

## THE EFFECT OF THE COVID-19 PANDEMIC ON THE PRICE OF STAPLE FOODS IN MEDAN CITY

### *Dampak Pandemi COVID-19 pada Harga Pangan Pokok di Kota Medan*

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### ABSTRACT

Staple food must be available in sufficient quantities and at affordable prices. However, the COVID-19 pandemic has restricted public access and disrupted food distribution. As one of the most affected cities, Medan City is facing the threat of rising food prices due to the COVID-19 pandemic. This study aims to analyze the impact of the COVID-19 pandemic on staple food prices in Medan City. The commodities that are the focus of the research are: (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, (5) chicken meat, and (6) beef. This study used weekly time series data which is divided into two periods; the period before the COVID-19 pandemic (2018-2019) and during the COVID-19 pandemic (2020-2021). Data analysis was performed using the ANOVA method; where the price difference shows the impact of the COVID-19 pandemic on food prices. The results of the analysis show that the COVID-19 pandemic has had a significant impact on increasing staple food prices in Medan City for the commodities: (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, and (5) beef. The results of the study also show that the COVID-19 pandemic has had a negative implications on the food security in Medan City. This research emphasize the government intervention in stabilizing staple food prices during extraordinary conditions (such as the COVID-19 pandemic) to preserve food security in urban area.

**Keyword:** COVID-19, food security, staple food price

## ABSTRAK

*Pangan pokok harus tersedia dalam jumlah cukup dan harga terjangkau. Namun, pandemi COVID-19 menyebabkan pembatasan akses masyarakat dan mengganggu distribusi pangan. Sebagai salah satu kota yang paling terdampak, Kota Medan menghadapi ancaman kenaikan harga pangan akibat pandemi COVID-19. Penelitian ini bertujuan untuk menganalisis dampak pandemi COVID-19 pada harga pangan pokok di Kota Medan. Komoditas pangan pokok yang menjadi fokus penelitian adalah : (1) beras, (2) gula, (3) minyak goreng, (4) telur ayam, (5) daging ayam, (6) daging sapi. Penelitian ini menggunakan data time series mingguan yang dibagi menjadi dua periode; yakni periode sebelum pandemi COVID-19 (2018-2019) dan selama pandemi COVID-19 (2020-2021). Analisis data dilakukan dengan metode ANOVA; dimana perbedaan harga menunjukkan dampak pandemi COVID-19 terhadap harga pangan. Hasil analisis menunjukkan bahwa pandemi COVID-19 berdampak signifikan pada kenaikan harga pangan pokok di Kota Medan pada komoditas : (1) beras, (2) gula pasir, (3) minyak goreng, (4) telur ayam, dan (5) daging sapi. Sehingga, hasil penelitian menunjukkan bahwa pandemi COVID-19 berimplikasi negatif pada kondisi ketahanan pangan di Kota Medan. Penelitian ini menekankan intervensi pemerintah dalam menstabilkan harga pangan pokok pada saat kondisi luar biasa (seperti pandemi COVID-19) untuk menjaga ketahanan pangan di perkotaan.*

**Kata Kunci:** COVID-19, ketahanan pangan, harga pangan pokok

## INTRODUCTION

Fulfillment of staple food is a basic need for every person. Staple food is used as the main source of daily food. The types of staple foods accord the potential resources and local wisdom of the region (Undang-Undang Nomor 18 Tahun 2012 Tentang Pangan). The government also stipulates staple foods to be staple goods and important goods whose availability, distribution, and price are monitored and regulated; both at the producer and consumer (public or society) levels based on Peraturan Presiden Republik Indonesia Nomor 59 Tahun 2020.

Staple food must be available in sufficient quantities and at affordable prices. The scarcity of staple foods triggers an increase in food prices. This condition makes it difficult for people to access staple food for their daily needs. Referring to the explanation above, the aspect of food security is not only seen from the aspect of availability, but also from the aspect of food prices (Firdaus, 2021; Rachmadhan et al., 2020).

Building upon these considerations, realization of food security is a condition that must be achieved. Staple foods are important commodities in economic, social, and even political aspects. The development of food security has three main pillars: (1) the food availability sub-system, (2) the food distribution sub-system, and (3) the food consumption sub-system (Rachman, 2010). The government is obliged to maintain the availability of staple food in

sufficient quantities, at affordable prices and in good quality conditions and is safe for consumption by the public (Nuryanti et al., 2017; Rachman, 2010).

However, the COVID-19 pandemic threatens the condition of food security in Indonesia (Maskun et al., 2021). The COVID-19 pandemic is an extraordinary condition experienced globally. The COVID-19 pandemic in Indonesia began in the first week of March 2020, when the first positive case was found. The COVID-19 pandemic has had a major multi-sectoral impact in Indonesian, especially in the health, economic and social sectors.

The government is implementing large-scale social restrictions (PSBB) and implementation of restricting public activities (PPKM); with the aim of reducing the spread of the Corona virus. The PSBB and PPKM policies in general include: (1) the obligation to implement health protocols, (2) directives on physical restrictions on social and economic activities, and (3) restrictions on office operations, markets and shopping centers, educational facilities and places of worship. Despite having positive goals, the PSBB and PPKM policies are considered to have a negative impact on the economy (Kemenkeu, 2021; Khoirunurrofik et al., 2021).

As one of the most affected cities, Medan City is facing the threat of rising food prices due to the COVID-19 pandemic. Medan City is the region with the highest number of positive cases of COVID-19 and the highest number of cases of death due to COVID-19 in North Sumatra Province (Satgas COVID-19, 2022).

This condition prompted the government to tighten social restriction policies in Medan City; including closing and limiting the operating hours of modern markets and traditional markets, as well as transportation restrictions. This policy had a negative impact on people's access to food, disrupted food distribution between regions, and increased food prices (Muhyiddin & Nugroho, 2021; Rizal et al., 2021; Safitri & Dewa, 2021; Suliyah, 2021; Wardhani, 2021).

Fluctuations in the staple foods price affect the inflation rate; from a social perspective, the availability and price of staple food also determines political stability. However, fluctuations in staple food prices are a natural thing to happen. Increases in food prices naturally occur when demand is high (during religious holidays), or when crop failure occurs and distribution channels are hampered (Bola & Prihtanti, 2019; Kesuma et al., 2020; Rachmadhan et al., 2020; Sayaka & Adhie, 2016; Wijayati et al., 2019). The price of staple food can also decrease when there is a big harvest, when the food supply is abundant (Pratama, 2018; Rasoki et al., 2016).

However, the COVID-19 pandemic situation is a different moment. The COVID-19 pandemic has also had an impact on decreasing people's income, increasing unemployment, and decreasing people's purchasing power to access staple food (Habtewold, 2021; Maleha et al., 2021; Safitri & Dewa, 2021; Saputra, 2021). This shows that the COVID-19 pandemic situation can threaten food security in affected areas, especially in Medan City (Cariappa et al., 2021; Ikhsan & Virananda, 2021; Kang et al., 2021; Rahman et al., 2021).

This study aims to analyze the impact of the COVID-19 pandemic on staple food prices in Medan City. The focus of research on staple food commodities supervised by the government, : (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, (5) chicken meat, and (6) beef (Peraturan Presiden Republik Indonesia Nomor 59 Tahun 2020). The urgency of this research is to analyze changes in staple food prices in Medan City due to the impact of the COVID-19 pandemic; where the price difference shows the impact of the COVID-19 pandemic on food prices.

## RESEARCH METHOD

### Research Location and Time

This research is focused on Medan City, considerate Medan City is the city with the highest number of positive cases of COVID-19 and the highest number of cases of death due to COVID-19 in North Sumatra Province. This condition prompted the government to tighten the social restriction policy in Medan City (Satgas COVID-19, 2022). This research was conducted in August 2023.

### Type and Source of Data

This study uses secondary weekly time series data (192 data series) obtained from Pusat Informasi Harga Pangan Strategis Nasional (PIHPS; National Strategic Food Price Information Center). Price data refers to the average price of staple food commodities (Rp/kg) of all qualities at all PIHPS observation markets in Medan City.

The staple food commodities that are the focus of this research are: (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, (5) chicken meat, and (6) beef. Determination of staple food commodities as the focus of research is based on "Peraturan Presiden Republik Indonesia Nomor 59 Tahun 2020 Tentang Perubahan Atas Peraturan Presiden Republik Indonesia Nomor 71 Tahun 2015 Tentang Penetapan Dan Penyimpanan Barang Kebutuhan Pokok Dan Barang Penting."

Data is divided into two periods, namely the period before the COVID-19 pandemic (fourth week of April 2018 to fourth week of February 2020; 96 data series) and during the COVID-19 pandemic (first week of March 2020 to fourth week of December 2021; 96 data series).

## Data Analysis Methods

Data analysis was carried out using the descriptive method and one-way ANOVA, by comparing the average values of the two period groups, the period before the COVID-19 pandemic and during the COVID-19 pandemic. The price difference shows the impact of the COVID-19 pandemic on food prices.

### Descriptive Analysis

Descriptive analysis in this study was carried out using graphical approach and the average price of the two groups of periods, the period before the COVID-19 pandemic and during the COVID-19 pandemic. The graphical approach depicts fluctuations in staple food prices in the period before the COVID-19 pandemic and during the COVID-19 pandemic. While the average price of the two groups of periods shows the magnitude of the change in the average price in the period before the COVID-19 pandemic and during the COVID-19 pandemic.

### One-way ANOVA Methods

The ANOVA method is a statistical analysis used to test the difference in mean values between groups. The ANOVA method requires that the data is normally distributed; however, the time series data on staple food prices is heavily influenced by inflation which causes the data to have its own trend. This study takes a simplification step by prioritizing the substance of the research objectives; so that a compromise is made for the possibility that the data is not normally distributed. However, with the large amount of data used and based on the centralized limit theorem, the data used is assumed to be normally distributed (Gujarati & Porter, 2008; Kao & Green, 2008).

This study uses the one-way ANOVA method. The one-way ANOVA method is used to test the difference in the mean value of a data that uses one factor that can have two or more groups. This study uses periodization grouping; namely the period before the COVID-19 pandemic and during the COVID-19 pandemic. The steps for analyzing research data using the one-way ANOVA method are as follows:

#### 1. *Determine the research hypothesis and testing criteria*

The hypothesis and test criteria (with  $\alpha = 5\%$ ) are as follows:

- Statistical probability value  $< \alpha$  : accept  $H_0$  ( $\mu_1 = \mu_2$ ), where there is no mean significant difference between staple food prices before and during the COVID-19 pandemic.

- Statistical probability value  $> \alpha$  : accept  $H_1$  ( $\mu_1 \neq \mu_2$ ), where there is a significant difference in the mean between staple food prices before and during the COVID-19 pandemic.

## 2. *Performing a one-way ANOVA test analysis*

The results of the one-way ANOVA analysis were compared with the test criteria.

## RESULT AND DISCUSSION

### The Price of Staple Foods in Medan City

The availability of staple food is a fundamental need, as well as a substantial indicator of food security. Staple foods play an important role in the energy and nutritional needs supply, and the public health matters. Staple food must be available at an affordable price. Fluctuations in staple foods price affect the inflation rate; from a social perspective, the availability and price of staple food also determines political stability (Firdaus, 2021; Kesuma et al., 2020; Nuryanti et al., 2017; Rachmadhan et al., 2020; Wijayati et al., 2019). Thus, fluctuations in food prices are something that must be observed; especially during the COVID-19 pandemic.

Staple food prices in Medan City fluctuated relatively from time to time, both in the period before the COVID-19 pandemic and during the COVID-19 pandemic. Even so, the price of rice did not change (did not fluctuate) during the COVID-19 pandemic. The fluctuation of staple food prices in Medan City in the period before and during the COVID-19 pandemic is shown in Figure 1.

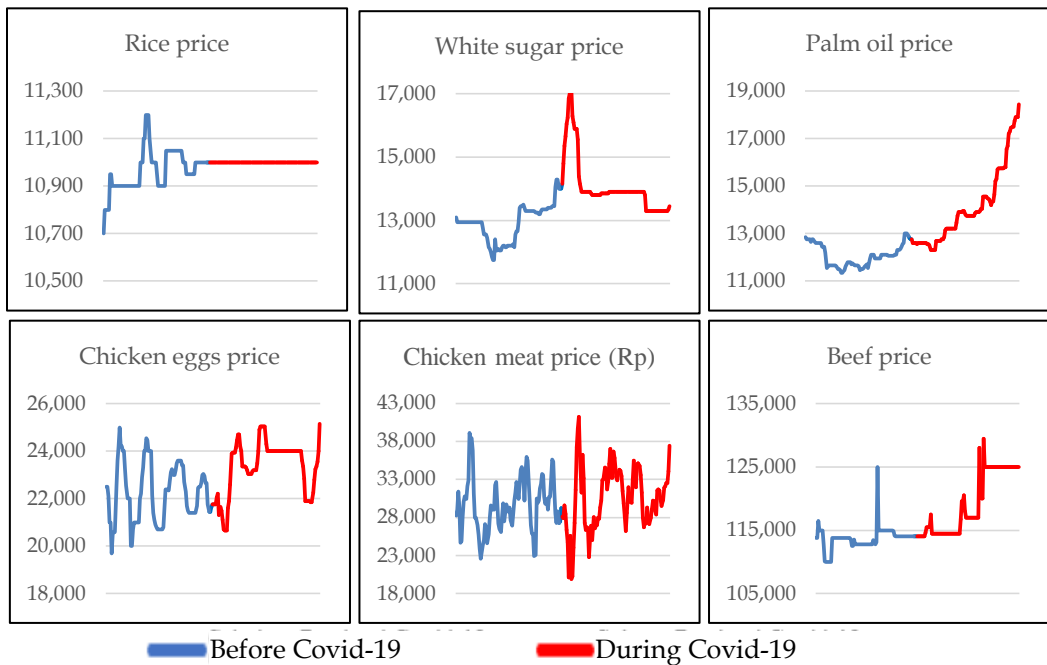


Figure 1.  
Staple Food Prices in Medan City Before and During the COVID-19 Pandemic (IDR/kg)

The fluctuations of staple food prices in Medan City during the COVID-19 pandemic can be categorized into three categories. The first category is staple food that has not experienced price fluctuations during the COVID-19 pandemic; i.e. rice. The second category is staple food which has experienced price fluctuations during the COVID-19 pandemic. The second category can be divided into three subcategories; (1) the first subcategory is staple food whose price increased at the start of the COVID-19 pandemic, i.e. sugar; (2) the second subcategory is staple food whose prices increased at the end of the COVID-19 pandemic, i.e. cooking oil and beef; (3) the third subcategory is staple food that experienced price increases at the beginning and end of the COVID-19 pandemic, i.e. chicken eggs. The third category is staple food which has experienced very volatile price fluctuations during the COVID-19 pandemic; i.e. chicken.

Price fluctuations show the movements of increases and decreases in the price of a commodity. Changes in prices can be caused by market mechanisms, changes in production costs, macroeconomic conditions, or a decrease in the value of these commodities. Conditions where price changes are very fluctuative are called volatile (Reza et al., 2014; Tomek & Robinson, 2014).

Fluctuations in staple food prices are a natural thing to happen. The price of staple foods can increase when demand is high (during religious holidays), or when crop failure occurs and distribution channels are hampered (Bola & Prihtanti, 2019; Rachmadhan et al., 2020; Sayaka & Adhie, 2016). Otherwise, the price of staple food can also decrease when there is a big harvest, when the food supply is abundant (Pratama, 2018; Rasoki et al., 2016). Nonetheless, the COVID-19 pandemic situation is a different momentum. Restricting public access causes disruption to distribution channels, which is thought to have an impact on increasing staple food prices (Cariappa et al., 2021; Ikhsan & Virananda, 2021; Kang et al., 2021; Rahman et al., 2021).

Despite the price fluctuations (increase and decrease) in prices, staple foods price in Medan City have increased during the COVID-19 pandemic. In fact, the rice food commodity, which did not experience price fluctuations during the COVID-19 pandemic, also experienced price increases. The average price shows the prices changes that occurred during the period before and during the COVID-19 pandemic; shown in Table 1.

Table 1. The Average Price of Staple Food Commodities in Medan City Before and During the COVID-19 Pandemic

Commodities	Price (IDR/kg)		Change (%)
	Before C-19 pandemic	During C-19 pandemic	
Rice	10,965.10	11,000.00	0.32
White sugar	12,927.08	14,073.44	8.87
Palm oil	12,068.23	14,108.85	16.91
Chicken eggs	22,250.52	23,339.06	4.89
Chicken meat	29,696.35	30,501.04	2.71
Beef	113,691.67	119,185.42	4.83

Source : PIHPS (2023)

Palm oil is a food commodity that experienced the highest price increase during the COVID-19 pandemic; where the price continued to increase until the end of the COVID-19 pandemic period. According to Kantor Perwakilan Bank Indonesia Provinsi Sumatera Utara (2021), the increase in palm oil prices is one of the main sources of inflation in the food, beverage and tobacco group in 2021. Commodities that experience price fluctuations during the COVID pandemic (at the beginning, at the end, and/or at the beginning and the end) relatively have higher price increases; i.e. palm oil, white sugar, chicken eggs, and beef. Contrarily, at the extreme point, food commodities that do not experience price fluctuations and food commodities with very volatile price relatively have lower price increases; i.e. rice and chicken meat.

The increase of food prices during the COVID-19 pandemic showed that the COVID-19 pandemic situation could threaten food security in affected areas, especially in Medan City (Cariappa et al., 2021; Ikhsan & Virananda,



2021; Kang et al., 2021; Maskun et al., 2021; Rahman et al., 2021). Food security is a condition of fulfilling food of the state down to individuals level, which is reflected in the food sufficiency, both in quantity and quality, safe, diverse, nutritious, equitable and affordable, also does not conflict with the religion, beliefs and culture of society; so that they can live healthy, active and productive in a sustainable manner (Undang-Undang Nomor 18 Tahun 2012 Tentang Pangan).

Realization of food security is a condition that must be achieved. The development of food security has three main pillars: (1) the food availability sub-system, (2) the food distribution sub-system, and (3) the food consumption sub-system. The food availability subsystem is related to production, procurement/supply of food. The food distribution subsystem is related to distribution, the provision of facilities and infrastructure so that food can reach consumers (public/society). Meanwhile, the food consumption subsystem relates to utilization, accessibility/affordability of the public to food (Rachman, 2010). Thus, the realization of food security is not only the availability, but also from the aspect of distribution and food prices that are affordable and can be utilized by the public.

### **The Effect of The Covid-19 Pandemic on The Price of Staple Foods in Medan City**

This research focused to analysis the changes (increases) of food prices during the COVID-19 pandemic in Medan City. Through one-way ANOVA analysis, statistical tests were carried out on price changes that occurred. The test results show whether there is a statistically significant difference of staple food prices in the period before and during the COVID-19 pandemic. The significant price difference shows the impact of the COVID-19 pandemic on food prices. The results of the one-way ANOVA analysis are shown in Table 2.

Table 2. The Effect of The Covid-19 Pandemic on The Price of Staple Foods in Medan City

Commodities	F-value	Probability
Rice	15.629	0,000*
White sugar	109.606	0,000*
Palm oil	141.787	0,000*
Chicken eggs	41.222	0,000*
Chicken meat	2.160	0,143
Beef	109.410	0,000*

Note : significant at  $\alpha = 5\%$

The results of the one-way ANOVA analysis show that there were significant differences in the prices of staple foods in Medan City before and during the COVID-19 pandemic for the following commodities: (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, and (5) beef. There was no

significant price before and during the COVID-19 pandemic for the chicken meat commodity. So it can be concluded that the COVID-19 pandemic has had a significant impact on changes in staple food prices in Medan City for commodities: (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, and (5) beef.

As shown in Figure 1, the price of chicken meat are very volatile both before and during the COVID-19 pandemic. The price fluctuations can be influenced by various factors; including increasing demand for food at certain times (for example during religious holidays), crop failure due to disease, climate and weather factors, as well as farming input factors. It is suspected that these factors are not all directly influenced by the conditions of the COVID-19 pandemic. Thus, the COVID-19 pandemic has no direct effect on changes in the price of chicken meat in Medan City.

Generally concluded, the increase of staple food prices in Medan City can be caused by obstructions in distribution channel. Closing and limiting the operating hours of modern and traditional markets, as well as transportation restrictions have had a negative impact on staple food distribution channels in Medan City. This policy also has an impact on public's physical access to staple foods (Maskun et al., 2021; Muhyiddin & Nugroho, 2021; Rizal et al., 2021; Safitri & Dewa, 2021; Suliyah, 2021; Wardhani, 2021).

In addition, it is widely known that the COVID-19 Pandemic has also had an impact on increasing the unemployment rate and decreasing people's income. This causes a decline in people's purchasing power to access staple foods (Habtewold, 2021; Maleha et al., 2021; Safitri & Dewa, 2021; Saputra, 2021). So, this proves that the COVID-19 pandemic has a negative impact on the condition of food security in Medan City.

Policy steps can be done by the intervention of the government in stabilizing staple food prices during the COVID-19 pandemic. Monitoring food prices can be focused on staple food commodities that have experienced price increases. This action would be better if not only the commodities that are the focus of this research. More efforts also need to be made for sensitive commodities, such as commodities that have fluctuating or volatile prices.

## CONCLUSION AND SUGGESTION

### Conclusion

As one of the most affected cities, Medan City is facing the threat of rising food prices due to the COVID-19 pandemic. The COVID-19 pandemic has had a significant impact on increasing staple food prices in Medan City for the commodities: (1) rice, (2) white sugar, (3) palm oil, (4) chicken eggs, and (5)

beef. The results of the study also show that the COVID-19 pandemic has had negative implications for the food security in Medan City.

### Suggestion

Government intervention in stabilizing staple food prices during extraordinary conditions such as the COVID-19 pandemic is fundamental. Monitoring food prices can be focused on staple food commodities that have experienced price increases (not only the commodities that are the focus of this research). More efforts also need to be made for sensitive commodities, such as commodities that have fluctuating or volatile prices.

This research also takes simplification steps by prioritizing the substance of the research objectives; so a compromise was made on the data analysis method. So, it is hoped that future research discussing the impact of the COVID-19 pandemic can use more complex analytical methods.

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