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Price Controlled Petroleum and LPG Prices and COVID-19: Some Evidence From Fiji

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This note examines the effects of the COVID-19 pandemic on price-controlled petroleum and LPG prices in Fiji. We develop autoregressive models of price control orders authorised by the Fijian Competition and Consumer Commission and find that the controlled prices of imported fossil fuels in Fiji did increase during the COVID-19 because of supply chain issues during the pandemic. Moreover, the effect of the pandemic on LPG prices was greater than those on petrol prices. These effects of the COVID-19 pandemic are found to be insignificant, which implies that consumers of imported fossil fuel were shielded by the price control policy and in the case of transport fuel, reduced demand for transport fuel due to the economic lockdowns also provided some relief in the domestic market.

I. Introduction

Given Fiji's geographic isolation and reliance on imported petroleum products and LPG for transportation and household use (such as kerosene or LPG for cooking purposes), the objective of this note is to explore whether the domestic fuel and gas markets were affected by the economic lockdowns and the global supply chain disruptions during the COVID-19 pandemic. Indeed, the uniqueness of using Fiji data on petrol and LPG products also arises from the fact that both are price controlled. That those prices are controlled by the Fijian Competition and Consumer Commission (FCCC) provides a laboratory to test the effectiveness of such price controls. Hence, there is a strong policy interest to understanding whether price controls were effective or an obstacle during these shocks. Knowledge on this can inform FCCC's future policy stance and interventions including the timing of such interventions when faced by a crisis.

In essence, we examine the association between the domestic price-controlled petroleum (or LPG) and the supply chain disruptions and economic lockdowns created by the COVID-19 pandemic. Price ceiling policy is heavily prevalent in Fiji and is a common strategy used for improving affordability of essentials. Our study uses the price control orders on fossil fuels in Fiji over the last decade.

There is now a large scholarship on the effects of COVID-19 on the economic and financial systems and a subset of these closely examine the international oil markets during the COVID-19 (Devpura & Narayan, 2020; Fu & Shen, 2020; Gil-Alana & Monge, 2020; Iyke, 2020; Narayan, 2020; Ren et al., 2021; Salisu & Adediran, 2020). This note, unlike the literature, considers the effects of the pandemic on the fossil fuel market focusing on domestic prices of disaggregated petroleum products and LPG products in a small Island developing state, which is heavily regulated through the price ceiling policy.

II. Empirical Analysis

A. Data

The paper uses monthly data on domestic retail prices of gas and petroleum products. These are regular price control orders authorised by the FCCC. All prices are expressed in Fiji dollars and are measured in term of per litre. The petroleum products, namely, motor spirit, diesel (or diesoline), kerosene and premix are available for the period 2011:01 to 2022:03 while the domestic LPG products are represented by cylinder (4.5kg), cylinder (12 kg)[1], and Autogas (in litres). To capture the effects of the COVID-19 pandemic, we create a dummy variable which takes the value of one from 2020:01 to 2021:12 or zero, otherwise.. This measure is sufficient for the analysis as the aim is to capture the

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1 Households in Fiji commonly use LPG in cylinder for cooking purposes.

Table 1. Descriptive Statistics

FJ$	Diesel (per litre)	Kerosene (per litre)	Motor spirit (per litre)	Premix (per litre)	Cylinder (4.5kg)	Cylinder (12 kg)	Autogas (per litre)
Mean	1.92	1.58	2.24	2.08	14.41	38.42	1.82
Median	1.89	1.63	2.21	2.03	13.88	37.02	1.74
Maximum	2.39	2.03	2.75	2.55	18.51	49.35	2.55
Minimum	1.24	0.91	1.66	1.29	10.77	28.73	1.36
Std. Dev.	0.32	0.30	0.30	0.36	2.21	5.88	0.30
C.V.	16.89	19.06	13.51	17.12	15.31	15.31	16.28
Obs.	135	135	135	135	123	123	123

This table contains selected descriptive statistics, such as the mean, median, maximum, minimum, standard deviation (Std. Dev), the coefficient of variation (C.V.). The last row captures the number of observation (Obs.).

effects of lockdowns and supply chain issues and not the effects of deaths due to COVID-19 or cases of COVID-19. Given that the gas data is sufficiently large, we also test the effect of the Ukraine-Russia war on the prices. Again, we use a binary variable to depict the war. It takes a value of 1 from February 2022 onwards, which is the month that marks the beginning of the war on Ukraine and a value of zero in the other months.

Table 1 explains the common statistics for these price-controlled fossil fuels. Notice that average per litre price of motor spirit is the highest among petroleum products, at FJ$2.24, followed by premix at FJ$2.08, diesel (FJ$1.92) and kerosene (FJ$1.58). The LPG price for a 4.5kg and a 12 kg cylinder averaged FJ$14.41 and FJ$38.42, respectively, while autogas price averaged FJ$1.82 per litre. Of all the fossil fuels, controlled prices of kerosene are the most volatile, followed by that of premix. Diesel and Autogas prices are nearly as volatile as the other, while LPG, by both cylinder sizes, displays similar volatility.

Next, we examine the stationarity of the variables using the conventional Augmented Dickey Fuller test and find that the logarithmic form of the domestic prices of fossil fuel (which attract price ceiling) are non-stationary. This informs the form of the stationary variables in the *AR(p)* models. In essence, the price variables will need to be differenced (*D*) once.

Our *AR(p)* model is estimated with a maximum of three lags. The optimal lag length for each model is determined using the Akaike Information Criteria (AIC). Results are presented in Table 3. Price of petroleum products is explained by *AR(3)* models, while LPG prices are depicted in *AR(2)* or *AR(1)* models. However, we notice some significance of the *AR* process only when using kerosene and premix price models.

More importantly, the COVID-19 pandemic does show a positive effect. And, although this is insignificant for both petroleum products and LPG, the magnitude of the effect is milder when it comes to the petroleum products. This insight we obtain is that price controls have shielded the pressures of the supply chain disruptions during the COVID-19, although the lacklustre transportation demand during the economic lockdowns may have helped Fiji cope with the supply pressures that it faced during the COVID-19.

III. Concluding Remarks

This note examines the effect of the COVID-19 pandemic on the prices of imported fossil fuels, which is essential for transportation and household use in Fiji and as a result also price controlled. The findings show the effect of economic lockdowns and supply chain disruptions were higher on LPG prices than transport fuels, although for both, the effects are insignificant. This says two things: first, that the policy of price controls has been shielding consumers from some of the effects from the COVID-19 pandemic; and second, that the effects of the economic lockdowns that curbed demand for transportation cannot be discounted for releasing some of the market pressures in the petroleum and LPG market. Overall, the FCCC's role has been important during the pandemic.

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Table 2. Unit Root test results

Variables (in Log form)	Level form		First Difference Form	
Petroleum Products (2011:01-2022:03)				
Diesel	-1.143	0.697	-10.652	0.000
Kero	-2.674	0.081	-9.838	0.000
Motor spirit	-1.385	0.588	-10.270	0.000
Premix	-1.883	0.339	-9.552	0.000
Gas (2012:02 – 2022:12)				
Cylinder (4.5 kg)	-2.090	0.249	-10.863	0.000
Cylinder (12 kg)	-2.090	0.249	-10.869	0.000
Auto gas	-1.756	0.401	-10.531	0.000

This table has unit root test results. The first column of statistics are the t-tests examining the null hypothesis of a unit root, followed by the p-values. The first set of results the variables in level form while the second set of results are based on subjecting the first difference of the variables to a unit root test. Column 4 therefore reports the associate t-test statistics while the last column has the associated p-values.

Table 3. *AR (p)* model results

	Diesel		Kerosene		Motor spirit		Premix	
C	-0.001	0.680	-0.001	0.880	-0.001	0.749	-0.001	0.686
dlpetrol(-1)	0.057	0.510	0.146*	0.097	0.097	0.269	0.195**	0.029
dlpetrol (-2)	-0.020	0.818	-0.117	0.184	-0.047	0.597	-0.145	0.107
dlpetrol (-3)	0.018	0.838	-0.161	0.068	-0.135	0.126	-0.043	0.624
COVID-19	0.004	0.283	0.003	0.726	0.005	0.213	0.004	0.438
Adjusted *R*-squared	-0.018		0.040		0.012		0.030	
	Cylinder (4.5kg)		Cylinder (12 kg)		Autogas			
Variable	coef.	Prob.	coef.	Prob.	coef.	Prob.		
C	-0.002	0.673	-0.002	0.672	-0.003	0.650		
dlpetrol(-1)	-0.016	0.859	-0.017	0.855	0.019	0.834		
dlpetrol(-2)	-0.036	0.697	-0.036	0.697				
COVID-19	0.017	0.178	0.017	0.177	0.017	0.197		
UKRAINE	-0.008	0.674	-0.008	0.674	0.002	0.929		
Adjusted *R*-squared	-0.015		-0.015		-0.010			

This table presents estimated coefficients from the *AR(p)* petrol and gas models. All variables are in their log (L) form and as per the unit root test, were differenced (d) once. * and ** denotes significance level at the 10% and 5%.

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