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Assessing The Effects Of Government Expenditure And Tax Revenue On Economic Growth In Seven ASEAN Countries

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Abstract:
***Background**: This study investigates the Assessing the Effects of Government Expenditure and Tax Revenue on Economic Growth in Seven ASEAN Countries namely Brunei Darussalam, Indonesia, Myanmar, Malaysia, Philippines, Singapore and Thailand over a lengthy temporal prospect from 1980 to 2022. This research aims to deliver a nuanced understanding of how these government expenditure and tax revenue dynamics effects on the economic growth of these regions. Spanning over four decades, the study investigates into the multidimensional extents of government expenditure and tax revenue and its effects on economic growth, presenting a comprehensive exploration of the long-term strategies besides their implications for economic growth. This research covers both short-term and long-term dynamics, thus enhancing the robustness of this investigation. Moreover, the findings contribute to the hypothetical discourse by enriching the understanding for the effects of government expenditure and tax revenue on economic growth within these regions. The outcomes of this study embrace the potential to appraise evidence-based policy decisions, academic explorations, and the broader recreation of sustainable and inclusive economic development contained by these ASEAN regions. The focus of this study has investigated the effectiveness of government expenditure and tax revenue measures in promoting economic growth in seven ASEAN countries. These studies utilize the panel Autoregressive Distributed Lag (ARDL) approach and find that government expenditure was statistically significant in these ASEAN economies. It is important to note that the effectiveness of fiscal policy in promoting economic growth can vary across countries and over time.*
***Keyword**: Government Expenditure, Tax Revenue, Economic Growth, Panel ARDL, Seven ASEAN Countries*

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I. Introduction

Government expenditure can be managed and used to counteract the excesses and deficiencies of private sector consumption and investment spending in order to stabilize the economy. Tax revenue is a key tool used by governments to influence the economy. Changes in tax revenue can impact employment, household income, consumer spending, and investment, all of which are crucial elements of economic growth. Economic growth is one of the most extremely studied and debated in the arena of economics. Certainly, the growth process can be readily observed by rising income and standard of living of the people. Many countries have experienced unprecedented growth particularly among the North-east and South-east Asian economies that have consistently recorded close to double-digit GDP growth in the past few decades.

The implementation processes of government expenditure and tax revenue on economic growth in ASEAN countries encompass a strategic balance between government expenditure and tax revenue to raise strong and sustainable growth while reducing poverty. ASEAN members have familiarized incentive structures to attract investors, indicating a proactive approach to economic development. ASEAN countries impact fiscal policy instruments like tax incentives and intentional government expense to cheer economic growth, invite foreign investment, and improve competitiveness in the global market.

This study aims to investigate the relationship between government expenditure, tax revenue and economic growth in Seven ASEAN countries through four main objectives: analyzing the impact of government expenditure on economic growth and its underlying mechanisms, evaluating the effectiveness of fiscal measures such as tax revenue and education investments in enhancing economic progress, assessing both short-term and long-term effects of fiscal policy using advanced econometric techniques like unit root and causality tests, and exploring the causal relationship between government expenditure and tax revenue to understand the implications of tax and spend hypotheses. Ultimately, the research seeks to offer policy recommendations that can promote sustainable economic development in the region.

II. Literature Review

Definitions of Government Expenditure, Tax Revenue and Economic Growth

Usman and Agbede (2015) also listed five different basic interpretations of Wagner's law. In the first basic, Odhiambo (2015) stated that Government Expenditure should grow at a faster rate than the output of the country. This is a prerequisite to get public expenditure elasticity greater than one and further, Wagner's law can be trusted. Odhiambo (2015) uses GNP data as an indicator of Economic Growth. Unegbu and Irefin, (2011) described tax as a compulsory levy imposed on the taxable income of every taxable individual, companies, institutions or products by the government within a particular jurisdiction, to defray expenditure on public goods. Tax revenue is the concept and science of imposing tax on taxable income of tax payers within a particular jurisdiction. The tax collected is used for common good of every citizen within the state for the production of certain services, which are considered to be of paramount importance to the wellbeing of the citizens (Enahoro & Olabisi 2012).Economic growth is defined as an increase to the tools and products that will be used to meet the human needs in any country or region. A method to measure economic growth rate involves inquiring whether there has been a real increase (excluding price increases) in GDP (Gross Domestic Product) from one year to the other as GDP represents the market equivalent of all measurable values produced by one economy (Hülya Kesici ÇalÕúkan 2015).

The relationship between Government Expenditure and economic growth

Landau (1983) found that the effect of an increase of government spending reduced the economic growth in all four longer time of periods. He has examined; however, the negative and weaker relationship between government spending and real GDP per capita had been noticed for shorter periods of time. Hence, Landau (1983) recognized that even stronger relationship between government spending and real GDP per capita might have not proved an increase in the economic welfare. Later, while examining 98 countries, Barro (1990) discovered that an increase of government spending on non-productive government services would lead to lower economic growth per capita. Barro (1996) extended his research to the period of 1960-1990 for 100 different countries. He indicated that in the respect of government policy, among the other determinants of economic growth, real GDP per capita might be enhanced by effective implementation of law, lower inflation and smaller government spending. Meanwhile, government spending, excluding spending on education and defense, showed a significantly negative impact on economic growth. Thus, greater government spending, which might be associated with higher taxation, would tend to reduce growth. TAbdikarim Bashir Jama(2024) analyzed that the impact of government expenditure on economic growth in the ASEAN-5 countries from 2000 to 2021, utilizing the Pooled Mean Group (PMG) ARDL model and robust least squares method. It reveals a positive long-run relationship between government expenditure and economic growth, supporting the Keynesian view that increased government spending stimulates economic activity. The findings indicate a one-way causality from government expenditure to economic growth, which underscores the importance for policymakers to focus on effective allocation of resources and to promote productive expenditures while ensuring good governance.

The Relationship between Tax Revenue and Economic Growth

Tax Revenue serves as a critical tool for governments to generate public funds by imposing payments on the income, profits, or wealth of individuals and organizations. According to Anyaduba (2004), it is viewed as a mandatory contribution that supports government expenditures, while Dandago and Alabede (2001) define it as a compulsory levy on profits, income, or consumption. Essentially, taxation facilitates the transfer of financial resources from the private sector, including households and corporations, to the public sector, thus enabling societal development. Piana (2003) notes that this process involves applying a tax rate to a specific tax base.

Joseph M. B. Heimoh (2024) analyzes the impact of taxation on Sierra Leone's economic growth using time series data from 1995 to 2022 and the Auto Regressive Distributed Lag (ARDL) framework. The study finds cointegration between taxation and economic growth, indicating a long-term relationship. It reveals that 77.37% of the variation in Gross Domestic Product (GDP) is explained by factors such as indirect taxes, other taxes, interest rates, and foreign direct investment (FDI). Notably, indirect taxes have a negative and significant short-term effect on economic growth, while interest rates positively influence growth.

III. Material And Methods

Research Methodology

This study analyzed secondary annual time series and panel data spanning from 1980 to to 2022, focusing on variables such as real GDP, government expenditure, tax revenue, investment, education, and total population. Data will be sourced from credible institutions, including the World Bank, International Monetary Fund, and various economic databases. It is organized in Microsoft Excel format and subsequently imported

into Stata Software Version 17.0 for detailed analysis. The study employed a panel data analysis method, which allows for repeated measurements of multiple variables over time, offering a comprehensive understanding compared to traditional time series or cross-sectional data. Unlike standard regression, panel data regression requires meticulous estimation modeling due to its structure, providing deeper insights into the relationships among the studied variables. The variables are employed to empirical research has shown below:
GOVEXP: Government Expenditure
TAX: Tax Revenue
INV: Investment
EDU: Education
POP: Total Population**.**

Model Specification taxation and economic growth in Sierra

In this study, the author intends to employ the Panel Autoregressive Distributed Lag (ARDL) approach, utilizing the PMG, MG, DFE, and Hausman tests to estimate selected variables. The Panel ARDL model enables the examination of both long-run and short-run relationships among variables, making it suitable for small sample sizes while accommodating heterogeneous coefficients across countries. Prior to conducting the main analyses, the author will perform panel unit root tests, ensuring the selected data and variables align with prior empirical studies. The research aims to apply econometric techniques, including the Panel Unit Roots and Panel ARDL approach to cointegration, to thoroughly investigate the study's objectives. The regression model for this study is specified as follows:

$$\text{Ln RGDP}_{it} = \beta_0 + \beta_1 \text{Ln GOVEXP}_{it} + \beta_2 \text{LnINV}_{it} + \beta_3 \text{LnTAX}_{it} + \beta_5 \text{LnEDU}_{it} + \beta_6 \text{LnPOP}_{it} + t + \varepsilon_{it}$$

IV. Empirical Result

Summary statistics

Summary statistics are employed in research to illustrate and elucidate the characteristics of each variable within the model. For example, the standard deviation is utilized to investigate the variations in the data.

Table 4.1: Summary statistics:

Variable	Mean	SD	Min	Max	Skewness	Kurtosis
rgdp	1.632e+11	2.232e+11	1.011e+09	1.319e+12	0.523	2.309
govexp	31112236	46408876	6884610	3.228e+08	1.452	3.859
inv	4.527e+10	6.964e+10	197018	3.924e+11	0.117	1.518
tax	91702161	4.239e+08	2001047	3.220e+09	1.613	3.898
eduexp	2.918e+10	8.899e+10	39077000	4.077e+11	0.863	1.728
pop	58304305	70936932	100052	2.755e+08	0.666	1.851

Source: Author's computation in Stata/MP 17.0

According to the Table (4.1), summary statistics analysis of real GDP, government expenditure, investments, tax revenues, education expenditures, and population across seven ASEAN countries reveals several important insights. The mean real GDP is approximately 1.63e+11 with a moderate skewness of 0.523 and a kurtosis of 2.309, suggesting a relatively peaked distribution. Government expenditure averages 31,112,236, with a higher skewness of 1.452 and a kurtosis of 3.859, indicating a distribution with heavy tails. Private and public investments show a mean of 4.53e+10, slight asymmetry (skewness of 0.117), and moderate kurtosis (1.518). Tax revenues average 91,702,161, with a skewness of 1.613, and education expenditures have a mean of 2.92e+10, both demonstrating moderate asymmetry and peaked distributions. Finally, total population statistics indicate a mean of 58,304,305, with slight asymmetry (skewness of 0.666). Overall, the skewness and kurtosis values for all variables suggest that the data are reasonably symmetric and normally distributed across the selected ASEAN countries.

Pairwise Correlations Matrix of the Study

Table 4.2: Summary Results of Pairwise Correlations Matrix of the Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) rgdp	1.000					
(2) govexp	0.120*	1.000				
	(0.037)					
(3) inv	0.983*	0.051	1.000			
	(0.000)	(0.377)				
(4) tax	0.150*	0.616*	0.092	1.000		
	(0.009)	(0.000)	(0.109)			
(5) eduexp	0.123*	0.148*	0.104	0.060	1.000	

	(0.032)	(0.010)	(0.070)	(0.303)		
(6) pop	0.606*	0.128*	0.633*	0.136*	0.253*	1.000
	(0.000)	(0.027)	(0.000)	(0.018)	(0.000)	
Source: Author's computation in Stata/MP 17.0 Notes: * shows significance at p<0.05						

Table 4.2 illustrates a positive correlation between real GDP and several key economic indicators, including government expenditure, private and public investments, tax revenue, education expenditure, and population size, with all correlations being statistically significant at the 5% level. This indicates a strong relationship between these indicators and real GDP. The correlation test, typically employed to assess the linear relationships among independent variables, showed no issues of multicollinearity, as no correlation statistics reached the threshold of 0.80. Consequently, all independent variables can be included in the model without concern for multicollinearity, allowing for a comprehensive analysis of their impacts on real GDP.

Analysis of Lag Length Selection

Table 4.3 Empirical Results of Lag Length Selection
Running panel VAR lag order selection on estimation sample
Selection order criteria
Sample: 1985 - 2021
No. of obs = 259

No. of panels = 7

Ave. no. of T = 37.000

lag	CD	J	J	pvalue	MBIC	MAIC	MQIC
	1	1	171.771	0.027	-595.072	-104.229	-301.577
	2	1	112.197	0.274	-465.713	-95.803	-244.529
	3	1	66.565	0.527	-311.300	-69.435	-166.679
	4	1.000	33.929	0.328	-138.333	-28.071	-72.403

Source: Author's computation in Stata/MP 17.0

In this table (4.3), the findings presented that the lag with the lowest J value, which is 33.929, or the lowest MBIC, MAIC, and MQIC values (considering absolute values and disregarding the sign), is lag 4. Therefore, lag 4 is determined to be the optimal lag length for the model.

Panel Unit Roots Test of the Study

Prior to conducting unit root tests, it is essential to determine the optimal lag length for the model. The optimal lag for the model has been identified as lag 4, and the corresponding result is detailed in table 4.3. The study employs Levin-Lin-Chu, Im-Pesaran-Shin, and Fisher-type unit root tests to test stationary of the variables. The null hypothesis for all these tests is that all panels contain unit root.

Table 4.4: Analysis of Unit Root Tests

Variable	Test Method	At Level P- value	At First Difference P-value
lnrgdp	LLC	0.0588	0.0335
	IPS	0.9599	0.0008
	FISHER	0.9972	0.0035
lngovexp	LLC	0.521	0.0223
	IPS	0.3503	0.0000
	FISHER	0.3713	0.0000
lninv	LLC	0.9871	0.0421
	IPS	0.9389	0.0000
	FISHER	0.9972	0.0000
lntax	LLC	0.9617	0.0407

	IPS	0.1889	0.0249
	FISHER	0.2485	0.0320
lneduexp	LLC	0.9942	0.0431
	IPS	0.3394	0.0001
	FISHER	0.2312	0.0000
lnpop	LLC	0.0009	0.0693
	IPS	0.0163	0.3412
	FISHER	0.0015	0.0979

Source: Author's computation in Stata/MP 17.0
Note:*,**,*** is significant level at the 10%,5% and 1% respectively .

According to the test results, it is evident that we are unable to reject the null hypothesis for the natural logarithms of real GDP, government expenditure, private and public investments, tax revenue of governments, and expenditure in education at the specified level. However, we do reject the null hypothesis when considering their first difference. Conversely, we can reject the null hypothesis for the natural logarithm of the population count. This implies that the natural logarithms of real GDP, government expenditure, private and public investments, tax revenue of governments, and expenditure in education exhibit stationary at their first difference, while the natural logarithm of the population count demonstrates stationary at the level. Consequently, in subsequent analyses, all variables will be used at their first difference, with the exception of the population number variable, which will be utilized at its level.

Analysis of Granger Causality Tests

Table 4.5: Empirical Results of Dumitrescu & Hurlin (2012) Granger Causality Tests

Null Hypothesis	Z-bar	P-value
dlngovexp does not Granger-cause dlnrgdp.	4.132	0.0000
dlninv does not Granger-cause dlnrgdp.	3.1041	0.0019
dlntax does not Granger-cause dlnrgdp.	2.9041	0.0093
dlneduexp does not Granger-cause dlnrgdp.	4.132	0.0000
lnpop does not Granger-cause dlnrgdp.	3.9089	0.0001

Source: Author's computation in Stata/MP 17.0
Note * denotes rejection of the null hypothesis at the 5% significance level.

As indicated in Table 4.5, the p-values resulting from all the tests are found to be lower than the critical value of 0.05. Consequently, we are compelled to reject all the null hypotheses. This leads us to the conclusion that there is sufficient evidence to assert that all the independent variables Granger cause the dependent variable, real GDP.

Kao Test for Cointegration Results of the Variables

Table 4.6: Empirical Analysis for Kao Test for Cointegration

H0: No cointegration	Number of panels = 7	
Ha: All panels are cointegrated	Number of periods = 40	
Cointegrating vector: Same		
Panel means: Included	Kernel: Bartlett	
Time trend: Not included	Lags: 1.14 (Newey–West)	
AR parameter: Same	Augmented lags: 4	
	Statistic	p-value
Modified Dickey–Fuller t	-25.4795	0.0000
Dickey–Fuller t	-14.1006	0.0000
Augmented Dickey–Fuller t	-6.0593	0.0000
Unadjusted modified Dickey–Fuller t	-29.2815	0.0000
Unadjusted Dickey–Fuller t	-14.2177	0.0000

Source: Author's computation in Stata/MP 17.0
Note * denotes rejection of the null hypothesis at the 5% significance level.

As depicted in table 4.6, the null hypothesis in the Kao test for cointegration posits the absence of cointegration in all panels. The test employed an augmented lag of 4, as indicated by the VAR lag order selection conducted on the estimation sample (refer to Appendix, Table 1). The test results revealed that all p-values are 0.0000, which is less than the critical value of 0.05, leading to the rejection of the null hypothesis. Therefore, it can be said that a long-run relationship exists between the dependent and independent variables of the model.

Results of PMG Estimations for Panel Level

Table 4.7: Long-run Panel ARDL Result (PMG Estimation)

Iteration 0: log likelihood = 379.47817 (not concave)
Iteration 1: log likelihood = 385.13988 (not concave)
Iteration 2: log likelihood = 386.98536 (not concave)
Iteration 3: log likelihood = 390.14827
Iteration 4: log likelihood = 391.57173
Iteration 5: log likelihood = 391.76324
Iteration 6: log likelihood = 392.50492
Iteration 7: log likelihood = 392.51985
Iteration 8: log likelihood = 392.51987

Pooled Mean Group Regression
(Estimate results saved as pmg)

Panel Variable (i): countryid Number of obs = 294
Time Variable (t): year Number of groups = 7
Obs per group: min = 42
avg = 42.0
max = 42
Log Likelihood = 392.5199

D.lnrgdp	Coefficient	Std. err.	z	P>z	[95% conf. interval]	
ECT						
lngovexp	0.300	0.046	6.580	0.000	0.210	0.389
lninv	0.584	0.042	13.810	0.000	0.501	0.666
lntax	0.001	0.072	0.010	0.992	-0.140	0.142
lneduexp	0.021	0.066	0.320	0.748	-0.151	0.109
lnpop	0.018	0.054	0.340	0.735	-0.088	0.124
SR						
ECT	-0.160	0.059	-2.720	0.007	-0.276	-0.045
lngovexp						
D1.	0.082	0.061	1.330	0.182	-0.201	0.038
lninv						
D1.	0.305	0.088	3.470	0.001	0.133	0.477
lntax						
D1.	0.010	0.035	0.290	0.772	-0.058	0.079
lneduexp						
D1.	0.000	0.044	0.010	0.991	-0.087	0.088
lnpop						
D1.	-11.196	6.737	-1.660	0.097	-24.401	2.008
_cons	1.157	0.400	2.900	0.004	0.374	1.940

Source: Author's computation in Stata/MP 17.0

According to the table 4.7, the results from the Pooled Mean Group (PMG) estimation of the long-run Panel ARDL model indicate significant relationships between real GDP and several independent variables. The estimated coefficients reveal that government expenditure (lngovexp) and private investments (lninv) have a positive and statistically significant impact on real GDP, with coefficients of 0.300 and 0.584, respectively ($p < 0.001$). In contrast, tax revenue (lntax), education expenditure (lneduexp), and population (lnpop) show no significant effects on real GDP, with p-values of 0.992, 0.748, and 0.735, respectively. The Error Correction Term (ECT) is negative (-0.160) and statistically significant ($p = 0.007$), indicating a tendency for the model to return to long-run equilibrium after a shock. This suggests that while government and investment expenditures are crucial for economic growth, other factors such as taxation, education spending,

Results of MG Estimation for Panel Level

Table 4.8: Long-run Panel ARDL Result (M G Estimation)

Mean Group Estimation: Error Correction Form						
(Estimate results saved as mg)						
D.lnrgdp	Coef.	Std.Err.	z	P>z	[95% Conf.	Interval]
ECT						
lngovexp	0.375	0.179	2.100	0.036	0.024	0.725
lninv	0.537	0.140	3.820	0.000	0.262	0.812
lntax	0.291	0.394	0.740	0.461	-0.482	1.063
lneduexp	0.246	0.269	0.910	0.360	-0.773	0.281
lnpop	1.521	0.456	3.340	0.001	0.628	2.415
SR						
ECT	-0.316	0.103	-3.080	0.002	-0.517	-0.115
lngovexp						
D1.	0.098	0.055	1.780	0.075	-0.207	0.010
lninv						
D1.	0.268	0.055	4.850	0.000	0.160	0.376
lntax						
D1.	-0.051	0.059	-0.870	0.385	-0.166	0.064
lneduexp						
D1.	0.159	0.135	1.180	0.236	-0.104	0.423
lnpop						
D1.	-8.944	8.556	-1.050	0.296	-25.714	7.825
_cons	-4.069	3.864	-1.050	0.292	-11.643	3.505

Source: Author's computation in Stata/MP 13.0

According to the table 4.8, the results from the Mean Group (MG) estimation of the long-run Panel ARDL model reveal several important relationships with real GDP (D.lnrgdp). The positive coefficients for government expenditure (lngovexp = 0.375, $p = 0.036$) and private investment (lninv = 0.537, $p < 0.001$) suggest that both significantly contribute to economic growth. Conversely, tax revenue (lntax = 0.291, $p = 0.461$), education expenditure (lneduexp = 0.246, $p = 0.360$), and population (lnpop = 1.521, $p = 0.001$) show varied levels of influence, with population having a strong significant positive impact. The Error Correction Term (ECT = -0.316, $p = 0.002$) indicates that the model adjusts towards long-run equilibrium after a disturbance. Additionally, the differential effects of the independent variables in the short run indicate that while investments are crucial, government expenditure plays a marginal role. Overall, these results emphasize the importance of strategic investment and government spending in fostering economic growth within the analyzed panel.

Results of DFE Estimation for Panel Level

Table 4.9: Empirical Results of DFE

Dynamic Fixed Effects Regression: Estimated Error Correction Form						
(Estimate results saved as DFE)						
	Coefficient	Std. err.	z	P>z	[95% conf. interval]	
ECT						
lngovexp	0.373	0.275	1.360	0.175	-0.166	0.912
lninv	0.834	0.118	7.050	0.000	0.602	1.067
lntax	0.277	0.302	0.920	0.358	-0.314	0.869
lneduexp	0.006	0.069	0.090	0.929	-0.142	0.130
lnpop	0.386	0.255	1.510	0.131	-0.115	0.886
SR						

ECT	-0.079	0.022	-3.520	0.000	-0.123	-0.035
lngovexp						
D1.	0.100	0.060	1.670	0.096	-0.217	0.018
lninv						
D1.	0.037	0.011	3.380	0.001	0.016	0.059
lntax						
D1.	-0.007	0.025	-0.280	0.777	-0.055	0.041
lneduexp						
D1.	-0.016	0.015	-1.080	0.280	-0.045	0.013
lnpop						
D1.	-0.006	0.019	-0.320	0.748	-0.043	0.031
_cons	-0.888	0.674	-1.320	0.188	-2.210	0.434

Source: Author's computation in Stata/MP 17.0

According to the table 4.9, the results from the Differenced Fixed Effects (DFE) estimation indicate several key insights regarding the determinants of real GDP growth. The coefficient for private investment (lninv = 0.834, $p < 0.001$) shows a highly significant positive relationship, suggesting that increases in investment are strongly associated with economic growth. Conversely, government expenditure (lngovexp = 0.373, p = 0.175), tax revenue (lntax = 0.277, p = 0.358), education expenditure (lneduexp = 0.006, p = 0.929), and population (lnpop = 0.386, p = 0.131) do not yield statistically significant effects on GDP growth in this framework. Furthermore, the Error Correction Term (ECT = -0.079, $p < 0.001$) is significant and negative, indicating that any deviations from the long-run equilibrium are corrected over time. The short-run analyses show a marginally significant effect of government expenditure (D1.lngovexp = 0.100, p = 0.096), while the other short-run variables exhibit negligible effects on GDP. Overall, these findings highlight the pivotal role of investment in fostering economic growth, with limited influence from other factors within the DFE frameworks.

Results of Husman Test

Table 4.10: Hausman Test for Selecting from PMG and MG Estimators

	__coefficeints__					
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))		
	pmg	mg	Difference	S.E.		
lngovexp	0.2995262	0.3747319	0.0752057	0.2609526		
lninv	0.5835385	0.5366864	-0.0468522	0.2036543		
lntax	0.0007422	0.2905965	0.2898543	0.580088		
lneduexp	0.0213319	0.2459512	-0.2246193	0.3931444		
lnpop	0.0183252	1.521367	1.503042	0.6733464		
	b = consistent under Ho and Ha; obtained from xtpmg					
	B = inconsistent under Ha, efficient under Ho; obtained from xtpmg					
	Test: Ho: difference in coefficients not systematic					
			chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)			
			= 11.07			
		Prob>chi2 = 0.0501				

Source: Author's computation in Stata/MP 17.0

According to the table 4.10, the Hausman test is essential for selecting the most appropriate estimator among pooled mean group (PMG), mean group (MG), and dynamic fixed effects (DFE) models in the analysis. It assesses the consistency and efficiency of these estimators, guiding researchers in identifying the best model specification. Initially, the author uses the Hausman test to compare PMG and MG estimators, determining which one aligns more closely with the data's characteristics. Following this, a further Hausman test compares the favored PMG or MG estimator against the DFE estimator. This systematic process ensures a thorough evaluation of the models, ultimately aiding in the selection of the estimator that best suits the research context and yields reliable, efficient parameter estimates. Employing the Hausman test in this way reinforces the integrity of the modeling approach, enhancing the robustness of the findings.

Results of Hausman Test for Selecting from PMG and MG Estimators

Table 4.11: Hausman Test for Selecting from PMG and MG Estimators

	__coefficeints__					
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))		
	pmg	DFE	Difference	S.E.		
lngovexp	0.2995261	0.3729145	0.0733884	0.912796		
lninv	0.5835386	0.8344892	0.2509507	0.876676		
lntax	0.000742	0.2772634	0.2765214	1.475248		
lneduexp	0.0213318	0.0062058	-0.015126	1.386833		
lnpop	0.0183251	0.3856724	0.3673474	1.104337		
	b = Consistent under H0 and Ha; obtained from xtpmg.					
	B = Inconsistent under Ha, efficient under H0; obtained from xtpmg.					
	Test: Ho: difference in coefficients not systematic					
			chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)			
			= 0.40			
		Prob>chi2 = 0.9952				

Source: Author's computation in Stata/MP 17.0

Similarly, the decision criterion based on the probability distribution, with a threshold of 0.05, leads us to the same conclusion. With a p-value of 0.9952, well above the threshold, we once again find ourselves unable to reject the null hypothesis. This further reinforces the notion that the PMG estimator is well-supported within the model. In summary, when considering the three estimators under evaluation, the evidence overwhelmingly suggests that the pooled mean group (PMG) estimator emerges as the most appropriate choice for the analysis.

Discussion from Pooled Mean Group Estimator (PMG) Result (From Table 4.7)

Based on the results of the Hausman tests, it has been established that the most suitable estimator for the model is indeed the pooled mean group (PMG) estimator. Consequently, this section will delve into a comprehensive discussion of the results derived from this particular estimator, providing a thorough examination of the insights it offers.

Furthermore, for a more in-depth exploration of the short-run effects for each country within the sample, a detailed presentation of the full pooled mean group estimator can be found in Appendix, Table 1. This supplementary resource is designed to provide a comprehensive overview of the short-run effects, offering valuable insights into the dynamics of the model across the different countries included in the sample. By analyzing the country-specific short-run impacts, we can gain a nuanced understanding of how the various factors influence real GDP at the individual country level, complementing the broader long-run analysis.

Turning our attention to the upper part of Table 4.7, which is the section below the ECT (error-correction-term), this area provides information about the long-run coefficients of the variables under consideration. The findings reveal that government expenditures have a positive long-run impact on the real GDP of the Asian countries included in the study. The coefficient of 0.3 for this variable indicates that a 1% increase in government expenditure leads to a 0.3% increase in real GDP in the long run. This coefficient is statistically significant at the 1% level, suggesting a robust and reliable relationship between government spending and economic growth in the long term.

Similarly, the analysis demonstrates that both private and public investments also have a positive long-run impact on the real GDP of the countries. The coefficient of 0.584 for this variable indicates that a 1% increase in investment leads to a 0.584% increase in real GDP in the long run. This coefficient is also statistically significant at the 1% level, underscoring the importance of capital formation in driving long-term economic growth in the region.

Furthermore, the results indicate that taxes, expenditure on education, and the size of the population also have positive long-term impacts on real GDP. Specifically, a 1% increase in each of these variables causes a 0.001%, 0.021%, and 0.018% increase, respectively, in the real GDP of the countries in the long run. However, it is important to note that these coefficients are statistically insignificant, suggesting that the relationships between these factors and economic growth are less robust compared to the effects of government spending and investment.

Moving on to the segment of the table denoted SR, which pertains to the short-run coefficients of the variables, the lower part of the table starts with the ECT, which stands for the error-correction-term. The -0.160

coefficient of the ECT shows a short-run deviation in the real GDP from its equilibrium point, traveling at a speed of 16% per year towards the equilibrium point. The very low p-value associated with this coefficient indicates the existence of long-run cointegration between the variables in the model, meaning that the variables are linked in a stable long-term relationship.

Additionally, the coefficient of -0.160 for the ECT signifies that short-term deviations of the variables from the long-term equilibrium are corrected at a speed of 16% per year. This relatively high speed of adjustment suggests that the model is well-equipped to address any short-term disequilibria and quickly converge towards the long-run equilibrium path.

Next to the ECT, the short-run influence of each of the variables on the real GDP of the countries can be further explored in the detailed presentation provided in Appendix, Table 1. This supplementary information allows for a more nuanced understanding of the short-run dynamics, complementing the broader long-run analysis discussed earlier.

For instance, the short-run impact of government expenditures on real GDP has been found to be positive, similar to the long-run effect. However, the coefficient is statistically insignificant in the short run, indicating that the immediate impact of changes in government spending on economic growth may be less pronounced compared to the long-term effects.

Regarding private and public investments, the short-run impact on real GDP has also been found to be positive, consistent with the long-run findings. However, the coefficient value has decreased from 0.584 in the long run to 0.305 in the short run. This suggests that a 1% increase in private and public investment leads to a 0.305% increase in real GDP of the countries in the short term, which is lower than the long-term impact.

Furthermore, the tax revenues of governments and educational expenditures of the countries have been found to have a positive short-run impact on real GDP of the countries. While number of populations have found to have negative impact on real GDP of the countries. All of the three variables coefficients however are statistically insignificant.

Causality Tests

In addition to the granger casuality test previously performed, causality can also be determined using significance of the:

1. Error correction term (for joint long-run causality)
2. Long-run coefficients (for long-run causality)
3. Short-run coefficients (for short-run causality)
4. The ECT, long-run, and short-run coefficients (for strong causality)

The results presented in Table 4.7 indicate that the coefficient of the error correction term (ECT) is statistically significant. This suggests that the independent variables jointly have a long-run causal impact on the dependent variable, real GDP.

Furthermore, the analysis reveals that government expenditures, as well as private and public expenditures, have a long-run causal impact on the real GDP of the countries. Additionally, private and public expenditures are found to have a short-run causal impact on the real GDP of the countries.

V. Conclusions

The findings of this study, based on the Pooled Mean Group (PMG) estimator, offer significant insights into the long-run and short-run dynamics of key macroeconomic variables influencing real GDP in the Asian countries examined. The Hausman test affirmed the PMG estimator as the most suitable model, ensuring the reliability of the analysis. In the long-term, government expenditure and both private and public investments positively and significantly impact real GDP; a 1% increase in government expenditures correlates with a 0.3% rise in GDP, while a similar increase in investment results in a 0.584% increase. Although tax revenues, education expenditures, and population size also demonstrate positive long-term effects on GDP, these relationships are statistically insignificant, indicating their comparatively weaker impact. In the short run, the error-correction term (ECT) reveals a 16% annual adjustment rate, suggesting that any short-term deviations from long-run equilibrium are swiftly corrected. Additionally, country-specific short-run effects, detailed in the Appendix, enhance the understanding of individual dynamics. Overall, the study highlights the essential role of government expenditures and investment in promoting long-term growth in the region and emphasizes the importance of considering short-run dynamics at the country level in policymaking for sustainable economic development.

References

[1]. Alaaeddin Al-Tarawneh (2020), Impact Of Taxation On Economic Growth In An Emerging Country.

[2]. Alina Cristina Coman (2023), The Impact Of Public Education Spending On Economic Growth In Central And Eastern Europe. An Ardl Approach With Structural Break.

[3]. Çalışkan, H. K. (2015). Technological Change And Economic Growth. Procedia-Social And Behavioral Sciences, 195, 649-654.
[4]. Cooray, A. (2009), Government Expenditure, Governance And Economic Growth. Comparative Economic Studies, 51, 401-418.
[5]. Daniel Bayera Tujo (2021), Tax Revenue Determinants And Tax Efforts In Ethiopia From 2000 – 2019- Ardl Approach.
[6]. Davies, D. E. A. S., & Heimoh, J. M. (2024). Estimating The Effect Of Taxation On The Economic Growth Of Sierra Leone Using A Time Series Analysis. European Journal Of Economic And Financial Research, 8.
[7]. Dudzevičiūtė, G., Šimelytė, A., & Liučvaitienė, A. (2018). Government Expenditure And Economic Growth In The European Union Countries. International Journal Of Social Economics, 45(2), 372-386.
[8]. Hasnul, A. G. (2015), The Effects Of Government Expenditure On Economic Growth: The Case Of Malaysia. Mpra Paper No.71254.Available At: Https://Mpra.Ub.Uni-Muenchen.De/71254/1/.
[9]. Hlongwane (2021), The Relationship Between Government Expenditure And Economic Growth In South Africa From 1981-2019: An Ardl And Ecm Approach.
[10]. Jama, A. B., Daud, S. N. M., & Nayan, S. (2024). The Relationship Between Government Expenditure And Economic Growth In Asean-5 Countries. Journal Of Infrastructure, Policy And Development, 8(7), 4329.
[11]. Masud Shahmoradi (2019), Tax Policy And Economic Growth In The Developing And Developed Nations.
[12]. Matthew Abiodun Dada (2021), The Nexus Of Government Spending, Price, Output, And Money In The Ecowas Sub-Region: Evidence From Panel Ardl And Causality Approach.
[13]. Norashida Othman (2023), Environmental Tax – Economic Growth Nexus In Asean-4 Countries.
[14]. Okwara, C. C., & Amori, O. M. (2017). Impact Of Tax Revenue On Economic Growth In Nigeria. International Journal Of Advanced Scientific Research, 2(2), 90-102.
[15]. Olufemi, A. T., Jayeola, O. L. A. B. I. S. I., Oladele, A. S., & Naimot, A. O. (2018). Tax Revenue And Economic Growth In Nigeria. Scholedge International Journal Of Management & Development, 5(7), 72-85.
[16]. Saragih, J., Wardati, J., & Pratama, I. (2020). Trade Openness, Government Development Expenditures, Gross Capital Formation And Economic Growth: An Asean Case. International Journal Of Innovation, Creativity And Change, 12(10), 366-383.
[17]. Sarfaraz Javed (2022), Influence Of Government Expenditure On Economic Growth: An Empirical Retrospection Based On Ardl Approach.
[18]. Selda (2023), Government Expenditure And Economic Growth In Central And Eastern European Economies: A Panel Ardl Approach.
[19]. Thanh Tuan Chu (2018), The Impact Of Government Expenditure Compositions On Economic Growth: An Empirical Analysis.
[20]. Zia Ur Rehman (2020), Indirect Taxation And Economic Growth Relationship: Empirical Evidence From Asian Countries.