

Investigating the causal structure of financial performance in the livestock sector in Indonesia: A causal-loop diagram approach

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Abstract

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The livestock sector faces operational and financial challenges. Financial monitoring of livestock businesses is crucial for developing opportunities, identifying problems early, optimizing operations, and maximizing profits. This study aimed to investigate and understand the causal and effect of financial performance of livestock companies in Indonesia. The quarterly data from the financial reports announced every quarter from 2020 to 2022 were used to calculate financial performance indicators. The causal relationships among financial variables were created using a Causal-Loop Diagram (CLD). From a financial perspective, the components are necessary for constructing the model. Our study provides an overview of financial ratios used to examine the financial performance of livestock companies, as well as their limitations. The obtained results of financial ratio analysis showed that, overall, the selected companies can generate profits by utilizing more of their assets or equity. Our CLD model in this research offers new insights into the causal relationships between drivers of financial performance in livestock industries, such as desired sales and operating revenue, marketing budget, and production budget. Our findings explain how using a causal loop approach during financial performance evaluation can help policymakers and businesses/investors understand program implementation and variations in program outcomes related to livestock business sector development. Effective management and planning are necessary to develop efficient and practical strategies that optimize livestock production and economic benefits

Keywords: financial performance; livestock sector; causal-loop diagram; Indonesia

Introduction

The agricultural sector is one of the nine sectors listed on the Indonesia Stock Exchange, operating in the farming sector, which is reclassified into six sub-sectors: the food crops sector, plantation sector, livestock sector, fishery sector, forestry sector, and other sub-sectors (www.bei.go.id). Industrial activities in the agricultural industry, such as animal husbandry, are the sub-sectors that drive the economy, especially in rural areas. Based on data from the Central Statistics Agency, in 2021, there were 555 registered livestock companies, comprising 37 dairy farming companies (6.67%)

and large and small livestock companies (117 companies, 21.08%). And 401 poultry farming companies with a share of 72.25% (Badan Pusat Statistik, 2022)

Developments in the agricultural sector have increased, with exports rising 8.81% in early 2021. By April 2021, the increase in exports had risen to 18.89%, resulting in increased business opportunities in agriculture. This is one of the reasons why the agricultural sector is the backbone of economic performance, because if we look back, investment in the farm sector is promising (Directorate General of Livestock and Veterinary, 2022)

Investors' interest in the agricultural sector requires com-

panies engaged in farming to have a precise and reliable assessment system for their financial reporting. This enables both investors and creditors who wish to invest in the agricultural industry to understand the financial statement information presented by the company easily. The availability of information, such as that obtained from digital platforms, can support developments in the agricultural sector. Information asymmetry is not expected to occur in media and technologies related to agriculture, as it can limit the proper use of adopted technology (Ogada et al., 2020). This information is available in financial reports used by both external and internal parties, which is essential for making informed decisions (Alfiani and Rahmawati, 2019).

The reliability of financial statement information will significantly determine the quality of the data itself. Compliance with generally accepted accounting standards is also beneficial for decision-makers. Based on these various interests, an accounting standard is expected to reflect information that meets the elements of qualitative characteristics, namely relevance and faithful representation (Dewi, 2019).

The financial condition of the firm is affected by various factors, the significance of which needs to be effectively identified for business development. The situation in agriculture sector is no exception. Therefore, farmers need to understand the fundamental factors that impact their financial capabilities, performance, and competitiveness in the broader market environment. Assess the financial condition of agricultural enterprises and reveal critical surroundings through practical methods. A financially healthy company can generate profits, thereby increasing the value of its capital invested and meeting all its liabilities on time (Myšková and Hájek, 2017). Bookkeeping and financial reports are still limited to recording the income and expenses of livestock business development, whereas many other factors can be applied to determine profits (Rizal et al., 2018).

The financial performance of the livestock sector is evaluated using various methods and criteria. The level of accuracy, complexity, and recommendations for assessing financial health are taken into consideration in this financial evaluation. Many studies have sought to demonstrate financial indicators quantitatively (Barth et al., 2023; Lestari et al., 2019; Vuković et al., 2022). Most research results related to the calculation, understanding, and implications of financial conditions are quantitative (Cho et al., 2019). Understanding financial statements and their determinants helps decision-makers develop effective policies and strategies to improve livestock operations, such as reducing profit loss rates and costly resource inefficiencies. Existing literature examines the identification of major components of financial reporting (Robu and Istrate, 2015), analysing determinant

factors of financial statement quality (Nirwana and Haliah, 2018), the intention of financial analysis in maximizing the firm's value (Al-Nasser, 2014), the importance of ratios for understanding the financial position of the company (Putri and Maghfiroh, 2022).

In addition to being quantitative, the qualitative aspects of financial reporting are crucial for external users when making financial decisions (Ahmed, 2022; Twedt and Rees, 2012). Organizing phenomena using qualitative analysis that emphasizes integrated thinking on the many connections between constituent parts can be effectively formulated using a Causal Loop Diagram (CLD). Two studies (Kwamie et al., 2014; Renmans et al., 2020) used the causal-loop diagrams as part of a realist evaluation. CLD can produce a description of the behaviour of several key variables in a dynamic system, either in the form of graphs or pipeline logic models (Alonge et al., 2017; Fredericks et al., 2008).

Through CLD, know how the factors or variables involved in or related to the problems it faces, including the causal relationship between the variables affected in CLD. This is because we are constructing a set of important and interacting variables, interrelated skills and relationships, or as 'influence diagrams', or simply 'system maps' (Barbrook-Johnson and Penn, 2022). Overall, previous studies positively describe the use of causal loop diagrams. This method covers various aspects, including understanding system components and behaviour, explaining the intervention, considering implementation, interconnecting evaluation findings, and validating the evaluation findings. Numerous previous studies have been conducted to investigate the effectiveness of causal-loop diagrams. Strength in this context is the ability to identify the key variables contextually (Dyehouse et al., 2009; Kwamie et al., 2014; Renmans et al., 2020; Rüegg et al., 2018) and to show the causal structure responsible for the behaviour of variables over time (Knai et al., 2018; Sarriot et al., 2015). Clarifying the intervention through a what-if scenario (Okumu et al., 2016) and identifying unintended consequences (Merrill et al., 2013; Mutale et al., 2017) were also commonly mentioned. Several studies have noted that causal-loop diagrams are practical for communicating complex subjects (Dyehouse et al., 2009; Owen et al., 2018; Renmans et al., 2020).

This study aimed to understand the financial performance of livestock farming companies through the CLD approach. The conceptual models created through this research provide new insights into the causal relationships between drivers of financial performance in the context of the business in the agricultural sector, e.g., the livestock industry. This research provides evidence of a new approach to investigating the patterns and causes of financial performance, a persistent public

global challenge that involves market and production factor prices, which is both context-specific and relevant beyond the livestock business. It demonstrates a new application of systems modelling that can be adapted to different contexts and considers the strengths of various connections between variables that impact them.

Materials and Methods

This research employs both quantitative and qualitative approaches. The secondary data from financial reports announced on a quarterly basis from 2020 to 2022 were extracted from the Indonesia Stock Exchange, the Central Bureau of Statistics (CBS), and official websites managed by agricultural entities. In this study, the selected entities are 20 of the 37 livestock companies registered and located in Indonesia, which regularly announce financial report information. Therefore, 20 companies with quarterly observations for three years become 240 observations.

In this study, some financial indicators are measured as Return on Equity (ROE), Return on Assets (ROA), and Current Ratio (CR). ROE represents the return on the owner's share of capital invested, while ROA represents the return on both debt and equity capital invested in the business. The current ratio measures the ability of the business to meet all of its current debt obligations. It can be calculated as in the below equations:

$$ROE = \frac{\text{Net profit}}{\text{Equity}} \times 100\%$$

$$ROA = \frac{\text{Net profit}}{\text{total Assets}} \times 100\%$$

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Debts}}$$

Analyzing the financial performance of the livestock industry is used to understand how the behaviour of financial performance is influenced by causalities between variables and their interactions with Causal-Loop Diagrams (CLDs). Causal-loop diagram analysis was created to understand the cause-and-effect relationship between financial elements that drive the system's behavior over time in terms of financial performance. The CLD model of financial performance was simulated through Vensim PLE software.

The creation of CLD began by understanding the variables in the research through qualitative data analysis and

studying the literature on financial behavior and performance. CLD can be used to capture more complex models qualitatively and to broaden the understanding of variables that are often underestimated (Crabolu et al., 2023). A CLD is a causal diagram that helps visualize how various variables in a system are interrelated. The causal loop shows the interrelationship of causes and effects. The diagram consists of a set of nodes and edges. Nodes represent variables, and edges are links that represent connections or relationships between two variables. A positively marked link indicates a positive relationship, and a negatively marked link indicates a negative relationship. A positive causal relationship means that the two nodes change in the same direction; that is, if the node from which the link originates decreases, the other node also decreases. Similarly, if the node where the link starts increases, the other node also increases in value. A negative causal relationship means that the two nodes change in the opposite direction, i.e., if the node from which the link starts increases, the other node decreases, and vice versa (Figure 1).

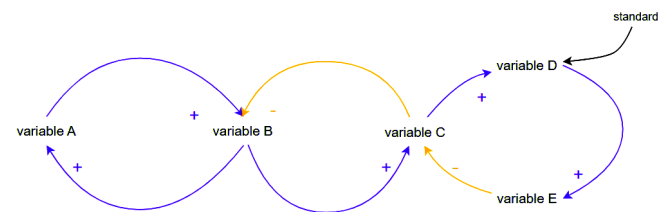


Fig. 1. Cause and effect relation concept

Results and Discussion

Analysis of the livestock sector financial ratio

Analysing financial ratios involves comparing the relationship (or ratio) between two or more financial data points taken from the financial statements of a business. It is mainly employed as a means of conducting equitable comparisons over time and among various businesses or industries. The profitability ratio is used to assess a company's capacity to turn a profit over a given time frame as well as the efficacy of management in overseeing day-to-day activities. A company's performance improves with a higher profitability ratio; yet, strong financial performance is only transient.

Return on Assets (ROA) and Return on Equity (ROE) are popular measures of firm performance. ROA of poultry feed companies shows higher than other companies in the livestock sector (Figure 2). This shows that, in the poultry feed company shows that the company has been efficient in using its assets in operating activities to generate profits. This

could be due to turnover from operating assets or the company's high-profit margin. While other similar companies experienced fluctuations, this could be due to the company's profits from sales activities being unstable, followed by a decrease in total asset turnover. The increase in the price of feed ingredients from time to time and the company's dependence on suppliers of feed ingredients such as maize greatly affect the price of feed and the company's sales.

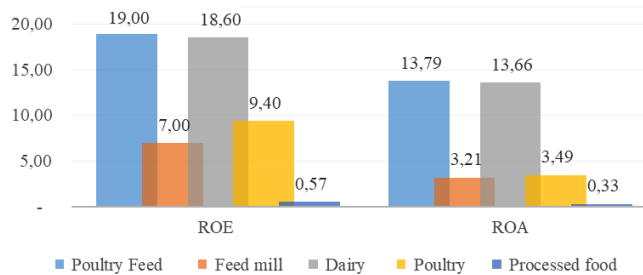


Fig. 2. Financial performance in different field industry

It can be seen from the company's total assets that not all companies experience an increase in total assets from year to year. Companies experienced an increase in the number of assets owned from year to year; this shows that the company has good asset management, so that it can survive in difficult conditions such as the pandemic that occurred in Indonesia in 2020. While companies experienced a decrease in their total assets, this decline could be due to the company selling some of its assets to cover its liabilities. It is undeniable that the larger the company's size, the greater the risk it faces.

Companies with experienced an increase in the number of liabilities held. This can be due to the expansion carried out by the company, such as adding assets or warehouses, carried out by credit, thereby increasing the liabilities owned. Meanwhile, companies have a decrease in total liabilities. The reduction in the total amount of this liability can be caused because the company has paid off both short-term obligations and long-term obligations owned by the company. Companies with an increased ROA continue to experience severe declines; this may be due to low net profit margins caused by low total asset turnover. This decrease indicates that the company is increasingly ineffective in managing assets to generate profits.

Companies an increase in ROE shows a stronger stakeholder position. This also shows the company's performance is getting better in managing capital to generate profits for shareholders. This could be due to a reduction in the rate of return on assets owned by the company. Other factors such as the debt to profit ratio, the greater the

company's debt is usually accompanied by a lower ROE. The ROE of livestock companies is not generally related to other company characteristics; more profitable companies may have less debt (regardless of maturity) (Berzkalne and Zelgalve, 2014).

In addition, we analyze the Leverage Ratio, which is a ratio that measures how much debt is used by the company to fund total assets. The greater the debt used, the greater the risk that will be faced by the company in fulfilling contractual obligations with creditors. The measure used to know the company's leverage is to use DER (debt to equity ratio), DAR (Debt to Asset Ratio), and Current Ratio (CR) (Figure 3). DER is an indicator of how much profit shareholders will receive. When the company focuses on repaying loans, the benefits that will be received by shareholders will be smaller, or in other words, the DER ratio is large. Poultry industry high DER compare with others, while CR of processed food industry had greatest.

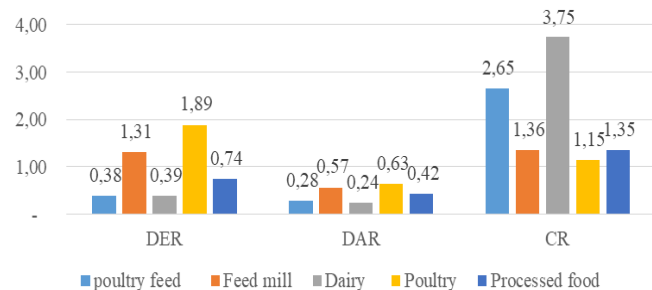


Fig. 3. DAR, DER and CR of Livestock Industry

Except for the poultry and feed mill industries, the DER value was less than one, indicating that the company's debt or liability was smaller than its total assets. Meanwhile, companies with a ratio of more than 1 indicate high debt or liabilities compared to the total net capital owned by the company. If the company cannot manage its debt effectively, it will hurt its financial health.

Based on the data obtained, it can be seen that companies have a higher value than other similar companies. A high DAR is an unhealthy signal, but it does not mean it is terrible. A high DAR ratio in which the company uses more considerable debt can impact the potential for higher income for the company. However, not all companies can maximize their debt. Generally, only companies that have matured (maturity) can maximize the use of their obligation to generate greater profits. The smaller the DAR value, the less debt the company uses to acquire its assets. A healthy company usually has a DAR of less than 1.

Profitability ratio, liquidity ratio, and leverage ratio

The profitability ratio shows the ability to generate profits during a specific period and measures the effectiveness of the company's operational management. The greater the value of a company's profitability ratio, the better the company's performance; however, good financial performance can only be temporary.

Profitability ratio tends to decrease in all sectors of the livestock industry in Indonesia (Table 1). A farm's success can be assessed by utilizing key financial ratios, benchmarking its actual performance against industry standards, and tracking trends in key metrics over time. Factors that could lead to a declining operating profit margin ratio include decreased activity levels, increased operating expenses, decreased operating income, decreased other operating income, suboptimal management of capital and assets, aggressive price negotiations, rising administrative expenses, lack of growth in sales and capital expenditure, and potential inflation of accounting calculations.

The profitability of some fields tends to increase. A larger asset base financed by debt may result in more net income, which would raise the ratio. In several regions in Indonesia, from the report of Indonesia Stock Exchange (idx.co.id), the results of the calculation of profitability of small and medium breeders reached an average of 57.14 percent in Kendari higher than that of only 18.68 percent in Central Kalimantan

in 2022. This is due to two things: on the one hand, the price of local materials is still relatively cheap in Kendari, and on the other hand, management is quite good because managers are continuously assisted by experts from the core company.

By industry, liquidity ratios differ. The business determines what a good ratio is. The ability of a business to convert its assets to pay off debts is shown by its liquidity ratio. The greater the ratio, the easier it is to pay off debt and avoid default. A company's liquidity ratio serves as an essential early warning system, indicating it when its available cash is running low and business may improve low. Livestock industry faces high risk of high debt burdens. The addition of capital from debt in order to encourage business activities does not go hand in hand with increased profits. It can be seen that the average profit growth tends to decline, and the high leverage ratio value shows the tendency of debt default risk.

Paying off debt, postponing purchases, and collecting receivables more rapidly can raise a low ratio. A greater percentage could indicate that capital is not being fully utilized, which would encourage allocating more funds to growth-promoting initiatives like R&D, innovation, product or service development, or global marketing. The pandemic had varying effects on manufacturers in importing, exporting, and self-sufficient nations. Excess milk supply leads to lower producer prices (Acosta et al., 2021).

Table 1. Financial ratio on various commodity fields of livestock companies in Indonesia

Commodity fields	2020	2021	2022	Year-on Year Differences 2022-2021	Year-on Year Differences 2023-2022
Profitability Ratio					
Dairy	0.38	0.36	0.33	(0.02)	(0.03)
Processed food	0.10	0.11	0.17	0.01	0.05
Feed Mill	0.08	0.08	0.07	0.00	(0.02)
Poultry	0.18	0.21	0.17	0.04	(0.04)
Poultry Feed	0.15	0.18	0.16	0.04	(0.02)
Liquidity Ratio					
Dairy	3.74	2.88	3.30	(0.85)	0.41
Processed food	1.35	1.33	1.41	(0.02)	0.08
Feed Mill	1.08	1.16	1.22	0.08	0.05
Poultry	1.84	1.83	1.86	(0.01)	0.04
Poultry Feed	2.50	2.35	1.97	(0.15)	(0.38)
Leverage Ratio					
Dairy	0.34	0.70	0.37	0.37	(0.33)
Processed food	0.82	0.94	0.91	0.12	(0.03)
Feed Mill	1.45	1.54	1.75	0.09	0.21
Poultry	1.37	1.40	1.36	0.03	(0.04)
Poultry Feed	0.39	0.37	0.48	(0.02)	0.10

Source: Indonesia Stock Exchange (processed)

The availability of information can support developments in the agricultural sector. Information asymmetry is not expected to occur in media and technologies related to agriculture because information asymmetry can limit the proper use of adopted technology (Ogada et al., 2020). This information is available in financial reports used by both external and internal parties, which is essential for making informed decisions (Alfiani and Rahmawati, 2019). A manual financial recording system was used by most agricultural business actors. Good financial records, i.e., every transaction is identified, are the key to maintaining a long-term business (Putri and Maghfiroh, 2022).

The financial health and performance of agricultural holdings can be influenced by various factors associated with financial distress (Tarighi et al., 2022). Most research on financial distress focuses on the internal causes of poor farm performance. The internal causes of unsatisfactory farm performance are the primary focus of research on financial distress. To become a successful company and thrive in a dynamically changing environment, it is not only essential to maintain a strong financial position but also to ensure future financial growth (Kliestik et al., 2018).

Financial condition reports are primarily prepared for the benefit of investors (Olayinka and History, 2022), market analysis (Kosan, 2014), and creditors to assess a company's financial health and earnings potential (Diatmika et al., 2019). Financial statements enable investors to view a company's comprehensive income and expenses (Simanjuntak et al., 2023). This, in turn, helps them determine their ability to generate profits and grow at a sustainable rate.

Causal relationship driving financial performance

Financial performance can be analyzed through financial statements such as balance sheets. The balance sheet is a collection of shares only, while the income statement and cash flow statement consist of inflows and outflows from the shares on the balance sheet. In this analysis, to explain the cause and effect of financial performance using a thinking pattern that is in line with the CLD concept. All transactions in the balance sheet in the accounting system has the principle of simultaneously in balance between inflows and/or outflows. Inflows represent assets, and outflows represent liabilities and equity (the credit side) (Figure 4) (Yamaguchi, 2003).

Causal structure of financial performance was described by Causal-Loop Diagram (Figure 5). One of important financial performance is necessary to look at the current ratio. The greater the current ratio value, the return on assets in agricultural sector companies will increase. Measurement

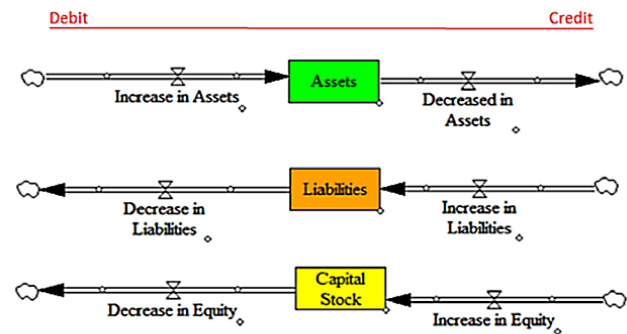


Fig. 4. Balance sheet as a system of stocks (Yamaguchi, 2003)

of the current ratio can be used to set strategies to facilitate liquidity, such as interest relief to banks. For investors and traders, there is no clear boundary on when the current ratio is high and when it is considered low because it depends on the industry.

The current ratio shows the financial condition regarding the use of cash for investment. A high ratio indicates that the company has excess cash that is not used for investment or business development. Thus, it can be said that the current ratio is a benchmark for a company's development as a consideration for investing.

Financial report information will be handy and beneficial for farmers' performance (Argilés and Slof, 2003) and planning long-term measures (Ahearn et al., 2018), for instance, in determining the amount of production costs, a Day-Old-Chick (DOC) cost, feed costs, vaccine costs, electricity costs, employee costs and cage maintenance costs. In addition, the existence of appropriate information for stud chicken farmers will make it possible to predict the needs during the process of purchasing chicks until the chickens are ready to be sold. When the information needed by farmers is not available, it will result in failure or less than optimal chicken production which will interfere with the cash flow planning of the livestock business.

Reviewing and comprehending these financial documents can provide valuable information about the company, such as its debts and ability to repay them, profits and/or losses for a given quarter or year, whether profit has increased or decreased compared to similar past accounting periods, the level of investment required to maintain or grow the business, and operational expenses, particularly when compared to revenue generated from those expenses.

In addition, an optimum income can be obtained for farmers with access to finance. Farmers can achieve a high level of income with the combination of these conditions

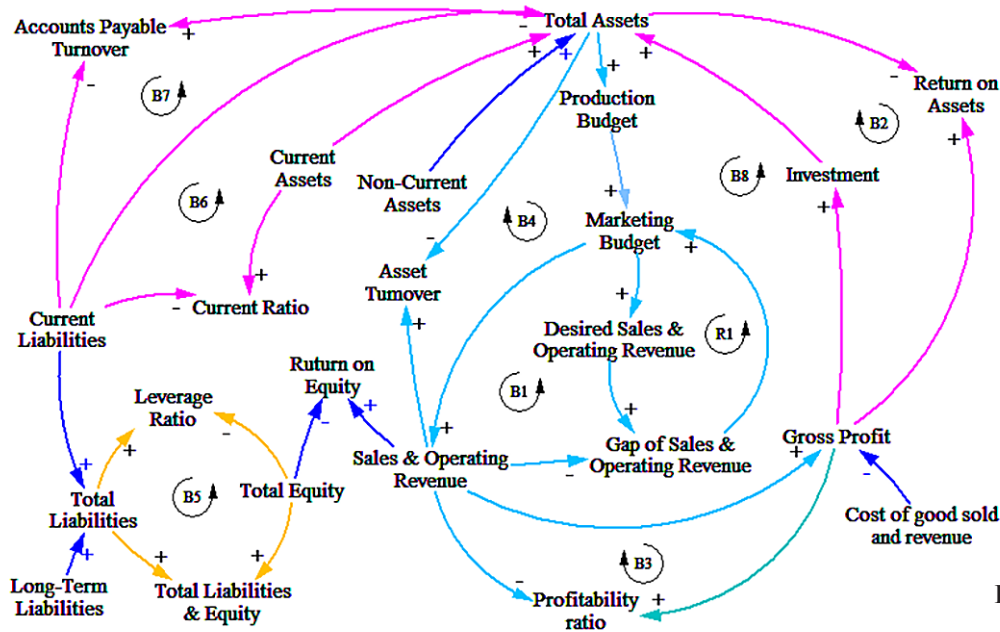


Fig. 5. Causal Loop Diagram of financial performance

for recording farm finances and access to finance, but also optimize their earnings from agricultural production activities.

Some forms of strategies that can be formulated for the company are maintaining cash flow by extending the debt period and shortening the receivable period in order to restore the company's financial health level, accompanied by making efficiency in the cost of goods sold and increasing operational cooperation in order to improve the company's financial performance.

The importance of financial statement information lies not only in its value for the company's internal management but also for external stakeholders, such as investors. This information enables increased investor confidence and facilitates the capital market, thereby promoting the country's economic growth (Mohammed et al., 2017). So, it would be better for companies engaged in the livestock industry to implement the applicable asset standards, prepare reports systematically, and present reports on company financial information honestly to avoid internal and external conflicts.

Business liquidity indicates the ability of the farmer to pay all of its short-term obligations at any given time. Theoretically, the ideal company liquidity ratio is two, because it means that each one rupiah of debt or short-term liabilities is guaranteed by a supply of funds of two Indonesia Rupiahs (IDR). Based on the theory put forward, it is known that if a business's liquidity is less than 2, then the company is clas-

sified as less secure. Vice versa, if it is greater than two, then the company is healthy but less efficient in the use of funds, as a significant portion of funds is idle in cash.

In this study, the current assets in question are assets that can be immediately cashed and disbursed within the next month at the most, namely cash and supplies of raw materials, namely DOC, feed, and medicines that have been distributed by the core company at the end of December to carry out production activities in the next cycle, while current liabilities are accounts payable in the form of production inputs whose payment process is carried out when the harvest arrives. Based on this data, the liquidity of the company can be calculated for each business unit and also for the average of all business units.

The variable amount of production has a positive and significant effect on the level of business liquidity, where the amount of production affects the level of current assets, namely cash received from sales. Likewise, the equity ratio variable has a positive and significant effect on the level of business liquidity, because the greater the level of equity, the lower the level of business debt. Addition of equity capital will increase business liquidity. The level of company growth affects financial performance. This is because companies with significant current assets tend to have a higher growth rate, whereas agricultural companies typically recognize biological assets as fixed assets. In livestock farming, an increase in equity capital accelerates liquidity, as farming operations can move more quickly. Cash reserves

must be higher because variable costs such as feed and other production facilities are relatively volatile. Fluctuations in the prices of livestock inputs and outputs make the livestock business vulnerable to losses, and the company's failure rate in repaying its loans will be higher.

Policies focused on agricultural development, especially in the livestock sector, essentially aim to achieve food security through the provision of "animal protein" from livestock. It may overlook the underlying determinants of stunting (Fenske et al., 2013), as this linear cause-and-effect approach does not account for the potential role of feedback pathways that exist within the system and are important in governing system behaviour. A successful agricultural production system rests on solid financial management (Bampasidou et al., 2017). Thus, financial management in the agricultural industry must be able to make the best decisions from the financial information available in the company.

The quality of the company's disclosure through the annual report affects decision-making by stakeholders. Accounting procedures are also required to take part in decision-making by stakeholders. If accounting procedures are based on inconsistent information, even when the information is available, it does not aid in making a decision (Oliveira et al., 2015).

Analysis of financial asset loop behaviour

Firms that benefit from cash and liquid assets prefer to use this internal funding for their investments rather than external financing. Thus, subsidies, which naturally increase farm liquidity, can reduce debt. High assets contain much debt, so the return on assets decreases, resulting in reduced profits. Meanwhile, increasing profits will encourage investment which will automatically tie up total assets (B2) in other words assets financed by debt. Total assets are obtained from current liability, where it will reduce the current ratio because current assets decrease. The meaning is that assets are financed/obtained from debt. Financing decisions can be analysed from the asset structure (Figure 6).

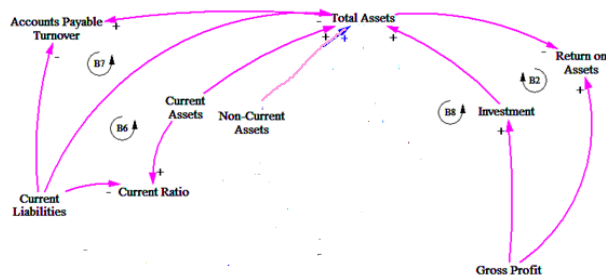


Fig. 6. Asset causal loop diagram of livestock industry

A strict credit policy will lead to a decrease in the amount of receivables, resulting in a higher turnover of receivables, and a low level of cash in receivables. The company's revenue will be high because if the receivables can be collected within the specified time limit, the revenue will increase. Conversely, a lenient credit policy will result in a low turnover of receivables. The amount of receivables will increase, and the level of cash in receivables will be high.

Revenue

The company's revenue will also be low because if the receivables cannot be collected, the revenue will decrease.

There is a lower risk of bankruptcy for businesses with product diversification and stable/ non-fluctuating profits (Smith and Stulz, 1985). Tangible assets can be utilized when the business avoids bankruptcy (Michaelas et al., 1999). In a livestock business, assets such as land and equipment can be used as collateral for the business. Liquidity of assets is significant because a high liquidity ratio indicates a company's ability to meet its short-term obligations (Lipson and Mortal, 2009).

Subsidies contribute to farm profitability and stability (Kumbhakar et al., 2023) and reduce risk (Springmann and Freund, 2022). Agriculture, and also livestock sector, face uncertain future cashflow and profitability. For instance, in agriculture, risk comes from various factors, such as the weather and both unstable input and output prices. Livestock businesses and industries' finances are sensitive to the country's economic conditions (Khadka and Thapa, 2020), as well as social and global conditions such as pandemics and avian flu cases (Thompson et al., 2019).

Current assets during the pandemic have decreased significantly. This is because sales turnover declined during this period. Some activities that require community mobility have stopped, such as tourism activities and a decrease in culinary demand. According to (Directorate of Livestock Processing and Marketing, 2022), 75% of current assets were dominated by inventory and financing facilities that were still operational at the end of the year preceding the pandemic. This is due to financing activities and the use of cash for the purchase of cows and goats that will be fattened for dairy cows.

Dairy cattle

Currently, Indonesia relies on imports to meet its beef needs, both by importing meat and its derivatives, as well as feeder cattle and breeding cattle. In 2022, the number of cattle imports was not as large as the import of dairy raw materials; approximately 40% of Indonesia still imports every year (Director General of Livestock and Animal Health,

2023). This is an excellent opportunity for business players to develop their business, be it fattening, breeding, or raising cattle.

Liabilities and equity loop behaviour

Total own capital/equity will reduce the leverage ratio/ratio debt to capital, then will reduce total debt, where total debt will increase total assets (total debt and equity = assets). The leverage ratio will increase with the overall debt (Figure 7). The leverage ratio is a measure of the amount of debt used to finance the company. In dairy companies, this ratio is high starting from the end of 2020 and throughout 2021. This indicates that debt is high. Processed food companies, frozen food based on livestock products, have relatively stable leverage. Consumer preferences and industrial production of this type tend to be stable because this food is the mainstay of households, followed by the spread of online sales of processed/frozen food products (Muzayyanah et al., 2021).

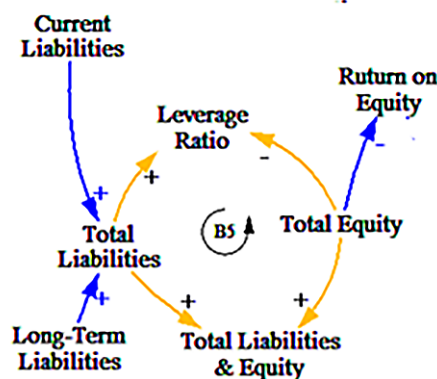


Fig. 7. Liabilities and Equity Loop

Leverage affects financial performance. The company does not use sources of funds through debt to finance the company's operations. High intensity of biological assets improves company performance, primarily financial because biological assets are the main component in supporting the company's operations main component in supporting the Company's operating activities. Additionally, small-scale farmers may lack access to resources and technology that could improve productivity and profitability. Government policies, trade agreements, and global economic conditions can also impact the profitability of the agriculture sector. Despite these challenges, agriculture remains crucial for food security, economic development, and employment in many regions. Efforts to support sustainable and efficient agricultural practices, improve market access, and provide financial and technical assistance to farmers can help address some of

these profitability challenges.

Leverage can be used by companies to increase the amount of equity owned by the company, or the use of fixed costs on assets to increase the rate of return of the company's owners. The company will reduce risk by reducing the cost of debt so that investor confidence is maintained. Investors' interest in investing in the agricultural sector requires companies engaged in the farming sector to have a precise and reliable assessment system for their financial reporting so that both investors and creditors who want to invest in the agricultural industry can easily understand the financial statement information presented by the company.

In the long term, activity might be associated with higher indebtedness. Annual financial reports and accounts are still the single most important source for effective management (Osadchy et al., 2018). The entity's performance, effectiveness, and financial stability can be assessed from the quality of its financial statements (Korableva et al., 2017). In addition to financial statements, business development efforts in the livestock sector need to consider market conditions, as well as more modern/integrated management (Majstorovic et al., 2016).

In terms of liabilities or debt, access to credit can be a solution for access to business financing. In high-risk livestock enterprises, access to credit is more limited (Agustia et al., 2020). Various risks especially those in Indonesia with market price risk and risk of business failure, government offers some loans, particularly for small-medium farm size.

Behaviour loop of financial pressure force for livestock productivity

Livestock companies face an uncertain future, with cash flows and profitability at risk due to the high risks inherent in the livestock sector, including weather, livestock diseases, and volatile input and output prices. Long-term operational activities may be associated with higher debt, given that established firms are more profitable than newer firms.

An increase in company profits will affect the increase in the value invested. It will also affect the company's assets and production budget (Figure 8). The increase in the company's production budget will encourage the company's marketing performance, and will again affect the profits that the company can receive. This condition will continue to occur and will only stop if there are other factors that affect the company's sales performance and the company's profit value (R2). On the other hand, the increase in marketing costs will increase the company's revenue in real terms. The higher the company's revenue in real terms, the gap between expectations and real income will decrease. This can affect the marketing budget that will be issued by the company (B1).

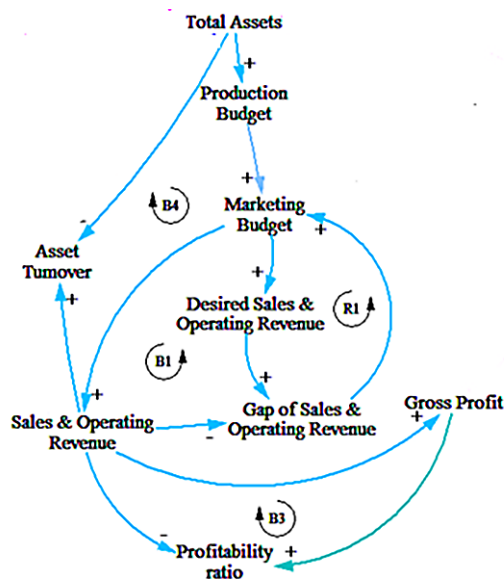


Fig. 8. Financial pressure force loop in livestock industry

Causal loop diagram showing a reinforcing feedback loop (R1) between gap of sales and operating revenue and marketing budget, and a balancing feedback loop (B) between marketing budget and revenue from sales and operating revenue in livestock farm/industry. Marketing costs will increase the company's revenue expectations. The higher the company's revenue expectations, the more marketing costs will grow (R1). The greater the assets there will be a tendency for the budget for production and marketing to increase, the production and marketing budgets go hand in hand. The greater the marketing budget allocation, the value of sales/revenue increases, further encouraging asset turnover. Intensive asset turnover is then total assets growth.

Livestock sector in Indonesia face fluctuated market price. In contrast to meat, milk production in Indonesia tends to remain steady, and prices are more stable. Dairy farming was reported to have survived the COVID-19 pandemic (Setyawan et al., 2021) and even experienced an increase in prices due to high demand (Muzayyanah et al., 2020). However, national milk production is still low. Maintenance management factors play a role in the productivity of dairy cows, including milking methods and the cleanliness of livestock and cages, as well as practical management during milking (Khasanah and Widianingrum, 2021). Breeding strategies for the provision of superior seeds must consider objectives, infrastructure, implemented programs, livestock genetic potential analysis, program monitoring and evaluation, as well as environmental conditions and production systems. In general, the trend of livestock-based food products is increasing

along with public awareness and understanding of healthy food and animal protein sources. This creates an opportunity for the livestock sector to increase population and production. This opportunity is also faced with the challenges of globalization and liberalization of the world economy, requiring the livestock sector to become more efficient in order to face global competition (Nair et al., 2019).

Profitable farms are less indebted. Indeed, profitability is also promoting retained earnings and reducing external financing needs. Growth opportunities play a significant positive role in indebtedness for all specializations. Therefore, an investment signals a positive signal to the lenders, which indicates future cash flow. The specificity of farm investments, which are considered to be a means of repayment of debt, can explain this result. There are few or no effects of specific parameters such as subsidies, flexibility, liquidity, and risk on debt levels.

Conclusions

Financial performance is using to measures the profitability, liquidity, and financial efficiency of their businesses. Several financial performance indicators show that in the analysed data period, livestock industry has been efficient in using its assets in operating activities to generate profits. The ratio analysis calculations showed that the livestock companies build equity and pay their debts promptly. This will bring financial resilience in the face of volatility in internal prices and high feed input prices. Liquidity ratios remain a challenge, particularly in the event of short-term cash shortages. The companies have good asset management. The technical aspects of livestock operations have complex relationships. The aspect of profit generation from the utilization of assets and/or equity determines the financial performance. Decrease in total liabilities due to the company having paid off both short-term obligations and long-term obligations owned by the company. This also shows the company's performance is getting better in managing capital to generate profits for shareholders. These figures also showed that producers have used the past several years to pay down debt and build up equity, which should provide financial resilience in the face of lower livestock prices and a turning weather cycle. The proportion of non-liquid equity remains a challenge, especially in the event of short-term cash shortfalls, but in general, producers are well-positioned for the next several years.

The understanding cause and effect among the variables were analysing through CLD. The finding showed that financial condition plays an important role in the utilization of financial resources and the dynamics of the livestock sector. The complexity of the system indicates that the application

of a strategy to improve the livestock sector must be able to anticipate various factors that can be caused. It is worth noting that, despite the ongoing challenges in the livestock market, this sector has maintained a strong financial position for many years. In order for organizations to be able to cope with rapid change, it is important to emphasize the framework-based business foresight process.

There is a need for accounting, investors, shareholders and management to be well aware of the financial situation of an organization but employees can also benefit from understanding its balance sheet, income statement, cash flow statement or annual report. The balancing condition, i.e., the position of assets and liabilities, drives the aspect of increasing the cattle population, consisting of two reinforcing loops and two balancing loops. The study used the CLD approach to show how managerial models impact strategic responses and company performance over time, in order to determine why there have been significant changes in operating results under a single chief executive officer and top management team. The findings and implications of strong financial performance are putting the industry in a good financial position despite recent challenges in the livestock market.

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Conflicts of interest

The authors declare that they have no conflict of interest.

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