



From Crude Palm oil to Chocolate: The Future of Indonesia's Cocoa Plantations by Analysis of International Chocolate Prices on the Increase in Indonesian Chocolate Production Volume

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Indonesia's cocoa sector has fallen behind other major producers like Côte d'Ivoire and Ghana. The volatility of global chocolate prices is a crucial factor of cocoa production in emerging economies. To resolve this issue, it is essential to analyse global chocolate pricing. This study aims to investigate the influence of perceived international chocolate price trends on cocoa production volume, as well as the mediating effect of cocoa farmers' investment plans. Primary data were obtained from Indonesian cocoa producers through a questionnaire survey, yielding 333 valid replies. The answers were analysed by structural equation modelling. The study's findings emphasised the beneficial impact of perceived international chocolate price trends on cocoa output volume, mediated via cocoa farmers' investment intentions. This study also identified the moderating influence of government agricultural support, a factor overlooked in prior research. The study's findings indicated that governmental agricultural support can enhance the correlation between perceived international chocolate price trends and cocoa output volume. These results are crucial for Indonesian cocoa production and beneficial for strategically expanding the agricultural export base and enhancing its participation in the global cocoa market.

1. Introduction

Indonesia, historically recognised as one of the foremost producers of crude palm oil (Bantacut, Romli, & Nasution, 2025; Pasaribu, Chen, & Ma'ruf, 2025), is progressively establishing itself as a significant contributor to cocoa production in response to the escalating global demand for chocolate. Nevertheless, the nation's cocoa industry has fallen behind other leading producers such as Côte d'Ivoire and Ghana. A major

element affecting cocoa production in underdeveloped economies is the volatility of international chocolate prices (Staritz et al., 2022), which mirror global demand and supply chain dynamics. The price of this product is significantly correlated with production in the Indonesian environment. In recent years, chocolate prices have surged significantly due to changing consumer preferences, supply limitations, and inflationary pressures in global markets. The anticipated price fluctuations will have substantial consequences

for upstream players, especially cocoa farmers in underdeveloped nations like Indonesia. Indonesia is among the leading cocoa-producing countries, with other nations, as illustrated in Figure 1.

Indonesia has become a significant participant in the global cocoa industry during the past few decades. In 2023, the nation produced 641,741 tonnes of cocoa, with exports amounting to \$47 million. Presently, around 31,000 farmers plant cocoa beans under the Cocoa Life program, established in the country since 2013.

The predominant manufacturing occurs in five key regions: Sulawesi, North Sumatra, West Java, Papua, and East Kalimantan. Indonesia commenced industrial cocoa production in the 1970s; hence, a deficiency in expertise relative to more experienced nations persists as a worry. Nevertheless, as cocoa demand increases, the sector seems poised to address the difficulty, and the future outlook for the Indonesian market is expected to enhance gradually. Analysts predict that Indonesia will yield 836,000 metric tonnes of cocoa by 2026.



Figure 1: Top Cocoa Producing Countries.
Source: WorldAtlas

Cocoa farming is a significant agricultural endeavour (Boateng et al., 2023) that encompasses the harvesting, fermenting, drying, and processing of cocoa beans, which are then utilised to produce chocolate and other cocoa products. Despite the significant relevance of cocoa farming (Rojas-Briceño et al., 2022), empirical research examining the impact of perceptions of international chocolate prices on production behaviour at the plantation level is scarce. Despite the significance of examining international chocolate prices, the existing literature is devoid of discourse on this subject. The challenges associated with international chocolate prices remain underexplored in the literature. It is uncertain whether Indonesian cocoa producers acknowledge these worldwide price trends. Conversely, it is essential to investigate whether this acknowledgement results in heightened investment intentions and augmented production capacity. The production volume is significantly correlated with the price of cocoa. Furthermore, cocoa producers

in Indonesia function within a multifaceted context (Idawati et al., 2024) where their investment choices are influenced not alone by market indicators but also by governmental agricultural assistance, including subsidies, training initiatives, and infrastructure enhancement. Consequently, in addition to the market signals that inform participants whether to purchase or divest a particular asset (Timmer, 1995), governmental agricultural support is the most crucial determinant for individuals to invest in cocoa production. Consequently, the moderating function of these institutional support systems is inadequately examined in the current literature.

Cocoa production has been the subject of numerous prior studies, addressing various elements within the literature. Nonetheless, the discourse regarding the issues addressed by the present study is significantly constrained in the literature. Consequently, although numerous studies have investigated cocoa production

through macroeconomic or secondary data (Onwumere et al., 2021; Quartey-Papafio, Javed, & Liu, 2020; Suh & Molua, 2022), a limited number have employed a micro-level, behavioural perspective based on primary data to examine the interplay of perceptions, attitudes, and support structures in influencing production outcomes. Consequently, a distinct vacuum in the literature has been identified, prompting the current study to examine investor intentions in cocoa production, as well as price and production volume. A distinct research gap exists in comprehending these relationships via robust analytical frameworks such as Partial Least Squares Structural Equation Modelling (PLS-SEM), which is adept at modelling latent variables and intricate interactions. The purpose of this study is to investigate the influence of perceived international chocolate price trends on cocoa production volume, as well as the mediating effect of cocoa farmers' investment intentions. This analysis also identified the moderating influence of government agricultural support, a factor overlooked by prior research.

2. Literature Review

2.1. Theoretical Foundation

The concept articulated in this study is based on the Theory of Planned Behaviour (TPB). The Theory of Planned Behaviour (TPB) is a psychological framework that forecasts individuals' actions based on their intentions, which are shaped by their attitudes, subjective standards, and perceived behavioural control (Ajzen, 1991; Jain et al., 2020). It suggests that a more positive attitude towards a behaviour, a stronger subjective norm endorsing it, and an increased perception of control over it correlate with a higher likelihood of intending to perform the behaviour, and consequently, executing it. The Theory of Planned Behaviour (TPB), formulated by Ajzen in 1991, offers a comprehensive theoretical framework for comprehending how individual perceptions, intentions, and environmental influences determine behavioural outcomes. It asserts that human activities are predominantly influenced by three elements: (1) Attitude towards the behaviour, (2) Subjective norms, and (3) Perceived behavioural control (Ajzen, 1991, 2020). Collectively, these factors shape behavioural intention, the most direct predictor of actual behaviour. It suggests that a more positive attitude towards a behaviour, a stronger subjective norm endorsing it, and an increased perception of control over it correlate with a higher likelihood of intending to perform the behaviour, hence increasing the probability of actual execution. This study investigates the impact of international chocolate pricing

on cocoa production volume in Indonesia. The Theory of Planned Behaviour provides a significant framework for elucidating farmers' decision-making and investing tendencies. The theoretical framework of the investigation is illustrated in Figure 1.

The Theory of Planned Behaviour emphasises that an individual's attitude towards a behaviour reflects their assessment of the anticipated outcomes (Ajzen, 2020; Nickerson, 2023)1975. In this study, perceived global chocolate prices act as an external market indicator that influences farmers' perceptions of cocoa production. External market signals possess the capacity to affect farmers' intentions towards increased production. When farmers observe escalating international chocolate prices, they may view it as an economic opportunity to enhance revenues by augmenting cocoa cultivation. All the farmers endeavour to seize this chance by enhancing production levels. This optimistic assessment of future profits cultivates a favourable disposition towards augmenting production, resulting in heightened investment intentions. Consequently, price perception functions as a cognitive impetus influencing behavioural intention, in alignment with the fundamental tenet of the Theory of Planned Behaviour (TPB). Thus, based on the TPB mechanism, investment intentions are associated with international chocolate prices.

Moreover, the Theory of Planned Behaviour asserts that behavioural intention is a key predictor of actual behaviour (de Leeuw et al., 2015; Nickerson, 2023). It denotes an individual's preparedness or intention to execute a specific action. The proposed model of this study anticipates that farmers' intentions to invest in cocoa (e.g., increasing tree planting, adopting improved methods, employing labour) will influence their actual production volume. Investment intention is correlated with cocoa output volume, as per the Theory of Planned Behaviour (TPB). The conversion of intention into behaviour relies on accessible resources, time, and situational factors; yet, intention continues to be a robust predictor. This study posits that elevated investment intentions, driven by perceived market incentives, will lead to an augmentation in cocoa production. It quantifies the probability of an individual's actions. In behavioural research, it is considered a significant predictor of actual behaviour, reflecting the drive or inclination to perform a specific action.

The Theory of Planned Behaviour (TPB) incorporates perceived behavioural control (PBC) as a variable that influences the intensity of intention and the probability

of behaviour execution. In the agricultural environment, this pertains to the degree to which farmers see their ability to act on their goals, contingent upon the presence or absence of enabling conditions. This study explores the intriguing relationship between TPB and perceived behavioural control (PBC) in the context of examining the influence of international prices on cocoa output in Indonesia. This study examines government agricultural support, encompassing various subsidies, training, loan programs, and infrastructure, which represent institutional structures that enhance perceived behavioural control. This regulating mechanism may enhance or diminish the correlation between (i) perceived pricing and investment intention, and (ii) investment intention and actual production. The perceived capacity to translate intention into action has increased, remaining elevated due to government assistance that has fostered

output development.

Moreover, the Theory of Planned Behaviour elucidates both mediated and direct interactions. Consequently, the Theory of Planned Behaviour (TPB) was established to account for both direct and indirect interactions. The Theory of Planned Behaviour allows for direct impacts under certain conditions, outside the mediated link. In this instance, perceived global chocolate prices may directly affect production decisions, particularly among larger or more experienced farmers who respond promptly to market information without requiring an intermediary deliberation phase. Consequently, the Theory of Planned Behaviour elucidated how worldwide chocolate prices may directly influence production decisions among Indonesian farmers or cocoa producers. This pathway enhances the mediated structure and mirrors practical reality.

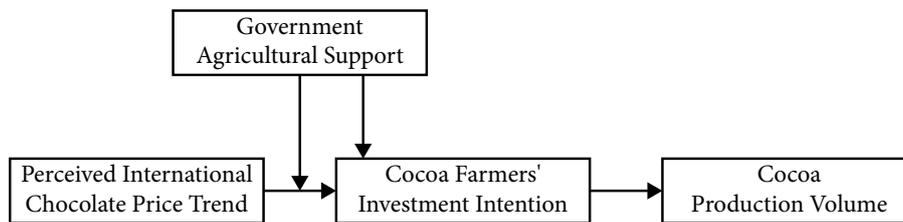


Figure 2: Theoretical Framework of the Study.

Source: Developed by the Author.

2.2. Perceived International Chocolate Price Trend and Cocoa Production Volume

The global cocoa sector is profoundly affected by fluctuations in international chocolate prices, which act as critical market indicators for producers in underdeveloped nations (Sharkova & Sycheva, 2021). In Indonesia, where cocoa cultivation is predominantly small-scale and responsive to market fluctuations, farmers’ awareness of global chocolate price trends significantly influences their production practices. The worldwide cocoa industry constitutes a significant agricultural sector with substantial ramifications for both producing and consuming nations. West Africa is the predominant region for production, with Côte d’Ivoire and Ghana in the forefront, while Indonesia and Ecuador also provide significant quantities. When farmers observe a rise in worldwide chocolate prices, it triggers a sequence of economic incentives, behavioural adjustments, and strategic investments, finally resulting in an increase in cocoa production volume.

The industry is marked by variable production influenced by elements such as climate and disease, which impact global price and the livelihoods of farmers.

Notwithstanding these challenges, cocoa continues to be a significant commodity, with a global valuation estimated between \$8 billion and \$10 billion annually. Initially, perceived price movements affect farmers’ profitability expectations (Fudjaja et al., 2024). Rising international chocolate prices indicate heightened demand for cocoa beans, the essential raw material in chocolate manufacturing. Although cocoa bean prices may not be increasing immediately at the local level, producers cognisant of these developments sometimes perceive them as prospective profit prospects. This prompted the farmers to focus their intentions on production volume. This perspective motivates them to contemplate the expansion of their cocoa farming enterprises, allocating additional area for cocoa cultivation and implementing improved agricultural practices to increase productivity. Secondly, the notion of rising prices enhances farmers’ investment intentions (Ilyas et al., 2021), which are essential antecedents to heightened production. Agriculturists may allocate resources towards premium seedlings, fertilisers, and pest management to enhance yield. Consumers’ perceptions of price escalations are intricate and shaped by numerous aspects, including the extent of the increase, the rationale behind it, and the consumer’s prior experiences with the product or

brand. Some may contemplate intercropping methods or reallocating resources from less lucrative crops to cocoa.

Moreover, perceived patterns in chocolate pricing can stimulate entrepreneurial risk-taking behaviour, especially among cocoa farmers who are more market-savvy or commercially inclined. An upward trend in prices enhances confidence in the sustainability of cocoa growing as a viable income-generating endeavour. Consequently, fluctuations in income resulting from alterations in international prices influence cocoa producers' production behaviour. This confidence may result in decisions to enter the cocoa industry for the first time or to expand current operations. A price increase may be perceived positively as a sign of quality or value, or negatively as unfair or excessive (Fuss & Vermeulen, 2008). Comprehending these perceptions is essential for companies to effectively navigate price increases and uphold customer trust. A favourable assessment of international market circumstances might stimulate collective action, including participation in cooperatives or engagement in training programs designed to enhance industrial efficiency. Collective responses diminish input costs, enhance access to capital, and generate economies of scale, all of which augment production capacity. According to the literature, price perception has the power to alter behaviour (Renwick, 1968). Ultimately, when the perception of global chocolate price trends coincides with favourable government policies or export prospects, the impetus to increase cocoa production is significantly heightened. For instance, price perception may influence farmers to respond more decisively to government extension services, certification programs, and collaboration proposals from global chocolate corporations aiming to secure sustainable supply chains.

Hypothesis 1: The perceived international chocolate price trend can influence cocoa production volume.

2.3. Perceived International Chocolate Price Trend and Cocoa Farmers' Investment Intention

This study examined the influence of international chocolate price trends on the investment intentions of farmers in Indonesia. The proposed concept posits that international chocolate prices affect investment decisions in cocoa. The conduct of agricultural producers is significantly influenced by market views (Opara, 2000), especially in commodity-driven industries such as cocoa. In Indonesia's agricultural sector, where cocoa is an emerging commodity, farmers' perceptions about worldwide chocolate price trends considerably impact their decision-making. When cocoa producers recognise

an increase in international chocolate prices, this positive market perspective motivates them to enhance their investment intentions in cocoa cultivation.

The escalation of prices on a worldwide scale signifies a growth in demand for associated products, which influences investment intentions. The foundation of this connection is the idea of economic rationality, wherein farmers seek to optimise returns on their land, labour, and resources. Economic rationality posits that individuals and firms make decisions aimed at maximising their own well-being or profits (Le Menestrel, 2002). Consequently, escalating chocolate prices worldwide are typically regarded as a sign of heightened demand for cocoa beans, the fundamental raw material in chocolate manufacturing. Although local cocoa prices may not instantly mirror international fluctuations, astute farmers typically foresee that global market trends would ultimately affect domestic pricing, resulting in improved income opportunities. This expectation bolsters farmers' perceived profitability, a crucial incentive for investment.

This impression influences farmers' attitudes, a key component of the Theory of Planned Behaviour (TPB). A favourable disposition towards cocoa cultivation, influenced by anticipated global price escalations, leads to an enhanced readiness to invest. Investment can manifest in several ways: procuring superior seedlings, utilising fertilisers and pesticides, obtaining irrigation equipment, or implementing enhanced agricultural practices. These investments are not arbitrary; they are a strategic response to what farmers perceive as a market opportunity. The reported increase in chocolate prices bolsters confidence and optimism among cocoa farmers. This psychological enhancement diminishes reluctance and risk aversion (Aren & Nayman Hamamci, 2020), especially in smallholder farming communities where investment choices are frequently cautious and limited by uncertainty. Moreover, it is noted that millions of cocoa growers labour intensely under arduous conditions, yet fail to get a sustainable income. Optimism stemming from favourable pricing perceptions can motivate farmers to invest additional resources in cocoa instead of alternative crops or to resume cocoa production after prior abandonment due to unfavourable market conditions. Positive price perceptions are crucial in influencing their investment intentions in cocoa. This study emphasised the impact of worldwide price fluctuations on the investment intentions of Indonesian cocoa growers.

Similarly, the notion of global pricing trends frequently stimulates long-term considerations (Greitemeyer et

al., 2005). The farmers' understanding of worldwide price trends is crucial since it informs their long-term investment strategies. Cocoa trees require time to mature and produce, hence a choice to engage in cocoa farming necessitates farmers' confidence that present favourable trends will continue or at least stabilise. When farmers recognise a surge in chocolate demand driven by global consumption trends, such as the increasing demand in developing markets or the premiumization of chocolate products, they are more inclined to view cocoa farming as a sustainable and lucrative investment over time. Typically, robust earnings lead to an appreciation in stock prices, enabling cocoa investors to advocate for their investment prospects and enhance growth alongside rising production volumes. This relationship is significantly affected by access to market information. Farmers having enhanced access to market data via cooperatives, extension services, or internet platforms are more inclined to accurately discern international chocolate price patterns. Their investing intents are thus more congruent with global market realities, rendering them both responsive and proactive.

Hypothesis 2: The perceived international chocolate price trend can influence cocoa farmers' investment intention.

2.4. Mediating role of Farmers' Investment Intention between Perceived International Chocolate Price Trend and Cocoa Production Volume

The investment intentions of cocoa farmers are crucial for increasing cocoa production, especially in a market-sensitive sector such as cocoa cultivation. The intention to invest may significantly impact cocoa output volume in Indonesia, however it has been infrequently examined in the literature. Investment intentions are influenced by motivating factors and the investor's endeavours to act (Kim et al., 2021; Kim, Lee, & Kim, 2023; Schlosser, White, & Lloyd, 2006; Shim, Lee, & Kim, 2008). The term 'investment purpose' denotes the rationale underlying an investor's decision to allocate funds (Kim et al., 2021). Investment intention signifies a farmer's dedication to deploy resources—such as time, capital, land, and labor—toward cocoa cultivation endeavours. When farmers have robust investment plans, they are more inclined to employ enhanced agricultural techniques, increase cultivated areas, and elevate their inputs (e.g., utilising superior seedlings or fertilisers). These methods directly enhance yields and thus augment the overall cocoa production volume.

The perceived price trend indirectly influences output volume (Greitemeyer et al., 2005) by altering farmers'

investment incentives, which impacts overall production levels. The mediating pathway is crucial in emerging agricultural economies such as Indonesia, where production responses to market signals are not consistently prompt. This study examined the mediating effect of farmers' investment intention on the relationship between perceived worldwide chocolate price trends and cocoa output volume. Farmers' choices are frequently limited by the availability of resources and their perceptions of danger. Thus, investment intention serves as a conduit between market awareness and concrete behavioural results. This mediating effect has not been explored in the literature, particularly for cocoa output volume. Enhancing farmers' desire to invest via market transparency, training, or finance access can magnify the beneficial impact of global market trends on national productivity. Ultimately, investment intention not only directly influences cocoa production volume but also serves as a crucial mediating variable that allows perceived international chocolate prices to affect production outcomes in a systematic and behaviourally informed manner. As a result, the above debate leads to the following ideas regarding direct and indirect effects:

Hypothesis 3: Cocoa farmers' investment intention can influence cocoa production volume.

Hypothesis 4: Cocoa farmers' investment intention mediates the relationship between perceived international chocolate price trend and cocoa production volume.

2.5. Moderating role of Government Agricultural Support

This study introduced a distinctive moderating impact of government agricultural support in the relationship between perceived international chocolate price trends and farmers' investment intentions, a topic not previously explored in the literature. The government's agricultural support plays a vital role in enhancing the relationship between This study posits a correlation between perceived international chocolate price trends and farmers' investment intentions. The government's agricultural support is evaluated concerning Indonesian cocoa farmers. Although increasing global chocolate prices may enhance farmers' views on profitability (Adefemi, 2019), their ability to act on this perception frequently relies on the presence of institutional assistance. Government assistance via subsidies, training initiatives, loan accessibility, and infrastructure enhances farmers' confidence and investment capacity. Despite the considerable literature examining cocoa production globally, the moderating function of government support

remains infrequently addressed (Parra-Paitan & Verburg, 2022; Salcedo-Puerto, Mendoza-Martinez, & Vakkilainen, 2025; Yalu & Matous, 2024). Without governmental assistance, farmers may be reluctant to allocate resources despite advantageous market trends due to perceived dangers, restricted access to financing, or technical obstacles. Consequently, this resulted in a reduction in investment in diverse cocoa production opportunities, thereby diminishing the national production volume. Conversely, when governmental assistance is robust, farmers are more inclined to regard cocoa growing as a feasible and low-risk business, hence enhancing the influence of anticipated market opportunities. Consequently, governmental agricultural support mitigates this relationship by transforming passive optimism into proactive investment behaviour, ensuring that market signals effectively translate into tangible production responses. Consequently, the following theories are presented based on the above discussion:

Hypothesis 5: Government agricultural support can influence cocoa farmers’ investment intentions.

Hypothesis 6: Government agricultural support moderates the relationship between perceived international chocolate price trend and cocoa farmers’ investment intentions.

3. Methodology

3.1. Research Design

This study investigated the correlation among perceived international chocolate price trends, farmers’ investment intentions, government agricultural support, and cocoa

output volume within the Indonesian setting. This association was analysed employing a quantitative research methodology. Primary data were collected from respondents to analyse the relationship between the proposed variables. This study employed a cross-sectional research design, a widely utilised quantitative research strategy in numerous prior studies on agricultural production. A questionnaire was devised to gather primary data from Indonesian farmers, assessing each variable.

3.2. Questionnaire Development

Notwithstanding the comprehensive investigations conducted by various researchers on international chocolate pricing, agricultural growth, and crude palm oil, appropriate questionnaires were lacking to assess perceived trends in international chocolate prices, farmers’ investment intentions, governmental agricultural support, and cocoa production volumes, particularly to achieve the study’s objectives. Consequently, this study opted to create a new questionnaire. All scale items utilised for data collection are presented in Table 1. The perceived trend of worldwide chocolate prices was assessed using five scale items derived from farmers’ perceptions of global chocolate price escalations. The investment intention of farmers was assessed through their willingness to invest in cocoa farming using a five-point scale. Cocoa production volume was assessed using five scale items based on self-reported increases in production or intentions to augment output. Ultimately, the assessment of government agricultural support was conducted through five scale items, emphasising perceived institutional support from the government.

Table 1: Questionnaire Items.

Variable	Items
Perceived International Chocolate Price Trend	<ol style="list-style-type: none"> 1. I believe international chocolate prices have been increasing recently. 2. Rising chocolate prices in global markets will benefit cocoa producers like me. 3. I follow international chocolate price trends to guide my farming decisions. 4. I think cocoa will become more profitable due to higher global chocolate prices. 5. I expect international chocolate prices to continue increasing soon.
Farmers’ Investment Intention	<ol style="list-style-type: none"> 1. I intend to invest more money in my cocoa farming activities this year. 2. I plan to expand the area under cocoa cultivation on my farm. 3. I am willing to purchase better inputs (seeds, fertilizers) for cocoa production. 4. I intend to adopt modern farming techniques to improve cocoa yield. 5. I am planning to increase my overall investment in cocoa over the next year.
Cocoa Production Volume	<ol style="list-style-type: none"> 1. My cocoa production volume has increased over the past year. 2. I expect my cocoa production to increase in the coming year. 3. I am producing more cocoa now than I did in previous years. 4. I aim to increase my cocoa output in response to market demand. 5. I believe my current investments will result in higher cocoa production.
Government Agricultural Support	<ol style="list-style-type: none"> 1. The government provides adequate support for cocoa farmers like me. 2. I have access to government subsidies or financial assistance for cocoa farming. 3. Training and extension services from the government are available for cocoa farmers. 4. I feel that government policies are favorable to cocoa production. 5. Government-provided infrastructure (e.g., roads, storage) helps me manage my cocoa farm better.

Source: Developed by the Author

3.3. Population, Sampling and Data Collection

The study’s target group consists of cocoa farmers in prominent cocoa-producing regions of Indonesia, including Sulawesi, Sumatra, and Papua. This study picked Sulawesi, Sumatra, and Papua due of their substantial cocoa production. Sulawesi, Sumatra, and Papua are prominent cocoa-producing areas in Indonesia. Sulawesi is the predominant producer, succeeded by Sumatra, with Papua also playing a role in Indonesia’s total cocoa output. This study exclusively selected farmers directly engaged in cocoa farming who possess the capability to respond to fluctuations in market trends about pricing. A purposeful sample method was utilised to choose participants with experience in cocoa growing and knowledge of market dynamics. Purposive sampling, or judgmental/selective sampling, is a non-probability sampling technique wherein researchers pick participants based on certain characteristics or criteria pertinent to the study topic. This is a methodological approach employed in research to get insights from persons possessing specialised knowledge, experiences, or perspectives on the pertinent subject (Auerswald et al., 2004). A total of 500 questionnaires were disseminated to farmers in Sulawesi, Sumatra, and Papua, Indonesia. Of the distributed questionnaires, 340 were returned, while 7 were excluded for various reasons. Consequently, 333 questionnaires were employed to fulfil the study’s purpose.

4. Findings

The demographic profile of responders indicated that the majority were aged between 40 and 50 years. Consequently, about 60% of the participants are aged between 40 and 50. In a similar vein, 81% of respondents were identified as married, while 21% were classified as unmarried. Furthermore, the majority of responders, around 86%, were male, while only 14% were female. Moreover, nearly 41% of the respondents possessed bachelor’s degrees.

Table 2: Factor Loading, Composite Reliability, Cronbach Alpha and AVE.

Variable	Item	Loading	Cronbach Alpha	Composite Reliability	AVE
Perceived International Chocolate Price Trend	CPV1	0.85	0.87	0.912	0.721
	CPV2	0.89			
	CPV3	0.891			
	CPV4	0.851			
	CPV5	0.828			
Farmers’ Investment Intention	FII1	0.901	0.949	0.961	0.83
	FII2	0.922			
	FII3	0.926			
	FII4	0.91			
	FII5	0.897			
Cocoa Production Volume	GAS1	0.825	0.913	0.935	0.743
	GAS2	0.709			
	GAS3	0.722			
	GAS4	0.891			
	GAS5	0.878			
Government Agricultural Support	PICPT2	0.852	0.867	0.903	0.654
	PICPT3	0.781			
	PICPT4	0.889			
	PICPT5	0.871			

This study utilised Structural Equation Modelling (SEM) to analyse the relationship among perceived international chocolate price trends, farmers’ investment intentions, government agricultural subsidies, and cocoa output volume. Structural Equation Modelling (SEM) is an advanced statistical method for analysing intricate relationships among variables, encompassing both latent (observable and unobservable) variables (Hair & Sarstedt, 2019; Henseler & Chin, 2010). It integrates factor analysis and multiple regression approaches, enabling researchers to assess and formulate theoretical models based on their alignment with observable data. This study initially assessed factor loading in SEM, which must exceed 0.5 (Anwer et al., 2021). Table 2 indicates that all scale items have factor loadings over 0.7. The reliability of constructs was assessed using composite reliability and Cronbach’s alpha. Both measurements attained a minimal reliability threshold of 0.7. The average variance extracted (AVE) exceeded 0.5. All these values validated convergent validity. Table 3 illustrates discriminant validity through the HTMT0.9 ratio.

Table 3: Discriminant Validity.

	Cocoa Production Volume	Farmers’ Investment Intention	Government Agricultural Support	Perceived International Chocolate Price Trend
Cocoa Production Volume				
Farmers’ Investment Intention	0.84			
Government Agricultural Support	0.871	0.883		
Perceived International Chocolate Price Trend	0.707	0.605	0.65	

The correlation among perceived international chocolate price trends, farmers’ investment intentions, governmental agricultural support, and cocoa

production volume was analysed using Structural Equation Modelling (SEM), with results presented in Table 4. The SEM methodology utilised to analyse this

association is illustrated in Figure 3. Six hypotheses were evaluated, with a minimal significance threshold for the t-value set at 1.96. All hypotheses possess a t-value over 1.96, thereby confirming their significance. The mediating influence of farmers' investment intention was shown to be substantial between the perceived

trend of international chocolate prices and cocoa output volume. Furthermore, Figure 4 illustrated that government agricultural support, as a moderating variable, enhances the positive correlation between perceived worldwide chocolate price trends and farmers' investment intentions.

Table 4: Results.

Effect	Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Direct Effect	Farmers' Investment Intention -> Cocoa Production Volume	0.626	0.624	0.039	16.17	0
Direct Effect	Government Agricultural Support -> Farmers' Investment Intention	0.76	0.762	0.039	19.684	0
Moderation Effect	Moderating Effect -> Farmers' Investment Intention	0.021	0.002	0.006	3.489	0.001
Direct Effect	Perceived International Chocolate Price Trend -> Cocoa Production Volume	0.289	0.289	0.047	6.109	0
Direct Effect	Perceived International Chocolate Price Trend -> Farmers' Investment Intention	0.113	0.113	0.045	2.544	0.011
In-Direct Effect	Perceived International Chocolate Price Trend -> Farmers' Investment Intention -> Cocoa Production Volume	0.071	0.071	0.028	2.506	0.013

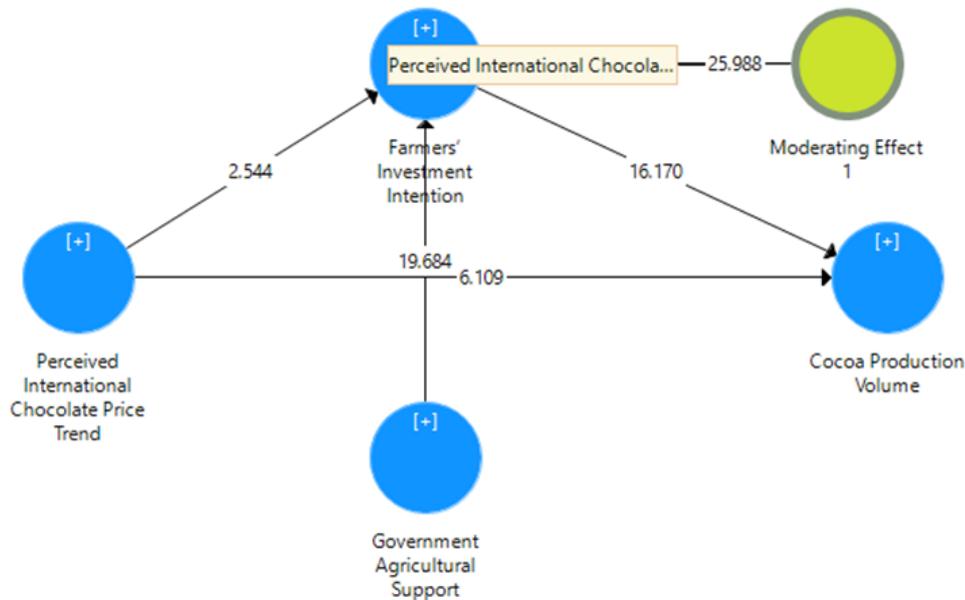


Figure 3: Study Model showing Significance Value.

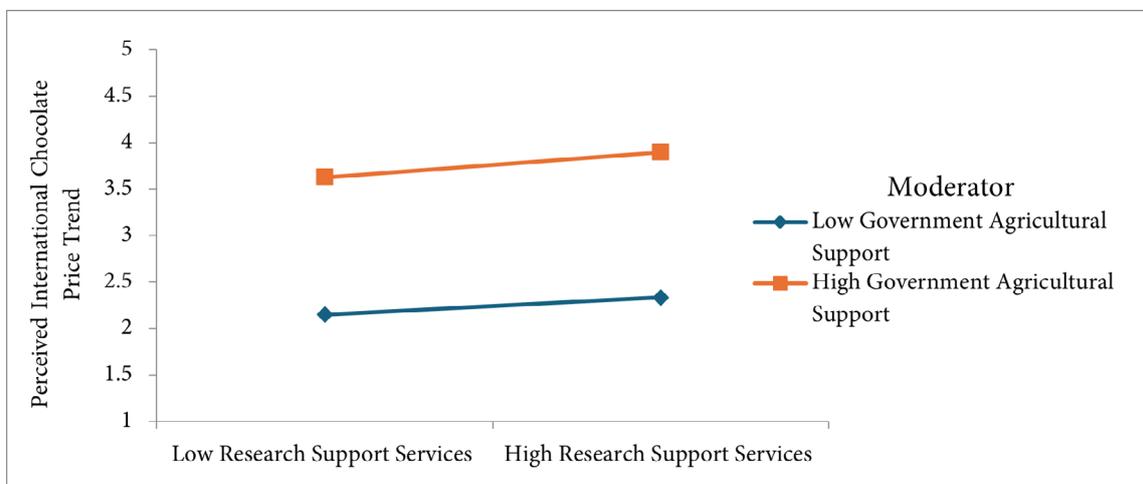


Figure 4: Moderating Effect.

5. Discussion and Conclusion

The cocoa sector in Indonesia has fallen behind major producers like Côte d'Ivoire and Ghana. The fluctuation

of global chocolate prices is a critical determinant affecting cocoa production in emerging economies. This study aimed to investigate the influence of perceived international chocolate price trends on cocoa production

volume, as well as the mediating effect of cocoa farmers' investment intentions. The objective was accomplished by analysing the correlation among the perceived international chocolate price trend, farmers' investment intentions, government agricultural support, and cocoa production volume. Six hypotheses were formulated, comprising four direct effect hypotheses, one indirect effect hypothesis, and one moderating effect hypothesis.

The findings of hypotheses 1 and 2 indicated that the perceived trend in international chocolate prices positively influences farmers' investment intentions and cocoa output volumes. Consistent with the present analysis, prior research has also demonstrated the correlation between international commodity prices and investment intentions (Huawei, 2022; Irwin, 2013). Consequently, fluctuations in commodity prices significantly impact the investment decisions of individuals within the agricultural sector. Investment decisions are frequently influenced by an optimistic market perspective, based on the conviction that rising global prices would ultimately yield enhanced returns. Ultimately, these investments lead to enhanced production volume, either by augmenting yield per hectare or by expanding cultivated areas. The observed tendency of increasing international chocolate prices (Sepúlveda et al., 2022) serves as a significant psychological and economic impetus for cocoa farmers in Indonesia. It augments cocoa production volume by fostering investment intentions, encouraging risk-taking behaviour, facilitating strategic agricultural decisions, and promoting participation with support mechanisms. The alterations, albeit influenced by perception, yield measurable enhancements in both the amount and quality of cocoa beans produced nationally. Consequently, comprehending and utilising farmers' perceptions of market trends is crucial for policymakers and industry players seeking to enhance Indonesian cocoa production in alignment with global market prospects.

Furthermore, the findings of hypothesis 3 indicated that cocoa farmers' investment intentions positively affect cocoa production volume. An increase in the investment intentions of cocoa farmers can enhance cocoa output volume in Indonesia. Consistent with the present study, prior research has also established a correlation between investment intention and agricultural productivity (Elfahmi et al., 2021; Lou, 2024). Moreover, hypothesis 4 emphasised that farmer investment intentions mediate the impact of international price trends on cocoa output volume. Investment intent is a crucial behavioural process that converts market perceptions into tangible production outcomes. It facilitates the relationship between the observed trend in global chocolate prices and the quantity

of cocoa production. Farmers perceive a rise in global chocolate prices as an indicator of impending profitability and escalating demand for cocoa beans. This impression will not enhance production unless it is accompanied by a conscious decision to engage in agricultural endeavours.

Moreover, hypothesis 5 underscores the beneficial impact of government agricultural subsidies on farmers' investment intentions. Literature indicates that government engagement in agriculture results in increased investment (Gurnovich et al., 2021). Hypothesis 6 posits that government backing enhances the favourable influence of international price trends on investment intentions. Consequently, when cocoa farmers recognise a positive trend in global chocolate prices, they are more likely to invest in local cocoa plantations. This heightened investment intention is based on anticipated profitability, enhanced perceptions of cocoa cultivation, increased confidence in future returns, and a readiness to allocate resources for long-term benefits. Acknowledging and bolstering the connection between perception and behaviour will assist policymakers and agribusiness stakeholders in fostering investment in the Indonesian cocoa sector, hence improving productivity and global competitiveness.

5.1. Implications of the Study

This study enhanced the literature and practice by elucidating the links among perceived worldwide pricing trends, investment intentions, production volume, and governmental agricultural support. The examination of the influence of perceived international chocolate prices is crucial for Indonesian cocoa production. Considering Indonesia's strategic objective to diversify its agricultural exports and enhance its participation in the global cocoa market, it is essential to examine the impact of international chocolate pricing on cocoa production volume via farmer-level behavioural mechanisms. Consequently, to augment their stake in the worldwide cocoa market, it is vital for investors to examine foreign prices. Thus, the results of this study are anticipated to provide pragmatic insights for policymakers, agricultural stakeholders, and international purchasers aimed at ensuring sustainable cocoa supply chains. The findings of the current study may significantly improve cocoa production in Indonesia.

6. Limitations and Future Directions

This study examined the significant association between perceived international price trends and cocoa production

volume, which plays a crucial role; however, it has certain limitations that may indicate potential future research topics. Initially, all variables pertinent to this study, including cocoa production volume, were assessed using self-reported responses, which may be susceptible to response bias or social desirability influences. Consequently, subsequent research should use secondary data and comprehensive interviews to substantiate the findings and enhance the degree of uniqueness. The sample is confined to specific cocoa-producing locations in Indonesia, perhaps limiting the generalisability of the findings to all cocoa producers nationally or in other cocoa-producing nations. This study is confined to three regions: Sulawesi, Sumatra, and Papua; hence, future research should encompass additional regions. This study examined price trends; however, it did not address external factors affecting cocoa prices and output, which should be included in future research.

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