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Demand and Supply of Vegetables and Fruits During Pandemic Covid-19 at the Downtown of Jember Regency

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ABSTRACT

People try to fulfill their need for food during the pandemic Covid-19, both in quantity and kind of food that have vitamins and minerals which are good for keeping dan increasing immunity, such as vegetables and fruits. This study aimed to identify if there was a difference in (1) the demand for vegetables and fruits, and (2) the supply of vegetables and fruits before during the pandemic Covid-19 at the downtown of Jember Regency. The method of study was descriptive-analytic with 100 samples, consisting of consumer and green groceries of vegetables and fruits. Data were analyzed by t-test paired samples. The result was: (1) demand for vegetables decreased during the pandemic Covid-19 as described below: (a)green vegetables at the traditional market were decreased21.25%, another vegetable decrease61.61% and they were significant at5% dan 10% test level, (c) green vegetables at modern market decreased 11.76% and another vegetable increased23.57 % but they were not significant (2) demand of fruits : (a) decreased 57.28% at a traditional market and significant at 5% level (b) increased 16.67 % at the modern market but not significant, (3) supply of vegetables when the study was done (January) decreased 28.88% and significant at 10% test level, meanwhile supply of fruits decreased 56.00% and significant at 1% test level.

Keywords: Demand, fruits, supply vegetables

Introduction

Covid-19 was determined by World Health Organization (WHO) as a world pandemic in 2019 because had spread almost all over countries in the world. The Indonesian government had done various efforts for overcoming it, such as suggesting wearing masker, washing hands, social distancing, avoiding crowds, and reducing mobility. Meanwhile, society tries to fulfill their food and consume vegetables and fruits which has vitamins and mineral for keeping and increasing immunity. Data from BPS (Indonesian Central Berau of Statistic) showed that demand for food increased by 51%, not only in account but the kind of food which was chosen that must have high vitamins and minerals.

According to producers and the government, there were two big challenges for agriculture, they were the fulfilling supply of food with achievable prices on one side, but on the other side still keeping the welfare of farmers. According to consumers, there were also two challenges too, which were keeping and increasing immunity by consuming goods folding one side, but on the other side, the income was unchanged and even tend to decrease in some households because of declining economic activity in social restriction.

Jember Regency produce 15 kinds of vegetables, 936.234-ton account in 2018 and increased to1.168.276 ku in 2019. Besides that, Jember also produces 25 kinds of fruits, 5.370.043 ku in account in 2018 and in 2019 reached 7.250.267 ku (BPS, 2020). A lot of kinds and accounts of vegetables and fruits could be an indicator that supply was high to fulfill demand, not only for Jember but also for another city. Related to the pandemic Covid-19 that attack Indonesia in early 2020, it predicted that

there was a difference in demand for vegetables and fruits before and during the pandemic, and so was the supply because producer always tries to fulfill consumer needs.

Based on that background, this study aimed to identify if there was a difference in BPS the demand of vegetables and fruits, and the supply of vegetables and fruits before and during the pandemic Covid-19 at the downtown Jember Regency.

Material and Methods
Method of study
The study used descriptive and analytic methods. This method examines the status of the respondent, object, set of conditions, a system of thinking, condition, or occurrence at one time, testing the hypothesis and interpreting the analysis result deeply.

Field of Study
The field of study was determined by purposive method at the downtown of Jember Regency in two kinds of the market: (a) "Pasar Tanjung" as a main traditional market in Jember, and (b) modern markets such as Lippo Hypermart and Giant.

Method of sampling
The method of sampling was convenience sampling because it was easy, available dan comfortable. The account sample was 100 respondents as described in Table 1.

Table 1. Determined sample

No.	Description	Number of samples	
		Vegetables	Fruits
1	Consumers in a traditional market	30	30
2	Consumer at 'Giant' modern market	5	5
3	Consumers at 'Lippo Hypermart' modern market	5	5
4	Green Groceries	10	10
	Total number of samples	50	50

Method of Data Analysis
For testing the difference between demand and supply before and during the pandemic covid-19 use two-tail paired sample t-test with this formula:

$$t = \frac{\overline{X_D} - \mu_0}{S_D/\sqrt{n}}.$$

$$\overline{X_d} = \frac{\sum D}{n}$$

$$S_d = \sqrt{\frac{1}{n-1}\left\{\sum D^2 - \frac{(\sum D)^2}{n}\right\}}$$

Explanation:
$\overline{X_d}$ = mean of difference compared variable
D = difference of compared variable
S_d = deviation standard of D
n = size of the sample

Hypothesis:

H0 = value of the compared variable was the same, or $\mu_1 = \mu_2$

Ha = value of the compared variable was different, or $\mu1 \neq \mu2$

Criteria of decision making:

$t_{count} > t\alpha$ (0.05), so: Ho was rejected

$\leq t \alpha$ (0.05), so: Ho was accepted

Results and Discussion

Profile of consumer and green groceries at The Downtown of Jember Regency 2021

There were three kinds of respondents in this study, they were consumers at traditional and modern markets also green groceries (Table 2). Based on gender, respondent was dominated female, with 56% in the traditional market, 90% in the modern market, 60% in green groceries, and most of them was between 30 – 55 years old. This data showed that the task of shopping for most households was done by a female. Most of the green groceries were female too it might be because they knew what consumers wanted well. Education of respondents in the traditional market was spread evenly, primary school 20%, secondary school 10%, high secondary school 30%, and graduate from university 40%.Respondents in the modern market are dominated by a graduate from university (60%), and the rest were from high secondary school (40%). An interesting condition occurred in green groceries respondent, 20% of them was not educated, just 30% until high secondary school, and the rest (50%) was until secondary school.

Based on income,10% of green groceries got more than 10 million per month,30% got 5 – 10 million, and the rest got less than 5 million. Meanwhile, 56.67% of the consumer at the traditional got less than 2 million per month, 26.67% got 2 -2.9 million per month, 10% got 3 – 4,9 million per month and 6.67% of the rest got 5 – 10 million per month. About 10% of the consumer in the modern market got less than 2 million per month, 60% got 2 – 2.9 million per month and 30% of the rest got 3 – 4.9 million per month. Most of the consumers had unchanged income, which could be a restriction for buying more vegetables and fruits during a pandemic. The main job of most consumers was entrepreneur, even in the modern market reached 90%, and more than 60% had no side job.

Related to the importance to consume vegetables and fruits for immunity, more than 70% of respondents answered knew, even consumers of traditional and modern markets and also green groceries.

The demand for vegetables during the pandemic Covid-19 at The Downtown of Jember Regency 2021

The demand for vegetables was different before and during the pandemic. Green vegetables at the traditional market decreased by 21.25 % and were significant at the 5% test level, and the other vegetables decreased to 61.67 % and were significant at the 10% test level (Table 3).

Table 3.The demand of vegetables before and during the pandemic in downtown of Jember Regency 2021

Kind of Commodity	The demand for vegetables Before and During the Pandemic				Paired sample t-test	
	Before	During	Change		t-count	Sig
	(unit)	(unit)	(unit)	(%)		(2-tailed)
Traditional market						
Green vegetables	4.00	3.15	-0.85	- 21.25	2,249	- 0.030
Other vegetables	6.00	2.33	-3.67	- 61.67	1,968	- 0.061
To be continued…						

Modern Market						
Green vegetables	1.70	1.50	-0.20	- 11.76	1,000	- 0.343
Other vegetables	1.40	1.67	+0.33	+ 21.43	-1,000	+ 0.423

Source: Processed primary data (2021).

Decreasing demand of green vegetables (11.76%) also occurred in the modern market, meanwhile, other vegetables increased by about 21.43 %, but both of them were not significant (Table 3). Decreasing demand of vegetables at traditional and modern markets during the pandemic was not caused by a lack of knowledge about covid-19. Table 1 showed that 70% of respondents knew about covid-19, including the importance of vegetables and fruits for increasing immunity. It might be caused by increasing in price. Based on the law of demand there was a relation between price and demand. Data in Table 4 showed that the price of vegetables increased during the pandemic, both in the traditional and modern markets, and the difference in price between before and during the pandemic was significant.

Table 4. Price of vegetables before and during the pandemic at the downtown ofJemberRegency 2021

Kind of market and commodity	Price of vegetables Before and During Pandemic				Paired sample t-test	
	Before	During	Change		t-count	Sig
	(Rp/unit)	(Rp/unit)	(unit)	(%)		(2-tailed)
Traditional market						
Green vegetables	10,715	13,954	3,238	+ 30.22	-528.17	0.021
Other vegetables	7,612	11,866	4,254	+ 55.88	-6.933	0.000
Modern Market						
Green vegetables	3,150	3,390	240	+ 7.61	-467.54	0.047
Other vegetables	8,997	9,433	436	+ 4.84	-1.979	0.189

Source: Processed primary data (2021).

Based on Table 3 decreasing demand of vegetables agree with the law of demand, which was caused by increasing price (Robert & Pindyck, 2013). The price of green vegetables at the traditional market increased by 30.22 % and was significant at the 5% test level, meanwhile other vegetables increased by higher, about 55,88%, and significant at 1%test level (Table 4). Research by Savira and Prihtanti (2019), Wirawan and Nubatonis (2019), Nurul Mf et al. (2019), and Silitonga and Salman (2014), also showed that increasing prices caused decreasing in demand for vegetables.

Table 5. The demand for fruits before and during the pandemic at the downtown Jember Regency 2021

Kind of market	Demand of fruits Before and During Pandemic				Paired samplet- test	
	Before	During	Change		t-count	Sig
	(kg)	(kg)	(kg)	(%)		(2-tailed)
Traditional market	20.6	9.1	-11.48	- 57.28	- 2.249	0.031
Modern Market	3.6	4.2	+ 0.60	+16.67	+ 0.970	0.357

Source: Processed primary data (2021)

Decreasing of demand of fruits at traditional market agree with the law of demand, that was caused by increasing of price about 10.34% and significant at 10% test level (Table 6).

Table 6. Price of fruits before and during the pandemic at the downtown of Jember Regency 2021

Kind of market	Price of fruits Before and During Pandemic				Paired sample t-test	
	Before	During	Change		t-count	Sig
	(Rp/kg)	(Rp/kg)	(Rp/kg)	(%)		(2-tailed)
Traditional market	19,333	21,333	+2.000	+ 10,34	+1.925	0.065
Modern Market	14,920	15,627	+ 706	+ 4,73	+0.966	0.359

Source: Processed primary data (2021).

According to Table 1, the increase in demand of fruits in modern markets might be caused by this condition, most of the consumers (50%) in the modern market were 30-50 years old, an age that was settled economically, and most of them (60%) graduated from university so should have enough knowledge about good and healthy food during pandemic covid-19, and also supported by good income compared with the consumer at a traditional market.

Research by Desfaryani et al. (2016), Habib and Risnawati (2018), Sari et al. (2021), Rosyidi et al. (2016), Medikana et al. (2016), Mulyadarma (2020), Rahmawati et al. (2018), also showed a same phenomenon, that demand decreased if the price increased. The exception occurred to the demand for bananas at Denpasar which was explained by Suparyanan et al. (2017) that was not affected by its price.

The different conditions occurred in the modern market, demand of fruits increased but actually, the case price increased too (4.73%) but was not significant. It might be because consumers in the modern market had higher incomes relatively, so increasing a few prices was not affected demand. On the contrary occurred to grapes based on research by Kilamase et al. (2015), which was agreed with the law of demand. The demand for grapes at the modern market at Ambon decreased by 0,125 kg for every IDR 1 increase in price.

Supply of vegetables and fruit at the downtown of Jember Regency 2021

Based on field observation at the traditional market and analysis of data there was a decrease in the supply of vegetables by about 28.28%, meanwhile, the supply of fruits decreased by about 56.0% and both of them were significant (Table 7). The supply of vegetables and fruits at the modern market could not be presented because the manager did not allow the researcher to get data.

Table 7. Supply of vegetables and fruit mic at the traditional market of Jember Regency 2021

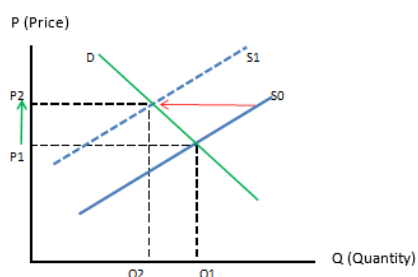| Kind of commodity	Supply of fruits Before and During the Pandemic				Paired sample t- test	
	Before	During	Change		t-count	Sig
	(unit)	(unit)	(unit)	(%)		(2-tailed)
Vegetables	145	104	- 40,50	- 28.28	-2.095	0.066
Fruits	55.00	24.2	- 30.80	-56.00	-3.346	0.009

Source: Processed primary data (2021)

Figure 1. Diagram of the supply curve shifting to the left caused increasing in price and decreasing in demand

Decreasing the supply of vegetables and fruit at the traditional market might be caused by the weather. The study was done in the rainy season December 2020 – January 2021. Vegetables and fruit are susceptible to pests and diseases in the rainy season and causing their growth was not optimal.

Figure 1 described that at the beginning there was an equilibrium between P1 and Q1. The effect of bad weather on vegetables and fruits shifted the supply curve to the left, which means that supply decreased from S_0 to S_1, as a result, prices increased from P_1 to P_2 and demand decreased from Q_1 to Q_2 (Robert & Pindyck, 2013).

Conclusion

The demand of vegetables before and during the pandemic covid 19 at Jember regency was different: (a) at the traditional market green vegetables decreased by 21.25% and significantly at 5% test level, and other vegetables decreased by 61.61% and significantly at 10%; (b) at modern market green vegetables decreased 11.76%, but other vegetables increased 23.57%, both of them were not significant.

Demand of fruits before and during the pandemic covid 19 at Jember regency was different: (a) at the traditional market decreased by 57.28% and significant at the 10 % test level; (b) at the modern market increased by 16.67 % but was not significant.

Supply of vegetables during the pandemic covid 19 at Jember regency in December 2020 – January 2021 decreased by 28.28% and was significant at the 10% test level, while the supply of fruits decreased by 56.0% and was significant at the 1% test level.

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