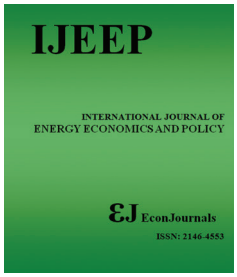


International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2025, 15(4), 83-93.

Energy Consumption and Economic Growth: Empirical perspective Asian Development Countries

Alpon Satrianto[1]*, Akmil Ikhsan[1], Remon Astra Safela[1], Mia Ayu Gusti[2], Muhamad Reza[3]

[1]Department of Economics, Faculty of Economics and Business, Universitas Negeri Padang, Padang City, Indonesia, [2]Department of Management, Faculty of Economics and Business, Universitas Negeri Padang, Padang City, Indonesia, [3]Agriculture Science Study Program, Universitas Muhammadiyah Sumatera Barat, Padang City, Indonesia. *Email: alponsatrianto@fe.unp.ac.id

Received: 19 January 2025 **Accepted:** 21 May 2025 **DOI:** https://doi.org/10.32479/ijeep.19315

ABSTRACT

This study examines the influence of energy consumption and economic growth in Asian countries. The analysis in this research was carried out using panel data with the simultaneous equation method. This article will analyses energy consumption and economic growth from perspective fiscal, household and finance. Research data between 2003 and 2022 in Asian countries (Bahrain, Bangladesh, Cambodian, China, India, Indonesia, Iran, Jordan, Kyrgyz Republic, Lebanon, Malaysia, Nepal, Oman, Pakistan, Philippines, Qatar, Tajikistan, Thailand, United Arab Emirates and Vietnam) comes from the World Development Indicator, World Bank. The simultaneous equation method was chosen to provide more comprehensive results in conducting complete research and interpretation. The results of the study provide economic growth, household expenditure, inflation, military expenditure and total greenhouse have a significant effect, while manufacturing does not have a significant effect on energy consumption. Then, government debt, domestic credit and manufacturing have a significant effect, but energy consumption and inflation do not have a significant effect on economic growth. Energy consumption can support economic growth by increasing energy needs from the careful and appropriate use of energy sources. Controlled inflation ensures that households obtain sufficient energy supplies for production needs. Government debt is still a stimulus for state revenue sources for overall economic development as a form of financing encouragement that emphasizes the importance of economic growth targets.

Keywords: Energy Consumption, Economic Growth, Government Debt, Total Greenhouse
JEL Classification: Q43, Q50, O10

1. INTRODUCTION

Climate change has become one of the most significant global challenges in the 21st century. One of the main contributors to climate change is greenhouse gas emissions resulting from the use of fossil fuels in economic activities. As economic growth increases, energy consumption tends to increase, which can ultimately have negative impacts on the environment. Therefore, it is necessary to understand in depth how energy consumption and economic growth influence each other in the context of climate change and the transition to a green economy (Abdelhedi and Boujelbène-Abbes, 2020; Sarker, 2024).

In recent decades, attention to the relationship between energy consumption and economic growth has increased significantly. Energy is one of the important factors of production in the process of economic development, and economic growth is often measured by Gross Domestic Product (GDP). Countries that experience rapid economic growth usually show significant increases in energy consumption. Therefore, understanding the relationship between energy consumption and economic growth is very important for economic and energy policy planning (Akalpler, 2023; Banday and Aneja, 2020).

Allam et al. (2023) explain in the context of global climate change, developing countries face additional challenges in managing their

energy consumption. Although economic growth is often a top priority, these countries must also consider the environmental implications of their energy consumption. Satrianto et al. (2024) excessive use of fossil fuels can lead to increased greenhouse gas emissions, which contribute to climate change. Therefore, it is important to explore how developing countries can leverage renewable energy sources and improve energy efficiency to achieve sustainable economic growth.

Karamov (2020)s developing countries face unique challenges in their pursuit of sustainable economic growth. One of the key factors driving economic growth is energy consumption. Energy plays a vital role in supporting industrialization, urbanization, and improving living standards. Satrianto et al. (2024) as economic growth increases, energy consumption in developing countries tends to increase, often creating a dilemma between economic growth and environmental sustainability.

Kumar Kavuturu et al. (2022) understanding the prevalence, patterning, and underlying drivers of energy consumption is a further important topic that has been addressed by geographers. The consumption of energy is a vital part of the functioning of contemporary, technologically driven societies, and is frequently seen as an indicator of progress and a necessary ingredient for human well-being. Yet at the same time, there is also widespread recognition of the importance of reducing aggregate energy consumption (globally, and in many cases nationally and individually) in response to pressures of the energy trilemma. Satrianto et al (2024) indeed, reducing consumption is sometimes framed as a way of addressing these problems in a manner that is less financially onerous than building substantial amounts of new low-carbon energy supply and associated infrastructure.

Kuhe and Bisu (2020) the major challenges facing developing countries is the limited energy infrastructure. Inadequate energy distribution networks and lack of access to modern energy technologies can hamper economic growth. In addition, many developing countries still rely on fossil fuels, which are not only environmentally hazardous but also vulnerable to global price fluctuations. Shen et al. (2022) the development of efficient energy infrastructure and the adoption of clean energy technologies are key to driving sustainable economic growth.

Efficient energy consumption can bring significant social and economic benefits to developing countries. Better energy use can increase productivity, create jobs, and improve people's quality of life. However, imbalances in energy access and distribution can exacerbate social and economic disparities. Therefore, it is important to analyses how energy policies can be designed to promote social inclusion and equitable distribution of economic benefits (Matar, 2020; Mongi, 2019; Okorie and Lin, 2024).

The relationship between energy consumption and economic growth in developing countries is important to understand because it can influence economic and energy policies. Increasing energy consumption is often considered an indicator of economic growth (Mrabet et al., 2019). However, high dependence on fossil fuels can lead to negative environmental impacts, such as increased greenhouse gas emissions and air pollution. Therefore, research on this relationship can provide valuable insights for policymakers in designing sustainable development strategies (Abdelhedi and Boujelbène-Abbes, 2020).

Government policies play an important role in guiding the relationship between energy consumption and economic growth. In many developing countries, policies that promote energy efficiency and investment in clean energy technologies can help reduce dependence on fossil fuels. In addition, policies that support innovation and the development of energy infrastructure can strengthen the relationship between energy consumption and economic growth. Therefore, this study will explore how government policies can influence these dynamics and promote sustainable development (Mouna et al., 2020).

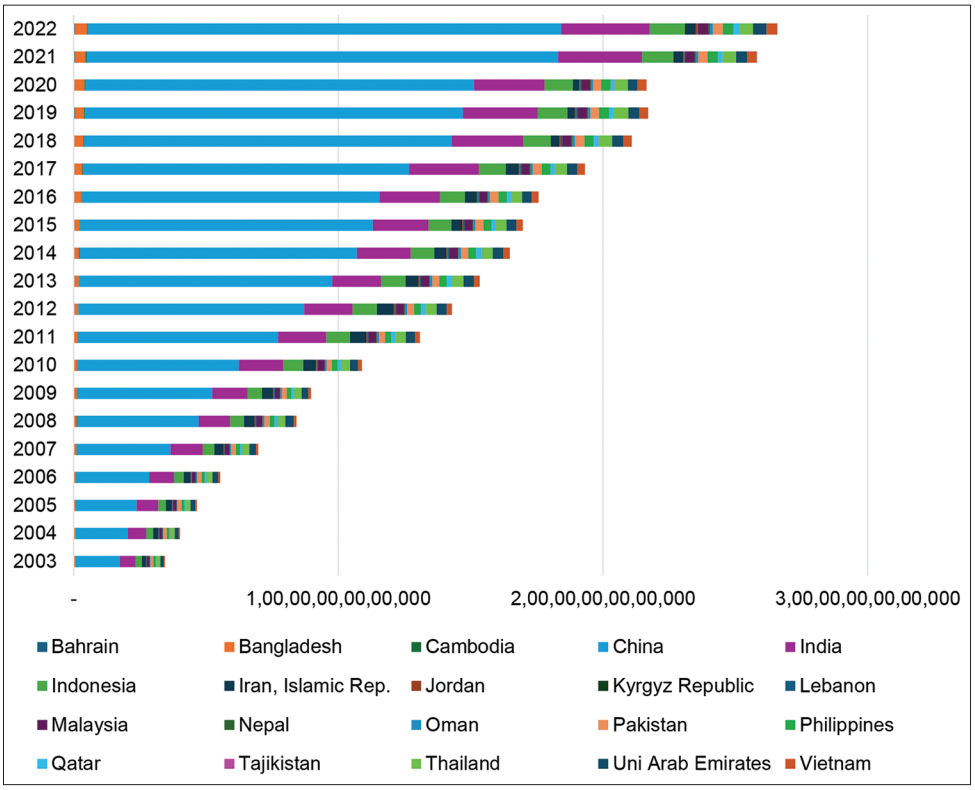
In the official report of the world bank, it is stated that China has the highest economic growth capacity from 2003 of 1,660,280,543,847 to 17,881,783,387,001 in 2022. In addition, India also experienced a rapid increase from 2003 of 607,700,687,237 to 3,353,470,496,886 in 2022. These two countries have indeed experienced significant economic growth in the last 2 decades with progress in various sectors, such as infrastructure, investment, consumption, education and health. Qatar is a new economic power in the Arab world along with Bahrain, Jordan, Oman and the United Arab Emirates. By relying on oil resources, this country is growing rapidly with equitable infrastructure development accompanied by increased public welfare. This is contrast to Lebanon, Nepal and Tajikistan which experienced stagnation in terms of economic growth that did not develop rapidly. In 2010, Lebanon gross domestic product was 38,443,907,042, Nepal's was 16,002,656,434 and Tajikistan's was 5,642,221,099 showing figures that did not grow rapidly compared to other countries (Figure 1).

Consumption of oil-based energy is certainly a mainstay for Arab countries, such as Bahrain, Oman, Qatar and the United Arab Emirates. Oil resources are the backbone of the economy that supports all national needs, even on an international scale oil from Arab countries as a supplier for industrial needs in various countries. However, after the issue of climate change emerged in environmental sustainability efforts, the decline in oil consumption was clearly visible in Bahrain in 2008 by 21, 68 down to 11, 39 in 2021. Oman in 2005 by 42, 84-21, 61 in 2002. Likewise in Qatar in 2005 38,17 down to 10,59 in 2020. The same thing also happened in the United Arab Emirates with a decline in 2006 by 25,88 to 10,49 in 2020. This condition reflects a significant decline in energy consumption, but as an effort to shift towards renewable energy it is very effective (Figure 2).

2. LITERATUR REVIEW

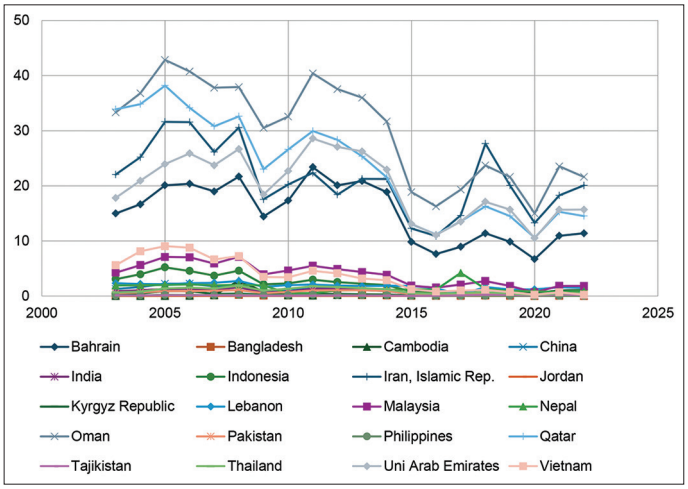
Adekunle et al. (2023) believing increases in gross domestic product typically reflect strong economic growth. With economic growth comes increased industrial activity, infrastructure development, and expansion of the service sector. All of these activities require energy, so energy consumption tends to increase with economic growth. Countries with rapidly growing economies often experience rapid urbanization and intensive industrialization.

Figure 1: Gross Domestic Product, Current US$



Source: Word Development Indicator, World Bank 2024

Figure 2: Energy Consumption (%)



Source: Word Development Indicator, World Bank

Kolawole et al. (2024) and Wang et al. (2020) both of these factors typically increase energy demand because these sectors rely heavily on energy for their daily operations. In some cases, economic growth may be accompanied by the adoption of more energy-efficient technologies. This can reduce the rate of increase in energy consumption even as the economy continues to grow.

Doğan et al. (2022) as household incomes increase, so does consumer purchase power. This allows households to purchase more energy-consuming goods and services, such as electrical appliances, vehicles, and heating or air conditioning. Higher incomes are often accompanied by lifestyle changes, which can include more use of electronic devices and more frequent travel, all of which contribute to increased energy consumption.

Jiang et al (2023) and Nwoko et al. (2016) believe energy consumption tends to be price inelastic in the short term. This means that even when prices increase due to inflation, energy demand may not change much, especially for essential needs such as electricity and heating. In many countries, especially developing countries, governments often subsidize energy or control energy prices to maintain affordability. Kuo et al. (2022) revealing these policies can insulate energy consumption from inflationary fluctuations, making it less likely to have a significant impact. Monetary and fiscal policies implemented to control inflation can also indirectly affect energy consumption.

Rajiv et al. (2024) clarifying Manufacturing companies are increasingly adopting energy efficiency technologies, such as more energy-efficient machinery and better production processes, which reduce energy consumption even as production volumes increase. In many countries, especially developed countries, there has been a shift from manufacturing to services, which are typically less energy intensive. Qayum et al. (2016) this can reduce the direct impact of manufacturing on total energy consumption. Manufacturing can be highly affected by economic cycles. During recessions or economic downturns, manufacturing activity can decline, leading to lower energy consumption, making its overall impact insignificant.

Praveen et al. (2020) believe rising temperatures can increase the need for energy for cooling in tropical and subtropical regions,

which can increase electricity consumption for air conditioning systems. Changes in weather patterns can affect seasonal energy demand, for example, increased energy use during longer, hotter summers. Akram et al. (2019) mentioning with increasing awareness of climate change, many countries are turning to cleaner energy sources to reduce greenhouse gas emissions. This can change energy consumption patterns from fossil fuels to renewable energy.

Countries that improve energy efficiency can achieve more economic output with the same or less energy consumption, which can affect the direct relationship between energy and economic growth. Government policies that support or discourage energy consumption, such as subsidies for renewable energy or carbon taxes, can affect the relationship between energy and economic growth (Sekine, 2020; Sharif et al., 2023). Policies aimed at reducing emissions and increasing energy efficiency can encourage innovation and investment in cleaner energy sectors, supporting long-term economic growth. When governments borrow to finance infrastructure projects or social programs, this can stimulate economic activity. Building roads, bridges, and public facilities can increase economic efficiency and accelerate economic growth (Xie et al., 2023).

Eddaoudi et al. (2024) and Rahman (2022) believe government debt spending can have a multiplier effect on the economy. For example, infrastructure investment can increase demand for construction and building materials, which in turn can increase incomes and consumption. In situations where government revenues are insufficient to finance spending, debt can be a tool to cover budget deficits, allowing governments to continue investing in important economic programs that support economic growth.

Liu et al. (2023) and Zhao and Zhao (2023). Domestic credit provides businesses and individuals with easier access to capital, which can boost investment and consumption. Broader and cheaper access to credit is often associated with increased economic growth. Opoku and Boachie (2020) credit to productive sectors such as manufacturing, agriculture, and technology can stimulate innovation and efficiency, which in turn increases economic output and economic growth. By increasing liquidity in domestic markets, credit can stimulate overall economic activity, increase employment, and spur greater consumption across society.

Wang (2024) revealing household consumption is typically the largest driver of economic growth. Moderate inflation can boost consumption by reducing the real value of savings (encouraging spending rather than saving), but high inflation can depress consumption by reducing people's purchasing power. High inflation often forces central banks to raise interest rates to control prices. Deka et al. (2023) revealing higher interest rates can reduce investment and consumer spending, affecting inflation affects the cost structure of firms, especially those that rely on imported raw materials or intensive labor. Changes in production costs can affect profit margins and investment decisions, which in turn affect economic growth.

The manufacturing sector serves as a major driver of economic growth in many countries, especially developing countries. Its contributions to economic growth include increased output, employment, and exports. Manufacturing drives value chain development and economies of scale. By producing efficiently and on a large scale, manufacturing can lower the unit cost of products, increase global competitiveness, and contribute to economic growth. Strong manufacturing increases a country's export capacity, improves the trade balance, and drives economic growth. Exports of manufactured goods can be an important source of foreign exchange supporting economic growth (Liu et al. (2023) and Wu et al. (2017).

3. METODHOLOGY

The author focuses on scientific objectivity in analysing energy consumption and economic growth. Data obtained from the World Development Indicator, World Bank for 20 years (2003-2022) in Asian countries (Bahrain, Bangladesh, Cambodian, China, India, Indonesia, Iran, Jordan, Kyrgyz Republic, Lebanon, Malaysia, Nepal, Oman, Pakistan, Philippines, Qatar, Tajikistan, Thailand, Uni Emirate Arab and Vietnam). Independent variable in this research is central government debt, domestic credit to private sector, household expenditure consumption, inflation, manufacturing, military expenditure and total greenhouse.

3.1. Simultaneous Equation Analysis

Simultaneous equations are a system of several equations that each describe the relationship between independent and dependent variables. In this system, several variables influence each other simultaneously. In many cases, the variables analysed are interdependent on each other. To obtain an accurate estimate of the influence of each variable, it is necessary to analyze it by taking this interaction into account. Economic models often involve many variables and complex relationships. The simultaneous equation method allows us to capture these dynamics better than methods that only look at one-way relationships.

The simultaneous equation method is an analytical tool that can be used to capture the relationship and reciprocal influence between two or more variables in an economic model. This method allows researchers to identify more accurate and complex causal relationships between energy consumption and economic growth, taking into account the influence of other relevant variables. The use of this model can reduce bias that may occur when the analysis is carried out with a simpler approach. The equation for this simultaneous test criterion can be seen in equations 1-3 below:

$$1.\ K - k = m - 1 \quad (1)$$

Definition:

- K: The total number of endogenous variables in a system of simultaneous equations.
- k: The number of variables identified outside the system as instruments or exogenous.
- m: The total number of equations in the system.

3.1.1. Explanation

This criterion is a perfect identification criterion or sufficient identification condition. In this case, the simultaneous model is said to be identifiable or well identified if the number of endogenous variables minus the number of exogenous variables is equal to the number of equations minus one.

3.2 Identification Criteria

Perfect Identification: The model can be identified if the number of endogenous variables minus the number of instruments (exogenous variables) is equal to the number of equations minus one. This means that each endogenous variable in the system can be predicted with sufficient information from the exogenous variables.

2. K – k > m – 1 (2)

Definition

- K: Total number of endogenous variables in the system of simultaneous equations
- k: Number of variables identified outside the system as instruments or exogenous
- m: Total number of equations in the system.

3.2.1. Explanation

This criterion means that the simultaneous model is said to be under-identified if the number of endogenous variables minus the number of exogenous variables is greater than the number of equations minus one. In this case, there are more endogenous variables that have not been fully identified by the available instruments compared to the number of existing equations.

Under-Identified: This means that there are more endogenous variables that are not fully explained by the existing instruments or exogenous variables, so that the parameters in the model may not be uniquely estimated.

3. K – k < m – 1 (3)

Definition

- K: Total number of endogenous variables in the system of simultaneous equations.
- k: Number of variables identified outside the system as instruments or exogenous.
- m: Total number of equations in the system.

3.2.2. Explanation

This criterion means that the simultaneous model is said to be over-identified or more than adequately identified if the number of endogenous variables minus the number of exogenous variables is less than the number of equations minus one. In this case, there are more instruments available compared to the number of endogenous variables that need to be identified.

More than Adequately Identified: This indicates that there are more instruments or exogenous variables available to explain the endogenous variables than the number of equations, so the model can be better identified. The model of simultaneous analysis is explained in the econometric equation below:

$$EC_{it} = \alpha_0 + \alpha_1 EG_{it} + \alpha_2 HE_{it} + \alpha_3 INF_{it} + \alpha_4 MAN_{it} + \alpha_5 MIL_{it} + \alpha_6 TG_{it} + \mu_{it} \quad (4)$$

$$EG_{2t} = \beta_0 + \beta_1 EC_{1it} + \beta_2 GD_{1it} + \beta_3 DC_{2it} + \beta_4 INF_{4it} + \beta_5 MAN_{5it} + \mu_{it} (5)$$

The model of simultaneous analysis is explained in the econometric equation below:

Equation 4: K -k ” 7 - 5 = 2

m-1 ” 2 - 1 = 1 (2 > 1, overidentified).

Equation 5: K -k ” 7 - 4 = 3

m-1 ” 2 - 1 = 1 (3 > 1, overidentified).

Simultaneous equation models show the dynamic relationships between endogenous variables that influence each other, providing a deeper understanding of the importance of analysing these variables within a single model framework. By applying this model, researchers can evaluate and compare the results of two equations when endogenous variables are treated differently in different models, thereby increasing the diversity of research results. This approach is very useful for cross-country studies, especially when economic characteristics vary across countries studied.

Table 1 shows the operational definition of each variable in this study as well as indicators, acronyms and variable data units. This is important to explain so that the variables studied have clear information

4. RESULT AND DISCUSSION

4.1. Statistic Descriptive

Descriptive statistics reflect the characteristics of research data as a form of initial analysis of the condition of each variable. Energy consumption has an average value of 6,363, a maximum of 42,824 and a minimum of 0.002. Economic growth has an average of 4.965 %, a maximum of 6.17 % and a minimum of 3,555. Government

Table 1: Variable measurement

Variable	Indicator	Acronym	Data unit
Energy consumption	Percentage of Oil Rents to GDP	EC	%
Economic growth	Economic Growth	EG	%
Government debt	Percentage of Central Government Debt to GDP	GD	%
Domestic credit	Percentage of Domestic Credit to Private Sector to GDP	DC	%
Household Expenditure	Household Final Consumption Expenditure	HE	$
Inflation	Consumer Price Index	INF	%
Manufacturing	Manufacturing, Value Added	MAN	$
Military expenditure	Military Expenditure	MIL	$
Total Greenhouse	Total Greenhouse Gas Emission	TG	KT of CO_2 Equivalent

debt has an average of 29.398 %, a maximum of 90.656 % and a minimum of 2.332 %. These data show that the government's foreign debt is still high, which has an impact on energy consumption policies and gross domestic product. Domestic credit has an average of 62,221 % as a form of capital distribution to the private sector to increase productivity. Household expenditure affects the level of consumption nationally so that it is able to provide an indication of the level of energy consumption with an average of 316,479 %.

Inflation is a challenge for developing countries in efforts to control prices, especially the energy sector must be consumed by the community and have an impact on economic growth with data of 5,596 %, maximum 43,488 % and minimum -4,863 %. Manufacturing has focused on productivity levels to meet the needs of private goods so that energy consumption will increase with an average of $174,447, maximum $4,909,020 and minimum $172,045. Military expenditure has had an impact on developing countries that focus on developing military equipment needs that absorb large energy needs with an average of $14,951. Total greenhouse is a challenge in reducing the impact of carbon emissions that aim to support climate change in the future with an average of 849,090 KT of CO_2 Equivalent (Table 2).

4.2. Result

After carrying out simultaneous analysis, the first equation with Fixed Effect Model approaches the energy consumption can see the results on Table 3.

Based on the Table 3, the results of the panel data regression equation are as follows:

$$EC_{it} = 88.08050 + 36.81887EG_{it} - 28.93232HE_{it} + 0.073531INF_{it} + 0.301385MAN_{it} - 4.394227MIL_{it} - 26.65689TG_{it} \quad (6)$$

On estimate get economic growth has a regression coefficient of 36.81887. These results show that there is a positive influence on energy consumption. That is, if 1% increase gross domestic product will increase energy consumption by 36.81887.

Household expenditure has a regression coefficient of −28.93232. These results show that there is a negative influence on energy consumption. That is, if 1% increase household expenditure will decrease energy consumption by −28.93232.

Inflation has a regression coefficient of 0.073531. These results show that there is a positive influence on energy consumption. That is, if 1% increase inflation will increase energy consumption by 0.073531.

Manufacturing has a regression coefficient of 0.301385. These results show that there is a positive influence on energy consumption. That is, if 1% increase manufacturing will increase energy consumption by 0.301385.

Military expenditure has a regression coefficient of −4.394227. These results show that there is a negative influence on energy consumption. That is, if 1% increase military expenditure will decrease energy consumption by −4.394227.

Total greenhouse has a regression coefficient of −26.65689. These results show that there is a negative influence on energy consumption. That is, if 1% increase total greenhouse will decrease energy consumption by −26.65689.

Then, below will display the second equation estimate from panel data analysis.

Based on the Table 4, the results of the panel data regression equation are as follows:

$$EG_{it} = 5.204265 - 0.003502EC_{it} + 0.002719DC_{it} - 0.001516INF_{it} + 0.552450MAN_{it} \quad (7)$$

On estimate get energy consumption has a regression coefficient of −0.003502. These results show that there is a negative influence on gross domestic product. That is, if 1% increase energy consumption will decrease energy gross domestic product by −0.003502 %.

Government debt has a regression coefficient of 0.001522. These results show that there is a positive influence on gross domestic product. That is, if 1% increase energy government debt will increase gross domestic product by 0.001522 %.

Domestic credit has a regression coefficient of 0.002719. These results show that there is a positive influence on gross domestic product. That is, if 1% increase domestic credit will increase gross domestic product by 0.002719 %.

Inflation has a regression coefficient of −0.001516. These results show that there is a negative influence on gross domestic product. That is, if 1% increase inflation will decrease gross domestic product by −0.001516 %.

Manufacturing has a regression coefficient of 0.552450. These results show that there is a positive influence on gross domestic product. That is, if 1% increase manufacturing will increase gross domestic product by 0.552450 %.

Table 2: Variable description

Descriptive Statistic	EC	EG	GD	DC	HE	INF	MAN	MIL	TG
MEAN	6.363	4.965	29.398	62.221	316.497	5.597	174.447	14.951	849.090
MEDIAN	1.138	4.333	30.153	51.356	72.723	4.071	20.495	3.175	160.300
MAX	42.842	6.170	90.656	186.207	6.792	43.488	4.909.020	291.958	12.942
MIN	0.002	3.555	2.332	4.784	1.300	−4.863	172.045	32.603	6.824
STDV	10.063	2.245	1.796	39.866	864.329	6.076	631.283	39.511	2.330
KOV	158.134	45.217	1.570	64.072	273.092	108.567	361.875	264.256	0.274

Table 3: Panel data estimation result first equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	88.08050	9.091079	9.688674	0.0000
EG	36.81887	3.879445	9.446923	0.0000
HE	−28.93232	3.368690	−8.588598	0.0000
INF	0.073531	0.034981	2.101989	0.0362
MAN	0.301385	0.959059	0.314250	0.7535
MIL	−4.394227	1.131531	−3.883436	0.0001
TG	−26.65689	3.715106	−7.175269	0.0000
Effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.923951	Mean dependent var		6.363281
Adjusted R-squared	0.918868	S.D. dependent var		10.06252
S.E. of regression	2.866175	Akaike info criterion		5.006625
Sum squared resid	3072.394	Schwarz criterion		5.266070
Log likelihood	-975.3250	Hannan-Quinn critter.		5.109369
F-statistic	181.7565	Durbin-Watson stat		0.667402
Prob (F-statistic)	0.000000			

Table 4: Panel data estimation result second equation

Variable	Coefficient	Standard error	t-Statistic	Prob.
EG	5.204265	0.229322	22.69417	0.0000
EC	−0.003502	0.001788	−1.958981	0.0509
GD	0.001522	0.000516	2.952966	0.0033
DC	0.002719	0.000377	7.211336	0.0000
INF	−0.001516	0.001370	−1.106923	0.2690
MAN	0.552450	0.023008	24.01137	0.0000
Effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.980741	Mean dependent var		11.06097
Adjusted R-squared	0.979509	S.D. dependent var		0.814300
S.E. of regression	0.116565	Akaike info criterion		−1.400271
Sum squared resid	5.095290	Schwarz criterion		−1.150804
Log likelihood	305.0542	Hannan-Quinn critter.		−1.301479
F-statistic	795.6968	Durbin-Watson stat		0.407533
Prob. (F-statistic)	0.000000			

4.3. Discussion

The discussion in this section will clearly describe the interpretation of the previously processed data while adding perspective to this study. The first equation shows that economic growth can significantly impact energy consumption. When a country's gross domestic product increases, it is usually accompanied by economic growth that includes an increase in industry, transportation, and other economic activities. These results are supported by Al-Kasasbeh et al. (2024) and Osei Opoku et al. (2024) this growth often leads to increased energy demand because these sectors require more energy for operation and production. Higher economic growth means more economic activity, which generally increases energy consumption. For example, the industrial and transportation sectors, which are a large part of economic growth, require significant energy consumption. In some cases, even though economic growth increases, energy consumption can decrease if there is an increase in energy efficiency or the adoption of more efficient technology. Liu et al. (2024) this is known as the de-correlation effect between economic growth and energy consumption. Technological advances and the adoption of renewable energy can affect how economic growth affects energy consumption.

Household spending can significantly affect energy consumption. Household energy expenditure typically includes electricity, gas, and fuel consumption. Such as the explanation of Padhan et al. (2020) revealing when household expenditure increases, it usually means energy consumption also increases, because households tend to consume more energy when they have more income. The structure of household expenditure, such as the proportion of expenditure on energy versus other expenditures, can affect energy consumption. Ockerby et al. (2023) believe if a household allocates more of its budget to energy-efficient household appliances, the impact of household expenditure on energy consumption may be smaller than if it allocated more of its budget to more energy-intensive products and services. Increases in household income often lead to increased spending on energy-intensive goods and services, such as larger homes or more vehicles, which in turn increases energy consumption.

Inflation has a significant impact on energy consumption. Inflation in one country can affect global energy prices. According to research from Orikpete et al. (2023) and Osuntuyi and Lean (2022) inflation causes energy prices to rise significantly, this can affect international energy markets and impact energy consumption in other countries that rely on energy imports. High inflation can cause volatility in energy prices in international markets, affecting energy price stability and consumption in energy-importing countries.

The impact of inflation on energy consumption can vary between countries or regions. Countries with high dependence on energy imports may be more sensitive to energy price fluctuations due to inflation than countries with greater domestic energy resources. In some countries, governments may provide energy subsidies to protect consumers from the impact of inflation. Omolade et al. (2019) and Poy (2023) mention these subsidy policies can affect energy consumption patterns and the effect of inflation on energy consumption. Inflation can cause increased production costs for industries, including energy costs. Increased production costs can cause firms to raise the prices of their goods and services, which in turn can affect energy consumption by consumers and firms.

Manufacturing has no significant impact on energy consumption. Many manufacturing industries have adopted more energy-efficient technologies, such as more energy-efficient machinery and production processes. According to research from Mangeli et al. (2024) and Matar (2020) adoption of these technologies can reduce energy consumption per unit of output even as the manufacturing sector expands. Innovations in production technology, such as automation and the use of energy management systems, can reduce energy requirements without reducing production output. This may cause the manufacturing sector's impact on energy consumption to be less significant.

Manufacturing is increasingly moving toward high-tech industries that focus more on high-value-added products and information technology. These sectors may use energy more efficiently or use renewable energy, which may reduce the impact of manufacturing on energy consumption. Research from Ma et al. (2024) Makun and Devi (2019) and Mokoena and Mazenda (2023) believe many advanced economies, the manufacturing sector has experienced a relative decline in its contribution to economic growth compared to the service sector. If the service sector grows faster than manufacturing, the impact of manufacturing on energy consumption may be less significant. Globalization and outsourcing of production to lower-cost countries may reduce the proportion of domestic manufacturing in the economy, which in turn reduces the direct impact of this sector on domestic energy consumption.

Military spending has a significant impact on energy consumption. The military sector requires large amounts of energy for operations such as transportation, heavy equipment operations, and training activities. These results are supported by Kurniawan et al. (2021) and Morrissey (2014) increased military spending is often associated with increased energy consumption, as militaries typically require significant amounts of fuel and energy to maintain operational readiness. Military spending also includes the construction and maintenance of infrastructure, such as military bases and logistics facilities, which require energy for construction and operation. Countries with high military spending may prioritize energy allocations to the defence sector, which can affect the availability of energy for other sectors. Kwakwa et al. (2020) revealing can have a significant impact on the overall energy consumption of the country. High military spending can encourage investment in new energy technologies or energy efficiency in the defence sector, which may also affect how other sectors use energy. High military spending can affect government spending and budget allocations for other sectors, including energy. If a country's budget is allocated heavily to defence, there may be a lack of investment in civilian energy infrastructure or clean energy technologies.

Total greenhouse gas emissions have a significant impact on energy consumption. Energy consumption, especially from fossil fuels, is often directly related to greenhouse gas emissions. According to research from Chandrarin et al. (2022) Ma et al. (2024) increased consumption of fossil fuels such as oil, gas, and coal can lead to increased emissions of CO_2 and other greenhouse gases. Policies aimed at reducing greenhouse gas emissions, such as carbon taxes or emissions regulations, can affect energy consumption by encouraging a shift toward renewable energy or more efficient technologies. Government policies that focus on reducing greenhouse gas emissions can create incentives to use cleaner energy sources, such as renewables. This can reduce reliance on fossil fuels and affect energy consumption patterns. Im and Hong (2019) industries that are regulated to reduce greenhouse gas emissions may have to adapt their production processes, which can affect energy consumption and energy efficiency. Policies that focus on reducing greenhouse gases often encourage the adoption of more efficient technologies and the use of cleaner energy sources, which can reduce overall energy consumption. Efforts to reduce greenhouse gas emissions can lead to a shift from fossil fuels to renewable energy sources, which can change energy consumption patterns even if total energy consumption remains stable or decreases.

The second equation explains that energy consumption does not significantly affect economic growth. As technology advances, many industries have improved their energy efficiency. According to research from Ashour and Sayed (2024) and Zhao and Zhao (2023) country can produce more output with less energy consumption. This means that increasing energy consumption may not always be directly proportional to economic growth if energy efficiency increases rapidly. Developing economies often experience a shift in sectoral structure, from more energy-intensive sectors (such as manufacturing) to less energy-consuming sectors (such as services and information technology). This shift can lead to a weak relationship between energy consumption and economic growth. In some countries, energy consumption may not be fully correlated with economic output if energy consumption does not increase proportionally with economic growth. Kamarudin et al. (2020) and Sahu (2020) countries with a dominant service sector may have more stable energy consumption despite increasing economic growth. Diversification of energy sources can also affect this relationship. Countries that rely on a variety of renewable energy sources and technologies may not show a strong relationship between energy consumption and economic growth.

Government debt can significantly affect economic growth. Government debt is often used to finance large infrastructure projects such as roads, bridges, and transportation systems. These results are in line with Cao et al. (2021) and Sharif et al. (2023) investments can increase economic productivity and drive economic growth by improving logistics efficiency and accessibility. In a recession or economic slowdown, governments can raise debt to finance fiscal stimulus, such as public spending and social assistance. This can boost aggregate demand and drive economic growth. High government debt can lead to significant interest payments. This burden can reduce the budget available for other spending, including productive investment, which in turn can limit economic growth. Kalu et al. (2019) revealing high government debt can lead to concerns about the ability to repay debt, which can affect market confidence and currency exchange rates. This instability can negatively impact investment and economic growth. The effect of government debt on economic growth depends largely on how the debt is managed and used. Debt that is well managed and allocated to productive projects can drive economic growth, while debt that is not well managed can pose economic risks.

Domestic credit can significantly influence economic growth. Available domestic credit can encourage investment by companies and individuals. These results are in line with Can and Korkmaz (2019), Haider and Adil (2019) and Natto (2024) access to credit, companies can expand operations and make productive investments, which can increase output and economic growth. Domestic credit also allows consumers to borrow and spend more, which can increase aggregate demand and support economic growth. Too much domestic credit can lead to overleverage, or

excess debt, in both households and companies. This can lead to the risk of default and financial crises that can harm economic growth. Poorly regulated credit can lead to financial instability, such as asset bubbles and credit crises. Foxon et al. (2015) this instability can affect market confidence and hinder economic growth. Good regulation of the domestic credit sector can ensure that credit is provided in a safe and productive manner. This can enhance the positive impact of domestic credit on economic growth while minimizing the negative risks.

Inflation does not significantly affect economic growth. High inflation can reduce consumer purchasing power, which can reduce consumption of goods and services. These results are supported by Chun et al. (2020), Gordo et al. (2024) and Liu et al. (2023) revealing consumption declines, this can hinder economic growth and potentially affect economic growth. However, if inflation is relatively stable, its effect on economic growth may be less significant. High inflation can also affect investment decisions. Rising inflation can create economic uncertainty, which can reduce business investment. Central banks often adjust monetary policy to address inflation. For example, raising interest rates to control inflation. The effect of monetary policy on economic growth can vary depending on how effective it is in managing inflation and its impact on consumption and investment. Esen and Bayrak (2017) believe some cases, inflation can be a result of strong economic growth. In this situation, inflation may not have a significant negative impact on economic growth because positive economic growth can offset the effects of inflation.

Manufacturing significantly affects economic growth. The manufacturing sector typically makes a significant direct contribution to economic growth through the production of goods and services. These results are supported by Fatima et al. (2018) and Fernández-Marín et al. (2022) performance of this sector can increase economic output and create jobs. The manufacturing sector often has a large multiplier effect, where growth in this sector can stimulate growth in related sectors, such as transportation, distribution, and services. This can extend its positive impact on economic growth. Some manufacturing industries can have negative impacts on the environment and health, such as pollution and ecosystem damage. These issues can create social costs that can reduce the economic benefits of manufacturing growth. Atashov et al. (2023) manufacturing sector can be heavily affected by global economic fluctuations and changes in supply chains. Global instability or crisis can affect the performance of the manufacturing sector and in turn have no impact on economic growth. As technology advances and consumer preferences change, some economies are shifting from manufacturing to services and technology. In this context, manufacturing growth may not always be in line with economic growth if other sectors become more dominant.

5. CONCLUSION

This study has analysed energy consumption and economic growth in Asian countries. These results have provided evidence that economic growth encourages many industrial sectors to use energy sources as raw materials in the production process, so that energy needs will increase along with increasing production capacity. In addition, household spending directly affects the level of energy consumption because households need energy sources to meet the needs of a decent life. Likewise, military spending absorbs a lot of fuel energy needs in an effort to encourage the development of national defences to be better with the many military activities carried out by the country. The significant influence is aimed at the total greenhouse in contributing massive energy consumption which has an impact on emissions and pollution in the long term as a cause of the hampering of the target of anticipating climate change.

Economic growth has always been a reference for the development of a country when viewed from the process of producing goods and services. In achieving economic growth, Asian countries tend to attract foreign debt as an indicator of development from foreign institutions for additional financing, so this variable can be an alternative policy that will have an impact on the success of development. Financing to the private sector is the key to achieving economic growth, with the availability of financial resources for the private sector will facilitate additional capital for production needs. In addition, the manufacturing sector is a milestone for large-scale production with various commodities and investments aimed at building industrial areas based on economic growth. This study will provide a different perspective from the analysis that has been carried out so that further research, even from the perspective of state policies in Asia, can formulate strategic steps aimed at utilizing energy and economic growth in the future.

REFERENCES

Abdelhedi, M., Boujelbène-Abbes, M. (2020), Transmission of shocks between Chinese financial market and oil market. International Journal of Emerging Markets, 15(2), 262-286.

Adekunle, A.O., Gbadebo, A.D., Akande, J.O., Yoshifumi, H., Ndanusa, M.M.N. (2023), Dynamics of capital flight components and domestic investment in Nigeria. Asian Economic and Financial Review, 13(7), 515-532.

Akalpler, E. (2023), Triggering economic growth to ensure financial stability: Case study of Northern Cyprus. Financial Innovation, 9(1), 77.

Akram, V., Jangam, B.P., Rath, B.N. (2019), Does human capital matter for reduction in energy consumption in India? International Journal of Energy Sector Management, 13(2), 359-376.

Al-Kasasbeh, O., Al-Khazaleh, S.M., Alsheikh, G. (2024), The dynamic impact of environmental sustainability, green finance, and fintech on energy efficiency in middle eastern economies. International Journal of Energy Economics and Policy, 14(4), 574-579.

Allam, A., Moussa, T., Abdelhady, M., Yamen, A. (2023), National culture and tax evasion: The role of the institutional environment quality. Journal of International Accounting, Auditing and Taxation, 52, 100559.

Ashour, G.H., Sayed, M.N. (2024), The role of renewable energy consumption in targeting debt sustainability in African and MENA region countries. International Journal of Energy Economics and Policy, 14(1), 393-400.

Atashov, B., Mammadova, E., Ibrahimov, E. (2023), Promotion of green economic growth in post-Soviet countries: Role of foreign direct and portfolio investments. Problems and Perspectives in Management, 21(4), 288-303.

Banday, U.J., Aneja, R. (2020), Renewable and non-renewable energy consumption, economic growth and carbon emission in BRICS: Evidence from bootstrap panel causality. International Journal of Energy Sector Management, 14(1), 248-260.

Can, H., Korkmaz, Ö. (2019), The relationship between renewable energy consumption and economic growth: The case of Bulgaria. International Journal of Energy Sector Management, 13(3), 573-589.

Cao, F., Zhang, Y., Zhang, J. (2021), Carbon tax, economic uncertainty and tourism: A DSGE approach. Journal of Hospitality and Tourism Management, 49, 494-507.

Chandrarin, G., Sohag, K., Cahyaningsih, D.S., Yuniawan, D., Herdhayinta, H. (2022), The response of exchange rate to coal price, palm oil price, and inflation in Indonesia: Tail dependence analysis. Resources Policy, 77, 102750.

Chun, D., Cho, H., Ryu, D. (2020), Economic indicators and stock market volatility in an emerging economy. Economic Systems, 44(2), 100788.

Deka, A., Ozdeser, H., Seraj, M., Kadir, M.O. (2023), Does energy efficiency, renewable energy and effective capital promote economic growth in the emerging 7 economies? New evidence from CS-ARDL model. Future Business Journal, 9(1), 52.

Doğan, M., Tekbaş, M., Gursoy, S. (2022), The impact of wind and geothermal energy consumption on economic growth and financial development: Evidence on selected countries. Geothermal Energy, 10(1), 19.

Eddaoudi, Z., Aarab, Z., Boudmen, K., Elghazi, A., Rahmani, M.D. (2024), A brief review of energy consumption forecasting using machine learning models. Procedia Computer Science, 236, 33-40.

Esen, Ö., Bayrak, M. (2017), Does more energy consumption support economic growth in net energy-importing countries? Journal of Economics, Finance and Administrative Science, 22(42), 75-98.

Fatima, T., Xia, E., Ahad, M. (2018). An aggregate and disaggregate energy consumption, industrial growth and CO_2 emission: Fresh evidence from structural breaks and combined cointegration for China. International Journal of Energy Sector Management, 12(1), 130-150.

Fernández-Marín, J.C., de Oliveira, N.S.M.N., Mourao, P. (2022), The role of policies in transforming regional fiscal structures: An exploratory analysis of spatial data from a policy of fiscal decentralization in Latin America. Journal of Economic Structures, 11(1), 9.

Foxon, T.J., Bale, C.S.E., Busch, J., Bush, R., Hall, S., Roelich, K. (2015), Low carbon infrastructure investment: Extending business models for sustainability. Infrastructure Complexity, 2(1), 4.

Gordo, N., Hunt, A., Morley, B. (2024), Alternative monetary policies and renewable energy stock returns. Energy Economics, 136, 107740.

Haider, S., Adil, M.H. (2019), Does financial development and trade openness enhance industrial energy consumption? A sustainable developmental perspective. Management of Environmental Quality: An International Journal, 30(6), 1297-1313.

Im, J., Hong, S.H. (2019), Local amenities and geographic disparity in population and industry distribution in Korea. International Symposia in Economic Theory and Econometrics, 26, 54-68.

Jiang, Y., Sharif, A., Anwar, A., The Cong, P., Lelchumanan, B., Thi Yen, V., Thi Thuy Vinh, N. (2023), Does green growth in E-7 countries depend on economic policy uncertainty, institutional quality, and renewable energy? Evidence from quantile-based regression. Geoscience Frontiers, 14(6), 101652.

Kalu, E.U., Daniel, P.B., Nwafor, U.F., Okoyeuzu, C.R., Okoro, O.E.U., Okechukwu, E.U. (2019), Relating energy consumption to real sector value added and growth in a developing economy: A case of Nigeria. International Journal of Energy Sector Management, 13(1), 166-182.

Kamarudin, K.A., Mohamad Ariff, A., Wan Ismail, W.A. (2020), Intensity of product market competition, institutional environment and accrual quality. Pacific Accounting Review, 32(3), 391-419.

Karamov, D.N. (2020), Autonomous renewable energy systems in Russia. Critical review of the current situation. Energy Reports, 6, 31-37.

Kolawole, K.D., Abdulmumin, B.A., Uzuner, G., Seyingbo, O.A., Abdulrauf, L.A.O. (2024), Modelling the nexus between finance, government revenue, institutional quality and sustainable energy supply in West Africa. Journal of Economic Structures, 13(1), 1-13.

Kuhe, A., Bisu, D.Y. (2020), Influence of situational factors on household's energy consumption behaviour: Towards an effective energy policy. International Journal of Energy Sector Management, 14(2), 389-407.

Kumar Kavuturu, K.V., Sai Tejaswi, K.N.V., Janamala, V. (2022), Performance and security enhancement using generalized optimal unified power flow controller under contingency conditions and renewable energy penetrations. Journal of Electrical Systems and Information Technology, 9(1), 18.

Kuo, Y., Maneengam, A., Phan The, C., Binh An, N., Nassani, A.A., Haffar, M., Qadus, A. (2022), Fresh evidence on environmental quality measures using natural resources, renewable energy, non-renewable energy and economic growth for 10 Asian nations from CS-ARDL technique. Fuel, 320, 123914.

Kurniawan, R., Sugiawan, Y., Managi, S. (2021), Economic growth-environment nexus: An analysis based on natural capital component of inclusive wealth. Ecological Indicators, 120, 106982.

Kwakwa, P.A., Alhassan, H., Adu, G. (2020), Effect of natural resources extraction on energy consumption and carbon dioxide emission in Ghana. International Journal of Energy Sector Management, 14(1), 20-39.

Liu, F., Umair, M., Gao, J. (2023), Assessing oil price volatility co-movement with stock market volatility through quantile regression approach. Resources Policy, 81, 103375.

Liu, P., Ur Rahman, Z., Jóźwik, B., Doğan, M. (2024), Determining the environmental effect of Chinese FDI on the Belt and Road countries CO_2 emissions: An EKC-based assessment in the context of pollution haven and halo hypotheses. Environmental Sciences Europe, 36(1), 48.

Liu, Y., Liu, H., Yan, C., Feng, Z., Zhou, S. (2023), Evaluation and dynamic monitoring of ecological environment quality in mining area based on improved CRSEI index model. Heliyon, 9(10), e20787.

Liu, Z., Zhang, W., Lu, H., Ji, J., Yang, Z., Chen, C. (2023), Exploring evolution characteristics of eco-environment quality in the Yangtze River Basin based on remote sensing ecological index. Heliyon, 9(12), e23243.

Ma, S., Li, S., Luo, Q., Yu, Z., Wang, Y. (2024), Revisiting the relationships between energy consumption, economic development and urban size: A global perspective using remote sensing data. Heliyon, 10(5), e27318.

Makun, K., Devi, S. (2019), The effect of information and communication technology on economic output: An empirical study of the Republic of Fiji Islands. International Journal of Development Issues, 18(2), 229-242.

Mangeli, M., Aram, F., Abouei, R. (2024), Energy consumption and thermal comfort of rock-cut and modern buildings. Heliyon, 10(14), e34217.

Matar, A. (2020), Does electricity consumption impacting financial development? Wavelet analysis. Future Business Journal, 6(1), 1-9.

Mokoena, M., Mazenda, A. (2023), The role of fiscal policy on poverty reduction in South Africa. Future Business Journal, 9(1), 78.

Mongi, A. (2019), The global influence of oil futures-prices on Dow Jones Islamic stock indexes: Do energy-volatility's structural breaks matter? International Journal of Emerging Markets, 14(4), 523-549.

Morrissey, K. (2014), Producing regional production multipliers for Irish marine sector policy: A location quotient approach. Ocean and Coastal Management, 91, 58-64.

Mouna, A., Nedra, B., Khaireddine, M. (2020), International comparative evidence of e-government success and economic growth: Technology adoption as an anti-corruption tool. Transforming Government: People, Process and Policy, 14(5), 713-736.

Mrabet, Z., Alsamara, M., Salem S. A. Al-Marri, S., Ali Al-Khayat, Z. (2019), Modelling the asymmetric responses of price level to oil price changes in Qatar. Journal of International Trade and Economic Development, 28(5), 548-560.

Natto, S.Y.A. (2024), The impact of fluctuating oil revenues on economic growth: New Evidence from Saudi Arabia. International Journal of Energy Economics and Policy, 14(1), 245-253.

Nwoko, I.C., Aye, G.C., Asogwa, B.C. (2016), Oil price and food price volatility dynamics: The case of Nigeria. Cogent Food and Agriculture, 2(1), 1-13.

Ockerby, C., Wood, O., Le, C.O., Redley, B., Yuen, E., Thornton, R., Hutchinson, A.M. (2023), Exploring the relationship between compassion, the practice environment, and quality of care as perceived by paediatric nurses. Journal of Pediatric Nursing, 73, e549-e555.

Okorie, D.I., Lin, B. (2024), Global shocks and fiscal stimulus: A tale of an oil-dependent-exporting country. Financial Innovation, 10(1), 26.

Omolade, A., Ngalawa, H., Kutu, A. (2019), Crude oil price shocks and macroeconomic performance in Africa's oil-producing countries. Cogent Economics and Finance, 7(1), 1-17.

Opoku, E. E. O., Boachie, M. K. (2020), The environmental impact of industrialization and foreign direct investment. Energy Policy, 137, 111178.

Orikpete, O.F., Gungura, N.M., Ehimare, E., Ewim, D.R.E. (2023), A critical review of energy consumption and optimization strategies in the Nigerian aviation sector: Challenges and prospects. Bulletin of the National Research Centre, 47(1), 170.

Osei Opoku, E.E., Acheampong, A.O., Dogah, K.E., Koomson, I. (2024), Energy innovation investment and renewable energy in OECD countries. Energy Strategy Reviews, 54, 101462.

Osuntuyi, B.V., Lean, H.H. (2022), Economic growth, energy consumption and environmental degradation nexus in heterogeneous countries: Does education matter? Environmental Sciences Europe, 34(1), 48.

Padhan, H., Padhang, P.C., Tiwari, A.K., Ahmed, R., Hammoudeh, S. (2020), Renewable energy consumption and robust globalization(s) in OECD countries: Do oil, carbon emissions and economic activity matter? Energy Strategy Reviews, 32, 100535.

Poy, S. (2023), In-work poverty dynamics: Trigger events and short-term trajectories in Argentina. Journal for Labour Market Research, 57(1), 24.

Praveen, R.P., Keloth, V., Abo-Khalil, A.G., Alghamdi, A.S., Eltamaly, A.M., Tlili, I. (2020), An insight to the energy policy of GCC countries to meet renewable energy targets of 2030. Energy Policy, 147, 111864.

Qayum, A., Gupta, A., Gupta, A., Arya, R. (2016), Environmental taxation based integrated modeling towards sustainable environmental conservation approach. Environmental Systems Research, 5(1), 1-10.

Rahman, M.M., Sultana, N. (2022), Impacts of institutional quality, economic growth, and exports on renewable energy: Emerging countries perspective. Renewable Energy, 189, 938-951.

Rajiv, A., Shree, R., Rohit Bhatt, P., Islam, B. (2024), Renewable energy mechanisms: An examination of the progress achieved in wireless power transmission techniques. Measurement: Sensors, 34, 101249.

Sahu, J.P. (2020), Do surges in foreign direct investment inflows lead to surges in economic growth? Evidence from developing countries. Studies in Economics and Finance, 38(2), 317-338.

Sarker, B. (2024), FDI-growth and trade-growth relationships during crises: Evidence from Bangladesh. Financial Innovation, 10(1), 55.

Satrianto, A., Ikhsan, A., Dirma, E.Y., Candrianto, C., Juniardi, E., Gusti, M.A. (2024), The effect of institutional quality on renewable energy: Evidence from developing countries. International Journal of Energy Economics and Policy, 14(5), 678-686.

Satrianto, A., Ikhsan, A., Dirma, E.Y., Candrianto, Juniardi, E., Gusti, M.A. (2024), Energy consumption and current account balance: Empirical from Asian countries. International Journal of Environmental Impacts, 7(3), 569-581.

Satrianto, A., Ikhsan, A., Samad, K.A. (2024), Analysis of renewable energy, environment quality and energy consumption on economic growth: Evidence from developing countries. International Journal of Energy Economics and Policy, 14(4), 57-65.

Sekine, A. (2020), Oil price pass-through to consumer prices and the inflationary environment: A STAR approach. Applied Economics Letters, 27(6), 484-488.

Sharif, A., Kartal, M.T., Bekun, F.V., Pata, U.K., Foon, C.L., Kılıç Depren, S. (2023a), Role of green technology, environmental taxes, and green energy towards sustainable environment: Insights from sovereign Nordic countries by CS-ARDL approach. Gondwana Research, 117, 194-206.

Sharif, A., Kartal, M.T., Bekun, F.V., Pata, U.K., Foon, C.L., Kılıç Depren, S. (2023b), Role of green technology, environmental taxes, and green energy towards sustainable environment: Insights from sovereign Nordic countries by CS-ARDL approach. Gondwana Research, 117, 194-206.

Shen, X., Yang, S., Chen, Y., Zeng, J. (2022), How does economic policy uncertainty influence managers' learning from peers' stock prices? Evidence from China. Pacific Basin Finance Journal, 74, 101804.

Wang, R., Mirza, N., Vasbieva, D. G., Abbas, Q., Xiong, D. (2020), The nexus of carbon emissions, financial development, renewable energy consumption, and technological innovation: What should be the priorities in light of COP 21 Agreements? Journal of Environmental Management, 271, 111027.

Wang, X. (2024), Effect of carbon reduction policies on economic growth from a dual carbon perspective. Energy Informatics, 7(1), 41.

Wu, Y., Huang, Y., Zhao, J., Pu, Y. (2017), Transfer payment structure and local government fiscal efficiency: Evidence from China. China Finance and Economic Review, 5(1), 1-15.

Xie, P., He, W., An, M., Fan, M., Dong, X. (2023), Synergy of ecological environment quality and economic development at industrial park level. Ecological Indicators, 155, 111027.

Zhao, X., Zhao, J. (2024), Digital finance and inequality in renewable energy technology innovation. Energy and Environment, 35(7), 3673-3702.