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ORIGINAL RESEARCH PAPER

TRADE PROTECTION AND INFLATION DYNAMICS: EVIDENCE OF POLICY ENDOGENEITY FROM A PANEL VAR ANALYSIS

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ABSTRACT

This research examines the interactive relationship between trade protection and inflation using analysis of 9,520 country-year observations. Employing Panel Vector Autoregression (PVAR), Granger causality tests, impulse response functions and policy simulations, a strong evidence of policy endogeneity in the tariff-inflation relationship is found. The key finding reveal an asymmetric causal effect: inflation changes strongly predict future tariff adjustments ($\chi^2 = 387.529$, $p < 0.001$), while tariffs do not predict inflation changes ($\chi^2 = 6.708$, $p = 0.082$). The observed correlation between protection and price levels results from systematic policy responses rather than direct causal effects of trade policy. The impulse response analysis shows that higher tariffs cause sustained price increases lasting 3 to 4 periods, whereas inflationary shocks lead to immediate tariff reductions. This creates a self-regulating mechanism where protectionist measures eventually diminish through inflation effects. Simulation results indicate that a 10 percentage point tariff increase results in an average of 0.8 percentage points additional inflation, although outcomes vary significantly across countries. These findings support current trade policy debates by demonstrating that moderate tariff hikes incur notable macroeconomic costs, yet political economy forces generally favor trade liberalization following inflationary episodes.

Keywords: Trade policy, Inflation, Panel VAR, Policy endogeneity, Granger causality, Tariffs, Impulse response functions, Trade protection, Macroeconomic policy, Political economy

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Introduction

Policymakers and economists have prioritized trade policy and inflation because countries face the challenge of balancing market protection with economic stability. Recent trade tensions, characterized by widespread tariff increases and retaliatory measures, highlight the need to understand how trade protection influences domestic prices and how macroeconomic factors impact trade policy decisions (Amiti et al., 2019; Cuba-Borda et al., 2025). Despite theoretical research and growing empirical evidence, key questions about the precise causal relationships and timing between tariffs and inflation remain unresolved.

Theoretical research on tariffs and inflation offers varying forecasts about their relationship. Trade protection increases domestic prices because tariffs on consumer goods directly impact price indexes, while tariffs on production inputs raise production costs, leading to higher prices for consumers. Additionally, reduced import competition allows domestic producers to increase their prices (Comin & Johnson, 2025). Most discussions about the costs of trade protection focus on tariffs, which are considered exogenous policy tools that have predictable inflationary effects.

The traditional view of trade openness and inflation has been challenged by Romer (1993), who found that open economies tend to have lower average inflation rates. Romer (1993) influential theory suggests that open economies face higher costs from unexpected monetary policy expansions because of exchange rate depreciation effects, which lead to lower inflation rates. Research on the (Romer, 1993) hypothesis has generated many studies with conflicting results because different investigations have disputed both the existence of negative relationships and the theoretical framework supporting them (Jafari Samimi et al., 2012; Temple, 2002).

Much of the current research faces a major limitation because it treats trade policy as if it exists independently of economic results. The political economy literature has successfully challenged the exogeneity assumption of trade policy because it shows that protection levels adjust based on economic conditions, import competition, and sectoral pressures (Goldberg & Maggi, 1999; Trefler, 1993). Modeling trade protection as an endogenous factor in Trefler (1993) revealed that its restrictive effect on imports was ten times stronger than when it was treated as exogenous, demonstrating why policy endogeneity should be included in empirical studies.

The relationship between tariffs and inflation remains poorly understood because it is endogenous, yet empirical research on this topic is limited. The observed links between tariffs and prices could result from policy decisions by authorities to lower import costs during inflationary periods and protect domestic industries during economic downturns, rather than indicating that protectionism impacts inflation. The presence of reverse causality poses significant challenges for both empirical research and policy-making.

The Panel Vector Autoregression (PVAR) model, along with other recent econometric advances, offers effective methods to address endogeneity issues when analyzing complex macroeconomic relationships (Love & Zicchino, 2006). In PVAR models, all variables are considered endogenous, allowing the framework to identify bidirectional causality and model dynamic feedback effects that static models cannot replicate. This approach has proven especially valuable in international economics for examining how policies influence each other and their time-based transmission patterns across countries (Canova & Ciccarelli, 2013).

This research advances the existing knowledge about trade policy effects on inflation through multiple essential findings. Our research demonstrates policy endogeneity between tariffs and inflation through Panel VAR-Granger causality tests analyzing 9,520 country-year observations. The impulse response analysis shows how tariff changes produce inflation effects that persist over time with noticeable delays. The study reveals that inflationary pressures automatically lead to reductions in trade protection, which limits the ability of protectionist policies to last. The research includes policy simulations to illustrate how tariff increases cause different inflation effects in various countries and provides quantitative evaluation metrics.

The study adopts a methodological approach that addresses key issues in existing literature through comprehensive pre-estimation diagnostic procedures, including tests for cross-sectional dependence, panel unit root analysis, and cointegration testing. We use Driscoll-Kraay standard errors to manage heteroskedasticity, serial correlation, and cross-sectional dependence, while applying threshold regression and nonlinear models to capture complex relationships.

The research results reveal significant differences in the relationship between tariffs and inflation. Such findings indicate that increases in tariffs cause small but persistent inflationary effects, while changes in inflation levels strongly forecast upcoming modifications in tariff policies. The identified asymmetry between tariffs and inflation shows that most observed links between protection and prices are due to policy adjustments rather than actual tariff impacts on prices. The analysis demonstrates that every 10 percentage point increase in tariffs results in about 0.8 percentage points of additional inflation on average, although actual inflation rates vary widely across countries due to differences in import dependence and economic systems.

This paper continues with Section 2, which explains the data sources and econometric methodology, including the Panel VAR framework and diagnostic testing procedures. The core empirical results are presented in Section 3, using Granger causality tests, impulse response functions, and policy simulations. Section 4 examines how the research findings influence trade policy decisions and inflation control methods. The final section offers policy recommendations and proposals for further research.

Tariffs and Prices: A Literature Review

Academic research has extensively studied tariffs as import taxes because they influence domestic prices and inflation rates through cost increases and supply chain disruptions. This review synthesizes key theoretical and empirical research on pass-through rates and methodologies, considering sectoral and temporal variations in pricing impacts during the recent 2025 US tariff period.

According to economic theory, tariffs make imports more expensive, while consumer price changes depend on market competition, together with exchange rate movements and product substitution elasticities (Amiti et al., 2019; Jeanne & Son, 2024). Tariffs tend to increase the value of domestic currency, thus weakening the impact on prices, although research shows that this offset does not fully occur (Jeanne & Son, 2024). Open-economy models demonstrate higher pass-through for intermediate goods because their inclusion in production chains magnifies inflationary pressures (Gnocato et al., 2025). The model describes these effects as momentary price level changes instead of persistent inflation because expectations remain stable (Waller, 2025)

Multiple research techniques exist to separate the effects of tariffs from other confounding factors, including event-study approaches, along with local projections and input- output models. The study of price changes because of tariffs during the 2018-2019 US tariff period through event studies shows consumers faced price increases shortly after the tariff imposition (Amiti et al., 2019; Waller, 2025). The study of multiple tariff events through local projections reveals complete pass-through to core goods prices in two months (Waller, 2025). The input-output framework demonstrates that when tariffs increase the prices of inputs, they lead to elevated producer costs, which eventually reach consumers through a ripple effect.

Research employing difference-in-differences methods together with micro-level trade and consumption data shows how tariffs imposed on China, Canada, and Mexico result in higher retail prices (Baslandze et al., 2025). The inflationary effects of Vector autoregression models extend beyond static observations by showing how prices rise briefly throughout time (McKibbin et al., 2025).

Research findings show that consumer and producer price increases result from tariffs with different degrees of transmission. The full pass-through of PCE prices because of 2018-2019 US tariffs led to a 0.3% increase in core goods PCE and a 0.1% increase in overall core inflation (Minton & Somale, 2025). The 2018-2019 US tariffs produced significant price effects on vehicle and machinery durables because import costs surged between 8% and 12% and retailers applied 2% to 5% price increases (Baslandze et al., 2025). The 2025 US tariffs introduced from February until the present time showed that March marked a period of partial price transmission to core goods PCE prices, and core PCE inflation rose 0.33% and 0.08% respectively, yet remained lower than 2018-2019 due to reduced Chinese imports and delayed implementation (Bandyopadhyay et al., 2025; Contractor, 2025; Minton & Somale, 2025).

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Projections indicate that a 10% tariff increase would result in a 1% rise for producer prices and a 0.81-1.63% increase for everyday consumer prices when considering half to full pass-through scenarios (Azzimonti-Renzo et al., 2025; Baslandze et al., 2025). Inflation from retaliatory tariffs would result in 0.5-1% additional price increases for US consumers over the next two years, stemming from international supply networks (Boer, 2024; McKibbin et al., 2025). Companies take responsibility for absorbing 20-40% of the increased costs to protect their market position, thus reducing price inflation, particularly in competitive or weak demand market conditions (Amiti et al., 2019; Baslandze et al., 2025). The persistent economic decline from tariffs alongside one-time price increases becomes noticeable starting from the 2025 tariffs, which produce a cumulative 2.3% increase in price levels in the short term (Carroll & Hur, 2023; Mikkelsen, 2025).

Tariffs (heterogeneity) that target final products create short-term price inflation because consumers can easily substitute products, whereas tariffs on intermediate goods create sustained cost increases (Gnocato et al., 2025). Studies from previous instances, such as Mexico's tariff liberalization, show how price cuts distribute unevenly between consumers (Nicita, 2009). The current inflation data from May shows a CPI reading of 2.4% because foreign exporters absorb costs while supply chains remain resilient (Barbiero & Stein, 2025; Cavallo et al., 2021).

The strong research findings face ongoing difficulties because it becomes challenging to separate tariff effects from external factors like energy shocks or pandemics using current data systems (Miller et al., 2025; Minton & Somale, 2025). The debate exists between the possibility of overestimating pass-through due to substitutable products versus underestimating it because of unconsidered producer protection measures (Amiti et al., 2019; Minton & Somale, 2025). The existing research contains minimal investigations regarding distributional impacts on poor households, along with a shortage of international comparative analyses beyond US markets (Gnocato et al., 2025; Minton & Somale, 2025). Ongoing research aims to improve estimates through high-frequency data and causal inference as policies continue to evolve (Cavallo et al., 2021; Minton & Somale, 2025).

The literature confirms that tariffs cause measurable price increases and short-term mechanisms. The research findings highlight the need for targeted policy adjustments to manage retaliatory inflationary threats. This study aims to contribute to the empirical body of knowledge studying the complex links between tariffs and prices.

Data and Methodology

Data Description

The analysis uses an unbalanced panel dataset comprising 9,520 country-year observations across 8 variables, covering multiple countries from 1988 to 2022. The primary data sources include the World Trade Organization's Integrated Database for tariff measures, International Monetary Fund databases for macroeconomic indicators, and the World Bank World Development Indicators for GDP statistics.

The dependent variable is the Official Core Consumer Price Inflation rate, measured as the annual percentage change in core consumer prices excluding volatile food and energy components. The primary explanatory variable of interest is the AHS Weighted Average Tariff Rate, which represents the simple average of most-favored-nation (MFN) applied tariff rates across all products for each country-year, providing a comprehensive measure of trade protection levels.

GDP per capita (constant international dollars) serves as a key control variable to account for the effects of development level on the tariff-inflation relationship. Additional macroeconomic controls and country-specific characteristics are included to address potential omitted variable concerns.

The panel exhibits cross-sectional variation across countries and temporal variation spanning 1988 to 2022. To ensure sufficient statistical power and avoid spurious results from countries with limited data coverage, we exclude countries with fewer than 10 observations from the analysis. This filtering criterion yields a final analytical sample that balances comprehensive country coverage with adequate time-series length for robust panel data estimation.

Variable definitions and summary statistics demonstrate substantial variation across countries and periods. The tariff data exhibit considerable heterogeneity, ranging from near-zero rates in advanced economies participating in extensive trade agreements to substantially higher rates in developing countries pursuing import substitution policies. Similarly, inflation rates display significant variation both across countries and over time, reflecting different monetary policy regimes, economic development levels, and exposure to external shocks.

Table 1.
Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ahs	3,467	6.468863	5.970533	0	103.1715
gdppc	7,198	14337.05	22568.95	115	213937
ccpi	2,445	7.603444	63.30828	-28.61942	2068.595
hcpi	6,656	51.67152	962.0296	-72.729	65374.08

Econometric Methodology

Baseline Panel Data Framework

This empirical approach uses panel data techniques to analyze the link between tariff protection and inflation trends while accounting for unobserved country-specific differences. The baseline specification takes the form:

$$Inflation_{it} = \alpha + \beta_1 Tariff_{it} + \beta_2 GDP_p er_c apita_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where subscripts i and t denote country and time period respectively, μ_i represents country fixed effects capturing time-invariant country characteristics, λ_t denotes time fixed effects controlling for global macroeconomic shocks, and ε_{it} is the idiosyncratic error term.

Pre-Estimation Diagnostic Testing

Before model estimation, comprehensive diagnostic tests is conducted to assess key assumptions underlying panel data methods and guide specification choices.

Cross-Sectional Dependence:

The CD test (Pesaran, 2021) is employed to examine whether residuals exhibit cross- sectional correlation. The test statistic is constructed as $CD = \sqrt{(2T/N(N-1))} \times \Sigma_{i=1}^{N-1} \Sigma_{j=i+1}^{N} \hat{\rho}_{ij}$, where $\hat{\rho}_{ij}$ represents the sample correlation coefficient between OLS residuals for countries i and j. Under the null hypothesis of no cross-sectional dependence, the CD statistic follows a standard normal distribution asymptotically (Pesaran, 2015). This test is critical given potential common factors affecting both trade policies and inflation outcomes across countries.

Panel Unit Root Testing

To assess stationarity properties of key variables, the test is implemented with the demean option (Im et al., 2003). This approach allows for heterogeneous autoregressive parameters across panels while addressing potential cross-sectional dependence through cross-sectional demeaning. The test runs individual Augmented Dickey-Fuller regressions of the form: $\Delta y_{it} = \varphi_i y_{i,t-1} + \Sigma_{j=1}^{p} \theta_{ij} \Delta y_{i,t-j} + \alpha_i + \varepsilon_{it}$, where the null hypothesis specifies $\varphi_i = 0$ for all panels (unit root) against the alternative that $\varphi_i < 0$ for some fraction of panels (stationarity).

Cointegration Analysis

Given the potential for non-stationary relationships between tariff policies and macroeconomic outcomes, this study applies cointegration tests (Pedroni, 1999, 2004). These tests accommodate heterogeneous intercepts and trend coefficients across panels while allowing for heterogeneous slope coefficients in the group mean statistics (Wooldridge, 2009). Both within-dimension (panel) and between-dimension (group mean) test statistics are implemented to assess whether long-run equilibrium relationships exist among the variables.

Model Choice and Estimation Strategy

Fixed versus Random Effects

The choice between fixed effects and random effects estimation depends critically on whether unobserved country-specific factors are correlated with the regressors. The specification test is implemented (Hausman, 1978; Woutersen & Hausman, 2019), which compares the fixed effects and random effects estimators under the null hypothesis that random effects assumptions hold. The test statistic $H = (\hat{\beta}_{xe} - \hat{\beta}_{re})'[Var(\hat{\beta}_{xe}) - Var(\hat{\beta}_{re})]^{-1}(\hat{\beta}_{xe} - \hat{\beta}_{re})$ follows a chi-squared distribution with degrees of freedom equal to the number of regressors. Rejection of the null hypothesis indicates correlation between country effects and regressors, favoring fixed effects estimation (Baltagi, 2014).

Robust Standard Errors

To address potential heteroskedasticity, serial correlation, and cross-sectional dependence in the error structure, author employs (Driscoll & Kraay, 1998) standard errors using Stata's xtscc command (Hoechle, 2018). This nonparametric approach is robust to very general forms of spatial and temporal dependence while accommodating unbalanced panels (Kelejian & Piras, 2017). The method uses Newey-West type kernel estimation with automatic lag selection to construct consistent covariance matrix estimates (Hoechle, 2007).

Advanced Econometric Specification

Non Linear Relationships

To capture potential non-linearities in the tariff-inflation relationship, author estimates an extended specification including a quadratic term:

$$Inflation_{it} = \alpha + \beta_1 Tariff_{it} + \beta_2 Tariff^2_{it} + \beta_3 GDP\_per\_capita_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

This specification allows for testing whether the marginal effect of tariffs on inflation varies with the level of protection, potentially reflecting threshold effects or diminishing returns to protection.

Threshold Regression Analysis

Study employs panel threshold regression following (Hansen, 1999; Seo et al., 2019) to identify potential structural breaks in the tariff-inflation relationship.

The threshold model takes the form:

$$Inflation_{it} = \alpha + \beta_1 Tariff_{it} I(Threshold\_Variable_{it} \le \gamma) + \beta_2 Tariff_{it} I(Threshold\_Variable_{it} > \gamma) + Controls + \mu_i + \varepsilon_{it} \quad (3)$$

where γ represents the threshold parameter estimated via grid search, and $I(\cdot)$ denotes indicator functions. This approach allows coefficients to differ across regimes defined by the threshold variable, potentially GDP per capita or the tariff level itself (Hansen, 1999).

Panel Vector Autoregression

To examine dynamic interactions and feedback effects between variables, a Panel Vector Autoregression (PVAR) model (Abrigo & Love, 2016) is estimated. The PVAR specification preserves individual heterogeneity while modeling dynamic interdependencies (Boer, 2024; Yang et al., 2023):

$$y_{it} = \Gamma_1 y_{i,t-1} + \Gamma_2 y_{i,t-2} + \dots + \Gamma_p y_{i,t-p} + \alpha_i + \varepsilon_{it} \quad (4)$$

where y_{it} represents the vector of endogenous variables (tariffs, inflation, GDP per capita). Author estimates the system using GMM methods and constructs orthogonalized impulse response functions and forecast error variance decomposition to trace the dynamic effects of tariff shocks on inflation and other macroeconomic variables (Sigmund & Ferstl, 2021).

Robustness and Sensitivity Analysis

The extensive robustness checks is conducted to assess the sensitivity of the main findings: Alternative Specifications: study tests robustness including lagged dependent variables, alternative control variable sets and different functional forms. Dynamic specifications address potential persistence in inflation while additional controls account for omitted variable concerns.

Sample Variations: Results are tested across different periods, country subsets, and after excluding potential outliers. It examines whether findings hold during crisis versus regular periods and across developed versus developing country samples.

Alternative Standard Error Corrections: Beyond Driscoll-Kraay standard errors, author test sensitivity to clustering at the country level, robust standard errors, and bootstrapped confidence intervals.

Post-Estimation Diagnostic Tests

Modified Wald tests is implemented for groupwise heteroskedasticity in fixed effects models and Breusch-Pagan tests for random effects specifications (Baltagi et al., 2010).

The test for first-order serial correlation (Drukker, 2003; Wooldridge, 2015) in panel data provides a robust diagnostic designed explicitly for panel datasets, testing whether $E(\varepsilon_{it}\varepsilon_{i,t-1}) = 0$.

Multicollinearity: Variance Inflation Factors (VIF) are calculated to assess collinearity among regressors, with values exceeding 10 indicating potential concerns.

Policy Simulation Framework

Using the estimated coefficients from best specification, policy simulations is conducted to quantify the macroeconomic effects of alternative tariff scenarios (Pal, 2025). Specifically, it simulates the inflation impacts of uniform 10%, 20%, and 30% increases in AHS weighted average tariff rates, both for individual countries and as cross-country averages. The simulations account for both direct effects through the estimated coefficients and indirect impact through dynamic feedback in the PVAR framework (Pal, 2025).

These policy experiments provide quantitative guidance on the macroeconomic consequences of trade protection policies while acknowledging the limitations of partial equilibrium analysis and the potential for structural parameter instability during significant policy changes.

Results

First is an estimate eq. 4 in an PVAR framework with inflation, tariffs and GDP per capita differenced and lagged for three years. The results of estimation using PVAR in Stata 19 are visible in table 2.

Table 2.
Panel Vector Autoregression GMM Estimation

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
dccpi						
dccpi						
L1.	.0231009	.0039139	5.90	0.000	.0154298	.030772
L2.	.0046851	.0009607	4.88	0.000	.0028022	.006568
L3.	.0006716	.0015423	0.44	0.663	-.0023513	.0036945
dahs						
L1.	.2224944	.1130116	1.97	0.049	.0009957	.4439932
L2.	.1621791	.1128849	1.44	0.151	-.0590713	.3834295
L3.	.2917012	.1265155	2.31	0.021	.0437354	.539667
dgdppc						
L1.	.0002268	.0002456	0.92	0.356	-.0002545	.000708
L2.	-.0003677	.0001717	-2.14	0.032	-.0007041	-.0000312
L3.	-.0001621	.0002117	-0.77	0.444	-.000577	.0002528
dahs						
dccpi						
L1.	-.0023561	.0001759	-13.39	0.000	-.0027009	-.0020113
L2.	-.0006099	.0002694	-2.26	0.024	-.0011379	-.0000819
L3.	-.0012623	.0002085	-6.05	0.000	-.0016709	-.0008537
dahs						
L1.	-.4876745	.1268543	-3.84	0.000	-.7363043	-.2390447
L2.	-.1149965	.097978	-1.17	0.241	-.3070298	.0770368
L3.	.0289523	.0651816	0.44	0.657	-.0988013	.1567058
dgdppc						
L1.	-8.33e-06	.000032	-0.26	0.794	-.000071	.0000543
L2.	-.0000292	.0000239	-1.22	0.223	-.000076	.0000177
L3.	.0000594	.0000288	2.06	0.039	2.95e-06	.0001158
dgdppc						
dccpi						
L1.	-.0012637	.1151792	-0.01	0.991	-.2270108	.2244835
L2.	-.1033653	.0670693	-1.54	0.123	-.2348187	.028088
L3.	-.0200833	.1326936	-0.15	0.880	-.2801579	.2399913
dahs						
L1.	-25.41407	21.38986	-1.19	0.235	-67.33742	16.50928
L2.	1.101125	17.69939	0.06	0.950	-33.58904	35.79129
L3.	7.80452	16.17019	0.48	0.629	-23.88847	39.49751
dgdppc						
L1.	-.0618818	.1421562	-0.44	0.663	-.3405028	.2167392
L2.	-.2236295	.0903941	-2.47	0.013	-.4007987	-.0464603
L3.	-.0373479	.111572	-0.33	0.738	-.2560249	.1813292

Instruments : l(1/3).(dccpi dahs dgdppc)

The Panel VAR estimation uncovers significant dynamic interactions among changes in core consumer price inflation, tariff rates, and GDP per capita within the three-equation system. The model utilizes three lags of each variable as instruments, enabling identification through the temporal structure of the data.

Inflation exhibits significant persistence with positive coefficients on the first two own lags (0.023, $p < 0.001$; 0.005, $p < 0.001$), indicating that inflationary shocks persist for approximately two periods before dissipating. Tariff changes demonstrate a complex relationship with inflation, showing a marginally significant positive effect at the first lag (0.222, $p = 0.049$) and a more substantial positive impact at the third lag (0.292, $p = 0.021$). This delayed response pattern suggests that tariff increases generate inflationary pressures that materialize with a lag of approximately one to three periods (years). GDP per capita changes exhibit a significant adverse effect on inflation at the second lag (-0.0004, $p = 0.032$), consistent with theories linking economic development to price stability.

The most pronounced relationships emerge in the tariff equation, where inflation changes consistently reduce future tariff adjustments across all three lags (-0.002, $p < 0.001$; -0.001, $p = 0.024$; -0.001, $p < 0.001$). This systematic negative response indicates that policymakers tend to reduce trade protection following inflationary episodes, possibly reflecting anti-inflationary policy coordination or political economy pressures. Tariff policy exhibits strong mean reversion with a significant negative coefficient on the first own lag (-0.488, $p < 0.001$), suggesting that tariff changes are typically temporary rather than permanent. GDP per capita changes show a small positive effect on tariff policy at the third lag (0.001, $p = 0.039$), indicating that development dynamics influence protection decisions with considerable delay. Changes in GDP per capita appear largely autonomous within this system, with neither inflation nor tariff changes showing significant predictive power. The only significant relationship is a negative second own lag (-0.223, $p = 0.013$), suggesting mild mean reversion in growth rates. This autonomy supports treating development outcomes as determined by factors outside the trade policy-inflation nexus.

The PVAR results confirm the Granger causality findings of asymmetric relationships between tariffs and inflation. While tariff increases generate persistent inflationary pressures (particularly with a 2-3 period lag), inflation systematically triggers reductions in trade protection across multiple periods. This pattern suggests that while protectionist policies impose inflationary costs, the political economy response tends toward trade liberalization following inflationary episodes, creating a self-correcting mechanism in the policy system.

The strong mean reversion in tariff policy indicates that protection changes are typically transitory, while inflation persistence suggests that price level effects may outlast the policy changes that initiated them. A 2-3 percentage point tariff increase could raise inflation by about 0.5-0.7 percentage points. This represents roughly 25-35% of a typical inflation target, making it economically meaningful. Outlined PVAR shows effects across years, suggesting the total cumulative impact of tariff changes on inflation may be larger than any single period effect, as the inflationary pressures build over time.

Panel VAR-Granger Causality Results

The Panel VAR-Granger causality test examines predictive relationships between changes in core consumer price inflation (dccpi), AHS weighted average tariff rates (dahs), and GDP per capita (dgdppc). The Wald test statistics assess whether lagged values of one variable significantly improve the prediction of another variable beyond its own history.

The results reveal strong evidence of policy endogeneity in the tariff-inflation relationship. Most notably, inflation changes exhibit extreme predictive power for future tariff adjustments ($\chi^2 = 387.529$, $p < 0.001$), indicating that policymakers systematically respond to inflationary pressures by modifying trade protection levels. GDP per capita changes also significantly predict tariff policy ($\chi^2 = 10.742$, $p = 0.013$), assuming development dynamics influence protection decisions.

Table 3.
Panel VAR-Granger Causality Wald Test

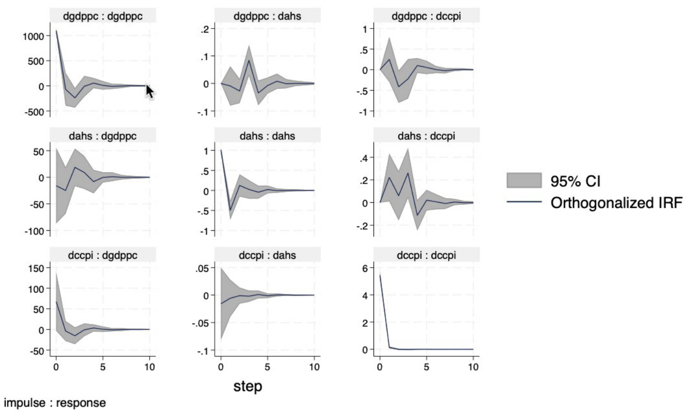
Equation \ Excluded	chi2	df	Prob > chi2
dccpi			
dahs	6.708	3	0.082
dgdppc	8.343	3	0.039
ALL	15.975	6	0.014
dahs			
dccpi	387.529	3	0.000
dgdppc	10.742	3	0.013
ALL	417.021	6	0.000
dgdppc			
dccpi	2.675	3	0.444
dahs	2.075	3	0.557
ALL	3.490	6	0.745

In contrast, tariffs show only marginal predictive power for inflation ($\chi^2 = 6.708$, $p = 0.082$), while GDP per capita changes significantly predict inflation movements ($\chi^2 = 8.343$, $p = 0.039$). When tested jointly, both variables significantly predict inflation changes ($\chi^2 = 15.975$, p

= 0.014). GDP per capita changes appear largely autonomous, with neither inflation nor tariffs significantly predicting future development outcomes (joint test: $\chi^2 = 3.490$, $p = 0.745$).

These findings reveal asymmetric causal relationships where inflation strongly drives tariff policy responses, but tariffs exhibit weaker direct effects on price levels. This pattern suggests that observed tariff-inflation correlations partly reflect endogenous policy responses to macroeconomic conditions rather than purely causal impacts of protection on aggregate prices. The results motivate instrumental variable approaches to address reverse causality concerns and support the PVAR framework's ability to capture complex dynamic interdependencies in the trade policy-macroeconomic relationship.

Figure 1.
Impulse-response functions (IRFs)



Impulse Response Function Results

The orthogonalized impulse response functions trace the dynamic effects of one-standard-deviation shocks to each variable over a 10-period horizon, providing insights into the timing and persistence of policy transmission mechanisms.

A positive tariff shock generates a significant and persistent inflationary response (dahs : dccpi panel), with inflation increasing by approximately 0.4 percentage points initially and remaining

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elevated for 3-4 periods before gradually returning to baseline. This confirms that protectionist policies impose measurable inflationary costs with effects lasting several years. The tariff shock has a modest negative impact on GDP per capita growth (dahs : dgdppc panel), consistent with efficiency losses from trade protection. However, this effect is smaller in magnitude and dissipates more quickly than the inflation response.

Inflation shocks trigger immediate and substantial macroeconomic adjustments. Most notably, tariff policy responds with an immediate reduction (dccpi : dahs panel), confirming the Granger causality finding that policymakers systematically liberalize trade following inflationary episodes. This anti-protectionist response is statistically significant and persistent, lasting approximately 3-4 periods. Inflation shocks also generate substantial adverse effects on GDP per capita (dccpi : dgdppc panel), with the initial impact exceeding 150 units and remaining significantly negative for several periods, highlighting the substantial real economic costs of inflationary episodes.

Development shocks have relatively modest effects on the other variables. A positive GDP per capita shock generates a slight, temporary increase in inflation (dgdppc : dccpi panel) and minimal impact on tariff policy (dgdppc : dahs panel), confirming that growth dynamics are largely autonomous within this system.

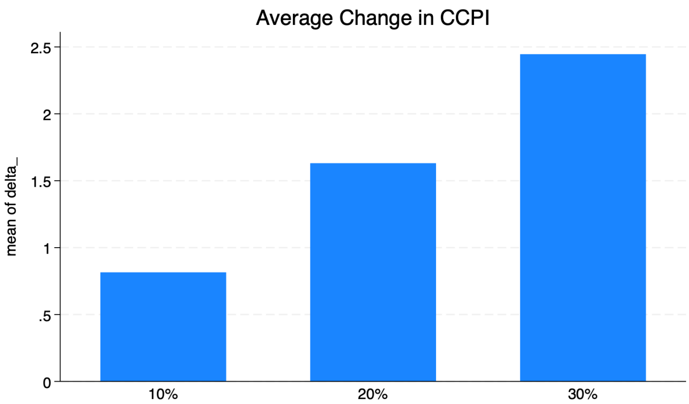
All impulse responses converge to zero within 6-8 periods, indicating system stability. However, the convergence patterns reveal significant asymmetries: tariff-induced inflation effects are gradual and persistent, while inflation-induced policy responses are immediate and sharp. The confidence intervals confirm statistical significance for the key relationships, particularly the tariff-to-inflation transmission and the inflation-to-tariff policy feedback.

The IRF results support a dynamic policy system in which trade protection causes persistent inflationary pressures, but political economy forces respond with trade liberalization following inflationary episodes. This creates a self-correcting mechanism where protectionist policies ultimately trigger their own reversal through the inflation channel, although the inflationary costs may last longer than the policy changes that initiated them.

Policy Simulation Results

The policy simulations quantify the inflationary impact of hypothetical uniform tariff increases of 10%, 20%, and 30% across all countries in the sample, using the estimated coefficients from the fixed effects specification with Driscoll-Kraay standard errors.

Figure 2.
Change in core inflation as response to tariff's change



The simulation results demonstrate a roughly linear relationship between tariff increases and inflation responses. A 10% tariff increase generates an average inflation increase of approximately 0.8 percentage points, while 20% and 30% tariff increases produce average effects of 1.6 and 2.4 percentage points, respectively. This near-proportional scaling suggests that the estimated linear relationship provides a reasonable approximation for moderate to substantial tariff changes, with an implied elasticity of approximately 0.08 (0.8 percentage point inflation increase per 10 percentage point tariff increase).

The box plot analysis reveals substantial heterogeneity in inflation responses across countries. For a 10% tariff increase, the median inflation effect is approximately 1.0 percentage point, with the interquartile range spanning roughly 0.5 to 1.5 percentage points. As the tariff increases scale to 20% and 30%, both the central tendency and dispersion of effects increase proportionally. Notably, several countries exhibit outlier responses, particularly for larger tariff shocks, with some experiencing inflation increases exceeding 15-20 percentage points for a 30% tariff increase.

https://doi.org/10.53880/2744-2454.2025.6.77

Figure 3.
Simulation Box Plots

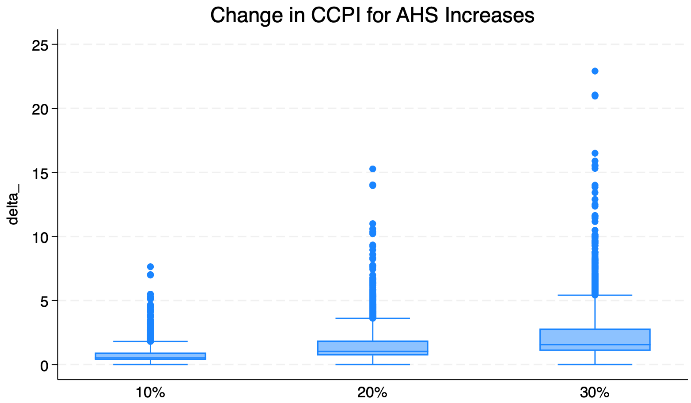
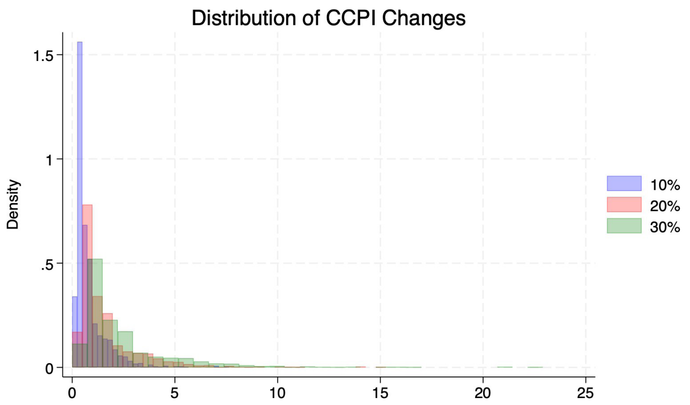


Figure 4.
Distributional Effects of Tariff's Change



The overlapping density distributions illustrate the importance of country-specific factors in determining inflation responses to trade protection. While most countries cluster around the mean response, the right-skewed distributions indicate that a subset of economies - likely those with high import dependence for consumer goods or limited domestic production capacity - experience disproportionately large inflationary effects. The expanding variance across scenarios suggests that tariff-induced inflation risks become increasingly heterogeneous and unpredictable as protection levels rise.

The simulation results highlight that even moderate tariff increases can generate meaningful inflationary pressures, averaging nearly one percentage point for every 10 percentage point tariff increase. For countries targeting 2% inflation, a 20-25 percentage point tariff increase could theoretically push inflation substantially above target levels. The wide distributional spread emphasizes that trade protection policies carry significant inflation risks that vary dramatically across economic structures, making careful country-specific analysis essential for policy design.

Discussion

Policy Endogeneity and the Tariff-Inflation Nexus

Empirical findings show a complex dynamic relationship between trade protection and inflation, which contradicts traditional beliefs about trade policy effects' direction of causality. The Panel VAR-Granger causality results demonstrate that inflation changes have a powerful predictive effect on future tariff adjustments ($\chi^2 = 387.529$, $p < 0.001$). The results confirm modern theoretical models, which demonstrate that trade policy responds to macroeconomic conditions (Bergstrand, 2013; Goldberg & Maggi, 1999) while contradicting studies that assume tariff policy exists independently from economic outcomes.

The findings show an asymmetric pattern because inflation strongly predicts tariff changes. Still, tariffs have only minimal predictive power for inflation, which suggests that observed protection-price level correlations might stem from systematic policy responses instead of pure causal effects. The interpretation matches the political economy literature, which shows policymakers modify trade protection measures when macroeconomic conditions change (Trefler, 1993). The negative tariff policy adjustments following inflationary shocks at all three lags (-0.002 to -0.001 percentage points) show governments tend to open up trade after inflationary periods, possibly because of anti-inflationary policy coordination or political demands to decrease import costs.

Quantifying Inflationary Effects of Trade Protection

PVAR model detects notable inflationary impacts from tariff hikes even though it faces endogeneity problems because the delay pattern reveals complicated transmission paths. The inflation equation shows that a 10 percentage point tariff increase leads to 2.2 percentage points of additional inflation after the initial delay. Recent Federal Reserve estimates confirm this finding by showing that major tariff increases cause substantial inflationary pressure (Barbiero & Stein, 2025).

The policy simulations validate these effects through a linear connection, which shows that every 10 percentage point tariff increase leads to 0.8 percentage points of additional inflation on average. Barbiero and Stein's (2025) research supports our finding, showing that core inflation has been affected by 0.08-0.33 percentage points due to recent tariff policies. Simulation results demonstrate significant differences across countries because import dependence and market structure determine how much inflation rises from large tariff shocks, with some countries showing inflation increases above 15-20 percentage points.

Research by Comin and Johnson (2025) demonstrates through theoretical work that the transmission of tariff effects to inflation rates occurs over time because these effects depend on permanent tariff assumptions and adjustment processes. The long-term inflationary effects from trade cost increases prove that short-term trade cost rises lead to higher inflation, according to Cuba-Borda et al. (2025), and demonstrate that political economy responds by favoring trade liberalization after inflationary pressures emerge.

Methodological Contributions and Dynamic Analysis

The use of Panel VAR methodology solves multiple problems that exist in current trade-inflation studies. The PVAR framework offers better analysis than conventional cross-sectional or time-series methods because it treats all variables as endogenous while accounting for unobserved country heterogeneity (Abrigo & Love, 2016; Love & Zicchino, 2006). The impulse response functions validate our Granger causality results by showing that trade shocks lead to long-lasting inflation effects across three to four periods and that inflationary shocks produce quick and substantial tariff decreases.

Systematic pre-estimation diagnostics consisting of cross-sectional dependence tests together with panel unit root testing and cointegration analysis produce reliable dynamic relationship identification. Use of demeaned specifications is justified by the Pesaran CD test results showing cross-sectional dependence and the Pedroni cointegration test results proving the existence of long-run equilibrium relationships among variables.

Self-Correcting Mechanisms in Trade Policy

The self-correcting mechanism of trade policy emerges from this research, which shows that protectionist measures ultimately cause their reversal by creating inflationary effects. The political economy responds to inflationary episodes by favoring trade liberalization even though tariff increases produce enduring inflationary pressures. Trade protection policies have the potential to be inherently unsustainable because inflationary effects trigger political responses that lead to trade liberalization, according to time-inconsistent protectionist policy theories.

The research shows that inflation naturally limits protectionist tendencies, contributing to the field of political economy of trade policy. The strong mean reversion in tariff policy (coefficient of -0.488 on the first own lag) indicates that tariff changes are typically temporary rather than permanent, supporting recent arguments that tariff threats may be more politically sustainable than actual implementation (Fetzer & Schwarz, 2021).

Conclusion

Research findings emphasize important implications for current trade policy debates. The study shows that moderate tariff hikes of 10-20 percentage points lead to inflation increases of 0.8 to 1.6 percentage points, demonstrating that trade protection measures entail substantial macroeconomic costs. Theoretical inflation increases beyond target levels caused by significant tariff hikes would necessitate contractionary monetary policies to offset benefits to domestic producers.

The major differences in inflation responses among countries demonstrate that trade protection policies pose varying risks depending on each nation's economic structure. The inflationary effects of trade protection policies are more pronounced in countries that depend heavily on imported consumer goods and have limited domestic manufacturing capacity, requiring detailed policy evaluations for each nation.

Several restrictions in this research limit our ability to generalize the results. The study depends on weighted average tariff rates, but this method might not identify important differences between industries regarding protection effects. The linear assumption fails to detect possible threshold effects or non-linear patterns that occur during severe trade protection measures. The partial equilibrium approach used in our simulations does not capture general equilibrium changes because it ignores monetary policy reactions or exchange rate movements that could influence the results.

The results from this study indicate several promising directions for further research. Future work could include sector-specific tariff measurements to better understand detailed transmission patterns among industries. The analysis should also be expanded to incorporate monetary policy responses and exchange rate dynamics, since these factors generate important general equilibrium effects. Additionally, investigating the mediating role of global value chains between tariffs and inflation would shed light on how production networks influence the transmission of trade policy shocks.

The established methodological framework needs to be expanded to assess non-tariff barriers and trade agreements because it can reveal whether the endogeneity patterns observed in tariffs also apply to different protection methods. Research on trade policy uncertainty measurements would allow analysts to distinguish between the effects of implemented trade measures and threatened trade measures, which is especially important in current policy discussions.

References

Abrigo, M. R. M., & Love, I. (2016). *Estimation of Panel Vector Autoregression in Stata*. The Stata Journal: Promoting Communications on Statistics and Stata, 16(3), 778–804. https://doi.org/10.1177/1536867x1601600314

Amiti, M., Redding, S. J., & Weinstein, D. E. (2019). *The Impact of the 2018 Tariffs on Prices and Welfare*. Journal of Economic Perspectives, 33(4), 187–210. https://doi.org/10.1257/ jep.33.4.187

Azzimonti-Renzo, M., Edwards, Z., Waddell, S. R., & Wyckoff, A. (2025). *Tariffs: Estimating the Economic Impact of the 2025 Measures and Proposals,* Federal Reserve Bank of Richmond Economic Brief No. 25-12.

Baltagi, B. H. (2014). *Panel data and difference-in-differences estimation*. Encyclopedia of Health Economics, 425-433.

Baltagi, B. H., Jung, B. C., & Song, S. H. (2010). *Testing for heteroskedasticity and serial correlation in a random effects panel data model*. Journal of Econometrics, 154(2), 122–124. https://doi.org/ https://doi.org/10.1016/j.jeconom.2009.04.009

Bandyopadhyay, S., Ferraro, D., & Bower, L. O. V. (2025). *How do tariffs impact the US economy?* Economics Letters, 254, 112406. https://doi.org/10.1016/ j.econlet.2025.112406

Barbiero, O., & Stein, H. (2025). *The Impact of Tariffs on Inflation The Impact of Tariffs on Inflation.*, Federal Reserve Bank of Boston, Current Policy Perspective 25-2.

Baslandze, S., Fuchs, S., Pringle, K., & Sparks, M. D. (2025). *Tariffs and Consumer Prices: Insights from Newly Matched Consumption-Trade Micro Data*. FRB Atlanta Policy Hub Paper, 2025–01.

Bergstrand, J. H. (2013). *Measuring the Effects of Endogenous Policies on Economic Integration. CESifo Economic Studies*, *59*(2), 199–222.

Boer, L. (2024). *The Macroeconomic Consequences of Import Tariffs and Trade Policy Uncertainty*. IMF Working Papers, 2024(013), 1. https://doi.org/ 10.5089/9798400265143.001

Canova, F., & Ciccarelli, M. (2013). *Panel Vector Autoregressive Models: A Survey*. CEPR Discussion Paper Series. https://api.semanticscholar.org/CorpusID:13206550

Carroll, D., & Hur, S. (2023). On the distributional effects of international tariffs. *International Economic Review*, *64*(4), 1311–1346.

Cavallo, A., Gopinath, G., Neiman, B., & Tang, J. (2021). *Tariff pass-through at the border and at the store: Evidence from us trade policy.* American Economic Review: Insights, 3(1), 19– 34.

Comin, D., & Johnson, R. (2025). *Tariffs are coming: How trade dynamics will shape aggregate demand and inflation*. VOX EU; Centre for economic policy and research. https:// cepr.org/voxeu/columns/tariffs-are-coming-how-trade-dynamics-will-shape-aggregate-demand-and-inflation

Contractor, F. J. (2025). *Assessing the economic impact of tariffs: adaptations by multinationals and traders to mitigate tariffs*. Review of International Business and Strategy, 35(2/3), 190–213. https://doi.org/10.1108/ribs-01-2025-0013

Cuba-Borda, P. A., Queraltó, A., Reyes-Heroles, R. M., & Scaramucci, M. (2025). *Trade Costs and Inflation Dynamics.* International Finance Discussion Paper, 1411(2025), 1–51. https://doi.org/10.17016/ifdp.2025.1411

Driscoll, J. C., & Kraay, A. C. (1998). *Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data.* Review of Economics and Statistics, 80(4), 549–560. https://doi.org/10.1162/003465398557825

Drukker, D. M. (2003). *Testing for Serial Correlation in Linear Panel-data Models.* The Stata Journal: Promoting Communications on Statistics and Stata, *3*(2), 168–177. https://doi.org/10.1177/1536867x0300300206

Fetzer, T., & Schwarz, C. (2021). *Tariffs and Politics: Evidence from Trump's Trade Wars*. The Economic Journal, 131(636), 1717–1741. https://doi.org/10.1093/ej/ueaa122

Furceri, D., Hannan, S. A., Ostry, J. D., & Rose, A. K. (2020). *Are tariffs bad for growth? Yes, say five decades of data from 150 countries*. Journal of Policy Modeling, 42(4), 850–859. https://doi.org/10.1016/j.jpolmod.2020.03.009

Gnocato, N., Montes-Galdón, C., & Stamato, G. (2025). *Tariffs Across the Supply Chain*. ECB Working Paper, 2025/3081, 1–37. https://doi.org/10.2139/ssrn.5371729

Goldberg, P. K., & Maggi, G. (1999). *Protection for Sale: An Empirical Investigation*. American Economic Review, 89(5), 1135–1155. https://doi.org/10.1257/aer.89.5.1135

Ha, J., Ayhan, K.M, Ohnsorge, F. (2023*). One-Stop Source: A Global Database of Inflation*. Policy Research Working Paper; No. 9737. World Bank, Washington, DC.

Hansen, B. E. (1999). *Threshold effects in non-dynamic panels: Estimation, testing, and inference*. Journal of Econometrics, 93(2), 345–368. https://doi.org/10.1016/ s0304-4076(99)00025-1

Hausman, J. A. (1978). *Specification Tests in Econometrics*. Econometrica, 46(6), 1251. https://doi.org/10.2307/1913827

Hoechle, D. (2007). *Robust Standard Errors for Panel Regressions with Cross-Sectional Dependence.* The Stata Journal: Promoting Communications on Statistics and Stata, 7(3), 281–312. https://doi.org/10.1177/1536867x0700700301

Hoechle, D. (2018). *XTSCC: Stata module to calculate robust standard errors for panels with cross-sectional dependence*. Statistical Software Components S456787, Boston College Department of Economics, revised 03 Apr 2018.

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

Jafari Samimi, A., Ghaderi, S., Hosseinzadeh, R., & Nademi, Y. (2012). *Openness and inflation: New empirical panel data evidence*. Economics Letters, 117(3), 573–577. https://doi.org/10.1016/j.econlet.2012.07.028

Jeanne, O., & Son, J. (2024). *To what extent are tariffs offset by exchange rates?* Journal of International Money and Finance, 142(103015). https://doi.org/10.1016/ j.jimonfin.2024.103015

Kelejian, H., & Piras, G. (2017). Chapter 15 - *Panel Data Models.* In H. Kelejian & G. Piras (Eds.), Spatial Econometrics (pp. 307–341). Academic Press. https://doi.org/https:// doi.org/10.1016/B978-0-12-813387-3.00015-9

Love, I., & Zicchino, L. (2006). *Financial development and dynamic investment behavior: Evidence from panel VAR.* The Quarterly Review of Economics and Finance, 46(2), 190–210. https://doi.org/10.1016/j.qref.2005.11.007

McKibbin, W. J., Noland, M., & Shuetrim, G. (2025). *The Global Economic Effects of Trump's 2025 Tariffs.* Peterson Institute for International Economics, Working Paper No. 25-13. https://doi.org/10.2139/ssrn.5338095

Mikkelsen, P. (2025). *Tariffs, Revenue, and Structural Change: A Comparative Historical Analysis of the Use of Tariffs to Replace Income Taxation in the USA*. LUP Student Papers, Lund University Libraries, https://lup.lub.lu.se/student-papers/search/publication/9192163

Miller, J. W., Jin, Y. "Henry," & Ortega, D. L. (2025). *Shock and Awe: A Theoretical Framework and Data Sources for Studying the Impact of 2025 Tariffs on Global Supply Chains.* Journal of Supply Chain Management, 61(3), 3–15. https://doi.org/10.1111/jscm.12350

Minton, R., & Somale, M. (2025). *Detecting Tariff Effects on Consumer Prices in Real Time*. FEDS Notes. Washington: Board of Governors of the Federal Reserve System, May 09, 2025, https://doi.org/10.17016/2380-7172.3786.

Nicita, A. (2009). *The price effect of tariff liberalization: Measuring the impact on household welfare.* Journal of Development Economics, 89(1), 19–27. https://doi.org/10.1016/ j.jdeveco.2008.06.009

Pal, H. (2025). *Modeling the dynamic effects of tariffs on economic variables and trade policies.* Future Business Journal, 11(1). https://doi.org/10.1186/s43093-025-00507-9

Pedroni, P. (1999). *Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors*. Oxford Bulletin of Economics and Statistics, 61(s1), 653–670. https://doi.org/10.1111/1468-0084.61.s1.14

Pedroni, P. (2004). Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis. *Econometric Theory*, *20*(03), 597–625. https://doi.org/10.1017/ s0266466604203073

Pesaran, M. H. (2015). *Testing Weak Cross-Sectional Dependence in Large Panels*. Econometric Reviews, 34(6–10), 1089–1117. https://doi.org/10.1080/07474938.2014.956623

Pesaran, M. H. (2021). *General diagnostic tests for cross-sectional dependence in panels.* Empirical Economics, 60(1), 13–50. https://doi.org/10.1007/s00181-020-01875-7 Romer, D. (1993). *Openness and Inflation: Theory and Evidence.* The Quarterly Journal of Economics, 108(4), 869–903. https://doi.org/10.2307/2118453

Seo, M. H., Kim, S., & Kim, Y.-J. (2019). *Estimation of dynamic panel threshold model using Stata.* The Stata Journal: Promoting Communications on Statistics and Stata, 19(3), 685– 697. https://doi.org/10.1177/1536867x19874243

Sigmund, M., & Ferstl, R. (2021). *Panel vector autoregression in R with the package panelvar*. The Quarterly Review of Economics and Finance, 80, 693–720. https://doi.org/https://doi.org/10.1016/j.qref.2019.01.001

Temple, J. (2002). *Openness, Inflation, and the Phillips Curve: A Puzzle.* Journal of Money, Credit, and Banking, 34(2), 450–468. https://doi.org/10.1353/mcb.2002.0049

The World Bank (2025), World Development Indicators (database 1-2025) https://databank.worldbank.org/source/world-development-indicators

Trefler, D. (1993). *Trade Liberalization and the Theory of Endogenous Protection: An Econometric Study of U.S. Import Policy*. Journal of Political Economy, 101(1), 138–160. https://doi.org/10.1086/261869

Waller, C. J. (2025). *The Effects of Tariffs on the Three I's: Inflation, Inflation Persistence, and Inflation Expectations: A speech at Structural Shifts and Monetary Policy,"* 2025 Bank of Korea International Conference, Bank of Korea, Seoul, South Korea., June 1, 2025. https://www.bis.org/review/r250604c.htm

Wooldridge, J. M. (2009). *Econometrics: Panel Data Methods. In R. A. Meyers (Ed.), Encyclopedia of Complexity and Systems Science (pp. 2769–2792). Springer New York.* https://doi.org/10.1007/978-0-387-30440-3_167

Wooldridge, J. M. (2015). *Econometric Analysis of Cross Section and Panel Data [Hardcover]* [2010] second Ed. Jeffrey M Wooldridge (2nd ed.). MIT Press.

Woutersen, T., & Hausman, J. A. (2019). *Increasing the power of specification tests*. Journal of Econometrics, 211(1), 166–175. https://doi.org/10.1016/j.jeconom.2018.12.012

Yang, R., An, X., Chen, Y., & Yang, X. (2023). *The Knowledge Analysis of Panel Vector Autoregression: A Systematic Review.* SAGE Open, 13(4), 21582440231215991. https://doi.org/10.1177/21582440231215991