Saudi Journal of Economics and Finance (SJEF)

ISSN 2523-9414 (Print)
ISSN 2523-6563 (Online)

Abbreviated Title: Saudi J. Econ. Fin.

A Publication by "Scholars Middle East Publishers", Dubai, United Arab Emirates

Asymmetric Price Adjustment and Rent Seeking: A Study of Spanish Retail Gasoline Market

Fidelia N. Onuigbo[1], Jonathan E. Ogbuabor[2*]

[1]Department of Economics, Enugu State University of Science and Technology, Enugu, Nigeria

[2]Department of Economics, University of Nigeria, Nsukka, Nigeria

***Corresponding author**
Jonathan E. Ogbuabor

Article History
Received: 10.12.2018
Accepted: 19.12.2018
Published: 30.12.2018

Abstract: This paper investigated the retail gasoline market in Spain for asymmetric price adjustment and rent seeking following changes in crude oil price. The paper used nonlinear autoregressive distributed lag (NARDL) approach and monthly time series data for the period 2005M1 – 2015M12. The results show that the speed of adjustment ranged between 43 – 44 % per month, which is sluggish and typical of markets witnessing lack of competition and prolonged periods of mispricing. In addition the results also show that there is significant evidence of long-run asymmetry even at the 1% level. The estimated coefficients are quite low, suggesting that consumes in this market are somewhat prone to the fluctuations in the crude oil market. Overall, retail gasoline prices respond more swiftly to crude oil cost increases in the long-run than to cost decreases. These results indicate that the market needs continuous monitoring to avoid exploitation of consumers.

Keywords: Asymmetric Price Adjustment; Rent Seeking; NARDL model; Spain.
JEL Codes: Q43; D40; C22; N94

INTRODUCTION

Crude oil is one of the most important natural resource for most industrialized countries across the globe. Indeed, most countries, regardless of their level of development, are affected by changes in crude oil prices.

The recent fluctuations in the price of crude oil have rekindled the interest of economic researchers on the transmission of crude oil price changes to the prices of various petroleum products, particularly gasoline. There is a global perception that the recent tumbling in global crude oil prices which started in 2013 appears not be reflecting at the pumps. In other words, consumers across the globe are concerned that the recent decline in oil prices is not being felt by consumers of gasoline at the pumps, especially in Spain which is an oil-deficient country. The critical questions in this study are: How does gasoline market respond to changes in crude oil prices in Spain, symmetric or asymmetric? Is there evidence of rent-seeking in the Spanish retail gasoline market?

Crude oil is the main input in the production of gasoline and other petroleum products. The concern that Spanish retail gasoline market may respond asymmetrically to the changes in crude oil prices arises mainly because Spain has negligible domestic oil production. The rockets and feathers effect is one of the main problems associated with asymmetric price adjustment in the petroleum sector. This effect explains that when input costs (i.e. crude oil prices) increase, output price (such as gasoline price) rises faster; however, when input costs decrease, output prices adjust more slowly [1]. The existence of these asymmetries is undesirable since it can be detrimental for consumers. In fact, such asymmetric pattern of retail price adjustment is typical of markets witnessing practices that are detrimental to consumers' welfare, such as rent seeking, uncompetitive pricing, collusion, product hoarding, and artificial shortage/scarcity of products, among others [2, 3].

The Comission Nacional de Los Mercadesu La Competencia (CNMC) (Spanish National Competition Authority) 2015 observed the lack of competition in Spanish gasoline market and also imposed fines several times on Repsol, Cepsa and BP for fixing prices in their petrol stations. European Commission [4] also accused Repsol of practicing exclusive dealing contracts. These facts further reinforce our motivation to undertake this study. Recall that the concern that the gasoline market may have been witnessing non-competitive pricing and collusive behaviour underlined the three main investigations by the Monopolies and Mergers Commission (MMC) in the UK between 1965 and 1990. The reports of the MMC concluded that there was evidence of asymmetric response of gasoline price to changes in crude oil cost. Following these investigations, Bacon [1] econometrically established the reality of asymmetric price

transmission from crude oil market to retail gasoline market as well as the prevalence of the rockets and feathers effect in the retail gasoline market in UK. An authoritative global survey of asymmetric price adjustment in the retail gasoline market can be found in Grasso and Manera [5].

In this study, we investigate the Spanish retail gasoline market for evidences of asymmetric price adjustment and rent seeking following changes in crude oil costs. The rest of the paper is organized thus: Section 2 provides an overview of the empirical literature; Section 3 discusses the data and methodology; Section 4 presents the empirical results; while Section 5 concludes the paper.

AN OVERVIEW OF THE EMPIRICAL LITERATURE

Some economic researchers have investigated the problem of asymmetric adjustment of retail energy prices following changes in crude oil costs using various methodologies. Grasso and Manena [5] studied the gasoline market of France, Germany, Italy, Spain and UK over the period 1985 to 2003 using asymmetric ECM, autoregressive threshold ECM and ECM with threshold cointgration. The models captured some evidence of the presumed asymmetry. Polemis and Fotis [6] using the Dynamic ordinary least square method explored the degree of competition in various gasoline markets in twelve European countries and the United States from 1996 – 2011. The result indicate that less competitive gasoline markets exhibit price asymmetry while highly competitive gasoline markets follow symmetric price adjustment path. Also, the inclusion of taxes (VAT and Excise tax) into retail gasoline prices, support the existence of price asymmetry in many European countries.

Chou, Chang and Hu [7] estimated retail price adjustments in the gasoline and diesel markets of Taiwan, Japan, South Korea, and Singapore using monthly data June, 2012. The study employed an asymmetric error correction model (ECM). The results indicate that asymmetric adjustments in retail gasoline and diesel prices are common, and that the adjustments, which quickly and obviously responded to cost reductions, are a type of political – economic asymmetry.

Chen, Haung and Ma [8] also used monthly data on wholesale prices of gasoline and diesel product in China and International Crude oil prices from February 2006 to October 2013. The study employed an asymmetric error-correction model (AECM) to examine whether China's gasoline and diesel price adjust asymmetrically to international crude oil price changes. The empirical result suggest that increases and decreases in international oil price have asymmetric effects on wholesale prices of both gasoline and diesel fuel in China and that both increases and decreases in international oil prices have a greater effect on diesel prices than on gasoline prices in China. Using non-linear autoregressive distributed lags (ARDL) model. Atil, Lahiani and Nguyen [9] examined the pass-through of crude oil prices into gasoline and natural gas prices. This approach allowed the study to simultaneously test the short and long-run non-linearities through positive and negative partial sum decompositions of predetermined explanatory variables. The results indicate that oil prices affect gasoline prices and natural gas prices in an asymmetric and non-linear manner, but the price transmission mechanism is not the same.

Chau and Tseng [10] evaluated the influence of oil price and exchange rate fluctuations on retail gasoline prices in Taiwan using the asymmetric autoregressive distributed Lag model. The study showed that the adjustments of retail gasoline price follow a politico-economic asymmetry. Moreover, gasoline price responses to exchange rate shocks were slow and complex and exhibit reverse adjustments during periods of initial exchange rate depreciation. Using gasoline markets of Germany, France, Italy and Spain, Karagiannis, Panagopoulos and Vlamis [11] examined whether crude oil prices are transmitted to the retail gasoline prices in the short and long-run, and tested the symmetry of price adjustment hypothesis. They applied an Error Correction Model, which accounts for possible asymmetric adjustment behavior. The results show that rigidities in the transmission process exist but the retail fuel speed of upward/downward price adjustment to equilibrium is considered as symmetric in all four economies analyzed. Thus, the findings on the whole do not provide firm evidence to support the rockets and feathers hypothesis.

Perdiguero-Garcia [12] provides a comprehensive documentation of 48 empirical studies on gasoline market asymmetries for various countries in the global economy. This study observed that the analysis of price asymmetries in the gasoline market is one of the most studied in the energy economics literature. However, the great variability of results makes it very difficult to extract conclusive results on the existence or not of asymmetries. Through a meta-analysis approach, the study showed how the industry segment analyzed the quality and quantity of data, the estimator and the model used may explain this heterogeneity of result.

Greenwood-Nimmo and Shin [3] used the nonlinear ARDL framework to examine the UK gasoline, diesel, kerosene and gas oil markets over the period January 1999 to March 2013. They found evidence in support of the presumed asymmetry, which is largely obscured at pump where prices include both tax and duty, suggesting the possibility of firms using the tax system to conceal rent-seeking behavior. Kihm, Ritter and Vance [13] examined the influence of the crude oil price on the retail gasoline price, focusing specifically on how this influence varies according to

the brand and to the degree of competition in the vicinity of the station. The study identified several factors other than cost (including the absence of nearby competitors and regional market concentration) that play statistically significant roles in mediating the influence of the oil price on the retail gas price, suggesting moderate price-setting power among stations.

Bagnai and Ospina [14] studied the asymmetries in gasoline pricing on a comprehensive sample of monthly data from twelve Eurozone countries running from January 1994 to December 2014. Non linear autoregressive distributed Lag (NARDL) modeling framework was applied. The result showed that while the effects of exchange rate variations display a positive asymmetry (i.e devaluation have a greater impact with respect to revaluation), crude oil price variations induce negative asymmetry (i.e, reductions in the price of crude oil have greater impact than price rises). Again, the positive asymmetry to exchange rate change is much stronger in core Eurozone countries.

DATA AND METHODOLOGY

The data consists of monthly observations from January 2005 to December 2015 (i.e. a total of 132 observations) on the retail price of gasoline and average costs of imported crude oil in Spain. The data are both at pump (i.e. inclusive of taxes) and also exclusive of taxes (i.e ex-tax prices). Two forms of taxes are levied on oil products in Spain, namely: value-added tax (VAT) and excise tax (*impuesto sobre hidrocarburos*). The excise tax rate consists of both the state rate and the regional rate. The excise tax rate was increased in 2009 to help limit the government's budget deficit. The state excise tax for gasoline was increased from EUR 0.396 per litre to EUR 0.465 per litre in 2008; while the regional excise tax rate, which has been in force since 2007, is set by the regional authorities and varies according to the autonomous community, from zero in some regions to EUR 0.048 per litre in others. Apart from excise taxes, oil products are levied a 21% VAT. The entire data set for this study were collected from the International Energy Agency (IEA) monthly oil price statistics. To effectively track the asymmetry in the response of the retail price of gasoline to change in the cost of crude oil, this study used the crude oil cost for Spain measured in dollars per barrel. However, the retail price of gasoline that is measured in the national currency of Spain was converted to U.S dollars using the exchange rate data obtained from OECD statistics (Monthly Monetary and Financial Statistics, MEI). The entire data set is indexed to 2010 base year and logged prior to estimation. Figure-1 presents a time series plot of the data based on its indexed representation.

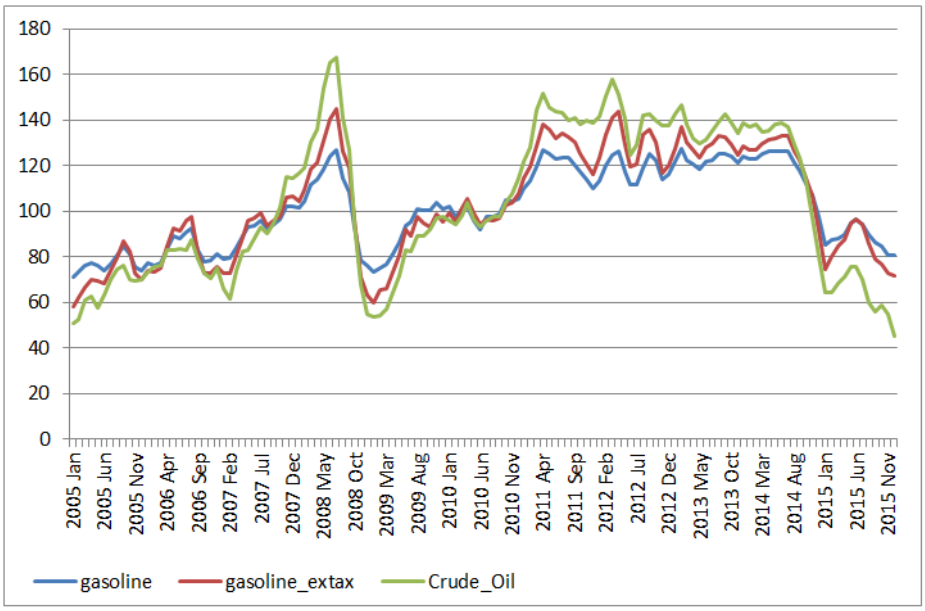

Fig-1: Time series plots of the data

Source: Authors' plot

Notes: Gasoline capture the gasoline prices at pump (i.e. inclusive of tax and duty) while gasoline_extax captures the ex-tax prices of gasoline. All the prices are indexed to 2010 base year (i.e. year 2010 = 100).

The graphs in Figure-1 show that the data track themselves quite closely. Our empirical methods will therefore include cointegration tests based on the bounds testing approach of Pesaran, Smith and Shin [15] (henceforth PSS) and the t_{BDM} statistic of Banerjee *et al*., [16]. Notice also that the graphs aptly capture the fall in prices during the 2008-2009 Global Financial Crisis.

The econometric framework advanced by Shin, Yu and Greenwood-Nimmo [17] for modeling asymmetric cointegration and dynamic multipliers in a non-linear autoregressive distributed lag (NARDL) framework was adopted. Under this framework, short-run and long-run non-linearities are introduced through positive and negative partial sum decompositions of the explanatory variables. Greenwood Nimmo and Shin [3] applied this framework in modeling the asymmetric price transmission in the UK retail energy sector. Other studies have also used this framework and examples include: Ogbuabor, Orji and Anthony-Orji [18]; Ogbuabor, Orji, Aneke and Manasseh [19]; Ogbuabor, Eigbiremolen, Manasseh and Mba [20]; and the references therein.

The framework is built around the asymmetric cointegrating relationship of the form:

$$Y_t = \theta^{+1} X_t^{+} + \theta^{-1} X_t^{+} + u_t \quad (1)$$

Where y_t is an I(1) variable; and the explanatory variable is decomposed as follows:

$$X_t = X_0 + X_t^{+} + X_t^{-} \quad (2)$$

Where $X_t^{+} = \sum_{j=1}^{t} \max(\Delta X_j, O)$ and $X_t^{-} = \sum_{j=1}^{t} \min(\Delta X_j, O)$ are partial sum processes of positive and negative changes in X_t, while X_o is an initial threshold value that is assume to be zero following Shin, Yu and Greenwood-Nimmo [17]. Δ is the first difference operator while θ^{+} and θ^{-} are the associated asymmetric long-run parameters. The NARDL (p, q) model associated with equation (1) can be written in its level form as follows

$$Y_t = \sum_{j=1}^{P} \phi_j Yt - j + \sum_{j=O}^{q} (\theta_j^{+1} X_{t-j}^{+} + \theta_j^{-} X_{t-j}^{-}) + \varepsilon_t \quad (3)$$

Following Shin, Yu and Greenwood-Nimmo [17], the underlying model in this study is derived from equation (3) and specified in its error correction form as follows:

$$\Delta Y_t = \rho Y_{t-1} + \theta^{+} X_{t-1}^{+} + \theta^{-1} X_{t-1}^{-} + \sum_{j=1}^{P-1} \phi_j \Delta Y_{t-1} + \sum_{j=O}^{q-1} (\Pi_j^{+1} \Delta X_{t-1}^{-} + \Pi_j^{+1} \Delta X_{t-1}^{-}) + \varepsilon_t \quad (4)$$

Where ρ is the speed of adjustment while $\beta^{+} = -\frac{\theta^{+}}{P}$ and $\beta^{-} = -\frac{\theta^{-}}{P}$ are the asymmetric long-run parameters.

Here, Y_t is used to capture the retail price of gasoline while X_t is used to capture the crude oil costs for Spain. The ADF unit root tests were used to ascertain the orders of integration of the variables in this study to ensure that they are consistent with the underlying requirements of the NARDL framework. The results of cointegration tests based on the PSS bounds testing approach and the t_{BDM} statistic of Banerjee *et al*., [16] are also reported in this study.

EMPIRICAL RESULTS AND DISCUSSION

The empirical analysis stated with tests of stationarity on the variables. The ADF unit root tests (controlling for tend and intercept) were conducted and the results are shown in Table-1 as follows:

Table-1: Unit root test results

Variables	Test 5% Critical Values	Level ADF Test Stat	1st Difference ADF Test Stat	Order of Integration
Gasoline	-3.445	-2.479	-7.026*	I(1)
Gasoline (Ex-Tax)	-3.445	-2.900	-6.916*	I(1)
Crude oil	-3.445	-1.693	-5.984*	I(1)

Notes: Gasoline denotes the retail prices which are inclusive of tax and duty; while Gasoline Ex-Tax) denote the ex-tax prices of gasoline. * denotes significance at 5% level.

The results in Table-1 indicate that the variables are all integrated of order one, I(1). This suggests that there may be an equilibrium relationship between the variables as we suspected from the plots in Figure-1. Thus, as part of the empirical results in Table-2, we report the results of the cointegrated tests based on the bounds testing approach of Pesaran, Smith and Shin [15] and the t_{BDM} – statistics of Banerjee, Dolado and Mestre [16].

The estimation results of NARDL model that captured the transmission of changes in crude oil costs to both ex-tax and pump prices of retail gasoline in Spain are presented in Table 2. The results indicate that the speeds of adjustment are 43% and 44% per month for the pump prices and the ex-tax prices, respectively. These are quite sluggish and typical of markets witnessing weak competition and prolonged period of mispricing. This result is consistent with Greenwood-Nimmo and Shin [3], which also found similar patterns of sluggish speed of adjustment in the UK retail petroleum products markets.

The results in Table-2 also show that there is significant evidence of long-run asymmetry at the 1% level. The pattern of this long-run asymmetry indicates that ex-tax retail prices respond more strongly to positive than to negative changes in crude oil costs since the value for β^+ (i.e. 0.62) in higher than the value for β^- (which is 0.57). Furthermore, these estimated coefficients for the gasoline market are quite low, indicating that consumers in this market are somewhat prone to the fluctuations in the crude oil market, especially at pump. The results did not show any significant evidence of short-run additive asymmetry. This indicates that there is no evidence of rockets and feathers, and hence, there is no possibility of rent-seeking by retailers in this market. This result is quite interesting given that Spain has negligible domestic oil production activity. In fact, Spain is one of the oil-deficient economies in Europe. The absence of the problems of rockets and feathers effect and rent-seeking indicates that regulators in this market have been able to effectively deal with these challenges, at least in the short-run.

A review of Spanish oil industry indicates that Spain is a European country with very high oil import dependency ratio, which remained at 99.8% from 2005 until 2011. In 2012, it stood at 99.7%. This indicates that Spain imports virtually all its crude oil requirements. However, Spain has a large and relatively complex refining industry, with nine refineries and a total capacity of 1.5 mb/d. Spain also enjoys an extensive network of pipelines and storage capacity connected to the refineries. It has an efficient and flexible system, where transport and storage services are integrated, making products available in any of its storage facilities. The Spanish oil retail market is fully open to competition. Imports, exports, trade and prices are free; while the government intervenes only to protect competition and to avoid abuse of dominant positions. As of the end of 2012, there were around 10,400 filling stations. Law 11/2013 of 26 July, implementing measures to support entrepreneurs and to foster growth and job creation, adopted urgent measures to reinforce market competition in the retail market by regulating clauses in exclusive contracts between retailers and major operators, by simplifying administrative procedures to set up new filling stations and by capping market share of operators accounting for 30% or more of total points-of-sale. These facts about the Spanish oil industry are consistent with our findings of no rockets and feathers effect and no rent-seeking in the retail gasoline market.

Table-2: NARDL estimation results

Dependent Variables	Gasoline (Ex-Tax Price)	Gasoline (Pump Price)
Estimated Coefficients		
ρ	-0.43***	-0.44***
β^+	0.62***	0.46***
β^-	0.57***	0.40***
$\sum_{j=1}^{q-1} \pi_j^+$	0.71***	0.48***
$\sum_{j=1}^{q-1} \pi_j^-$	0.75***	0.39***
Symmetry Tests		
$\mathcal{H}_0: \beta^+ = \beta^-$	42.94***	112.52***
$\mathcal{H}_0: \sum_{j=1}^{q-1} \pi_j^+ = \sum_{j=1}^{q-1} \pi_j^-$	0.08	0.91
Diagnostics Checks		
F_{PSS}	9.49***	11.59***
t_{BDM}	-5.25***	-5.85***
BG Test (NR^2)	18.44	9.99
ARCH Test	17.21	8.97
$\bar{\mathcal{R}}^2$	0.81	0.77

Notes: The results and notations for the estimated coefficients relates to the NARDL model of equation (4). The reported symmetry tests are standard Wald tests. The BG Test is the Breusch–Godfrey serial correlation test, while the ARCH Test is the standard Heteroskedasticity Test. The BG Test and the ARCH Test were conducted at lag 12, since the dataset comprises monthly series. The relevant k = 1 critical values reported by PSS for the t_{BDM} statistic are −2.91, −3.22, and −3.82 at the 10%, 5% and 1% levels. The equivalent critical values for the F_{PSS} statistic are 4.78, 5.73 and 7.84.
* denotes Significance at the 10% level; ** denotes Significance at the 5% level; *** denotes Significance at the 1% level.

The diagnostic checks indicate that at 1% level, both the PSS bounds testing results and the t_{BDM} statistics of Banerjee *et al.*, [16] overwhelmingly confirmed the existence of equilibrium relationship between crude oil prices and retail gasoline prices. The result did not show any problem of autocorrelation and heteroskedasticity. The adjusted R^2 shows that the dynamics of the crude oil market have substantially explained the variations in the retail gasoline market. This is consistent with the fact that crude oil is the main input material in the production of gasoline.

CONCLUSION AND POLICY IMPLICATIONS

This paper investigated the retail gasoline market in Spain for asymmetric price adjustment and rent seeking following changes in crude oil price. The paper used nonlinear autoregressive distributed lag (NARDL) approach and monthly time series data for the period 2005M1 – 2015M12. The results show that the speed of adjustment ranged between 43 – 44 % per month, which is sluggish and typical of markets witnessing lack of competition and prolonged periods of mispricing. In addition the results also show that there is significant evidence of long-run asymmetry even at the 1% level. The estimated coefficients are quite low, suggesting that consumes in this market are somewhat prone to the fluctuations in the crude oil market. Overall, retail gasoline prices respond more swiftly to crude oil cost increases in the long-run than to cost decreases. However, the results did not indicate any evidence of short-run dynamic asymmetry. This means that neither rockets and feathers effect nor rent-seeking is associated with the Spanish retail market. The existence of long-run asymmetry, however, calls for continuous monitoring of the market by regulators and the government so that consumers are not unduly exploited in the long-run.

REFERENCES

1. Bacon, R. W. (1991). Rockets and Feathers: The Asymmetric Speed of Adjustment of UK Retail Gasoline Prices to Cost Changes. *Energy Economics 13*, 211-218.
2. Borenstein, S., Cameron, A. C., & Gilbert, R. (1997). Do gasoline prices respond asymmetrically to crude oil price changes?. *The Quarterly journal of economics*, *112*(1), 305-339.
3. Greenwood-Nimmo, M., & Shin, Y. (2013). Taxation and the asymmetric adjustment of selected retail energy prices in the UK. *Economics Letters*, *121*(3), 411-416.
4. Nugent, N. (Ed.). (2016). *At the heart of the Union: studies of the European Commission*. Springer.
5. Grasso, M. and M. Manera (2007). Asymmetric Error Correction Models for the Oil–Gasoline Price Relationship. *Energy Policy 35*, 156-177.
6. Polemis, M. L., & Fotis, P. N. (2014). The taxation effect on gasoline price asymmetry nexus: Evidence from both sides of the Atlantic. *Energy Policy*, *73*, 225-233.
7. Chou, K. W., Chang, C. Y., & Hu, F. (2013). An empirical study of asymmetric pricing in retail gasoline and diesel markets in Taiwan, Japan, South Korea, and Singapore. *International Journal of Financial Research*, *4*(3), 35.
8. Chen, Y., Huang, G., & Ma, L. (2017). Rockets and Feathers: The Asymmetric Effect between China's Refined Oil Prices and International Crude Oil Prices. *Sustainability*, *9*(3), 381.
9. Atil, A., Lahiani, A., & Nguyen, D. K. (2014). Asymmetric and nonlinear pass-through of crude oil prices to gasoline and natural gas prices. *Energy Policy*, *65*, 567-573.
10. Chou, K. W., & Tseng, Y. H. (2016). Oil prices, exchange rate, and the price asymmetry in the Taiwanese retail gasoline market. *Economic Modelling*, *52*, 733-741.
11. Karagiannis, S., Panagopoulos, Y., & Vlamis, P. (2015). Are unleaded gasoline and diesel price adjustments symmetric? A comparison of the four largest EU retail fuel markets. *Economic Modelling*, *48*, 281-291.
12. Perdiguero, J. (2010). Symmetric or asymmetric gasoline prices? A meta-analysis approach. *IREA–Working Papers, 2010, IR10/13*.
13. Kihm, A., Ritter, N. and C. Vance (2016). Is the German Retail Gasoline Market Competitive? A Spatial-Temporal Analysis Using Quantile Regression. *Land Economics*, *92*(4), 718-736. doi: 10.3368/le.92.4.718
14. Bagnai, A., & Ospina, C. A. M. (2016). *Price asymmetries in the European gasoline market* (No. 1602). Italian Association for the Study of Economic Asymmetries, Rome (Italy).
15. Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.
16. Banerjee, A., Dolado, J., & Mestre, R. (1998). Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of time series analysis*, *19*(3), 267-283.
17. Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In Festschrift in Honor of Peter Schmidt (pp. 281-314). Springer, New York, NY.
18. Ogbuabor, J. E., Orji, A., & Anthony-Orji, O. I. (2018). Asymmetric adjustment of retail energy prices in Europe: Analysis of structural change and exchange rate dynamics. *Journal of Renewable and Sustainable Energy*, *10*(1), 015904.
19. Ogbuabor, J. E., Orji, A., Aneke, G. C., & Charles, M. O. (2018). Did the global financial crisis alter the oil–gasoline price relationship?. *Empirical Economics*, 1-30.

20. Ogbuabor, J. E., Eigbiremolen, G. S. O., Manasseh, C. O., & Mba, I. C. (2018). Asymmetric Price Transmission and Rent-seeking in Road Fuel Markets: A Comparative Study of South Africa and Selected Eurozone Countries. African Development Review, 30(3), 278-290.