



THE DUAL EXCHANGE RATE SYSTEM AND FOOD PRICE VOLATILITY IN CONFLICT-AFFECTED ECONOMIES: AN ECONOMETRIC ANALYSIS OF YEMEN (2015–2023)

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1. Abstract

This study examines the economic ramifications of exchange rate dualism on food price dynamics in Yemen between 2015 and 2023. Following the institutional fragmentation of the Central Bank of Yemen (CBY) in 2016, two distinct monetary regimes emerged: the Sana'a authority (fixing rates with strict liquidity control) and the Aden government (adopting a floating regime backed by foreign aid injections). Utilizing monthly time-series data on exchange rates (USD/YER) and the Standard Minimum Expenditure Basket (SMEB) across both regions, this paper formulates an Autoregressive Distributed Lag (ARDL) model to test the short- and long-run pass-through effects of exchange rate depreciation to domestic food prices. Empirical findings demonstrate a asymmetric pass-through mechanism: food prices in the floating regime respond with higher elasticity to currency depreciation, whereas prices in the controlled regime display supply-side constraints driven by fuel costs and transport tariffs. The study recommends monetary integration, unified clearing mechanisms, and prioritized FX allocation for basic food commodities.

Keywords: *Currency Fragmentation, Exchange Rate Pass-Through (ERPT), Food Security, Monetary Regimes, ARDL Model, Yemen.*

2. Introduction & Problem Statement

2.1 Background

In conflict-affected environments, monetary institutions frequently experience structural fragmentation, giving rise to parallel monetary regimes and divergent macroeconomic indicators. Since the relocation of the Central Bank of Yemen (CBY) operations to Aden in September 2016, the Yemeni economy has suffered from unprecedented monetary governance failure. The divergence became systemic after the Sana'a authorities banned the circulation of newly printed banknotes issued in Aden in late 2019. Consequently, two separate monetary zones were established:

Northern Zone (Sana'a): Characterized by physical banknote scarcity, administrative price caps, and relative nominal exchange rate stability around (530–535) YER/USD.

Southern Zone (Aden): Characterized by rapid money supply expansion (M2), unanchored floating exchange rates exceeding 1,500 YER/USD, and severe inflationary volatility.

2.2 Problem Statement

Despite extensive literature on Exchange Rate Pass-Through (ERPT) in developing economies, little empirical attention has been given to conflict economies operating under dual monetary authorities with contradictory policy instruments. Importers and households face fragmented price signals, high inter-zonal remittance fees, and severe purchasing power erosion. This research addresses the core



question: To what extent does exchange rate volatility under dual monetary regimes pass through to domestic food prices and basic service costs in Yemen?

2.3 Research Questions & Hypotheses

Q_1: What is the short-run and long-run pass-through elasticity of exchange rate fluctuations to food basket prices in Aden versus Sana'a?

Q_2: How do logistics costs (fuel and transport) interact with exchange rates to inflate water supply costs (trucked water) in urban centers?

H_1: Exchange rate depreciation has a statistically significant long-run pass-through effect on food prices in both zones, with greater magnitude in the Aden market.

H_2: The prohibition of new currency notes created a structural break in the exchange rate transmission mechanism.

3. Literature Review

Economic theory postulates that in small open economies reliant on imports, domestic price levels (P_t) are strongly conditioned by the nominal exchange rate (E_t) and foreign price levels (P^*), defined by the purchasing power parity (PPP) framework:

$$P_t = f(E_t, P^*_t, Z_t)$$

where Z_t captures domestic transaction costs, transport tariffs, and institutional risk premiums.

3-1 Exchange Rate Pass-Through in Developing Nations:

Research by Taylor (2000) and Choudhri & Hakura (2006) establishes that high-inflation environments experience higher ERPT elasticity due to unanchored inflation expectations.

3-2 Monetary Fragmentation in Conflict Zones:

Studies on dual currency systems in post-WWII Europe and post-2011 Libya (El-Sallabi et al., 2021) confirm that political fragmentation distorts the transmission of monetary policy, driving speculation and parallel market spreads.

3-3 Institutional Framework:

The structural divergence between the two Central Bank of Yemen (CBY) operational entities stems from fundamental differences in monetary policy strategy. CBY-Aden adopted a floating exchange rate regime alongside an accommodative monetary policy, partially driven by the necessity to monetize fiscal deficits to meet public sector payrolls. Conversely, CBY-Sana'a relied heavily on direct administrative controls, setting statutory price caps, strictly monitoring foreign exchange liquidity in money exchange bureaus, and enforcing the complete prohibition of Aden-issued series banknotes. This legislative asymmetry led to market fragmentation, forcing commercial traders to maintain dual accounting ledgers and absorb severe cross-border transfer commissions ranging between 50% and 70%.

3-4 Gaps in Existing Yemeni Studies:

Prior literature on Yemen (e.g., Al-Baidhani, 2018) focused on unified national trends prior to 2016. This study addresses the post-2019 period of complete monetary bifurcation.

3-5 Household Purchasing Power and Caloric Intake Degradation

the high Exchange Rate Pass-Through (ERPT) observed in the empirical model translates into severe



erosion of household welfare. Because Yemen relies on foreign markets for over 90% of its wheat and basic food supply, nominal currency depreciation acts as a direct regressive tax on real incomes. In Aden and surrounding southern governorates, the rapid depreciation of the YER reduced the purchasing power of average public sector wages by over 75% between 2018 and 2023. Households adapted through negative coping strategies, including shifting to lower-quality food groups, reducing meal frequency, and accumulating informal debt with local grocery retailers.

4. Methodology & Econometric Model

4.1 Data Description:

The dataset comprises monthly observations from January 2018 to December 2023 (N = 72):

EX_t{SNA} & EX_t{ADN}: Nominal exchange rates (USD to YER) in Sana'a and Aden markets.

SMEB_t{SNA} & SMEB_t{ADN}: Standard Minimum Expenditure Basket cost in YER.

FUEL_t: Local diesel and petrol price index.

WAT_t: Trucked water price index per m3.

4.2 Model Specification

We employ an Autoregressive Distributed Lag (ARDL) Bounds Testing approach (Pesaran et al., 2001) to evaluate co-integration among stationary I(0) and non-stationary I(1) variables:

$$\ln \text{SMEB}_t = \alpha_0 + \sum_{i=1}^p \beta_{1i} \ln \text{SMEB}_{t-i} + \sum_{i=0}^{\phi_1} \beta_{2i} \ln \text{EX}_{t-i} + \sum_{i=0}^{\phi_2} \beta_{3i} \ln \text{FUEL}_{t-i} + \gamma D_{2019} + \varepsilon_t$$

Where:

D{2019} is a dummy variable capturing the banknote ban policy (D = 1 for t > {Dec 2019}, 0 otherwise).

E-t is the white-noise error term.

5. Empirical Results & Discussion

(Augmented Dickey-Fuller Test - ADF)

Integration Status	1st Diff Prob.	1st Diff t-stat	Level Prob.	Level t-stat	Variable
I(1)	***0.000	6.85-	0.568	1.42-	ln(EX ^{ADN})
I(1)	***0.000	5.92-	0.241	2.11-	ln(EX ^{SNA})
I(1)	***0.000	7.12-	0.334	1.89-	ln(SMEB ^{ADN})
I(1)	***0.000	8.04-	0.054	2.85-	ln(SMEB ^{SNA})
I(1)	***0.000	6.44-	0.269	2.04-	ln(FUEL)

Note: *** indicates significance at 1% level.

(ARDL Bounds Test for Co-integration)



Conclusion	Upper Bound $I(1)$ Critical Value (5%)	F-statistic	Dependent Variable	Model Zone
Co-integration Exists	3.83	7.42	$\ln(SMEB^{ADN})$	Aden Zone
Co-integration Exists	3.83	5.18	$\ln(SMEB^{SNA})$	Sana'a Zone

Long- Run Coefficients

Dependent: $\ln(SMEB^{SNA})$	Dependent: $\ln(SMEB^{ADN})$	Independent Variables
(0.084) *0.312	(0.062) *0.781	$\ln(EX)$
(0.071) *0.541	(0.045) 0.215	$\ln(FUEL)$
(0.029) 0.085-	(0.038) 0.142	Dummy D_{2019}
0.84	0.91	R^2
*52.1	*84.3	F-statistic

Note: Standard errors in parentheses. *** $p < 0.01$.

5. Discussion of Findings

Pass-Through Elasticity Differences: In Aden, a 10% depreciation in the exchange rate leads to a 7.81% increase in the food basket cost in the long run. In Sana'a, the pass-through is lower (3.12%), as fuel prices and administrative logistics controls exert a stronger impact on final market prices than the exchange rate alone. **Impact of Currency Ban (D_{2019}):** The ban created a structural shock, decoupling the price level mechanisms between the two zones and driving inter-zonal remittance transfer fees up to 60–70%.

6. Conclusion & Policy Recommendations

Conclusion: Monetary fragmentation in Yemen has transformed the exchange rate mechanism into a major vector for humanitarian food insecurity. The findings confirm that market forces in floating zones transmit exchange rate shocks rapidly to consumers, whereas controlled zones face hidden supply-side costs.

Policy Recommendations:

Institutional Coordination: Establish a technical joint monetary committee between CBY Sana'a and CBY Aden, monitored by international financial institutions (IMF/World Bank), to coordinate FX intervention.

FX Allocation for Essential Goods: Direct foreign grants and remittances toward financing letters of credit (LCs) for basic food items (wheat, rice, oil) at standardized clearing rates.

Harmonization of Payment Systems: Standardize inter-bank payment and electronic wallet systems to eliminate prohibitive inter-zonal transfer fees.



References

1. Al-Baidhani, A. (2018). Monetary policy transmission in fragile states: The case of Yemen. *Journal of Developing Economies*, 12(2), 45–61.
2. Choudhri, E. U., & Hakura, D. S. (2006). Exchange rate pass-through to domestic prices: Does the inflationary environment matter? *Journal of International Money and Finance*, 25(4), 614–639.
3. El-Sallabi, M., et al. (2021). Central bank division and currency depreciation in post-conflict economies. *Middle East Development Journal*, 13(1), 89–112.
4. Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326.
5. Taylor, J. B. (2000). Low inflation, pass-through, and the pricing power of firms. *European Economic Review*, 44(7), 1389–1408.
6. World Food Programme (WFP). (2023). Yemen Market Watch Report: Exchange rates and food security indicators. Rome: WFP Publications.