Jejak Vol 18 (1) (2025): hlm 24-35 DOI: https://doi.org/10.15294/jejak.vi8i1.9701

JEJAK

Journal of Economics and Policy

http://journal.unnes.ac.id/nju/index.php/jejak

The Impact of the One Price Fuel Oil (BBM) Program on the 3T Rural Economy in Indonesia

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Permalink/DOI: https://doi.org/10.15294/jejak.v18i1.9701

Received: July 2024 ; Accepted: November 2024 ; Published: March 2025

Abstract

The One Price Fuel Policy is a positive step to reduce fuel price inequality throughout Indonesia. In the 6 years of implementing this program (2017-2022), the BBM Distribution Business Entity has built 423 distributors throughout Indonesia. The success of the One Price Fuel program is still being debated. So this research wants to examine further the influence of one-price fuel on the rural economy in the 3T region of Indonesia with a research focus on the number of small industries and economic facilities including markets, supermarkets, grocery stores, food stalls, restaurants, and hotels. Researchers used a Difference in Difference (DiD) regression model with a staggered events approach and two strategies to control non-intervention factors that influenced the results. This research found that in certain case scenarios, this policy was implemented gradually after one year of implementation, causing a causal impact on the number of grocery stores and food stalls, and in other outcomes, the results could not be validated because the assumptions had not been met.

Key words : One Price Fuel, Small Industries, Economic Facilities, 3T (Remote, Outermost, and Frontier Areas)

How to Cite: Adam, F., & Hartono, D (2025) The Impact of the One Price Fuel Oil (BBM) Program on the 3T Rural Economy in Indonesia. JEJAK: Jurnal Ekonomi dan Kebijakan. 18(1). DOI : https://doi.org/10.15294/jejak.vi8i1.9701

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p-ISSN 1979-715X
e-ISS

INTRODUCTION

Indonesia is the largest archipelagic country in the world with more than 17,000 islands, Indonesia has spatial challenges in providing affordable energy access for residents in all rural areas. This situation is complicated by infrastructure development which is largely concentrated in urban areas (Sandee, 2016). In addition, Indonesia has varied geographical conditions which cause difficulties in the supply and distribution of fuel in several regions and cause welfare inequality between regions. Apart from hampering regional economic growth, difficulties in the supply and distribution of fuel also act as a barrier to production input and driving consumption.

In response to this problem, at the beginning of 2017, the Indonesian Government implemented a policy called One Price Fuel, to determine certain price standards and not be determined by free market mechanisms. In general, this policy aims to realize the availability, ease of access, and affordability of fuel prices for rural communities, especially in the outermost disadvantaged areas (3T) in Indonesia 1. This policy ensures the distribution of petrol and diesel fuel in 3T villages at the same price throughout Indonesia (Kim, 2019). For example, in NTB and Papua, fuel prices can reach 95,000-100,000 rupiah per liter.2, Disparities in fuel prices in various regions occur because the costs of production facilities or transporting resource needs to villages in the 3T area are high due to long distances, limited transportation infrastructure, and difficult terrain (Haire & Machemehl, 2010). Several studies have shown that increasing transportation mobility can reduce socio-economic disparities between regions (Yudhistira & Sofiyandi, 2018), spatial effects of local economic activity (Karimah & Yudhistira, 2020).

The One Price Fuel Program is a Government policy regulated in Peraturan Menteri (Permen) Energi dan Sumber Daya Mineral Nomor 36 Tahun 2016. This regulation mandates that fuel distribution business entities establish distributors in locations where there are no fuel distributors so that people can buy fuel at the retail selling price set by the government. The construction of fuel distributors under the One Price Fuel Program in the 3T area allows people to buy fuel at affordable prices. Until 2023, this program is claimed to have exceeded the set target and succeeded in achieving the 100% target, namely providing fuel at the same price as the official selling price of IDR 6,450 per liter (Premium) and IDR 5,150 per liter (Solar) in all regions of Indonesia, especially in the regions remote and difficult to reach areas.

Based on targets and realization, the development of one price fuel distributors, since the program was implemented in 2017 to 2022, the one price fuel program has reached 423 distributors and will continue until 2024. On the other hand, members of the DPR Commission VII DPR RI Mulyanto doubt the success of One Price Fuel nationally because in some regions fuel prices are still different, for example, the selling price of fuel in Papua is still very high (Indrawan, 2021). In its journey, the One Price Fuel program has faced several challenges including the lack of official distributors, difficult geographic access in border areas, and inadequate infrastructure. Therefore, the success of the One Price Fuel program in boosting the economy in the 3T area still needs to be studied further. Government intervention through fuel subsidies is considered to possibly have a significant macro impact by providing and distributing fuel at affordable prices that can be felt by the community, especially in the 3T area. Although,

this cannot directly solve the problem of fuel availability in the 3T area.

Recent studies have shown that fuel price policies can reduce transportation costs (Ichsan et al., 2021) and inflation (Barrell & Pomerantz, 2008), while also having broader multidimensional effects on health, education, and community welfare (Bouzarovski & Petrova, 2015).

Rural growth and development can be reflected in improvements in the economy, society, public facilities, and governance (Sashkova et al., 2024). Enhancing public facilities such as markets, hospitals, stalls, and small industries may serve as key indicators of rural development and sustainability (Omar et al., 2018). Technological innovation and affordable fuel prices can significantly improve public services and infrastructure, thereby stimulating rural growth. A comprehensive understanding of the impact of fuel price policies is crucial for effective government policymaking. However, research on the extent to which fuel prices influence the rural economy particularly in the 3T (frontier, outermost, and underdeveloped) regions remains limited.

Therefore, the general aim of this research is to analyze whether One Price Fuel has an impact on increasing socioeconomic activities such as small industries, shops, markets, supermarkets, restaurants, food stalls, and hotels in the 3T area in Indonesia.

RESEARCH METHODS

This research uses analytical tools using the Difference in Differences (DiD) method, event study (staggered events) approach to estimate the causal effect of the impact of the One Price Fuel program on small industries and rural economic facilities. By carrying out a gradual analysis of the research results through (equation 1). This analysis tool uses village area coverage with the construction of gas stations in 3T areas as program implementation. Difference in differences (DiD) with an event study approach is a type of quasi-experimental method. This research uses a stepwise DiD specification to estimate the impact of a regression specification using the following equation model:

$$Y_{it} = \alpha + \beta\, SPBU_{it} + \gamma X_{it} + \delta_i + \vartheta_t + \varepsilon_{it} \quad (1)$$

Our hypothesis proposed that the One Price Fuel policy positively impacts socioeconomic activities such as small industries, shops, markets, supermarkets, restaurants, food stalls, and hotels in Indonesia's 3T regions. This hypothesis was tested using the first model, while the second model assessed the average dynamic effects that could introduce potential bias.

This research uses two control variables, namely the condition of the widest road pavement in the village and road accessibility for car transportation. (Goodman-Bacon, 2021) argues that the validity of the causal interpretation of the effects estimated in DiD regression depends on several assumptions, including (i) the common pre-treatment trend assumption test (ii) the assumption that there is no anticipation of treatment, and (iii) no selective timing of treatment and there are no causal effects on outcomes related to early and late implementation of the policy. Additionally, these effects may grow or weaken over time. To capture this effect, using the dynamic effect of changes in the impact of the construction of the One Price Gas Station using an event study (staggered events) model, including lead and

lag treatment as regressors to estimate the average dynamic effect of discrete shocks and non-temporary treatment effects as follows:

$$Y_{it} = \alpha + \sum_{k=1}^{K} \beta_{pre,k} SPBU_{it+k} + \sum_{j=0}^{J} \beta_j SPBU_{it-j} + \gamma X_{it} + \delta_i + \vartheta_t + \mu_{it} \quad (2)$$

The process of building One Price Gas Stations in the 3T area is not being implemented simultaneously but is happening in stages. This development timeline includes the initial development phase in 2017 with 18 gas stations, the second phase in 2018 with 24 gas stations, then the third phase in 2019 with 15 gas stations. It is hoped that this division will facilitate accurate estimates of the different impacts attributed to each phase by categorizing treatment villages based on the stages of the year of gas station construction, namely:

1. Case scenario I, villages where gas stations have been built since 2017-2019: Assume, that to see the stages and impacts of gas station construction, a model analysis was carried out by including all treatment villages (57 units) without dividing them by year category. Shows the accumulated number of villages where gas stations were built in 2017, 2018 & 201.

2. Case scenario II, villages where gas stations were built until 2018: Assuming, to see the stages and impacts of gas station construction, a model analysis was carried out by including all treatment villages (42 units) by dividing them by year category. Shows the accumulated number of villages where gas stations were built in 2017 and 2018 only

3. Case scenario III, villages where gas stations were built in 2017-2018 and 2019: Assuming, to see the stages and impacts of gas station construction, a model analysis was carried out with stagger (in stages) initially until 2018 treatment villages (42 units) then in 2019 and so on there were additional treatment villages (15 units) to 57 units. By dividing by year category. Shows the accumulated number of villages where gas stations were built until 2018 and 2019 only.

In general, this research uses two data sources. The first source is data on One Price Fuel Distributors from the Downstream Oil and Gas Regulatory Agency (BPH Migas) in 2017, 2018, and 2019. This data is used to determine the location points where gas stations distributing the One Price Fuel policy were built, consisting of 57 treatment villages, and 291 Control villages were obtained from 2017, 2018, and 2019. The second source is Village Potential data from 2011, 2014, 2018, 2019, 2020 and 2021. This data shows that economic activity is proxied by the number of small industries and economic facilities. This research uses a village analysis unit based on the village area code in the Podes data and adapts the regulations contained in the policy program. To provide an overview of the use of models in data structures, in this study a placebo test was carried out with random treatment with many iterations.

RESULTS AND DISCUSSION

Common Pre-Treatment Test & Difference in Differences (DiD) Regression Analysis of One Price Fuel Policy on Small Industries and Economic Facilities through Case Scenarios

1. **Case scenario I (A village where a gas station was built from 2017 to 2019)**

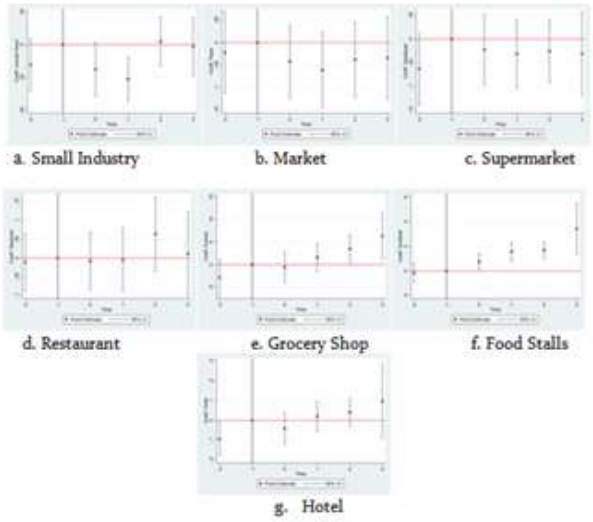

Figure 1. One Price Fuel Policy using Case Scenario I Analysis

Based on the average results in Figure 1 and the estimation results in Table 1, the DiD regression for grocery shop stores and food stalls supports the parallel trend assumption. Data before treatment for the two outcome variables showed the same trend between the treatment and control groups. Post-treatment data indicate a treatment effect that is significant from zero, indicating that changes in outcomes can be attributed to the treatment applied. DiD regression results for small industries, markets, supermarkets, restaurants, and hotels show a tendency for treatment effects to occur. However, these five variables do not meet the validity of the parallel trend assumption. In addition, some variables had quite wide 95% CIs and time differences for different groups. This indicates that there is high uncertainty in the estimation of effects at some points in time.

2. **Case scenario II (Villages where gas stations were built until 2018)**

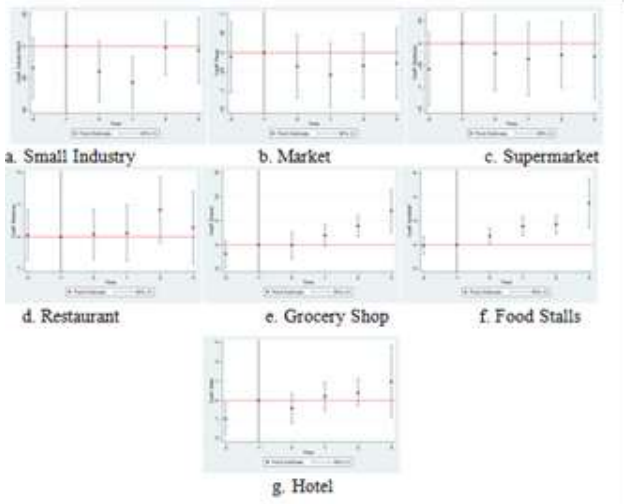

Figure 2. One Price Fuel Policy using case scenario II analysis

Based on the average results in Figure 2 and the estimates in Table 2, only the DiD regression results for retail stores and food stalls support the parallel trend assumption. Meanwhile, the DiD regression results for small industries, markets, supermarkets, restaurants, and hotels show a tendency for treatment effects, but these business sectors do not meet the validity of the parallel trend assumption. In addition, these business sectors have some fairly wide 95% CIs and time differences for different groups. This indicates high uncertainty in the estimates of effects at some points in time.

3. **Case scenario III (Villages where gas stations were built in 2017-2018 and 2019)**

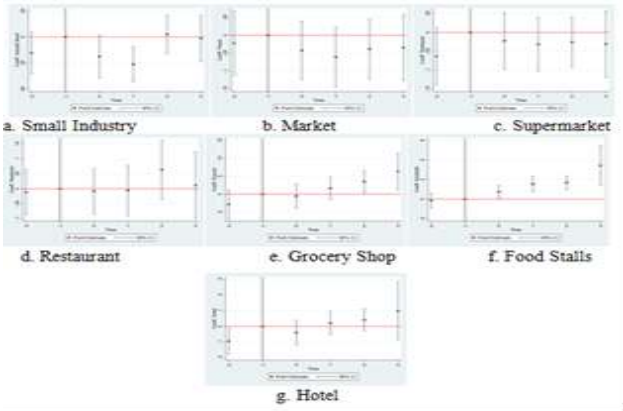

Figure 3. One Price Fuel Policy using Case Scenario III Analysis

In line with case scenario I, the average results in Figure 3 and the estimation results in Table 3 show that the DiD regression for grocery shop stores and food stalls supports the parallel trend assumption. DiD regression results for small industries, markets, supermarkets, restaurants, and hotels show a tendency for treatment effects to occur. However, these five variables do not meet the validity of the parallel trend assumption. In addition, some variables had quite wide 95% CIs and time differences for different groups. This indicates that there is high uncertainty in the estimation of effects at some points in time.

Changes in the Number of Economic Facilities Due to the Construction of Gas Stations

Table 4 shows the dynamics of changes in small industries and economic facilities before and after the One Price Gas Station development program in the recipient and control village groups. In general, the difference in economic means in the two groups shows additional means. For example, in the period before the gas station construction program, the difference in the number of food stalls between the treatment and control groups was two. This figure increased after the program to build gas stations to five. The same thing was also shown in the number of retail stores which originally had a gap of 15 units, which increased to 20 units after the one-price gas station program was implemented.

However, small industries and markets show different patterns in which there is a decrease in the difference in numbers after the policy is implemented. The decrease in the number of markets and small industries after the implementation of the One Price Fuel policy could be caused by increasing operational and logistics costs which are not balanced with selling prices, thereby reducing profits and causing the closure of several business units. Additionally, tougher competition and changes in the distribution of goods may also have contributed to this decline.

Based on these dynamics, it can be said that for villages with a One Price Fuel program with fuel quotas that are constant over time, higher demand will logically increase prices, reducing the discounting effect of subsidies. In addition, the increase in the number of gas station construction after the implementation of the One Price Fuel program can have a direct impact on the supply side and the final price paid by consumers. Explicitly, from the supply side, the aggregate shipping costs borne by shipping producers (distributing agencies) due to higher demand will not exceed the government's allocation for total One Price Fuel Subsidy expenditure because it will reduce business profits.

Table 1. Difference in difference (DiD) regression results for case scenario I

Variable	(1) Small industry	(2) Market	(3) Supermarket	(4) Grocery shop	(5) Food Stalls	(6) Restaurant	(7) Hotel
Did case 1	-2.713**	-0.271***	0.0161**	4.509**	2.011**	0.111**	0.118**

	(0.0673)	(0.00165)	(0.00112)	(0.0775)	(0.0369)	(0.00274)	(0.00403)
Constant	9.421***	0.229	0.0631*	12.44	2.391*	0.141**	0.272**
	(0.0697)	(0.0712)	(0.00609)	(2.062)	(0.203)	(0.00327)	(0.0210)
Control Variable	YES	YES	YES	YES	YES	YES	YES
FE for Village	YES	YES	YES	YES	YES	YES	YES
FE for Years	YES	YES	YES	YES	YES	YES	YES
Observations	2,088	2,088	2,088	2,088	2,088	2,088	2,088
Treated	228	228	228	228	228	228	228
Control	1860	1860	1860	1860	1860	1860	1860
R-squared	0.067	0.011	0.005	0.018	0.030	0.004	0.014

Tabel 2. Difference in difference (DiD) regression results for case scenario II

Variable	(1) Small Industry	(2) Market	(3) Supermarket	(4) Grocery shop	(5) Food Stalls	(6) Restaurant	(7) Hotel
Did case 2	-6.039***	-0.398***	-0.0189*	1.625**	2.146***	0.148***	0.232***
	(0.0430)	(0.00274)	(0.00181)	(0.0773)	(0.0136)	(0.00126)	(0.00312)
Constant	9.117**	0.213	0.0648**	12.18*	2.412**	0.149**	0.256*
	(0.339)	(0.0852)	(0.00199)	(1.661)	(0.0476)	(0.00416)	(0.0213)
Control Variable	YES	YES	YES	YES	YES	YES	YES
FE for Village	YES	YES	YES	YES	YES	YES	YES
FE for Years	YES	YES	YES	YES	YES	YES	YES
Observations	1,998	1,998	1,998	1,998	1,998	1,998	1,998
Treated	168	168	168	168	168	168	168
Control	1830	1830	1830	1830	1830	1830	1830
R-squared	0.067	0.017	0.005	0.017	0.030	0.004	0.016

Table 3. Difference in difference (DiD) regression results for case scenario III

Variable	(1) Small Industry	(2) Market	(3) Suprmarket	(4) Grocery shop	(5) Food Stalls	(6) Restaurant	(7) Hotel
Did case 3	-2.463**	-0.270***	0.0120***	3.417*	1.888**	0.0902*	0.105**
	(0.0577)	(0.00140)	(0.000126)	(0.343)	(0.122)	(0.0107)	(0.00215)
Constant	9.419***	0.228	0.0631*	12.44	2.393*	0.141**	0.272*
	(0.142)	(0.0681)	(0.00521)	(2.305)	(0.246)	(0.00824)	(0.0246)
Control Variable	YES	YES	YES	YES	YES	YES	YES
FE for Village	YES	YES	YES	YES	YES	YES	YES

FE for Years	YES	YES	YES	YES	YES	YES	YES
Observations	2,088	2,088	2,088	2,088	2,088	2,088	2,088
Treated	213	213	213	213	213	213	213
Control	1875	1875	1875	1875	1875	1875	1875
R-squared	0.067	0.011	0.005	0.018	0.030	0.004	0.014

Table 4. Changes in additional economic facilities due to the construction of gas stations

Outcome	Before the construction of the One Price gas station 2011-2014		After the construction of the One Price gas station 2018-2021		Treatment Group Delta – Control	
	Control	Treatment	Control	Treatment	Before	After
Small Industry	11	12	17	16	1	-1
Market	0,198	0,658	0,226	0,417	0,460	0,191
Grocery shop	11	26	15	35	15	20
Food Stalls	2	4	3	8	2	5
Supermarket	0,053	0,246	0,094	0,303	0,193	0,209
Hotel	0,204	0,781	0,304	1	0,577	0,696
Restaurant	0,144	0,421	0,152	0,539	0,277	0,387

Estimated Impact of Differences in Development Time for One Price of Fuel

The dynamic analysis method for the impact of the One Price Fuel program adopts dynamic specifications by modifying equation (1) and identifying variables one and two years before the operation of the gas station. Here's the modified equation 3:

$$Y_{it} = \alpha + \sum_{k=1}^{2} \beta_{pre,k} SPBU_{it+k} + \sum_{j=0}^{3} \beta_j SPBU_{it-j} + \beta 3\ typeroad_{it} + \beta 4\ drivable_{it} + \gamma_t + \delta_i + \mu_{it} \quad (3)$$

In general, the existence of the One Price Fuel program has been proven to increase the number of local economic facilities in the number of supermarkets, hotels, food stalls, restaurants, and grocery shops, and reduce the number of small industries and markets. In addition, this research obtained suggestive evidence about the anticipatory response of the One Price BBM program.

The coefficient for lead time tends to be statistically insignificant. Thus, the figure also shows that the parallel trend assumption applies, at least in the two years before operations begin. Furthermore, to ensure that the identification strategy meets the parallel trend assumption, this research also checks robustness with a robustness check through a placebo test with interactions between policy variables and trends over time and hopes that the resulting parameters are robust to various scenarios and assumptions.

Robustness Test with Placebo Test (Random Treatment)

1. **Case Scenario I**

   The robustness test using placebo (random treatment) in Case Scenario I demonstrated that the original treatment effects are largely resistant to random shocks across various sectors. In the placebo tests conducted for small industries, traditional markets, supermarkets, food

stalls, grocery shops, restaurants, and hotels, the majority of the ten random treatment iterations in each sector yielded statistically insignificant results—ranging from 80% to 100% insignificance—indicating strong robustness. Only isolated iterations in a few sectors (e.g., small industry, supermarket, restaurant, and hotel) showed significance, but these were minimal and scattered. Moreover, when the random treatment simulation was extended to 100 and 1,000 iterations, significant effects remained limited (10–15%), reinforcing the conclusion that the actual treatment effect is unlikely due to chance. These findings validate the reliability of the main model, particularly given that the DiD regression and event study visualizations confirm the parallel trend assumption, strengthening the credibility of the observed causal impacts.

2. Case Scenario II

In Case Scenario II, the placebo tests across sectors—small industries, markets, supermarkets, food stalls, grocery shops, restaurants, and hotels—showed that 90% of random treatment iterations were statistically insignificant in most sectors, except for restaurants with 70% insignificance. This suggests strong robustness of the original results against random treatment. Although a few iterations showed significance, the majority remained insignificant, including in extended simulations with 100 and 1,000 iterations, where only 10–15% were significant. These findings reinforce that the observed effects are unlikely due to random chance and support the validity of the original treatment's impact.

3. Case Scenario III

Case Scenario III, placebo tests using random treatment across sectors—including small industries, markets, supermarkets, food stalls, grocery shops, restaurants, and hotels—showed that most iterations (80–100%) were statistically insignificant, indicating strong robustness of the original results. Only a few sectors, such as food stalls and restaurants, had up to two significant iterations out of ten. Extended simulations with 100 and 1,000 iterations further confirmed that significant effects were limited (10–15%), reinforcing that the observed treatment effects are unlikely due to random chance. These findings support the validity of the intervention's actual impact.

DISCUSSION

This study showed that One Price Fuel policy was implemented gradually after one year of implementation, causing a causal impact on the number of grocery stores and food stalls.

The affordability of fuel prices makes operational and distribution costs that were initially large smaller. Retailers can offer more competitive prices and more efficient costs to consumers (Walker et al., 2015). Ultimately, this program can help improve the living standards of local communities and reduce economic disparities between 3T regions.

Lower and uniform fuel prices make transportation and logistics costs more affordable and increase purchasing power (Abdulrahman, 2023). This makes it easier for retailers, supermarkets, food stalls, and

restaurants to access raw materials and operate businesses at lower costs so they can open new business branches. In the Hotel sector, low logistics costs encourage increased marketing and advertising costs. This condition is also supported by road improvements that support the entry of tourists to potential areas in 3T. As a result, there is a growth in the number of hotels in the 3T area in the group that receives the One Price Fuel program.

The potential decline in the number of markets in the 3T region is something that is not expected in this program. The possible cause of the decline in the number of markets in the 3T region is related to logistics costs. Oil prices are a major driver of input costs and a risk factor for logistics service providers (Aggarwal et al., 2012; Drobetz et al., 2010; Hofmann et al., 2018; Maitra et al., 2021; Yun & Yoon, 2019). Fluctuations in fuel prices have a major impact on low and middle-income group consumers while high-income group consumers have little impact on their expenditure (Butt et al., 2022). The reduction in fuel prices when the One Price Fuel program was implemented caused logistics costs to decrease. The community, both traders and consumers, have easy access and mobility to reach larger and more complete markets located in other areas. As a result, many small traditional markets lost their traders and consumers. This ultimately resulted in a decrease in the number of traditional markets in the 3T area.

Interestingly, the One Price Fuel policy also causes small industries not to develop. Reducing fuel prices and reducing logistics costs are not the main determinants of small industry growth in the 3T area. The growth of small industries in areas in 3T is determined more by the distance between the source of raw materials and the factory, the availability of credit, good road infrastructure, and optimal market access (Mottaeva & Gritsuk, 2016). Apart from that, in 3T areas investor interest in investing is still low, and small industrial players depend on credit facilities (Hailay & Hagos, 2014; Jones, 2022). Optimal market access is very necessary to increase consumers and plays an important role in developing export-priority products. Optimal market access can be obtained from the use of digital technology such as online marketing and e-commerce (Syuhada & Gambett, 2013).

FUTURE DIRECTIONS

Several policy recommendations are needed to ensure that the benefits of this policy are maximized and sustainable. First, the government must carry out regular evaluations of the implementation of the one price fuel policy, by involving other actors and stakeholders to find obstacles and opportunities in adjusting the policy. Therefore, the one price fuel policy can provide optimal and sustainable profits for retail and food stall businesses, while supporting more equitable, inclusive economic growth. Second, subsidies issued by the government such as quotas and strengthening fuel distribution infrastructure to ensure equal availability in all remote areas result in quite high costs, so they are not commensurate with the benefits provided in reducing fuel price disparities between regions. In addition, increasing transparency and accountability in fuel distribution will prevent irregular practices and ensure that businesses in the retail and food stall sectors truly experience the benefits of the policy.

CONCLUSION

The One Price Fuel policy has contributed to rural economic growth, particularly in the grocery shop and food stall business sectors.

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