# ENERGY SECTOR'S MONOPOLY RENT-SEEKING AND SUPPLEMENTARY TIME-SERIES ANALYSIS IN THE CASE OF AZERBAIJAN

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## Abstract

*In this paper, energy sector's monopoly behavior is analyzed in the case of Azerbaijan by referring to the literature of Dutch disease and rent-seeking. As a theoretical background, a new general equilibrium model is also developed in order to explain unusual surge of gasoline prices in Azerbaijan during the decreasing global oil prices. The paper shows the relationship between crude oil price and local gasoline prices (rent-seeking in this paper). There is a cointegrating relation between two variables under Johansen Cointegration Test and it supports the idea in the theoretical general equilibrium model. Monopolies use higher local gasoline prices as rent-seeking during decreasing crude oil prices for covering their losses due to diminishing revenues from oil exports.*

**Keywords:** Monopoly, Rent-seeking, Dutch disease, Natural resources, Energy
**JEL Codes:** D42; D50; D72; O12; O13

## Introduction

Natural resource curse theory describes that resource-rich countries usually have slower growth compared to resource-poor countries (Auty, 2001a; 2001b). Dutch disease and rent-seeking is studied under the resource curse theory. Dutch disease is a phenomenon where the resource exports have negative impact on non-resource sector of an economy and, hence, real exchange appreciates together with surge in unemployment rate (Corden and Neary, 1982; Corden, 1984). Natural resource abundance or resource boom is considered as a degree of technological advancement in the resource sector (Corden and Neary, 1982). Norway and Botswana were successful in terms of economic growth as resource abundant countries (Van der Ploeg, 2011). For Brazil, the Dutch disease evidence is available due to the problems (negative impact on non-oil GDP) occurred after the discovery of natural resources (Caselli and Michaels, 2013). Nigeria, South Africa, Iraq and Venezuela are also amongst the countries which suffered from Dutch disease (Sala-i-Martin and Subramanian, 2003; Stokke, 2008; Van der Ploeg, 2011). Moreover, rent-seeking is a depletion of resources in order to generate beneficial opportunity for firms which is detrimental for a society as a result and, it is also considered as one of the problems which reduce national income during the resource boom (Torvik, 2002).

Several studies tried to measure rent-seeking as a result of dissipation of resources in a society but those papers have different techniques for empirical rent-seeking measurements due to the fact that there is no unique formula for empirical analysis (Laband and McClintock, 2001; Cole and Chawdhry, 2002; Mixon, 2002; Sobel and Garrett, 2002; Antwi and Adams, 2003; Liebman and Reynolds, 2006; Reynolds, 2006; Calderon and Chong, 2007, Del Rosal, 2011). Previous studies have flexible approach to rent-seeking depending on various situations and variables. Hence, it is possible to apply different data analysis depending on various countries' situation. Azerbaijan will be chosen in this paper as a case for empirically supplement rent-seeking analysis of the general equilibrium model in this paper. There are no previous studies which measure rent-seeking in natural resource industry of Azerbaijan, and it will be the new contribution to the literature. The paper also uses distinct approach for the empirical measurement of rent-seeking which is the surging local gasoline prices within a country. The difference between crude oil prices and domestic gasoline prices usually increases during a crisis time due to plummeting oil prices. Intuitively, domestic gasoline prices decrease with dropping oil prices. However, usually opposite situation occurs in Azerbaijan which makes it interesting for the research because monopolies increase the domestic gasoline prices in order to cover the losses occurring during decreasing oil revenues. Hence, increasing local gasoline prices can be used as a rent-seeking for the empirical time-series analysis because of increasing discrepancy.

The paper demonstrates the background information about natural resource industry in Azerbaijan. For the theoretical background, new general equilibrium model for a monopoly rent-seeking will be made here for analyzing the behavior of local monopolies which can be applied to the case of Azerbaijan. The data for global crude oil price and domestic gasoline prices (rent-seeking in the model) in Azerbaijan is used for explaining the relations between those two variables through time-series cointegration analysis. The model will show that there is a cointegration between two variables, and empirically the theoretical model will be supported. Monopolies use soaring local gasoline prices as a tool for gaining the rent which is available in the market during the times of crises. The model will also give clear ideas on unusual and irrational increasing gasoline prices within the country due to the existence of cointegration relationships between the above-mentioned variables.

## Natural Resource Industry in Azerbaijan and Its Impact on the Economy

Azerbaijan gained its independence from the USSR (Soviet Union) in 1991 (Muradov, 2018), and the "Contract of the Century" which was signed in 1994, created investment opportunities for the corporations such as British Petroleum, Lukoil, Chevron, Ramco, Statoil, and so forth. They invested financial resources in the natural resource industry for the exploration and extraction. The investments in the resource industry were the major reasons that the GDP had increased from around 3 billion USD (1995) to 75 billion USD (2014) (World Bank, 2022). Furthermore, the "Contract of the 21st Century" in 2013 is another major contract which helps the country to be the gas exporter to the European market as well (Muradov, 2021). Although the country struggles for developing the non-oil sector (due to institutional problems) and decreasing corruption, Azerbaijan developed faster and created better business environment for the international companies unlike other post-Soviet oil-rich Central Asian countries. The poverty reduction [4,8 % in 2019 (ADB, 2022)] and decreasing unemployment rate [6% in 2020 (World Bank, 2022)] were the important achievements in the last decade but country's regional socio-economic development projects were inadequate for the economic diversification. Macroeconomic instability is another problem because Azerbaijan's dependency on the export of natural resources makes it vulnerable to the external factors such as the changing oil prices and the production level (Rosenberg and Saavalainen, 1998). This is because there is an increasing gap between the oil and non-oil sector, and the economy is heavily dependent mostly on the export of the natural resources. Furthermore, new institutional reforms are necessary in order to decrease the vulnerability of the economy towards the external factors. The diminishing oil production hinders the economic growth because natural resources play crucial roles for GDP growth. Majority of the investment projects go to the natural resource industry and, thus, this slows down diversification of the economy. Ibadoglu (2008) is also negative about this issue and states that the country should immediately facilitate the diversification in order to escape the long-run economic stagnation.

## General Equilibrium Model

### *Monopoly Rent-seeking*

As an assumption there are three markets in the model which are services, energy and labor (input). Services are perfectly competitive market, whereas energy market is monopolistic. The model consists of three economic entities of the household, the competitive firm (services) and the monopoly firm (energy). The households have same income level and they maximize utility depending on budget constraint. Services sector firms are price takers and they maximize their profits. This sector's firms' economic profit is zero because it is perfectly competitive. Energy sector's monopoly is the price maker and it can increase price for gaining extra profits due to inelastic demand for energy. With the general equilibrium model, it is possible to consider the effects of other markets and discern the effects of outside factors on the economy. Moreover, in this model spending effect will be analyzed under the concept of Dutch disease (Corden and Neary, 1982). During the resource abundance the extra income gained by exports will increase consumption for the services and this is a spending effect.

***Services sector***

Assuming that there are two goods, such as services and energy the input in each sector is labor. Services are assumed to be produced with constant return to scale and one unit of labor can produce one unit of output. The production function in services sector $Q_N$ is

$$Q_N(l_N) = l_N\ , \tag{1}$$

where $l_N$ is labor input in the services sector. The labor input and output relations are as follows

$$l_N = Q_N \tag{2}$$

Profit maximization in this sector is

$$\max_{l_N} P_N F_N(l_N) - w_N l_N\ , \tag{3}$$

where $P_N$ is the price of good in the services sector and $w$ is the wage in this sector.

The first order condition is

$$P_N = w, \tag{4}$$

As an assumption $P_N$ is numeraire therefore $P_N = 1$ and $w = 1$.

***Energy sector***

The production function for the monopoly in the energy sector $Q_T$ is

$$Q_T(l_T) = \alpha l_T, \tag{5}$$

where $l_T$is labor input in the energy sector and α (α>0) is a parameter about productivity (technological advancement or boom). Considering the case where a firm in the energy sector is a monopolist we get the following from the profit equation of a monopoly

$$\Pi_T = P_T Q_T - w l_T, \tag{6}$$

From the equation (5) we can derive the following

$$l_T = \frac{Q_T}{\alpha}, \tag{7}$$

Adding the equation (7) into the equation (6) we get

$$\Pi_T = \left(P_T - \frac{w}{\alpha}\right) Q_T, \tag{8}$$

where $P_T$ is the price of good, $Q_T$ total quantity and $w$ is the wage in the energy sector.

### *Households*

Households purchase both energy and services in order to maximize their utility depending on the budget constraint. Here we are going to assume that every household has same labor hours along with dividend income meaning that they have same level of income.

Utility maximization is formulated as follows

$$\max_{c_T, c_N} \mathrm{U}(c_T,\ c_N) = (\beta c_T{}^{-\frac{1-\sigma}{\sigma}} + \gamma c_N{}^{-\frac{1-\sigma}{\sigma}})^{\frac{-\sigma}{1-\sigma}}, \tag{9}$$

subject to

$$P_T c_T + P_N c_N = \bar{l}w + \Pi_T + \Pi_N\ , \tag{10}$$

where $U(c_T,\ c_N)$ is a utility function, $c_T$ is the amount of consumption in the energy sector, $c_N$ is the amount of consumption in the services sector. $\bar{l}$ is a labor supply (number of labor hours) of the whole economy. In the services sector the market is competitive

$$\Pi_N = 0, \tag{11}$$

and in the energy sector we have the monopoly. $\Pi_T$ is controlled by the monopolist.

From marginal rate of substitution and first order condition we get

$$MRS = (\frac{c_N}{c_T})^{\frac{1}{\sigma}}\frac{\beta}{\gamma}, \tag{12}$$

and

$$MRS = \frac{P_T}{P_N}, \tag{13}$$

Considering the previous assumption ($P_N = 1$) and solving this problem yields demand for goods:

$$c_T = c_N(\frac{\beta}{P_T\gamma})^{\sigma}, \tag{14}$$

From the budget equation we get

$$c_T = \frac{\bar{l}w}{(\frac{P_T\gamma}{\beta})^{\sigma} + \frac{w}{\alpha}}\ , \tag{15}$$

and

$$c_N = \frac{\bar{l}w}{(\frac{P_T\gamma}{\beta})^{\sigma} + \frac{w}{\alpha}}(\frac{P_T\gamma}{\beta})^{\sigma}, \tag{16}$$

### *Market equilibrium condition*

$(l_T, l_N)$ is a pair of labor at equilibrium in each sector. An equilibrium condition of labor market is

$$l_T + l_N = \bar{l}, \tag{17}$$

From the market equilibrium condition $c_T = Q_T$ and $c_N = Q_N$. The total quantities in the energy and services sectors will be as follows

$$Q_T = \frac{\bar{l}w}{(\frac{P_T\gamma}{\beta})^\sigma + \frac{w}{\alpha}} \ , \tag{18}$$

and

$$Q_N = \frac{\bar{l}w}{(\frac{P_T\gamma}{\beta})^\sigma + \frac{w}{\alpha}} (\frac{P_T\gamma}{\beta})^\sigma, \tag{19}$$

***The effect of the boom***

When a boom occurs (a parameter α increases); the equilibrium quantity in the services sector along with the consumption is affected by the boom:

$$\frac{dc_N}{d\alpha} = \frac{\bar{l}w^2(\frac{P_T\gamma}{\beta})^\sigma}{(\alpha(\frac{P_T\gamma}{\beta})^\sigma + w)^2} > 0, \tag{20}$$

It means the boom will definitely increase the quantity and consumption in the services sector. So, labor input in the services sector also increases and productivity improvements will occur in this sector. The spending effect (Corden and Neary, 1982) occurs in the sector.

The equilibrium quantity in the energy sector is affected by the boom:

$$\frac{dc_T}{d\alpha} = \frac{\bar{l}w^2}{(\alpha(\frac{P_T\gamma}{\beta})^\sigma + w)^2} > 0, \tag{21}$$

It means the boom will increase the quantity and consumption in the energy sector. So, labor input in the energy sector also increases. The spending effect occurs in this case.

Adding the energy sector's quantity ($Q_T$) (eq. 18) into the monopoly profit equation (8) we get

$$\Pi_T = \left(P_T - \frac{w}{\alpha}\right) \frac{\alpha\bar{l}w}{\left(\alpha\left(\frac{\gamma P_T}{\beta}\right)^\sigma + w\right)}. \tag{22}$$

By separate differentiation of the monopoly profit on the price ($P_T$) and the boom (α) we get the following:

$$\frac{d\Pi_T}{dP_T} = \frac{\alpha\bar{l}\mathrm{w}(\mathrm{w}\left(\sigma\left(\frac{P_T\gamma}{\beta}\right)^\sigma + P_T\right) - \alpha(\sigma-1)P_T\left(\frac{P_T\gamma}{\beta}\right)^\sigma}{P_T(\alpha(\frac{P_T\gamma}{\beta})^\sigma + w)^2}, \tag{23}$$

$$\frac{d\Pi_T}{d\alpha} = \frac{\bar{l}wP_T}{\alpha(\frac{P_T\gamma}{\beta})^\sigma + w} > 0. \tag{24}$$

If $\sigma$ <1 (inelastic), the equation (23) is positive. The equation (24) is always positive regardless of $\sigma$. The monopoly uses the price for rent-seeking activities and it can infinitely increase profit by increasing the price. However, it does not do so due to political reasons in order to control people's behavior under political stability. This behavior is observable in Azerbaijani economy where the energy sector monopolies usually do not increase gasoline prices during the boom time (because of revenues from exports) but it increases the prices during the crisis times in order to cover the costs. This behavior is also observable from the above-mentioned differentiations (23 and 24) by looking at $P_T$. The boom (α ) can also be considered as the revenues from exports because it induces productivity increases within the energy sector. The energy sector's monopoly can change $P_T$ depending on α (boom) during boom (increasing export revenues) and crisis times by checking the political situation within a country. Increasing $P_T$ during the crises times is necessary for covering the losses due to decreasing oil export revenues (decreasing α) but the level of $P_T$ will be controlled depending on people's reaction. During the boom time (increasing α) they do not increase prices because there is enough profit from the export of crude oil and it is useful for the stable political situation within the country by keeping people satisfied with stable gasoline prices.

## Data and Methodology

The paper uses two groups of data. The first group of data is a domestic gasoline price per liter (octane-95) in dollar terms in Azerbaijan. The second group of data is a global crude oil price per liter (Brent oil) in dollar terms. For the both data the period from the first quarter of 2001 to the second quarter of 2021 is used. This is because Azerbaijan is relatively new country and the data for the local gasoline price is available from 2001 onwards. Domestic gasoline prices (Figure 1, blue line) are obtained from the Tariff (price) Council of Azerbaijan Republic. Global oil prices are taken from the US Energy Information Administration (Figure 1, red line). Logs of variables in Gretl econometric software is used for the whole data analysis of the paper.

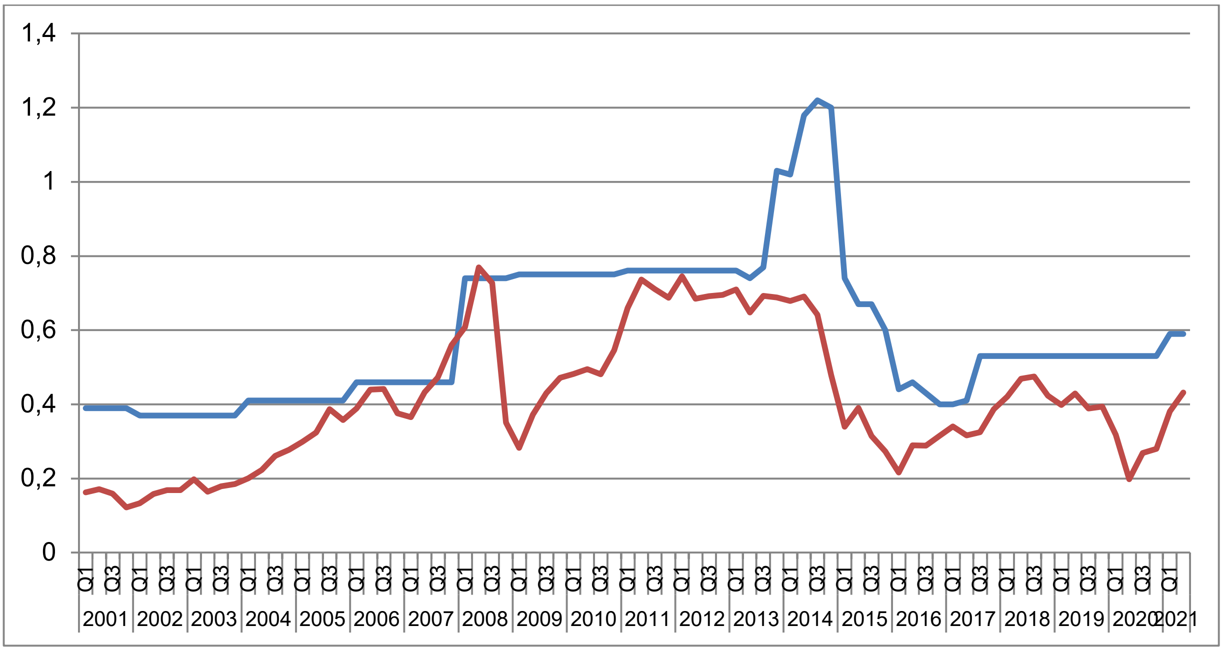


**Figure 1.** Time series plots for variables.

Firstly, it is necessary to check the stationarity (means and variances are constant over time) of the variables through unit root test, and Augmented Dickey-Fuller (ADF) is used here for that purpose. After checking the unit root, Johansen Cointegration Test is used for the long-run relationship between those variables in order to support the claim of the paper. Even though ADF test result shows the non-stationarity of the variables, their linear combinations can be stationary. This is the main idea behind the concept of cointegration.

Cointegration tests help us to understand to long-run relationship between the variables showing that they wander (move) together (Hendry and Juselius, 2000). Mainly, the results of Johansen Cointegration Test are of importance for the research due to the solidity of the results, and trace and eigenvalues are considered as the main indicators of the test.

## Empirical Results

### *Unit-root test results*

Stationarity in time series econometrics means that mean, variance and standard deviation for variables are same in all time trends. In order to check whether the above-mentioned variables are stationary or not the ADF test is used for each variable separately. By referring to Wooldridge (2015) it is possible to test for a unit root starting with a model:

$$y_t = \rho y_{t-1} + u_t \,, \tag{25}$$

where $u_t$ is a stochastic error term. If $\rho = 1$ then there is a unit root problem arises and the model becomes as:

$$y_t = y_{t-1} + u_t \,, \tag{26}$$

If we subtract $y_{t-1}$ from both sides we get

$$\Delta\, y_t = (\rho - 1)y_{t-1} + u_t \,, \tag{27}$$

The first difference will be

$$\Delta\, y_t = \; y_t - y_{t-1} \,, \tag{28}$$

Taking $(\rho - 1)$ as $\delta$

$$\Delta\, y_t = \delta y_{t-1} + u_t \,, \tag{29}$$

If $\rho = 1$ and $\delta = 0$ the equation becomes

$$\Delta\, y_t = u_t \,, \tag{30}$$

where the first difference will be stationary.

For the unit root tests (with constant) lag one is used with eighty observations. Logs of variables are used for both variables. It is tested down from max order and AIC (Akaike criterion) is the respective information criteria here.

For log of Brent oil price per liter (l_Brentpriceliter):

**Table 1.** ADF Unit-root test results for oil price

| **l_Brentpriceliter** | **Test statistic (Criterion t-statistic)** |
|---|---|
| Testing down from 1 lag | tau_c(1) = -2.25182 |
| Sample size: 80 | Asymptotic p-value = 0.1881 |

For log of domestic gasoline price per liter (l_domprice):

**Table 2.** ADF Unit-root test results for domestic gasoline price

| **l_domprice** | **Test statistic (Criterion t-statistic)** |
|---|---|
| Testing down from 1 lag | tau_c(1) = -2.37309 |
| Sample size: 80 | Asymptotic p-value = 0.1495 |

The unit root test results for both variables show that the null hypothesis ($\mathrm{H_0}$: Series has a unit root, $\mathrm{H_1}$: Series is stationary) cannot be rejected with 1%, 5% and 10% level of significance (p=0.1881≥0.05 (oil price), p= 0.1495≥0,05 (gasoline price)). Furthermore, by comparing the value of t statistics (tau_c in both tables) with critical test values (Wooldridge, 2015: 575) it seen that the null hypothesis is not rejected for both cases. For the oil price the comparison is |-2.25182|<|-2.57|, |-2.86|, |-3.12|, and for the gasoline price it is |-2.37309|<|-2.57|, |-2.86|, |-3.12|. The absolute values are smaller than the absolute critical values meaning that there is a unit root problem and the variables are non-stationary.

### *VAR (Vector Autoregression) lag selection*

According to Hendry and Juselius (2001) "…in a VAR, each variable is 'explained' by its own lagged values and the lagged values of all other variables in the system". In a VAR structure as a goal it is possible to model the time persistence of a vector of n time series, $\mathrm{y}_t$, through a multivariate autoregression such as:

$$\mathrm{y}_t = \mathrm{A}_1\mathrm{y}_{t-1} + \mathrm{A}_2\mathrm{y}_{t-2} + .. + \mathrm{A}_p\mathrm{y}_{t-p} + \mathrm{Bx}_t + \varepsilon_t, \quad (31)$$

The number of lags (p) is considered as the order of the VAR. The vector $\mathrm{x}_t$, includes a set of exogenous variables. The vector $\varepsilon_t$ is a vector white noise (not predictable series, like a sequence of random numbers) (Johnston and Dinardo, 1996: 287). Before using the Johansen Cointegration Test, for the solidity of the results it is necessary to check VAR lag selection (Table 3).

**Table 3.** VAR system, maximum lag order 4

| lags | loglik | p(LR) | AIC | BIC | HQC |
|---|---|---|---|---|---|
| 1 | 112.20936 | | -2.723317* | -2.542032* | -2.650745* |
| 2 | 113.73385 | 0.54966 | -2.659842 | -2.357700 | -2.538889 |
| 3 | 114.89395 | 0.67709 | -2.587024 | -2.164025 | -2.417690 |
| 4 | 117.62426 | 0.24321 | -2.554468 | -2.010612 | -2.336753 |

The asterisks in the table indicate the best (that is, minimized) values of the respective information criteria, AIC = Akaike criterion, BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion. AIC determines the quality of each model compared to other models. BIC is used for selecting the model amongst other models and lower BIC are usually chosen. HQC is related to AIC and it is also used for model selection. The asterisks which are mentioned in the table are the conditions (lowest values for AIC, BIC and HQC) that it is better to choose lag one for the cointegration test.

***Residual-based diagnostic tests and results: Autocorrelation, Autoregressive conditional heteroskedasticity (ARCH) and Normality of residuals***

Autocorrelation shows whether there is a relationship between the current and past values of the chosen variables. During the consecutive time intervals, it measures the degree of similarity between a given time series and a lagged version of the variables. It is necessary to avoid autocorrelation for the accurate data analysis. Otherwise, it is difficult to precisely model the correlation between datapoints (Bruggemann et. al, 2006). The result below shows that there is no autocorrelation by checking the p-values:

**Table 4.** Test for autocorrelation of order up to 4

| Lags | Rao F | Approx. dist. | p-value |
|---|---|---|---|
| 1 | 0.567 | F (4, 132) | 0.6874 |
| 2 | 0.507 | F (8, 128) | 0.8494 |
| 3 | 0.566 | F (12, 124) | 0.8655 |
| 4 | 0.515 | F (16, 120) | 0.9353 |

Table 4 shows that in all four lags the p-values are quite large meaning that the null hypothesis is not rejected ( $H_0$ : There is no autocorrelation, $H_1$ : There is an autocorrelation). For example, in lag one the null hypothesis cannot be rejected with 1%, 5% and 10% level of significance (p=0.6874>0.001, 0.05, 0.1).

It is also necessary to test autoregressive conditional heteroskedasticity (ARCH). It is connected to the observable fact that the market volatility is not constant meaning that oil and gasoline prices go through periods of high and low volatility. In a regression, heteroskedasticity is considered as a non-constant variance of the error term. It is better to avoid it for the better data analysis. There is no ARCH by looking at the p-value at lag one due to the following results:

**Table 5.** Test for ARCH of order up to 4

| Lags | LM | df | p-value |
|---|---|---|---|
| 1 | 13.769 | 9 | 0.1308 |
| 2 | 19.662 | 18 | 0.3522 |
| 3 | 40.308 | 27 | 0.0479 |
| 4 | 49.009 | 36 | 0.0727 |

Table 5 also demonstrates greater p-values in all four lags which means that the null hypothesis is not rejected ($H_0$: There is no ARCH, $H_1$: There is an ARCH). By looking at lag one, the null hypothesis cannot be rejected with 1%, 5% and 10% level of significance (p=0.1308>0.001, 0.05, 0.1).

The final step before the cointegration test is to check the normality of the residuals meaning they should follow normal distribution (mean is zero and the standard deviation is 1). This is because having not normal residuals will cause a problem with the model stability and reliability. Chi-square (if the model follows normal distribution or not) is satisfactory in the analysis by looking at the table 6:

**Table 6.** Normality of residuals

| Residual correlation matrix, C (2 x 2) | Eigenvalues of C | Doornik-Hansen test |
|---|---|---|
| 1.0000 0.28350<br>0.28350 1.0000 | 0.716504<br>1.2835 | Chi-square (4) = 68.3162<br>[0.0000] |

Test by Doornik and Hansen (2008) for multivariate normality is based on the skewness and kurtosis of multivariate data that is transformed for ensuring independence. This test statistics roughly follows Chi-square distribution. Chi-square test is used to check the goodness-of-fit of a regression model. In our table, Doornik-Hansen test result rejects the null hypothesis of multivariate normality of the data ($H_0$: There is no multivariate normality, $H_1$: There is a multivariate normality), because the Chi-square value is 68.3162 and under this value from the Chi-square distribution table the p-value is less than 5% ($p \leq 0.05$) level (Wooldridge, 2015: 749).

### *Johansen Cointegration test results*

Afterwards, Johansen Cointegration Test is applied here in order to support the chapter's claim. Cointegration in time-series analysis indicates that there is a long-term correlation between the variables. Thus, the variables move together in a long-run by affecting each other. In the VAR model such as

$$\Delta y_t = \Pi y_{t-1} + \sum_{j=1}^{k-1} \Gamma_j \Delta y_{t-j} + e_t \tag{32}$$

if $\Pi = 0$ this means there is no cointegration. If $\Pi$ has full rank then all $y_t$ is stationary, and if $\Pi$ is less than full rank and not equal to zero then it is a cointegration case which is the main goal of this paper. For the Johansen's cointegration test we use the basic equation (31). Here also we use logs of variables. As it is mentioned in the VAR selection section, lag one is chosen due to the results of the table 3, because it includes the best values with respect to information criteria (AIC, BIC, HQC). The results at the table 7 show that cointegration exists between the variables checking the trace test (with restricted constant).

**Table 7.** Johansen Cointegration Test results

| Rank | Eigenvalue | Trace test | p-value | Lmax test | p-value |
|---|---|---|---|---|---|
| 0 | 0.18725 | 22.368 | [0.0234] | 16.793 | [0.0337] |
| 1 | 0.066512 | 5.5750 | [0.2344] | 5.5750 | [0.2339] |

At the rank 0 the null hypothesis is rejected because p-value is smaller than the 5% significance level ($p=0.02601<0.05$). However, at the rank 1 the p-value is larger than 5% or 10% significance level ($p=0.2346>0.05$, 0.1), and it means there is one cointegration relationship because null hypothesis is not rejected ($H_0$: there is a cointegration, $H_1$: there is no cointegration).

**Table 8.** Johansen Cointegrating vectors

| l_domprice | l_Brentpriceliter | const |
|---|---|---|
| -4.6099<br>(1.5789) | 3.0918<br>(1.0891) | 0.48388<br>(1.7338) |

Table 8 demonstrates the cointegrating vectors and it is seen that oil price and domestic gasoline prices move opposite ways due to the positive coefficient sign (3.0918) for the oil price and negative coefficient sign (-4.6099) for the gasoline price. It supports our theoretical model and claim that during the boom time (increasing oil price) local monopolies usually increase gasoline price during the crises for covering their costs due to decreasing revenues from the export of oil. They use domestic gasoline prices as a rent-seeking tool for political purposes. The dissipated surplus is a rent in this study, and it damages the welfare of the society. Consumers do not gain from the increasing gasoline prices because it is wasted by the monopolies and politicians (rent-seeking). These findings show that policymakers should consider the dissipation of the resources seriously because nothing is produced but wasted for rent-seeking activities. Consumers do not benefit from such transactions during crises times, which in turn, make the situation worse for the society due to increasing deadweight loss. On the other hand, the local monopolies within the country keep gasoline prices stable (or decrease) because they receive sufficient revenues from the export of oil. Stable gasoline price during the boom time is helpful for the political stability.

## Conclusion

The paper explains the rent seeking behavior of monopolies in Azerbaijan through time-series analysis. Mainly because of the institutional deficiencies, there is a gap between oil and non-oil sectors. It causes investment diversification problems within the economy, and energy sector plays a crucial role as an attractive field for the investors. Before the data analysis, the rent seeking is theoretically analyzed under general equilibrium theoretical setting by explaining the energy sector monopoly behavior and shows how the incomes and labor inputs are impacted. Furthermore, the paper takes the data for global crude oil price and Azerbaijani domestic gasoline prices (rent-seeking for this study). There is a cointegration between two variables through Johansen Cointegration Test. Monopolies increase domestic gasoline prices during crises for obtaining the rent which is detrimental for a society because the surplus is wasted. This should be the concern for the policymakers because of the dissipation of the resources. The model explained why local monopolies irrationally increase gasoline prices Azerbaijan. The reason is that they can cover their losses locally during decreasing global oil prices and gain the surplus as a rent. However, during the boom time they do not increase local gasoline prices due to the revenues from the export of oil. Empirically this behavior is also supported due to the existence of cointegration relationships between the above-mentioned variables which demonstrates that these variables move together in a long-run. Hence, local monopolies mainly engage in rent-seeking during crises times.

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