Vol. 6(1), 24-29

Journal of Energy & Environmental Policy Options

The Impact of Financial Development and Energy Prices on Turkey's Energy Consumption

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Abstract

This paper explores the intricate relationship between energy consumption, economic growth, energy prices, financial development, and trade openness in Turkey over the period from 1960 to 2020. Utilizing a comprehensive dataset and robust econometric techniques, the study aims to elucidate the long-term interactions among these critical economic variables. The findings reveal that economic growth and trade openness positively influence energy consumption in the long run. This positive relationship suggests that as Turkey's economy expands and integrates more deeply into global markets, the demand for energy correspondingly increases. Economic growth typically leads to greater industrial activity, higher production outputs, and improved living standards, all of which drive up energy consumption. Similarly, trade openness, by fostering international trade and economic activities, necessitates higher energy usage to support the associated increase in production and transportation. Conversely, the study finds that financial development and energy prices negatively affect energy consumption in the long run. The negative impact of financial development on energy consumption might be explained by the increased efficiency and technological advancements that often accompany financial growth. As financial markets develop, they facilitate investments in energy-efficient technologies and renewable energy sources, leading to a reduction in overall energy consumption. Higher energy prices, on the other hand, naturally deter excessive energy use by making it costly, thus encouraging both consumers and businesses to adopt energy-saving measures and technologies. The study also identifies bidirectional causality between energy consumption and economic growth, indicating a feedback loop where each variable mutually influences the other. This bidirectional causality underscores the interdependence between energy usage and economic performance, highlighting that energy consumption is both a driver and a consequence of economic growth. As the economy grows, energy consumption rises, which in turn supports further economic activities and growth. Furthermore, the research uncovers unidirectional causality from financial development to energy consumption in the long run. This finding suggests that improvements in financial markets and institutions can lead to changes in energy consumption patterns. Specifically, as financial development progresses, it may enhance access to capital for energy-efficient technologies and infrastructure, thereby reducing overall energy consumption. The implications of these findings are significant for policymakers in Turkey. To sustain economic growth while managing energy consumption, there is a need for balanced strategies that promote both economic expansion and energy efficiency. Policies that encourage technological innovation, energy efficiency, and the adoption of renewable energy sources can help mitigate the environmental impact of increased energy consumption. Additionally, measures to stabilize energy prices and enhance financial development can contribute to more sustainable energy usage patterns.

Keywords: Energy Consumption, Economic Growth, Turkey

JEL Codes: Q43, O13, F43

1. INTRODUCTION

The determinants of energy consumption in Turkey are a subject of ongoing debate within economic literature. While there has been extensive research on how energy consumption impacts economic development globally, the specific factors influencing Turkey's energy consumption patterns have not been as thoroughly studied. Despite Turkey's rapid economic growth, its heavy dependence on energy imports is a significant contributor to the country's persistent current account deficit. This dependency underscores the critical importance of understanding the relationship between economic growth and energy consumption. Policy decisions hinge on whether economic growth drives increased energy consumption or vice versa. If economic growth leads to higher energy demand, policies promoting energy conservation become imperative to ensure sustainable development and mitigate environmental impacts. On the other hand, if reducing energy consumption risks stifling economic growth, policymakers must strike a delicate balance to foster economic stability without compromising energy security. Clarifying these relationships is essential for formulating effective energy policies tailored to Turkey's unique economic landscape. By addressing the interplay between economic growth, energy consumption, and external energy dependencies, policymakers can steer the country towards a more resilient and sustainable energy future.

The relationship between financial development and economic growth is a topic of ongoing debate in economic literature. Many studies suggest that advancements in the financial system positively influence economic growth by facilitating increased investment activities. However, there are contrasting views that economic growth itself drives financial development. This dual perspective underscores the complexity of understanding how financial systems and

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economic growth interact and shape each other over time. In addition to financial development, trade openness is another significant factor influencing energy consumption. Scholars hold diverse views on how trade openness impacts energy consumption. For instance, Sadorsky (2012) argues that increased international trade tends to result in higher energy consumption levels. This perspective suggests that as countries engage more extensively in global trade, the demand for energy to support production and transportation activities rises accordingly. Understanding the implications of trade openness on energy consumption is crucial for energy policy formulation and economic planning. Policymakers need to consider how trade agreements and global economic integration affect national energy demands and sustainability goals. By studying these dynamics, countries can adopt strategies that promote energy efficiency, reduce environmental impacts, and harness the economic benefits of global trade effectively. Cole (2006) posits that the impact of trade openness on energy consumption is contingent upon a country's economic development status. This assertion is further supported and elaborated upon by Nasreen and Anwar (2014), who argue that increased openness to trade facilitates access to advanced technologies. Consequently, countries can import high-tech goods, which often have higher energy efficiency standards, thereby lowering overall energy consumption requirements. The relationship between trade openness and energy consumption thus hinges on the technological advancements that trade facilitates. For developing countries, integrating into global trade networks can provide access to state-of-the-art technologies that improve energy efficiency in production processes. In contrast, for already developed economies, trade openness might lead to increased energy consumption due to higher overall economic activity and international trade volumes. This nuanced perspective underscores the importance of considering not only the direct economic impacts of trade openness but also its implications for energy use and environmental sustainability. Policymakers must navigate these complexities to harness the potential benefits of trade while addressing energy security and environmental challenges effectively.

While numerous studies explore the interplay between energy consumption, financial development, and economic growth, many overlook significant economic shocks or oil shocks that simultaneously impact both economic growth and financial progress. Addressing this gap, this paper seeks to analyze the relationship between economic growth, financial development, and energy consumption while considering structural breaks. By incorporating structural breaks into the analysis, this study aims to capture periods where significant shifts in economic dynamics occur, potentially altering the relationships between these variables. These breaks could arise from major economic events, policy changes, or external shocks such as oil price fluctuations, which have profound implications for both financial markets and overall economic activity. Understanding these relationships under conditions of structural breaks is crucial for policymakers and researchers alike. It allows for a more nuanced examination of how energy consumption and financial development interact with economic growth across different phases of economic cycles or in response to external shocks. This approach not only enhances our theoretical understanding but also provides practical insights for formulating robust policy frameworks that can mitigate the impacts of economic volatility and enhance sustainable economic development.

2. LITERATURE REVIEW

Following the oil shocks of the 1970s, numerous studies delved into the intricate relationship between energy consumption and economic growth. Early research by Kraft and Kraft (1978) and Akarca and Long (1979) identified a positive effect of energy consumption on economic growth, highlighting its pivotal role in fostering economic development. In recent years, causal approaches have come to the forefront in analyzing this relationship. These approaches typically involve testing for Granger causality to determine the direction of influence between GDP and energy consumption. Scholars assess whether GDP Granger causes energy consumption, vice versa, or if a feedback relationship exists between the two variables. Alternatively, some studies, such as those by Sadorsky (2012), find no significant causal link between energy consumption and economic growth, underscoring the complexity and variability of these relationships across different contexts and time periods. Understanding these causal dynamics is crucial for policymakers aiming to formulate effective energy policies that support sustainable economic growth. By elucidating how changes in energy consumption affect economic outcomes and vice versa, researchers can provide valuable insights into optimizing resource allocation, enhancing energy efficiency, and promoting economic resilience in the face of energy-related challenges.

The presence of unidirectional causality from economic growth to energy consumption or neutrality implies that energy conservation policies can be implemented without imposing constraints on economic growth. In contrast, bidirectional causality or unidirectional causality from energy consumption to economic growth suggests that efforts to reduce energy consumption might adversely affect economic growth (Cole, 2006). Understanding the direction and nature of causality between economic growth and energy consumption is crucial for policymakers seeking to balance economic development with sustainable energy use. By clarifying these relationships, policymakers can devise strategies that promote energy efficiency and environmental sustainability while supporting robust economic growth. Studies by Soytas and Sari (2003) indicate bidirectional causality between energy consumption and economic growth in Argentina, with unidirectional causality from energy consumption to economic growth observed in Turkey, France, and Germany. Lee (2005) expanded this analysis across 18 developed countries, finding unidirectional causality from energy consumption to economic growth in several South American nations such as Argentina, Chile, Colombia, Peru, and Venezuela. Apergis and Payne (2010), using panel data analysis across nine South American countries, confirmed both short-run and long-run causality from energy consumption to economic growth. Ozturk (2010) extensively reviewed literature on the energy-growth nexus, contributing to the understanding of these relationships globally.

Ozturk and Acaravci (2010) conducted a comprehensive analysis on the causal relationship between energy consumption and GDP in Albania, Bulgaria, Hungary, and Romania. They employed the ARDL bound testing approach, a method commonly used in econometrics to investigate long-run relationships among variables. This approach helps in determining whether a stable long-term relationship exists between energy consumption and economic growth in the studied countries. Their study likely involved examining the direction and strength of causality between energy consumption and GDP. The ARDL bound testing approach allows researchers to analyze both short-run dynamics and long-run equilibrium relationships, which is crucial for understanding how changes in energy consumption impact economic performance over time. There are various viewpoints regarding the influence of financial development on economic growth (Dow, 1996; Stiglitz, 2000; Rogoff, 2004). Additionally, some scholars contend that financial development could potentially have adverse effects on economic growth (Stiglitz, 2000; Rogoff, 2004). While the correlation between financial development and economic growth has been extensively researched, studies examining the relationship between energy consumption and financial development have only started to emerge recently. This area of research seeks to understand how the development of the financial sector might interact with energy consumption patterns and their combined impact on economic performance. Karanfil (2009) emphasized the importance of including financial factors such as domestic credit to the private sector when analyzing the relationship between energy consumption and economic growth. This perspective underscores how access to credit and financial resources can influence the capacity of industries and households to invest in energy-intensive activities and infrastructure, thereby affecting overall energy consumption patterns within an economy.

In a similar vein, Sadorsky (2010) expanded the analysis by investigating a range of financial indicators beyond credit, including FDI, stock market characteristics (like capitalization and turnover), and overall market size. His research highlighted the broader impacts of financial development on energy consumption, suggesting that a more developed financial sector tends to support higher levels of energy consumption. This linkage can be attributed to increased investment opportunities and economic activities facilitated by a robust financial system, which in turn drive energy demand across various sectors. Moreover, understanding these dynamics is crucial for policymakers and analysts aiming to balance economic growth with sustainable energy use. While financial development can stimulate economic activity and growth, it also raises challenges in terms of managing energy efficiency and environmental impacts. This dual perspective underscores the need for integrated policy frameworks that promote both economic development and sustainable resource management, ensuring that financial sector growth aligns with broader societal and environmental goals.

Altay and Topcu (2015) conducted a Granger causality analysis for Turkey spanning from 1980 to 2011. Their study found evidence supporting the neutrality hypothesis concerning the relationship between financial development and energy consumption. This hypothesis suggests that changes in financial development do not significantly affect energy consumption patterns, and vice versa, indicating an absence of causal relationship or feedback between the two variables during the studied period in Turkey. Shahbaz and Lean (2012) utilized the ARDL bound test approach to examine the long-run effects of financial development on energy consumption in Tunisia. Their study identified a positive relationship between financial development and energy consumption, suggesting that as financial development improves, there tends to be an increase in energy consumption levels in Tunisia over the long term. This finding implies that financial sector advancements may stimulate economic activities that drive energy demand, reflecting the interconnectedness between financial development and energy dynamics in the Tunisian context.

Shahbaz (2015) investigated the feedback effect between financial development and electricity consumption in Pakistan using the ARDL (AutoRegressive Distributed Lag) approach. The study highlighted a significant relationship between financial development and electricity consumption, suggesting that developments in the financial sector can influence patterns of electricity consumption in Pakistan. This finding underscores the interplay between financial sector growth and energy demand dynamics, indicating that improvements in financial infrastructure may contribute to increased electricity consumption as economic activities expand. Sadorsky (2011) explored the impact of trade openness on energy consumption, concluding that increased trade liberalization enhances economic growth, consequently boosting energy demand. This finding underscores the link between trade policies and energy consumption patterns, highlighting the role of international trade in influencing energy dynamics within economies. Carrion-i-Silvestre et al. (2009) employed a panel data approach to examine eight Middle Eastern countries, revealing bi-directional causality between imports and energy consumption. Additionally, the study identified a uni-directional causality from exports to energy consumption. These findings suggest that energy consumption in Middle Eastern countries is influenced by both imports and exports, reflecting the interconnectedness between trade activities and energy usage in the region.

3. THE MODEL

Based on above discussions, energy consumption described as a function of GDP, Energy prices, Domestic credit to private sector as share of GDP and Trade openness rate in this study. The time series version of this model can be written as follows:

LNEC=f(LNGDP, LNEP, LNCRE, LNOPEN)

Where ER represents total energy consumption per capita (kg of oil equivalent), GDP represents gross domestic product per capita and this variable is the proxy for economic growth, EP represents Dubai crude oil price deflated by the consumer price index (2005=100) of Turkey and this variable is the proxy for energy price, CRE represents domestic credit to private sector (% of GDP) and this variable is the proxy for financial development and OPEN represents trade

openness rate. All series are converted to natural logarithmic since the results of logarithmic form are better than linear forms. The of selected variables have been taken from the World Development Indicators.

4. RESULTS AND DISCUSSIONS

Table 1 presents the results of the Augmented Dickey-Fuller (ADF) unit root tests for various variables, distinguishing between tests conducted at the level and those conducted on first differences. For the variable lnEC (natural logarithm of EC), at the level, the ADF test statistic is -0.979 with a p-value of 0.753, indicating insufficient evidence to reject the null hypothesis of a unit root (non-stationarity). With a constant and trend included, the test statistic becomes -2.414, with a p-value of 0.368, still not significant enough to reject the null hypothesis. In first differences, however, the test statistic drops significantly to -6.952 and -6.979 for constant and constant with trend cases, respectively, both with p-values of 0.000. This suggests strong evidence to reject the null hypothesis, indicating that lnEC is likely stationary in first differences. Similarly, for lnGDP (natural logarithm of GDP), the ADF test statistics at the level are -0.670 and -2.356 with corresponding p-values of 0.844 and 0.397, respectively, indicating non-stationarity. In first differences, the test statistics are -7.292 and -7.230, both with p-values of 0.000, suggesting stationarity in first differences. For lnEP (natural logarithm of EP), lnCRE (natural logarithm of CRE), and lnOPEN (natural logarithm of OPEN), the patterns are consistent. At the level, the ADF test statistics and p-values indicate non-stationarity. However, in first differences, all variables show significant ADF test statistics (-6.939 to -7.292) with p-values of 0.000, indicating stationarity in first differences. These results are crucial for time series analysis, as they inform whether variables are stationary and suitable for further modeling and analysis, such as vector autoregression (VAR) or error correction models (ECM).

Table 1: Unit Root Tests

	Augmented Dickey-Fuller (ADF) Test			
	Level		First Differences	
Variables	Constant	ConstantandTrend	Constant	ConstantandTrend
LNEC	-0.979 (0.753)	-2.414 (0.368)	-6.952 (0.000)	-6.979 (0.000)
LNGDP	-0.670 (0.844)	-2.356 (0.397)	-7.292 (0.000)	-7.230 (0.000)
LNEP	-1.087 (0.714)	-1.614 (0.773)	-6.939 (0.000)	-6.877 (0.000)
LNCRE	0.348 (0.978)	-0.701 (0.967)	-6.175 (0.000)	-6.217 (0.000)
LNOPEN	-1.841 (0.357)	-3.493 (0.051)	-7.020 (0.000)	-6.837 (0.000)

Table 2 presents the results from the Fully Modified OLS (FMOLS) estimator applied to the dependent variable lnEC, which represents the natural logarithm of EC (Energy Consumption). The coefficients and corresponding t-statistics are reported for each variable included in the model. The constant term in the model is estimated at -3.123 with a t-statistic of -9.951, indicating strong statistical significance at the 1% level. This suggests that the intercept is significantly different from zero, providing a baseline for the model's predictions. The coefficient for lnGDP (natural logarithm of GDP) is estimated to be 1.112 with a high t-statistic of 25.087, indicating a robust and highly significant positive relationship between GDP and energy consumption. This implies that an increase in GDP is associated with a proportional increase in energy consumption. The variable lnEP (natural logarithm of EP) shows a coefficient of -0.018 with a t-statistic of -2.171, indicating a statistically significant negative relationship between EP and EC. This suggests that higher levels of economic openness are associated with lower energy consumption.

Table 2: FMOLS Estimator Results

Dependent Variable = LNEC		
Variable	Coefficient	t-statistic
Constant	-3.123***	-9.951
LNGDP	1.112***	25.087
LNEP	-0.018**	-2.171
LNCRE	-0.063**	-2.328
LNOPEN	0.033**	2.053
D1	-0.036**	-2.024
D2	0.061***	3.829
D3	-0.013	-0.705
D4	0.054***	4.937
D5	-0.062***	-2.750

The coefficient for lnCRE (natural logarithm of CRE) is -0.063 with a t-statistic of -2.328, indicating a statistically significant negative relationship between CRE and EC. This suggests that higher levels of economic competitiveness are associated with lower energy consumption. The variable lnOPEN (natural logarithm of OPEN) has a coefficient of 0.033 with a t-statistic of 2.053, indicating a statistically significant positive relationship between economic openness and energy consumption. This suggests that more open economies tend to have higher energy consumption levels. Additionally, the dummy variables (D1, D2, D4, and D5) included in the model show varied levels of significance. Specifically, D2 and D4 are statistically significant with coefficients of 0.061 and 0.054, respectively, and t-statistics of 3.829 and 4.937, indicating their significant impact on energy consumption. D1, on the other hand, shows a coefficient

of -0.036 with a t-statistic of -2.024, suggesting a negative but less significant effect. Overall, these results provide insights into the factors influencing energy consumption, highlighting the importance of GDP, economic openness, competitiveness, and specific contextual factors represented by the dummy variables in determining energy consumption patterns. The FMOLS estimation approach ensures robustness against endogeneity and autocorrelation issues, making these estimates suitable for rigorous time series analysis.

Table 3 presents the results from the Vector Error Correction Model (VECM) Granger Causality/Block Exogeneity Wald Test, examining causal relationships among Energy Consumption (EC), Gross Domestic Product (GDP), Economic Openness (EP), Competitiveness (CRE), and Openness (OPEN). When Energy Consumption (EC) is the dependent variable, the results indicate significant causal relationships: GDP and EP both Granger-cause EC. GDP shows a Wald statistic of 6.416 with a significance level of ** (p = 0.011), indicating that changes in GDP precede and influence changes in EC over time. Similarly, EP exhibits a Wald statistic of 6.835 with a significance level of *** (p = 0.008), suggesting that changes in EP lead to subsequent changes in EC. In contrast, CRE and OPEN do not show significant Granger causality towards EC, with Wald statistics of 0.123 (p = 0.725) and 9.133 (p = 0.057), respectively. When GDP is the dependent variable: EP Granger-causes GDP, evidenced by a Wald statistic of 8.561 and a significance level of *** (p = 0.003). This indicates that changes in EP lead to subsequent changes in GDP. However, EC, CRE, and OPEN do not exhibit significant Granger causality towards GDP, with Wald statistics of 1.469 (p = 0.225), 1.301 (p = 0.253), and 12.874 (p = 0.011), respectively. When Economic Openness (EP) is the dependent variable: No significant Granger causality is observed from EC, GDP, CRE, or OPEN towards EP. Wald statistics for these variables are 0.539 (p = 0.462), 0.001 (p = 0.965), 0.317 (p = 0.573), and 2.122 (p = 0.713), respectively, indicating no directional causal relationships in these directions. When Competitiveness (CRE) is the dependent variable: None of the variables (EC, GDP, EP, OPEN) show significant Granger causality towards CRE. Wald statistics for EC, GDP, EP, and OPEN are 0.398 (p = 0.528), 0.008 (p = 0.925), 0.135 (p = 0.712), and 2.451 (p = 0.653), respectively, indicating no significant directional causal relationships in these directions. When Openness (OPEN) is the dependent variable: EC Granger-causes OPEN, with a Wald statistic of 2.920 and a significance level of * (p = 0.087). This suggests that changes in EC lead to subsequent changes in OPEN. However, GDP, EP, and CRE do not show significant Granger causality towards OPEN, with Wald statistics of 1.599 (p = 0.206), 0.037 (p = 0.846), and 3.850 (p = 0.426), respectively. Overall, these findings underscore the nuanced relationships among EC, GDP, EP, CRE, and OPEN, revealing varying degrees of causal influence among these economic variables within the context analyzed by the VECM Granger Causality/Block Exogeneity Wald Test.

Table 3: VECM Granger Causality Test

Variables	LNEC	LNGDP	LNEP	LNCRE	LNOPEN	Overall X^2
LNEC	-	6.416**	1.279	6.835***	0.123	9.133*
		[0.011]	[0.258]	[0.008]	[0.725]	[0.057]
LNGDP	1.469	-	0.375	8.561***	1.301	12.874**
	[0.225]		[0.539]	[0.003]	[0.253]	[0.011]
LNEP	0.539	0.001	-	1.522	0.317	2.122
	[0.462]	[0.965]		[0.217]	[0.573]	[0.713]
LNCRE	0.398	0.008	0.135	-	1.505	2.451
	[0.528]	[0.925]	[0.712]		[0.219]	[0.653]
LNOPEN	2.920*	1.599	0.037	0.003	-	3.850
	[0.087]	[0.206]	[0.846]	[0.954]		[0.426]

5. CONCLUSIONS

This study investigates the dynamics among energy consumption, economic growth, financial development, energy prices, and trade openness in Turkey spanning from 1960 to 2020. Using the FMOLS cointegration estimator, the results indicate a positive correlation between economic growth and trade openness with energy consumption, while financial development and energy prices show a negative correlation. The causality tests reveal significant findings: in the long run, there is bidirectional causality between energy consumption and economic growth in Turkey. In the short run, the results show unidirectional causality running from economic growth to energy consumption, from financial development to energy consumption, and from financial development to economic growth. These findings provide insights into the complex interplay among economic variables in Turkey, highlighting the importance of considering both long-term and short-term dynamics in energy policy and economic development strategies. The identification of bidirectional causality between economic growth and energy consumption over the long term implies a complex interplay where economic expansion drives energy demand while energy availability and efficiency also influence economic activities.

This finding underscores the challenge of balancing economic development with sustainable energy use strategies in Turkey. While long-term policies may need to consider the energy demands of a growing economy, short-term unidirectional causality from economic growth to energy consumption supports the implementation of targeted energy conservation policies. These policies can be crucial in mitigating immediate energy consumption pressures without compromising economic growth trajectories. Moreover, the observed unidirectional causality from financial development to both economic growth and energy consumption suggests an intricate relationship. While financial development enhances economic growth by facilitating investment and innovation, it also promotes technological

advancements that can potentially reduce energy consumption per unit of output. This dual effect highlights the role of financial policies in fostering not only economic expansion but also sustainability initiatives aimed at optimizing energy use efficiency. In practical terms, these insights imply that Turkish policymakers have a spectrum of policy levers to manage economic growth and energy consumption dynamics effectively. By leveraging short-term energy conservation measures alongside long-term sustainable development strategies, such as promoting technological innovation and enhancing energy efficiency standards, Turkey can navigate the dual imperatives of economic progress and environmental responsibility. Understanding these causal relationships is crucial for devising comprehensive energy and economic policies that align with Turkey's development goals while addressing global sustainability challenges. Future research could further explore the specific mechanisms through which financial development influences energy consumption dynamics, offering deeper insights into optimizing Turkey's energy policy framework for sustainable economic growth.

REFERENCES

Akarca, A. T. and Long, T. V. (1979). Energy and employment: A time series analysis of the causal relationship. *Resour Energy*, 5, 326-331

Altay, B. and Topcu, M. (2015). Relationship between financial development and energy consumption: The case of Turkey. *Bulletin of Energy Economics*, 3(1), 18-24.

Apergis, N. and Payne, J. E. (2010). Energy consumption and growth in South America: evidence from a panel error correction model. *Energy Econ* 32, 1421–1426

Carrion-i-Silvestre, J. L. Kim, D. and Perron, P. (2009). GLS-based unit root tests with multiple structural breaks under both the null and the alternative hypotheses. *Econometric Theory*, 25(6), 1754–1792.

Cole, M. A. (2006). Does trade liberalization increase energy use? *Econ. Lett.* 92, 108-112

Dow, S. (1996). European monetary integration, endogenous credit creation and regional economic development. In: Vence-Deza, X., Metcalfe, J. (Eds.), Wealth from Diversity: Innovation and Structural Change and Finance for Regional Development in Europe, Kluwer, 293–306.

Karanfil, F. (2009). How many times again will we examine the energy–income nexus using a limited range of traditional econometric tools? *Energy Policy*, 36, 3019–3025.

Kraft, J. and Kraft, A. (1978). On the relationship between energy and GNP. *J. Energy Dev,* 3, 401–403.

Lee, C. C. (2005). Energy consumption and GDP in developing countries: A cointegrated panel analysis. *Energy Econ*, 27, 415-427

Nasreen, S. Anwar, S. (2014). Causal relationship between trade openness, economic growth and energy consumption: A panel data analysis of Asian countries. *Energy Policy*, 69, 82-91

Ozturk, I. (2010). A literature survey on energy-growth nexus. *Energy Policy*, 38, 340-349.

Ozturk, I. and Acaravci, A. (2010). The causal relationship between energy consumption and GDP in Albania, Bulgaria, Hungary and Romania: evidence from ARDL bound testing approach. *Applied Energy*, 87, 1938–1943.

Rogoff, K. (2004). Extending the limits of global financial integration. *Journal of Policy Modeling*, 26, 519–523.

Sadorsky, P. (2010). The impact of financial development on energy consumption in emerging economies. *Energy Policy*, 38, 2528–2535.

Sadorsky, P. (2011). Trade and energy consumption in the Middle East. *Energy Econ* 33, 739–749.

Sadorsky, P. (2012). Energy consumption, output and trade in South America. *Energy Econ.* 34, 476-488

Shahbaz, M. (2015). Electricity consumption, Financial Development and Economic Growth Nexus in Pakistan: A visit. *Bulletin of Energy Economics*, 3(2), 48-65

Shahbaz, M. Lean, H. H. (2012). Does financial development increase energy consumption? The role of industrialization and urbanization in Tunisia. *Energy Policy*, 40, 473-479.

Soytas, U. and Sari, R. (2003). Energy consumption and GDP: causality relationship in G-7 countries and emerging markets. *Energy Econ*, 25, 33-37

Stiglitz, J. (2000). Capital market liberalization, economic growth, and instability. *World Development*, 28, 1075–1086.

Yu, E. S. H. and Choi, J. Y. (1985). The causal relationship between energy and GNP: An international comparison. *J. Energy Dev*, 10, 249-272