with the following equation:

$$EVA_t = NOPAT_t - FINANCE\ CHARGE_t, \qquad [1]$$

where $NOPAT_t$ is the net operating profit after tax in the period and the finance charge in the period is equal to:

$$Finance\ charge_t = (NOA_t)(WACC_t), \qquad [2]$$

where $NOA_t$ is the net operating assets for the period, which is the sum of the net operating working capital and the net operating fixed assets :

$$NOA_t = NOWC_t + NFA_t, \qquad [3]$$

The $NOWC_t$ is the difference between current assets and current liabilities at no explicit cost. The $NFA_t$ results from subtracting depreciation from operating fixed assets.

The WACC$_t$ represents the weighted average cost of capital (or cost of capital) for the period $t$. According to Modigliani and Miller (1963, p. 441), it is obtained as follows:

$$WACC_t = Re(1\text{-}L) + Rd(1\text{-}t)L, \quad\quad [4]$$

Where symbolizes the cost of equity or opportunity cost[4]. is the level of indebtedness that results from dividing the debt with explicit cost by the net operating asset represents the cost of debt but, since interest expense is deductible from the company's tax base, the after-tax cost of debt is expressed as ; the represents the company's tax rate.

Stewart (2000, p. 163) presents this other equation for calculating EVA:

$$EVA = (NOA_t)[(EBIT_t)(1\text{-}t)/(NOA_t)\text{-}(WACC_t)] \quad\quad [5]$$

where EBIT)(1-t)/NOA$_t$ is the after-tax return on net operating assets. The result of comparing the after-tax return on net operating assets $NOA$ and the weighted average cost of capital $WACC_t$ is known as residual income or loss percentage.

By bringing the multi-year EVA to present value, the market value added ( of the evaluated period is obtained; which can be expressed as follows:

$$MVA = \sum^{\Sigma^{j=n}_{j=1}} EVA_j / \left(1 + WACCj\right)^j \quad\quad [6]$$

The EVA offering the investment of a currency unit is calculated with the ratio:

$$EVA / NOA \quad\quad [7]$$

## METHODOLOGY

In order to fulfill the purpose of this research, which is to know the financial performance of the small and medium-sized dairy product manufacturing enterprises in Colombia during the period 2014-2019, a quantitative approach of exploratory and descriptive scope was followed. This approach allowed explaining the factors that influenced their behavior. In addition, the methods used were the static and trend analysis of accounting inductors (Zutter and Smart, 2019) and value management. According to modern corporate finance, those methods have been the most appropriate for the financial evaluation of companies in the manufacturing sector. The joint analysis of accounting and value management inductors has been proposed, among others, by Chen and Dood, suggesting "that, together with *EVA*, companies should continue to monitor traditional measures of profit accounting, such as earnings per share, return on assets and return on equity" (1997, p. 331). Similarly, Obaidat "*recommends the use of EVA along with traditional accounting measures because they do not replace each other. Instead, EVA should be seen as an enhancement of traditional accounting measures, which, if used correctly altogether, will provide a more powerful tool for evaluating performance*" (2019, p. 66). Sharma and Kumar, in turn, find that "the results on the value relevance of *EVA* components along with traditional performance measures reveal that EPS dominates, but *EVA* components

also contribute to variations in shareholder value" (2012, p.814). These results were compared with another national benchmark (Rivera and Samboní, 2021).

The traditional accounting inductors selected were growth, efficiency, efficacy and effectiveness, while the value management inductors chosen were economic value added, EVA, and market value added (MVA). These inductors were calculated based on the financial statements of the last six years (2014-2019) of companies in the dairy product processing industry in Colombia, with ISIC 1040 (DANE, 2020a), which were retrieved from the database of the Superintendence of Companies (2020). Information derived from an average of 51 companies was obtained from that source. These are presented with their corporate name and tax identification number (TIN) in Annex 1.

## RESULTS

This section presents some of the most relevant characteristics of the SME of the dairy processing industry in Colombia, followed by a baseline study on the financial management of this industry at the national level, and concludes with the financial performance of the dairy manufacturing SME in Colombia during the period 2014-2019.

### The dairy product manufacturing SMEs in Colombia

The dairy product processing industry includes: The production of pasteurized, sterilized, homogenized or high temperature treated fresh liquid milk; milk-based beverages; cream from pasteurized, sterilized or homogenized fresh liquid milk; powdered milk or condensed milk, sweetened or unsweetened; evaporated milk; milk or cream in solid form; butter; yogurt, cheese and curd; buttermilk; casein, and lactose; ice cream, sorbets, milk-based desserts, and *dulce de leche* or *arequipe* (DANE, 2020a).

This industry has maintained an average of 168 establishments representing 2.0% of the national industrial park, has created 21,424 jobs corresponding to 3.0% of the employability offered by the industrial sector and has generated an annual average of $3,293,751 million pesos in value added, that is, 3.7% of the average value added of the country's entire industry (Table 1).

TABLE 1.
Number of establishments and jobs, and value added: average 2014-2019

Table 1. Number of establishments and jobs, and value added: average 2014-2019

|  | No. Establishments | % | No. Jobs | % | Value added ($) | % |
|---|---|---|---|---|---|---|
| Domestic industry | 8,399 | 100 | 709,496 | 100 | 88,864,524 | 100 |
| Dairy processing | 168 | 2.0 | 21,424 | 3.0 | 3,293,751 | 3.7 |

Source: Authors' own creation based on DANE (2020b and 2020c).
Note: Monetary figures in millions of Colombian pesos ($MM).

Authors' own creation based on DANE (2020b and 2020c).
Monetary figures in millions of Colombian pesos ($MM).

Small and medium-sized enterprises engaged in the dairy product processing have represented, in the period 2014-2019, an average of 73.1% of this entire industry, of which 38.1% are small and 35.0% are medium-sized (Table 2).

TABLE 2.

Average SME 2014-2019 in the dairy product processing industry

Table 2. Average SME 2014-2019 in the dairy product processing industry

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average |
|---|---|---|---|---|---|---|---|
| SMEs (%) | 73.1 | 70.2 | 73.8 | 74.7 | 73.3 | 73.5 | 73.1 |
| Small (%) | 42.9 | 37.1 | 39.3 | 36.1 | 37.9 | 35.5 | 38.1 |
| Mid-size (%) | 30.2 | 33.1 | 34.5 | 38.6 | 35.4 | 38.1 | 35.0 |

Source: Authors' own creation based on DANE (2020b and 2020c).

Authors' own creation based on DANE (2020b and 2020c).

## Baseline study on the financial performance of the dairy industry

Among the research related to the objective of this study, there is the work of Rivera and Samboní (2021), which shows how during the period 2014-2019 the dairy product processing industry in Colombia[5] (DIC) grew in sales until 2018 (decreasing after this year). Researchers also analyze the increase in assets until 2016, which then varied, while net income fluctuated throughout the period (Table 3).

TABLE 3.

Assets, sales and net income of the dairy product processing industry in Colombia (DIC)

Table 3. Assets, sales and net income of the dairy product processing industry in Colombia (DIC)

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average |
|---|---|---|---|---|---|---|---|
| Sales | | | | | 91,416 | 82,466 | |
| | 60,832 | 63,233 | 82,147 | 84,827 | | | 77,487 |
| Assets | | | | | 62,380 | 56,511 | |
| | 42,658 | 49,661 | 66,102 | 58,538 | | | 55,975 |
| Net income | | 722 | | | 1,456 | 1,296 | 1,570 |
| | 1,229 | | 3,391 | 1,327 | | | |

Source: Rivera and Samboní (2021, p. 11). Note: Figures in millions of Colombian pesos (MM$).

Rivera and Samboní (2021, p. 11).
Figures in millions of Colombian pesos (MM$).

Regarding the inductors of effectiveness, the researchers found an average ROA of 5.6 % and an average ROE of 8.0 % for this period, both being positive each year. The changing behavior of ROA was determined, jointly, by the orientation of the after-tax operating profit margin and the total asset turnover; while the variation of the ROE was largely related to the guideline of the net profit margin which was extended by financial leverage, leaving asset turnover as the third explanatory component.

ROE outperformed ROA, except in 2015. This supremacy was confirmed by the six-year average results, which, due to the presence of positive financial leverage, expanded by 293.3 % the net profit margin. This margin had been reduced by 2.0% due to the effects of non-operating activities, which resulted from the difference between the averages of the after-tax operating profit margin, 4.0 %, and the net profit margin, 2.0% (Table 4).

TABLE 4.
Inductors of effectiveness of the DIC

Table 4. Inductors of effectiveness of the DIC

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average | σ |
|---|---|---|---|---|---|---|---|---|
| a. ROA: DuPont System | | | | | | | | |
| ROA (%) | 5.9 | 4.9 | 5.5 | 6.1 | 5.5 | 5.5 | 5.6 | 0.4 |
| NOPAT margin (%) | 4.1 | 3.8 | 4.5 | 4.2 | 3.8 | 3.7 | 4.0 | 0.3 |
| Total asset turnover (times) | 1.4 | 1.3 | 1.2 | 1.4 | 1.5 | 1.5 | 1.4 | 0.1 |
| b. ROE: Expanded DuPont System | | | | | | | | |
| ROE (%) | 6.1 | 4.4 | 16.1 | 6.8 | 6.9 | 7.8 | 8.0 | 4.1 |
| Net profit margin (%) | 2.0 | 1.1 | 4.1 | 1.6 | 1.6 | 1.6 | 2.0 | 1.1 |
| Asset turnover (times) | 1.4 | 1.3 | 1.2 | 1.4 | 1.5 | 1.5 | 1.4 | 0.1 |
| Financial leverage (%) | 210.5 | 300.1 | 313.7 | 297.9 | 296.6 | 340.8 | 293.3 | 43.8 |

Source: Authors' own creation based on Rivera and Samboní (2021, p. 13).

Authors' own creation based on Rivera and Samboní (2021, p. 13).

ROE was less stable than ROA, especially due to the variability of financial leverage and also because the deviation of net profit margin was greater than that of the net operating profit after tax (1.1 % *vs.* 0.3 %).

Although this industry had positive returns, it destroyed economic value in three years, leaving in negative both the average EVA ($-112 MM) and MVA of the six-year period ($-460) to 01.01.2014, with a remarkable large residual loss in 2015 (-$1,424 MM) which, along with other minor losses presented in the last two years, exceeded the residual income of 2014, 2016 and 2017. On average, the after-tax return on net operating assets (14.4%) was lower than the cost of capital (15.0%), leaving a residual loss percentage of -06%. Meanwhile, the NOA grew from 2016 onwards (Table 5).

TABLE 5
Average EVA per company and its DIC inductors

Table 5. Average EVA per company and its DIC inductors

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average | s |
|---|---|---|---|---|---|---|---|---|
| EVA (MM$) | 427 | -1,424 | 258 | 205 | -48 | -93 | -112 | |
| NOA (MM$) | 18,693 | 18,385 | 20,053 | 23,573 | 25,014 | 25,266 | 21,831 | |
| NOPAT/NOA (%) | 13.4 | 13.2 | 18.3 | 15.3 | 13.8 | 12.2 | 14.4 | 2.1 |
| WACC (%) | 11.1 | 20.9 | 17.0 | 14.4 | 14.0 | 12.6 | 15.0 | 3.5 |
| MVA to 1/1/2014 (MM$) | -460 | | | | | | | |
| EVA/NOA | | | | | | | -0.005 | |

Source: Authors' own creation based on Rivera and Samboní (2021, p. 15). Note: Figures in millions of Colombian pesos (MM$).

Authors' own creation based on Rivera and Samboní (2021, p. 15).
Figures in millions of Colombian pesos (MM$).

## Financial performance of the dairy SME

This section presents an analysis of the growth, efficiency, efficacy, effectiveness and economic value added of small and medium-sized enterprises in the dairy manufacturing industry in Colombia, during the period 2014-2019.

## Assessment of Growth

The study found an increase in sales and assets in small enterprises until 2018 (in the last year they fell). In contrast, net income oscillated until 2017, the year with the only loss, but then grew in the last two years. The annual averages were in their order $5,556 MM, $2,095 MM and $44 MM. Meanwhile, sales and net income of medium-sized enterprises fluctuated in the opposite direction, except in 2017; and assets increased from 2016, after falling in 2015, leaving the following annual averages: $20,280 MM, $326 MM and $10,022 MM in sales, net income and assets respectively (Table 6).

As expected, the absolute values of these growth inductors were higher in medium-sized enterprises, which on average exceeded those of small enterprises by about 3.6 times sales, 4.8 times assets and 7.4 times net income.

TABLE 6
Assets, sales and average net income

| Table 6. Assets, sales and average net income | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average |
|---|---|---|---|---|---|---|---|
| **Small** | | | | | | | |
| Sales | 2,545 | 3,149 | 6,717 | 7,572 | 7,654 | 5,697 | 5,556 |
| Assets | 1,227 | 1,476 | 2,247 | 2,548 | 2,931 | 2,142 | 2,095 |
| Net income | 36 | 12 | 19 | -49 | 110 | 137 | 44 |
| No. enterprises | 14 | 17 | 9 | 4 | 4 | 13 | 10 |
| **Mid-size** | | | | | | | |
| Sales | 17,251 | 17,975 | 17,760 | 21,520 | 24,380 | 22,794 | 20,280 |
| Assets | 9,628 | 8,659 | 9,335 | 10,107 | 11,174 | 11,227 | 10,022 |
| Net income | 251 | 131 | 289 | 467 | 270 | 548 | 326 |
| No. enterprises | 48 | 39 | 33 | 40 | 39 | 46 | 41 |

Source: Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020) Note: Monetary figures in millions of Colombian pesos (MM$).

Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020)
Monetary figures in millions of Colombian pesos (MM$).

## Assessment of efficiency

The behavior of the turnover of each of the assets of the small enterprise was different: the portfolio increased until the second-to-last year and then declined; inventory grew until 2016 and then oscillated; fixed assets decreased until 2018, and eventually rose; total assets varied each biennium until 2017 and then each year. While, in the medium-sized enterprise, only the orientation of the portfolio was different from that of the rest of assets: the portfolio went up until 2016, and then declined; the inventory, fixed assets and total assets fluctuated until 2016, growing the following biennium and decreasing the last year (Table 7).

TABLE 7
Inductors of efficiency

Table 7. Inductors of efficiency

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average |
|---|---|---|---|---|---|---|---|
| Turnover (times) | | | | | | | |
| Small | | | | | | | |
| Portfolio turnover | 4.4 | 4.9 | 8.8 | 26.3 | 10.8 | 8.7 | 10.7 |
| Inventory turnover | 11.8 | 12.7 | 24.0 | 20.6 | 26.1 | 19.7 | 19.2 |
| Fixed asset turnover | 7.0 | 6.8 | 6.5 | 5.2 | 4.7 | 5.9 | 6.0 |
| Total asset turnover | 2.1 | 2.1 | 3.0 | 3.0 | 2.6 | 2.7 | 2.6 |
| Mid-size | | | | | | | |
| Portfolio turnover | 7.7 | 9.1 | 9.8 | 9.1 | 8.2 | 7.4 | 8.6 |
| Inventory turnover | 14.3 | 14.9 | 12.8 | 13.8 | 15.2 | 12.5 | 13.9 |
| Fixed asset turnover | 6.0 | 6.6 | 3.7 | 4.2 | 4.7 | 4.6 | 5.0 |
| Total asset turnover | 1.8 | 2.1 | 1.9 | 2.1 | 2.2 | 2.0 | 2.0 |

Source: Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020).

Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020).

In addition, it was found that the average of the turnover of the different asset categories was higher in the small enterprise; however, this supremacy was not replicated in all years, meaning that both small and mid-size were equal in 2015 for the total asset and in 2018 for the fixed asset. In the biennium 2014-2015, in the inventory, the inequality benefited the medium-sized enterprise as it did in the triennium 2014-2016 in the portfolio. The average annual turnover for the small enterprise was 10.7 times in portfolio, 19.2 times in inventory, 6.0 times in fixed assets and 2.6 times in total assets. On the other hand, the average for the medium-sized enterprise was 8.6 times in portfolio, 13.9 times in inventory, 5.0 times in fixed assets and 2.0 times in total assets.

Therefore, it was evident that during the period 2014-2019, the small enterprise was more efficient in the use of its assets.

## Assessment of efficacy

Inductors of efficacy in the control of costs and expenses were positive in all years, both in small and medium-sized enterprises, except for the net profit margin of the small enterprise in 2017; and although small and medium-sized enterprises behaviors were not similar to one another, they showed a little more similarity within each of them. In the small enterprise, margins decreased until 2016, a trend that went on until 2017 with the operating and net margins. From 2017 to 2018 the gross margin rose, but fell in the last year; while from 2018 to 2019 the operating margin fluctuated and the net margin increased. In the medium-sized

enterprise, margins fluctuated in the same direction each year, with the exception of 2017 for operating and net profit margins.

The gross profit margin was higher in the small enterprise, except in 2016, but the operating and net margins were higher in the medium-sized enterprise, except in 2018, and with an equal net margin in 2019. On average, the gross profit margin over the six-year period was 25.5 % for the small and 20.6% for the medium-sized enterprise; operating profit margin was 3.5 % in the small and 4.7% in the medium-sized enterprise, and the net profit margin was 0.9 % in the small and 1.6% in the medium-sized enterprise. The small enterprise managed to get in control of costs of products sold (4.9 %), an advantage this enterprise lost in its control management of operational expenses, thus being outpaced by the medium-sized enterprise by 1.2% in the management of these operational expenses. Although in the management of non-operating activities the small enterprise was more effective, it was still surpassed by the medium-sized enterprise by 0.7% in the control of total costs and expenses (Table 8).

TABLE 8.
Inductors of efficacy

Table 8. Inductors of efficacy

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average |
|---|---|---|---|---|---|---|---|
| Margin (%) | | | | | | | |
| Small | | | | | | | |
| Gross profit margin | 29.1 | 29.0 | 20.5 | 22.0 | 26.7 | 25.5 | 25.5 |
| Operating profit margin | 4.3 | 3.7 | 2.5 | 1.4 | 5.0 | 4.1 | 3.5 |
| Net profit margin | 1.4 | 0.4 | 0.3 | -0.6 | 1.4 | 2.4 | 0.9 |
| Mid-size | | | | | | | |
| Gross profit margin | 20.0 | 18.6 | 22.8 | 21.4 | 19.7 | 21.0 | 20.6 |
| Operating profit margin | 4.7 | 3.8 | 4.5 | 5.5 | 3.6 | 5.8 | 4.7 |
| Net profit margin | 1.5 | 0.7 | 1.6 | 2.2 | 1.1 | 2.4 | 1.6 |

Source: Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020).

Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020).

## Assessment of effectiveness

ROA and ROE effectiveness inductors for small and medium-sized enterprises varied throughout the six-year period in a slightly similar way between categories and a little more similar within each category (Table 9). In the small enterprise, the ROA and ROE changed guidelines each year, except in 2016 for the ROE, which continued to grow. Both inductors followed the trend of the operating and net profit margins, respectively; asset turnover did not follow this orientation and financial leverage only did so from 2016 to 2018 (part . and . of Table 9).

In the medium-sized enterprise, ROA and ROE waved annually, except in 2017, following the trend of operating and net margins, respectively; however, they were contrary to the fluctuation of the operating asset turnover, except in 2017, as well as of the financial leverage, except in 2016 (part . and . of Table 9).

The medium-sized enterprise was more effective and stable in achieving returns on investment during the six-year period, as can be seen by comparing its ROA with the small enterprise (6.7 % vs 6.2 %) and its ROE (6.8 % vs 5.7 %) and the standard deviation of its ROA (1.4 % vs 2.3 %) and of its ROE (2.8 % vs 8.1 %), as shown in Table 9.

TABLE 9.
Inductors of effectiveness

Table 9. Inductors of effectiveness

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average | σ |
|---|---|---|---|---|---|---|---|---|
| **Small** | | | | | | | | |
| a. ROA: DuPont System | | | | | | | | |
| ROA (%) | 6.0 | 5.6 | 6.0 | 2.5 | 9.3 | 7.7 | 6.2 | 2.3 |
| NOPAT margin (%) | 2.9 | 2.6 | 2.0 | 0.8 | 3.6 | 2.9 | 2.5 | 0.9 |
| Total asset turnover (times) | 2.1 | 2.1 | 3.0 | 3.0 | 2.6 | 2.7 | 2.6 | 0.4 |
| b. ROE: Expanded DuPont System | | | | | | | | |
| ROE (%) | 6.2 | 2.0 | 3.2 | -6.6 | 13.6 | 15.4 | 5.7 | 8.1 |
| Net profit margin (%) | 1.4 | 0.4 | 0.3 | -0.6 | 1.4 | 2.4 | 0.9 | 1.1 |
| Asset turnover (times) | 2.1 | 2.1 | 3.0 | 3.0 | 2.6 | 2.7 | 2.6 | 0.4 |
| Financial leverage (%) | 214.0 | 257.3 | 386.3 | 345.5 | 363.7 | 240.4 | 301.2 | 72.6 |
| **Mid-size** | | | | | | | | |
| c. ROA: DuPont System | | | | | | | | |
| ROA (%) | 5.9 | 5.9 | 6.0 | 8.3 | 5.4 | 8.8 | 6.7 | 1.4 |
| NOPAT margin (%) | 3.3 | 2.9 | 3.1 | 3.9 | 2.5 | 4.3 | 3.3 | 0.7 |
| Total asset turnover (times) | 1.8 | 2.1 | 1.9 | 2.1 | 2.2 | 2.0 | 2.0 | 0.1 |
| d. ROE: Expanded DuPont System | | | | | | | | |
| ROE (%) | 5.0 | 3.1 | 7.0 | 10.0 | 5.4 | 10.2 | 6.8 | 2.8 |
| Net profit margin (%) | 1.5 | 0.7 | 1.6 | 2.2 | 1.1 | 2.4 | 1.6 | 0.6 |
| Asset turnover (times) | 1.8 | 2.1 | 1.9 | 2.1 | 2.2 | 2.0 | 2.0 | 0.1 |
| Financial leverage (%) | 190.7 | 205.5 | 224.6 | 215.4 | 221.8 | 209.0 | 211.2 | 12.4 |

Source: Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020).

Authors' own creation based on Rivera and Samboní (2021) and Superintendence of Companies (2020).

The ROA of the medium-sized enterprise was not always higher than that of the small enterprise, the latter surpassed it between 2014 and 2018, and equaled it in 2016. When comparing DuPont system factors, it was found that the average after-tax operating profit margin of the small enterprise (2.5 %) was lower than that of the medium-sized enterprise (3.3 %), although in 2018 the one with a higher average was the small enterprise. Regarding the average asset turnover, the one for small enterprise (2.6 times) was higher than the one for the medium-sized (2.0 times), an advantage present every year, except in 2015, when they obtained an equal average. Therefore, it can be deduced that the greater effectiveness of the medium-sized enterprise, measured by the ROA, depended on its greater efficacy in controlling expenditures. Such efficacy helped this enterprise to compensate for its lower efficiency in the use of physical assets.

The ROE of medium-sized enterprise did not exceed that of the small enterprise in the years 2014, 2018 and 2019. When contrasting the factors of the extended DuPont system, it was found that the average net profit margin of the small enterprise (0.9 %) was lower than that of the medium-sized enterprise (1.6 %), although it was higher in 2018 and equal for both in 2019. The asset turnover, for its part, was always higher in the small enterprise, except in 2015, when it was equal for both. This superiority was also maintained with the financial leverage in each of the years, yielding an average of 301.2 % in the small enterprise and 211.2 %

in the medium-sized. Therefore, it can be deduced that the best effectiveness of the medium-sized enterprise, measured by the ROE, was based on the fact that it was more effective in controlling costs and expenses.

## Economic value added

The average small enterprise in the dairy processing industry in Colombia destroyed EVA in almost all years with a fluctuating behavior (except in 2018), showing its highest peak in 2018, when it created economic value added by $80 MM, and its lowest peak in 2017, when it destroyed value by $-81 MM. On an annual average, EVA was of $ -26 MM (Table 10).

EVA follows the orientation of the after-tax return on net operating assets, which presents extreme percentages for two consecutive years: 2017 (5.6 %) and 2018 (17.7 %), leaving in the period an average of 10.9 %; the other two inductors of EVA followed directions that were not similar to this one. As for the cost of capital, it rose and reached the top in 2015 (16.0 %), but then fell gradually until reaching the lowest percentage in 2018 (12.5 %), in 2019 it rises again, reaching an annual average of 13.9 %. The net operating asset, for its part, grew until 2018, and in the last year fell, yielding an average annual investment of $1,144 MM.

TABLE 10
Average EVA per company

Table 10. Average EVA per company

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | average | s |
|---|---|---|---|---|---|---|---|---|
| **Small** | | | | | | | | |
| EVA (MM$) | −38 | −77 | −39 | −81 | 80 | −2 | −26 | |
| NOA (MM$) | 872 | 992 | 1,119 | 1,126 | 1,542 | 1,215 | 1,144 | |
| NOPAT/NOA (%) | 8.5 | 8.3 | 12.0 | 5.6 | 17.7 | 13.6 | 10.9 | 4.4 |
| WACC (%) | 12.9 | 16.0 | 15.5 | 12.8 | 12.5 | 13.7 | 13.9 | 1.5 |
| MVA to 1/1/2014 (MM$) | −125 | | | | | | | |
| EVA/NOA | | | | | | | −0.023 | |
| **Mid-size** | | | | | | | | |
| EVA (MM$) | 63 | −104 | −280 | 9 | −304 | 57 | −93 | |
| NOA (MM$) | 4,491 | 4,531 | 6,124 | 7,088 | 7,759 | 7,555 | 6,258 | |
| NOPAT/NOA (%) | 12.6 | 11.3 | 9.1 | 11.8 | 7.8 | 13.0 | 11.0 | 2.1 |
| WACC (%) | 11.3 | 13.6 | 13.7 | 11.7 | 11.7 | 12.3 | 12.4 | 1.1 |
| MVA to 1/1/2014 (MM$) | −356 | | | | | | | |
| EVA/NOA | | | | | | | −0.015 | |

Source: Authors' own creation based on Rivera and Samboní (2021), Superintendencia de Sociedades (2020), Superintendencia Financiera de Colombia (2020) and Damodaran (2020) Note: Monetary figures in millions of Colombian pesos (MM$).

Authors' own creation based on Rivera and Samboní (2021), Superintendencia de Sociedades (2020), Superintendencia Financiera de Colombia (2020) and Damodaran (2020)
Monetary figures in millions of Colombian pesos (MM$)

The small enterprise destroyed value in five of the six years studied because during that period the NOPAT/NOA index was lower than the WACC. In the six-year period, value was destroyed by $-26 MM, corresponding to the MVA as of January 1, 2014.

On the other hand, the medium-sized enterprise in the dairy processing industry in Colombia destroyed EVA in three years of the six-year period: After having created value in the first year, it destroyed it in the following two years, leading to a fluctuation in the next triennium, with some positive and negative EVA. The lowest and highest EVA occurred in 2018 ($-304 MM) and 2019 ($57 MM) respectively, and the EVA annual average was $-93 MM (Table 10).

Among the inductors that determined the EVA, the relationship with the NOPAT/NOA indicator was direct throughout the period, with the lowest percentage in 2018 (7.8 %) and the highest in 2019 (13.0 %), leaving an annual average of 11.0 % in the entire six-year period. Instead, the relationship with the cost of capital was inverse, except in 2018, going in two consecutive years from the highest percentage (13.7% in 2016) to the lowest (11.7% in 2017 and 2018). Meanwhile the NOA increased until the penultimate year, then it fell, leaving an average annual investment of $6,258 MM.

The reason the medium-sized enterprise destroyed value in three years was that the after-tax return on net operating assets did not exceed the capital cost of all resources invested. Over the six years, value was destroyed by $-356 MM, which is the MVA as of January 1, 2014. The negative values of the MVA of small and medium-sized enterprises showed that, despite having achieved positive inductors of profitability in each year, excluding the 2017 ROE in small enterprises, they were not enough to create value in the six-year period, as they did not exceed the investors' cost of capital.

## Analysis of results

This section contrasts and analyzes the main results of this research in the small (SDIC) and medium-sized (MDIC) enterprises of the dairy processing industry in Colombia with the entire industry (DIC, referring to Dairy Industry in Colombia), taking the financial inductors related to growth, efficiency, efficacy, effectiveness and economic value added.

## Growth

The six-year averages of sales, assets and net profits were higher in the DIC, followed in order by the MDIC and the SDIC. Their behaviors were disparate, except for DIC and SDIC sales that increased until 2018 and fell in 2019 (Tables 1 and 4).

## Effectiveness

When comparing the ROA average of the three groups: DIC (5.6 %), SDIC (6.2 %), MDIC (6.7 %) and its standard deviation in the six-year period: MDIC (1.4 %), SDIC (2.3 %) and DIC (0.4 %), it was evidenced that DIC presented the lowest ROA, although greater stability; SDIC followed it by achieving an intermediate profitability though with greater instability; and finally MDIC, that obtained the highest profitability with an average stability (Table 10).

MDIC's greater effectiveness in achieving operating profits on investment was due to the fact that it was the second most effective in controlling operating expenditures (3.3 %) and the second most efficient in the use of assets (2.0 times), ceding the first place in efficacy to DIC (4.0 %) and the first place in efficiency to SDIC (2.6 times). In addition, together with DIC, it maintained the greatest stability in efficacy (s = 0.1 times) and an intermediate stability of efficiency (s = 0.7%). DIC's lower effectiveness in obtaining profits for investors was due to its lower efficiency in the use of assets (1.4 times); which could not be compensated by its higher efficacy. In the case of SDIC, intermediate effectiveness in generating profits for the company could be maintained by compensating its lower efficacy (2.5 %) with a higher efficiency (Tables 4 and 9).

When confronting the ROE average of the SDIC (5.7 %) with that of the MDIC (6.8 %) and DIC (8.0 %), and its standard deviation in the MDIC (2.8%), with that of the DIC (4.1) and the SDIC (8.1%), it was found that the advantage of effectiveness measured by the ROE was in favor of the DIC, although with intermediate stability. Second place was for MDIC with the greatest stability, and third place for the SDIC which, apart from that, was less stable (Table 10). The order from highest to lowest effectiveness in achieving profits for owners was similar to that of the efficacy in controlling all expenditures with greater stability in the MDIC (s = 0.6% compared to s = 1.1% for the SDIC and the DIC), but contrary to that of the efficiency in the use of the assets (with the same stability mentioned in the previous paragraph). Meanwhile, financial leverage was higher in the SDIC (301.2 %), but more unstable (s = 72.1 %), while that of the MDIC was lower (211.2 %), but more stable (12.4 %).

The change in positioning of the three groups, according to ROA and ROE, shows that the MDIC was more effective for all company investors, while the DIC was more effective for company owners. This happened because DIC outperformed the other two groups in its efficacy in managing operating and non-operating results, and the MDIC in financial leverage, which was enough to compensate for its lower efficiency. The medium-sized enterprise in this industry was more effective for all investors and owners than the small enterprise, due to its greater efficacy in controlling costs and expenses, which compensated for its lower efficiency in the use of assets and its lower financial leverage (Tables 4 and 9).

## Economic value added

The SDIC destroys value in five of the six years evaluated, while the EVA in MDIC and DIC was negative in three years, coinciding in value creation in 2014 and 2017. Despite the fact that in absolute average values the DIC destroyed the most value ($-112 MM), and the SDIC the least ($-26 MM), leaving the MDIC in the intermediate ($-93 MM), in terms of (EVA/NOA), the SDIC (-0,023) was the most destructive and the DIC the least (-0,005), being the MDIC in the middle (-0,015), as shown in tables 5 and 10.

EVA's behavior in the three groups of companies was not similar, and opposite fluctuations were observed among the SMEs from 2016. When reviewing EVA inductors, it is found that NOA's behavior was similar among SMEs, increasing until the penultimate year and falling at the end, while the DIC decreased the first year and grew in the following years. Regarding the NOPAT/NOA ratio, they were different among the three groups, and with variations in the opposite direction among SMEs. While the WACC increased until 2015 in all three groups and then decreased in the DIC, and so did in the SDIC until the penultimate year, grewing eventually, in the MDIC it continued increasing until 2016, remaining constant in the following year and falling the last one.

Of these three groups, the DIC achieved a higher return on net operating assets (14.4 %), although with the highest cost of capital (15.0 %), while the SDIC showed a lower return on NOA (10.9 %) with an intermediate cost of capital (13.9 %), compared to MDIC that obtained an intermediate return on NOA (11.0 %), although with a lower cost of capital (12.4 %). Variability (s) of NOPAT/NOA was higher in the SDIC (4.4%) in relation to the MDIC and the DIC (2.1 %); while the variability (s) of the WACC was higher in the DIC (3.5 %) and lower in the MDIC (1.1 %). This resulted in a higher average residual loss in the SDIC (-3.0 %), followed by the MDIC (-1.4 %) and the DIC (-0.6 %).

When measuring effectiveness with ROA, it was found that the most effective were SMEs, being superior in the MDIC; while when effectiveness was measured with ROE and NOPAT/NOA, the superiority went to the DIC, followed by the MDIC.

## CONCLUSIONS

In the study conducted to the small and medium-sized enterprises of the dairy processing industry in Colombia in the period 2014-2019 it was found, on the one hand, that the assets and sales of the small ones grew until the penultimate year, but fell in the end. On the other hand, the assets of the medium-sized ones fell in the first year and then grew, but their sales fluctuated for several years. The same happened with the net profits of the SMEs, whose behavior was different from that of the DIC, except for the SDIC's sales. In absolute values, these inductors were higher in the DIC, followed by the MDIC and the SDIC.

The SMEs in this industry presented favorable accounting results during the six-year period, by revealing, in each year and on average, profits, profit margins and positive returns. This was not the case for the year 2017 in the SDIC. MDIC was the most effective in achieving profits on investment, either measured by ROA or ROE. This happened because MDIC was more effective in controlling costs and expenses, allowing it to counteract a less efficient use of its assets and a lower use of financial leverage.

The effectiveness of the MDIC measured by the ROA was higher than that of the DIC because of its more efficient management of the assets. However, when measured by the ROE, superiority was in favor of the DIC, which continued to be more effective not only in the management of operating results, but also of non-operating results, and also because it used a higher positive financial leverage. The SDIC was the most efficient in the use of physical resources and the one with the greatest financial leverage; however, given its lower efficacy in controlling costs and expenses, its effectiveness in obtaining profits on investment was surpassed by the other two groups.

In summary, according to the performance accounting inductors, the SDIC was the most efficient, but the least effective; the DIC was the most effective, but the least efficient; this left the MDIC in an intermediate place.

The positive results of the financial performance of SMEs in this industry, estimated by the accounting inductors, were not fully confirmed by the economic value added inductors, since they destroyed EVA in several years (except in one year in the SDIC, and in three years in the MDIC), leaving a negative MVA in the six-year period. The destruction of value was due to the fact that, on average, the cost of capital was higher than the return on net operating assets. This impact was reflected on an average percentage of residual loss.

Similar results were presented in the DIC, particularly with the MDIC, which destroyed value in three years, leading to a negative MVA in the analyzed period, not fully corroborating the favorable accounting results of financial performance. The difference between the after-tax return on net operating assets and the cost of capital was negative on average. In absolute terms, the SDIC destroyed less EVA than the MDIC, and the MDIC in turn less than the DIC, but in relative terms this order was opposite.

EVA inductors proved that the most effective group in generating return on net operating assets was the DIC, followed by the MDIC and finally the SDIC; however, SMEs, mainly the medium-sized enterprise, managed to obtain less expensive financial resources.

This study enabled to identify that, from the perspective of the analysis conducted with accounting inductors, the financial performance of dairy manufacturing SMEs was positive for the period 2014-2019, but from the perspective of the analysis of value management inductors, these results were not ratified because value was destroyed in several years. On average, the MDIC obtained better results than the SDIC, but was surpassed by the DIC.

This research examined the factors that influenced the financial performance of small and medium-sized enterprise in the dairy processing industry in Colombia; however, the analysis could be extended with more in-depth studies of the variables that determine each of the factors, in addition to similar studies for groups of companies of the same age and geographical location at national and international level, especially with nations where there are free trade agreements.

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## Notes

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3 The stockholders' equity multiplier is equal to the asset-equity ratio, which is a way of determining financial leverage.

4 To find Re the Pure Play CAPM methodology explained by Rivera and Alarcón (2012, pp. 89-90) is followed, since small and medium-sized enterprises in this industry are not listed on the stock exchange.

5 The study was conducted to an average of 78 companies in this industry.