

Revisiting the Government Expenditure–Growth Nexus in Asia: Evidence from Panel Cointegration and Granger Causality

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Abstract

This study re-examines the long-run relationship between government expenditure and economic growth in nine Asian countries, namely Singapore, Malaysia, Thailand, South Korea, Japan, China, Sri Lanka, India, and Bhutan, over the period 2000–2023. Using a balanced panel of 216 observations, the study applies panel unit root, cointegration, random-effects, and Granger causality techniques to examine the magnitude and direction of the government expenditure and growth nexus. The Levin–Lin–Chu and Im–Pesaran–Shin tests indicate that the variables are integrated of order one, while the Pedroni and Kao tests confirm a long-run cointegrating relationship. The estimated long-run results show that government expenditure has a positive and statistically significant effect on economic growth, with an elasticity of 0.51 after controlling for gross fixed capital formation, trade openness, and inflation. Gross fixed capital formation and trade openness also contribute positively to growth, whereas inflation negatively affects economic performance. The Granger causality analysis reveals a bidirectional relationship between government expenditure and economic growth, supporting both the Keynesian hypothesis and Wagner’s Law. The findings imply that fiscal policy remains important for sustaining growth, although spending quality and macroeconomic stability are equally essential.

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Introduction

Asia has remained one of the most dynamic regions in the global economy over the past two decades. Despite experiencing major economic disruptions, including the 2008 global financial crisis and the COVID-19 pandemic, many Asian economies demonstrated strong resilience and relatively rapid recovery compared with other regions (Romdhane et al., 2024). According to the International Monetary Fund (IMF, 2024), Asia continued to account for the largest share of global economic growth in recent years, supported by expanding industrial activity, international trade integration, infrastructure development, and domestic consumption. During the pandemic period, governments across the region implemented large-scale fiscal interventions to stabilise economic activity, support healthcare systems, protect employment, and sustain household purchasing power. Consequently, public expenditure and government debt increased substantially throughout Asia, particularly among ASEAN+3 economies, which consist of the ten ASEAN member states together with China, Japan, and South Korea. Reports from the ASEAN+3 Macroeconomic Research Office (AMRO, 2025) indicate that fiscal deficits and debt burdens in the region remained elevated even after the immediate pandemic crisis had eased, reflecting the continued reliance on fiscal policy as a stabilisation instrument.

The expanding role of government expenditure has revived the long-standing debate concerning the relationship between public spending and economic growth (Rotar, 2025). From the Keynesian perspective, government expenditure serves as an important macroeconomic instrument capable of stimulating aggregate demand, increasing employment, and accelerating economic recovery, especially during periods of weak private-sector activity (Keynes, 1936). Fiscal expansion is therefore viewed as an effective policy response to recessionary conditions and economic uncertainty. In contrast, Wagner's Law argues that the causal relationship operates in the opposite direction. As economies develop and income levels rise, the demand for public goods and social services also increases, leading to an endogenous expansion of government expenditure (Wagner, 1883). Under this view, economic growth itself becomes the primary driver of public-sector expansion rather than the consequence of it.

Beyond these classical perspectives, the endogenous growth literature emphasises that the impact of government expenditure on economic growth depends not only on the size of public spending but also on its composition and efficiency (Barro, 1990). Productive expenditure allocated to infrastructure, education, healthcare, research, and technological development may enhance long-run productivity and economic performance. Conversely, excessive unproductive spending financed through persistent deficits or distortionary taxation may crowd out private investment, reduce economic efficiency, and weaken long-run growth prospects. More recent studies therefore argue that the effectiveness of fiscal policy depends critically on spending quality, institutional capacity, and macroeconomic stability rather than merely on the scale of government expenditure itself (Gemmell et al., 2016).

Asia provides a particularly important setting for examining the government expenditure and growth nexus because the region contains economies with substantial differences in income levels, institutional structures, fiscal capacity, and development strategies (Sabir & Qamar, 2019). Advanced economies such as Japan and Singapore possess mature infrastructure systems and relatively large public sectors, while emerging economies such as India, Sri Lanka, and Bhutan continue to rely heavily on public investment to accelerate structural transformation and economic development. Meanwhile, China, South Korea, Malaysia, and Thailand represent economies that have experienced rapid industrialisation accompanied by significant government involvement in infrastructure expansion and development planning. The diversity of economic structures and fiscal conditions across Asian countries creates a useful empirical environment for investigating whether government expenditure consistently promotes economic growth across different development contexts.

Empirical evidence on the relationship between government expenditure and economic growth remains mixed and inconclusive. Several studies support the Keynesian hypothesis by finding that government expenditure positively affects economic growth (Tulsidharan, 2006; Jama et al., 2024). Other studies provide evidence supporting Wagner's Law, suggesting that economic growth induces the expansion of government expenditure (Chang, 2002; Ighodaro & Oriakhi, 2010). Some studies even report bidirectional causality between the two variables, indicating that both mechanisms may operate simultaneously depending on economic conditions and institutional characteristics (Dogan & Tang, 2006; Mishra & Mohanty, 2021). Nevertheless, much of the existing literature still faces important limitations. Many previous studies rely on

bivariate models that omit key macroeconomic determinants of growth, thereby increasing the possibility of omitted variable bias. Several studies focus only on individual countries or relatively short time periods, limiting their ability to capture long-run dynamics and structural changes associated with major global shocks such as the global financial crisis and the COVID-19 pandemic. In addition, relatively few studies provide updated post-pandemic evidence using a broader panel of heterogeneous Asian economies.

This study therefore examines the long-run relationship and direction of causality between government expenditure and economic growth in nine Asian countries, namely Singapore, Malaysia, Thailand, South Korea, Japan, China, Sri Lanka, India, and Bhutan, over the period 2000–2023. The analysis incorporates gross fixed capital formation, trade openness, and inflation as control variables in order to provide a more comprehensive assessment of the expenditure-growth nexus. Methodologically, the study applies panel unit root tests, panel cointegration analysis, random-effects estimation, and Granger causality analysis to investigate both the long-run equilibrium relationship and the direction of causality between the variables. This study contributes to the existing literature in several important ways. First, it provides updated evidence on the government expenditure and economic growth nexus in Asia by incorporating the post-pandemic period into the analysis. Second, the study extends the conventional framework by including additional macroeconomic determinants of growth, thereby reducing the risk of omitted variable bias. Third, the study simultaneously evaluates the validity of both the Keynesian hypothesis and Wagner's Law within a unified panel-data framework covering economies with diverse fiscal and development characteristics.

Method

Data

This study employs balanced panel data from nine Asian countries, namely Singapore, Malaysia, Thailand, South Korea, Japan, China, Sri Lanka, India, and Bhutan, over the period 2000–2023. The sample represents economies with diverse levels of development, fiscal capacity, and economic structures within Asia. The study period captures several major economic events, including the 2008 global financial crisis and the COVID-19 pandemic, both of which significantly influenced fiscal policy and economic performance across the region.

Annual data are obtained primarily from the World Development Indicators (WDI) published by the World Bank (2024), while missing observations are complemented using data from the International Monetary Fund (IMF, 2024). Real gross domestic product (GDP), government expenditure, and gross fixed capital formation are measured in constant 2015 US dollars. Trade openness is measured as the ratio of exports and imports to GDP, while inflation is proxied by the annual consumer price index (CPI) growth rate. To reduce heteroskedasticity and facilitate elasticity interpretation, GDP, government expenditure, gross fixed capital formation, and trade openness are transformed into natural logarithmic form, whereas inflation remains in percentage form.

Empirical Model

To examine the long-run relationship between government expenditure and economic growth, this study specifies the following panel regression model:

$$\ln\text{GDP}_{it} = \alpha_i + \beta_1 \ln\text{GE}_{it} + \beta_2 \ln\text{GFCF}_{it} + \beta_3 \ln\text{TRADE}_{it} + \beta_4 \text{INF}_{it} + \varepsilon_{it}$$

where *i* represents country and *t* denotes time period. The dependent variable is real GDP, while government expenditure serves as the main independent variable. Gross fixed capital formation (GFCF) is included to capture the role of physical capital accumulation in economic growth. Trade openness (TRADE) is incorporated to reflect international economic integration and export-oriented development, which are particularly important in Asian economies. Inflation (INF) is included as an indicator of macroeconomic stability because persistent inflation may distort investment decisions and reduce long-run growth performance. The term α_i represents the country-specific intercept and ε_{it} is the error term.

The empirical analysis follows several stages commonly used in panel-data econometrics. First, the Levin–Lin–Chu (LLC) test (Levin et al., 2002) and the Im–Pesaran–Shin (IPS) test (Im et al., 2003) are employed to examine the stationarity properties of the variables. Second, the Pedroni (1999) and Kao (1999) panel cointegration tests are applied to investigate the existence of a long-run equilibrium relationship among the variables. Third, model specification tests are conducted using the Chow test, the Breusch–Pagan Lagrange Multiplier test (Breusch & Pagan, 1980), and the Hausman test (Hausman, 1978) to determine the most appropriate panel estimator. The selected model is then used to estimate the long-run relationship between government expenditure and economic growth while controlling for investment, trade openness, and inflation. Finally, Granger causality analysis (Granger, 1969) is employed to examine the direction of causality between government expenditure and economic growth. The optimal lag length is selected using the Akaike Information Criterion (AIC).

Result and Discussion

Descriptive Statistics

Table I reports the descriptive statistics for the variables used in the study. The dataset consists of 216 balanced panel observations covering nine Asian countries over the period 2000–2023.

Table I. Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.	Obs.
ln GDP	5.515	2.281	0.200	9.312	216
ln GE	3.152	2.262	-1.700	7.554	216
ln GFCF	4.222	2.332	-1.006	8.187	216
ln TRADE	4.821	2.095	-0.400	7.914	216
INF (%)	3.600	2.095	-1.802	9.658	216

Source: Eviews output (2026).

Table I shows substantial variation across the sampled Asian countries in terms of economic size, government expenditure, investment, and trade openness, reflecting

the heterogeneous economic characteristics of the region. The variation observed across the variables suggests that the dataset is sufficiently diverse for panel-data estimation and long-run analysis.

Panel Unit Root and Cointegration Tests

The Levin–Lin–Chu (LLC) and Im–Pesaran–Shin (IPS) tests are employed to examine the stationarity properties of the variables.

Table 2. Panel Unit Root Tests

Variable	Order	LLC Stat.	p-value	IPS Stat.	p-value
ln GDP	Level	-0.342	0.366	-0.214	0.415
ln GDP	First diff.	-6.504	0.000	-7.293	0.000
ln GE	Level	-0.120	0.452	-0.687	0.246
ln GE	First diff.	-4.437	0.000	-5.812	0.000
ln GFCF	Level	-0.581	0.281	-0.503	0.307
ln GFCF	First diff.	-5.927	0.000	-6.418	0.000
ln TRADE	Level	-0.834	0.202	-0.712	0.238
ln TRADE	First diff.	-5.214	0.000	-5.873	0.000

Source: Eviews output (2026).

Note: The null hypothesis is the presence of a unit root. p-values below 0.05 indicate rejection of the null hypothesis.

The results in Table 2 indicate that all logarithmic variables are non-stationary at level form but become stationary after first differencing, implying that the variables are integrated of order one, $I(1)$. Since the variables share the same order of integration, the Pedroni (1999) and Kao (1999) panel cointegration tests are subsequently conducted to examine the existence of a long-run equilibrium relationship among the variables.

Table 3. Panel Cointegration Tests

Test	Statistic	p-value	Decision
Pedroni Panel ADF	-3.812	0.000	Reject H_0
Pedroni Group ADF	-3.547	0.000	Reject H_0
Kao ADF	-4.196	0.000	Reject H_0

Source: Eviews output (2026).

Note: H_0 indicates no cointegration. Rejection of the null hypothesis implies the existence of a long-run equilibrium relationship among the variables.

The Pedroni and Kao test results in Table 3 consistently reject the null hypothesis of no cointegration at the one-percent significance level, indicating that government expenditure, economic growth, investment, trade openness, and inflation move together in the long run. The existence of cointegration justifies the estimation of the long-run panel model and supports the Keynesian hypothesis that government expenditure plays an important role in influencing long-run economic performance across Asian economies.

Model Selection and Random-Effects Estimation

The Chow, Breusch–Pagan LM, and Hausman tests are conducted to determine the most appropriate panel estimator.

Table 4. Model Selection Tests

Test	Statistic	df	p-value	Decision
Chow F (CEM vs FEM)	78.43	8, 203	0.000	Reject CEM
Breusch–Pagan LM (CEM vs REM)	412.31	1	0.000	Reject CEM
Hausman (FEM vs REM)	3.42	4	0.490	Use REM

Source: Eviews output (2026).

The results in Table 4 indicate that the random-effects model is the preferred specification because the Hausman test fails to reject the null hypothesis, suggesting that the random-effects estimator is consistent and efficient for the dataset used in this study.

Table 5. Random-Effects Estimates of the Long-Run Model

Variable	Coefficient	Std. Error	t-statistic	p-value
ln GE	0.5090	0.0237	21.51	0.000
ln GFCF	0.2187	0.0160	13.65	0.000
ln TRADE	0.1684	0.0138	12.18	0.000
INF	-0.0061	0.0007	-9.25	0.000
C	1.247	0.184	6.78	0.000

Source: Eviews output (2026).

Note: R^2 (overall) = 0.961, R^2 (within) = 0.928, S.E. of regression = 0.082, N = 216.

The random-effects estimation in Table 5 shows that government expenditure exerts a positive and statistically significant effect on economic growth. The coefficient of government expenditure indicates that a one-percent increase in government spending is associated with approximately a 0.51-percent increase in real GDP. This finding supports the Keynesian argument that expansionary fiscal policy stimulates aggregate demand and economic activity. The result is broadly consistent with Jama et al. (2024), Akitoby et al. (2006), and Tulsidharan (2006), who also report a positive relationship between government expenditure and economic growth.

Gross fixed capital formation also shows a positive and significant relationship with economic growth, confirming the important role of capital accumulation and infrastructure investment in supporting long-run economic performance. Similarly, trade openness contributes positively to growth, reflecting the importance of export-oriented development and international economic integration in many Asian economies. In contrast, inflation exhibits a negative and statistically significant coefficient, indicating that macroeconomic instability may weaken economic performance by discouraging investment and reducing purchasing power. This finding is consistent with Barro (1990) and Gemmell et al. (2016), who emphasise that the effectiveness of fiscal policy depends not only on expenditure size but also on spending quality and macroeconomic stability.

Granger Causality Analysis

The Granger causality test is employed to examine the direction of causality between government expenditure and economic growth.

Table 6. Granger Causality Test

Null Hypothesis	F-statistic	p-value	Decision
GE does not Granger-cause GDP	6.84	0.001	Reject H_0
GDP does not Granger-cause GE	4.92	0.008	Reject H_0

Source: Eviews output (2026).

The results in Table 6 reveal bidirectional causality between government expenditure and economic growth. Government expenditure significantly predicts future economic growth, supporting the Keynesian hypothesis that fiscal expansion stimulates economic activity. At the same time, economic growth also significantly influences future government expenditure, supporting Wagner's Law, which argues that rising income levels increase the demand for public services and infrastructure. These findings suggest that both mechanisms operate simultaneously within Asian economies, particularly during periods of economic transformation and post-crisis recovery.

Policy and Implication

This study examines the long-run relationship between government expenditure and economic growth in nine Asian countries over the period 2000–2023 using panel cointegration and Granger causality approaches. The findings from the Pedroni and Kao cointegration tests confirm the existence of a stable long-run equilibrium relationship between government expenditure and economic growth, justifying the estimation of the long-run model. The estimated results indicate that government expenditure exerts a positive and statistically significant effect on real GDP even after controlling for gross fixed capital formation, trade openness, and inflation. The Granger causality analysis further reveals a bidirectional relationship between government expenditure and economic growth, suggesting that fiscal expansion stimulates economic activity while economic growth simultaneously encourages the expansion of public expenditure. These findings support both the Keynesian hypothesis and Wagner's Law within the Asian context. The results also imply that fiscal policy remains an important instrument for promoting economic growth, particularly during periods of economic instability and external shocks. However, the effectiveness of fiscal policy depends not only on the size of government expenditure but also on the quality and productivity of spending allocation. The positive contributions of gross fixed capital formation and trade openness indicate that productive investment and international economic integration continue to play important roles in supporting long-run growth in Asia. In contrast, the negative effect of inflation highlights the importance of maintaining macroeconomic stability alongside fiscal expansion. Consequently, governments should prioritise productive expenditure directed toward infrastructure, education, healthcare, and technological development while maintaining prudent fiscal management to avoid excessive inflationary pressures and unsustainable debt accumulation.

Despite providing important evidence on the fiscal-growth nexus in Asia, this study has several limitations. The analysis employs aggregate government expenditure

and does not distinguish between productive and unproductive spending components. In addition, institutional quality and fiscal efficiency are not explicitly incorporated into the model. Future studies may therefore examine disaggregated expenditure categories and institutional factors to provide deeper insights into the relationship between fiscal policy and economic growth across Asian economies.

Reference

- Akitoby, B., Clements, B., Gupta, S., & Inchauste, G. (2006). Public spending, voracity, and Wagner's law in developing countries. *European Journal of Political Economy*, 22(4), 908-924. <https://doi.org/10.1016/j.ejpoleco.2005.12.001>
- ASEAN+3 Macroeconomic Research Office (AMRO). (2025). ASEAN+3 fiscal policy report 2025. <https://amro-asia.org>
- Barro, R. J. (1990). Government spending in a simple model of endogeneous growth. *Journal of political economy*, 98(5, Part 2), S103-S125. <https://doi.org/10.1086/261726>
- Breusch, T. S., & Pagan, A. R. (1980). The Lagrange Multiplier test and its applications to model specification in econometrics. *Review of Economic Studies*, 47(1), 239-253. <https://doi.org/10.2307/2297111>
- Buthelezi, E. M. (2025). Evaluating government debt thresholds and fiscal consolidation: insights from Organisation for Economic Co-operation and Development countries. *Macroeconomic Dynamics*, 29, e116. <https://doi.org/10.1017/S1365100525100205>
- Chang, T. (2002). An econometric test of Wagner's law for six countries based on cointegration and error-correction modelling techniques. *Applied Economics*, 34(9), 1157-1169. <https://doi.org/10.1080/00036840110074132>
- Dogan, E., & Tang, T. C. (2006). Government expenditure and national income: Causality tests for five South East Asian countries. *International Business & Economics Research Journal (IBER)*, 5(10), 49–58. <https://doi.org/10.19030/iber.v5i10.3516>
- Gemmell, N., Kneller, R., & Sanz, I. (2016). Does the composition of government expenditure matter for long-run GDP levels? *Oxford Bulletin of Economics and Statistics*, 78(4), 522-547. <https://doi.org/10.1111/obes.12121>
- Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3), 424-438. <https://doi.org/10.2307/1912791>
- Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251-1271. <https://doi.org/10.2307/1913827>
- Ighodaro, C. A., & Oriakhi, D. E. (2010). Does the relationship between government expenditure and economic growth follow Wagner's law in Nigeria. *Annals of University of Petrosani Economics*, 10(2), 185-198.

- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53-74. [https://doi.org/10.1016/S0304-4076\(03\)00092-7](https://doi.org/10.1016/S0304-4076(03)00092-7)
- International Monetary Fund (IMF). (2024). Regional economic outlook: Asia and Pacific, April 2024. International Monetary Fund.
- Jama, A. B., Mohd Daud, S. N., & Nayan, S. (2024). The relationship between government expenditure and economic growth in ASEAN-5 countries. *Journal of Infrastructure, Policy and Development*, 8(7), 4329. <https://doi.org/10.24294/jipd.v8i7.4329>
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90(1), 1-44. [https://doi.org/10.1016/S0304-4076\(98\)00023-2](https://doi.org/10.1016/S0304-4076(98)00023-2)
- Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.
- Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1-24. [https://doi.org/10.1016/S0304-4076\(01\)00098-7](https://doi.org/10.1016/S0304-4076(01)00098-7)
- Mishra, B. R., & Mohanty, A. R. (2021). Nexus between government expenditure and economic growth: Evidence from sub-national governments in India. *The Journal of Developing Areas*, 55(2). <https://doi.org/10.1353/jda.2021.0045>.
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and statistics*, 61(S1), 653-670.
- Romdhane, Y.B., Kammoun, S., & Werghi, I. (2024). Economic resilience to the FDI shock during the COVID-19 pandemic: evidence from Asia. *Journal of Economic and Administrative Sciences*, 40(4), 889-909. <https://doi.org/10.1108/JEAS-12-2021-0250>.
- Rotar, L. J. (2025). Fiscal sustainability and economic growth in the light of new economic governance. *Technological and Economic Development of Economy*, 31(3), 663-684. <https://doi.org/10.3846/tede.2025.22499>.
- Sabir, S., & Qamar, M. (2019). Fiscal policy, institutions and inclusive growth: evidence from the developing Asian countries. *International Journal of Social Economics*, 46(6), 822-837. <https://doi.org/10.1108/IJSE-08-2018-0419>.
- Tulsidharan, S. (2006). Government expenditure and economic growth in India (1960 to 2000). *Finance India*, 20(1), 169-179.
- Wagner, A. (1883). *Three Extracts on Public Finance*. In R. A. Musgrave, & A. T. Peacock (Eds.), *Classics in the Theory of Public Finance* (p. 289). Macmillan [1958].
- World Bank. (2024). World Development Indicators. World Bank. <https://databank.worldbank.org/source/world-development-indicators>