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The Impact of Rupiah Depreciation on Household Purchasing Power, Food Affordability, and Nutritional Vulnerability: Evidence from Balikpapan, East Kalimantan

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ABSTRACT

This study aims to examine the impact of rupiah depreciation on household purchasing power, food affordability, and nutritional vulnerability in Balikpapan, East Kalimantan, Indonesia. Currency depreciation may increase the cost of imported goods, production inputs, transportation, and food distribution, potentially contributing to rising consumer prices and reducing households' ability to meet their basic nutritional needs. These economic pressures may disproportionately affect low- and middle-income households, particularly those with limited income flexibility and high expenditure shares allocated to food consumption. This study proposes a quantitative research approach using household-level survey data supported by secondary information on exchange rate movements, food prices, and regional economic conditions. The analysis focuses on the relationship between rupiah depreciation, household purchasing power, and food affordability, while examining nutritional vulnerability as an important public health outcome. Descriptive statistical analysis, correlation analysis, and Structural Equation Modeling (SEM-PLS) are proposed to evaluate the relationships among the research variables. The study also considers household income, food expenditure patterns, dietary diversity, and changes in food consumption as indicators for understanding the transmission of macroeconomic pressures into household nutritional conditions. By integrating macroeconomic analysis with public health indicators, this research is expected to provide a broader understanding of how exchange rate instability may influence food access and

nutritional well-being at the household level. The findings are expected to contribute to the development of local policies concerning food affordability, household economic resilience, and public health protection, particularly for vulnerable communities in urban areas. This study highlights the importance of integrating economic stability and food security strategies into public health policy to reduce the potential nutritional consequences of macroeconomic fluctuations.

Keywords: Rupiah Depreciation; Household Purchasing Power; Food Affordability; Nutritional Vulnerability; Food Security

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INTRODUCTION

The stability of a country's currency is an important macroeconomic factor influencing domestic economic conditions, household consumption, and the affordability of essential goods. In an increasingly interconnected global economy, fluctuations in exchange rates can affect the prices of imported commodities, production inputs, transportation, and distribution services. When a domestic currency depreciates against major international currencies, the cost of imported goods and intermediate inputs may increase, creating inflationary pressure that can eventually be transmitted to consumer prices. These developments are particularly relevant to household food consumption because food represents a basic expenditure that cannot easily be eliminated from household budgets. Consequently, rupiah depreciation should not be understood solely as a monetary or financial issue; it may also have implications for food security, nutritional well-being, and public health. Examining this relationship is important for understanding how macroeconomic instability can influence the everyday living conditions of households, particularly those with limited financial resources (World Bank, 2022; FAO et al., 2024).

The relationship between exchange rate depreciation and household welfare operates through several economic transmission mechanisms. First, depreciation can increase the domestic currency cost of imported food products, agricultural inputs, fertilizers, animal feed, packaging materials, and energy-related commodities. Second, higher

production and distribution costs may be reflected in retail prices, reducing the quantity and quality of goods that households can purchase with the same level of income. Third, inflationary pressure may weaken real purchasing power when household income does not increase at a rate comparable to the rise in prices. The consequences are not distributed equally across society because households differ in income, expenditure patterns, employment conditions, and access to affordable food markets. Lower-income households are generally more vulnerable because a larger proportion of their income is allocated to basic necessities, leaving limited room to absorb unexpected price increases. This situation demonstrates that currency instability can create broader socioeconomic vulnerabilities beyond the financial sector (World Bank, 2022; IMF, 2023).

Household purchasing power is therefore a central variable in understanding the effects of rupiah depreciation on public welfare. Purchasing power reflects the capacity of individuals and families to obtain goods and services based on their available income and prevailing market prices. When food prices increase while nominal income remains relatively unchanged, households may experience a decline in real purchasing power. This condition can encourage adjustments in consumption patterns, including reducing the quantity of food purchased, switching to less expensive food alternatives, postponing non-essential purchases, or reallocating expenditure from other basic needs. Although these adjustments may help households maintain short-term financial stability, they can also affect the nutritional quality and diversity of daily diets. From a public health perspective, the reduction in household purchasing power is important because it may influence access to sufficient, safe, and nutritious food, especially among vulnerable population groups (FAO et al., 2023; FAO et al., 2024).

Food affordability represents another important dimension of the relationship between macroeconomic conditions and nutritional outcomes. Food affordability is not determined exclusively by the availability of food commodities but also by the economic capacity of households to obtain adequate and nutritious food at prevailing prices. A household may live in an area where food products are physically available but still experience food insecurity because nutritious food is financially inaccessible. The increasing cost of protein sources, vegetables, fruits, and other nutrient-rich commodities may encourage households to prioritize cheaper and more filling alternatives. Such

changes can reduce dietary diversity and potentially increase nutritional vulnerability over time. The FAO and its partner organizations emphasize that food security must be assessed through interconnected dimensions, including availability, access, utilization, and stability. Accordingly, evaluating food affordability provides an important foundation for understanding how economic fluctuations may influence nutritional security at the household level (FAO et al., 2023; FAO et al., 2024).

The affordability of food is also closely associated with the nutritional quality of household diets. When economic pressure increases, households may prioritize the quantity of food over its nutritional composition, resulting in reduced consumption of protein-rich foods, fruits, vegetables, and other essential nutrients. This pattern may contribute to inadequate dietary diversity and increase the risk of nutritional vulnerability, particularly among children, pregnant women, older adults, and low-income families. Nutritional vulnerability in this context refers not only to the direct experience of hunger but also to the reduced capacity of households to maintain balanced, diverse, and nutritionally adequate diets. The State of Food Security and Nutrition in the World 2024 reported that approximately 2.8 billion people worldwide were unable to afford a healthy diet in 2022, demonstrating the continuing importance of economic access to nutritious food. These conditions indicate that food affordability should be considered an important determinant of public health, particularly when economic shocks affect household consumption decisions (FAO et al., 2024).

In Indonesia, the relationship between exchange rate movements and food security is particularly relevant because domestic food prices are influenced by both internal production conditions and external market developments. The availability and affordability of several food commodities may be affected by international prices, imported agricultural inputs, distribution costs, and fluctuations in the rupiah exchange rate. A recent study by Fitrawaty et al. (2026), which examined Indonesian annual data from 1990 to 2024 using a Vector Error Correction Model, identified exchange rate movements as an important long-term determinant of food security through price transmission mechanisms. The study illustrates how currency depreciation can increase the domestic cost of imported food and agricultural inputs, potentially weakening household purchasing power and access to food. Although

national-level findings provide an important foundation, their implications need to be examined at the local level because the intensity of economic exposure, household income structures, and food distribution characteristics may differ across regions. Therefore, a city-level investigation can provide more specific evidence regarding the relationship between macroeconomic changes and household nutritional conditions (Fitrawaty et al., 2026).

Balikpapan, located in East Kalimantan, provides a relevant geographical context for examining these issues. As an urban economic center, the city has household consumption patterns and market activities that are influenced by regional trade, transportation, distribution networks, and the availability of food commodities. Changes in commodity prices may affect households differently depending on their income levels, employment conditions, and expenditure priorities. Data published by the Central Statistics Agency (BPS) of Balikpapan indicate that the city recorded annual inflation of 1.11% in 2024. The food, beverages, and tobacco expenditure group experienced a year-on-year price increase of 2.64% in East Kalimantan in December 2024, while Balikpapan recorded the lowest overall inflation rate among the reported locations in the province. These figures demonstrate that food-price movements need to be examined separately from the general inflation rate because individual expenditure groups may experience different price dynamics. Consequently, an analysis focusing on household food affordability in Balikpapan can provide a more detailed understanding of the economic pressures experienced by local communities (BPS Kota Balikpapan, 2025; BPS Provinsi Kalimantan Timur, 2025).

Local food-price developments also indicate that food inflation can fluctuate considerably over time. According to the Balikpapan City Trade Office, the annual figures for volatile food inflation were 2.28% in 2021, 5.81% in 2022, 6.76% in 2023, 3.54% in 2024, and 4.58% in 2025. This variation suggests that household food affordability is exposed to changing market conditions and that the general inflation rate alone may not adequately represent the economic burden of food consumption. Volatile food prices can create uncertainty in household budgeting, particularly for families whose incomes are fixed or irregular. When the prices of essential commodities increase, households may adjust their spending by reducing consumption quantities, purchasing lower-cost alternatives, or reallocating expenditure from other necessities. These

adjustments may be temporary, but repeated price pressures can gradually affect dietary quality and household nutritional security. Therefore, examining food-price volatility alongside exchange rate movements and household purchasing power is important for understanding the broader economic determinants of nutritional vulnerability in Balikpapan (Dinas Perdagangan Kota Balikpapan, 2025).

Despite the importance of macroeconomic stability, household responses to food-price increases are not determined by purchasing power alone. Food affordability interacts with household preferences, nutritional knowledge, food availability, and consumption behavior. A household may have sufficient expenditure capacity to purchase nutritious food but still consume an unbalanced diet because of convenience, taste preferences, limited nutritional awareness, or established consumption habits. Research published in Food Policy in 2026 on healthy diet affordability in Indonesia highlights that the affordability of a healthy diet does not automatically guarantee adequate nutritional consumption. The study reports that many households continue to consume insufficient quantities of fruits, vegetables, legumes, and other nutrient-rich foods despite the potential availability of affordable dietary options. This finding suggests that nutritional vulnerability should be examined through both economic and behavioral dimensions. Accordingly, the present research considers household purchasing power and food affordability as important explanatory factors while also examining dietary diversity and changes in food consumption patterns as indicators of nutritional vulnerability (Food Policy, 2026).

Nevertheless, the existing discussion of rupiah depreciation, food affordability, and nutritional vulnerability still requires further examination at the household level, particularly in specific urban settings such as Balikpapan. National macroeconomic studies generally explain the relationship between exchange rates, inflation, imports, and food security through aggregate economic indicators. Meanwhile, local inflation statistics describe changes in consumer prices without necessarily identifying how individual households respond to those changes or whether their nutritional conditions deteriorate. This creates an important research gap concerning the transmission of macroeconomic pressures into household-level purchasing decisions, food accessibility, and nutritional vulnerability. An integrated analytical

approach is therefore needed to connect exchange rate developments with household income, food expenditure, the affordability of nutritious commodities, and dietary diversity. Such an approach can help distinguish the direct effects of rising prices from the broader socioeconomic and behavioral factors that influence household food consumption (Fitrawaty et al., 2026; FAO et al., 2024).

Based on this research gap, the present study examines the impact of rupiah depreciation on household purchasing power, food affordability, and nutritional vulnerability in Balikpapan, East Kalimantan. The study focuses on how exchange rate depreciation and related price pressures may influence households' capacity to purchase essential food commodities, maintain adequate food consumption, and preserve dietary diversity. Household purchasing power is examined through income conditions and expenditure capacity, while food affordability is assessed through the relationship between household resources and the cost of essential and nutritious food. Nutritional vulnerability is evaluated through indicators such as dietary diversity, changes in food consumption, reductions in food portions, and the ability to maintain balanced diets. The research also considers differences in household socioeconomic characteristics to identify groups that may be more exposed to economic pressures. By integrating these dimensions, the study seeks to provide a more comprehensive understanding of the relationship between macroeconomic instability and public health at the local level.

The contribution of this study lies in connecting exchange rate dynamics with household-level economic access to food and nutritional well-being. From an academic perspective, it expands the discussion of currency depreciation beyond conventional macroeconomic indicators by examining its potential implications for public health. From a methodological perspective, the study proposes an integrated quantitative framework that can employ descriptive statistics, correlation analysis, and Structural Equation Modeling–Partial Least Squares (SEM-PLS), subject to the availability and suitability of the collected data. From a policy perspective, the findings are expected to provide insights for local government, food security institutions, and public health stakeholders in developing interventions that strengthen household economic resilience, improve access to affordable nutritious food, and protect vulnerable population groups. Ultimately, maintaining food

affordability should be understood not merely as an economic objective but also as an important component of public health protection and sustainable community welfare (FAO et al., 2024; BPS Kota Balikpapan, 2025).

METHOD

This study employs a quantitative research design to examine the impact of rupiah depreciation on household purchasing power, food affordability, and nutritional vulnerability in Balikpapan, East Kalimantan, Indonesia. The quantitative approach is selected because the research aims to measure relationships among macroeconomic conditions, household economic capacity, food consumption patterns, and public health indicators using numerical data and statistical analysis. The study combines primary data obtained through household surveys with secondary data collected from official institutions, including Bank Indonesia, the Central Statistics Agency (BPS), and relevant local government agencies. The integration of these data sources is intended to provide an understanding of how exchange rate fluctuations and associated food-price changes may influence household welfare and nutritional conditions (Creswell & Creswell, 2023; FAO et al., 2024).

The research population consists of households residing in Balikpapan that are directly involved in daily food consumption and household expenditure decisions. Respondents are selected using a purposive sampling technique based on relevant criteria, including residence in Balikpapan, responsibility for household food purchases, and willingness to participate in the survey. The sample size will be determined according to the study population, research objectives, and statistical requirements of the analytical model. Primary data are collected through structured questionnaires using a five-point Likert scale, ranging from strongly disagree to strongly agree, supplemented by questions concerning household income, monthly food expenditure, food purchasing frequency, and consumption patterns. Secondary data include rupiah exchange rate movements, regional inflation, food commodity prices, and relevant socioeconomic indicators during the selected observation period. The use of multiple data sources is expected to strengthen the contextual interpretation of household-level findings (Sekaran & Bougie, 2020; BPS Kota Balikpapan, 2025).

The research framework consists of three principal constructs: rupiah depreciation, household purchasing power, and food affordability, with nutritional vulnerability serving as the main outcome variable. Rupiah depreciation (X1) is measured through secondary indicators of exchange rate movements and household perceptions of price increases associated with economic fluctuations. Household purchasing power (X2) is assessed through income adequacy, expenditure capacity, and the ability to purchase essential commodities. Food affordability (M) is measured through the affordability of staple foods, protein sources, vegetables, and fruits relative to household income and food expenditure. Nutritional vulnerability (Y) is evaluated through dietary diversity, changes in food consumption, reductions in food portions, meal frequency, and the ability to maintain balanced nutritional intake. The indicators are designed to capture the potential pathways through which macroeconomic pressures may influence household nutritional conditions (FAO et al., 2023; FAO et al., 2024).

Data analysis is conducted in several stages, beginning with descriptive statistics to identify respondent characteristics, household income distribution, food expenditure patterns, and perceptions of food affordability. The next stage involves data screening, validity testing, and reliability testing to evaluate the quality of the measurement instruments. Correlation analysis is used to examine preliminary relationships among the research variables, followed by Structural Equation Modeling–Partial Least Squares (SEM-PLS) to evaluate the proposed structural relationships and potential indirect effects. The proposed analytical model is expressed as follows:

$$M_i=\beta_0+\beta_1X_{1i}+\beta_2X_{2i}+\varepsilon_i$$

$$Y_i=\gamma_0+\gamma_1X_{1i}+\gamma_2X_{2i}+\gamma_3M_i+\mu_i$$

where X_1 represents rupiah depreciation, X_2 represents household purchasing power, M represents food affordability, and Y represents nutritional vulnerability. The analysis will examine the estimated path coefficients, coefficient of determination (R^2), effect sizes, and indirect relationships, subject to the adequacy of the collected data and the suitability of the model. Statistical processing and

visualization may be conducted using appropriate statistical software and Python-based computational techniques (Hair et al., 2022).

Finally, the research findings will be interpreted by considering the socioeconomic characteristics of households and the broader public health context of food security and nutrition. The analysis will distinguish the statistical relationship between exchange rate movements and household outcomes from other factors, including income instability, local food supply, distribution costs, and consumption behavior. Since the study uses household survey data, rupiah depreciation will not automatically be interpreted as the sole cause of changes in nutritional vulnerability. The research will also apply informed consent, voluntary participation, confidentiality, and responsible data management to protect respondents. Through this methodological framework, the study is expected to provide an evidence-based assessment of how macroeconomic instability may affect household food affordability and nutritional well-being in Balikpapan (World Bank, 2022; FAO et al., 2024).

RESULTS AND DISCUSSION

Rupiah Depreciation and Its Transmission to Household Purchasing Power

Rupiah depreciation represents an important macroeconomic factor that can influence domestic economic conditions through changes in import prices, production costs, and consumer prices. When the rupiah weakens against major international currencies, imported commodities and production inputs become more expensive in domestic currency terms. This situation may affect food production and distribution, particularly commodities that depend on imported agricultural inputs, transportation equipment, packaging materials, and energy resources. The transmission of exchange rate fluctuations into domestic prices is not necessarily immediate or uniform because it depends on market structures, import dependence, government policies, and the availability of domestic substitutes. Nevertheless, exchange rate depreciation may create additional cost pressures that influence the affordability of essential commodities and household consumption capacity. This relationship demonstrates that exchange rate stability has implications extending beyond financial markets and monetary policy into household welfare and food security (IMF, 2023; World Bank, 2022).

In the context of Balikpapan, the relationship between rupiah depreciation and household purchasing power needs to be understood alongside the city's economic and geographical characteristics. As an urban center in East Kalimantan, Balikpapan has consumption and distribution activities that are connected to regional trade networks and interregional supply chains. Changes in transportation costs, wholesale prices, and commodity distribution can influence the final prices paid by consumers. Households with relatively stable income may have greater capacity to absorb price increases, whereas informal workers, daily laborers, and households with irregular earnings may experience greater financial pressure. This distinction is important because the consequences of currency depreciation are mediated by household income structures and the proportion of expenditure allocated to basic necessities. Therefore, the assessment of purchasing power should consider not only changes in consumer prices but also the capacity of households to maintain their usual consumption levels under changing economic conditions (BPS Kota Balikpapan, 2025; World Bank, 2022).

Household purchasing power can be understood through the relationship between nominal income and the prices of goods and services available in the market. When nominal income remains relatively constant while food and other essential prices increase, real purchasing power may decline. Such a decline can encourage households to modify their spending priorities, including reducing discretionary expenditure, postponing purchases, selecting lower-priced commodities, or changing the composition of their food consumption. These responses may help households maintain short-term budget balance, but they can also generate longer-term welfare implications if the adjustments consistently reduce access to nutritious food. From a public health perspective, the capacity to maintain adequate food consumption is particularly important for households with children, pregnant women, older adults, and individuals who require specific nutritional support. Accordingly, purchasing power should be treated as a central mechanism connecting macroeconomic developments with household food security and nutritional well-being (FAO et al., 2024; World Bank, 2022).

The proposed research framework therefore places household purchasing power as one of the principal explanatory dimensions in evaluating the consequences of rupiah depreciation. Its indicators include income adequacy, the proportion of household expenditure allocated to

food, the ability to purchase essential commodities, and perceived changes in the affordability of daily necessities. These indicators can provide a more detailed understanding of how households respond to changes in economic conditions. Secondary exchange rate and inflation data can also be used to establish the macroeconomic context of the survey period. However, the relationship between depreciation and household purchasing power should not be interpreted as an automatic causal relationship because food prices are also influenced by domestic harvest conditions, weather, distribution efficiency, government interventions, and market competition. The integration of macroeconomic and household-level indicators is therefore necessary to distinguish external economic pressures from local factors affecting household welfare (Bank Indonesia, 2025; FAO et al., 2024).

Household Purchasing Power and Food Affordability

Food affordability is a crucial dimension of household welfare because the ability to obtain sufficient and nutritious food depends on both the availability of commodities and the financial resources of consumers. In economic terms, food affordability reflects whether household income is adequate to purchase food products that meet basic nutritional requirements without compromising other essential expenditure. When purchasing power weakens, households may prioritize inexpensive staple foods and reduce their consumption of higher-priced protein sources, fruits, and vegetables. This adjustment can influence dietary diversity even when the overall quantity of food consumed appears relatively stable. Therefore, food affordability should be evaluated not only through the price of staple commodities but also through the financial accessibility of a balanced and nutritious diet (FAO et al., 2023; FAO et al., 2024).

In Balikpapan, the affordability of food may vary across household groups according to income, family size, employment status, and consumption preferences. Households with limited financial resources may allocate a larger proportion of their monthly expenditure to food, leaving less income available for education, housing, transportation, healthcare, and other necessities. When food prices increase, these households may face difficult decisions regarding the allocation of limited financial resources. For example, a family may reduce expenditure on animal-source protein or fresh produce to preserve the

availability of staple foods throughout the month. Although such decisions may be economically rational in the short term, repeated adjustments can reduce dietary diversity and potentially increase nutritional vulnerability. Consequently, household food affordability represents an important link between economic resilience and public health outcomes (FAO et al., 2024; BPS Kota Balikpapan, 2025).

The relationship between purchasing power and food affordability can also be examined through household consumption behavior. Changes in food expenditure, purchasing frequency, commodity substitution, and household budgeting practices provide information about how families respond to economic pressure. A household that maintains the same food expenditure despite increasing prices may experience a reduction in the quantity or quality of food purchased. Conversely, a household with sufficient income flexibility may maintain its previous consumption pattern by absorbing additional costs. These differences demonstrate that the effects of price increases cannot be adequately assessed through aggregate inflation indicators alone. Household-level analysis is needed to identify which groups experience the greatest constraints in accessing nutritious food and how their consumption strategies change under economic pressure. This approach is consistent with the broader understanding of food security, which emphasizes economic access as a central component of adequate food consumption (FAO et al., 2023; FAO et al., 2024).

The proposed analytical model positions food affordability as a mediating variable connecting household purchasing power and nutritional vulnerability. In this framework, the relationship between rupiah depreciation and food affordability is examined through changes in the prices of essential commodities and the financial capacity of households to obtain them. Food affordability may also explain why households with similar income levels experience different nutritional outcomes. For example, households with better access to affordable traditional markets, local food products, and alternative protein sources may have greater flexibility in maintaining dietary diversity. Meanwhile, households that depend heavily on particular retail channels or commodities with limited substitutes may face greater exposure to price fluctuations. This suggests that local food distribution systems and market accessibility should be considered when interpreting the

relationship between household purchasing power and food affordability (World Bank, 2022; FAO et al., 2024).

Food Affordability and Nutritional Vulnerability: Implications for Public Health

Nutritional vulnerability represents an important public health concern because economic difficulties in accessing food can affect the quality, diversity, and adequacy of household diets. When nutritious food becomes less affordable, households may change their consumption patterns by selecting cheaper food products, reducing the frequency of purchasing protein sources, or limiting the consumption of fruits and vegetables. These adjustments can create nutritional risks even when households continue to consume sufficient quantities of staple foods. The distinction between food quantity and nutritional quality is therefore essential in evaluating household food security. Adequate calorie consumption does not necessarily indicate that individuals receive sufficient protein, vitamins, minerals, and other nutrients required to maintain good health. Consequently, nutritional vulnerability should be assessed through multiple indicators, including dietary diversity, meal frequency, food substitution, and the ability to maintain balanced food consumption (FAO et al., 2024; WHO, 2023).

The relationship between food affordability and nutritional vulnerability is particularly important for households with limited economic resources. Low-income households often have fewer opportunities to absorb unexpected increases in food prices because most of their available income is allocated to basic necessities. When food expenditure increases, families may reduce spending on nutrient-rich products or replace them with less expensive alternatives that provide lower nutritional diversity. Such consumption adjustments may have different consequences depending on household composition and nutritional requirements. Children require adequate nutrition to support physical growth and cognitive development, while pregnant women and older adults may have specific dietary requirements. Therefore, the economic accessibility of nutritious food should be considered an important determinant of health equity. Policies aimed at improving food affordability can contribute to the prevention of nutritional inequalities and strengthen the resilience of vulnerable population groups (FAO et al., 2023; UNICEF, WHO, & World Bank, 2024).

In Balikpapan, nutritional vulnerability should be examined in relation to household characteristics and local food consumption conditions. Differences in income, household size, employment status, and access to food markets may influence the ability of families to maintain adequate dietary diversity. Urban households may have access to various food distribution channels, including traditional markets, supermarkets, and retail outlets, but physical availability does not necessarily guarantee economic accessibility. A household may be surrounded by food retailers yet remain unable to purchase nutritious products because of limited income. This distinction is important for public health planning because interventions that focus exclusively on increasing food supply may not sufficiently address the economic barriers experienced by vulnerable households. Local food security policies should therefore consider both the availability of commodities and the purchasing capacity of different household groups (BPS Kota Balikpapan, 2025; FAO et al., 2024).

The measurement of nutritional vulnerability in this research can be operationalized through several household-level indicators. Dietary diversity can be used to identify the variety of food groups consumed within a specified reference period. Changes in protein consumption can provide information about whether households reduce their intake of fish, eggs, meat, legumes, or other protein sources when prices increase. Reductions in meal portions and meal frequency can also indicate economic constraints affecting household food consumption. In addition, the frequency of purchasing fruits and vegetables may help identify changes in access to essential micronutrient sources. These indicators should be collected through structured questionnaires using clearly defined recall periods to improve the consistency of responses. Where possible, established food-security and dietary-diversity instruments should be adapted to the Indonesian context rather than relying exclusively on subjective perceptions of nutritional adequacy (FAO, 2021; FAO et al., 2024).

From an analytical perspective, the relationship between food affordability and nutritional vulnerability can be examined using the proposed SEM-PLS framework. Food affordability is expected to function as a pathway through which changes in household purchasing power may be associated with nutritional outcomes. The proposed relationship can be represented by the following equation:

$$Y_i=\gamma_0+\gamma_1X_{1i}+\gamma_2X_{2i}+\gamma_3M_i+\mu_i$$

where Y_i represents nutritional vulnerability, X_{1i} represents rupiah depreciation, X_{2i} represents household purchasing power, and M_i represents food affordability. The estimated coefficients will indicate the direction and magnitude of the statistical relationships among the constructs. The indirect relationship between rupiah depreciation and nutritional vulnerability through food affordability can also be examined using bootstrapping procedures. However, the interpretation of these relationships must consider the characteristics of the research design. If the study uses cross-sectional survey data, the results can demonstrate statistical associations and proposed mediation relationships but cannot independently establish long-term causal effects. The measurement model should also be evaluated through indicator reliability, internal consistency, convergent validity, and discriminant validity before interpreting the structural model (Hair et al., 2022).

The integration of economic and nutritional indicators provides an opportunity to develop a more comprehensive assessment of household vulnerability. For example, a household experiencing reduced purchasing power may not immediately report a reduction in meal frequency but may gradually substitute more expensive food products with cheaper alternatives. In this situation, conventional economic indicators may identify declining purchasing power, while dietary-diversity indicators reveal changes in nutritional quality. Combining these measurements can help identify different forms of vulnerability that might otherwise remain unnoticed. Computational analysis and data visualization can further support the identification of household groups with similar expenditure patterns, food affordability constraints, and nutritional risks. Such techniques can be used to organize survey responses, examine relationships among variables, and present the distribution of nutritional vulnerability across household characteristics. Nevertheless, any classification of households should be based on validated indicators and transparent analytical procedures rather than arbitrary thresholds (Hair et al., 2022; FAO et al., 2024).

The policy implications of this relationship extend beyond conventional economic interventions. Local governments can strengthen household food security by improving the accessibility of affordable

nutritious commodities, supporting local food production and distribution, and monitoring price movements of essential food products. Targeted social assistance may also be important for households experiencing severe financial constraints, particularly when food-price increases coincide with unstable employment or declining income. In addition, nutrition education can help households make informed food choices within their financial limitations, including the use of locally available and nutritionally adequate food alternatives. Public health institutions, local food security agencies, and economic policymakers should therefore coordinate their interventions to address both the financial and nutritional dimensions of household welfare. This integrated approach recognizes that the protection of public health requires not only adequate food availability but also the economic capacity to obtain nutritious food consistently (WHO, 2023; FAO et al., 2024).

Overall, the relationship between rupiah depreciation, household purchasing power, food affordability, and nutritional vulnerability demonstrates the importance of connecting macroeconomic stability with public health protection. Exchange rate fluctuations may create price pressures through imported inputs, production costs, and distribution channels, while household income and expenditure structures determine the extent to which these pressures influence food consumption. Food affordability subsequently becomes an important dimension in understanding whether households can maintain dietary diversity and adequate nutritional intake. In Balikpapan, this relationship needs to be assessed by considering local economic conditions, food-price movements, household characteristics, and access to nutritious commodities. The proposed framework offers a basis for examining these interconnected dimensions through quantitative and computational analysis. Its empirical contribution will depend on the collection of reliable household data and the subsequent testing of the proposed relationships using appropriate statistical procedures.

CONCLUSION

This study highlights the importance of understanding rupiah depreciation as a macroeconomic phenomenon that may have broader implications for household welfare, food affordability, and public health.

The relationship between exchange rate fluctuations and household nutritional conditions can be explained through several interconnected mechanisms, including increases in the cost of imported inputs, changes in food production and distribution costs, and potential increases in consumer prices. These developments may weaken household purchasing power, particularly among low- and middle-income families whose expenditures are largely allocated to essential necessities. In the context of Balikpapan, East Kalimantan, examining these relationships is important because household food consumption is influenced by income conditions, regional distribution networks, local commodity prices, and access to affordable nutritious food. The study identifies household purchasing power as an important dimension connecting macroeconomic pressures with food affordability. When food prices increase without corresponding improvements in household income, families may experience difficulties maintaining their previous consumption patterns. Such conditions can encourage changes in purchasing behavior, including selecting less expensive food alternatives, reducing expenditure on protein sources, and limiting the consumption of fruits and vegetables. Food affordability consequently becomes a critical factor in determining whether households can maintain adequate dietary diversity and nutritional intake. From a public health perspective, persistent limitations in accessing nutritious food may increase nutritional vulnerability, particularly among children, pregnant women, older adults, and economically disadvantaged households.

The proposed analytical framework integrates rupiah depreciation, household purchasing power, food affordability, and nutritional vulnerability into a quantitative research model. Through descriptive statistics, correlation analysis, and Structural Equation Modeling–Partial Least Squares (SEM-PLS), the framework provides an approach to examining the relationships among macroeconomic conditions, household economic capacity, and nutritional outcomes. The integration of household survey information with secondary data on exchange rates, inflation, and food prices can provide a more comprehensive understanding of the economic mechanisms influencing food consumption. Nevertheless, the relationship between rupiah depreciation and nutritional vulnerability should not be interpreted as exclusively causal because other factors, including household income instability, local food availability, distribution costs, consumption

preferences, and government interventions, may also influence nutritional conditions.

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