“Assessing the impact of trade deficits on public debt in Asian economies under inflation volatility”

AUTHORS	Huyen Le Thanh Trang Tran Thi Thu Ha Le Hai

ARTICLE INFO	Huyen Le Thanh, Trang Tran Thi Thu and Ha Le Hai (2026). Assessing the impact of trade deficits on public debt in Asian economies under inflation volatility. *Public and Municipal Finance*, *15*(2), 91-106. doi:10.21511/pmf.15(2).2026.08
DOI	http://dx.doi.org/10.21511/pmf.15(2).2026.08
RELEASED ON	Thursday, 21 May 2026
RECEIVED ON	Sunday, 16 November 2025
ACCEPTED ON	Monday, 11 May 2026

JOURNAL	"Public and Municipal Finance"
ISSN PRINT	2222-1867
ISSN ONLINE	2222-1875
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
42	3	8

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Huyen Le Thanh (Vietnam), **Trang Tran Thi Thu** (Vietnam), **Ha Le Hai** (Vietnam)

ASSESSING THE IMPACT OF TRADE DEFICITS ON PUBLIC DEBT IN ASIAN ECONOMIES UNDER INFLATION VOLATILITY

Abstract

Public debt has emerged as a critical macroeconomic issue in many Asian economies, where persistent trade imbalances and inflation volatility continue to exacerbate fiscal pressures. A clear understanding of the causal mechanisms linking these factors to public debt is therefore essential for effective fiscal and monetary policymaking. This study examines the causal effects of trade deficits and inflation on public debt using balanced panel data from 31 Asian countries over the period 2005–2022, where annual observations from all countries were combined into a pooled panel dataset for econometric estimation. To capture both long-run and short-run dynamics, the analysis employs the Autoregressive Distributed Lag (ARDL) model and the Cross-Sectionally Augmented ARDL (CS-ARDL) approach.

The empirical findings reveal that trade balance and inflation exert statistically significant long-run effects on public debt. Improvements in the trade balance are associated with a substantial reduction in public debt, while higher inflation is also linked to lower public debt levels in the long run. In the short run, changes in the trade balance do not have a significant impact, while inflation effects remain negative but statistically insignificant. The error correction term (–0.196) indicates a relatively rapid adjustment toward long-run equilibrium. Panel causality test results further reveal bidirectional relationships among public debt, trade balance, and inflation, implying mutual feedback effects. Overall, the findings highlight the importance of improving trade performance and maintaining stable inflation to support long-term debt sustainability in Asian economies.

Keywords debt dynamics, external imbalance, fiscal sustainability, price instability, macroeconomics, structural reforms, export capacity, Asian nations

JEL Classification H63, F32, E31, O53

Type of the article: Research Article

Received on: 16th of November, 2025
Accepted on: 11th of May, 2026
Published on: 21st of May, 2026

Huyen Le Thanh, Ph.D., Department of Public Finance, Faculty of Finance and Banking, Thuongmai University, Vietnam.

Trang Tran Thi Thu, Ph.D., Department of Finance and Banking, Faculty of Public Finance, Thuongmai University, Vietnam. (Corresponding author)

Ha Le Hai, Ph.D., Faculty of Economics and International Business, Thuongmai University, Vietnam.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

Over the past two decades, many Asian economies have simultaneously experienced widening trade deficits, rising public debt, and persistent inflation volatility. From 2000 to 2023, the median public debt-to-GDP ratio in developing Asia nearly doubled, while a large number of countries recorded sustained current account deficits of 4-6% of GDP. Inflation dynamics further complicated this landscape, as several economies – including Pakistan, Sri Lanka, Mongolia, and Turkey – faced highly volatile inflation, reflecting repeated external shocks such as the global financial crisis, commodity price fluctuations, and the COVID-19 pandemic.

This study is motivated by a central tension in open-economy macroeconomics. Standard theory and the twin deficits hypothesis suggest that prolonged trade deficits must be financed through higher public borrowing, leading to debt accumulation. However, in economies characterized by volatile and elevated inflation, the real value of public

debt may be eroded by unexpected price increases, while governments can partially rely on inflation-related revenues. These mechanisms may weaken, offset, or even reverse the conventional link between external imbalances and public debt.

Despite extensive research on trade deficits, inflation, and debt in isolation, their joint interaction remains underexplored, particularly in emerging Asian economies with shallow financial markets, diverse exchange-rate regimes, and exposure to volatile capital flows.

1. LITERATURE REVIEW AND HYPOTHESES

The trade balance, defined as the difference between exports and imports of goods and services, constitutes a fundamental component of the current account, together with net factor income and net transfers (Ghosh & Ramakrishnan, 2012). From a macroeconomic identity perspective, the current account reflects the gap between national savings and investment, implying that external imbalances may arise from insufficient domestic savings, excessive investment, or both. While the distinction between the trade balance and the broader current account is often quantitatively small, trade flows tend to respond more rapidly to macroeconomic shocks, making them particularly relevant for analyzing short- and medium-term external dynamics.

The relationship between fiscal and external imbalances has long attracted considerable attention in macroeconomic research. Most existing studies focus on the interaction between budget deficits and current account deficits, commonly referred to as the twin deficits hypothesis. Within this framework, two main theoretical perspectives emerge. The first suggests a direct linkage, whereby expansionary fiscal policy increases domestic absorption, stimulates imports, and consequently widens the trade or current account deficit. The second emphasizes indirect transmission mechanisms, arguing that fiscal deficits affect external balances through their impact on interest rates, capital flows, and exchange rate movements. These competing perspectives reflect the complexity of fiscal–external interactions and suggest that the direction and magnitude of the relationship may depend on institutional and macroeconomic conditions.

The theoretical foundation of the twin deficits hypothesis is typically associated with the Mundell–Fleming model, which highlights the role of the exchange rate regime in shaping the fiscal–external nexus (Fleming, 1962). Under fixed exchange rates, expansionary fiscal policy increases domestic income and prices, leading to a deterioration of the current account. Under flexible exchange rates, higher fiscal deficits tend to raise interest rates, attract capital inflows, and appreciate the domestic currency, thereby reducing net exports and worsening the external balance. A substantial body of empirical evidence supports this conventional view. Cross-country analyses and country-specific studies, particularly for the United States, consistently document a positive relationship between fiscal deficits and current account or trade deficits (Milne, 1977; Miller & Russek, 1989; Rosensweig & Tallman, 1993).

Further research highlights the importance of transmission channels underlying this relationship. For instance, increases in government spending are generally found to generate external deficits regardless of the financing method, whereas tax-financed debt may be neutral under certain conditions (Enders & Lee, 1990). Using a vector autoregression approach, Abell (1990) demonstrates that fiscal deficits influence trade deficits indirectly through interest rate and exchange rate channels, rather than through a purely direct causal mechanism. Empirical evidence from individual countries, including Greece and Lebanon, also indicates that budget deficits can lead to trade or current account deficits in both the short and long run (Vamvoukas, 1999). Moreover, fiscal consolidation episodes suggest that reducing budget deficits tends to improve external balances, with a one-percentage-point reduction in fiscal deficits associated with a significant improvement in the current account (Bluedorn & Leigh, 2011). However, this relationship is not uniform across countries. Evidence from the Eurozone reveals substantial heterogeneity, with strong support for the twin deficits hypothesis in some countries, such as Austria, but weaker or mixed results elsewhere (Carrasco, 2016).

http://dx.doi.org/10.21511/pmf.15(2).2026.08

In contrast, a growing body of literature challenges the traditional twin deficits hypothesis by identifying reverse or bidirectional causality between fiscal and external imbalances. Empirical findings for South Korea indicate that causality may run from the current account to the budget balance rather than the reverse, particularly during periods of financial stress (C.-H. Kim & D. Kim, 2006). Similar patterns are observed in Greece, where external imbalances appear to drive fiscal deficits despite a positive correlation between the two variables (Kalou & Paleologou, 2011). Panel data studies for EU and OECD countries further confirm that the direction and strength of causality vary significantly across economies (Rault & Afonso, 2009). Other contributions emphasize more complex dynamics, including bidirectional causality driven by capital mobility and savings–investment behavior (Feldstein & Horioka, 1979; Kouassi et al., 2004), or even cases where fiscal deficits may improve external balances depending on regional and structural conditions (Magazzino, 2012). Evidence focusing specifically on trade deficits also remains inconclusive, with some studies suggesting that trade imbalances may precede fiscal imbalances rather than result from them (Helmy, 2018).

An alternative theoretical perspective is provided by the Ricardian Equivalence Hypothesis, which posits that fiscal deficits do not affect external balances because forward-looking consumers adjust their savings behavior in anticipation of future taxation (Barro, 1989). Under this framework, fiscal policy has no impact on key macroeconomic variables such as interest rates, exchange rates, or the current account. Empirical evidence from advanced economies often lends support to this view, with several studies finding no significant relationship between fiscal deficits and external imbalances (Evans, 1989; Garcia & Ramajo, 2004). Cross-country analyses further indicate that in many developed economies, changes in government balances are offset by corresponding adjustments in private savings and investment, thereby weakening the link between fiscal and external deficits (Khalid & Guan, 1999; Papadogonas & Stournaras, 2006; Algieri, 2013).

Beyond fiscal deficits, the literature also examines the role of public debt in shaping external imbalances. Governments typically finance budget deficits through borrowing, including both domestic and external debt issuance (Tanzi & Blejer, 1988; Sobel et al., 2006). Persistent fiscal imbalances can lead to rising public debt levels, increasing borrowing costs, and potentially undermining macroeconomic stability (Caselli et al., 1999). In developing economies, reliance on external borrowing is often more pronounced due to underdeveloped financial markets and limited domestic savings (Congdon, 1987). While some studies argue that current account deficits must ultimately be financed through external debt, thereby linking public debt to external imbalances (Rao et al., 1994; Stock, 2000), others suggest that the relationship operates through more complex channels involving macroeconomic policy and financial conditions (Debelle & Faruqee, 1996; Edwards & Frankel, 2001; Bulut, 2011). However, empirical evidence remains mixed, with several panel studies finding no consistent relationship between public debt and current account deficits in developing countries (Calderón et al., 2000).

Overall, despite an extensive body of research on fiscal deficits, public debt, and external balances, empirical findings remain inconclusive and highly context-dependent. Importantly, while the majority of studies focus on the relationship between public debt and the current account, relatively limited attention has been paid to the specific link between public debt and trade deficits. Given that trade imbalances may respond more directly to fiscal and macroeconomic shocks, this gap warrants further investigation. Accordingly, this study aims to examine the interaction between trade deficits and public debt in the context of inflation volatility, thereby contributing to a more nuanced understanding of fiscal-external dynamics.

The purpose of this study is to examine the long-run and short-run effects of trade deficits on public debt in a panel of 31 Asian economies, explicitly accounting for the role of inflation volatility. Based on the reviewed literature and identified gaps, the following hypotheses are proposed:

H1a: There is a long-run relationship between trade balance and public debt in Asian countries.

H1b: There is a short-run relationship between trade balance and public debt in Asian countries.

H2a: There is a long-run relationship between inflation and public debt in Asian countries.

H2b: There is a short-run relationship between inflation and public debt in Asian countries.

H3: There is a causal relationship between public debt and trade balance in Asian countries.

H4: There is a causal relationship between public debt and inflation in Asian countries.

These hypotheses leverage panel ARDL and CS-ARDL models to examine dynamic effects (Nkoro & Uko, 2016; Chudik & Pesaran, 2015), complemented by Dumitrescu and Hurlin panel causality tests to assess directional impacts (Dumitrescu & Hurlin, 2012). By focusing on Asia's diverse economic contexts, this paper extends the twin deficit literature, offering novel insights into debt-trade linkages and inflation's role, with implications for fiscal policy and debt sustainability.

2. METHODOLOGY

In order to achieve the study objectives, we examine a panel of 31 Asian countries over the period from 2005 to 2022. The full list of countries included in the sample is presented in Appendix B. These countries were selected based on the availability of consistent data on public debt, trade balance, and inflation for the entire study period. The data were downloaded directly from the World Bank's official website in July 25, 2023. Specifically, we used the following indicators. Public debt represents the total outstanding fixed-term contractual obligations of the government, including domestic and foreign liabilities such as currency deposits, securities (excluding shares), and loans. Public debt is expressed as a percentage of GDP. Trade balance is measured as net trade in goods and services as a percentage of GDP. It is calculated by subtracting imports from exports of goods and services, reflecting all transactions that involve a change of ownership between a country's residents and the rest of the world. Finally, inflation is measured by the consumer price index (CPI) and reflects the annual percentage change in the cost of a fixed or periodically adjusted basket of goods. The study period ends in 2022 because complete and consistent data for all variables and countries were available from the World Bank database up to that year at the time of data collection. Using a balanced panel over 2005–2022 ensures comparability across countries and avoids bias caused by missing observations.

We built the autoregressive distributed lag (ARDL) model. With an aim to obtain accurate research results, slope heterogeneity, cross-section dependence, unit root, and cointegration tests are used in our study. Our ARDL model is established as follows:

$$y_{it} = \mu_i + \sum_{j=1}^{p} \beta_{ij} y_{i,t-j} + \sum_{k=0}^{q} \gamma_k X_{i,t-k} + \varepsilon_{it}, \quad (1)$$

where: $i = 1, 2, ..., N$; units of cross-sectional; $t = 1, 2, ..., T$: the annual periods; *j, k:* the time lags number; *p:* dependent variable lag; *q:* independent variables lag; μ_i: the fixed individual effect of each unit; ε_{it}: the random error term; *y*: dependent variable of public debt; *X:* the vector of the independent variables (trade balance and inflation).

2.1. Long-run dynamics analysis

The long-run relationship is determined through the estimated β_k coefficients of the independent variables in the long-run equation of the model. The long-run effect can be derived as:

$$\beta = \frac{\sum_{k=0}^{q} \delta_k}{1 - \sum_{j=1}^{p} \gamma_j}. \quad (2)$$

If β_k is statistically significant, it indicates the existence of a long-run relationship between the variables.

2.2. Short-run dynamics analysis

The short-run relationship is captured by the coefficients of the first-differenced independent variables, which measure how the dependent variable responds to short-term fluctuations in the independent variables. Unlike long-run effects, which reflect equilibrium relationships, short-run effects represent transitory deviations that may not persist over time.

http://dx.doi.org/10.21511/pmf.15(2).2026.08

The short-run equation is expressed as follows:

$$\Delta y_{it} = \phi\left(y_{i,t-1} - \beta X_{i,t-1}\right) + \sum_{j=1}^{p-1}\alpha_j \Delta Y_{i,t-j} + \sum_{k=0}^{q-1}\gamma_k \Delta X_{i,t-k} + \varepsilon_{it}. \quad (3)$$

where the coefficients of ΔX represent short-run impacts. A positive coefficient indicates that an increase in the explanatory variable leads to an immediate increase in the dependent variable, whereas a negative coefficient suggests a short-term decline. The magnitude of these coefficients determines the strength of the short-run effects.

Additionally, the inclusion of lagged differences accounts for possible delayed responses in the dependent variable. This is particularly relevant in economic and financial studies, where adjustments to external shocks may take time to materialize. If the model includes a lagged dependent variable, it captures persistence, reflecting how past values influence current changes.

2.3. Error correction mechanism (ECM)

The error correction mechanism (ECM) in the panel ARDL model captures the speed at which the dependent variable adjusts from short-term deviations back to its long-run equilibrium. When there is a discrepancy between the actual value and the equilibrium value, the model determines how quickly the dependent variable returns to its balanced state after experiencing a shock.

The ECM equation is expressed as follows:

$$\Delta y_{it} = \lambda\left(y_{i,t-1} - \beta X_{i,t-1}\right) + \sum_{j=1}^{p-1}\alpha_j \Delta Y_{i,t-j} + \sum_{k=0}^{q-1}\gamma_k \Delta X_{i,t-k} + \varepsilon_{it}, \quad (4)$$

where λ represents the error correction term (ECT), which indicates the speed at which the dependent variable adjusts back to its long-run equilibrium.

In the traditional ARDL estimation, there is a problem that can distort the research results – cross-sectional dependency (CSD), which arises due to common shocks and unobserved components. If CSD is present, ignoring it can lead to biased and inconsistent estimates. The CS-ARDL approach, introduced by Chudik and Pesaran (2015), is considered a more efficient method compared to traditional Mean Group (MG), Pooled Mean Group (PMG), and Dynamic Fixed Effects (DFE) estimators, which do not adequately control for CSD.

Unlike standard Panel ARDL, which assumes weak cross-sectional dependence or homogeneity across units, CS-ARDL explicitly accounts for cross-sectional dependence by augmenting the model with cross-sectional averages of both dependent and independent variables. This allows the model to capture unobserved common factors that affect all units to varying degrees, making the estimation more robust in the presence of global shocks or spillover effects.

Additionally, while panel ARDL estimators (PMG, MG, and DFE) focus on estimating long-run and short-run relationships without considering strong cross-sectional linkages, CS-ARDL is designed specifically for situations where cross-sectional dependence is significant. It is particularly useful in cases where the number of cross-sectional units (N) is large relative to the time dimension (T), ensuring that the estimated coefficients remain unbiased and efficient.

Thus, when there is strong evidence of cross-sectional dependence, the CS-ARDL model provides a more reliable and accurate framework for estimating dynamic relationships in panel data compared to traditional panel ARDL approaches.

The CS-ARDL model is built as follows:

$$\Delta y_{it} = \mu i + \varphi\left(y_{i,t-1} - \beta_i X_{i,t-1}\right) - \theta_{1i}\overline{y}_{t-1} - \theta_{2i}\overline{yX}_{t-1} + \sum_{j=1}^{p-1}\lambda_{ij}\Delta y_{i,t-j} + \sum_{j=0}^{q-1}\xi_{ij}\Delta X_{i,t-j} + \eta_{1i}\Delta\overline{y}_t + \eta_{2i}\Delta\overline{X}_t + \varepsilon_{it}, \quad (5)$$

where *y*: dependent variable of public debt; *X:* the vector of the independent variables (trade balance and inflation); ε_{it}: the error terms.

To investigate causal relationships among trade deficit, public debt, and inflation rate, the Dumitrescu and Hurlin (2012) panel causality

test was applied to panel data of 31 Asian countries from 2005 to 2022 (Rault & Afonso, 2009; Dumitrescu & Hurlin, 2012). This test extends the traditional Granger causality framework to heterogeneous panel data, accommodating cross-sectional variations.

The test is based on the regression model:

$$Y_{it} = \alpha_i + \sum_{j=1}^{J} \beta_{i,j} Y_{i,t-j} + \sum_{j=1}^{J} \gamma_{i,j} X_{i,t-j} + \varepsilon_{it}, \quad (6)$$

where i = 1, 2, ..., N denotes cross-sectional units (countries); t = 1, 2, ..., denotes time periods; Y_{it} and X_{it} represent the variables under investigation (public debt, trade deficit, and inflation); α_i is the individual-specific intercept. $\beta_{i,j}$ and $\gamma_{i,j}$ are the estimated coefficients for lag order j. ε_{it} is the error term.

Prior to testing, stationarity was confirmed using the Im-Pesaran-Shin (Im et al., 2003) unit root test (Im et al., 2003), and cross-sectional dependence was addressed with the Pesaran (2004) CD test ($p < 0.05$) (Pesaran, 2004). Optimal lags (J) were selected using the Akaike Information Criterion (AIC).

The hypotheses tested for each pair of variables are as follows.

For trade balance and public debt:

H0_1: Trade balance does not Granger-cause public debt for all 31 countries (γ_(i,j) = 0 for all i).

H1_1: Trade balance Granger-causes public debt for at least one country (γ_(i,k) ≠ 0 for at least one i).

H0_2: Public debt does not Granger-cause trade balance for all 31 countries (γ_(i,j) = 0 for all i).

H1_2: Public debt Granger-causes trade balance for at least one country (γ_(i,k) ≠ 0 for at least one i).

For inflation and public debt:

H0_3: Inflation does not Granger-cause public debt for all 31 countries (γ_(i,j) = 0 for all i).

H1_3: Inflation Granger-causes public debt for at least one country (γ_(i,k) ≠ 0 for at least one i).

H0_4: Public debt does not Granger-cause inflation for all 31 countries (γ_(i,j) = 0 for all i).

H1_4: Public debt Granger-causes inflation for at least one country (γ_(i,k) ≠ 0 for at least one i).

These hypotheses are formulated to determine whether directional causal relationships exist among trade balance, inflation, and public debt in the panel data framework.

The test employs the W-bar statistic, the average of individual Granger causality F-statistics, and the Z-bar statistic, which standardizes W-bar for asymptotic normality:

$$Z_{NT} = \sqrt{N}\left(\frac{W_{NT} - K}{\sqrt{2K}}\right), \quad (7)$$

where N is the number of cross-sectional units and K is the number of restrictions (lagged terms tested).

The Z-bar statistic follows an asymptotic standard normal distribution under the null hypothesis and is used to determine whether a causal relationship exists between the variables in panel data.

This complements the ARDL and CS-ARDL models by addressing directional causality and endogeneity.

3. RESULTS

3.1. Descriptive statistics

According to Table A1, Table A2, and Figure 1, the level of public debt in Asian nations experienced dramatic changes in the studied period. Since the year of 2005, it quickly decreased to the bottom point in 2008 before a significant rise in the next year, partly because of the 2008–2009 global economic crisis. Over the decade following, this ratio increased continuously from about 41% to more than 53% due to the rapid development of the worldwide economy. From 2014 to 2019, Asian countries used more

http://dx.doi.org/10.21511/pmf.15(2).2026.08

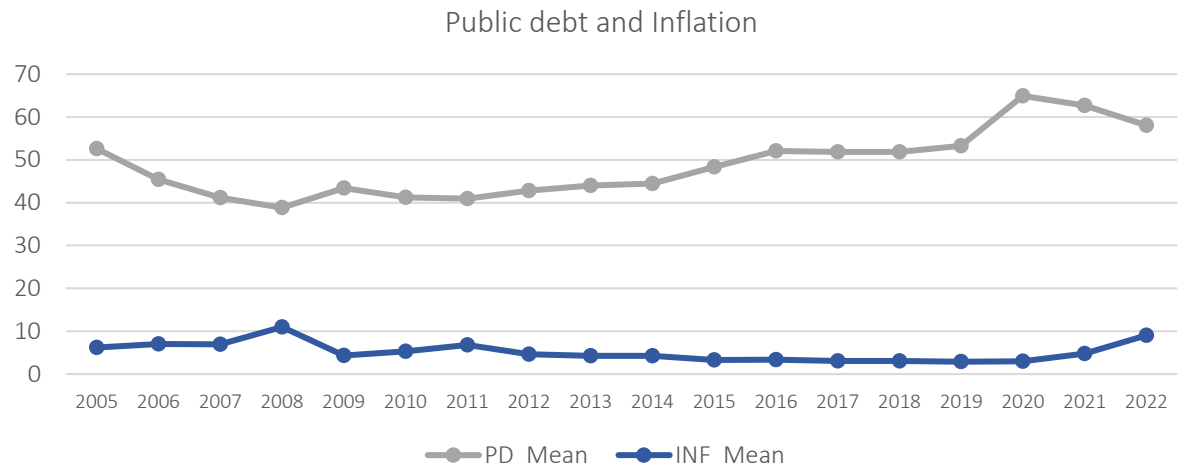


Figure 1. Public debt and inflation of Asian countries (2005–2022)

debt capital to finance their activities. This orientation helped many nations obtain great economic achievements. However, this way also implied large risks because it made debtor countries more vulnerable. In the last three years, under the pressure of an increase in government expenditure to address COVID-19 consequences and cope with the abnormal social, political, and economic occurrences in the world, the debt ratio of many nations suddenly climbed to higher than 60%, leading to a range of stresses.

Meanwhile, according to Table A1, Table A2, and Figure 2, the trade balance in this region also faced a deficit in the 2005–2022 period. Apart from the three years of 2005, 2006, and 2011, the export prices of goods and services were always lower than the import values. That difference increased to its highest point in 2015 and tended to ease in the next four years. Nevertheless, the spread of COVID-19 and some conflicts in the world in recent years raised the imbalance in trade again.

In that complicated context, it was not easy for Asian countries to control inflation. In fact, only in 2019 and 2020, this rate was sorted in the type of creeping inflation. In the remaining studied years, this ratio fluctuated between 3.1% and 10.99%, and whenever the economy faced difficulties, it immediately rocketed. Specifically, during the great recession from 2007 to 2008, it climbed to high levels, at 6.95% and 10.99% respectively. After, thanks to the efforts of governments, it was decreased and maintained in an acceptable scope. However, in 2022, the war between Russia and Ukraine caused a crisis rocking the worldwide economy, the inflation sharply increased to nearly 10%.

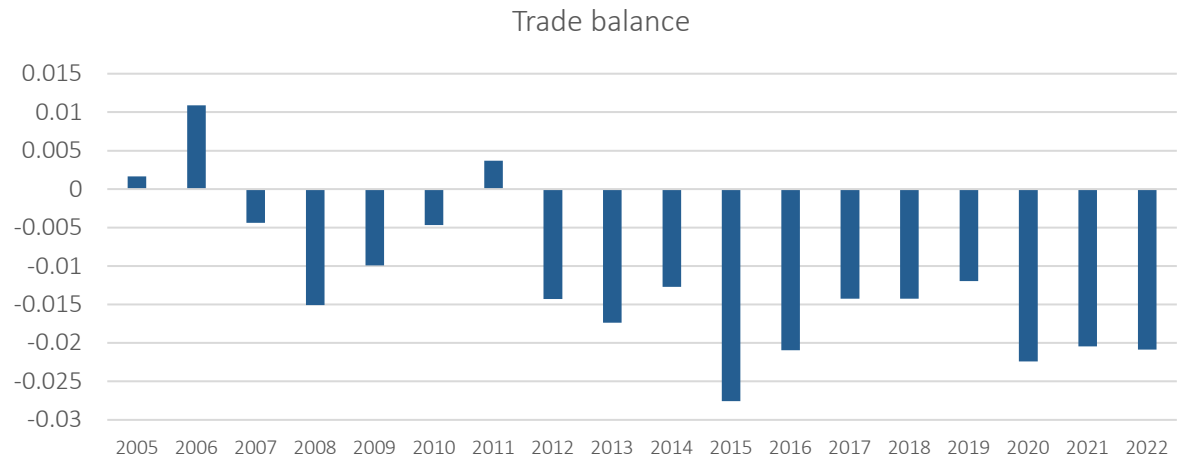


Figure 2. Trade balance of Asian countries as a percentage of GDP (2005–2022)

3.2. Preliminary tests

3.2.1. *CD test results*

The statistically significant values of delta and adjusted delta in Table 1 indicate that a slope heterogeneity problem exists. Moreover, the result of Pesaran's CSD test shows that there is the issue of cross-sectional dependence (CSD). In this case, the use of the second-generation unit root tests is suitable.

Table 1. Slope-heterogeneity and cross-sectional dependency test results

Slope coefficients homogeneity/heterogeneity		
Delta	7.473***	
Adjusted delta	8.473***	
Pesaran's cross sectional dependency test		
Test statistic	**Statistic**	**P-value**
Panel	32.512	0.000

Note: PD = public debt; TB = trade balance; INF = inflation; ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

3.2.2. *Unit root test results*

The CIPS test in Table 2 indicates that trade balance (TB) and inflation (INF) are stationary at level. Meanwhile, the public debt variable is stationary at its first difference. Three variables in the models are I(0) or I(1), thus the use of the panel ARDL model estimation is suitable in this context.

Table 2. CIPS test results

Variables	Levels		First differences	
	Constant	Constant and trend	Constant	Constant and trend
PD	–1.581	–1.437	–2.572***	–2.957***
TB	–2.251***	–2.202		
INF	–2.427***	–2.309		

Note: H0: all series within the panel are nonstationary; Ha: some series within the panel are stationary. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. PD is public debt; TB is trade balance; INF is inflation.

3.2.3. *Cointegration test results*

Examining the cointegration relationship in econometrics of panel data has particular importance. As can be seen from Table 3, the outcomes of the Westerlund test reveal the existence of the cointegration relationship between the study variables.

Table 3. Westerlund cointegration tests

Westerlund cointegration test	Statistic	*p*-value
Variance ratio	1.711	0.044

3.2.4. *Correlation analysis*

As can be seen from Table 4, the variable of public debt significantly correlates with both trade balance and inflation.

Table 4. Correlation matrix

Variable	PD	TB	INF
PD	1.000		
TB	–0.075 (0.075)	1.000	
INF	–0.137 (0.001)	–0.166 0.0001	1.000

Note: PD = public debt; TB = trade balance; INF = inflation.

3.2.5. *Panel ARDL estimation*

Based on the results of Hausman and Taylor test in Table 5, we conclude that PMG seems to be the most efficient among the three estimators in this research. Regarding the error correction term (ECT) coefficient, its value is –0.1956, which stays between 0 and –1, which means that if the equilibrium is left, it will approach to equilibrium level in the long run. Therefore, it meets the condition and is statistically significant.

The ARDL estimation results show that in the short term, public debt is significantly positively affected by the previous year's public debt level. Meanwhile, the two remaining variables, including trade balance and inflation, do not have a significant influence on the response variable.

By contrast, in the long term, both explanatory factors statistically significantly impact public debt, and their effects are negative.

The Pesaran's CSD test indicates the existence of cross-sectional dependency which can make PMG results less accurate, therefore the use of the CS-ARDL approach is necessary to obtain more exact conclusions.

As can be seen from Table 5 and Table 6, the results of CS-ARDL estimation are quite similar to that of ARDL estimation except for one point, which is

http://dx.doi.org/10.21511/pmf.15(2).2026.08

http://dx.doi.org/10.21511/pmf.15(2).2026.08

Table 5. Panel ARDL estimation results

Variables	Long Run	Short Run	p–value	Long Run	Short Run	p–value	Long Run	Short Run	p-value	Long Run	p-value	Short Run	p-value
Error correlation		–0.196	0.000		–0.271	0.000		–0.151	0.000	–0.943	0.000		
D		0.321	0.000		0.153	0.001		0.130	0.003			–0.143	0.001
D		3.378	0.775		15.402	0.270		–5.110	0.353			–24.823	0.047
D		–0.376	0.100		–0.0677	0.684		–0.025	0.754			–0.409	0.144
TB	–18.678		0.000	–409.87		0.237	–95.372		0.003	–0.383	0.087		
INF	–0.899		0.000	–3.615		0.410	–2.046		0.002	–21.873	0.059		
Constant		10.066	0.000		18.755	0.000		9.296	0.000	0.179	0.954	0.504	0.892
Observation		558			558			558		558		558	
Hausman Test		PMG vs. MG *p*–value: 0.6928			MG vs. DFE *p*–value: 0.1458			DFE vs. PMG *p*–value: 0.5780					

Note: PD is public debt; TB is trade balance; INF is inflation.

that this estimation finds out the significant negative influence of trade deficit on public debt at 5% level in the short run.

Table 6. Comparison of ARDL (PMG) and CS-ARDL estimation results

Variables	ARDL (PMG)	CS-ARDL
Short-run estimation		
Δ *L PD*	Positive, significant	Negative, significant
Δ *TB*	Positive, insignificant	Negative, significant
Δ *INF*	Negative, insignificant	Negative, insignificant
Long-run estimation		
TB	Negative, significant	Negative, significant
INF	Negative, significant	Negative, significant

Note: PD is public debt; TB is trade balance; INF is inflation.

In order to check the reliability and stability of empirical results of the CS-ARDL approach, we use the AMG method, which accounts for cross-sectional dependence and heterogeneity across units.

As can be seen from Table 7, the factors of trade balance, inflation, and lagged public debt have significant effects on the public debt. This result also shows that there are not changes in the impact or statistical significance level, confirming that the model is stable.

Table 7. Robustness check (AMG)

Variables	Coefficients	P-value
INF	–0.3682	0.000
TB	–22.0898	0.000
*PD*_lag1	0.8257	0.000
Constant	8.742	0.000

Note: PD is public debt; TB is trade balance; INF is inflation.

In this last step, we carry out a panel causality test in order to know the causal linkage among the variables in our models, and the results in Table 8 show a bidirectional causal relevance among them.

4. DISCUSSION

Using panel data from 31 Asian economies over 2005–2022 and applying both the autoregressive distributed lag (ARDL) and cross-sectionally augmented ARDL (CS-ARDL) models, this study identifies the key determinants of public debt dynamics in the region.

The central finding is that trade deficits exert a statistically significant negative effect on public debt in both the long run and the short run. In other words, a widening trade deficit is associated with a lower public debt ratio. This result stands in sharp contrast to the conventional twin-deficits hypothesis, which predicts that external imbalances increase fiscal pressure and public borrowing (Ghosh & Ramakrishnan, 2012; Vamvoukas, 1999; Neaime, 2015). Earlier studies, including Ghosh and Ramakrishnan (2012) on developing economies and Neaime (2015) on Lebanon, document a positive linkage between current account deficits and fiscal/budgetary strain, often through higher external borrowing or reduced fiscal space. Their conclusion on the trade deficits and public debt relationship is not the same as our findings, yet our results align more closely with Rao et al. (1994). The discrepancy in research result could be explained by the characteristics of study sample.

The observed negative relationship in Asia can be attributed to the region's distinctive post-2008 external environment and financing patterns. The global financial crisis sharply curtailed Asian exports (falling more than 30% in 2009) as demand collapsed in advanced economies (Edwards & Frankel, 2001), while the COVID-19 pandemic further disrupted supply chains and widened trade deficits through import surges for essential goods (Rao et al., 1994). Despite these shocks, many Asian governments avoided a proportional rise in public debt. Persistent trade deficits were largely financed by

Table 8. Results of panel causality test

Causality direction	*Z*–statistics	p–value	Result	Conclusion
TB → PD	2.075	0.038	Yes	TB cause PD
PD → TB	2.049	0.040	Yes	PD cause TB
INF → PD	2.058	0.040	Yes	INF cause PD
PD → INF	3.331	0.001	Yes	PD cause INF

Note: PD is public debt; TB is trade balance; INF is inflationю Overall, hypotheses H1a, H2a, H3, and H4 are supported, while hypotheses H1b and H2b are not supported due to insignificant short-run effects in the ARDL estimation.

http://dx.doi.org/10.21511/pmf.15(2).2026.08

non-debt-creating inflows (especially foreign direct investment) and accumulated foreign-exchange reserves rather than new sovereign borrowing (Rao et al., 1994). Moreover, the resulting currency depreciation improved competitiveness over time, supporting export recovery and higher tax revenues that helped contain debt accumulation. Prolonged import surpluses did increase demand for foreign currency and weaken domestic currencies, raising the local-currency burden of foreign-denominated debt in some cases; however, the overall effect on total public debt remained negative, confirming that the traditional transmission channels from trade deficits to higher public indebtedness (Ghosh & Ramakrishnan, 2012; Neaime, 2015) do not dominate in the contemporary Asian context.

The negative long-run and short-run impact of trade deficits on public debt, although counterintuitive, is consistent with theoretical channels under specific Asian conditions. A widening trade deficit typically depresses GDP growth and tax revenue, which conventional theory suggests should be offset by higher public borrowing (Ghosh & Ramakrishnan, 2012). Yet our results align more closely with Rao et al. (1994) for ASEAN countries, where sustained external imbalances did not systematically translate into higher public debt ratios. The difference arises because many Asian economies finance trade deficits primarily through equity inflows and reserve drawdowns rather than new sovereign debt, while depreciation-induced export recovery eventually restores fiscal revenue without lasting debt accumulation.

A further notable result is the significantly positive coefficient on the lagged public debt variable in the short-run dynamics. This persistence is also supported by the observed trends in public debt over time. After declining in the early 2000s following the 1997–1998 Asian financial crisis, public debt ratios surged again during the 2008–2009 global financial crisis and rose even more sharply after the COVID-19 pandemic, as governments faced simultaneous collapses in revenue and sharp increases in health and stimulus spending (Tanzi, 2013). South Asia recorded the steepest increase, with the debt-to-GDP ratio rising from approximately 45% in 2000 to nearly 80% in 2022, driven by heavy infrastructure and social-sector borrowing that left the region highly vulnerable to external shocks (Tanzi, 2013; Neaime, 2015). Even the Asia-Pacific subregion, despite starting from the lowest base, exhibited a clear upward trend over the same period. These patterns reveal a debt-dependence trap: borrowing is used not only to finance current deficits but also to service past obligations, progressively elevating sovereign risk (Helmy, 2018). The findings therefore reinforce the urgency of shifting toward growth-oriented policies that reduce reliance on debt-financed expenditure and simultaneously narrow trade imbalances through enhanced domestic production and consumption of local goods.

Additionally, we only find out the negative long-run effect of inflation, which means that if inflation increases, the public debt will decrease in the future. This result is reasonable, and it could be explained by the benefits of a creeping inflation rate, because a range of theories indicate that when the inflation rate is well controlled under 10%, especially less than 3%, it can bring a lot of advantages to economic growth, thereby decreasing the deficit in the national budget. In addition, inflation slightly increases the price of goods. That rise is not strong enough to slow the consumption of goods, but it enhances the revenue of manufacturers, encouraging them to supply more products to maximize their profit. Such decisions boost the reproduction and expansion of businesses, which results in an improvement in GDP, thereby enhancing national budget collection, and the dependence on public debt could be decreased (Mendoza & Ostry, 2008). This result comes from the fact that in the 2005–2022 period, the inflation rate in the Asian area was often under 7.5%. Nevertheless, when the inflation rate exceeds the point of 10 percent and becomes galloping inflation or hyperinflation, the impact of that element will be changed (Congdon, 1987). Our results are consistent with Mendoza and Ostry (2008), who found that fiscal solvency improves with controlled inflation.

Several promising research directions remain. First, splitting the sample into subgroups (low- vs. middle-income economies, commodity exporters vs. manufacturers, and fixed vs. floating exchange-rate regimes) may reveal important heterogeneities hidden in the full sample. Second, incorporating nonlinear or threshold models would allow testing whether the debt-reducing effect of inflation disappears or reverses once inflation exceeds critical levels (e.g., 10-15% annually).

CONCLUSION

This study aims to examine the impact of trade deficits and inflation on public debt in 31 Asian economies over the period 2005–2022 by applying the ARDL and CS-ARDL approaches. Preliminary tests, including unit root, cointegration, and cross-sectional dependence tests, were conducted to ensure the validity of the estimation results. In addition, the Dumitrescu-Hurlin panel causality test was applied to identify the direction of relationships among the variables.

The findings indicate that trade balance and inflation exert statistically significant long-run effects on public debt. Specifically, improvements in the trade balance reduce public debt in the long run, while short-run trade balance movements have no significant impact. Inflation also has a negative long-run effect on public debt, whereas its short-run effect remains statistically insignificant. The causality results further reveal bidirectional relationships among public debt, trade balance, and inflation.

Overall, the results suggest that external balance adjustment and stable inflation conditions play an important role in moderating public debt in Asian economies. Therefore, policymakers should focus on improving trade performance and maintaining effective inflation control frameworks to support long-term fiscal sustainability.

AUTHOR CONTRIBUTIONS

Conceptualization: Huyen Le Thanh, Trang Tran Thi Thu.
Data curation: Trang Tran Thi Thu, Ha Le Hai.
Formal analysis: Huyen Le Thanh, Ha Le Hai.
Methodology: Huyen Le Thanh, Trang Tran Thi Thu, Ha Le Hai.
Supervision: Ha Le Hai.
Writing – original draft: Huyen Le Thanh, Trang Tran Thi Thu, Ha Le Hai.
Writing – review & editing: Huyen Le Thanh, Trang Tran Thi Thu.

AI USAGE STATEMENT

No artificial intelligence tools were used to generate the scientific content of this manuscript. Artificial intelligence tools were used solely for language editing purposes.

REFERENCES

1. Abell, J. D. (1990). Twin deficits during the 1980s: An empirical investigation. *Journal of Macroeconomics, 12*(1), 81-96. https://doi.org/10.1016/0164-0704(90)90057-H
2. Algieri, B. (2013). An empirical analysis of the nexus between external balance and government budget balance: The case of the GIIPS countries. *Economic Systems, 37*(2), 233-253. https://doi.org/10.1016/j.ecosys.2012.11.002
3. Barro, R. J. (1989). The Ricardian approach to budget deficits. *Journal of Economic Perspectives, 3*(2), 37-54. https://doi.org/10.1257/jep.3.2.37
4. Bluedorn, J., & Leigh, D. (2011). Revisiting the twin deficits hypothesis: The effect of fiscal consolidation on the current account. *IMF Economic Review, 59*(4), 582-602. https://doi.org/10.1057/imfer.2011.21
5. Bulut, L. (2011). External debts and current account adjustments. *The B.E. Journal of Macroeconomics, 11*(1). https://doi.org/10.2139/ssrn.1089161
6. Calderón, C., Chong, A., & Loayza, N. (2000). *Determinants of current accounts in developing countries* (Policy Research Working Paper No. 2398). The World Bank. https://doi.org/10.1596/1813-9450-2398
7. Carrasco, C. A. (2016). Causality between external balance and (some) fiscal variables: Preliminary results for the Eurozone. *Economic and Business Letters, 5*(3), 80-86. Retrieved from https://savearchive.zbw.eu/bitstream/11159/466/1/11197-21086-1-PB.pdf
8. Caselli, F., Giovannini, A., & Lane, T. (1999). *Fiscal discipline and the cost of public debt service: Some estimates for OECD countries* (IMF Working Paper No. WP/98/55). University of Chicago Press. Re-

http://dx.doi.org/10.21511/pmf.15(2).2026.08

trieved from https://digitallibrary.un.org/record/262937

9. Chudik, A., & Pesaran, M. H. (2015). Common correlated effects estimation of heterogeneous dynamic panel data models with weakly exogenous regressors. *Journal of Econometrics, 188*(2), 393-420. https://doi.org/10.1016/j.jeconom.2015.03.007

10. Congdon, T. (1987). The link between budget deficits and inflation: Some contrasts between developed and developing countries. In M.J. Boskin, J. Flemming, & S. Gorini (Eds.), *Private saving and public debt* (pp. 72-91). New York, USA: Basil Blackwell.

11. Debelle, G., & Faruqee, H. (1996). *What determines the current account? A cross-sectional and panel approach* (IMF Working Paper No. 96/58). International Monetary Fund. Retrieved from https://ssrn.com/abstract=882958

12. Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling, 29*(4), 1450-1460. https://doi.org/10.1016/j.econmod.2012.02.014

13. Edwards, S., & Frankel, J.F. (2001). Does the current account matter? In *Preventing Currency Crises in Emerging Markets.* University of Chicago Press. Retrieved from https://www.nber.org/system/files/chapters/c10633/c10633.pdf

14. Enders, W., & Lee, B. S. (1990). Current account and budget deficits: Twins or distant cousins? *Review of Economics and Statistics, 72*(3), 373-381. https://doi.org/10.2307/2109344

15. Evans, P. (1989). *Do budget deficits affect the current account?* (Working Paper). Ohio State University.

16. Feldstein, M., & Horioka, C. (1979). *Domestic savings and international capital flows* (NBER Working Paper No. 310). National Bureau of Economic Research. Retrieved from https://www.nber.org/papers/w0310

17. Ferrarini, B., Dagli, S., & Mariano, P. (2023*). Sovereign debt vulnerabilities in Asia and the Pacific* (Economics Working Paper No. 680), Asian Development Bank (ADB). https://dx.doi.org/10.22617/WPS230124-2

18. Fleming, J. M. (1962). Domestic financial policies under fixed and under floating exchange rates. *IMF Staff Papers, 9,* 369-379. Retrieved from https://www.econbiz.de/Record/domestic-financial-policies-under-fixed-and-under-floating-exchange-rates-fleming-marcus/10002191514

19. Garcia, A., & Ramajo, J. (2004). Budget deficit and interest rates: Empirical evidence for Spain. *Applied Economics Letters, 11*(11), 715-718. https://doi.org/10.1080/1350485042000236593

20. Ghosh, A., & Ramakrishnan, U. (2012). Current account deficits: Is there a problem? *IMF Finance & Development, 49*(2), 48-49. Retrieved from https://www.imf.org/external/pubs/ft/fandd/basics/pdf/ghosh_current-account-deficits.pdf

21. Helmy, H. E. (2018). The twin deficit hypothesis in Egypt. *Journal of Policy Modeling, 40*(2), 328-349. https://doi.org/10.1016/j.jpolmod.2018.01.009

22. 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

23. Kalou, S., & Paleologou, S. M. (2011). The twin deficits hypothesis: Revisiting an EMU country. *Journal of Policy Modeling, 34*(2), 230-241. https://doi.org/10.1016/j.jpolmod.2011.06.002

24. Khalid, A. M., & Guan, T. W. (1999). Causality tests of budget and current account deficits: Cross-country comparisons. *Empirical Economics, 24,* 389-402. https://doi.org/10.1007/s001810050062

25. Kim, C.-H., & Kim, D. (2006). Does Korea have twin deficits? *Applied Economics Letters, 13*(10), 675-680. https://doi.org/10.1080/13504850500404910

26. Kouassi, E., Mougoue, M., & Kymm, K. (2004). Causality tests of the relationship between the twin deficits. *Empirical Economics, 29,* 503-525. https://doi.org/10.1007/s00181-003-0181-5

27. Magazzino, C. (2012). Fiscal policy, consumption and current account in the European countries. *Economic Bulletin, 32*(2), 1330-1344. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2333404

28. Mendoza, E. G., & Ostry, J. D. (2008). International evidence on fiscal solvency: Is fiscal policy "responsible"? *Journal of Monetary Economics, 55*(6), 1081-1093. https://doi.org/10.1016/j.jmoneco.2008.06.003

29. Miller, S. M., & Russek, F. S. (1989). Are the deficits really related? *Contemporary Policy Issues, 7*(4), 91-115. https://doi.org/10.1111/j.1465-7287.1989.tb00577.x

30. Milne, E. (1977). *The fiscal approach to the balance of payments*. Banca Monte dei Paschi di Siena.

31. Neaime, S. (2015). Twin deficits and the sustainability of public debt and exchange rate policies in Lebanon. *Research in International Business and Finance, 33,* 127-143. https://doi.org/10.1016/j.ribaf.2014.09.004

32. Nkoro, E., & Uko, A. K. (2016). Autoregressive distributed lag (ARDL) cointegration technique: Application and interpretation. *Journal of Statistical and Econometric Methods, 5*(4), 63-91. Retrieved from https://www.scienpress.com/Upload/JSEM/Vol%205_4_3.pdf

33. Papadogonas, T., & Stournaras, Y. (2006). Twin deficits and financial integration in EU member-states. *Journal of Policy Modeling, 28,* 595-602. https://doi.org/10.1016/j.jpolmod.2006.02.002

34. Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels* (Cambridge Working Papers in Economics No. 0435). University of Cambridge. https://doi.org/10.17863/CAM.5113

35. Rao, V. V. B., Dacuila, T. C., & Pau, W. Y. (1994). *ASEAN external debt perspectives*. Times Academic

Press. Retrieved from https://www.nlb.gov.sg/main/book-detail?cmsuuid=afcc74be-65af-4fcc-80d4-6f0f91040c2a

36. Rault, C., & Afonso, A. (2009). Bootstrap panel Granger-causality between government budget and external deficits for the EU. *Economic Bulletin, 29*(2), 1027-1034. Retrieved from http://hdl.handle.net/10400.5/25655

37. Rosensweig, J. A., & Tallman, E. W. (1993). Fiscal policy and trade adjustment: Are the deficits really twins? *Economic Inquiry, 31*(4), 580-594. https://doi.org/10.1111/j.1465-7295.1993.tb00892.x

38. Sobel, R. S., Stroup, R. L., Macpherson, D. A., & Gwartney, J. D. (2006). *Understanding macroeconomics*. Thomson South-Western.

39. Stock, M. (2000). *The international handbook of corporate finance*. Chartered Institute of Bankers.

40. Tanzi, V. (2013). *Dollars, euros, and debt* (pp. 109-115). Palgrave Macmillan.

41. Tanzi, V., & Blejer, M. I. (1988). Public debt and fiscal policy in developing countries. In J. K. Arrow & M. J. Boskin (Eds.), *The economics of public debt* (pp. 230-263). International Economic Association. https://doi.org/10.1007/978-1-349-19459-9_8

42. Vamvoukas, G. A. (1999). The twin deficits phenomenon: Evidence from Greece. *Applied Economics, 31*(9), 1093-1100. https://doi.org/10.1080/000368499323571

http://dx.doi.org/10.21511/pmf.15(2).2026.08

APPENDIX A

Table A1. Descriptive statistics

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
PD	Public debt as a percentage of GDP	558	48.75748	38.31494	1.540992	227.3443
TB	Trade balance as a percentage of GDP	558	−0.012771	0.176366	−0.70407	0.477687
INF	Inflation (CPI)	558	5.184588	5.821268	−2.3	72.3

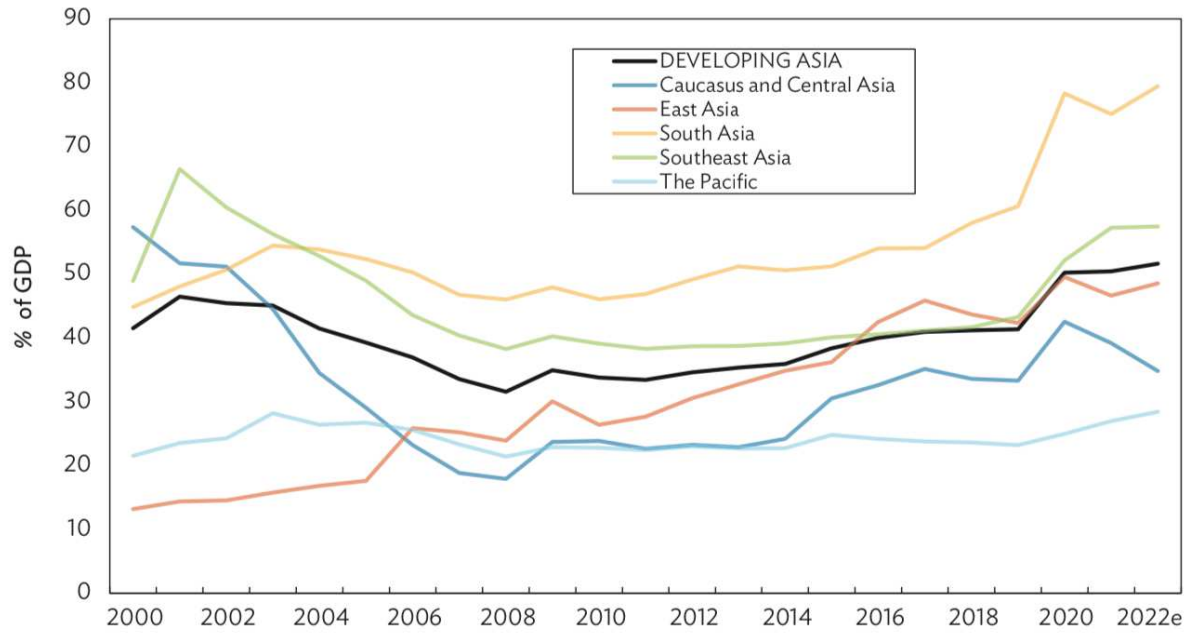
Note: PD is public debt; TB is trade balance; INF is inflation.

Table A2. Descriptive statistics by year

Year		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Obs		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
PD	Mean	52.60	45.41	41.20	38.84	43.42	41.27	40.96	42.78	44.02	44.45	48.37	52.09	51.82	51.82	53.29	64.93	62.65	58.07
	Std. Dev.	44.16	34.35	31.90	30.23	32.70	32.71	35.04	37.34	39.56	40.38	39.16	37.52	38.37	38.37	39.63	45.03	43.60	42.03
	Min	6.85	5.30	4.00	3.20	4.73	4.98	4.44	3.01	2.13	1.54	4.65	13.49	12.92	12.92	11.63	11.70	8.67	2.92
	Max	227.34	143.16	135.45	143.28	158.07	165.75	177.91	185.03	189.14	192.85	189.86	193.93	195.73	195.73	199.88	220.67	218.10	214.27
TB	Mean	0.00	0.01	0.00	−0.02	−0.01	0.00	0.00	−0.01	−0.02	−0.01	−0.03	−0.02	−0.01	−0.01	−0.01	−0.02	−0.02	−0.02
	Std. Dev.	0.18	0.20	0.23	0.23	0.18	0.19	0.21	0.21	0.20	0.17	0.13	0.13	0.15	0.15	0.13	0.11	0.17	0.19
	Min	−0.41	−0.47	−0.70	−0.64	−0.45	−0.44	−0.46	−0.48	−0.52	−0.42	−0.36	−0.32	−0.38	−0.38	−0.32	−0.27	−0.47	−0.38
	Max	0.33	0.37	0.40	0.42	0.32	0.35	0.46	0.48	0.43	0.37	0.27	0.27	0.30	0.30	0.29	0.31	0.35	0.36
INF	Mean	6.22	7.02	6.95	10.99	4.35	5.33	6.81	4.61	4.26	4.28	3.27	3.39	3.10	3.10	2.88	2.96	4.76	9.05
	Std. Dev.	6.74	9.15	5.80	7.26	4.88	2.88	4.25	3.42	2.98	3.11	3.63	3.07	3.01	3.01	3.33	3.57	4.20	12.42
	Min	−0.30	0.30	0.00	1.40	−2.20	−0.70	−0.30	−0.90	−0.50	−0.30	−1.50	−0.80	0.40	0.40	−2.10	−2.30	−0.60	1.90
	Max	37.00	53.20	30.80	28.00	19.60	10.50	18.70	13.90	10.60	12.90	15.50	12.80	16.30	16.30	15.20	12.30	19.60	72.30

Note: PD is public debt; TB is trade balance; INF is inflation.

Source: Ferrarini et al. (2023).



Note: e = estimate, GDP = gross domestic product.

Figure A1. Government debt

APPENDIX B. List of countries included in the sample

Armenia, Azerbaijan, Bahrain, Bangladesh, Cambodia, China, Cyprus, Georgia, India, Indonesia, Iraq, Israel, Japan, Jordan, Kazakhstan, Kuwait, Kyrgyz Republic, Malaysia, Mongolia, Nepal, Oman, Pakistan, the Philippines, Russia, Saudi Arabia, Singapore, Tajikistan, Thailand, Turkey, Vietnam, and South Korea.

http://dx.doi.org/10.21511/pmf.15(2).2026.08