

The Effect of Plastic Price Increases on Production Costs and SMEs Profitability: Evidence from a Green Accounting Perspective

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ABSTRACT

Objective: This study aims to analyze the impact of rising plastic prices on production costs and profits of SMEs and examine the role of green accounting as a strategy in addressing cost pressures and sustainability demands. **Method:** The study used a qualitative approach with a literature review method sourced from scientific journals, articles, and trusted publications. **Results:** The results show that a significant increase in global oil prices in 2026 will have a direct impact on the price of plastic raw materials, a petrochemical derivative. A 40%–100% increase in plastic prices will increase the Cost of Goods Sold (COGS) and reduce SMEs profits by around 50%. This condition creates economic pressure that increases SMEs' vulnerability to fluctuations in global raw material prices. In facing these conditions, SMEs implement various adaptation strategies through innovation, such as efficient use of raw materials, waste reduction, and the application of the circular economy concept. **Novelty:** Furthermore, the implementation of green accounting is a strategic solution in identifying and managing environmental costs more effectively. Green accounting not only improves cost efficiency but also strengthens financial resilience and supports business sustainability. However, its implementation in SMEs still faces limitations in terms of understanding and resources. Therefore, support from various parties is needed to encourage the wider adoption of green accounting.

INTRODUCTION

The rise in global oil prices triggered by geopolitical conflicts in the Middle East has had a significant impact on various industrial sectors. As reflected in the Brent crude oil price trend in early 2026, there was a very sharp anomaly in the increase from a stable range of USD 67 per barrel to a drastic surge, surpassing the psychological threshold of USD 110 per barrel. The protracted conflict between Iran and the US-Israel coalition has had a serious impact on regional tensions in this major oil-producing region. As a result, there has been a disruption in the supply of fossil fuels to several importing countries, including Indonesia (TRADING ECONOMICS, 2026). This surge was exacerbated by supply disruptions in the Strait of Hormuz, a route through which approximately 20% of global oil and LNG trade flows, making it the most strategic energy chokepoint global (CNBC, 2026).

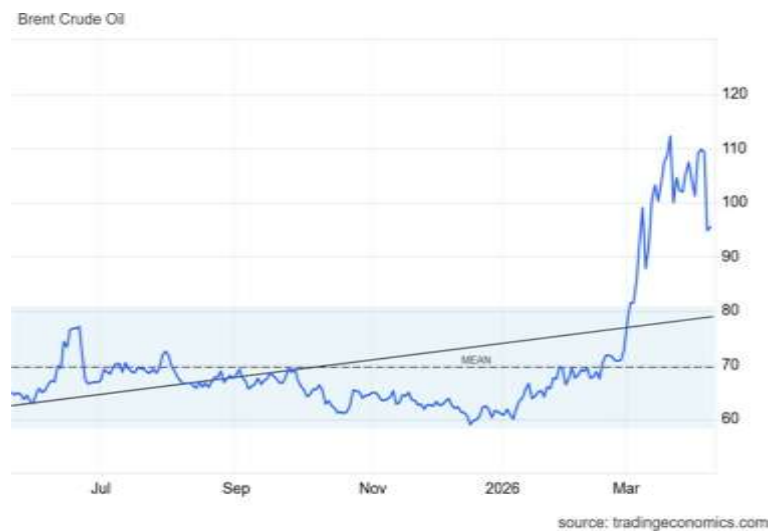


Figure 1. Brent Crude Oil Price Chart

Petroleum, as the primary raw material in plastic production, makes plastic prices highly sensitive to fluctuations in global oil prices. This is confirmed by Saputera (2019) research in the *Managerial Journal*, which found that the price of plastic raw materials, particularly LLDPE, is highly influenced by fluctuations in petroleum prices, with an influence reaching 70.3%, considering that plastic is a direct derivative of petroleum through petrochemical processes [1]. Technically, crude oil is processed into naphtha, which is then processed to produce basic compounds such as ethylene and propylene, the main foundations in the manufacture of various types of plastic. This finding is reinforced by recent research in the *International Journal of Economic Integration and Regional Competitiveness* (2024), which shows a very strong positive correlation of 0.948 between petroleum prices and plastic pellet prices, thus emphasizing the importance of effective risk management for companies in the plastics industry.

When oil prices experienced a sharp escalation, as seen in global market data in early 2026, the production costs of plastic polymers automatically increased, triggering a massive increase in the price of plastic raw materials on an international scale. Based on price movements on the commodity exchange, Brent crude oil soared drastically from around USD 67 per barrel to break the psychological threshold of USD 110 per barrel at the end of March 2026, driven by geopolitical uncertainty in the Middle East. Given that the region accounts for approximately 25 percent of global polyethylene and polypropylene exports, disruptions in these production centers created a shock effect on global stock availability. Specifically, the most obvious impact is seen in the price of naphtha as an intermediate material which has soared from around USD 630 per ton in February 2026 to USD 917 per ton as of April 1, 2026. This drastic increase of 45% in a short period of time is greatly influenced by the fact that around 70% of the world's naphtha supply comes from the Middle East, so that any disruption to the Strait of Hormuz directly increases input costs for the plastic manufacturing industry which is highly dependent on the stability of the price of this fossil raw material (CNBC, 2026).

The increase in plastic prices has put significant pressure on businesses, particularly Small and Medium Enterprises (SMEs), which rely heavily on plastic as a packaging material. According to a report by the Ministry of SMEs, the surge in plastic prices, which has reached an average of 40–60 percent, has forced many SMEs into a dilemma they must bear the drastic increase in production costs while tending to hold back selling prices to maintain purchasing power and customer loyalty. The direct impact of this policy is a decrease in profit margins and net profits for SMEs, which are estimated to fall by up to 50 percent. Considering that the domestic plastic packaging industry dominates the market by 67.61 percent in 2025, with the food sector as the largest contributor, the increase in plastic prices automatically increases the Cost of Goods Sold (HPP) significantly [2]. This condition poses a challenge for SMEs due to limited resources, making them more vulnerable to fluctuations in raw material prices.

On the other hand, the dual pressures of soaring production costs and growing awareness of the environmental crisis have driven businesses to transform through various forms of strategic innovation. These innovations include efficient use of materials, the adoption of alternative, environmentally friendly packaging materials, and the

implementation of the circular economy concept (reduce, reuse, recycle) to mitigate the risk of dependence on fossil-based polymers [3]. However, the success of these innovations requires a measurable performance monitoring system, which has fueled the urgency of implementing the green accounting concept. In the context of Indonesian regulations, the implementation of environmental accounting aligns with the spirit of POJK No. 51/POJK.03/2017 concerning the Implementation of Sustainable Finance, which emphasizes the importance of business entities managing environmental and social risks in their operational activities. Furthermore, the integration of environmental costs into financial reporting also refers to the Financial Accounting Standards (SAK) framework, particularly regarding the transparent presentation of financial statements regarding provisions and contingencies related to environmental impacts. Through this approach, SMEs can identify hidden cost efficiencies and transform waste management costs into added economic value. Thus, green accounting is not just a reporting tool, but a strategic decision-making instrument that helps SMEs maintain profit margins while increasing competitiveness amid fluctuating global raw material prices.

The implementation of green accounting is a crucial instrument in this context, as it not only helps businesses identify and manage environmental costs transparently but also supports the creation of sustainable business practices. Through integrated accounting records, SMEs can transform environmental cost burdens into strategic information for resource efficiency and product innovation. By simultaneously considering economic, social, and environmental aspects as is the spirit of sustainability reporting SMEs are expected to increase financial resilience amidst the pressure of rising global raw material prices. Ultimately, the adoption of green accounting is not merely a form of compliance with reporting standards, but a concrete step for SMEs to survive and

contribute significantly to achieving sustainable economic development goals in Indonesia.

RESEARCH METHOD

This study uses a qualitative approach with a literature review method. A literature review is a written summary of journals, articles, books, and other documents containing descriptions of past or present information relevant to the research title [4]. This method is used to explain the importance of the research and identify the problems studied based on various existing sources. This approach allows researchers to gain a comprehensive understanding without directly collecting data in the field. The data used in this study are secondary data obtained from various sources such as scientific journals, articles, and scientific publications accessible through Google Scholar and other trusted sources. This study focuses on how the collected data is analyzed and synthesized to produce a conceptual picture of the economic pressures faced by SMEs due to rising plastic prices. Furthermore, this study also examines the impact of these price increases on increasing production costs (COGS) and their implications for the implementation of green accounting as an effort towards more sustainable business practices.

RESULTS AND DISCUSSION

Result

Based on the analysis of the literature study conducted, it was found that the increase in plastic prices as a result of the escalation in global oil prices has various significant implications for the performance of SMEs. This impact is not only seen in increased production costs (COGS) and decreased profits, but also creates economic pressure that increases the level of vulnerability of SMEs to fluctuations in raw material prices. Furthermore, the study results also show various adaptation strategies implemented by SMEs through innovation, such as efficient use of raw materials, waste reduction, and the use of more environmentally friendly packaging alternatives. In this context, the application of green accounting emerges as a strategic approach that plays a role in identifying, managing, and optimizing environmental costs to support cost efficiency and business sustainability.

The results of a literature study indicate that the increase in plastic prices triggered by the surge in global oil prices has a direct impact on increasing production costs or Cost of Goods Sold (COGS) in SMEs. The increase in Brent crude oil prices from around USD 67 per barrel to exceeding USD 100 per barrel has caused a significant increase in the cost of plastic raw materials. Plastic is a direct derivative of petroleum through a petrochemical process, so fluctuations in oil prices significantly affect the price of plastic raw materials. Research by Wahyuni et al., (2024) shows a significant positive relationship between oil prices and plastic prices, which is reinforced by (Saputera, 2019) who stated that plastic raw materials are very sensitive to changes in oil prices because they come from petrochemical derivative processes [1], [5].

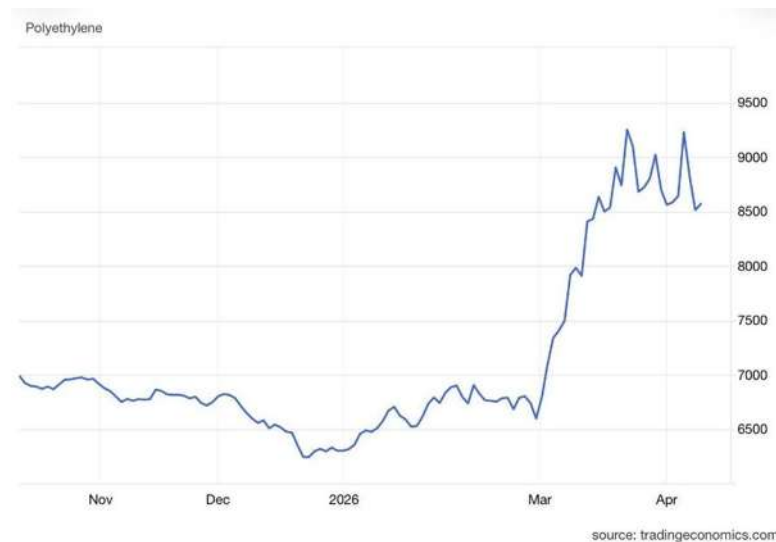


Figure 2. Polyethylene Price Chart

In line with rising oil prices, data shows that the price of plastic raw materials has also experienced a significant increase. Polyethylene prices have been recorded as increasing by around 8%–16% in a single month and up to 25% year-on-year, while polypropylene has seen an increase of up to 24% year-on-year (TRADING ECONOMICS, 2026). Even during a supply crisis caused by geopolitical conflict, global plastic prices have reportedly increased by up to 50% in some markets. In Indonesia, plastic price increases have reached 40%–100%, directly increasing production costs for SMEs.

Furthermore, macroeconomically, rising oil prices also impact inflation and increase national production costs [6], thus amplifying the effect of rising raw material prices in the industrial sector, including plastics. Technically, crude oil is processed into naphtha, which is then processed into ethylene and propylene, the basic ingredients of plastic. The increase in naphtha prices of approximately 45% from USD 630 to USD 917 per ton further increases production cost pressures. At the SMEs level, a 40%–60% increase in plastic prices directly increases the packaging cost component as part of the COGS. Thus, the increase in plastic prices has proven to be a major factor in increasing SMEs production costs, especially in businesses that are highly dependent on the use of plastic as a packaging material.

Impact on SMEs Profits

Rising production costs due to rising plastic prices have a direct impact on the decline in SMEs profits. In accounting theory, profit is the difference between revenue and costs, so an increase in costs without a corresponding increase in revenue will reduce profit margins. Under normal circumstances, businesses can adjust selling prices to maintain profit margins, but in practice, most SMEs are unable to increase selling prices proportionally due to consumer purchasing power. As a result, the increase in production costs cannot be fully offset by increased revenue.

This situation has led to significant cost pressure, with production costs increasing while revenues remain stable. The immediate impact is a decline in gross profit margins and net profit. In some cases, SMEs have even experienced profit declines of up to 50%,

particularly in business sectors that rely heavily on plastic packaging as a major component of production costs.

This decline in profitability aligns with research by Saputera (2019), which shows that rising plastic raw material prices significantly impact a company's Return on Assets (ROA), a key indicator of financial performance. Furthermore, research on sustainability also shows that cost pressures can undermine financial performance if not balanced with efficiency strategies [1], [7]. Thus, rising plastic prices not only increase production costs but also create multiple pressures on SMEs, ranging from declining profit margins, weakening financial performance, to increasing the risk of business instability. This indicates that SMEs profitability is highly sensitive to fluctuations in raw material prices, necessitating appropriate adaptation strategies to maintain a balance between costs and revenue.

Rising production costs accompanied by a simultaneous decline in profits create significant economic pressures for SMEs. This situation not only impacts short-term financial performance but also disrupts operational stability and long-term survival. In business structures that generally have relatively small profit margins, even small increases in costs can immediately erode profitability. This places SMEs in a highly sensitive position to changes in input prices, particularly those for imported raw materials or those affected by global dynamics.

The vulnerability of SMEs is increasingly apparent due to limitations in capital, technology, and access to resources, making them more susceptible to fluctuations in global raw material prices. Unlike large companies that have the capacity to implement scale efficiencies, diversify suppliers, or hedge, SMEs tend to lack such flexibility. Research by Chakraborty et al. (2025) shows that SMEs contribute a significant portion of economic activity, but also face limitations in implementing sustainable systems and managing resources [8]. These limitations can exacerbate the impact of increasing cost pressures. Furthermore, external pressures such as oil price volatility due to geopolitical conflicts also have a broad impact on economic stability and production costs [9].

On the other hand, the pressures faced by SMEs stem not only from economic aspects but also from increasing environmental demands. The use of plastic as a primary packaging material has become a global concern due to its impact on environmental pollution. Plastic, as a primary packaging material, has a significant environmental impact and is a global concern in the supply chain [3]. This combination of economic pressures and environmental demands increases the vulnerability of SMEs, particularly in maintaining business sustainability amidst global uncertainty.

The combination of economic pressures and environmental demands increases the vulnerability of SMEs in the face of global uncertainty. SMEs are required not only to survive financially but also to adapt to sustainable principles. In this context, the concept of green accounting becomes relevant as an approach that can help SMEs integrate economic and environmental aspects into decision-making. However, limited capacity and resources make implementing this concept a significant challenge, requiring support from various parties, including the government and other stakeholders.

Facing the dual pressures of soaring production costs and growing awareness of the environmental crisis, SMEs are beginning to transform through various innovative adaptation strategies. These innovations serve not only as a short-term response to external pressures but also as an effort to build long-term business resilience. This change reflects a paradigm shift from mere survival to the creation of sustainable added value, both economically and environmentally.

One form of innovation widely implemented is the efficiency of raw material use, waste reduction, and the use of more environmentally friendly packaging alternatives. SMEs are starting to optimize production processes to minimize waste, for example through more precise production techniques or the reuse of remaining viable materials. Furthermore, waste reduction is a crucial focus, as unmanaged waste not only impacts the environment but also reflects cost inefficiencies. This approach aligns with the concept of a circular economy, which emphasizes resource efficiency through the principles of reduce, reuse, and recycle [8].

Furthermore, innovation is also evident in the use of more environmentally friendly packaging alternatives. As global pressure to reduce plastic waste increases, SMEs are turning to materials such as biodegradable materials, recycled paper, or natural fiber-based packaging. Furthermore, innovations in sustainable packaging, such as biodegradable materials and smart packaging, are also emerging as alternatives to conventional plastics [10]. These innovations demonstrate that sustainability can go hand in hand with improving product quality.

Research by Oliveira et al. (2025) also shows that circular economy-based packaging innovations can reduce waste and improve supply chain efficiency. However, the implementation of these innovations still faces obstacles such as high costs, technological limitations, and limited access to alternative materials. This suggests that while innovation is a solution, its implementation in SMEs still requires external support [11].

In the context of cost pressures caused by rising plastic prices and sustainability demands, green accounting is a strategic approach to helping SMEs manage environmental costs more comprehensively. Green accounting enables businesses to not only record conventional costs but also identify and allocate environmental costs such as waste management, raw material use, and energy efficiency as part of operational costs. This approach provides more comprehensive information for decision-making, especially in the face of significant increases in raw material costs.

The rise in plastic prices, which has led to increased production costs, demonstrates the need for more adaptive cost control systems for SMEs. In this regard, green accounting serves as a tool to identify hidden efficiency potential, such as reducing plastic use, optimizing production processes, and reusing waste. Thus, green accounting serves not only as a record-keeping tool but also as an instrument for improving cost efficiency and reducing dependence on fossil-based raw materials.

Research by Depi & Utami (2025) shows that the implementation of green accounting significantly impacts a company's financial performance, particularly in

improving operational efficiency and cost transparency [12]. This suggests that integrating environmental aspects into accounting systems can provide added economic value for businesses. Furthermore, research by Appiah-Kubi et al. (2024) confirms that sustainability practices and environmental reporting contribute to increasing the competitiveness of SMEs in a market that increasingly prioritizes environmental aspects [13].

However, the implementation of green accounting in SMEs still faces various limitations. Research by Lolan et al. (2024) shows that most SMEs are only somewhat aware of environmental issues but are unable to systematically record environmental costs [14]. This is reinforced by Arofah et al. (2025) who stated that environmental cost accountability in SMEs is still low, resulting in suboptimal information for supporting decision-making [15].

Furthermore, the application of environmental management accounting has been shown to improve strategic resilience and business sustainability, particularly in the face of cost pressures and economic uncertainty. This approach enables companies to more systematically integrate environmental aspects into their business strategies, thereby increasing efficiency and strengthening business resilience. Thus, green accounting serves not only as a reporting tool but also as a strategic instrument to help SMEs cope with the pressure of rising raw material prices. Through the application of green accounting, SMEs can improve cost efficiency, strengthen financial resilience, and support sustainable business practices amidst global economic dynamics.

Discussion

The escalation in global oil prices, which has led to rising plastic prices, not only impacts SMEs production costs but also creates the need for a more comprehensive cost management system. In this context, green accounting is a relevant approach for integrating economic and environmental aspects into decision-making. The rising cost of plastic raw materials indicates that most SMEs still focus on conventional costs without considering environmental efficiency as part of their cost-control strategy. From a green accounting perspective, costs arising from the use of plastic raw materials are not limited to purchasing costs but also include environmental costs such as waste management and long-term ecological impacts. However, research results show that SMEs tend not to systematically identify and record these environmental costs. This is in line with research by Lolan et al. (2024) which states that the implementation of green accounting in SMEs is still limited to awareness, not integrated recording practices.

Furthermore, rising plastic prices can actually provide momentum for SMEs to adopt green accounting as a cost-control tool. By identifying environmental costs, businesses can identify potential efficiencies, such as reducing the use of plastic raw materials, optimizing production processes, and utilizing more environmentally friendly alternative materials. Research by Depi and Utami (2025) shows that implementing green accounting has a positive impact on financial performance because it can increase cost efficiency and transparency. Furthermore, the implementation of green accounting is also closely related to the concepts of sustainability and the circular economy. Under cost

pressures, SMEs that are able to integrate the principles of reduce, reuse, and recycle can not only reduce production costs but also increase product added value. Research by Chakraborty et al. (2025) confirms that circular economy practices can increase resource efficiency while reducing dependence on fossil-based raw materials.

However, the implementation of green accounting in SMEs still faces various challenges, such as limited human resources, lack of technical understanding, and the absence of simple and applicable reporting standards for small businesses. Research by Arofah et al. (2025) also shows that environmental cost accountability in SMEs is still low, so the resulting information cannot be used optimally in decision-making. Therefore, green accounting functions not only as a reporting tool, but also as a strategic instrument in improving cost efficiency and financial resilience of SMEs amid fluctuating global raw material prices. Therefore, support from the government and related institutions is needed in the form of education, regulations, and the provision of simple implementation guidelines so that green accounting can be implemented more widely by SMEs.

CONCLUSION

Fundamental Finding: This study shows that rising global oil prices have significant implications for the price of plastic raw materials, which in turn increases production costs (COGS) and suppresses SMEs profitability. The inability of SMEs to adjust selling prices proportionally leads to cost pressure, which leads to declining profit margins and weakening financial performance. This situation confirms that SMEs are highly sensitive to fluctuations in energy-based raw material prices. **Implication:** Furthermore, this study confirms that green accounting plays a strategic role in helping SMEs manage cost pressures by identifying and controlling environmental costs. The implementation of green accounting not only contributes to increased cost efficiency but also strengthens financial resilience and supports sustainable business practices. Thus, green accounting can be positioned as a relevant approach in addressing the economic and environmental challenges faced by SMEs. **Limitation:** However, this study has limitations because it used a literature review method without involving direct empirical data from SMEs, so the results obtained are conceptual in nature. Furthermore, the limited quantity and variety of literature can also affect the depth of analysis. **Future Research:** Therefore, further research is recommended to use a quantitative or mixed methods approach with primary data to empirically test the relationship between plastic price increases, production costs, and the implementation of green accounting. Future research can also explore simpler and more applicable green accounting implementation models for SMEs, thereby increasing their adoption and effectiveness in business practices.

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