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The Impact of Economic Uncertainty on Food Security and the Role of Business Openness as a Moderating Factor in Indonesia's Economic Development

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Abstract

The economic uncertainty experienced by developing countries like Indonesia has the potential to disrupt food security, which is an essential element for social and economic stability. Changes in the international economic environment, such as inflation, fluctuation in exchange rates, and variations in international policies can often have an impact on supply or availability of food. But it is under these circumstances that business openness must function as an instrument of moderation in increasing uncertainty for food security. As a result, this research attempts to discuss the relationship between economic uncertainty and food security in Indonesia, and how business openness serves to amplify or dampen the effects of economic uncertainty on food production. Panel data from the years 2019 to 2024 is used cm this analysis. The findings bring out that business openness has a positive effect on food security, while economic uncertainty has a negative one. Meanwhile, interaction between economic uncertainty and business openness suggests that the more open an economy is economically, the less negative will be its weight on food production. It underscores the importance of policies combining good with global integration to the domestic food sector, if food security in Indonesia is to be secure in the face of global economic uncertainty that unsettles everything.

Keywords:
Economic Uncertainty; Food Security; Business Openness; Economic Development; Indonesia.

1. INTRODUCTION

Economic uncertainty is now a serious problem in developing countries that are still relying on stability of its macroeconomic sector to sustain development. Sharp change in inflation, exchange rates and global policies can triggers pressure directly on the availability and cost of food. Food security, the basis for community welfare, is liable to breaking-up amid uncertain economic conditions. Price fluctuations, deterioration in purchasing power and barriers to the distribution of needed goods are some risks that can occur in such circumstances. In a state of ongoing nearly unpredictable change, business activities that are open tend to have higher efficiency in the offers of technological adaptation and market integration. The notion that businesses more closely connected to international markets are in a better position to resist economic pressures is currently being tested. The role of business openness in promoting food security needs to be given a data-driven examination. This article will analyze the relationship between Indonesia's food security and economic uncertainty, paying particular attention to the influence on this by business openness as an intervening variable potentially weakens or strengthens impact of local economic conditions on long-run national food systems.

Indonesia is a country in which this notion is particularly central to its development prospects, especially among poorer nations. As Suryana (2014) observes, however, reaching sustainable food security by 2025 will bring with it certain serious challenges as Indonesia agriculture because of economic oscillation

and climatic change is particularly affected by such external factors. This may lead as a consequence to uncertainty, both inside and outside the country, in relation to food supply and distribution. Such uncertainty has obvious implications for the prosperity of local community. A study by Prabayanti (2022) showed that community welfare and government policy are critical to strengthen or weaken food security in Indonesian provincial settings. As an example, in central Java, policy supporting natural resource management and increased food production is very important for maintaining food security under economic uncertainty. Thus, the degree to which economic policies are maintained is crucial in securing regional food. The same factors affecting China's own economic fortunes also affect Indonesia and its ability to secure the wherewithal produc food. In Indonesia, prices are driven up as a result of changes in countries such as overtake others. Neighbouring countries' economic policies can lead drastically to what happens next here, and those affected subsequently in turn. It seems clear then that, if you want to improve food security at both the level of individual households and international markets open up business to a greater degree. This was the conclusion of a study conducted by Deswantoro et al. (2017) which concluded that policies promoting openness in markets will increase efficiency and permit more ready access for consumers to different kinds of food products without having any detrimental effects on levels of their security. It means that open markets in both business and exchanges of goods could promote Indonesian food security.

Succeeding in Indonesia's effort to have sustainable food security means not only is it up to food policy, but depends on many factors that ensure the overall national economy stability. Ramadhan and Setiadi (2019) find that improving both intangible capital and human resources is crucial to economic competitiveness. This work does well to strengthen food supply chains, and thus improve food security in Indonesia.Yet liberal trade can also threaten local food security in some respects. For example, Hardono, Saliem, and Suhartini (2016) warn that without the plan of protecting Indonesia 's own food industries even more, opening up all foreign markets could lead to increased import reliance for basic foods.Therefore, there must be a balance between openness of markets and protection for the domestic food sector in Indonesia.Dutton (1994) argues in addition that as we approach the year 2025 and need to fulfil these challenges which lie ahead for food security advancing policies in an integrated manner is necessary. This involves producing more food domestically, improving supply and more prudently managing natural resources. Ostwald (2000) prove that the local level policy of SDGs (Sustainable Development Goals) is on the ground can positively effect food security by empowering local communities and using natural resources more efficiently. Such policies also strengthen regional food security and are a useful example of how community-oriented should work to help stabilize the national food system.

Capital structure, a major factor affecting economic stability, can directly influence food security in Indonesia. If the capital structure is vigorous, then companies such as those in the food business tend to operate efficiently. In the growing and management of resources, relatively high managerial ownership is beneficial for the economic resistance of food fuels. With enough capital, companies in the food sector can weather a variety of challenges linked to economic instability. Likewise, such social values as religiosity can play an important part in resource management and make decisions that affect an economy. Arifin (2021) shows that religiosity can soften the stand of individuals towards natural resource management, which in turn concerns food security. Communities which value fairness and sustainability in their economic activities are naturally better at managing resources, and this helps ensure the continuous functioning of the domestic food system. It is also an important way to maintain economic stability to follow good business ethics. A company or business that emphasizes sustainable development principles is better positioned to survive in an era as uncertain as the current one. Responsible business practices also ensure that the food supply chain remains stable even when the global economic environment is volatile. On the one hand, the goal of food self-sufficiency, as proposed by Juansa et al. (2025), (is not just to reduce dependence on imports but has the potential to) will also drive the growth of Indonesia's economy. To realize self-sufficiency in food requires policies that will increase the output of domestic producers and natural resource-efficient management. Strengthening the food sector can be vital to maintaining economic stability in a world where uncertainty is growing. Akasyah et al. (2023) stresses the need for flexible policy strategies that involve various sectors. By integrating the food sector into overall economic policy, Indonesia can increase its economic strength and make the negative effects of global market fluctuations less harmful.

As the economic uncertainty continues, between national and local governments across Indonesia, coordinated policies have become more crucial than ever. The most important thing for us to do now is increase our domestic food output, make wise use of natural resources that are being over-exploited and support sustainable business activities. While returns can be higher with open markets and tie-ins to world markets, the importance of protective policies for domestic food production is still crucial. This study aims to Identify the relationship between economic uncertainty and food security, and make policy recommendations for in extensively Inonesia in the future.

2. RESEARCH METHOD

To analyze the relationship between economic uncertainty and food security in Indonesia, this study adopts a quantitative approach that harnesses panel data. It also employs business openness as a moderating variable. This approach is chosen because it allows for analysis of data with both time dimensions and cross-sectional data across individuals or entities, thereby helping to illustrate a larger dynamic in relation to the issue being studied. The period under analysis is 2019 to 2024, because these years straddle pivotal shifts in the global economy, fluctuations in international food prices as well as national food security challenges arising from geopolitical pressure. During key periods, Indonesia faced huge challenges such as the covid pandemic affecting food circulation systems and policy-related vagueness in economic uncertainty. This research uses panel data to look into the relationship between economic uncertainty and food security in Indonesia, plus business openness. It aims to find out how these variables work with each other in order to influence the country's food sector.

In this research, a dynamic panel method was adopted so that the connections between variables could be found out together over a specific period of time.With this model, one is more able to make a correct analysis of the changes over time. This is especially so when the fact in issue is a macroeconomic variable causing food security that no one can possibly observe at the instant itself, Food security changes slowly.There are no obvious sudden changes in food security values, so this model uses lag variables. Concept Lag variables help to observe how the ongoing effects of previous economic policies or conditions feed through into current food security.In such a situation, a shift in economic indicators be it food prices rising and falling, changes wrought by currency trading policies or exchanges rates There the answers are very long-term, vague in advance. For this sake, the study can explain how uncertain economic conditions or broadening business scenarios will impact on food security in the future.

It is a secondary material.Data collected each year from 2019 to 2024. This meant that researchers were able to observe trends and changes over that time, especially in response to economic uncertainty and its impact on food security. The primary focus of the analysis is Indonesia but data from other developing countries is also included in order to test and improve the model. Comparing data from countries with similar conditions helps us understand more clearly what makes food security in Indonesia and other developing countries possible or impossible. This approach lets one both identify common patterns and gain insight into differences between Indonesia and other countries in dealing with economic problems.

Table 1. Data Sources

Variable	Data Source
Food Security	Economist Impact – Global Food Security Index (GFSI)
Economic Uncertainty	World Uncertainty Index (WUI)
Business Openness	World Bank – Export-Import Ratio to GDP
Gross Domestic Product	World Bank – GDP per capita (USD)
Food Inflation	FAOSTAT – Consumer Price Index for food category

The score from the Global Food Security Index (GFSI), a measurement of food security, divides into four main sections: food availability, food affordability, food quality, and food system resilience. Each of these aspects is necessary for food security, making it possible to can provide food sustainably over time without any loss in production levels. GFSI scores range between 0 and 100, meaning that the higher your country's score is, the more stable and sustainable its food-supply system. The higher your score, the bettercapacity that nation has to maintain an adequate food supply in terms of quantity, access and the quality of its available food. Use of the GFSI score enables a more objective evaluation of the global food-security levels and of particular countries, including Indonesia. This is because such appraisal can be based on data from these different indicators.

This study uses the economic uncertainty index from the World Uncertainty Index (WUI), which is determined based on the frequency of terms related to uncertainty in Economist Intelligence Unit reports. For macroeconomic studies, the WUI has become the most widely used tool to gauge and represent the degree of uncertainty surrounding economic policy risks faced by a country or region. By counting the frequency of terms that refer to uncertainty, this index provides a more precise measurement of the economic difficulties that a country might face including their potential impact on vital sectors such as food security. As an indicator, WUI enables people to understand better how the economy works in practice and where relevant policy initiatives could be designed achieve greater certainty.

The total trade ratio (imports and exports) to GDP shows how open a business is. For example, this ratio reflects the extent to which a given country is linked with international markets. The higher that ratio, or percentage of national income represented by imports and exports, the more heavily dependent the national economy will be on cross-border activities A greater ratio indicates more integration with the international trade system; However, two control variables are also given: GDP per capita and food inflation. Both explain the resilience level of a family's economy and hence their readiness to afford the food they need for

themselves well-being. Similarly, changes in GDP per capita and food inflation can directly influence purchasing power and food security.

The empirical model is formulated to measure the effect of economic uncertainty on food security, as well as whether business openness strengthens or weakens this relationship. The basic model can be written as follows.

$$FS\_it = \alpha + \beta1*WUI\_it + \beta2*TO\_it + \beta3*(WUI\_it * TO\_it) + \beta4*GDP\_it + \beta5*INF\_it + \varepsilon\_it$$

Where:
FS_it: Food security index of country i at time t
FS_it-1: Food security value in the previous year
WUI_it: Economic uncertainty index
TO_it: Business openness (trade openness)
WUI_it * TO_it: Interaction between uncertainty and openness
GDP_it: Gross Domestic Product per capita
INF_it: Food inflation
ε_it: Error term
α: Constant
β1…β5: Regression coefficients
δ: Lag variable coefficient

The method of the two-step System Generalized Method Moments (System GMM) was chosen due to its ability to handle endogeneity and reciprocal relationships between variables, especially when the model involves lagged variables. The dynamic panel model provides a flexible way of capturing time effects and structural differences across observational units. This model, by taking lagged variables into account, shows how current food security conditions is influenced by the situation in the previous year. This approach also serves to reduce the bias that may arise due to variables are correlated with error components. Not only can System GMM effectively yield effi-cient and robust estimates when the number of observational units is limited, or the time period short; it also can control for unobserved individual effects and heterogeneity across countries.

3. RESULTS AND DISCUSSION

3.1. Results

The data used in this study comes from the period from 2019 to 2024 in Indonesia period of significant changes in economics and food. These six years were marked by global economic instability, pressures on international supply chains, and trade policies that underwent adjustments over time. In uncertain situations, these fluctuations may affect the country's food security. Focusing on business openness as a factor that may strengthen or weaken this relationship, the point is to find out what the specific correlation between economic uncertainty and food security might be. Moreover, for two control variables per capita income in the total population and food inflation are also considered. This is important because both of these figures play a very large role when it comes to whether the people can get, and afford, basic necessities. All data were collected from reliable sources such as the World Bank, FAOSTAT, and the Global Food Security Index. The data structure is annual. Each variable is quantitatively measured so that the relationships between variables can be tested using a dynamic panel approach. A summary of the statistics of the collected data can be found in the next section.

Table 2. Descriptive Statistics (2019–2024)

Variable	Obs	Mean	Std. Dev.	Min	Max
Food Security	60	57.43	4.22	53.25	61.10
Economic Uncertainty	60	0.283	0.137	0.09	0.49
Trade Openness	60	41.75	5.95	36.04	48.91
GDP per Capita	60	4,120.56	673.12	3,270.42	5,094.81
Food Inflation	60	5.26	2.44	1.22	9.13

The food security index has an average value of 57.43; this level signifies that food safety is relatively stable. However, with a standard deviation of 4.22 quantitative dispersion is also clear from such details. On average the economic uncertainty index comes out at 0.283, with the lowest point in the series at 0.09 and highest point hitting 0.49: this indicates a fluctuation reflecting both international and domestic developments. During this time of openness rankings for trade, Indonesia's average figure was 41.75, implying that their import-export policies varied from year to year.

a. Hypothesis 1 (H1): Trade openness has a positive effect on food security in Indonesia.

b. The estimation results show that trade openness has a significant positive effect on food security, with a coefficient of 0.0518 and a p-value below 0.05. Therefore, H1 is accepted.
c. Hypothesis 2 (H2): Economic uncertainty has a negative effect on food security in Indonesia.
d. The coefficient of economic uncertainty is -0.231, and the p-value is significant at the 5% level. Hence, H2 is also accepted. This indicates that economic pressure leads to a decline in food security scores.
e. Hypothesis 3 (H3): Trade openness strengthens the negative effect of economic uncertainty on food security.

Economic uncertainty and trade openness, as a multiplication term, the coefficient n will be 0.114 different from what I had originally supposed. And this result suggests that on the negative effects of economic risks, openness to trade international can compensate somewhat. More indirectly, such findings imply that the more involved in and divided up internationally via world markets a nation is, the better able it now has to resist or even transform adverse eco-cyclical shocks. Neve rthelessHypothesis H3 which foresaw that trade with the world would increase the negative impact of uncertainty on food security is not confirmed. The results, which are statistically significant using the two-stage GMM (Generalized Method of Moments), further illustrate that trade openness tends to reduce adverse effects brought about by economic uncertainty. Detailed estimation outputs are explained as follows.

Table 3. System GMM (Two-Step) Estimation Results

Variable	Coefficient	Std. Error	Significance
L.Food Security	0.482***	0.078	0.000
Economic Uncertainty (WUI)	-0.231**	0.092	0.012
Trade Openness (TO)	0.0518***	0.0109	0.000
WUI × TO	0.114**	0.048	0.017
GDP per Capita (GDP)	0.000733***	6.51e-05	0.000
Food Inflation (INF)	-0.00718	0.0126	0.571

The meaning above suggests that the table presents the achieved results in respect of 2019-2024 2019-2024 various food security affecting variables. The Food Security variable has a positive coefficient of 0.482. This figure is highly statistically significant (0.000) and corresponds to a major phenomenon of improvements in food security being closely associated with more stable conditions. Westuncertaintyvillage has a negative (-0.231) effect upon food security which is significant at the 0.012 level, indicating that higher uncertainty means lower food safety. However, trade openness has a clear-cut positive effect (0.0518; $p = 0.000$), which suggests that countries open themselves to the international trade will tend toward better food security levels. The interaction item (WUI × Trade Openness) produces a positive coefficient of 0.114 and is significant at 0.017, which implies that trade openness may alleviate the negative effects of economic uncertainty. Also, GDP per capita has a strong positive and highly significant relationship with food security; whilst food inflation does not show any significant impact at all.

The estimate outcomes were reviewed for model valid to ensure their reliability. Sargan test came out with a p-value of 0.1010, bigger than 0.05. Therefore, there is no controversy with respect to instrumentalism. Moreover, Sargan's second-order autoporelation test (AR(2)) reported that the p-value is 0.8473. This means that there is no anteriority in the model's errors. Therefore, their means could not skew it to bias estimates. The Wald test showed a p-value of 0.0000. This implies that all the variables are jointly statistically significant, and thus that the model used in our study is valid. In summary, as the model passed all these tests for validity, it can be considered successful in giving accurate estimates.

3.1.1. The Effect of Trade Openness on Food Security

Food in the Open Economy For each one percentage point increase in a country's trade open rating, its food security index will go up by a factor of Recipe is defined as 0.0518 (the greater the more secure.) The conclusion agreed with the theory of international trade that by being efficient in its export and import activities, a country can provide people with abundant supplies at cheaper prices. More weapons mean war but thldaAnnual itsThe supply of s for food producers is no less crucial. Adopting an open trading policy internationally not only enriches a country's choice of food products but also brings down the cost. Improved living conditions for the consumers living there are well worth it. The country that trades freely is able to take advantage of a wide range of food products at keernity of daret prices and at ryelatively meek expense; it reduces the necessity for domestic its own monotonous fare hey providing A variety. Hence a country domestical remains largely in thrall to past patterns of local produce on the model of that seen elsewhere. For an archipelagic state with diverse as well as plentiful agricultural resources, Indonesia's open-door policy toward overseas markets serves as a counterbalance to its own un natural circumstances. In each province differences between agronomic environment, climate and infrastructure often mean output is highly uneven. Trade enables food to flow from where there is plenty for a country which during times of drought or crop failure has the ability to import rice, corn, and other staple foods it means no shortage of food and no price rise that could threaten household subsistence. At the same time, when it is a bumper year with plenty

coming into farmers ' hands but little people eating, such exports help balance domestic over supply and allow their incomes to remain stable.

Also, the positive impact of trade openness is more or less in line with theory comparative advantage, Africa can produce anything well. Whereas country has sectors where production is relatively efficient. That efficient produce is then taken up by these strengths and what is less-efficiently produced elsewhere. The result is economies achieve an optimal allocation of world resources. Wheat and dairy products unsuited for tropical climates not only fail to satisfy Indonesia's needs can only be grown at very high costs in the cultivation of paddy fields using water buffalo rather than tractors (in these cases every second or third year we literally use our feet in congee medicine plants on concrete streets). The result was a new type of farming for rice and palm oil which, instead being closely connected with fishing, practised their livelihoods independently in relative isolation from society. Empirical findings from other scholars also verify this relationship. Research by Purnawan (2024) and Andini et al. (2024) discovered that being included in international markets raises the reliability of diversification resources for which you obtain to feed yourself-you do not need all four stores to have four shops selling rice! Hariri (2025) observed that economies with greater openness recover more quickly from supply shocks and have fewer disturbances in food distribution over the long-term Combine these findings together, and we see that securing needs through global trade does not only mean an economic strategy but also tool of food security during times when new problems arise or might arise at any moment.

Through price mechanisms and supply diversification, trade openness not only affects food security. Imported food also works as a buffer once less than the food produced domestically provision fails, blocking sharp price rises at the lower end which could hit consumers on tight budgets hard. Export opportunities also help to stabilize prices at times of surplus, protecting farmers 'incomes. Together these two channels of import relief in times of deficit and export support when supply is over-abundant keep the food market in rough balance. In Indonesia, regional trade cooperation within ASEAN has helped to smooth the flow of commodities, especially major essential products such as rice, sugar, and cooking oil. But the benefits of an open trade system depend on the strength of domestic institutions and infrastructure. An open trade system lacking sound regulation can leave the economy vulnerable to external shocks, such as sudden global price hikes or export restrictions by partner countries. Therefore, it is essential to build up reliable port facilities, efficient logistics and transparent import procedures which can all help ensure that the process of global integration actually increases rather than diminishes security in an area so basic as food provision. The contains make this outcome vital. These things of course also provide a cushion for adverse times, with the result that all people are able to share buily in the gains from international trade and small farmers or just consumers are treated fairly.

A balanced policy approach is crucial. Peeling in too much may shield local producers for a while, but it endangers competitiveness and innovation. In contrast, full deregionalization leaves domestic farmers vulnerable to violent world prices. The best method is selective openness trading freely whilst giving limited direction to home growers. Governmentinvestment in agricultural research, irrigation and rural infrastructure helps local industries to survive and benefit from global value chains rather than being swamped by them. Trade also serves to spread technology and know-how. Exposure to international markets raises the quality of production, introduces better farming methods and places improved quality control systems in place. As a result, local producers eventually become more efficient public goods providers. As technology spreads through the rural economy, production levels rise and ability to deal with future challenges in food production and distribution improves. An open trade policy will also enhance rural welfare:[If farmers can participate in the international market as a result of more employment opportunities arising from outward-oriented agriculture and if they gainmore access to intellectual property TickeIncome poverty'] Through a combination of supportive social policy measures such as credit access and market training with trade, poverty reduction and greater household food sufficine can be achieved.

3.1.2. The Effect of Economic Uncertainty on Food Security

Food security can be significantly affected by economic uncertainty. It is especially vulnerable when the uncertainty comes from unstable fiscal systems, geo-graphical conflicts, or pressure on money. Even a small increase in uncertainty will cause the food system to collapse. People who grow food have fewer and fewer customers as a result of climatic factors that make shortages into regular occurrences, increases standing costs due to investment in protecting against those possible futures end up being higher than expected once we get into the present reality for which they were originally intended both of these occurring at once creates distress among the agricultural population as whole. The combination of weaker global economic conditions and strong rebound in commodity prices makes for more serious food security challenges than in the past. Policy responses that distort prices or quantities are driving things further off course. A shift in food prices accompanies changes in the balance of payments. In particular, more devaluation of a country 's currency can make imports more expensive and drive prices for domestic goods upwards. Put another way, while looking at instances in countries well-trained agricultural workers that can be no match for international trade laws and are therefore doomed to see their products lose market share abroad. Because of rising food costs,

consumers change their buying habits. They might reduce the amount and/or quality within their meals; switch to food that is less nutritious but temporarily cheaper. This affects health and productivity over time.

Production is equally affected by uncertainty Farmers rely on predictable conditions to do To relax the input price market or whose demand is just around the corner, Moreover this makes their production slow down a bit While hesitating the produce of agricultural products comes and goes Pushing suppy beyond demand, these subtle processes end up in shortages, fodder for price rises With the increase in oil and fertilizer prices depending on political instability as well as minus credit markets that are no longer stable to offer sundry loans, farmer's costs have risen more places where they are simply unableto access money than ever before All these things together actually prevent agricultural expansion while weakening rural incomes Government policy plays a crucial role in mitigating such risks Indonesia provides a good example with Presidential Regulation No. 125 of 2022, which regulates the operation of national grain storage facilities This action was taken to ensure that global events such as mixed by the Russia-Ukraine conflict would not throw domestic society off balance when it came to its food supply or its energy sources Maintaining an appropriate reserve makes it possible for the government to let out grain at times of scarcity, taking charge of price inflations and ensuring that suffocating people have food by distribution all over the country This method has proved effective in the past, maintaining a consistent flow of products and using special measures for controlling public sentiment when things are unclear.

They are more than a safety net for emergencies; food stocks also act as stabilizing mechanism. A well-managed stockpile-By balancing supply between production cycles, the need for hoarding and market manipulation can be better controlled. Efficient storage systems, modern logistics and transparent management improve the reliability of these reserves and help national preparedness in the face of external shocks. Periodic trade disruptions caused by global uncertainty can affect the economy of an import-dependent country. Export restrictions, transportation and storage barriers or rises in shipping costs any of these will reduce access to critical goods. The COVID-19 pandemic and the Ukraine conflict have shown how quickly supply chains can be stressed when major producers stop shipping goods abroad. To weather these storms, Indonesia has diversified its import partners and broadened cooperation within regional frameworks such as ASEAN. A wider range of suppliers reduces vulnerability to external shocks and helps safeguard food supplies even during world crises. Stable macroeconomic management also helps to ensure food security. A predictable fiscal and monetary orientation anchors expectations, preventing market reactions spurred by panic. When inflation is kept in check, both producers and consumers make rational decisions rather than speculative ones. Subsidies or social safety nets, when correctly targeted so that they do not alter market incentives, can shield low-income families from hunger whilst maintaining incentives. Consistent policies play a definite role in sustaining confidence in the food system, which is invaluable at times of great uncertainty.

From the food security point of view, economic instability led to food shortages by price changes and income effects as well as production adjustments. The extent of the impact depends on how resilient the national economy and its institutions are. In Indonesia, substantial ongoing investment in agricultural modernization, infrastructure construction and supply-chain efficiency has increased food security on a national level. Diversified food supplies, local storage facilities and integrated distribution mitigate the chances that international turmoil will lead to severe shortages at home. Although there always will exist uncertainties, their negative effects can be controlled through foresight and adaptability. Effective governance, transparent market operations, and well-coordinated sectoral policies are the foundations of resilience. By simultaneously diversifying trade, adopting prudent fiscal policies and releasing reserves in a timely manner, balance is maintained for both prices and stocks. Indonesia's practice underlines the significance of creating a proactive flexible policy framework that can assure national food stability and safeguard the welfare of the people even in a world beset by uncertainties.

3.1.3. The Moderating Role of Trade Openness

The interaction between economic uncertainty and trade opening shows that the more open an economy is, the less adverse effect it will suffer on food security from uncertainty. When trade barriers are lowered and marketing access becomes easier, economy is better able to adapt to external shocks. The evidence indicates that engaging more actively in international trade can help countries handle fluctuations in supply and demand. This is particularly true when local production encounters temporary disruptions. Instead of heightening vulnerability, openness can strengthen a nation's ability to keep food supplies constant and prices stable, whatever happens in world markets. Indonesia has an outstanding example of trade integration playing such a role. While the country is tied in its connections to world markets, it does not rely too heavily on food staples from abroad. Domestic agricultural production, especially in rice, maize and vegetables, still provides the backbone of national food security. Imports serve mainly as an auxiliary role smoothing out times when regional harvests drop or natural events interrupt supplies This mix of indigenous and imported food supplies means that Indonesia can lessen its exposure to global volatility while still deriving from overseas the efficiency of wide-ranging modern trade. In many developing economies, the situation is different. Heavy dependence on imported grains or energy-intensive foods means that global price fluctuations are often an added factor at play. When geopolitical tensions or worldwide supply shocks occur, such economies will see

a sudden surge in cost which is hard to stem. Aryo et al. (2022) and Aryo et al. (2023), they elaborated, that heavy reliance on world markets makes any policy change, trade constraint, or price instability all the more dangerous. By contrast Indonesia's situation is more variegated and so it has greater resilience to uncertainty.

Greater trade openness furthers flexibility by broadening the markets and suppliers open to people. A wealthy and quiet trading country Decentralization of a country's purchasing power Away from a small area Single. And if it did, there were often long delays involved. This was a great help to Indonesian negotiators. The flexibility also paid off in another way: even when several food exporting countries in the 1970s scrambled to limit their own backyard supply, Indonesia could maintain its import pace. By keeping trade outlets open around the world, shortages can be filled from anywhere. Diversified sources also enhance bargaining power. We need no longer depend on any single source for anything but have many avenues of action at our disposal when circumstances change. Besides reducing risk, a trade policy that is open encourages technology and improves processes of production. Having to meet with international standards puts a most healthy pressure on manufacturers to improve quality, organization, and output rates. Agricultural producers can get better equipment, materials and technology via trading relationships, which in turn help to increase national output. With higher export earnings, over time these advances decrease the amount of capital goods and capital imports a country needs and provide an anchor against inflation. On the other hand, we have to be careful about the benefits of openness. Liberalization without direction can put peasants at risk from unfair competition and destabilize small producers. That is why government has a duty to make sure trade expansion meets with the national development strategy. It is only through policies fostering infrastructure investment, credit facilities, and innovation that local industries can then stand up against foreign products. In this balanced approach to openness, Indonesia's trade policy can turn defense into offense. The country has policies in place that reflect this idea. Through regional accords like ASEAN cooperation, for instance, markets for foodstuffs have widened while retaining enough space to produce them at home some more. By planning well, the inflow of imports and through public investment in storage and circulation, external supply continues to complement local produce quite smoothly in Indonesia. Such measures have enabled Indonesia to keep food prices reasonable in the midst of global instability.

3.2. Discussion

According to Purnawan's research of 2024, Indonesia's agricultural policy has a significant impact on the social basis for food. The agricultural sector, when given stable and vigorous assistance, may produce larger quantities of superior quality even in an environment where everything is uncertain worldwide. This kind of policy is essential to maintaining the country's food supply. Building agriculture into national production chains and making it part of the national project brings great benefit in terms of both volume and quality to food consumption for everyone who lives there.The country therefore becomes less at the mercy of demands made by international markets if these mechanisms work properly.Although international trade can offer a buffer in food supply and price stabilization, Indonesia's long-term food security is still ultimately in the hands of its domestic farming sector.Countries that have both the capacity to produce table rice and indulge domestically in a range of other staple fruits are not at the mercy of the market when it comes to external shocks. Importing countries, on the other hand, are vulnerable to sudden fluctuations and the unpredictable distribution network of global prices. Ill-balanced reliance on imported commodities tends to result in inflationary pressures which could restrict access to food for the poorer classes in society. Previously, agriculture and selective trade engagement was the most effective policy for Indonesia. Policies encouraging locally made products, combined with a certain degree of import access, allow for greater flexibility and less overall risk.The study found that the national food security is best fostered when trade supplements but does not replace local capabilities.Supporting innovation, providing credit facilities to farmers, and making sure that the distribution system functions smoothly, are essential elements in maintaining this balance and making national food security sustainable.

Information from Andini et al. (2024) adds to our understanding of how regional economic stability determines food security. A sluggish national economy is more likely to see efficient function in food production and distribution. In contrast, stable growth with manageable inflation is like oil for the operation of fuel lines. Households who enjoy a stable income can protect their proper access to food. Market conditions that are reasonably predictable serve both farmers and small producers in raising output levels. The study observes that a region which has serious economic problems will be vulnerable to food shortages and even price instability. Financial insecurity results from both domestic and global sources of uncertainty like exchange rate fluctuations, shifts in government policies, and outside trade disruptions. These findings highlight the crucial role that proactive government intervention must play through well-targeted fiscal and agricultural policies. The economic base of sustainable local existence provides the foreseeable future for defending food security on a global scale. It also enables us to spare weak sectors that would be hard-hit by external pressures, such as poor people, who live from agriculture.

A 2025 study by Hariri showed that in the transparency of The Policy for Sustainable Agricultural Land Management (LP2B) is fundamental. If the rules regarding farmland are not customarily obeyed then cropland could be irrevocably altered by conversion and unconstrained development, a frequent threat to the stability of national food production. Moreover, when agricultural land is preserved and properly managed,

the cultivation opportunities that farmers enjoy become more reliable. Nothing obstructs investment in technology to increase yields. The more transparent is the governance, conflicts over land uses are less likely to occur. It encourages local authorities, producers and communities to work together. When external forces such as large international foodprice fluctuations or geopolitical disruptions impact food imports, the combination of voluntary agricultural land protection policies and government-sponsored programs in those areas have been able to temporarily protect itself against this aggression from outside. This buffer effect at least temporarily ensures that domestic production can maintain what the country needs; x even more importantly, time can be bought both for long-term solutions and decisive measures to deal with temporary crises. Inside LP2B, effective supervision and popular power of attorney food resilience is enhanced when the stable base of agriculture great land area is capable Long-term national food security is supported by these functions.

Moreover, Hardono et al. (2016) has studied the impact of openingup areas to trade liberalization on food security, which offers one important viewpoint. Recently, however, they found (Figure 2) that whilethe free movement of goods on the world market has economic benefits for a country, opening itself to international trade also carries potential dangers. Unless you employ protective measures adequate to preserve domestic food-producing sectors. Globalization that lacks rules can result in unfair competition and decreasethe degree of national food self-sufficiency. Of course, when it is directed by appropriate policy decisions, trade liberalization canactually serve to improve conditions for food security. Adding new sources of food, a stable supply chain--or at least one which bends and does not break under pressure--and competitive prices all contribute to strengthening food security.This study emphasizes that the key lies in balance -countries should participate in international trade, but in the meantime they need to ensure that safeguards are in place to protect farmers and ensure food for the population in general. Managing such an open, yet effectively insulating system, makes it possible to create a food supply chain that is highly adaptable to the various changes taking place in global economic conditions.

The only way to really ensure that food will become a significant part of the economic lives of our children and grandchildren is with strong economic stability without interruption. As Akasyah et al. (2023) informed, turmoil from the politics of change, energy prices going up and wide global tension can all disturb national food systems and weaken supply reliability. Such conditions usually force up production costs, slow international trade and make food prices erratic. It simply means that the current situation, where global price shocks and inconsistent regulations serve to undermine food security in Indonesia, will continue. Against these risks therefore must be strong flexible government policy. Indonesia combats these kinds of risks by passing Presidential Regulation No. 125 of 2022 which adjusts the management and maintenance of national food reserves. This policy was launched into space to enable continuity supply, and prevent prices from following when Russia-Ukraine action disrupts the global community. Effective and centralized stock management, obtained between national and regional bodies, maintains low food prices and forecloses to consumers any really harsh consequences of economic uncertainty.

Suryana (2014) points out that Indonesia is still confronted by many difficulties in terms of sustainable food security: all due to climate change and pervasive global economic upheaval. Agriculture's ability to sustain itself and provide food is under threat from extreme weather patterns, changing rainfall patterns, and rising temperatures. At the same time, fluctuations in the global market add to pressure on prices and supply chains. Even so, guideline-based government policy that is committed to reinforcing family farming and improving international trade managment really does promise to bring stability. Strong support for agriculture communities, encouraging technology innovation, and export control collectives help guarantee local food supplies. The findings are consistent with this viewpoint, indicating that well carried-outpolices are able to fortifydomestic food system and maintain national food security even while external threats still persist on global markets.

4. CONCLUSION

It is certain that increased global economic uncertainty has had a profound influence on Indonesia’s food security status.Wars, monetary inflation and world-level policy vacillations frequently disrupt food system stability, affecting both availability and distribution and household purchasing power.However, what does emerge from the results above is that liberal trade policy can help mitigate in and alleviate the negative impact of economic instability on food security.Open markets let Indonesia buy food more cheaply from international competition, thereby reducing its reliance on potentially risky domestic production.Market openness thus acts as a stabilizing force over the long haul for food security.This suggests that with effective measures to protect the domestic agricultural sector overseas market integration is a good option for solving food security problems.Balancing trade liberalization with strong support for local food systems is therefore essential in Indonesia’s future.Other recommendations include that Indonesia should continue to promote market diversification and increased food production efficiency.In addition, sustainable management of nature’s resource base and expanding production capability domestically are among equally pivotal keys to achieving national food security.

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