



Inflation, Economic Growth, and Household Consumption in ASEAN-10: A Longitudinal Panel Analysis, 1987–2025

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Abstract

This study examines the historical performance of consumer-price inflation and the association of real economic growth with real household consumption across ten ASEAN economies during 1987–2025. The analysis uses annual World Development Indicators (WDI) data retrieved in October 2026. Descriptive statistics cover an unbalanced universe of 390 country-year records; the two-way fixed-effects household-consumption model comprises 308 complete records from nine economies because Myanmar lacks the required household consumption series. Inflation comparisons are additionally presented for the common 1996–2019 period. In that window, mean annual inflation ranges from 0.36% in Brunei Darussalam to approximately 16.24% in Lao PDR. In the Philippines, the consumer price index rose by approximately 8.14 times from 1987 to 2025, equivalent to a 5.67% annualized change between observed index endpoints. The baseline fixed-effects coefficient for real GDP per capita growth is positive ($\beta = 0.773$), whereas the contemporaneous CPI inflation coefficient is also positive ($\beta = 0.158$). Bootstrap and alternative-covariance checks support the baseline associations; however, the inflation estimate is not robust to using lagged inflation or restricting the panel to 2001–2016. Exploratory residual cross-country dependence diagnostics are sensitive to the inclusion of year fixed effects. The findings support distinguishing economic output, consumer-price dynamics, and realized household consumption in regional development assessments, without implying causal effects or uniform household welfare gains.

Keywords: *ASEAN-10; consumer price inflation; economic growth; real GDP per capita; household consumption; panel data; World Development Indicators*

1. Introduction

Inflation and economic growth are central to the interpretation of national economic performance, yet neither indicator alone describes how households experience development. Output may rise while consumer prices increase, and a lower annual inflation rate need not reverse the cumulative elevation of the price level. Conversely, growing national production can coincide with advances in real consumption even when nominal prices continue to rise. These distinctions matter in Southeast Asia, where economies differ markedly in production structures, demographic transitions, external trade exposure, and historical price stability. A careful comparative analysis therefore requires separate measures of aggregate output, output per resident, consumer prices, and actual inflation-adjusted consumption.

The conceptual motivation for the present study originated in a widely circulated comparison of consumer purchases from different years. Such comparisons can make cumulative price increases visible, but an anecdotal basket cannot substitute for a nationally representative, consistently compiled consumer price index. A photograph or receipt with uncertain provenance is especially unsuitable as primary quantitative evidence. Accordingly, the present research does not use any social-media receipt, estimated shopping basket, or reconstructed historical price as an observation. Instead, it uses internationally disseminated macroeconomic indicators, preserving their measurement definitions and source limitations.

The World Development Indicators (WDI) offers annual consumer-price inflation, CPI levels, constant-price gross domestic product (GDP) series, and household and nonprofit institutions serving households (NPISH) consumption expenditure. In WDI usage, CPI inflation describes percentage changes in a representative price index; real GDP per capita growth

describes changes in price-adjusted production per resident; and real household consumption per capita growth describes changes in price-adjusted household and NPISH final consumption divided by population (World Bank, 2026a, 2026b, 2026c). Although related, these series should not be conflated. GDP per capita is not an average wage, while household consumption is neither median disposable income nor an indicator of the distribution of economic gains.

An ASEAN perspective is analytically worthwhile for two reasons. First, common external disruptions—including financial crises, exchange-rate pressures, pandemics, and commodity-price shocks—have affected the region in different ways. In the Philippines, for example, year-over-year changes in oil prices and US dollar strength have been associated with changes in new business formation (R. G. O. Atento et al., 2026). Second, countries followed different development trajectories, so equivalent changes in measured output or inflation may have different implications for consumption. Evidence on PPP-adjusted income convergence across ASEAN-10 and selected Asian comparators similarly describes catch-up growth that is empirically present but structured and heterogeneous across economies (Balingit et al., 2026). A design that preserves observations where available, rather than dropping countries with incomplete historical series, is well suited to evaluating heterogeneous developments. The present ASEAN-10 definition comprises Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam; Timor-Leste is excluded to maintain the historical comparative frame selected for this study.

The inquiry focuses on the interval 1987–2025, a 39-calendar-year window containing 390 possible country-year records. As many historical series do not begin in the same year, most analyses use an unbalanced panel with clearly declared complete-case rules. One exception is the common 1996–2019 inflation comparison, designed to avoid ranking countries on averages calculated over dissimilar decades. The regression sample is necessarily narrower: 308 complete country-year observations in nine economies. Myanmar participates in descriptive analysis but not in the main household-consumption regression because the relevant variable is unavailable in the WDI data used.

The specific empirical contribution is to examine economic growth and inflation jointly in relation to real household consumption, without treating contemporaneous statistical association as evidence of causation. This differs from studies that use growth itself as the sole outcome, since household final consumption captures a distinct component of realized material activity. The comparison is modest in its identification claims: national accounts relationships, demand shocks, common economic influences, and nonrandom missing observations can generate observed co-movement. The resulting estimates therefore should be read as conditional associations, not structural policy effects.

1.1 Research questions and objectives

The principal question is: To what extent were annual real GDP per capita growth and consumer-price inflation associated with annual real household and NPISH consumption per capita growth in ASEAN economies between 1987 and 2025? The study further asks how inflation levels and volatility differed across countries on identical calendar years, whether historical CPI increases in the Philippines differ from the arithmetic average inflation rate, and whether the regression results change across alternative temporal and sample specifications.

The objectives are to (a) describe inflation and real macroeconomic growth for ASEAN-10; (b) establish comparable cross-country inflation statistics for 1996–2019; (c) characterize changes in the Philippine price index and real per-capita macroeconomic series; (d) estimate two-way fixed-effects associations with real consumption growth; and (e) examine robustness using country exclusions, a balanced historical subsample, lagged inflation, and alternative standard errors.

1.2 Hypotheses and scope

H1 proposes a positive association between annual real GDP per capita growth and annual real household consumption per capita growth after accounting for country and calendar-year effects. H2 proposes a negative conditional association between annual CPI inflation and real household consumption per capita growth. The lagged-inflation and sample-restriction exercises are treated as specification checks rather than additional confirmatory hypotheses. The research excludes comparisons between political administrations, individual commodity baskets, core inflation, and detailed wage purchasing power; each requires a different operational design or additional data.

2. Review of Related Literature and Conceptual Framework

2.1 Inflation, stability, and economic performance

A foundational difficulty in inflation research is that associations are highly sensitive to the level, persistence, and distribution of inflation. Sarel (1996) reported nonlinear inflation–growth relationships and a threshold in his historical multi-country data. Bruno and Easterly (1998) stressed the role of extreme inflation crises in shaping aggregate correlations, and their results cautioned against extrapolating from crisis episodes to ordinary rates of price increase. Comparative WDI evidence for China and the Philippines over 1987–2024 likewise found that threshold models improved fit but produced country-specific thresholds rather than a single common threshold at which inflation uniformly becomes growth-reducing (Chen & Atento, 2026). These findings do not establish a universal policy threshold for the present ASEAN sample. They instead provide reasons to report means alongside volatility and to inspect whether exceptional episodes disproportionately influence country comparisons.

Inflation also has effects that extend beyond real aggregate production. Easterly and Fischer (2001) investigated the relationship between inflation and the economic position of poorer populations, raising the possibility that price instability interacts with vulnerability and macroeconomic institutions. Walsh and Yu (2012) found that the relationship between inflation and inequality differed for food and nonfood prices and across household and production contexts. Such evidence indicates that headline inflation may conceal important distributional differences. Since the current WDI panel contains national aggregate consumption rather than household microdata or separate food-price indices, it cannot directly test those distributional mechanisms.

A further conceptual distinction separates the inflation rate from the price level. If the CPI rises from one year to the next, prices on average have risen even when the annual rate of increase is lower than in the preceding year. Reporting an endpoint CPI ratio and an annualized index change makes long-run price accumulation understandable while retaining a consistent reference period. Cross-country CPI index levels themselves are not suitable for ranking national price levels because index bases and consumer baskets are not harmonized measures of purchasing power parity (World Bank, 2026a). Accordingly, cross-country comparisons emphasize rates within common calendar windows, not raw CPI levels.

2.2 Growth, aggregate consumption, and household welfare

Economic growth and household consumption are related but distinct dimensions of development. The expenditure identity for GDP includes private consumption alongside investment, government consumption, and net exports. Consequently, a positive GDP–consumption association is economically plausible, but it may also reflect accounting connections and concurrent business-cycle conditions. Real GDP per capita growth measures price-adjusted output per resident, whereas the household consumption series measures the growth of a specific real expenditure component per resident. The present model does not interpret one series as a direct measure of what each household earns or can afford.

Dollar and Kraay (2002) documented a positive historical relationship between average income growth and income growth among poorer groups in a broad international sample. Ravallion (2001), however, emphasized that aggregate growth averages can mask considerable cross-country and within-country variation in outcomes for disadvantaged households. These perspectives are complementary rather than mutually exclusive: a positive national relationship is compatible with unequal distribution of its benefits. Country-specific evidence from Brunei, Malaysia, the Philippines, and Singapore similarly suggests that macroeconomic growth and stability, while necessary, are insufficient for achieving equitable child-nutrition outcomes (Quinto & Atento, 2025). This is particularly important when the dependent variable is average real consumption per person, which may grow even when selected households experience deteriorating financial conditions.

The household consumption indicator used here includes NPISH expenditure and is obtained from national accounts rather than from a representative salary survey. It is therefore a useful macroeconomic proxy for realized real consumption, but not a sufficient welfare index. More direct study of affordability would additionally require nominal and real wages, disposable household incomes, poverty metrics, food and housing expenditure shares, and potentially subnational or household-group-specific inflation. Those data needs explain why wage purchasing power remains a proposed extension rather than a reported outcome of this research.

2.3 ASEAN comparative analysis and fixed-effects identification

Panel data permit examination of annual variation within countries while retaining cross-country context. Country fixed effects remove constant differences among the observed economies; calendar-year fixed effects absorb shocks common to countries in a particular year. This is preferable to interpreting a simple pooled cross-country correlation as a direct economic law. Two-way fixed-effects designs with country and year effects have also been applied to WDI household final consumption expenditure per capita growth in ASEAN-5 economies, where internet access did not significantly predict household consumption growth (Lantin-Magana & Atento, 2026). Nonetheless, a two-way fixed-effects model cannot remove unobserved country-specific shocks that vary over time, measurement differences, or simultaneous determination of GDP components and spending. No instrumental-variable strategy, natural experiment, or structural identification design is employed in this paper.

Macroeconomic panels also create problems for conventional inference. Country residuals can remain correlated within an economy over successive years, while regional exposure may generate dependence across economies. Cameron and Miller (2015) and MacKinnon, Nielsen, and Webb (2023) explain why cluster-robust standard errors and few-cluster sensitivity checks matter for this type of analysis. Driscoll and Kraay (1998) provide a covariance estimator designed for forms of temporal and cross-sectional dependence. Pesaran (2004) introduced residual-based cross-section dependence diagnostics, but Juodis and Reese (2022) show that tests based on residual correlations may be biased when models include estimated time effects. These qualifications motivate the supplementary diagnostic approach used here.

2.4 Synthesis and analytical framework

The literature supports two qualified expectations. First, higher real production per resident should, on average, coincide with higher real consumption per resident, even though neither the strength nor the distribution of the relationship is predetermined. Second, inflation may interact with consumption through demand, macroeconomic instability, nominal adjustment, and distributional channels; the net contemporaneous correlation is not unambiguously negative in a model that already controls for real output growth. H2 is therefore a substantively meaningful directional proposition, but its rejection would not imply that higher inflation benefits households.

The operational framework specifies real household and NPISH consumption expenditure per capita growth as the dependent variable. Real GDP per capita growth and annual CPI inflation are the explanatory measures. Country and year effects are included to account for time-invariant differences and common shocks. Descriptive measures, correlations, and alternative panel specifications are reported alongside the preferred model. This framework is explicitly associational, subject to the conceptual overlap between GDP and consumption, observational endogeneity, data comparability, and unequal coverage.

3. Methodology

3.1 Research design

The study adopts a retrospective, comparative quantitative design using an annual country-year longitudinal panel. It is observational and nonexperimental. The analysis covers 1987–2025, comprising 39 years and ten ASEAN countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. Timor-Leste is excluded by design to preserve the established ASEAN-10 analytical frame.

The WDI data were downloaded in CSV format in October 2026 and processed programmatically in Python. The raw download is preserved separately, and all transformations can be reproduced with the accompanying analysis scripts. No survey sampling is involved; the analytic units are all country-year records present within the predefined universe and observation period.

3.2 Data source and operationalization

All core macroeconomic indicators were sourced from the World Bank World Development Indicators (WDI). Annual consumer inflation follows the CPI; the dependent variable follows the national-accounts concept of real household and

NPISH final consumption expenditure per capita. WDI documentation identifies both growth series as annual percentage changes in constant-price series.

Construct	WDI indicator code	Role / measurement
Inflation, consumer prices	FP.CPI.TOTL.ZG	Explanatory; annual %
Consumer price index	FP.CPI.TOTL	Descriptive; country-specific index
Real GDP per capita growth	NY.GDP.PCAP.KD.ZG	Explanatory; annual %
Real household + NPISH consumption per capita growth	NE.CON.PRVT.PC.KD.ZG	Dependent; annual %
Real GDP growth	NY.GDP.MKTP.KD.ZG	Context; annual %
Real GDP per capita	NY.GDP.PCAP.KD	Long-run level/trend; constant 2015 US\$
Real household + NPISH consumption per capita	NE.CON.PRVT.PC.KD	Long-run level/trend; constant 2015 US\$

Real GDP per capita and household consumption per capita levels are reported in constant 2015 US\$, while their real annual growth rates are percentages calculated from constant-price series. Consequently, CPI inflation will not be subtracted from those real growth rates. Neither nominal wages nor income inequality are measured by this core dataset; such claims are outside the primary empirical scope.

3.3 Panel completeness and inclusion rules

The country-year universe contains 390 rows (10 economies $\times$ 39 years). A record enters a given statistical test only when all variables required by that test are available. Missing entries remain missing, not zero; missing values are not interpolated or imputed. Comparable unbalanced WDI country-year panels have been used in ASEAN macroeconomic research where indicator coverage differs across economies and years (R. G. Atento, 2026). We retain Myanmar for the inflation and GDP analyses although the WDI data used contain no observations for the dependent household-consumption indicator.

The resulting observation counts are: 390 observations for GDP per capita growth; 365 jointly observed CPI-inflation and real-GDP-per-capita-growth records; and 308 records complete on inflation, real GDP per capita growth, and real consumption per capita growth. The baseline household-consumption regression therefore includes nine countries. An auxiliary balanced panel contains nine countries observed annually from 2001–2016 (144 rows). The inflation comparison uses 1996–2019, which supplies 24 years for each of the ten countries.

Because the incomplete years vary by country and indicator, comparisons of historical means based on each country's longest series are distinguished from comparisons based on identical calendar years. Coverage patterns are tabulated by economy (Table 1), and inferences are explicitly limited to the observed country-years. There is no assumption that missing observations are missing completely at random.

3.4 Variable construction and descriptive measures

The following descriptive statistics are reported by economy and period: valid observation count, first/last observed year, arithmetic mean, median, standard deviation, minimum, maximum, and selected shock-period comparisons. For national CPI indices, a common reference year can be used to display within-country changes; raw CPI levels from differing national index bases are not interpreted as cross-country price-level rankings.

$$\text{Annualized CPI change (\%)} = 100 \times [(CPI_{\text{end}} / CPI_{\text{start}})^{(1 / \Delta \text{years}}) - 1]$$

The exponent uses the exact number of annual intervals between the two CPI observations. For complete sequences of reported inflation rates, cumulative price change may alternatively be computed by chaining the annual factors $(1 + \text{inflation}/100)$, provided the start and end points and number of intervals are disclosed. These compounded quantities are distinct from the arithmetic mean of annual inflation rates.

For visual comparison of real-output and real-consumption levels, each country series may be rebased to 100 at the first mutually observed year (or at a declared common reference year where coverage permits). Index charts are interpreted as relative within-country evolution, not direct comparisons of welfare levels.

3.5 Panel regression specification

The baseline estimation is a two-way fixed-effects ordinary least squares model:

$$\text{ConsumptionGrowth}_{it} = \alpha_i + \lambda_t + \beta_1 \text{GDPpcGrowth}_{it} + \beta_2 \text{Inflation}_{it} + \varepsilon_{it}$$

Here i indexes economy and t indexes calendar year; α_i and λ_t represent country and year effects, respectively. This country-and-year specification follows recent ASEAN panel applications that use two-way fixed effects to account for time-invariant national characteristics and common temporal shocks (Quinto et al., 2026). The coefficients β_1 and β_2 are estimated partial associations measured in percentage points of the consumption-growth rate for a one-percentage-point difference in the respective regressor, conditional on the model. The estimates do not, without stronger identification assumptions, establish causation.

For lag sensitivity, the contemporaneous inflation variable is replaced by inflation in year $t-1$ while retaining contemporaneous real GDP per capita growth. Lagged-model observations are included only when the preceding inflation value is observed. Lagged two-way fixed-effects specifications have similarly been used in ASEAN panel research to examine the temporal persistence of country-level associations (Patron et al., 2026). The comparison of contemporaneous and lagged models is descriptive, not a claim to have solved simultaneity.

3.6 Statistical inference, diagnostics, and sensitivity analysis

Primary regressions include country- and calendar-year fixed effects with country-clustered standard errors. Because the outcome model contains only nine country clusters, conventional cluster-robust p -values may be unreliable. Accordingly, the analysis supplements them with restricted wild-cluster bootstrap tests (MacKinnon & Webb, 2017, 2018) using all $2^9 = 512$ Rademacher sign assignments for the nine country clusters; the bootstrap is re-studentized in each replication. The bootstrap inference is reported alongside conventional small-sample-corrected clustered inference, not as an absolute guarantee of finite-sample validity.

Model diagnostics include residual distribution and heteroskedasticity checks, country-specific serial correlation, and exploratory residual cross-country correlation. The unbalanced-panel pairwise Pesaran-style CD statistic is interpreted cautiously because period effects can distort the usual CD test. Driscoll–Kraay covariance estimates using lags two through five complement the country-clustered and exact wild-cluster bootstrap sensitivity analyses. These procedures evaluate uncertainty rather than establish causal identification.

Sensitivity specifications include country fixed effects without year effects; exclusion of Cambodia or Lao PDR; inflation winsorization at the sample 1st and 99th percentiles; a common 2001–2016 balanced sample; one-year lagged inflation; and leave-one-country-out re-estimation. Additional checks examine major crisis-year exclusions, influential observations, simultaneous winsorization of the three growth/inflation measures, and an exploratory interacted-slope model. Further sensitivity analyses evaluate each country's exclusion, country-and-year double-clustered uncertainty, and alternative lag timing. Robustness is evaluated by comparing both effect magnitudes and uncertainty, rather than by counting only statistically significant coefficients.

3.7 Ethics, reproducibility, and limitations

The study uses publicly compiled, aggregate country-level statistical data and does not involve identifiable individual participants. The cleaned country-year panel, data dictionary, sample-inclusion rules, analytic code, and the WDI retrieval date are retained for reproducibility. Values reflect the WDI release available at retrieval; later revisions to historical series are not combined with the present data.

Limits include heterogeneity of source statistics, historical national-accounts revisions, data gaps concentrated in particular countries/years, lack of household distributional indicators, the small number of country clusters, potential common shocks not fully absorbed by year effects, and endogeneity between production and consumption. Interpretation is restricted to observed macroeconomic associations, not household welfare causation or presidential-policy effects.

4. Results

This section reports descriptive statistics, common-period comparisons, Philippine historical trends, bivariate correlations, panel regression estimates, robustness checks, and residual diagnostics calculated from the World Development Indicators (WDI) data retrieved for this study. All observations and sample sizes refer to this data release; the analyses are observational and no missing data were imputed.

4.1 Country coverage and analytical sample

The study encompasses ten ASEAN economies over 39 calendar years (1987–2025), representing 390 possible country-year records. Real GDP per capita growth is reported for all 390 records. Annual CPI inflation and real GDP per capita growth are jointly available for 365 records, while the complete sample for inflation, real GDP per capita growth, and real household consumption expenditure per capita growth consists of 308 observations. As Table 1 shows, Myanmar lacks observations for the household-consumption outcome in the WDI data used; it consequently contributes to descriptive and GDP–inflation comparisons but not to consumption–growth regressions.

Table 1. WDI data coverage by economy, 1987–2025

Economy	CPI inflation: n (years)	GDPpc growth: n	Consumption growth: n (years)	Complete 3: n
Brunei	39 (1987–2025)	39	36 (1990–2025)	36
Cambodia	31 (1995–2025)	39	32 (1994–2025)	31
Indonesia	39 (1987–2025)	39	39 (1987–2025)	39
Lao PDR	37 (1989–2025)	39	16 (2001–2016)	16
Malaysia	39 (1987–2025)	39	39 (1987–2025)	39
Myanmar	33 (1987–2019)	39	0 (—)	0
Philippines	39 (1987–2025)	39	39 (1987–2025)	39
Singapore	39 (1987–2025)	39	39 (1987–2025)	39
Thailand	39 (1987–2025)	39	39 (1987–2025)	39
Viet Nam	30 (1996–2025)	39	31 (1995–2025)	30

Note. Complete 3 means nonmissing inflation, real GDP per capita growth, and real household consumption per capita growth in the same year. Missing country-year observations were retained as missing. The nine-country common panel for 2001–2016 contains 144 complete records.

4.2 Comparative inflation performance, 1996–2019

To avoid ranking economies using unequal historical windows, the principal country comparison uses 1996–2019, the 24-year period with full inflation coverage for all ten economies. Table 2 reports considerable variation across countries. Lao PDR and Myanmar display the highest arithmetic mean annual inflation (16.24% and 16.22%, respectively), whereas Brunei exhibits the lowest (0.36%). The Philippine mean is 4.37%, above Thailand, Malaysia, Singapore, and Brunei but below Cambodia, Viet Nam, Indonesia, Myanmar, and Lao PDR.

Table 2. CPI inflation in the common 1996–2019 period (annual %, 24 observations per country)

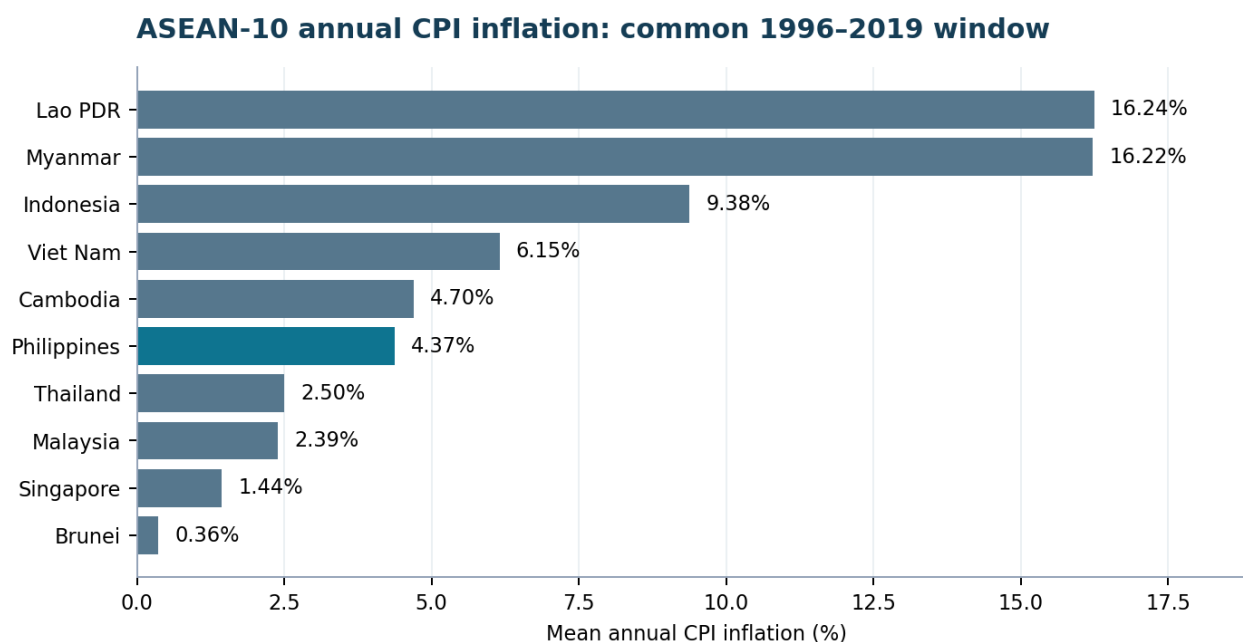
Economy	Mean	Median	SD	Maximum
Lao PDR	16.24	6.86	29.55	125.27
Myanmar	16.22	9.10	15.81	57.07
Indonesia	9.38	6.38	11.20	58.45
Viet Nam	6.15	4.90	5.45	23.12
Cambodia	4.70	3.44	5.45	24.10
Philippines	4.37	4.10	2.14	9.23
Thailand	2.50	2.04	2.27	7.99
Malaysia	2.39	2.10	1.30	5.44

Economy	Mean	Median	SD	Maximum
Singapore	1.44	0.98	1.83	6.64
Brunei	0.36	0.33	1.03	2.08

Note. Arithmetic statistics calculated from 24 annual CPI inflation percentages per country. SD = sample standard deviation. Large crisis-year observations influence mean inflation for some economies.

The distributions are not adequately represented by averages alone. Lao PDR has a median inflation rate of 6.86%, far below its 16.24% mean, and a standard deviation of 29.55 percentage points. Myanmar likewise shows a mean of 16.22%, median of 9.10%, and standard deviation of 15.81 percentage points. By contrast, Philippine inflation in the same years has a median of 4.10% and a standard deviation of 2.14 percentage points. These differences indicate substantial heterogeneity in inflation volatility and extreme price episodes.

Figure 1. ASEAN-10 mean annual CPI inflation, identical 1996–2019 comparison period



Note: Each country contributes 24 annual observations. Source: WDI extract; author calculations.

4.3 Long-run growth and household consumption across economies

Table 3 extends the descriptive view to real GDP per capita growth and real household consumption per capita growth, using all observed years from 1987 to 2025 for each country and variable. Since consumption observations are missing for some economies and periods, these means describe each economy's available series rather than a common sample. Viet Nam records an annual average GDP per capita growth rate of 5.16% (39 observations), while the Philippines averages 2.55% (39 observations). Philippine real household consumption per capita growth averages 2.54% over the same 39 years. Lao PDR has a consumption-growth mean of 6.58%, but this value relies on just 16 observations (2001–2016); it is therefore not directly comparable with a complete 39-year mean.

Table 3. Long-run means of real GDP per capita and real household consumption per capita growth, available observations in 1987–2025

Economy	GDPpc n	GDPpc mean (%)	Consumption n	Consumption mean (%)
Brunei	39	-1.28	36	2.77
Cambodia	39	3.56	32	3.48
Indonesia	39	3.45	39	3.34

Economy	GDPpc n	GDPpc mean (%)	Consumption n	Consumption mean (%)
Lao PDR	39	4.06	16	6.58
Malaysia	39	3.39	39	4.23
Myanmar	39	4.75	0	—
Philippines	39	2.55	39	2.54
Singapore	39	3.75	39	2.96
Thailand	39	3.51	39	3.58
Viet Nam	39	5.16	31	4.83

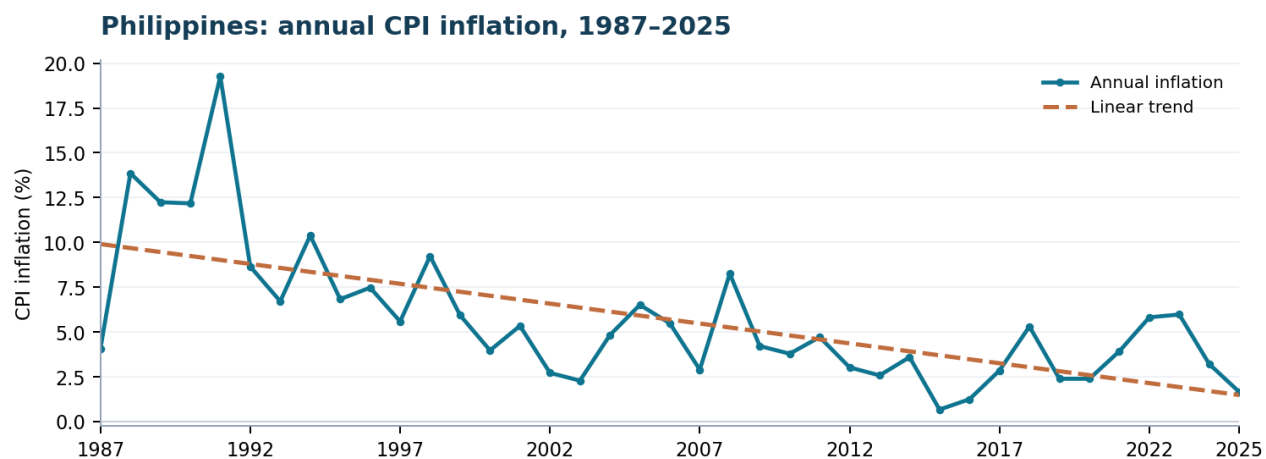
Note. Country-specific available-sample averages; differences in n and observed years mean these are not standardized international rankings. Household consumption includes nonprofit institutions serving households (NPISH); it is not an estimate of median income or household wages.

4.4 Philippine historical patterns

The Philippines records mean annual CPI inflation of 5.70% from 1987 through 2025. Its CPI level increased by a factor of 8.14 between the observed 1987 and 2025 indices (a cumulative increase of 714.04%). Annualizing the change across 38 index-to-index intervals gives 5.67%. This differs slightly from compounding the 39 reported inflation rates for 1987–2025 (5.63%) because the latter includes the 1986–1987 inflation observation. For the 2002–2025 index comparison, cumulative CPI inflation is 135.64%, equivalent to 3.80% per year across 23 intervals.

A linear trend fitted to Philippine annual inflation is negative (slope = -0.222 percentage points per year; HAC standard error with three lags, $p = 0.0007$; 95% CI [-0.344, -0.100]). A post hoc least-squares split at 1999 divides the series into averages of 9.71% (1987–1998) and 3.91% (1999–2025); this is an exploratory description, not a causal regime comparison or an independently validated structural break. The residual CUSUM test for the linear-trend specification does not reject at the 5% level ($p = .563$), and does not establish an official break year.

Figure 2. Philippine annual CPI inflation and fitted linear trend, 1987–2025



Dashed line is descriptive; HAC (3 lags) trend inference is reported in the text. Source: WDI extract.

In the level series, real GDP per capita rises from approximately US\$1,576.97 to US\$4,065.89 in constant 2015 dollars over 1987–2025, a factor of 2.58 (annualized growth: 2.52%). Real household consumption per capita increases from 1,111.86 to 2,904.87 in the corresponding level series, a factor of 2.61 (annualized growth: 2.56%). These are changes in national-accounts averages, not direct evidence that a typical household experienced identical gains.

Table 4. Philippine macroeconomic indicators in selected historical windows (arithmetic annual means, %)

Historical window	Years	CPI inflation	Real GDPpc growth	Real consumption growth
Asian financial crisis (1997–1999)	3	6.92	0.16	2.00
Global financial crisis (2008–2009)	2	6.24	1.08	1.37
Pre-pandemic reference (2015–2019)	5	2.50	5.19	4.85
COVID-19 (2020–2021)	2	3.16	-2.89	-2.87
Recent inflation period (2022–2025)	4	4.17	4.96	4.96

Note. Windows are descriptive and vary in duration. The 2020–2021 two-year mean masks the sharp 2020 contraction and partial 2021 rebound. Values are not presidential-administration comparisons.

The pre-pandemic 2015–2019 reference period shows Philippine real GDP per capita growth averaging 5.19% and real consumption growth averaging 4.85%, compared with inflation of 2.50%. During 2020–2021, the corresponding mean real growth rates are –2.89% and –2.87%, respectively, while inflation averages 3.16%. In 2022–2025, real GDP per capita and consumption per capita growth average 4.96% each, whereas inflation averages 4.17%. These temporal comparisons do not control for differences in macroeconomic circumstances and do not establish causal explanations.

4.5 Correlations among inflation, output, and consumption

The bivariate evidence in Table 5 shows a positive pooled correlation between real GDP per capita growth and real consumption growth ($r = .502$, 310 paired records). Inflation and real consumption growth are nearly uncorrelated in the pooled sample ($r = .003$, 308 paired records); inflation and real GDP per capita growth likewise have a weak positive pooled correlation ($r = .069$, 365 paired records). Country-demeaned correlations show a similar output–consumption pattern and slightly negative inflation relationships.

Table 5. Pooled and within-country-demeaned Pearson correlations

Variable pair	n	Pooled r	Naïve p	Demeaned r
Real GDPpc growth vs consumption growth	310	0.502	<.001	0.497
CPI inflation vs consumption growth	308	0.003	0.953	-0.024
CPI inflation vs real GDPpc growth	365	0.069	0.187	-0.096

Note. Pooled p-values are descriptive Pearson tests that do not account for country-year dependence; formal panel inference uses clustered regression and wild-cluster bootstrap tests. Country-demeaned values remove country means, not year effects. The GDPpc–consumption correlation has $n = 310$ because inflation is not required for this pair.

4.6 Two-way fixed-effects regression findings

The baseline two-way fixed-effects model uses 308 complete observations across 9 countries and 39 calendar years. It has $R^2 = 0.454$ and adjusted $R^2 = 0.352$. With country- and year-specific intercepts included, the estimated coefficient on real GDP per capita growth is positive (+0.773), indicating that a one-percentage-point greater annual GDP per capita growth rate is associated with about 0.77 percentage points greater consumption-growth rate conditional on the model. Its nine-cluster wild-bootstrap two-sided p-value is 0.0039.

Table 6. Baseline regression for real household consumption per capita growth

Regressor	Coefficient	Cluster SE	95% cluster CI	Cluster p	Wild p
Real GDP per capita growth	0.773	0.061	[0.631, 0.915]	<.001	0.0039
CPI inflation	0.158	0.051	[0.041, 0.276]	0.015	0.0234

Note. Dependent variable: real household and NPISH consumption expenditure per capita annual growth (%). Country and year fixed effects included. $n = 308$; nine countries and 39 calendar years. Conventional clustered tests use nine country clusters with small-sample correction; “Wild p” reports a two-sided, restricted, re-studentized Rademacher wild-cluster test enumerating 512 sign assignments.

Inflation has a positive contemporaneous conditional coefficient (+0.158), with a conventional country-clustered p-value of 0.015 and a wild-cluster bootstrap p-value of 0.0234. This sign is contrary to the negative association specified in H2. It does not imply that higher inflation improves household purchasing power: the outcome is already inflation-adjusted, and omitted economic factors, demand conditions, and simultaneous adjustment of consumption and output may influence contemporaneous coefficients.

4.7 Sensitivity analyses and regression diagnostics

Table 7 summarizes the estimated relationship under alternative sample and model specifications. The GDP-per-capita coefficient remains positive in every specification (approximately +0.43 to +0.78). The contemporaneous inflation estimate remains positive when using country effects only, excluding Lao PDR or Cambodia, or winsorizing the inflation variable. However, its statistical signal weakens in the balanced 2001–2016 sample and in the one-year-lagged inflation model, illustrating sensitivity to sample composition and timing.

Table 7. Sensitivity of fixed-effects coefficients and clustered inference

Specification	n	GDPpc β	Inflation β	Cluster p (infl.)	Wild p (infl.)
Full panel	308	0.773	0.158	0.015	0.0234
Country FE only	308	0.782	0.124	0.032	—
exclude Lao PDR	292	0.773	0.150	0.028	—
exclude Cambodia	277	0.736	0.141	0.023	—
Balanced 2001–2016	144	0.430	0.135	0.177	0.1914
Winsorized inflation	308	0.760	0.233	0.012	—
Lagged CPI inflation	306	0.729	0.072	0.250	0.3633

Note. Country-clustered p-values shown for inflation. Wild p-values are available for the full, balanced, and lagged specifications. The last row uses inflation in $t - 1$ rather than contemporaneous inflation. These specifications are sensitivity analyses and not causal identification strategies.

Leave-one-country-out estimation also yields consistently positive GDP per capita coefficients (range: +0.736 to +0.831) and inflation coefficients (+0.121 to +0.218). These exclusions do not change the coefficient signs, but they cannot eliminate time-varying confounding. The inflation contrast between the unrestricted model (wild $p = .0234$), balanced 2001–2016 panel (wild $p = .1914$), and lagged inflation model (wild $p = .3633$) cautions against interpreting the baseline inflation estimate as a stable relationship across periods.

Model diagnostics indicate substantial deviations from classical residual assumptions. The Jarque–Bera statistic is 357.42 ($p < .001$), rejecting residual normality, while the Breusch–Pagan LM statistic is 118.53 ($p < .001$), consistent with heteroskedasticity. The simple pooled correlation between adjacent annual residuals within countries is 0.062 across 299 year-to-year pairs, but this descriptive correlation is not a formal panel serial-correlation test. Country-clustered standard errors and the finite-sign wild-cluster tests are therefore reported, though the limited nine-cluster design remains a

qualification. Exploratory residual cross-country correlation checks are reported in Section 4.9; a formal bias-corrected residual-dependence test is not yet completed.

4.8 Summary of results

Across the ASEAN-10 comparison, historical inflation differs substantially in both average magnitude and volatility. The Philippine series shows a lower average annual inflation rate after the late 1990s than in the earlier part of the sample, alongside long-run increases in real GDP per capita and real household consumption per capita. In the nine-country consumption panel, real GDP per capita growth is the most consistent positive correlate of real household consumption growth. The estimated conditional relationship with inflation is positive in the baseline model but weaker and statistically inconclusive in key alternative samples and lag specifications. The evidence supports H1 as an association, does not support the predicted negative sign of H2 in the baseline specification, and does not by itself establish a causal effect of economic policy, inflation, or growth on household welfare.

Data note. Source: World Bank, World Development Indicators, retrieved October 2026. Inflation is WDI FP.CPI.TOTL.ZG, real GDP per capita growth is NY.GDP.PCAP.KD.ZG, and real household consumption per capita growth is NE.CON.PRVT.PC.KD.ZG. Real level series use NY.GDP.PCAP.KD and NE.CON.PRVT.PC.KD. Tables are reproducible from the authors' statistical workbook and Python scripts.

4.9 Supplementary cross-sectional dependence and covariance checks

Residual cross-economy correlation was examined using a descriptive Pesaran-style unbalanced-panel statistic constructed from pairwise residual correlations in overlapping calendar years. In the country-only fixed-effects model, the statistic was 0.692 (nominal normal-approximation $p = .489$), with mean pairwise residual correlation of 0.027. In the two-way fixed-effects model, the statistic was -3.116 (nominal $p = .0018$), with mean correlation of -0.117 . The negative shift following inclusion of year effects should not be interpreted as straightforward proof of remaining cross-sectional dependence because period-specific parameters may induce bias in ordinary CD statistics (Juodis & Reese, 2022). The overlapping pairwise time spans ranged from 16 to 39 years. These calculations are exploratory diagnostics rather than a fully bias-corrected test.

As an additional inference sensitivity, Driscoll–Kraay standard errors were calculated using temporal lag truncations of two through five years on the original two-way fixed-effects regression. Across these settings, the standard error for the real GDP per capita growth coefficient ranged from 0.131 to 0.139, and the standard error for the CPI inflation coefficient from 0.042 to 0.043. Using a conservative t reference distribution with 38 degrees of freedom, both baseline contemporaneous coefficients remained statistically detectable (GDP per capita $p < .001$; inflation $p < .001$). These standard errors corroborate inference for the full-sample contemporaneous model, but they do not resolve its sensitivity to the lagged-inflation specification, balanced-sample restriction, or potential simultaneity.

4.10 Additional model uncertainty and temporal checks

Additional sensitivity analyses assessed the stability of the baseline country- and year-fixed-effects coefficients. Leaving out one country at a time retained a positive GDP-per-capita slope, ranging from 0.736 to 0.831 across nine re-estimations; the corresponding inflation coefficients remained positive (0.121–0.218). Two-way clustered standard errors (country and year), calculated as an alternative covariance sensitivity with only nine country clusters, yielded $SE = 0.106$ for GDP-per-capita growth and $SE = 0.032$ for inflation. These figures do not resolve the finite-cluster problem, and clustered p -values should remain secondary to substantive and specification sensitivity.

A model allowing each country its own GDP and inflation slopes increased unadjusted R^2 but slightly decreased adjusted R^2 (0.352 to 0.350). The conventional homogeneity F-test was not significant, $F(16, 243) = 0.930$, $p = .535$; because it assumes homoskedastic, independent disturbances, this is only an exploratory fit diagnostic, not a robust test that slopes are identical. Lagging GDP-per-capita growth instead of using same-year growth produced a positive coefficient ($\beta = 0.188$; cluster $p = .006$) conditional on same-year inflation, whereas same-year inflation in that model was near zero ($\beta = 0.025$; $p = .727$). Both predictors lagged one year gave GDP $\beta = 0.286$ ($p = .003$) and inflation $\beta = 0.045$ ($p = .524$). Lag-based correlations are not proof of temporal causation and may reflect persistence and omitted variables. Detailed results and the complete country-deletion table appear in Appendix A.4.

5. Discussion

The findings offer three interconnected observations about the economic experience of ASEAN-10 between 1987 and 2025. First, consumer-price dynamics differed substantially across economies, and historical averages concealed episodes of unusually high inflation. Second, growth in real GDP per capita was positively and consistently associated with growth in real household consumption per capita. Third, the positive contemporaneous coefficient on inflation was not stable across alternative temporal and sample specifications, limiting its substantive interpretation. These findings should be understood as descriptive and conditional macroeconomic associations rather than evidence that changes in GDP or inflation caused household welfare outcomes.

5.1. Inflation heterogeneity and the importance of comparable historical periods

The common-window comparison for 1996–2019 reveals substantial differences in inflation experiences across the ten economies. Lao PDR and Myanmar recorded the highest arithmetic mean annual inflation, at 16.24% and 16.22%, respectively, whereas Brunei registered 0.36%. The Philippine average was 4.37%, below the means for Lao PDR, Myanmar, Indonesia, Viet Nam, and Cambodia, but above those for Thailand, Malaysia, Singapore, and Brunei. This comparison establishes the Philippines' position relative to its neighbors only for the same 24 calendar years; it does not imply an invariant ranking across all possible historical windows.

The distributions are equally important as the rankings. Lao PDR's 16.24% mean contrasts with a median of 6.86% and a standard deviation of 29.55 percentage points. Myanmar's mean of 16.22% similarly exceeds its 9.10% median, accompanied by a standard deviation of 15.81 percentage points. Such gaps indicate that a limited number of extreme annual observations have considerable influence on the arithmetic mean. By contrast, the Philippines had a 4.10% median and a 2.14-percentage-point standard deviation over the common period. Thus, two economies with superficially similar long-run average inflation could still differ meaningfully in price stability, shock exposure, and the predictability of nominal purchasing power.

These contrasts underscore why cumulative CPI change, average annual inflation, median inflation, and dispersion should be reported as distinct quantities. Annual inflation is the change in a consumer-price index between adjacent years; an arithmetic average describes the central tendency of annual rates, whereas a compound annual rate summarizes the multiplicative change between two specified index observations. The latter must use the number of intervals separating the two index dates. Moreover, national CPI indices may have different reference bases, so their index levels should not be ranked across countries as if they measured comparable absolute price levels (World Bank, 2026a).

The regional differences are compatible with the broader observation that Asian inflation has reflected varying exposures to food, energy, supply-chain disturbances, domestic demand, and national policy responses (International Monetary Fund [IMF], 2023). However, the present dataset does not separately identify these channels. A low historical inflation mean cannot, by itself, be attributed to a particular monetary framework, and high inflation cannot be assigned to a particular crisis without further identification and detailed country evidence.

5.2. The Philippine case: cumulative prices and real economic progress

The Philippine results illustrate the difference between the long-run level of prices and annual inflation. From the 1987 CPI observation to the 2025 CPI observation, the index increased by a factor of 8.14, equivalent to a cumulative increase of approximately 714.04%. Annualizing this level change across 38 index-to-index intervals gives 5.67%. This is the WDI-derived historical calculation adopted in the present study. It must not be conflated with the 5.70% arithmetic mean of the 39 annual inflation observations dated 1987–2025, or with the 5.63% geometric average obtained by compounding all 39 annual inflation rates, including the 1986–1987 change. Each statistic answers a different, legitimate question about the time span.

For 2002–2025, the Philippine CPI rose by approximately 135.64%, equivalent to 3.80% annually across 23 index intervals. This provides a more period-matched official benchmark for informal comparisons of historical grocery prices than does the full 1987–2025 rate. Nevertheless, an image of two shopping receipts, unless independently authenticated and carefully standardized by product specification and quantity, does not constitute a reliable historical price dataset. Nor would the

compounded increase in a small selected shopping basket be equivalent to official headline or core inflation, which are defined using broader statistical methodologies.

A second distinction prevents an erroneous conclusion about living standards. Over 1987–2025, Philippine real GDP per capita increased by a factor of approximately 2.58 (2.52% annualized), and real household consumption per capita increased by approximately 2.61 (2.56% annualized). These series are already adjusted for price changes. Therefore, the 5.67% nominal CPI compound increase should not be subtracted from their real growth rates or used to claim that prices “outpaced” real consumption by a directly comparable margin. The real consumption result instead indicates an increase in average inflation-adjusted consumption expenditure per person as represented in the national accounts.

This aggregate expansion does not establish that all households benefited equally. Changes in the distribution of income, expenditure on essentials, household size, geographic costs, public services, and savings or debt burdens are not resolved by a mean per-capita consumption series. The distinction between overall inflation and the composition of food versus nonfood price changes matters because heterogeneous expenditure baskets can produce different welfare experiences for different income groups. Walsh and Yu (2012), for example, documented that the relationship between components of inflation and income inequality varies across settings. Consequently, a national real-consumption gain can coexist with financial stress among particular populations; the present analysis cannot quantify that distributional possibility.

The downward Philippine inflation trend (approximately -0.222 percentage points per year in the fitted linear specification) and the exploratory difference between 1987–1998 (9.71% mean inflation) and 1999–2025 (3.91%) suggest that the historical inflation environment changed substantially. The post hoc split, however, is not a validated structural-break date or a test of presidential performance. The reported CUSUM result did not reject parameter stability at the conventional 5% level. Therefore, this contrast warrants careful descriptive treatment and should not be used as evidence that one political administration produced the observed improvement.

5.3. Economic growth and household consumption: a strong but noncausal association

The most consistent econometric result is the positive association between contemporaneous real GDP per capita growth and real household consumption per capita growth. In the baseline two-way fixed-effects model, the estimated coefficient is 0.773 (country-clustered $p < .001$; restricted wild-cluster bootstrap $p = .0039$). Conditional on inflation and the included country and year effects, a one-percentage-point higher real GDP per capita growth rate is associated with approximately 0.773 percentage points higher real household consumption per capita growth. The estimate remains positive across the reported alternative specifications, with coefficients ranging approximately from 0.43 to 0.78.

This pattern is economically intelligible: greater output per resident may be accompanied by more employment income, productive activity, and expenditure capacity. Yet several reasons prevent a causal interpretation. Consumption expenditure is itself a component of expenditure-side GDP, so both series can move together through a national-accounting relationship. Their common denominator—population—also introduces related per-capita transformations. Simultaneous responses to productivity, employment, credit conditions, remittances, fiscal measures, and external demand may influence both variables. Remittances illustrate this concern in the Philippine case, where annual WDI time-series evidence associated remittance inflows positively with changes in household consumption (R. G. Atento, Feng, & Tolentino, 2026). Country fixed effects address time-invariant country characteristics, while year fixed effects capture average shocks common to countries; neither specification automatically eliminates simultaneity, time-varying omitted variables, or measurement dependence.

The appropriate contribution of the regression is therefore narrower, but still useful. It documents that higher annual growth in measured real economic output per person tends to coincide with higher annual growth in measured real consumption per person in the observed ASEAN panel. This observation motivates a more direct investigation of the translation from production into living standards, ideally using disposable household income, employment earnings, distribution-sensitive household survey outcomes, and additional country-specific mediating variables. Related two-way fixed-effects evidence for ASEAN found GDP per capita growth to be only weakly associated with under-5 and neonatal mortality, consistent with distributional, sectoral, and health-system channels conditioning whether economic progress translates into welfare gains (R. G. Atento & Quinto, 2026).

5.4. Interpreting the unexpected inflation coefficient

The baseline inflation coefficient is positive rather than negative: 0.158 percentage points of real household consumption growth per one-percentage-point difference in annual CPI inflation, conditional on contemporaneous GDP-per-capita growth and fixed effects (country-clustered $p = .015$; restricted wild-cluster bootstrap $p = .0234$). This contradicts the stated directional hypothesis, H2, that inflation would be negatively associated with real consumption growth. It does not establish that higher inflation enhances household purchasing power. In particular, the dependent variable is measured in real terms, and the regression does not directly observe individual wages, household prices faced, or budget constraints.

Several nonexclusive explanations are conceivable. Stronger demand or post-shock recovery could coincide with both somewhat faster price increases and growth in aggregate consumption. Conversely, adverse supply disturbances might reduce consumption while increasing prices, yielding the opposite association in other periods. Fiscal transfers, monetary accommodation or tightening, exchange-rate changes, changing relative prices, and different country business cycles could affect the conditional coefficient. In the Philippine context, for instance, oil-price shocks transmitted through inflation and enterprise costs have been examined alongside household cash transfers and MSME credit support as distinct crisis-response instruments (A. G. Atento et al., 2026). Because these channels were not separately estimated, they must remain hypotheses for follow-up research rather than retrospective explanations asserted as findings.

The sensitivity exercises materially weaken any inference that the positive inflation coefficient represents a general historical regularity. In the balanced nine-country sample covering 2001–2016, the inflation estimate is 0.135, with a restricted wild-cluster bootstrap p -value of .1914. When inflation is lagged one year, the coefficient declines to 0.072 and its corresponding wild-bootstrap p -value rises to .3633. Such results do not prove that the true inflation relationship is zero, but they show that the baseline signal depends on the observations used and on whether same-year or prior-year inflation is examined. Accordingly, the evidence does not support the paper's predicted negative coefficient and is insufficient to establish a stable positive relationship in its place.

The near-zero pooled Pearson correlation between CPI inflation and real consumption growth ($r = .003$, $n = 308$) further clarifies the issue. The pooled association and the conditional two-way fixed-effects coefficient answer different statistical questions. The first summarizes an unadjusted linear relationship; the second conditions on GDP growth and absorbs systematic country and year components. Related ASEAN panel evidence has likewise shown that a strong pooled association can reflect between-country level differences and disappear once country heterogeneity is controlled (Tabujara et al., 2026). Their difference is not logically inconsistent, but it reinforces the need to avoid interpreting a partial association as a simple historical fact about inflation and welfare.

5.5. Sample coverage, model dependence, and uncertainty

The unbalanced design preserves substantially more historical information than a balanced panel would. All ten economies contribute to the broad inflation comparison and real GDP per capita growth description, but the three-variable regression uses 308 complete country-year records from nine economies because Myanmar has no observed real household consumption per capita growth series in this extract. Lao PDR contributes only 16 years to that dependent variable. Comparable WDI-based ASEAN panel analyses have likewise relied on unbalanced country-year data and reported substantial and persistent cross-country heterogeneity (Dela Cruz & Atento, 2026). Consequently, results from the regression describe the observed analytical sample rather than every ASEAN-10 country and every year in an equal manner. Data availability can be systematically related to institutional capacity, historical disruptions, national-account revisions, or other country characteristics, so complete-case selection is not assumed to be random.

The nine country clusters are an additional inferential constraint. Conventional country-clustered standard errors can produce misleadingly precise tests when the number of clusters is small, especially in models with many fixed effects (Cameron & Miller, 2015; MacKinnon et al., 2023). The enumerated restricted wild-cluster bootstrap p -values therefore provide a useful supplementary sensitivity analysis, but they should not be represented as proving finite-sample validity. Some residual diagnostics also identify heteroskedasticity and departures from normality. A formal bias-aware residual cross-sectional-dependence analysis and alternative identification designs therefore remain priorities for future research.

The model also pools economies with markedly different development levels, production structures, population trends, and macroeconomic policy environments. The country and year fixed effects reduce certain comparability problems, but a single

slope coefficient still assumes a common conditional response across highly heterogeneous economies. Future extensions could estimate interactions by income or institutional group, distinguish high-inflation episodes from moderate-inflation environments, consider asymmetric price shocks, or examine longer-run adjustments. Such extensions would need to respect the small cross-sectional sample and would be exploratory unless a sufficiently strong identification strategy and data coverage could be established.

5.6. Implications for interpreting economic development in ASEAN

Taken together, the findings argue for a multidimensional evaluation of macroeconomic progress. GDP growth describes expansion in aggregate production; real GDP per capita growth adjusts that expansion for population and inflation; CPI measures changes in a representative consumer-price basket; and real household consumption per capita describes the inflation-adjusted volume of household and nonprofit-institution consumption expenditure per person. These are related but noninterchangeable concepts. The World Bank explicitly situates household consumption within national accounts, where it forms part of the demand-side decomposition of output (World Bank, 2026b).

For comparative regional monitoring, a practical implication is to display indicators of price stability alongside real output and real household consumption, with separate attention to volatility, missing observations, and country-specific historical shocks. Observed consumption improvements should not be used to dismiss the pressures households may face from concentrated increases in food, housing, transport, utilities, or health costs. Recent energy-price shocks linked to disruption in the Strait of Hormuz illustrate how inflationary episodes can tighten household budget constraints (R. G. Atento, A. G. Atento, & Espelita, 2026). Conversely, historical CPI accumulation should not be used to claim deterioration in real consumption when the corresponding constant-price indicator actually rises.

The data also indicate the limits of moving directly from macroeconomic description to policy evaluation. This study does not measure whether wage growth matched household-specific inflation, whether poorer households gained proportionately, whether poverty declined, or which government interventions generated observed outcomes. A future welfare-focused extension should incorporate real wage data from a consistent labor-statistics source, household income and expenditure surveys, poverty or inequality measures, and potentially purchasing-power-parity consumption levels for cross-country living-standard comparisons. These indicators would permit a more direct test of the economic concern motivating the research: whether material gains are broad-based enough to be felt by households rather than appearing only in aggregate output figures.

5.7. Scope of the present interpretation

The observed evidence is strongest for the positive co-movement of real output per capita and real household consumption per capita. Historical inflation differs dramatically across ASEAN economies, and the Philippine CPI series documents substantial cumulative price increases alongside long-run positive growth in real consumption. The conditional inflation association is not sufficiently stable to warrant a simple positive or negative substantive conclusion. These statements can be maintained without treating any one estimate as a causal effect.

Accordingly, the Discussion supports a restrained central proposition: national economic progress and household material consumption are related, but they should be measured independently, while inflation must be evaluated through carefully defined price indices and time windows. Further research is required to establish distributional consequences, wage purchasing power, and the specific mechanisms through which macroeconomic conditions shape household experience.

5.8 Supplementary inference and the scope of model robustness

The additional residual-dependence calculations strengthen the case for cautious uncertainty statements. The country-only and two-way fixed-effects CD-style results differ in sign and nominal significance; the latter is potentially distorted by estimated time effects, as discussed by Juodis and Reese (2022). Driscoll–Kraay inference finds small standard errors for both contemporaneous slopes in the full panel, whereas the balanced-period and lagged-inflation bootstrap exercises do not yield a stable inflation association. Thus, the relevant limitation is broader than a single standard error: specification choices alter the meaning and apparent precision of the inflation result. The positive GDP per capita association is more consistent, although identification remains noncausal and part of its strength can reflect macroeconomic accounting links. An additional sensitivity analysis also found that the inflation coefficient was not statistically detectable under country-clustered inference

when observations from the 1997–1999, 2008–2009, and 2020–2021 crisis windows were jointly excluded ($\beta = 0.081$, $p = .424$), while the corresponding GDP per capita growth coefficient remained positive ($\beta = 0.463$, $p = .012$). These supplementary exclusions are exploratory and should not be interpreted as identifying crisis effects. Philippine WDI time-series evidence on manufacturing performance has similarly found outcomes to be sensitive to economy-wide disruptions once macroeconomic dynamics are controlled (Refozar et al., 2026). The leave-one-country-out analysis shows that no single economy drives the positive GDP growth coefficient; however, contemporaneous GDP and household consumption are linked by national-accounts definitions, and the country-specific slope exploration cannot provide few-cluster robust heterogeneity inference. Alternative lag specifications also emphasize that timing is consequential for interpretation (Appendix A.4).

6. Conclusion and Recommendations

This study examined the historical evolution of consumer-price inflation, real economic growth, and real household and nonprofit institutions serving households (NPISH) final consumption expenditure per capita across the ten ASEAN economies from 1987 to 2025. Using the World Bank World Development Indicators (WDI), the analysis combined country-specific historical profiles, a common-period inflation comparison, correlation analysis, and country- and year-fixed-effects panel regressions. The evidence permits several conclusions about observable macroeconomic relationships, while also delimiting what can reasonably be inferred about household welfare.

6.1. Conclusions

First, inflation experiences were highly heterogeneous across ASEAN economies. Even over the identical 1996–2019 comparison window, mean annual consumer inflation varied from 0.36% in Brunei Darussalam to 16.24% in Lao PDR; Myanmar recorded 16.22%, while the Philippines recorded 4.37%. Consequently, a single regional average would obscure substantial country-specific differences. The particularly large gaps between means and medians in high-inflation economies further demonstrate the influence of exceptional price shocks. Assessments of price stability should therefore consider the arithmetic mean, median, dispersion, and cumulative movement of prices rather than a single summary statistic.

Second, the Philippine historical series establishes a distinction between persistent increases in the price level and the annual rate of inflation. Between the observed CPI index values for 1987 and 2025, Philippine consumer prices increased approximately 8.14-fold, equivalent to about 714% cumulatively and 5.67% compounded annually over 38 index-to-index intervals. Across the annual inflation observations from 1987 through 2025, the arithmetic mean was approximately 5.70%. These statistics are not interchangeable: the former summarizes the change between two index levels, whereas the latter averages 39 separate annual rates. For 2002–2025, the index-based annualized rate was 3.80%, demonstrating the importance of selecting a time window matched to the research question.

The Philippine series also exhibits lower average annual inflation in 1999–2025 (3.91%) than in 1987–1998 (9.71%). This pattern is descriptive; the exploratory division at 1999 does not establish a statistically validated change point or identify the effects of a particular administration. External shocks, monetary and fiscal conditions, changes in domestic markets, and evolving institutions may all affect historical comparisons.

Third, real economic output per person and real household consumption per person exhibited a positive conditional association. In the principal nine-country, 308-observation two-way fixed-effects model, a one-percentage-point difference in annual real GDP per capita growth corresponded to an estimated 0.773-percentage-point difference in annual real household consumption per capita growth (country-clustered $p < .001$; restricted wild-cluster bootstrap $p = .0039$), holding the model's other variables and fixed effects constant. This association remained positive in the evaluated sensitivity specifications. The evidence is consistent with H1 as an association, but it does not establish that an exogenous increase in GDP per capita causes an equivalent increase in household consumption. Consumption is also a component of expenditure-side GDP, making some co-movement inherent to national accounting.

Fourth, the evidence does not support a stable, negative conditional relationship between inflation and real household consumption growth. The initial inflation coefficient was positive, rather than the negative sign proposed in H2 ($\beta = 0.158$; country-clustered $p = .015$; restricted wild-cluster bootstrap $p = .0234$). However, the inflation association was not statistically detectable using the bootstrap in the balanced 2001–2016 specification ($p = .1914$) or when inflation was lagged

by one year ($p = .3633$). The unadjusted pooled inflation–consumption growth correlation was approximately zero ($r = .003$). Accordingly, the baseline coefficient should not be interpreted as evidence that inflation improves living standards, nor do these models identify the causal effect of inflation on real household consumption.

Fifth, growth in real consumption is an informative but incomplete measure of household material welfare. In the Philippines, real GDP per capita and real household consumption per capita increased by approximately 2.58-fold and 2.61-fold, respectively, between 1987 and 2025. Unlike nominal income or expenditure, these series are already expressed in constant prices. The much larger accumulated CPI increase must therefore not be subtracted from their real growth or used to conclude that consumption power declined. Nevertheless, aggregate real consumption per person cannot indicate which households gained, whether real salaries kept pace with family-specific expenses, or how improvements were distributed across income groups.

In summary, the data establish both sustained long-run changes in consumer prices and a positive association between measured real output growth and measured real household consumption growth. They do not demonstrate that macroeconomic growth benefits households equally, that inflation is beneficial, or that any particular government caused the observed historical outcomes.

6.2. Recommendations for economic monitoring and public policy

1. Evaluate macroeconomic performance with a coordinated set of indicators. Government statistical and economic-policy institutions should report GDP growth, real GDP per capita growth, CPI inflation, and real household consumption per capita growth together. These indicators answer distinct questions about production, the average resident's share of output, prices, and recorded consumption. A dashboard presenting their annual trajectories and medium-term averages would reduce the likelihood that favorable aggregate GDP growth is mistaken for comprehensive improvements in household living standards.
2. Present both recent inflation and the cumulative level of prices. Communications concerning inflation should distinguish a reduction in the rate of price increases from a decline in actual prices. A lower inflation rate does not generally reverse earlier increases in the CPI level. Survey evidence among Filipino students indicates that awareness of monetary policy is moderate and differs by academic level and background, reinforcing the value of clear inflation communication (Espelita et al., 2025). For historical assessment, statistical agencies and researchers should publish a transparent base year, index rebasing procedure, exact observation endpoints, and the number of compounding intervals. Such practices would make public comparisons of historical living costs substantially more interpretable.
3. Supplement real consumption data with household-level welfare indicators. National agencies should examine real wage indices, median disposable household income, poverty incidence, expenditure shares devoted to food and housing, and selected distributional measures alongside macroeconomic aggregates. The present WDI analysis did not estimate these measures, so their inclusion is recommended as an additional monitoring requirement rather than as a conclusion from the fitted regression. Where households face different consumption baskets, disaggregated price indicators may also reveal pressures concealed by an all-items CPI.
4. Use differentiated country diagnostics rather than uniform ASEAN prescriptions. The dispersion of inflation experiences across the region supports country-specific investigation of inflation persistence, supply exposure, monetary conditions, and consumption dynamics. ASEAN comparative reporting should preserve a common-period benchmark for international comparisons while also presenting country-specific historical series. The findings alone do not justify adopting any one monetary, fiscal, or social-protection instrument across all ten economies.
5. Treat short-run inflation findings as a reason for better analysis, not a policy target. Because the estimated inflation–consumption relationship changes with the period and timing of the explanatory variable, policymakers should not use the positive baseline coefficient to argue for deliberately higher inflation. Policy evaluation should instead consider potential distributional costs, expected real earnings, inflation expectations, and the distinct effects of demand-driven versus supply-driven price movements, using research designs capable of addressing these mechanisms.

6.3. Recommendations for research and statistical practice

1. Preserve the full unbalanced panel and document exclusions. Future studies should retain every available country-year observation in descriptive analyses, provide an indicator-by-country coverage table, and disclose the analytic sample used for each regression. Myanmar should remain in the ASEAN-10 inflation and GDP comparisons even though the WDI data used do not provide its household consumption growth series. The central regression's coverage of nine countries and 308 complete observations should be reported consistently, alongside the balanced 2001–2016 sensitivity sample of 144 observations.
2. Extend inference methods for few-cluster panels. Future analyses should complement descriptive country-slope and leave-one-country-out checks with formal evaluation of heterogeneity, cross-sectional dependence, and uncertainty appropriate to a small number of country clusters. The restricted wild-cluster bootstrap provides an important sensitivity check, but nine country clusters remain a substantive limitation. Reporting both effect sizes and specification-dependent p-values is preferable to declaring a relationship robust on the basis of a single model.
3. Develop a wage-and-cost-of-living extension using harmonized labor statistics. A subsequent study could obtain comparable nominal employee-earnings data from ILOSTAT or national statistical agencies and deflate the earnings series by an appropriately matched national price index. Real wages could then be assessed in relation to real household consumption and price changes. Wage measures would need careful harmonization of employment coverage, compensation definitions, sampling frame, country, and calendar year before any pooled ASEAN estimation.
4. Examine heterogeneous and distributional mechanisms. Future models could explore country-specific slopes, nonlinear inflation ranges, major shock periods, food-price inflation, and the separate effects of external supply disturbances and domestic demand conditions. Where feasible, poverty and inequality indicators and microdata could reveal whether national consumption growth corresponds to similar improvements across income groups. Such extensions would require new variables and designs; none is directly identified by the present macroeconomic panel.
5. Investigate the Philippines by administration only as a distinct, carefully bounded project. A future administration-period study could descriptively compare real GDP per capita, inflation, consumption, and other welfare measures, using explicit transition-year rules and controls for inherited economic conditions and international shocks. Presidential terms are not natural experiments. Differences in period averages should not be presented as causal performance estimates without a defensible identification strategy.

6.4. Scope and concluding statement

The study's principal limitations arise from incomplete and unequal country-year coverage, the absence of Myanmar's household consumption data in the WDI data used, heterogeneity among the ASEAN economies, and the observational nature of the fixed-effects models. The nine-country regression also relies on a small number of clusters, and a bias-aware residual cross-sectional-dependence assessment is left for future work. Moreover, the household-and-NPISH consumption series is an aggregate national-accounts measure; it should not be interpreted as observed real wages, the spending of a representative household, or an indicator of distributional equity.

Within these limits, the empirical findings support a central conclusion: economic development cannot be evaluated adequately from output growth or consumer inflation alone. Real GDP per capita growth was positively associated with real household consumption growth in the observed ASEAN panel, but the independent statistical relationship between inflation and consumption was not sufficiently stable to support a general welfare claim. A rigorous interpretation of regional economic progress therefore requires simultaneous attention to prices, real production per person, real household consumption, and—through complementary data—the distribution and purchasing power of household resources.

Declarations

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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethics Statement

This study used publicly available, aggregate country-level data and did not involve human participants; ethical approval was therefore not required.

Data Availability

The data and analysis files supporting the findings of this study are available upon written request to the authors.

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Appendix A. Supplementary statistical and reproducibility notes

A.1 Model and sample

The universe has 390 possible country-year observations for 1987–2025. The baseline outcome model uses 308 complete records from nine countries. The descriptive mean inflation comparison for 1996–2019 uses 24 years for each of the ten economies. Missing observations were not imputed. Cross-country variation in the start dates of source series prevents imposing a fully balanced 1987–2025 panel for all outcomes.

A.2 Covariance and residual-correlation diagnostic summary

Diagnostic / sensitivity	GDPpc SE	Inflation SE	Interpretation
Country-clustered SE, baseline	0.0615	0.0510	9 clusters; see model table for conventionally reported SE
Driscoll–Kraay SE, 2 lags	0.1390	0.0424	Contemporaneous baseline only
Driscoll–Kraay SE, 3 lags	0.1376	0.0428	Contemporaneous baseline only
Driscoll–Kraay SE, 4 lags	0.1359	0.0433	Contemporaneous baseline only
Driscoll–Kraay SE, 5 lags	0.1307	0.0424	Contemporaneous baseline only
Pairwise CD-style, country FE	—	—	Statistic +0.692; nominal $p=.489$
Pairwise CD-style, two-way FE	—	—	Statistic -3.116 ; nominal $p=.0018$; biased under time effects

Note. Numerical columns show standard errors, not regression coefficients. CD-style statistics are exploratory and nominal p -values may be unreliable when year fixed effects are estimated. Residual dependence and covariance sensitivity do not establish causal identification.

A.3 Influential-observation and crisis-window sensitivity checks

A replication of the baseline two-way fixed-effects model directly from the raw WDI country–indicator file returned $\beta_{\text{GDPpc}} = 0.77325$ and $\beta_{\text{Inflation}} = 0.15809$ for $n = 308$, matching the principal reported estimates. Supplementary country-clustered specifications were fitted to assess the influence of crisis-period observations, high-influence records, and extreme growth values. Table A1 reports these exploratory estimates; hypothesis-testing interpretations remain limited by the nine-country cluster structure.

Table A1. Additional robustness checks

Specification	n	GDPpc β	Inflation β	Cluster p (infl.)
Baseline complete panel	308	0.773	0.158	0.015
Exclude 2020–2021	292	0.657	0.119	0.014
Exclude seven crisis years ¹	250	0.463	0.081	0.424
Exclude five highest Cook's D	303	0.750	0.144	0.012
Winsorize outcome and regressors 1–99%	308	0.775	0.210	0.010

Note. β coefficients represent percentage-point associations in country- and year-fixed-effects regressions. Reported inflation p-values use country-clustered standard errors with small-sample correction; they should be treated as exploratory given the small number of clusters. ¹Years 1997–1999, 2008–2009, and 2020–2021. The five highest Cook's-distance records are Brunei 1992, 2020, 1993, 2000, and 1994; their exclusion is diagnostic, not a principled data-cleaning decision. The simultaneous 1–99% winsorization applies to the outcome as well as both regressors.

An unrestricted country-specific-slope exploration yielded positive GDP-per-capita coefficients for every included country (approximately 0.381–1.154), whereas inflation coefficients varied in sign (approximately –0.287 to 0.622). These exploratory country slopes are not treated as confirmatory findings because of unequal observation counts, reduced degrees of freedom, and potentially unstable country-level inference. They suggest that a common ASEAN inflation slope should not be interpreted as universal.

A.4 Leave-one-country-out, covariance, and lag sensitivity checks

The country-deletion exercise re-estimated the full two-way fixed-effects equation after omitting exactly one country in turn; year effects were refitted for each sample. Each included country appears below, including Lao PDR with only 16 complete observations. Myanmar has no complete three-variable observations and therefore cannot enter these regressions. The leave-one-out coefficients are descriptive sensitivity checks, not independent replications or causal estimates.

Table A2. Leave-one-country-out two-way fixed-effects estimates

Excluded country	n	GDPpc β	CPI β	CPI cluster p
Brunei	272	0.759	0.121	0.017
Indonesia	269	0.756	0.218	0.017
Cambodia	277	0.736	0.141	0.023
Lao PDR	292	0.773	0.150	0.028
Malaysia	269	0.780	0.157	0.032
Philippines	269	0.756	0.170	0.007
Singapore	269	0.831	0.178	0.012
Thailand	269	0.777	0.153	0.033
Viet Nam	278	0.790	0.174	0.033

Note. Country and year effects are re-estimated in every model; standard errors cluster by the remaining eight countries. All GDP coefficients have conventional country-clustered $p < .001$. None of these small-cluster p-values is proof of population-level constancy.

Table A3. Additional uncertainty, slope-heterogeneity, and lag sensitivities

Specification / check	n	Statistic	Interpretation
Two-way clustered SE:	308	$\beta = 0.773$; SE = 0.106	Exploratory covariance only

GDP per capita			
Two-way clustered SE: CPI inflation	308	$\beta = 0.158$; SE = 0.032	Few-country limitation persists
Country-specific slope model	308	$F(16,243) = 0.930$; $p = .535$	Non-robust F test
GDP(t-1), inflation(t)	308	GDP $\beta = 0.188$; CPI $\beta = 0.025$	Cluster p .006 / .727
GDP(t-1), inflation(t-1)	306	GDP $\beta = 0.286$; CPI $\beta = 0.045$	Cluster p .003 / .524
Exclude seven crisis years	250	GDP $\beta = 0.463$; CPI $\beta = 0.081$	Cluster p .012 / .424

Note. Two-way clustered covariance adds country and year clustering; p-values under conventional small-cluster degrees of freedom should be interpreted cautiously, particularly because the number of countries is nine. The slope-interaction test is a classical OLS F-test, not a cluster-robust test. These alternative lag specifications omit contemporaneous GDP growth and are not the same estimand as the baseline.