ANALYSIS OF THE EFFECT OF CORRUPTION AND SHADOW ECONOMY ON THE ECONOMY AND SUSTAINABLE DEVELOPMENT OF DEVELOPING COUNTRIES IN THE ASEAN REGION DEVELOPING COUNTRIES IN THE ASEAN REGION

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Abstract

This research aims to analyze the impact of corruption and shadow economy on the economy and sustainable development in developing countries in the ASEAN region. Corruption and shadow economy are two interrelated phenomena that have serious implications for governance, resource allocation efficiency, and the achievement of long-term development goals. This research uses a quantitative approach with the Panel Autoregressive Distributed Lag (Panel ARDL) method to identify short-term and long-term effects among variables. The variables used include corruption perception index (CPI), size of the shadow economy (SE), Gross Domestic Product per capita (GDP per capita), and Sustainable Development Index (SDG Index). The data used are secondary data obtained from various official institutions such as the World Bank, International Monetary Fund (IMF), and the Sustainable Development Report (SDR). The research results show that in the short term, neither corruption nor the shadow economy has a significant effect on GDP per capita or the SDG Index. However, in the long term, the shadow economy has a negative and significant effect on GDP per capita and the SDG Index. Meanwhile, corruption (CPI) also has a negative and significant effect on GDP per capita, but shows a positive and significant effect on the SDG Index. These findings show the complexity of the correlation among variables and the need for integrated policies that look upon the interaction between corruption and shadow economy in an effort to improve economic performance and achieve sustainable development in ASEAN developing countries.

Keyword : Corruption, Shadow Economy, GDP per Capita, SDG Index, ARDL Panel, ASEAN

INTRODUCTION

Sustainable development has become a major agenda at the global level, as reflected in the 2030 Agenda which was adopted through 17 Sustainable Development Goals (SDGs) by all UN member states. These development goals not only emphasize economic growth, but also demand a balance between economic progress, social justice, and environmental protection to ensure the sustainability of life for future generations (Khurshid et al., 2024). Developing countries in the ASEAN region face multidimensional challenges in achieving the SDGs, including rapid economic growth rates that are often accompanied by social inequality and environmental degradation (Tantikul & Soranarak, n.d.). Data from the Sustainable Development Report (2019-2023) illustrates the differences in sustainable development achievements among ASEAN countries, showing disparities and structural challenges that still need to be addressed.

Table 1.
Sustainable Development Report ASEAN countries 2019 - 2023

Country	2019	2020	2021	2022	2023
Brunei Darussalam	63.02	65.22	64.87	64.87	67.04
Indonesia	67.94	68.44	68.95	69.24	69.43
Cambodia	62.98	63.62	63.56	63.31	64.09
Lao PDR	62.11	62.06	63.02	62.85	62.95
Myanmar	62.09	62.05	62.33	62.69	62.82
Malaysia	67.82	68.24	68.32	68.65	69.32
Philippines	66.26	65.79	66.32	67.06	67.47
Singapore	68.83	69.19	69.33	70.34	71.41
Thailand	72.09	73.55	73.09	74.27	74.67
Vietnam	71.65	71.79	72.21	73.22	73.32

Source: sdgindex.org

The Sustainable Development Report (SDR) 2019-2023 data shows the different achievements of sustainable development in ASEAN, where Singapore recorded steady progress with scores rising from 68.83 to 71.41, followed by Thailand from 72.09 to 74.67, and Vietnam from 71.65 to 73.32, all of which reflect positive improvements in economic, social, and environmental areas.

In the ASEAN context, sustainable development requires the integration of economic, social, and environmental policies in every public policy formulation. Integrating SDGs in national planning, developing inclusive infrastructure, and empowering the poor have become key strategies to reduce socio-economic disparities in the region. However, ASEAN countries' commitment to sustainable development still faces significant obstacles, especially due to dependence on extractive sectors, deforestation issues, and limitations in equitable education and health services (Butt et al., 2024). These challenges emphasize the importance of cross-sector collaboration between the government, private sector, and civil society to ensure a balance between economic growth, social justice, and environmental sustainability(Sultana, 2024).

One of the fundamental factors hindering the achievement of sustainable development in developing ASEAN countries is the high level of corruption and the pervasiveness of the shadow economy (Ngo & Pham, 2025). Corruption leads to inefficiencies in resource

allocation, exacerbates social inequality, and often leads to wasted public funds and degraded public services (Soranarak & Tantikul, 2024).

Table 2.
Corruption Perception Index of ASEAN Countries 2019 - 2023

Country	2019	2020	2021	2022	2023
Brunei Darussalam	60	60	60	60	60
Indonesia	40	37	38	34	34
Cambodia	20	21	23	24	23
Lao PDR	29	29	30	31	28
Myanmar	29	28	28	23	20
Malaysia	53	51	48	47	50
Philippines	34	34	33	33	34
Singapore	85	85	85	83	83
Thailand	36	36	35	36	35
Vietnam	37	36	39	42	41

Source: Transparency International

The Corruption Perceptions Index (CPI) for the 2019-2023 period shows significant variation between countries, with some countries such as Indonesia and Myanmar experiencing a downward trend in CPI scores reflecting worsening public perceptions of corruption eradication efforts, while countries such as Singapore remain consistently at high levels. This indicates that most ASEAN countries still face structural challenges in reforming governance and oversight systems (Xu, 2025).

The shadow economy, or informal sector, is an equally important phenomenon. This unrecorded economic activity often leads to lost potential tax revenues, weakens the government's fiscal capacity, and exacerbates inequitable access to public services (Ajide et al., 2024). Previous studies estimate that the shadow economy in ASEAN can account for up to 32% of GDP, with variations across countries influenced by institutional and regulatory weaknesses (Mehmood, Ali, et al., 2025). In addition, the informal sector tends to thrive in countries with complex tax systems and bureaucratic red tape, encouraging businesses to avoid the formal sector (Mehmood, Sharif, et al., 2025).

The combined impact of corruption and the shadow economy is significant on economic stability and the success of sustainable development(Mhejir et al., 2025). Corruption and the shadow economy not only reduce the effectiveness of fiscal and macroeconomic policies, but also reinforce inequality and reduce public trust in public institutions (Haw et al., 2020). Empirical data shows that countries with large shadow economies tend to experience bottlenecks in tax collection, weakening development financing and fueling social injustice. On the other hand, high corruption discourages foreign and domestic investment, and slows innovation and long-term economic growth (Yahaya, 2020).

Table 3.
Size of the Shadow Economy in Indonesia According to Previous Research (% of official GDP

Author	Approach	Period	Size of Shadow Economy
(Schneider, 2002)	Currency Demand & MIMIC	1990-2000	Indonesia: 19,6%;
			Thailand: 52,6%;
			Malaysia: 31,1%
	MIMIC Model		Philippines: 43%;

(Torgler & Schneider, 2007)		1999 - 2004	Indonesia: 19%; Thailand: 52%
(Purnomo, 2010)	Monetary Approach	2000 - 2009	Indonesia 5.03 - 5.04%
(Hassan & Schneider, 2016)	MIMIC Model	1999 - 2013	ASEAN average 32%
(Tatariyanto, 2014)	MIMIC Model	2000 - 2008	Indonesia 20%
(Samuda, 2016)	Monetary Approach	2001 - 2013	Indonesia 8.3%

Source: Previous Research, Processed

The existing literature largely separates the analysis of the impact of corruption and the shadow economy on development, without looking simultaneously at how the two phenomena interact and reinforce each other's negative impact on the economy and sustainable development (Nguyen et al., 2025). Some studies have found that in developing countries, corruption and the shadow economy have a complementary relationship that worsens the effectiveness of development policies (Janjua et al., 2025). However, very few studies have comprehensively analyzed the causal relationship between the two variables, especially in the context of developing countries in ASEAN that share similar socioeconomic characteristics, such as weak government institutions, limited fiscal capacity, and the dominance of the informal sector.

This study fills the gap by simultaneously analyzing the effect of corruption and shadow economy on the economy and sustainable development in ASEAN developing countries. Using the Panel Autoregressive Distributed Lag (Panel ARDL) approach, this study is able to identify short-term and long-term influences between variables, as well as examine the dynamics of a more complex relationship between corruption, the shadow economy, economic growth (GDP per capita), and the achievement of SDGs (SDG Index)(Rahman, 2024). The data used covers the period 2015-2023 and is sourced from the World Bank, IMF, Transparency International, and Sustainable Development Report, thus providing a comprehensive empirical picture for the ASEAN region(Syed, 2024).

Based on the description above, the main problems raised in this study are: **How are the long-term and short-term effects of corruption and shadow economy on the economy (GDP per capita) and sustainable development (SDG Index) in developing countries in the ASEAN region? ** By answering this question, the research is expected to make a significant contribution both theoretically and practically in the formulation of inclusive and sustainable development policies in the ASEAN region (Butt et al., 2025).

RESEARCH METHOD

This study uses a quantitative approach with an explanatory design, which aims to analyze the causal relationship between the level of corruption and the shadow economy on the economy and sustainable development in developing countries in the ASEAN region. This study applies the Panel Autoregressive Distributed Lag (Panel ARDL) analysis technique, which was chosen for its ability to identify short-run and long-run influences between variables on panel data across countries and time. The scope of the study covers ASEAN countries with developing country status, namely Indonesia, Cambodia, Laos, Myanmar, Malaysia, Philippines, Thailand, and Vietnam over the period 2015 to 2023.

The data used is secondary data sourced from official institutions, such as the World Bank, International Monetary Fund (IMF), Transparency International, SDG Transformation Center, and Asian Development Bank (ADB), which provide macroeconomic statistics, corruption perception index (CPI), size of the shadow economy (SE), GDP per capita, and the

Sustainable Development Index (SDG Index). These variables have been operationally defined: CPI is measured by a corruption perception score of 0-100, SE is estimated by the demand for currency approach, GDP per capita in USD, and the SDG Index as a score of 1-100.

Table 4.
Operational Definition of Variables

Variable	Symbol	Operational Definition	Unit	Data Source
Sustainable Development	SDG	Measured using the SDG Index, reflecting performance in environmental, social, and economic aspects.	Score 1-100	SDG Index
Economy	GDPCap	Measured using GDP per capita, illustrates the prosperity and economic growth of a region.	USD	International Monetary Fund
Corruption	CPI	Measured using the Corruption Perceptions Index (CPI), score 0-100; the lower, the higher the perception of corruption.	Score	Transparency International
Shadow Economy	SE	Unrecorded economic activity is measured by the cash demand approach, reflecting the magnitude of hidden activity.	USD	Calculation

In the context of this study, two ARDL Panel models were developed to analyze the effect of corruption (CPI) and the shadow economy (SE) on two main variables, namely the Economy (GDP per capita) and Sustainable Development (SDG Index). The form of the ARDL Panel model in this study is as follows:

- ARDL Panel Model for Economy (GDPKap)

$$\Delta lnGDPKap_{it} = a_0 + \sum_{p=1p}^{P} \beta_1 \Delta lnGDPKap_{it-p} + \sum_{q=1}^{Q} \gamma_{2q} \Delta\, lnCPI_{it-i} + \sum_{r=1}^{R} \delta_{1r} \Delta\, lnSE_{it-r} + \lambda_1\, lnGDPKap_{it-1} + \mu_1\, lnCPI_{it-1} + v_1 lnSE_{it-1} + e_{1it}$$

- ARDL Model for Sustainable Development (SDG)

$$\Delta lnSDG_{it} = a_1 + \sum_{p=1}^{P} \beta_{2p}\, \Delta lnSDG_{it-p} + \sum_{q=1}^{Q} \gamma_{2q} \Delta\, lnCPI_{it-i} + \sum_{r=1}^{R} \delta_{2r} \Delta\, lnSE_{it-i} + \lambda_2\, lnSDG_{it-1} + \mu_2\, lnCPI_{it-1} + v_2 lnSE_{it-1} + e_{2t}$$

Description:

- $\Delta lnGDPKap_{it}$ and $\Delta lnSDG_{it}$: First logarithmic change of GDP per capita.
- $lnCPI_{it}$ and $lnSE_{it}$: Logarithm of Corruption Perceptions Index and shadow economy measures.
- β,γ,δ: Short-run coefficients of each variable.
- λ,μ,ν: Long-run coefficients that show the effect in the long run

  long-run
- eit: Error term

- p,q,r: Optimal lag of each variable

All analyses were conducted using EViews 12 statistical software, and all data processing and model estimation followed transparent and systematic replication rules. In terms of ethics, this study only uses secondary data that is public and does not involve personal identities, so it does not pose a risk to privacy or research ethics. With this design and procedure, the research is expected to be replicated in other developing country contexts, as long as similar data and adequate periods are available.

RESULTS AND DISCUSSION

Economies of Developing Countries in ASEAN

GDP per capita is a leading indicator that describes the average economic output per person and reflects the level of welfare and wealth distribution in a country. This indicator is important for assessing economic development over time, where increases indicate healthy growth, improved productivity, and rising living standards. In the ASEAN context, GDP per capita reflects differences in development levels between countries as well as long-term economic growth trends influenced by factors such as the COVID-19 pandemic, energy crisis, and economic recovery. Analysis of this indicator is important for understanding the socio-economic dynamics and development prospects of the region.

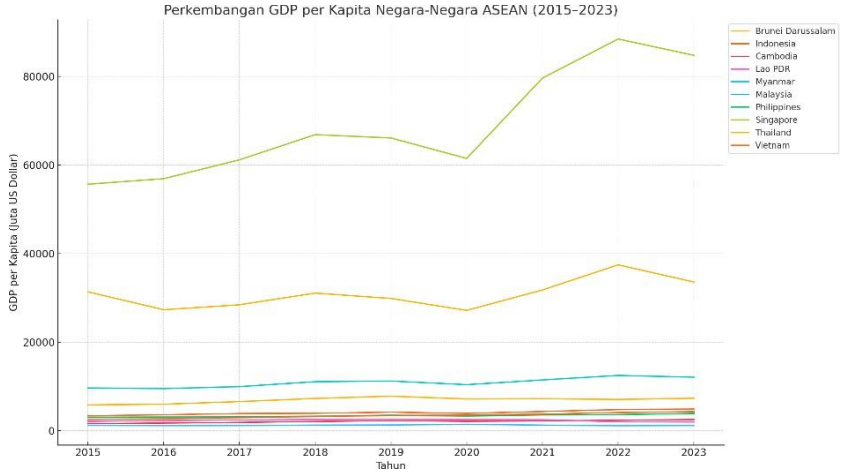

Figure 1.
GDP Per Capita of Developing Countries in the ASEAN Region (Million USD)

The development of GDP per capita of developing countries in ASEAN during 2015-2023 shows a varied trend. Malaysia and Thailand recorded stable growth despite being affected by the pandemic, with GDP per capita reaching 12,090 USD and 7,335 USD respectively in 2023. Indonesia and Vietnam experienced significant increases, reflecting their success in maintaining growth momentum and developing their manufacturing and export sectors. The Philippines also experienced a slower rise, while Cambodia showed gradual growth with great potential from tourism and light industry.

In contrast, Laos has experienced a decline in GDP per capita since 2019 due to debt pressure and economic dependence on natural resources. Myanmar recorded the sharpest decline due to political instability and prolonged conflict. Overall, although the gap between countries is still sizable, countries such as Vietnam, Indonesia, and Cambodia show potential to catch up if supported by sustainable development policies and appropriate economic reforms.

Sustainable Development in ASEAN Developing Countries

Sustainable development in developing countries in the ASEAN region involves striving to achieve a balance between economic growth, social welfare, and environmental

preservation. The Sustainable Development Goals (SDGs) initiated by the United Nations aim to address global challenges such as poverty, social inequality, climate change and environmental degradation, and ensure prosperity for all. Each country in ASEAN faces different challenges, with countries such as Thailand, Indonesia, Malaysia, Vietnam, Cambodia, Laos, and Myanmar showing varying progress in achieving the SDG targets.

Countries with lower levels of development such as Laos and Myanmar still face various obstacles in optimally implementing sustainable development policies. Nonetheless, the achievement of the SDGs is an important indicator to assess the extent to which a country has succeeded in achieving inclusive and sustainable development. Therefore, one of the main indicators to see the progress of sustainable development is by observing the SDG Index, which provides a of each progress achieving these goals. The following is data on the development of the SDGs index in ASEAN countries.

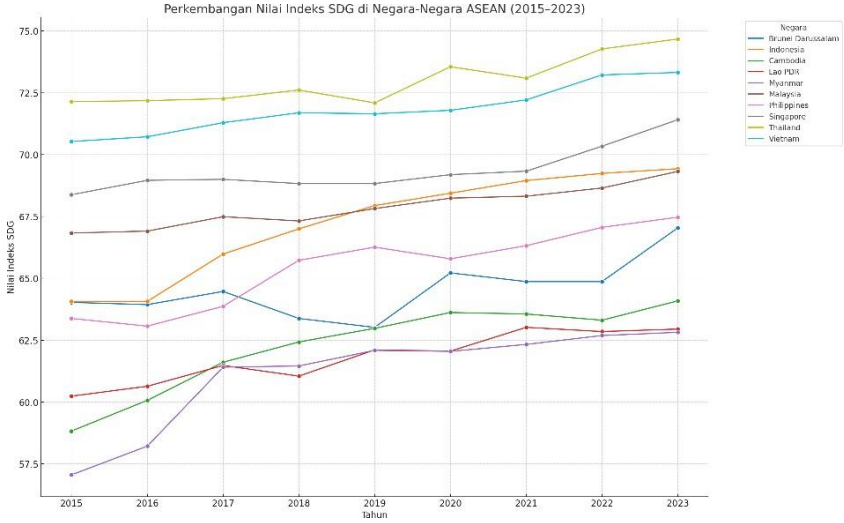

Figure 2.
SDG Index of Developing Countries in the ASEAN Region

Based on data on the progress of Sustainable Development Goals (SDGs) indicators in ASEAN developing countries, it can be seen that most countries have improved, albeit at different rates. Thailand and Vietnam showed the most significant progress, with the SDG index reaching 74.67 and 73.32 respectively by 2023, reflecting the effective integration of SDGs in national policies. Indonesia and Malaysia also recorded positive improvements with scores of 69.43 and 69.32 respectively, demonstrating continued commitment in strategic sectors such as education, health and poverty alleviation.

On the other hand, countries like Cambodia, Laos and Myanmar face greater challenges. Cambodia and Laos recorded SDG scores of 64.09 and 62.95 respectively with a slow pace of improvement due to structural barriers such as institutional capacity and funding. Myanmar stagnated at around 62 due to internal conflict and political instability. Overall, the gap in achieving the SDGs in ASEAN remains wide, emphasizing the importance of regional cooperation, financial support, and inclusive approaches to ensure no country is left behind, in line with the principle of "Leave No One Behind."

Shadow Economy Calculation

The shadow economy in the ASEAN region shows diversity in value and ratio to GDP throughout 2015-2023. Indonesia recorded a large shadow economy in nominal terms, but the ratio to GDP decreased from 7.68% to 5.07%, driven by tax digitalization and MSME reforms. Malaysia maintained a stable ratio of around 7.3% thanks to its well-established tax system, while the Philippines, with a ratio of around 4.4%, showed progress through tax reform and

financial digitization. Vietnam managed to lower its SE ratio from 5.5% to 4.0% through fiscal reforms and MSME formalization, although challenges remain in rural areas.

On the other hand, Laos recorded the highest SE ratio, averaging above 20% due to the dominance of the informal economy and weak fiscal capacity. Thailand with a ratio of around 12.5% also faces similar challenges, especially in the informal urban sector. Myanmar experienced a spike in SE after the 2021 coup, from 2.67% to 7.41%, reflecting the impact of political instability on the formal economy. Meanwhile, Cambodia recorded the lowest SE ratio, averaging 1.75%, which seems contradictory due to the high number of informal workers, but this is more due to data limitations and the large number of non-monetary activities. Overall, the differences across countries reflect the role of structural factors, fiscal governance, political stability, and statistical capacity in shaping the size of the shadow economy.

Descriptive Statistical Analysis Results

Table 5.
Descriptive Statistical Analysis Results Before LN

Statistics	SE	SDG	GDPCAP	CPI
Mean	7.581.944	6.632.333	4.299.195	3.363.889
Median	5.645.000	6.629.000	3.343.114	3.400.000
Maximum	2.535.000	7.467.000	12483.33	5.300.000
Minimum	1.080.000	5.706.000	1.146.239	2.000.000
Std. Dev.	5.940.610	4.480.548	3.012.405	8.129.767
Skewness	1.419.215	0.117066	1.274.256	0.342970
Kurtosis	4.509.362	1.942.811	3.596.819	2.828.120
Jarque-Bera	3.100.459	3.517.395	2.055.332	1.500.165
Probability	0.000000	0.172269	0.000034	0.472327
Sum	5.459.000	4.775.280	309542.0	2.422.000
Sum Sq. Dev.	2.505.650	1.425.347	6.48E+08	4.692.611
Observations	72	72	72	72

Source: Eviews 12 Processing Results

Based on the descriptive statistics results, most of the variables in the data show abnormal distributions. The SE and GDPCAP variables have high skewness and kurtosis values, as well as significant Jarque-Bera test results, indicating a skewed and spiky distribution. While the variables SDG and CPI tend to be more symmetrical, SDG shows low kurtosis and CPI still has slight skewness. Therefore, logarithm (ln) transformation is necessary to normalize the distribution and reduce the influence of outliers, so that further analysis becomes more accurate and reliable.

The following are the results of descriptive analysis after logarithm (ln) transformation:

Table 6.
Descriptive Statistical Analysis Results After LN

Statistics	LN_SE	LN_GDPCAP	LN_SDG	LN_CPI
Mean	1.7395	8.1505	4.1923	3.4862
Median	1.7307	8.1146	4.1940	3.5263

Maximum	3.2328	9.3421	4.3104	3.9702
Minimum	0.7852	7.0424	4.0413	2.3957
Std. Dev.	0.5186	0.8584	0.0673	0.2471
Skewness	0.3983	0.2390	0.0209	-0.2544
Kurtosis	2.3989	2.3087	1.9793	2.6307
Jarque-Bera	1.1866	2.1267	3.1304	1.1855
Probability	0.5525	0.3453	0.2090	0.5528
Sum	125.2475	586.8385	301.8541	251.0081
Sum Sq. Dev.	43.3685	30.3773	0.3237	4.3391
Observations	72	72	72	72

Source: Eviews 12 Processing Results

Based on the descriptive statistics output after logarithmic transformation, the data distribution of the four main variables can be considered close to normal. The mean of the shadow economy (LN_SE) is 1.7395 with a median of 1.7307, indicating a relatively symmetrical distribution, supported by a skewness of 0.3983 and a kurtosis of 2.3989. The Jarque-Bera test yielded a value of 1.1866 (p = 0.5525), indicating no significant deviation from the normal distribution.

The GDP per capita variable (LN_GDPCAP) has a mean of 8.1505 and a median of 8.1146, with a skewness of 0.2390 and a kurtosis of 2.3087, indicating a slightly right-skewed distribution but still close to normal. The Jarque-Bera result of 2.1267 (p = 0.3453) confirms this. The sustainable development variable (LN_SDG) is highly symmetric with a mean of 4.1923 and median of 4.1940, as well as skewness of 0.0209 and kurtosis of 1.9793; the Jarque-Bera test shows a value of 3.1304 (p = 0.2090). Meanwhile, the corruption perception index (LN_CPI) has a distribution that is also close to normal, with slightly negative skewness (-0.2544), kurtosis 2.6307, and a Jarque-Bera value of 1.1855 (p = 0.5528). Thus, all log-transformed variables have a good enough distribution for further analysis.

Data Stationarity Test Results

To ensure the validity of the Panel ARDL model, an important first step is to test the stationarity of the data to ensure that the variables have constant statistical properties over time, such as mean and variance. This test aims to ensure that there are no variables integrated at second order (I(2)), because Panel ARDL can only be used if the variables are at the I(0) or I(1) integration level. Therefore, a unit root test was conducted using the ADF - Fisher Chi-Square and PP - Fisher Chi-Square approaches, both at level and first difference. These two methods were chosen because they are able to handle cross-country heterogeneity, which is relevant given that ASEAN countries have different economic structures and growth dynamics.

The test results are presented in the following table:

Table 7.
Stationarity Test Results

		Panel Unit Root Test				
		Level		First Difference		Conclusion
		Statistic	Prob**	Statistic	Prob**	
CPI	ADF	170.331	2,663194444	268.152	0,302777778	I(1)

	PP	401.518	0.0007	794.336	0	
GDP	ADF	9.803	6,088194444	307.293	0,101388889	I(1)
	PP	800.982	6,5875	44.222	0.0002	
SE	ADF	172.476	2,568055556	345.428	0.0046	I(1)
	PP	221.346	0,964583333	835.182	0	
LN_CPI	ADF	167.146	2,807638889	27.209	0,272222222	I(1)
	PP	413.142	0.0005	833.808	0	
LN_SE	ADF	182.057	0,216666667	354.502	0.0034	I(1)
	PP	216.892	1,065972222	767.132	0	
LN_SDG	ADF	458.761	0.0001	442.085	0.0002	I(0)
	PP	367.228	0.0023	550.581	0	

Source: Eviews 12 Processing Results

Based on the results of stationarity testing using the ADF - Fisher Chi-Square and PP - Fisher Chi-Square methods, it is known that the CPI, GDP, SE, LN_CPI, LN_SE, and LN_GDPCAP variables are not yet stationary at the level because the probability value is greater than 0.05. However, after the first difference, all variables become significant ($p < 0.05$), so it can be concluded that the six variables are integrated at the I(1) level. Meanwhile, the LN_SDG variable has been stationary since the level, so it is at the I(0) integration level. Thus, all variables in the model are at the I(0) and I(1) integration levels, and none are integrated at I(2), so the model qualifies for estimation using the Panel ARDL method.

Determination of Lag Length

Akaike Information Criteria

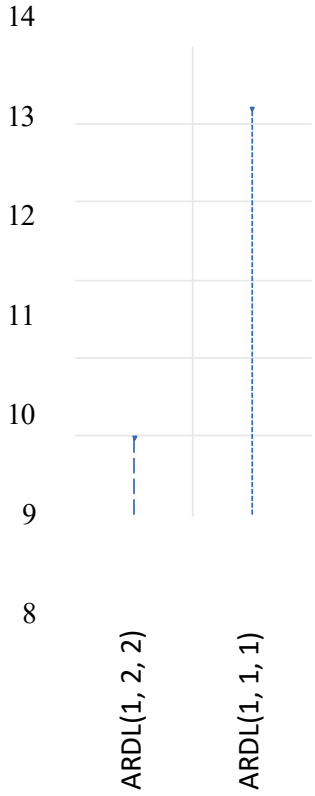

Figure 3.
Optimum Lag Test Results Model I

Based on the results of the optimum lag selection using the Akaike Information Criterion (AIC) approach, the ARDL(1, 2, 2) model is chosen as the best model because it has the lowest AIC value compared to other alternatives such as ARDL(1, 1, 1). A lower AIC value indicates a better ability of the model to explain data variations without causing overfitting. Therefore, ARDL(1, 2, 2) is considered the most optimal in capturing the dynamics of the relationship between variables, with a balance between model accuracy and complexity.

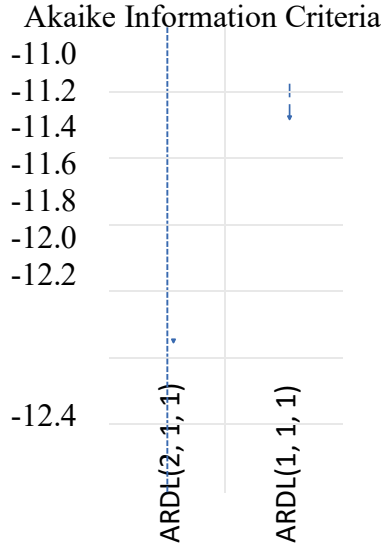

Figure 4.
Model II Optimum Lag Test Results
Source: E-Views 12 (data processed)

Based on the results of determining the optimum lag for Model II using Akaike Information Criterion (AIC), the ARDL(2, 1, 1) model was chosen because it has a lower AIC value than alternatives such as ARDL(1, 1, 1). A lower AIC value indicates that the model is more efficient in explaining the variation in data with parameter complexity remaining optimal. Therefore, ARDL(2, 1, 1) is considered the best model specification, as it provides a balance between goodness of fit and number of parameters. The choice of lag is very important to ensure the validity and reliability of the results in analyzing the long-run relationship between variables.

Cointegration Test

To test the existence of a long-run relationship (cointegration) among variables in the panel model, the residual-based Kao test is used. This method assumes that the autoregressive coefficients are the same across cross-section units, making it suitable for relatively homogeneous panel data such as developing ASEAN countries. This test aims to determine whether the residuals of the long-run relationship are stationary. If the Kao test results show a significant probability value (p-value) ($p < 0.05$), it can be concluded that there is a cointegration relationship or long-run equilibrium between variables.

Table 8.
Cointegration Test Results

Kao Residual Cointegration Test		
GDPCAP SE CPI		
	t-statistic	Prob.

Model I	ADF	-1.799249	0.036
LN_SDG LN_SE LN_CPI			
	t-statistic		Prob.
Model II	ADF	-1.74779	0.0403

Source: Eviews 12 Processing Results

Based on the results of cointegration testing using the Kao residual test approach, there is a long-term relationship between variables in both models tested. In Model I (GDPCAP, SE, CPI), the ADF statistic value is -1.799249 with a probability of 0.036, while in Model II (LN_SDG, LN_SE, LN_CPI), the ADF value is -1.74779 with a probability of 0.0403. Since both probability values are smaller than 0.05, this indicates that the residuals of the long-run relationship are stationary. Thus, it can be concluded that there is cointegration or long-run equilibrium relationship in both models, so the ARDL Panel analysis can proceed to the estimation and interpretation stage of the long-run relationship between variables.

ARDL Model I Estimation Results

ARDL estimation results are conducted to identify whether there is a short-term and long-term equilibrium relationship between the independent variable and the dependent variable. The following are the results obtained in this study:

Table 9.
Panel ARDL Model I Estimation

Model I				
Dependent Variable: D(GDPCAP)				
Long Run Equation				
	Coefficient	Std. Error	t-Statistic	Prob*
D(SE)	-22.48543	7.782551	-2.889211	0.0119
D(CPI)	-15.99823	1.884443	-8.489633	0.0000
Short Run Equation				
	Coefficient	Std. Error	t-Statistic	Prob*
COINTEQ01	-1.909931	0.760008	-2.513039	0.0248
D(SE)	-267.9315	241.6313	-1.108844	0.2862
D(SE(-1))	-145.6048	181.4987	-0.802236	0.4358
D(CPI)	-5368927	59.18099	-0.907205	0.3796
D(CPI(-1))	68.03490	82.77181	0.821957	0.4229
C	1542.357	587.0263	2.627406	0.0199

Source: Eviews 12 Processing Results

The ARDL Model I estimation results show a significant long-run relationship between GDP per capita, Shadow Economy (SE), and corruption perception index (CPI), with an error correction coefficient of -1.9099 (p = 0.0248). This suggests the adjustment process towards equilibrium is rapid. However, in the short run, SE and CPI have no significant effect on GDP per capita, as seen from the probability value that is above 0.05. Meanwhile, in the long run,

CPI has a negative and significant effect on GDP per capita (coefficient = -15.9982; $p < 0.01$), indicating that high perceived corruption negatively affects economic growth.

Panel ARDL Model II Estimation Results

Long-term testing aims to understand the equilibrium relationship between each independent variable and the dependent variable in the long term. The following are the long-term test results obtained in this study:

Table 10.
Panel ARDL Model II Estimation

Model II				
Dependent Variable: D(LN_SDG)				
Long Run Equation				
	Coefficient	Std. Error	t-Statistic	Prob*
D(LN_SE)	-0.002115	0.001051	-2.011686	0.0567
D(LN_CPI)	0.004481	0.001611	2.782292	0.0109
Short Run Equation				
	Coefficient	Std. Error	t-Statistic	Prob*
COINTEQ01	-1.506722	0.363423	-4.145919	0.0004
D(LN_SDG(-1),2)	0.264307	0.237804	1.111447	0.2784
D(LN_SE)	-0.010802	0.024173	-0.446879	0.6593
D(LN_CPI)	-087734	0.100354	-0.874245	0.3914
C	-0.012302	0.002809	4.379201	0.0002

Source: Eviews 12 Processing Results

The ARDL Model II estimation results show a highly significant long-run relationship between SDG, Shadow Economy (SE), and CPI, with an error correction coefficient of -1.5067 ($p = 0.0004$). This indicates that the adjustment process towards equilibrium is very fast. However, in the short term, changes in SE and CPI have no significant effect on SDG achievement, as indicated by probability values above 0.05. The model constant is significant, indicating the influence of external factors outside the model.

In the long run, the CPI has a positive and significant effect on SDG achievement (coefficient = 0.004481; $p = 0.0109$), suggesting that improvements in perceptions of corruption promote the success of sustainable development. In contrast, the Shadow Economy tends to have a negative impact on SDGs (coefficient = -0.002115; $p = 0.0567$), although it is not yet significant at the 5% level. This finding confirms the importance of good governance and informal sector control in supporting the long-term development agenda.

The Impact of Corruption and Shadow Economy on ASEAN Economies

This study found that in the short term, corruption as measured by the CPI and shadow economy activity has no significant effect on GDP per capita growth in ASEAN developing countries. This reflects that changes in perceptions of corruption and the scale of the informal sector have not had a direct impact on economic output in the short term. This is in line with institutional theory which states that the effects of institutional reforms take time to materialize, such as through increased trust and bureaucratic efficiency. In countries such as Indonesia, the

Philippines and Vietnam, the impact of anti-corruption reforms tends to be delayed due to the unfinished institutional transition process.

However, in the long run, the CPI shows a negative effect on GDP per capita, which paradoxically reflects that a reduction in corruption may slow growth, especially in an environment where the bureaucracy is still inefficient. This finding is in line with the view that corruption under certain conditions can accelerate informal economic processes. Meanwhile, the shadow economy also has a significantly negative impact on long-term economic growth as it reduces the tax base, creates business distortions, and reduces the effectiveness of fiscal policy. Therefore, controlling the informal sector through regulatory reform and digitalization is important to strengthen ASEAN's economic structure.

Impact on Sustainable Development (SDGs)

In the short term, neither corruption (CPI) nor the Shadow Economy shows a significant influence on the achievement of sustainable development (SDG) in ASEAN countries. This is due to weak bureaucratic reforms and ineffective anti-corruption policies as well as the existence of an informal sector that is not recorded and not integrated into the development planning system. As a result, the informal sector has not made a clear contribution to the achievement of the SDGs, especially in the education, health and environment indicators.

Conversely, in the long run, an increase in the CPI (decrease in corruption) has a positive impact on the achievement of the SDGs. This reflects the importance of the quality of governance in supporting inclusive and sustainable development. Increased transparency improves public services and social policy effectiveness, and strengthens environmental protection. On the other hand, the shadow economy has a negative impact on sustainable development as it reduces state revenues, widens inequality, and weakens environmental regulations. Therefore, strategies to strengthen institutions, increase economic formalization, and better oversight are crucial to support the overall achievement of the SDGs in the ASEAN region.

CONCLUSION

Based on the results of the research and discussion above, researchers draw several conclusions including, as follows:

1. Shadow Economy has no effect on GDP per capita in the short term, but has a negative and significant effect in the long term.
2. Corruption (CPI) has no effect on GDP per capita in the short term, but has a negative and significant effect in the long term.
3. Shadow Economy has no effect on sustainable development (SDG) in the short term, but has a negative and significant effect in the long term.
4. Corruption (CPI) has no effect on sustainable development (SDG) in the short term, but has a positive and significant effect in the long term.

Suggestion

Based on the conclusions that have been obtained, the researchers provide several suggestions, namely as follows:

1. The government needs to strengthen economic formality efforts through incentive policies and simplification of regulations in order to suppress the growth of the Shadow Economy which has proven to have a negative impact on economic growth and sustainable development in the long term.
2. Increasing the effectiveness of corruption eradication must continue, not only through law enforcement, but also through improving transparent and accountable governance systems,

considering that the CPI has a positive effect on economic growth and SDG achievement in the long run.

3. A structural and long-term policy approach is needed to overcome the impact of the shadow economy and corruption, because the impact is only significant in the long term, while in the short term it does not show a strong influence.
4. Future researchers are advised to include other more contextual variables, such as institutional quality, political stability, or ease of doing business index, to see the broader interactions that affect economic growth and sustainable development in ASEAN developing countries.

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