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ENERGY CONSUMPTION AND UNEMPLOYMENT NEXUS IN TURKEY

TÜRKİYE'DE ENERJİ TÜKETİMİ İŞSİZLİK İLİŞKİSİ

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ABSTRACT

This study investigates the relationship between energy consumption and unemployment in Turkey over the period from 1980 to 2015 by utilizing the Gregory-Hansen cointegration test and Toda-Yamamoto causality test. The Gregory-Hansen cointegration test results show that there is a cointegration relationship between the variables in the long run. According to Toda-Yamamoto causality test results, there is unidirectional causality relationship between variables from energy consumption to unemployment rates. Therefore, it is concluded that changes in energy consumption affects unemployment rates. It should be taken into consideration that energy consumption has effect on unemployment rates by policy makers.

Keywords: *Energy consumption, Unemployment, Gregory-Hansen Cointegration Test, Toda-Yamamoto Causality Test*

ÖZ

Bu çalışmada Gregory-Hansen eşbütünleşme testi ve Toda-Yamamoto nedensellik testi kullanılarak 1980-2015 döneminde Türkiye için enerji tüketimi ile işsizlik arasındaki ilişki araştırılmıştır. Gregory-Hansen eşbütünleşme testi sonuçlarına göre değişkenler arasında uzun dönemli bir ilişki olduğu görülmektedir. Toda-Yamamoto nedensellik testi sonuçlarına göre ise enerji tüketiminden işsizlik oranlarına doğru tek yönlü nedensellik ilişkisinin varlığı belirlenmiştir. Böylece, enerji tüketimindeki değişikliklerin işsizlik oranları üzerinde etkili olduğu sonucuna ulaşılmıştır. Politika yapıcılar tarafından enerji tüketiminin işsizlik oranları üzerinde etkili olduğu dikkate alınmalıdır.

Anahtar Sözcükler: *Enerji tüketimi, İşsizlik, Gregory-Hansen Eşbütünleşme Testi, Toda-Yamamoto Nedensellik Testi*

1. Introduction

It is assumed that some sort of causality between economic activity and energy consumption since energy is a key source in production and in many consumption activities. Besides its likely implications for economic activities energy consumption is widely of concern due to its environmental effects. As in summarized in Payne (2009: 128) there are four hypotheses on the assumed relationship between energy consumption and economic activity. The first hypothesis is growth hypothesis suggesting that energy consumption affects economic growth directly, implying that there is causality from energy consumption to economic activity. Thus, policies aiming energy conservation results in reduction in real output because such policies reduce energy consumption. The second hypothesis which might be called conservation hypothesis suggests that conservation policies designed to reduce energy consumption and waste would not result in decrease in real output. The search for unidirectional causality from real output to energy consumption would be used to see whether this hypothesis has any support empirically. The third hypothesis is feedback hypothesis stating that energy consumption and real output are interdependent. That is, they are complements to each other. The fourth, and final hypothesis is neutrality hypothesis which suggests that energy consumption has only minor effect on the production of real output.

These four hypotheses all find support from empirical studies. Thus, the search for existence and direction of the causality between economic growth measured by either real output or employment/ unemployment goes on as data needed and new techniques and tests become available.

This empirical study is one of those testing the relationship between energy consumption and unemployment in Turkey over the period from 1980 to 2015. First, we summarize existing studies on the relationship between energy consumption and unemployment. Second, this relationship between energy consumption and unemployment in Turkey over the mentioned period has been investigated by utilizing the Gregory-Hansen cointegration tests. And lastly, causality relationship will be investigated by using Toda-Yamamoto causality test.

2. Literature Review

There are numerous studies having investigated the relationship between energy consumption and unemployment. Findings of many of these studies point out the fact that there is a significant relationship between energy consumption and unemployment. Table 1 provides an extensive but probably not exhaustive review of the empirical studies on the topic. Looking through the empirical studies cited in Table 1, one can see that most of the studies find a significant relationship between the two variables.

Table 1. Empirical Studies Testing the Relationship between Energy Consumption and Unemployment

Study	Country(ies)	Period	Model	Result
Uri (1996)	USA	1890-1994	Cointegration, ADF, PP and CRDW	1.54% annual average increase in oil prices causes 0.0078% increase in unemployment.

Table 1 continue

Study	Country(ies)	Period	Model	Result
Hoag and Wheeler (1996)	USA (Ohio)	1957-1982	VAR	Shocks to oil prices have statistically significant effect on employment.
Keane and Prasad (1996)	USA	1966-1981	OLS	Increase in oil prices and labor force have negative relationship in the short run but in the long run their relation is positive
Carruth *et al*. (1998)	USA	1954-1978	Efficiency-Wage, Error Correction, Granger Causality	Increase in oil prices decreases the demand for labor and enhances the unemployment ratio.
Papapetrou (2001)	Greece	1989-1999	VAR	A shock to oil prices has immediate negative impact on labor force.
Caporale and Gil-Alana (2002)	Canada	1966-2000	Fractional Cointegration	Unemployment and oil prices have cointegration relationship both in the long term and short term.
Gil-Alana (2003)	Australia	1971-1995	Fractional Cointegration, Univariate Tests of Robinson	Real oil prices and unemployment have cointegration relationship.
Chang and Wong (2003)	Singapore	1978-2000	VECM	Shocks to oil prices have negative impacts on unemployment.
Dadkhah and Stijns (2006)	USA	1950-2005	VAR and Granger Causality	Oil prices and unemployment ratio have no relationship.
Ewing and Thompson (2007)	USA	1982-2005	Hodrick-Prescott and Baxter-King	Oil prices and unemployment has concurrent relationship.
Yahia and Saleh (2008)	Libya	1970-2005	Cointegration	Oil prices and employment have cointegration relationship.
Lescaroux and Mignon (2008)	OPEC Members and Non-OPEC Member 36 Countries	1960-2005	Cross Correlation, Granger Causality Tests	Changes in oil prices especially have negative impact for the countries which are not OPEC member.
Robalo and Salvado (2008)	Portugal	1968-2005	VAR	For the period from 1968 to 1985, there is a cointegration relationship amongst oil prices and unemployment. For the period from 1986 to 2005, cointegration relationship between oil prices and unemployment are stronger.
Rafiq *et al*. (2009)	Thailand	1993-2006	VAR	There is a causality relationship from oil prices to unemployment.

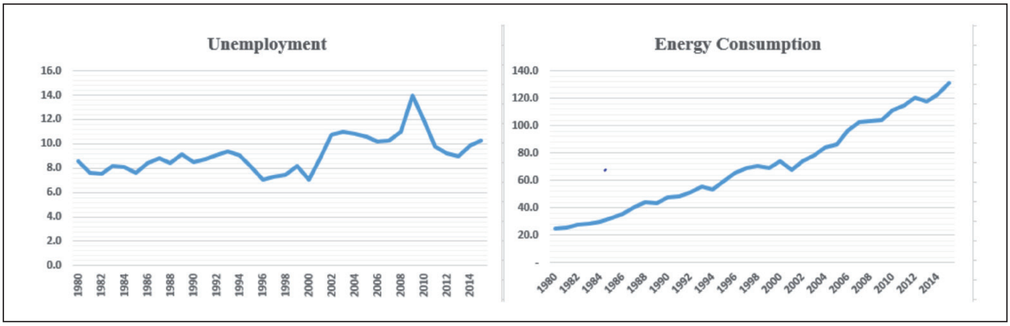
Table 1 continue

Study	Country(ies)	Period	Model	Result
Dogrul and Soytas (2010)	Turkey	2005-2009	Efficiency Wage and Causality	Increase in real oil prices and unemployment have long term relationship.
Umar and Abdulhakeem (2010)	Nigeria	1970-2008	VAR	Increase in oil prices decreases unemployment.
Erkan *et al.* (2011)	Turkey	2005-2009	Vector Autoregressive and Granger Causality	Oil prices and unemployment have relationship in the long run. Changes in unemployment do not have any effect on oil prices but changes in oil prices have effect on unemployment.
Chang *et al.* (2011)	Asia and Ocean Countries		VAR and VECM	There is no clear relationship amongst the fluctuations in oil prices and unemployment.
Ran and Voon (2012)	4 Asian Countries	1984-2007	VAR and VECM	Because of the shocks to oil prices countries may have to face high unemployment ratio.
Estrada and Cos (2012)	EU Countries	1965-2007		Increase in oil prices has impact on structural unemployment ratio.
Bouchaour and Al-Zeaud (2012)	Algeria	1980-2011	VECM	There is no significant cointegration and causality relationship amongst oil prices and unemployment in the short term.
Loganathan *et al*. (2013)	Malaysia	1980-2010	ARDL	Fluctuations in oil prices have impact on unemployment both in the long run and short run. There is a one-way causality from oil prices to unemployment. As for both variables, major breaking point is Gulf War.
Ahmad (2013)	Pakistan	1991-2010	Toda Yamamoto Causality	Oil prices and unemployment have significant relationship in the long run and the cause of unemployment is oil prices.

3. Data Set and Econometric Method

3.1. Data Set

To analyze the relationship between primary energy consumption as million tonnes oil equivalent (*ENG*) and unemployment rates (*UNEMP*) annual Turkish data from 1980 to 2015 have been used. The *ENG* dataset is obtained from BP Statistical Review of World Energy 2016 while the *UNEMP* dataset is obtained from the Turkish Statistical Institute.



Graph 1. The Trends of the Variables (1980-2015)

From the graph, we see that the two series have different trends during the period from 1980 to 2015. However, it requires formal testing to decide whether these two series move together. Following subsections undertakes this task.

3.2. Augmented Dickey Fuller and Phillips Perron Unit Root Test

Dickey Fuller test is shown in theory and practice as:

$$\Delta Y_t = \delta Y_{t-1} + u_t \tag{1}$$

with constant and trend,

$$\Delta Y_t = b_0 + \delta Y_{t-1} + u_t \tag{2}$$

with constant and without trend,

$$\Delta Y_t = b_0 + b_1 t + \delta Y_{t-1} + u_t \tag{3}$$

with constant and regressions with trend. Moreover, t or DF statistics and MacKinnon critical values are obtained.

If error term u_t contains autocorrelation, equation 3 is constructed as:

$$\Delta Y_t = b_0 + b_1 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-i} + u_t \tag{4}$$

Here, regressive difference terms are used and the number of these terms is generally determined by empirically. The main purpose in constructing the equation by this form is adding terms into the equation which make error term without autocorrelation problem. The null hypothesis is P = 1 or δ = 0. The null hypothesis is "Y contains unit root", thus Y is not stationary. The test becomes "Augmented Dickey Fuller" (ADF) test when DF test is applied to models as in the equation (4). The critical test statistics values of these tests are same (Tarı, 2010:388-390).

Phillips Perron (PP) test is more flexible than DF and ADF tests according to hypothesis about error term. For DF and ADF tests, error term is independent and with constant variance. It should be noted when using this methodology is the certainty on not having correlation between error terms and whether constant variances. PP has extended his hypothesis about DF's error terms. This regression expresses this situation much better (Tarı, 2010:400):

$$Y_t = a_0 + a_1 y_{t-1} + u_t \qquad (5)$$

$$Y_t = a_0 + y_{t-1} + a_2(t - T/2) + ut \qquad (6)$$

In this regression, T and u_t represents the number of observations and distribution of error terms, respectively. The expected average of this error term is equal to 0. However, there is a homogeneity assumption here that there shouldn't serial correlation between error terms. In this regard, the independence and homogeneity assumptions of DF test are not considered in PP test. On the contrary, the weak dependence and heterogeneous distribution of error terms are accepted. Therefore, Phillips-Perron did not take into account the limitations about error terms' hypotheses in developing DF t-statistics. (Tarı, 2010:400).

3.3. The Gregory-Hansen Cointegration Test

Contrary to Johansen cointegration test which assumes that the coefficients in the cointegrated vector do not change by time the cointegration test developed by Gregory and Hansen (1996) allows for a single structural break (Çatık, 2006:10).

The Gregory and Hansen cointegration test uses three different models to test for the presence of a long-term relation among the variables. These three models include:

Model C (Level Shift):

$$y_{1t} = \mu_1 + \mu_2 \varphi_{tT} + \alpha^T y_{2t} + e_t \qquad (7)$$

t = 1, …, n

in the model stands for the constant before the break while indicates the change brought about by the break on the constant.

Model C/T (Level Shift with Trend):

$$y_{1t} = \mu_1 + \mu_2 \varphi_{tT} + \beta t + \alpha^T y_{2t} + e_t \qquad (8)$$

t = 1,…,n

This model considers the breaks both in the constant and the trend.

Model C/S (Regime Shift):

$$y_{1t} = \mu_1 + \mu_2 \varphi_{tT} + \alpha_1^T y_{2t} + \alpha_2^T y_{2t} \varphi_{tT} + e_t \qquad (9)$$

t = 1,…,n

μ_1 and μ_2 show breaks in the constant and the change caused by the break on the constant, respectively. α_1 is the slope coefficient before the break while α_2 indicates the change in slope after the break (Gregory and Hansen, 1996:103).

Structural breaks for the three models will be defined using the following dummy variables:

$$\varphi_{1t} = \begin{cases} 0, \ if \quad t \leq [n\tau] \\ 0, \ if \quad t \, \text{f}[n\tau] \end{cases}$$

τ refers to the structural break point that takes the values of (0, 1) while $[n\tau]$ indicates the integer section of the structural break (Gregory and Hansen, 1996: 102).

The date on which the calculated Philips test statistics (Z_α^* and Z_t^*) and Augmented Dickey Fuller test statistics (ADF^*) for these three models are at the minimum level is specified as the appropriate break date.

The test statistics are expressed as follows (Gregory and Hansen, 1996:106):

$$\left. \begin{aligned} Z_\alpha^* &= \inf Z_\alpha(\tau) \\ Z_t^* &= \inf Z_t(\tau) \\ ADF^* &= \inf ADF(\tau) \end{aligned} \right\} \tau \in T$$

After comparing the calculated test statistics with table critical values for the appropriate model, the null hypothesis that there is no cointegration among variables is tested against the alternative hypothesis stating the existence of a cointegration relationship among variables with the structural breaks. The table critical values determined by the number of variables are provided by Gregory and Hansen (1996) (Tıraşoğlu and Yıldırım, 2012:115).

3.4. The Toda-Yamamoto Causality Test

Since the Granger causality analysis requires zero restrictions with specific parameters, the test statistics can be obtained applying the Wald or χ^2 test. However, in the case that VAR models contain nonstationary variables, distributions of F or χ^2 may have non-standard asymptotic characteristics. As a result of their study, Toda and Yamamoto (1995) developed a causality test that uses series in level and require no knowledge on stationarity and cointegration. That is, whether the series are stationary or they have cointegration relationship the test can be applied. Before this test is applied, an appropriate lag length (*p*) is to be determined for the VAR model (Akçacı, 2013:74).

The VAR ($p+d_{max}$) model is estimated for the Toda and Yamamoto test. d_{max} refers to the degree of maximum integration. The VAR ($p+d_{max}$) models used in the Toda and Yamamoto test are as follows:

$$Y_t = \alpha_0 + \sum_{i=1}^{p+d_{\max}} \alpha_{1(i+d)} Y_{t-(i+d)} + \sum_{i=1}^{p+d_{\max}} \alpha_{2(i+d)} + X_{t-(i+d)} + \varepsilon_{1t}$$

$$X_t = \beta_0 + \sum_{i=1}^{p+d_{\max}} \beta_{1(i+d)} Y_{t-(i+d)} + \sum_{i=1}^{p+d_{\max}} \beta_{2(i+d)} + X_{t-(i+d)} + \varepsilon_{2t}$$

The null hypothesis in the first model $H_0 : \alpha_{2(i+d)} = 0$ is tested against the alternative hypothesis $H_1 : \alpha_{2(i+d)} \neq 0$. That is the null hypothesis that the variable *X* is not the Granger-cause for the variable *Y* is tested against the alternative hypothesis that *X* is the Granger-cause for *Y*. These hypotheses are tested with the Wald test that complies with the χ^2 distribution with *p* degrees of freedom. Similarly, the second model is also tested. The additional terms here (d_{max}) is not included in the limitation (Yılancı and Özcan, 2010:28).

4. Empirical Results and Discussion

4.1. Empirical Results and Evaluation of Unit Root Tests

ADF and PP unit root test results are shown in Table 2.

Table 2. ADF and PP Unit Root Tests Results

ADF Test	***ENG***	***D(ENG)***	***UNEMP***	***D(UNEMP)***
Intercept	1.275 (0) [0.9980]	-6.389*** (0) [0.0000]	-1.981 (0) [0.2934]	-5.308*** (0) [0.0001]
Trend and Intercept	-1.920 (0) [0.6228]	-6.719*** (0) [0.0000]	-3.159 (1) [0.1095]	-5.224*** (0) [0.0008]
PP Test	***ENG***	***D(ENG)***	***UNEMP***	***D(UNEMP)***
Intercept	3.801 (11) [0.9998]	-6.438*** (3) [0.0000]	-1.877 (5) [0.3390]	-7.726*** (17) [0.0000]
Trend and Intercept	-1.788 (2) [0.6890]	-8.071*** (7) [0.0000]	-2.728 (4) [0.2322]	-7.399*** (17) [0.0000]

Notes: *Lag length in ADF test is determined according to Schwarz Information Criterion (SIC) and showed in the parenthesis. The numbers in the square brackets are showing p-values. In PP test, kernel method and bandwidth values are determined with "Barlett Kernel" and "Newey West Bandwidth", respectively.*

According to ADF and PP test results, both *ENG* and *UNEMP* series are not stationary and contains unit root at level for both models. Series become stationary when their first differences are taken at 1% significance level for all models. Therefore, *ENG* and *UNEMP* series are I(1).

4.2. Results and Evaluation of the Gregory-Hansen Cointegration Test

Since using ADF and PP unit root tests it is determined that both energy consumption and unemployment rates are *I* (1) the Gregory-Hansen cointegration test is performed to see whether a long-run relationship between the variables exists.

Table 3. The Results of the Gregory-Hansen Cointegration Test

Model	**Breaking Dates**	**ADF Stat.**	**Critical Values**	
			%1	**%5**
Model C	2003	-4.73** (0)	-5.13	
Model C/T	2003	-5.61*** (1)	-5.45	-4.99
Model C/S	1988	-5.84*** (1)	-5.47	

Notes: *Critical values are obtained from Gregory and Hansen (1996:109). *** represents that there is cointegration relationship between variables at %1 significance level and ** represents that there is cointegration relationship between variables at %5 significance level The values in parentheses show the number of lags selected by the Akaike Information Criteria.*

Minimum ADF test statistics and the corresponding breaking dates are presented in Table 3. Because minimum ADF statistics calculated for all models is greater than critical values in absolute terms, the null hypothesis that assumes no cointegration relationship between the series is rejected at 1% significance level for Model C/T and Model C/S, and at %5 significance level for Model C. Therefore, we conclude that there is a long-run relationship between the energy consumption and unemployment. Moreover, the first two model predicts a structural break in 2003 and the third model predicts it in 1988.

4.3. Results and Evaluation of the Toda-Yamamoto Causality Test

This subsection of the study will turn to the question of causality relationship between the energy consumption and unemployment in Turkey during the period from 1980 to 2015 using the Toda-Yamamoto method based on the Granger causality test.

Table 4. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-212.54	NA	1521.21	13.01	13.09	13.03
1	**-125.79**	**157.73***	**10.10***	**7.99***	**8.26***	**8.08***
2	-122.25	6.02	10.42	8.02	8.47	8.17
3	-120.65	2.51	12.16	8.16	8.79	8.37

Notes: ** indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion.*

As Table 4 shows the optimum VAR lag order (p) is 1 for all selection criterias.

Table 5. The Results of the Toda-Yamamoto Causality Test

Null Hypothesis	Lag Length	χ^2 Stat.
UNEMP $\not\Rightarrow$ ENG	(p=1) + (d_{max}=1) = 2	1.046924 (0.5925)
ENG $\not\Rightarrow$ UNEMP	(p=1) + (d_{max}=1) = 2	5.583394** (0.0413)

Notes: *The values in parentheses are probability values of the related test statistics. The p value for appropriate VAR model has been determined according to the Schwarz Information Criteria. ** represents that there is causality relationship between variables at %5 significance level.*

As Table 5 shows both main hypotheses stating that each variable is not Granger-cause of the other variable are rejected. Therefore, according to the Toda-Yamamoto causality analysis, it is concluded that there is a unidirectional causality relationship from energy consumption to unemployment rates. According to results it can be said that the changes in energy consumption affects the unemployment rates in Turkey.

5. Discussion and Conclusions

This study investigates the relationship between energy consumption and unemployment rates using Turkish case during the period from 1980 to 2015. According to the ADF and PP unit root test results, we find that both series have unit root at 1% significance level in all models.

Because the conclusion reached is that both series are I(1), the existence of long-run relationship between the variables is tested by Gregory-Hansen cointegration test. The test predicts that such relationship indeed exists. As for causality relationship, we conclude that there is a unidirectional causality relationship between the energy consumption and unemployment rates in Turkey during the period from 1980 to 2015.

According to results there is causality relationship is from energy consumption to unemployment rates that means changes in energy consumption affects unemployment rates. It should be taken into consideration that energy consumption has effect on unemployment rates by policy makers.

References

Ahmad, F. (2013). The Effect of Oil Prices on Unemployment: Evidence from Pakistan, *Business and Economics Research Journal*, 4(1), 43-57.

Akçacı, T. (2013). Eğitim Harcamalarının İktisadi Büyümeye Etkisi (The Influence of Education Expenditure on Economic Growth), *Kafkas Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 4(5): 65-79.

Bouchaour C., & Al-Zeaud H. A. (2012). Oil Price Distortion and Their Impact on Algerian Macroeconomic, *International Journal of Business and Management*, 7(18).

Caporale, G. M., & Gil-Alana, L. A. (2002). Unemployment and Input Prices: A Fractional Cointegration Approach, Applied Economics Letters, 9(6), 347-351.

Carruth, A. A., Hooker, M. A., & Oswald, A. J. (1998). Unemployment Equilibria and Input Prices Theory And Evidence From The United States, The Warwick Economics Research Paper Series (TWERPS), 496.

Chang, Y., & Wong, J. F. (2003). Oil Price Fluctuations and Singapore Economy, Energy Policy, 31(1), 1151-1165.

Chang, Y., Jha, K., Fernandez, K. M., & Jam'an, N. F. (2011). Oil Price Fluctuations and Macroeconomic Performance In Asian and Oceanic Economies, http://www.usaee.org/usaee2011/submissions/OnlineProceedings/Chang%20et%20al_Full%20Paper.pdf, (28.08.2015).

Çatık, A. N. (2006). Yapısal Kırılma Altında Para Talebinin İstikrarı: Türkiye Örneği (Money Demand Stability under The Stuctural Break: The Turkish Case), Ege Üniversitesi, *Working Paper*, No:06/11.

Dadkhah, K. M., & Stijns, J. C. (2006). The Effects Of Political Instability In The Middle East and OPEC Production Policy On Oil Prices, http://www.luc.edu/orgs/meea/volume8/PDFS/Dadkhah.pdf, (28.08.2015).

Doğrul, H. G., & Soytas, U. (2010). Relationship Between Oil Prices, Interest Rate, and Unemployment: Evidence From An Emerging Market, Energy Economics, 32(6), 1523-1528.

Erkan, B., Şentürk, M., Akbaş, Y. E., & Bayat, T. (2011). The Effect on the Indicators of Unemployment of International Crude Oil Price Volatility: Empirical Findings on the Case of Turkey, Gaziantep Üniversitesi Sosyal Bilimler Dergisi, 10(2): 715-730.

Estrada A., & Cos, P. H. D. (2012). Oil Prices and Their Effect On Potential Output, Applied Economics Letters, 19(3), 207-214.

Ewing, B. T., & Thompson, M. A. (2007). Dynamic Cyclical Comovements Of Oil Prices With Industrial Production,Consumer Prices, Unemployment, and Stock Prices, *Energy Policy*, 35(11), 5535-5540.

Gil-Alana, L. A., (2003). Unemployment and Real Oil Prices In Australia: A Fractionally Cointegrated Approach, Applied Economics Letters, 10(4), 201-204.

Gregory, A.. W. & Hansen B. E. (1996). Residual-Based Tests For Cointegration in Models with Regime Shifts, Journal of Econometrics, 70 (1), 99-126.

Hoag, J., & Wheeler, M. (1996). Oil Price Shocks and Employment: The Case Of Ohio Coal Mining, Energy, 18, 211-220.

http://www.tuik.gov.tr/PreTablo.do?alt_id=1007 https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf

Keane, M. P., & Prasad, E. S. (1996). The Employment And Wage Effects Of Oil Price Changes A Sectoral Analysis, The Review of Economics and Statistics, 78(3), 389-400.

Lescaroux, F. & Mignon, V. (2008). On the Influence of Oil Prices on Economic Activity and Other Macroeconomic and Financial Variables,*Opec Energy Review*, 32(4), 343-380.

Loganathan, N., & Kogid, M. (2013). Connection between Global Oil Price Instability and Unemployment Sustainability: Empirical Evidence from Malaysia, The Empirical Economics Letters, 12(4), 393-402.

Papapetrou, E. (2001). Oil Price Shocks, Stock Market, Economic Activity and Employment In Greece, Energy, 23(3), 511-532.

Payne James E. (2009). On the Dynamics of Energy Consumption and Employment in Illinois, Journal of Regional Analysis and Policy, 39 (2), pp. 126-130.

Rafiq, S., Salm, R., & Bloch, H. (2009). Impact of Crude Oil Price Volatility On Economic Activities: An Empirical Investigation In The Thai Economy, Resources Policy, 34(3), 121-132.

Ran, J. & Voon, J. P. (2012). Does Oil price Shock Affect Small Open Economies? Evidence from Hong Kong, Singapore, South Korea and Taiwan, Applied Economics Letters, 19(16), 1599-1602.

Robalo, P. B., & Salvado, J. C. (2008). Oil Price Shocks and The Portuguese Economy Since The 1970s, FEUNL Working Paper Series, 529.

Tarı, R. (2010), *Ekonometri*, Genişletilmiş 6.baskı, Umuttepe Yayınları, Kocaeli.

Tıraşoğlu, M. & Yıldırım B. (2012). Yapısal Kırılma Durumunda Sağlık Harcamaları ve Ekonomik Büyüme İlişkisi: Türkiye Üzerine Bir Uygulama (Health Expenditure and Economic Growth Relationship in The Case of Structural Break: A Case Study for Turkey), Electronic Journal of Vocational Colleges, 2 (2), 111-117.

Toda, H. Y. & Yamamoto T. (1995). Statistical Inference In Vector Autoregressions With Possibly Integrated Processes, Journal of Econometrics, 66 (1-2), 225-250.

Umar, G., & Abdulhakeem, K. A. (2010). Oil Price Shocks and Nigeria Economy: A Variance Autoregressive (VAR) Model, International Journal of Business and Management, 5(8).

Uri, N. (1996). Crude Oil Price Volatility And Unemployment In The United States, Energy, 21(1), 29-38.

Yahia, A. F. & Saleh, A.S., (2008). Economic Sanctions, Oil Price Fluctuations and Employment: New Empirical Evidence from Libya, American Journal Applied Sciences, 5(12), 1713-1719.

Yılancı, V. & Özcan B. (2010). Yapısal Kırılmalar Altında Türkiye için Savunma Harcamaları ile GSMH Arasındaki İlişkinin Analizi (Analyzing the Relationship Between Defense Expenditures and GNP for Turkey Under Structural Breaks), C.Ü. İktisadi ve İdari Bilimler Dergisi, 11 (1), 21-33.