

## **ACCESSING THE IMPACT OF CHANGES IN PRE-TAX SUBSIDY ON INFLATION IN DEVELOPING COUNTRIES**

Usman Alhaji Usman<sup>1,a,\*</sup>

<sup>1</sup>Department of Economics, Ibrahim Badamasi Babangida University Lapai, Niger State, Nigeria

<sup>a</sup>uubussu@gmail.com

\*Corresponding author

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### **Abstract:**

*Research background:* The framework of classical and Keynesian has little contribution on economic cycle in developing countries rather the issue is mostly structural cause. Subsidy continued to generate contentious issues as to whether it fuels inflation or not. Subsidy on energy has significant implication on pricing gap. Thus reform on subsidy taken cautiously or not can affect productive sector and spike inflationary pressure.

*Purpose of the article:* This study seeks to investigate the effect of pre-tax subsidy due to its direct effect on energy prices and inflation, it also empirically seeks to investigate the effect of post-tax subsidy due to its direct effect on environment and externality consequently on inflation and lastly, to investigate the effect of change in GDP on inflation.

*Methodology:* In the manuscript, the price gap model is used to measure pre-tax and post-tax subsidy due to enormous roles they play in energy prices and inflation. This study employs the panel data set often (10) developing countries spanned 2003-2019. The predicted model applied is the panel auto regressive distributed lag model which was selected as a result of the panel unit root test indicating series at 1(0) and 1(1). The pool mean group was selected among all classes of ARDL specifications following the test statistics of Hausman test.

*Findings & Value Added:* The result of pool mean group shows that pre-tax subsidy has a positive insignificant effect on inflation in the long run. GDP has negative insignificant effect on inflation in the long run and post-tax subsidy has negative and statistical significant effect on inflation in the long run. The result also revealed that there is a unit directional causality running from GDP to inflation. However, employing a separate time series data set on Nigeria, the result shows that all series are integrated in the long run and in any experience of shock in the short run, it will affect the movement in the individual series and eventually makes series to have long run convergence. The value added in this study is that several studies on this subject have measurement flaws not segregating pre-tax and post-tax subsidy separately. In addition, studies on panel data on oil exporting countries are scanty.

**Keywords:** pre-tax subsidy; post-tax subsidy; GDP; inflation and autoregressive distributed model

**JEL Classification:** E21; E31; D78

## **1. Introduction**

Subsidy on energy has significant implication on pricing gap as well as demand for energy products and inflationary pressures. The impact at the aggregate level is related to the economy's energy intensity and its openness to external competition and markets. In some cases, subsidy reform translates into an increase in inflationary pressures if price increases are large enough and by implication, the increase or hike in lag value subsidized prices of fuel will cause a first-round increase in fuel inflation, with the magnitude of the pass-through dependent on the weights of food and fuel products in the consumer price index (IMF, 2021). It translates to borrowing to cover up the price gap and by implication open door for corruption amongst oil stakeholders. NNPC oil marketers, MNC, bureaucrats and top political office holders continued to claim volume falsified subsidy claims especially in Nigeria and inflation uncontrollable (Acharya and Sadath, 2017). On theoretical framework that supports subsidy and inflation, Classicalist in (1517) assumes quantity theory of money caused inflation, in addition, Keynesian approach (1930) allows government framework to influence economic cycle. Phillips framework on inflation and wages in 1960, these frameworks only support data for advanced economies. However, inflation in developing countries is structural and it deals with weakness in a country capacity to produce goods internally to maintain adequate flow of supply. The problem of inflation in developing countries that do not produce but depend on import is structural not as theorized by classical and Keynesian framework. The poverty gap theory by Foster et al. (1984) inequality and poverty target are income distribution rather than per capital income. Kuznets (1995) investment is key to increasing income of the poor and raising expenditure. Most studies also focused on oil prices and inflation (Okwanya et al., 2015; Omolade et al., 2019; Rotimi and Ngalawa 2017). However, these studies failed to substantially segregate the effect of pre-tax and post-tax subsidy on inflation. The study will add insight to investigate the long and short run equilibrium effect of pre-tax and post-tax subsidy on inflation and causal direction. It investigates how fiscal policy tool affect monetary target.

## **2. Literature Review**

There is dearth with mixed evidences on the relationship between subsidy and inflation Omotosho (2019) in a study used time series to estimate the macroeconomic implications of oil price shocks and the extant fuel subsidy regime for Nigeria spanned 2010 to 2018 and applying the error variance decompositions approach. The result of the study showed that that fuel subsidy removal leads to higher macroeconomic instabilities. Bello (2020) used Vector Autoregressive Model to estimate the effect of PMS Subsidy on poverty using Nigerian data set span 1981-2016, PMS subsidy has no much significant effect on poverty.

Ghosh (2022) used data on India to investigate the relationship between subsidy on Diesel and inflation using VAR based macroeconomic model and employing 78 quarterly data spanned 1997-98 Q1 to 2016-17 Q2. Thus this covers the period of diesel subsidy reforms and pricing policy in Indian economy the result of the study show that diesel subsidy reform improves growth by reducing inflation. In a recent study, Auktor and Loewe (2021) in their study on Subsidy reforms in the Middle East and North Africa used data on Morocco, Egypt and Iran between 2010 and 2017 to investigate the effect of subsidy on poverty. The authors reported that subsidy spending could trigger inflation and reduce human welfare thus strategic reforms are needed to be implemented to reduce social unrest.

Harun et al. (2018) used data on Malaysia to impact of fuel subsidy removal policy on input costs of production sectors in Malaysia applying the Input-output Price Model. The

result of the study revealed that fuel subsidy removal policy led to an increase in fuel prices by 32 % on average input costs of production sectors.

Auktor and Loewe (2021) sample Middle East and North Africa (MENA) countries Morocco, Egypt and Iran to estimate the effect of subsidy reform and implication on social contract span 2010 to 2017. Analysis revealed that countries of studies have different reforms and different social contract such as cash transfer scheme.

Rehman and Khan (2015) sampled data set on to estimate the determinant of food prices on Pakistan between 1990–2013 applying the Vector Error Correction model and Johansen co-integration test. The result indicates a long run relationship between food prices and food export and subsidy

Dennis (2006) investigate the implication of fossil fuel subsidy removal on household welfare in developing counties, the authors report that welfare implications are unambiguously positive for government. However, the results are mixed for private households, although in an overwhelming majority the results also are positive. However, even in the cases where the welfare implications are negative for private households the result shows that it is possible for governments to carry out the reforms in such a way as to be welfare improving to households incomes by compensating them with some of the fiscal savings gained from the subsidy reform.

There are important lessons to be derived in different subsidy reforms undertaken across countries. For instance, the Factsheet (2014) records the effect of subsidy removal on Zambian economy in 2013, according to records, fuel subsidy removal causes low-income earners to fall in term of welfare by averagely, 29.9 percent indicating a welfare loss in their average income. However, the high income earners welfare is lost by 12 percent, resulting from fuel subsidy removal. in same vein, household savings declined by 19 percent. It therefore recommends that there should be a strategic measure for compensating for the poor.

IMF (2021) suggested social protection strategies but debt sustainability has been an issue in the context borrowing to support for subsidy and by implication, a huge debt profile result to debt overhang and compelling nations to pay debt servicing over a long period of time. Since subsidies accrued has implication on public debt profile and crowd out budgetary position of countries to undertake productive investment in especially human capital development and infrastructure, it become even more worrisome for policy makers across the globe to design alternative measures of cushioning or mitigating the plight of population who subsidy is given to. Therefore, so much debt burden and fiscal cost emanates from energy source subsidy and it pertinent for countries to choose among alternatives of subsidies. Thus to complement for increased energy subsidies, countries employed measures such as scaling-up of cash transfer programs. Some of the strategic plans to roll out subsidy has implication on sustainability and effects on fiscal policy response, nations have consolidated on reforms to support the poor. Mauritania, Egypt for instance created a cash transfer policy program. Similarly, Jordan plans to hike electricity tariffs and develop new energy sources with lower generation costs. Morocco adhered to comprehensive subsidy reform with cash transfer program. Sudan embraced social protection program and reduced subsidy on oil. Tunisia also removed subsidy on energy and supporting household with cash transfer policy program. Lastly, Yemen policy is to cut down energy subsidies by gradually hiking up fuel prices and to strengthen support to the poor through an expansion of the Social Welfare Fund.

Considering the regional distribution of subsidy, evidences shows that sub Saharan African region pre tax subsidy stood at \$19.3 billion which is averagely 1.6% of its GDP, in another development, advanced economies pre tax subsidy had reached almost \$25.4 billion which is 0.1% of its GDP. In Central and Eastern Europe and Commonwealth of Independent States

total pre-tax subsidy remained \$72.1 billion which is 1.7% of its GDP. In the same vein, record posits that for Emerging and Developing Asia, it has pre tax subsidy estimated at \$102.3 billion which is 0.9% its GDP. For Latin America and Caribbean, total pre-tax subsidy is \$36.2 billion which is 0.6% GDP (IMF, 2021).

### 3. Methodology

This study spanned 2003 to 2019 using panel data set. The rationale for using pre-tax subsidy data is due to the linear effect on energy price which affect macroeconomic indices. The post-tax subsidy addresses the issue of environmental and externalities and it also covers the price gap that has continued to awaken lingering issues in subsidy reform The data used is the secondary data set retrieved from (IMF, 2021). Sample countries used in this study are as follows Angola, Ecuador, Gabon, Iraq, Kuwait, Libya, Saudi Arabia, United Arab Emirate, Venezuela and Nigeria and this is justified due to availability of data on countries selected

#### 3.1. Model specification

The popular price gap model borrowed from IMF (2021) is important for choice selection of variables explaining inflation. The price gap model captures the difference between domestic prices and international prices. This study will adopt and modify price gap model including GDP in the model.

$$PG = RP - BP \quad (1)$$

The price gap parameter is denoted by  $PG$ ,  $RP$  denotes retail or consumer price of a specific product, and  $BP$  denotes product's benchmark price. The measure of pre-tax subsidy measure the extent to which retail (consumer) prices are lower than the benchmark price. Symbolically it can be expressed as:

$$perunit_{it} = -PG_{it} = BP_{it} - RP_{it} \quad (2)$$

$$\text{IF } RP < BP = 0 \text{ otherwise}$$

When tax on the energy product is measured below the desirable taxation levels, this can result to increase in post-tax subsidy. The latter is derived as the gap which exists between the benchmark price augmented by the desirable taxation denoted by  $T^*$  and the consumer price. However, post tax subsidy expressed mathematically as

$$perunit_{it} = \alpha_0 + \alpha_i BP_{it} + T_{it} - RP_{it}, \text{ IF } RP < BP + T^* = 0 \quad (3)$$

can be measured as total cost of subsidies obtained by multiplying the per unit subsidy with the estimated consumption volume over a certain period of time under consideration e.g., one quarter or one year.

$$INF_{it} = \alpha_0 + \alpha_i Presub_{it} + \beta_i postsub_{it} + \beta_2 GDP_{it} + \varepsilon_{it} \quad (4)$$

However, to ensure that the objective of the study is estimated, the Vector Autoregressive (VAR) model is expressed as:

$$X_t = \alpha + \sum_{j=1}^p X_{t-j} \phi_j + u_t \quad (5)$$

where  $X_t$  is the vector of independent variables employed in the study.

### 3.2. Estimation procedures

Firstly, due to heterogeneity of panel data set, it tests the hypothesis that there is no any significant relationship between pre-tax subsidy and inflation, so also, there is no any relationship between post tax subsidy and inflation. To solve for this hypothesis, the descriptive statistics and inferential statistics are used which explains the mean and standard deviation is employed, the inferential statistics is applied as well to justify and validate the causes of inflation linked to structural issue not as postulated by classicalist and Keynesian or Phillip curve hypothesis. The macroeconomic time series are known to be non-stationary so the unit root test was tested using the Fisher-Type test using ADF suggested by Maddala and Wu (1999), Choi (2001) and Hadri (2000). Fundamentally, when series are stationary and integrated of order one  $I(1)$ , it is followed by use of VECM and VAR. When series are of  $I(1)$  and  $I(0)$ , the ARDL approach is employed. Maddala and Wu (1999) argued that series converge to a long-run value, in that form, co-integration or long run is established.

More so, Madala and Wu (1999) in their study proposed the use of the Fisher (P) test which is based on combining the P-values of the test-statistics for unit root in each cross-sectional unit.

The generalized ARDL ( $p, q_1, q_2, \dots, q$ ) model is expressed as:

$$y_{it} = \sum_{j=1}^p \delta_i y_{i,t-j} + \sum_{j=0}^q \beta'_{ij} x_{i,t-j} + \Phi + e_{it} \quad (6)$$

In this case,  $y_{it}$  mean dependent variable ( $\beta'_{it}$ )' is a  $k \times I$  vector that are allowed to be purely  $I(0)$  or  $I(1)$  or cointegrated  $\delta_{ij}$  is the coefficient of lagged dependent variable called scalars;  $\beta_{ij}$  are  $k \times I$  coefficient of vectors;  $\Phi$  is the unit specific fixed effects;  $i = 1, 2, \dots, N$ ;  $t = 1, 2, \dots, T$ ;  $p, q$  are optional lagged orders;  $e_{it}$  is the error term or white noise.

There parameter ARDL  $p, q_1, q_2, \dots, q_T$  error correction model is specified as:

$$\Delta y_{ij} = \theta_i (y_{i,t-1} - \lambda'_i X_{i,t}) + \sum_{j=1}^{p-1} \xi_{ij} \Delta y_{i,t-1} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta X_{i,t-j} + \varphi_i + e_{it} \quad (7)$$

where  $\theta_i = -(1 - \delta_i)$  is group specific speed of adjustment coefficient (expected that  $\theta_i < 0$ )

$\lambda'_i =$  vector of long – run relationship

$ECT = [Y_{i,t-1} - \lambda'_{i,t}]$  is the error correction term

$\xi_{ij}, \beta'_{ij}$  are the short-run dynamic coefficients

### 3.3. Justification of applying autoregressive distributed lag model (ARDL)

Firstly, the panel autoregressive distributed lag model has distinct attribute of allowing the lag value of the dependent variable to be included in the model, by so doing, lag of inflation is also an explanatory variable or previous value of inflation has implication on current rate of inflation. This method evaluates policy reform to ascertain whether the monetary or fiscal policy tool is effective or not.

Secondly, it allows the investigation of heterogeneous panel accounting for country specificity. Individual country groups are estimated and also homogeneously.

Thirdly, the technique allows for convergence of series to a long-run value, in that form, co-integration or long run and short run as well.

Thus the technique seeks to answer the following null hypotheses:

*HO: There is no long run and short run relationship between pre-tax and post-tax subsidy on inflation.*

*HO: There is no any causality between pre-tax and post subsidy and inflation*

## 4. Results

The following table (Table 1) shows the mean of the samples and deviation from the mean and normality distribution.

*Table 1: The descriptive statistics of the samples*

Variable	INFLA	PRESUB	GDP	POSTSUB
Mean	10.7908	6.287412	3.89277	13.38159
Std. Dev	25.53804	11.38743	7.499473	23.47087
Variance	652.1914	129.6735	56.2421	550.882
Min	-2.093333	0	-15.67141	0
Max	254.9485	53.33	54.15778	122.99
Skewness	6.814307	2.629645	.8021384	2.996436
Kurtosis	60.01119	9.478493	18.40361	11.8437
Obs	150	170	160	170

*Source: authors computation using STATA*

The mean value for inflation is 10.7 and the deviation from the sample mean is 25.5. Similarly, pre tax subsidy has a mean of 6.28 while standard deviation from the sample mean is 11.38. For GDP, the mean of the sample is 3.89 and the deviation from the sample mean is 7.4 while post tax subsidy has a mean of 13.3 and the deviation from the sample mean is 23.47. In term of skewness, all series in the table have positive signs indicating that they are all positively skewed. This is because negatively skewed, implies that the negatively skewed variable has more falls than rises thus will have a flat surface. For kurtosis, the null hypotheses for the Jarque-Bera normality test for the variables can only be rejected. None of the series have value less than 3.

After applying the Augmented Dickey Fuller (ADF) stationary test approach, the series GDP is stationary at level value while pre tax subsidy and post-tax subsidy are stationary at differenced values and integrated of order one (Table 2). Thus, series are 1(0) and 1(1).

The assumption of the pooled mean result in panel A states that the long run coefficients are the same across all the groups that consist the sample. The upper part of the table shows the long run coefficients. In the long run pre tax subsidy has a positive impact on inflation at 5% significant value. GDP has a negative effect on inflation in the long run at 10% significant value while post tax subsidy has a negative effect on inflation at 1% significant value.

The lower part of the table panel B indicates short run coefficients. The assumption of the pooled mean group states that the short run coefficients and the error variances are not the same for all countries that make the panel. The error correction term shows that there is a long run co-integration among the coefficients and any deviation or disequilibrium in the long run can be corrected at 47% speed of adjustment.

*Table 2: Pooled mean group, mean group and dynamic fixed effect estimation*

<b>Panel A</b>	<b>PMG</b>	<b>MG</b>	<b>DFE</b>
presubs	0.27125** 0.1848148	8.669558** 11.50637	-1.520879** 2.06566
Gdpg	-0.0593408* 0.0897692	1.972078** 1.987707	4.793102*** 1.604713
postsubs	-0.2004739*** 0.0873734	-7.672523** 6.325196	0.4583079* 0.9536718
<b>Panel B</b>			
presubs	3.553921** 3.633745	0.1328148* 1.499035	0.2722468** 3776766
Gdpg	-0.2733341** 0.34577	-0.1834517* 0.3096653	-0.7378393*** 0.1992282
postsubs	-1.819377** 1.975226	5.793546** 2.932216	-0.0909401* 0.2070651
constant	3.180533*** 1.084781	5.793546*** 2.932216	2.088775** 2.253489
Ec	-0.4790518*** 0.1446062	-0.609082*** 1456003	0.2199344*** 0.027104
Number of obs	160		
Number of groups	10		

*Notes \*\*\* \*\* denotes 1% 5% 10% statistical significance*

*Source: authors computation using STATA*

The result (Table 3) also shows that the post-tax subsidy has a long run causal impact on inflation at 1% level of significance. However, it also indicates that there is no short run causality in the model.

*Table 3: Hausman MGPMG Sigmamore*

	<b>Mg</b>	<b>Pmg</b>	<b>(b-B) differential</b>	<b>sqrt(diag(V_b-V_B)) S.E.</b>
presubs	8.669558	0.27125	8.398308	26.95704
Gdpg	1.972078	-0.0593408	2.031419	4.656027
postsubs	-7.672523	-0.2004739	-7.472049	14.81871

*Note: b = consistent under Ho and Ha; obtained from xtmg; B = inconsistent under Ha, efficient under Ho; obtained from xtmg*

*Source: authors computation using STATA*

The rule of thumb is that if p-value is higher than 0.05, then run PMG otherwise MG should be estimated:

Test: Ho: difference in coefficients not systematic

$$\chi^2(3) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 0.86$$

$$\text{Prob} > \chi^2 = 0.8356$$

If the probability value of Hausman test is higher than 0.005 we cannot reject the null hypothesis that PMG is the most efficient estimation under the null. Therefore, p-value at 0.8356 indicates that PMG is the efficient estimator under the null hypothesis of slope homogeneity thus the null hypothesis cannot be rejected.

## 5. Discussion

This study Employ the pmg prefix to determine the relationship between pre-tax, post-tax subsidy and GDP on inflation. The assumption is that in the long run all coefficients are homogenous in the group that makes the sample. But the short run coefficients and error variances are not the same. For instance, the result for Angola shows that deviation from long run can be corrected at 60% as confirmed by Harun et al. (2018) but contrary to the findings

by Dennis (2006). For Ecuador deviation from long run is corrected at 46% and the result of short run coefficients indicates that pre tax subsidy is positive and significant at 1% while post tax subsidy is negative and significant at 1%. The result for Gabon shows that deviation from long run is corrected at 13%. In this country, post tax subsidy has a negative effect on inflation and significant at 1%.the result for Iraq revealed that deviation from long run is corrected at 59%. In Kuwait error correction mechanism is 69% and pre tax subsidy has a positive impact on inflation and significant at 1% level. For Libya, the result shows that deviation from long run can be corrected at 10%. In Saudi Arabia, the result shows that deviation is corrected at 45% GDP has a positive effect on inflation and significant at 1%. For united Arab Emirate, deviation from long run is corrected at 19% and GDP has a positive effect on inflation and it is significant at 1%. In Venezuela, there is no co-integration to long run equilibrium. Lastly, In Nigeria, the error correction mechanism shows that deviation from long run disequilibrium is corrected at 70%. The short run coefficients indicate that pre tax subsidy is negative but significant at 10%, GDP is negative but significant at 10% while post tax subsidy has a positive effect on inflation and significant at 10%. This study also employed time series data set on Nigeria to investigate whether a long run exist among series. Employing the Augmented Dickey Fuller test, series indicates 1(1) and non 1(2) thus the auto regressive distributed lag model (ADRL) is employed. We employed the recommended co-integration test proposed by Pesaran et al. (2001) which states the Null hypothesis of no co-integration and the alternative hypothesis of presence of co-integration. Pesaran et al. (2001) it is ideal to perform the co-integration test on level variable equation and not the first difference. The rule of thumb ADRL bound test is we reject the null hypothesis at 1% 5% 10% level of significance if the F statistical value is greater than the critical value at the upper bound 1(1), then we can take it as there exist co-integration. We reject the null hypothesis and estimate the long run relationship (ECM). However, where the F Statistics is lower than the critical value for lower bound 1(0), we cannot reject the null hypothesis of no co-integration in this case and that results to employing the short run estimate. In any case, where the F statistics fall between the lower bound 1(0) and upper bound 1(1) we see our result as inconclusive.

Table 4: ARDL Bounds Test

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_3	2.72	3.77	3.23	4.35	3.69	4.89	4.29	5.61
t	-2.953							
F	12.527							

Note:  $H_0$ : no levels relationship; accept if  $F < \text{critical value for } I(0) \text{ regressors}$ ; reject if  $F > \text{critical value for } I(1) \text{ regressors}$

Source: Pesaran et al. (2001)

Table 5: Critical Values (0.1-0.01), t-statistic, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
	-2.57	-3.46	-2.86	-3.78	-3.13	-4.05	-3.43	-4.37

Note: accept if  $t > \text{critical value for } I(0) \text{ regressors}$ ; reject if  $t < \text{critical value for } I(1) \text{ regressors}$

The result above shows that our F statistics is greater that the critical value at upper bound 1(1). This informed us to reject the null hypothesis of no co-integration and accept the alternative hypothesis of co-integration. The result indicates that there is a long run relationship and have a form of linear fashion combination and in any case, where there is shock in the short run, it can affect the movement in the individual series which will eventually make the series to have long run convergence over time. Pre-tax subsidy, post-tax



subsidy and inflation have a long run relationship in Nigeria. This confirms with findings by Ghosh (2021).

## **6. Conclusions**

Classicalist and Keynesian framework as conceived may not adequately explain the cause of inflation in countries depending on importation as the structural framework does. This shows that upcoming researches on the area need to conceive the issue from structural perspective. A limitation associated with this study is its inability to explore comparison between oil and no oil exporting nations, this will be a further research area in future. Subsidy reform agenda in developing nations for the past two decades has been prioritize as major way of cushioning the rising price of products on final consumer. To this extent, the policy reform agenda is employed to close the pricing gap. Although the level of reform by nations differs among developing countries sampled in this study, the outcome of result of coefficients and error correction mechanism varies across groups that make the panel.

This study employed the autoregressive distributed lag model to estimate the role of subsidy on inflationary pressure are heterogeneous across panel and the following conclusions are made: (i) pre-tax subsidy has a positive insignificant effect on inflation in the long run. This clearly shows that a fund directed towards pre tax subsidy is not as large as post tax subsidy. Thus, its effects on inflation is not significant; (ii) GDP has negative insignificant effect on inflation in the long run; (iii) post-tax subsidy has negative and statistical significant effect on inflation in the long run. Post tax subsidy reduces inflation to an extent that is why most country whose major export is oil spends heavily on post tax subsidy. However, without caution can affect the financial hub and fiscal sustainability of a nation; (iv) on causality relationship. The result also revealed that there is a unidirectional causality running from GDP to inflation.

The post-tax subsidy especially and pre-tax subsidy have so much implication on fiscal trajectory hence nations must realize that despite huge capital investment to cover the price gap, the effect is not felt on inflation. This is the case of sabotage and scam as most nations rejects the policy reform. Countries have resorted to social welfare program in an effort support for welfare of a people. There is need to build on sound resilient economic policies to increase GDP growth so as to reduce inflation in the long run, it also shows that nations have made several economic policies to target inflation although have not made much significant progress as a result of economic crisis and trade cycle.

This study is able to look at the effect of pre-tax and post-tax subsidy which other study did not do. More so, the best measure for price gap is pre-tax and post-tax subsidy which other studies could not use.

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