

The effect of raw material supply and production costs on the profit of manufacturing companies listed on the Indonesia Stock Exchange

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ABSTRACT

This study aimed to examine the effect of raw material inventory and production costs on company net profit. The dependent variable is the net profit of manufacturing companies, while the independent variables are raw material inventory and production costs consisting of raw material costs, direct labor costs, and factory overhead costs. The population of this study was manufacturing companies in the consumer industry sub-sector that were listed on the Indonesia Stock Exchange (IDX) during the period 2018–2020. Sampling was based on purposive sampling using the criteria of consumer industry companies listed on IDX during 2018–2020, which used the rupiah as the currency in their financial reports, and had complete financial report data. Multiple linear regression was employed as the data analysis technique. The results show that raw material inventory had no effect on company profits, raw material costs had a significant positive effect on company profits, direct labor costs had a significant positive effect on company profits, and factory overhead costs had no significant effect on company profits. The coefficient of determination (R^2) shows that 14.4% of company profits in the consumer industry sub-sector for the period 2018–2020 can be explained by raw material inventories, raw material costs, direct labor costs, and factory overhead costs.

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1. Introduction

Today's digital era is characterized by rapidly increasing competition in the business world, meaning only well-performing entities with good business strategies will survive (Bustami & Nurlela, 2009). In an increasingly competitive business environment, companies must be more efficient and productive in conducting their business (Agustina, 2016). This is especially true in today's highly uncertain and volatile economic climate. Indonesia has been affected by a very severe economic crisis that damaged all sectors, compelling firms to optimize their resources. Commercial companies seek to maximize the profits earned from their operational activities. This will ensure they can continue with those activities in a sustainable manner. The higher the company's profits, the better for the company as it will guarantee sustainable operational activities and provide a livelihood for its employees. High profit levels will increase the competitiveness between companies. Those that earn large profits will be able to expand their business, increase investment, or enter new investments related to their parent company. Profit is generated from the difference between incoming resources (income and profits) and outgoing resources (expenses and losses) over a certain period. According to Kasmir (2015, p. 303), "Net profit is profit that has been deducted by costs which are company costs in a certain period, including taxes." A firm's income statement comprises the following main elements: revenues, expenses/costs, gains and losses. Companies must develop plans to achieve optimal profits, especially in the current economic climate characterized by a high level of uncertainty; they must therefore optimize their resources. This is determined by the company's ability to accurately predict future highly uncertain trading conditions, in addition to closely monitoring factors that might affect profits. To maintain profits, every company must be able to formulate and implement an inventory control strategy. In procuring inventory, raw material orders must be adjusted to the company's production needs, to ensure there are no excess raw materials. Ultimately, inventory costs must

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be kept as low as possible in order to allocate funding to other investments that can benefit the company. Companies must also understand the optimal level of production at which their units generate the profit required to cover all of their incurred costs (Maryanto, Djoko, 2020). In principle, inventory facilitates or expedites the course of company operations that must be maintained to produce goods and distribute them to customers. Good inventory management enables a company to immediately convert stored inventory into profits through sales, which are then transformed into cash and receivables.

Companies are affected by many costs, in addition to variations in income and sales volume, meaning they must always pay close attention to their production and operational costs by maintaining sales prices and volumes to support the smooth running of the business (Munawir, 2012). A company will experience a loss if its costs exceed the income it receives. Conversely, if revenue is greater than costs, the company will make a profit. Costs are among the elements that affect the size of a company's profit or loss. They can be seen as sacrifices of economic resources, measured in units of money, that have occurred or are likely to occur for certain purposes (Mulyadi, 2015). Cost in a company is an important component in supporting the implementation of activities to achieve its goals. The achievement of this objective depends on the correct calculation of the costs incurred by the company as a form of sacrifice. Mulyadi (2015) highlighted that, in calculating costs correctly, it is essential to know the three main functions of the company; typically, these are the main production function, the marketing function, and the administrative and general function. Therefore, in manufacturing companies, costs can be split into three groups: production costs, marketing costs, and administrative and general costs. When transforming raw materials into finished products, companies sacrifice economic resources. This sacrifice is the firm's production costs, which comprise raw material costs, direct labor costs, and factory overhead costs; these are also elements in the income statement and are thus related to net income. In a previous study, Muawaningsih and Mudjiyanti (2013) reported that raw material inventory had a positive and significant effect on company profitability, while research conducted by Wibowo & Iriyadi (2014), Maryanto (2020) stated that raw material inventories did not influence on company profits. Meanwhile, Sayyida (2014), Felicia and Gultom (2018), Yuda and Sanjaya (2020), and Ariawat and Syafi'i, (2018) found that production costs had a significant positive effect on company profits. Additionally, Wulandari et al. (2015), Nurawaliah, Sutrisno, and Nurmilah (2020), and Broto (2019) stated that production costs have a significant negative effect on profit.

2. Literature Review

Decision-Usefulness Theory of Information (Decision-Usefulness Theory). The decision-usefulness theory of information (Decision-Usefulness Theory) asserts that the key role of financial reporting is to provide information that facilitates sound financial and investment decision-making. In this way, it ensures that the financial reporting component positively impacts economic decision-making (Soyinka, Fagbayimu, Adebroye, & Ogunmola, 2017). The theory first appeared in 1954 and was originally known as A Theory of Accounting to Investors. It has since become a reference in the preparation of the Financial Accounting Standards Board conceptual framework, namely the Statement of Financial Accounting Concepts (SFAC) applicable in the United States (Staubus, 2013). The theory of information usefulness contains a rule of thumb on the quality of accounting information that is useful when making decisions. In terms of meeting the needs of decision-makers as the users of accounting information, it is important to consider the presentation of that information when it is expected to serve as the basis of multi-component decisions, in addition to considering the level of need of the users of financial statements.

Net Profit. Irham Fahmi (2015) defined net profit as profit after tax, namely the amount of profit earned after taxes have been deducted. This is known as the company's net income or net profit (Ginanjar, 2020). Subramanyam (2012), meanwhile, asserted that net profit is the profit earned from the company's ongoing business after interest and taxes (Afrian et al., 2017), while Kieso, Weygandt, and Warfield (2009) stated that net profit consists of profit derived from the work of a company during a given period. Ismaya (2010) explained net profit as the difference between a firm's income and expenses charged that equates to a net increase in the amount of capital originating from its business activities (Maulidina Rahmanita, 2017).

Raw Material Inventory. According to Alexandri (2009, p. 135), "Inventory is an asset that includes goods belonging to the company with the intention of being sold within a certain business period or inventory of goods that are still in progress or production processes or supplies of raw materials awaiting use. work or production process or raw material inventory awaiting its use in a production process. Inventory of raw materials (raw material), namely goods - goods purchased for use in the production process. Sufficient raw materials can be provided for the production process by purchasing them during that process. Raw materials availability is thus an important factor in ensuring a smooth production process.

Cost of Production. An effective and efficient production process is crucial for the business activities of manufacturing companies. The production process concerns the transformation of raw materials into a product that is ready for sale. The process involves identifying the costs that can be directly attributed to a product, along with those that cannot be explicitly or directly associated with it. These two cost types support each other in the process of making a product. According to Mulyadi (2015), production costs are the costs incurred in processing raw materials into finished products that are ready for sale. Examples include machine and equipment depreciation costs, raw material costs, auxiliary costs, and the wages of employees who contribute both directly and indirectly to the production process (Afrian et al., 2017). Product costs are the totality of the costs incurred in producing a product and are closely related to the units produced by a factory or purchased for resale by retailers or traders. Product costs are considered "attached" to the units of a product when those goods are

purchased or produced, and they remain attached to the goods when they become inventory awaiting sale. Therefore, the cost of products is initially determined against the inventory account shown in the balance sheet. When goods are sold, the cost is transferred from inventory to expense (usually referred to as the cost of goods sold) and is matched/linked to sales revenue. Since product costs are determined in inventory, they are also known as inventory costs. Manufacturing companies divide production costs into three categories: direct materials, direct labor, and manufacturing overheads.

Hypothesis Development. Raw material inventory is a very important element in determining both the production cost and the cost of goods sold in a manufacturing company. Inventory must always be considered due to its ability to disrupt the continuity of the company. In principle, inventory facilitates the profit-making process of companies engaged in product sales due to its importance for their operations. Inventory affects both the balance sheet and income statement (Wibowo & Iriyadi, 2014). Ilham, S.W.R (2013) stated that inventory has a positive effect on company profits. Inventory and net profit are very closely related as the former greatly affects the size of the latter. At the same time, the cost of goods sold is very influential in the net income calculation. The cost of goods sold is calculated using the elements of production costs, one of which is the raw materials used in production, which are themselves initially purchased. It is therefore very clear that the level of raw material inventory affects the company's profit. Based on the explanation above, the following hypothesis is proposed:

H₁: *Raw material inventory has a positive effect on company profits.*

Production costs are directly related to the production of a product and will be matched with revenue in the period in which that product is sold. According to Mulyadi, to process raw materials into finished products, companies must sacrifice economic resources. This sacrifice consists of the firm's production costs, which are broken down into raw material costs, direct labor costs, and factory overhead costs. These are also elements in the income statement and are thus related to net income. These production costs determine the selling price of a product or service, which will ultimately affect the amount of profit earned (Djamalu, 2013). Companies seek to reduce their costs, especially those linked to their production processes, both in terms of raw material costs, costs incurred for auxiliary materials, labor costs, and factory overhead costs. Research conducted by Januarsah, Jubi, Inrawan, and Putri (2019) showed that production costs affect the company's net profit. According to Felicia and Gultom (2018), profit is influenced by production costs; as such, if a company's production costs increase, it will respond by increasing its production volume, which in turn will affect the amount of profit earned. High production costs will reduce net profit, while low production costs will increase the amount of net profit. Yuda and Sanjaya (2020) demonstrated in their results that production costs affect the company's net profit, while Ariawat and Syafi'i (2018) stated that production costs influence the company's net profit. Mulyadi (2015), in turn, explained that production costs, which include raw material costs, direct labor costs, and factory overhead costs, affect the company's profit. To determine whether a particular product is capable of generating gross profit or would result in a gross loss, management requires information on the costs of producing that product. This study tested production costs respectively, namely raw material costs, direct labor costs, and factory overhead costs, which are costs that a company must incur in creating its products. The higher the raw material costs, direct labor costs, and factory overhead costs incurred by a company, the higher its cost of goods sold and thus the lower its net profit. Based on the explanation above, the following hypotheses are proposed:

H₂: *Raw material costs have a negative effect on company profits.*

H₃: *Direct labor costs have a negative effect on company profits.*

H₄: *Factory overhead costs have a negative effect on company profits.*

3. Methodology

The population in this study comprises all consumer industry companies listed on the Indonesia Stock Exchange up to December 2020. Purposive or conditional sampling was conducted, namely the selection of samples based on certain criteria. Raw material inventory (X1) is the first independent variable used in this study, referring to materials that as a whole form a finished product and can be directly attributed to the product in question. It relates specifically to the raw material inventory reported in the financial statements, obtained here for the 2018–2020 period. The second independent variable is production costs, defined as costs that are directly related to the production of a product and will be matched with income (revenue) in the period in which the product is sold. Production costs comprise raw/direct material costs (X2), direct labor costs (X3), and factory overhead costs (X4). Raw material costs are thus the costs incurred to process the main raw materials into finished products or goods and are reported in the cost of goods sold. Direct labor costs are incurred for direct labor wages and are reported in the cost of goods sold report. Factory overhead costs are costs other than direct material and direct labor costs, and while not directly attributable to the production process, factory overhead costs can help to smooth it and are reported in the cost of goods sold. Profit (Y) is the dependent variable, obtained from the result of the difference between income and costs. In this research, profit is proxied by net income, with the following formula:

Net profit = Profit before tax – income tax.

Multiple regression is employed as the analysis technique, with the following regression equation:

$$Y = \alpha + \beta_1 \text{ Raw Material Inventory} + \beta_2 \text{ Raw Material Costs} + \beta_3 \text{ Direct Labor Costs} + \beta_4 \text{ Factory Overhead Costs} + e$$

4. Results and Discussions

Sample Selection. The population comprises all consumer industry companies listed on the Indonesia Stock Exchange during 2018–2020. Purposive or conditional sampling was conducted, with samples selected based on certain criteria. The results of the sample selection are shown in Table 1.

Table 1
Sample Selection

Criteria	Total
Consumer industry companies listed on the Indonesia Stock Exchange (IDX) in 2018–2020	57
Do not use the rupiah as the currency in financial statements	0
Do not have complete financial report data	(8)
Data outliers	(6)
Number of samples	(43)
Number of observations (3 years)	129

Multiple Regression Analysis. Based on the classic assumption test above, the proposed regression model was proven to meet the four classic assumptions, namely having a normal distribution, and being free from symptoms of autocorrelation, multicollinearity, and heteroskedasticity. The results of the multiple linear regression testing are shown in Table 2, 3,4:

Table 2
The Results of Multiple Linear Regression Analysis

Model	R	R Squared	Adjusted R Squared	Std. Error of the Estimate	Durbin-Watson
1	.413 ^a	.171	.144	2.31043	1.784

Table 3
The Results of Multiple Linear Regression Analysis

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	136.097	4	34.024	6.374	.000 ^a
	Residual	661.924	124	5.338		
	Total	798.021	128			

Table 4
The Results of Multiple Linear Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.027	4.638		1.731	.086
	Raw Material Inventory (X1)	-.317	.201	-.167	-1.573	.118
	Raw Material Costs (X2)	.465	.222	.265	2.096	.038
	Direct Labor Costs (X3)	.636	.275	.337	2.313	.022
	Factory Overhead Costs (X4)	-.093	.282	-.052	-.329	.742

a. Dependent variable: Profit

The resulting multiple linear regression equation is:

$$\text{Net Profit} = 8.027 - 0.317 X1 + 0.465 X2 + 0.636 X3 - 0.093 X4$$

Based on Table 2, the independent variables (raw material inventory, raw material inventory costs, labor costs, factory overhead costs) explain 14.4% of the variation that occurs in net profit, with the remaining 85.6% explained by other variables outside the research. Tabel 3 Show, the significant value on the F test is 0.000, or less than 0.05, meaning that all independent variables (raw material inventory, raw material costs, labor costs, factory overhead costs) jointly affect the dependent variable (net income). The partial test is carried out to see the effect of each independent variable on the dependent variable. If the probability value is less than 0.050, then H0 is rejected, and Ha is accepted, which means that the independent variable affects the dependent variable. Based on table 4, the Prob value (t-Statistic) of the raw material inventory is 0.118. The value indicates that 0.118 is greater than 0.050 with a coefficient of -0.317, which means that raw material inventory partially does not affect the profit. Prob value (t-Statistic) of the raw material costs is 0.038. The value indicates that 0.038 is smaller than 0.050 with a coefficient of 0.465, which means that the raw material costs partially affect the profit in a positive direction. Prob value (t-Statistic) of direct labor costs is 0.022. The value indicates that 0.022 is smaller than 0.050 with a coefficient of 0.636, which means that direct labor costs partially affect the profit in a positive direction. Prob value (t-Statistic) of the factory overhead costs is 0.742. The value indicates that 0.742 is greater than 0.050 with a coefficient of -0.093, which means that raw material partially does not affect the profit.

Effect of Raw Material Inventory on Net Profit. The results of the study show that raw material inventory has no effect on company net profit. However, the accurate determination of the level of inventory does have a direct effect on company profits, and errors will reduce profit. An inventory that is too large compared to the needs of the business will drive up

interest costs, and storage and maintenance costs in the warehouse, as well as increase the possibility of losses due to damage, quality reduction, and obsolescence, all of which will reduce profits. In contrast, too little inventory will depress profits because if one type of inventory is unavailable, the company is unable to work at an optimal level of production. The negative relationship between inventory and company profits reflects how inventory forms part of the company's assets; thus, increasing the inventory automatically increases the company's assets as a whole. Inventory is highly valuable for all companies, both trading and manufacturing companies. As such, an increase in inventory is not without risk since it will be accompanied by increased inventory depreciation costs and storage costs. Therefore, a negative relationship between inventory and company profits could arise if an increase in inventory is not accompanied by an increase in sales. Here, the extra inventory generates new costs, namely depreciation and storage costs, which naturally will impact the amount of profit earned. The results of this study are in line with Wibowo and Iriyadi (2013), who found that inventory had no significant effect on company net profit. However, the results contrast with those by Ilham, S.W.R (2013), who reported that inventory merchandise increased company profits, thus indicating a positive relationship between inventory and company profits.

Effect of Raw Material Costs on Net Profit. The results show that the cost of raw materials has a positive influence on company net profit. It is thus possible to state that high raw material costs will translate into an increased net profit for the year. Raw material costs are one of the most important components of production costs that can affect profit generation. As such, the company's management must formulate strategies for dealing with large raw material costs to ensure that profits increase. The results of this study show that increased raw material costs have an impact on increasing profits. This reflects how higher direct raw material costs increase the cost of goods sold from the products produced; however, an increase in production costs that is not followed by an increase in production volume will tend to encourage the company to increase its prices and ultimately its net profit. The results of this study are positive since it is also possible for the profit earned by the company to be determined by the volume of production. The higher the production volume, the higher the production costs but also the higher the profit earned (Carter, 2009). This means that high production costs accompanied by an increase in production volume will increase company profits. These results are in line with Wanialisa (2011) and Rustami, Kirya, and Cipta (2014), who found that raw material costs have a positive effect on company profits. Meanwhile, Sayyida (2014) reported that raw material costs have a negative effect on company profits.

Effect of Direct Labor Costs on Net Profit. The research results obtained show that direct labor costs have a positive influence on company net profit. Thus, an increase in direct labor costs will tend to produce an increase in net profit. This can be caused by two things; first, if direct labor costs increase but production volume does not, the company will increase its selling price, which in turn will increase profits; second, if a rise in direct labor costs is followed by an increase in production volume, the company's net profit will increase. These results align with those reported by Wanialisa (2011), who found that labor costs directly affect gross profit, and Oluwagbemiga, Olugbenga, and Solomon (2014), who reported that direct labor costs have a significant positive effect on profitability. However, the results contradict Sayyida (2014), who found that direct labor costs do not affect company profits.

Effect of Factory Overhead Costs on Net Profit. The results obtained in this study show that factory overhead costs have no effect on company net profit; as such, an increase in net income cannot be attributed to an increase or decrease in overhead costs. Factory overheads involve the classification of costs based on cost behavior and are divided into fixed and variable costs. When a company includes only fixed factory overhead costs, it is often the case that factory overheads do not always reflect changes in production costs, that is, they tend to be constant or fixed. In this way, factory overhead costs do not have a significant effect on company profits. This result matches that reported by Sayyida (2014), namely that factory overhead costs do not have a significant effect on company profits. However, this research contrasts with Wanialisa (2011), who found that factory overhead costs affect gross profit. Muktiadji and Somantri (2009) also identified a positive effect of factory overhead costs on profitability (gross profit margin), while Oluwagbemiga et al. (2014) reported that factory overhead costs had a significant negative effect on profitability.

5. Conclusion

This study aimed to examine the effect of raw material inventory and production costs on company net profit. To maintain profits, every company must be capable of using the correct strategy, which includes controlling inventory levels. Production costs are broken down into raw material costs, direct labor costs, and factory overhead costs, all of which are elements in the income statement and can thus affect net income. The results of this study indicate that together with raw material inventory, raw material costs, direct labor costs, and factory overhead costs have a significant effect on company profits. While partially raw material inventory and factory overhead costs do not have a significant effect on company profits, raw material costs and direct labor costs do have a positive effect. The coefficient of determination test (R^2) shows that 14.4% of company profits in the consumer industry sub-sector for the 2018–2020 period can be explained by raw material inventories, raw material costs, direct labor costs, and factory overhead costs, while the remaining 85.6% is explained by other factors not examined in this study.

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