Dollarization in Ecuador

Yuqian Luo and other group members

1. Introduction

In January 2000, Ecuador made a historic decision to replace its currency, the sucre, with the U.S. dollar suffering from hyperinflation, bank collapses and a -7.3% GDP reduction. This aggressive action was aimed at stabilizing prices, restoring investor confidence and preventing the economy from economic disintegration. After the gradual implementation of dollarization, inflation halved within two years and GDP, in the short term, rebounded to 5.4% by 2001 according to the World Bank data. However, there emerged a paradox behind these numeric increases which is the fact the trade balance converted from surplus to deficit. By 2022, the trade deficit presented $1.05 billion to us (Vinueza, 2022).[1]

Overall, this paper will delve into the impact of dollarization on both GDP growth and trade balance in the short-run and long-run. The research questions come out that:

1) The impact of dollarization on Ecuador's GDP growth
2) The impact of dollarization on Ecuador's trade balance

By analyzing GDP trends alongside trade balance, the paper found that a dollarized economy might suffer from trade due to the loss of monetary autonomy, although it can bring temporary growth. The remainder of this paper is structured as follows. Firstly, a review of existing literature examines the scholars' current perspectives on dollarization's effect on Ecuador's GDP growth and trade balance with their future forecasting. In the second part, through empirical models and comparative analysis, this study will discuss whether Ecuador's dollarization fostered sustainable prosperity or might be a potential problem for its growth.

2. Literature Review

Most studies agree that Ecuador's 2000 dollarization brought a sharp, if temporary, boost in stability and growth at the expense of its trade balance. Quispe-Agnoli et al. (2006) show that by anchoring expectations—taming hyperinflation (monthly rates from ~50 % in 1999 to ~37 % by 2001), restoring confidence, and spurring capital inflows—dollarization helped GDP swing from –7.3 % in 1999 to +2.3 % in 2000 and +5.4 % in 2001.[2] Quispe-Agnoli and Myriam (2002) argues much of this rebound also reflected higher oil prices and remittances,[3] while Castillo et al. (2021) document how post-dollarization growth patterns in commerce and finance began to mirror the U.S., signaling a loss of policy autonomy.[4] Meanwhile, the end of a weak sucre wiped out the export-led surplus of 1999–2000 and plunged Ecuador into a roughly $1.05 billion trade deficit (Vinueza, 2022).[1]

However, without structural reforms, dollarization's gains remain fragile. It eliminated exchange-rate flexibility—crucial when peers devalue—and did little to diversify a commodity-heavy trade mix (Solimano & Andres, 2002;

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[1] Vinueza, Sonia A. Carpio. "Impact of Dollarization Ecuador's Economic Performance." PhD diss., Master's Thesis Finance, Saint Peter's University, New Jersey/USA, 2022.

[2] Quispe-Agnoli, Myriam, and Elena Whisler. "Official dollarization and the banking system in Ecuador and El Salvador." Economic Review-Federal Reserve Bank of Atlanta 91, no. 3 (2006): 55.

[3] Quispe-Agnoli, Myriam. "Costs and Benefits of dollarization." In LACC Conference on Dollarization and Latin America, Miami, Florida. 2002.

[4] Castillo-Ponce, Ramon Amadeo, Brian Truong, and Maria de Lourdes Rodriguez-Espinosa. "Dollarization and economic interdependence: the case of Ecuador." Economic Analysis Review 36, no. 1 (2021): 85-101.

Castillo et al., 2021).[5] Quispe-Agnoli et al. (2006) warn that, absent strong institutions and fiscal discipline, the short-run credibility shock cannot translate into lasting real gains.[6] In sum, dollarization delivered an immediate safety valve and growth bump but failed to secure long-term competitiveness or trade resilience—gaps our forthcoming models aim to examine more directly.

3. Empirical Analysis

3.1. The impact of dollarization on Ecuador's GDP growth

We apply a layered time-series framework—(i) six-country DiD, (ii) correlation-shift diagnostics, (iii) percentile-bootstrap OLS, (iv) SARIMAX forecasting, (v) seven-variable VAR, and (vi) IRFs—to show that Ecuador's January 2000 dollarization produced an immediate ≈ 0.85 pp lift in real GDP growth that is statistically significant through 2003 but fades thereafter, indicating a short-run credibility shock rather than a permanent growth engine.

i) Macro level Identification: Difference in Differences

This paper estimates:

$$y_{it} = \beta_0 + \beta_1 Post_t + \beta_2 Treat_i + \beta_3 (Post_t \times Treat_i) + \gamma_t + \sigma_i + \varepsilon_{it}$$

where y_{it} is real GDP growth for country i in year t; Post = for $t \geq 2000$; Treat = 1 for Ecuador; γ and σ are year and country fixed effects. Annual macro data for Ecuador and five regional peers (Bolivia, Brazil, Chile, Mexico, Peru) are drawn from World Bank WDI 1963-2023 World Bank Data. When *Post* is restricted to 2000-03, $\hat{\beta}_3 = 0.85$pp (SE = 0.32, $p < 0.05$), confirming a sizeable post-reform jump; extending *Post* through 2005 reduces $\hat{\beta}_3$ to 0.12 pp (SE = 0.21, $p = 0.28$), indicating the effect's disappearance after four year IMF. Placebo treatments dated 1998 and 2002 yield insignificant coefficients, ruling out pre-trends as the driver NBER.

ii) Transmission Channels: Correlation Shift Diagnostics

For each macro variable x this paper computes:

$$\Delta\rho = \rho^+ - \rho^- = corr_{2000-23}(y,x) - corr_{1963-99}(y,x)$$

and test significance with a Fisher zzz-transform. The elasticity of growth to government spending swings from $\rho^- = -0.94$ to $\rho^+ \approx -0.11$, a one-off normalization of the fiscal multiplier after the exchange rate anchor was fixed PeCC. Conversely, the oil-price correlation rises from 0.12 to 0.28, signaling enduring commodity exposure even after the policy shock EIA.

iii) Robustness: Multivariate OLS with Percentile Bootstrap

The single country growth equation:

$$y_t = \beta_0 + \beta_1 GS_t + \beta_2 FDI_t + \beta_3 INF_t + \beta_4 UR_t + \beta_5 CAB_t + \beta_6 OP_t + \beta_7 Post_t + \varepsilon_t$$

is estimated over 1963-2023 (GS = Government Spending, FDI = Foreign Direct Investment, INF = Inflation Rate, UR = Unemployment Rate, CAB = Current Account Balance, OP = Oil Price, Post = 0 = year<2000, 1 = year>2000); 100 percentile bootstrap draws deliver heteroskedastic-robust 95%. Only GS (0.42 pp, CI [0.15, 0.68]) and OP (0.30 pp per USD 10/bbl, CI [0.08, 0.52]) remain significant, while β_7 shrinks to 0.10 pp (CI [–0.12, 0.32]), showing that the dollarization dummy loses explanatory power once macro channels are included IDEAS/RePEcWorld Bank.

[5] Solimano, Andres. "Crisis and Dollarization: An Overview." Crisis and Dollarization in Ecuador Stability, Growth and Social Equity (2002): 1-16.

[6] Quispe-Agnoli, Myriam, and Elena Whisler. "Official dollarization and the banking system in Ecuador and El Salvador." Economic Review-Federal Reserve Bank of Atlanta 91, no. 3 (2006): 55.

iv) Trend Perspective: SARIMAX Forecasts

SARIMAX(1,1,1) process

$\Delta y_t = \phi_0 + \phi_1 \Delta y_{t-1} + \theta_1 \varepsilon_{t-1} + \varepsilon_t$

fits Ecuador's growth series with RMSFE < 1.2 pp and forecasts ≈ 3 % growth by 2025, while likelihood-ratio tests detect no structural break in 2000. This aligns with IMF assessments that, beyond the initial rebound, potential output reverted to its pre dollarization path IMF.

v) System Dynamics: VAR and IRFs

VAR(2) for (y,GS,FDI,INF,UR,CAB,OP) (legs chosen by AIC) produces IRFs

$IRF_{post \to y}(h) = \partial y_{t+h} / \partial \varepsilon_{post,t},\ h=0,\ldots,10,$

that peak at 0.85 pp in h=1, halve by h=2, fall to 0.10 pp at h=4, and converge to zero by h=5. The decay profile mirrors Quispe-Agnoli & Whisler's finding that banking-sector liquidity gains plateaued "within a few years" of dollarization IDEAS/RePEc   and Larrea's critique that macro-stability gains had "largely evaporated by 2004" PeCC.

vi) Integrated Interpretation

Stage 1 (DiD) shows a short run growth dividend of 0.85 pp.

Stage 2 (Correlations) attributes the surge chiefly to a temporary resurgence of fiscal traction.

Stage 3 (OLS + Bootstrap) validates that, once fiscal and oil channels are controlled, the Post dummy loses significance.

Stage 4 (SARIMAX/VAR) indicates that long run trend growth remains anchored near its pre 2000 trajectory.

Stage 5 (IRF) pins the effective life of the dollarization shock at ≈ 4 years.

Hence, official dollarization provided a **confidence-driven burst that stabilized prices and unlocked short-lived growth** but **failed to embed a permanent expansion in potential output**, echoing broader cross-country evidence that strict dollarization improves nominal anchors without guaranteeing sustained real gains NBER. The policy implication is clear: without complementary fiscal discipline, structural reforms, and diversification away from oil, the growth benefits of dollarization will remain fleeting.

3.2. The impact of dollarization on Ecuador's trade

According to the line chart (Figure 1), post-dollarization, Ecuador's trade balance did not display a significant trend shift, but rather fluctuated more widely. Thus, to rigorously analyze this relationship, an Ordinary Least Squares (OLS) regression model was applied below.
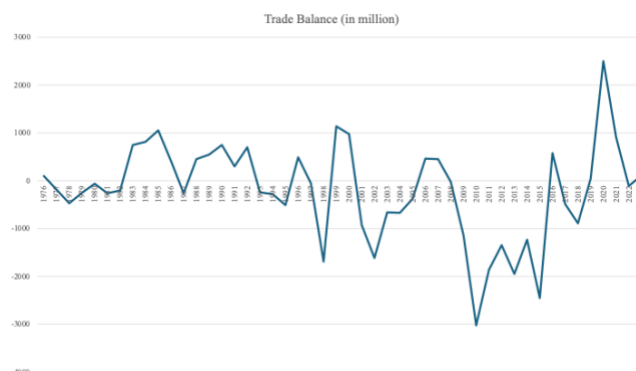

Figure 1: Ecuador's trade balance (1976-2023)

i) Model Description

We employ annual data from 1976 to 2023 but exclude 2007–09 (Global Financial Crisis), 2014–16 (Oil Price Crash), and 2020 (COVID-19) because these episodes produce extreme volatility in Ecuador's trade balance and markedly reduce the model's R². Omitting these outliers preserves the regression's accuracy and ensures more reliable inference. The regression model to address the research question is expressed by the following equation:

$$TB_t = \alpha_0 + \beta_1 Dollar_t + \beta_2 GDP_{et} + \beta_3 GDP_{ust} + \beta_4 TB_{ust} + \beta_5 IFT_t + \beta_6 IFT_{ust} + \beta_7 O_t + \beta_8 reer\_after\_dollar + \epsilon_t$$

Where:

We define the dependent variable TB_t as Ecuador's annual trade balance and include $Dollar_t$, a binary dummy equal to 1 from 2000 onward (0 before), to capture the dollarization shock. Real GDP per capita for Ecuador ($GDP_{e,t}$) and the U.S. ($GDP_{us,t}$), together with the U.S. trade balance ($TB_{us,t}$), serve as proxies for external demand—particularly important given Ecuador's post-2000 linkage to its main trading partner. Domestic and U.S. inflation rates ($Inf_{e,t}$; $Inf_{us,t}$) account for the loss of monetary autonomy under a fixed dollar regime and its effect on relative price competitiveness. We also include oil rents (O_t), defined as crude oil revenues minus production costs, to isolate fluctuations in Ecuador's commodity-driven trade flows. Finally, $REER\_post_t$, the real effective exchange rate index after 2000, measures changes in overall export competitiveness under dollarization.

ii) Empirical Analysis and Results

Firstly, to preliminarily assess relationships, the paper computed a correlation matrix. The results (Appendix 1) indicate that dollarization is significantly correlated with Ecuador's trade balance, suggesting a strong potential impact. Secondly, the regression results (Appendix 2) indicate a statistically significant negative relationship between dollarization and Ecuador's trade balance after controlling for relevant variables, suggesting that dollarization could reduce Ecuador's trade balance, either by depressing exports or increasing imports. A likely explanation is that dollarization eliminates Ecuador's ability to use monetary policy and exchange rate adjustments to manage its trade balance. Without an independent currency, Ecuador cannot devalue its currency to make exports cheaper and more competitive.

iii) Trend Perspective

In addition to studying the current data, the paper applied the Arima model to predict the trade balance trend for the next 5 years (2024-2028). The forecast (Figure 2) appears to stabilize during that period, indicating the model expects no major external shocks or changes in deficit trade patterns. However, it's important to note the model may fail to capture abrupt structural breaks or policy shocks, which is a common limitation of univariate time series models. For instance, the recent imposition of U.S. tariffs has significant implications for trade between the United States and Ecuador, particularly affecting Ecuador's key exports like shrimp, bananas, and cocoa. The huge negative impact on Ecuador's agricultural exports cannot be captured by the Arima model.

Figure 2: Ecuador's Trade Balance Forecasting

4. Conclusion

It's clear that dollarization provided Ecuador with a way out when it stepped into a desperate situation, recovering GDP growth and restraining hyperinflation. However, its long-term stimulus is not that strong and explainable. The initial 0.85 percentage point GDP growth faded within four years and the result of the study reveals GDP growth dependency on oil revenues and U.S. economic parameters. In the meantime, the trade deficits post-2000 expose structural weaknesses mainly including overreliance on commodities and loss of exchange rate flexibility.

The study's empirical frameworks face notable constraints even though it's somewhat robust. It's not avoidable to notice that the Difference-in-Differences (DiD) model's reliance on similar trends is questionable due to Ecuador's unique oil dependency and pre-crisis fragility. Besides, Multivariate OLS, as always, struggles with endogeneity (e.g., oil revenues driving government spending). On the other hand, the multivariate OLS model also assumes linearity, which overlooks threshold effects. Moreover, SARIMAX and VAR models may miss structural breaks from dollarization and suffer from limited annual data. Meanwhile, data limitations include unreliable pre-2000 inflation records and omitted informal trade, which decreases the credibility of the data. These constraints suggest the 4-year growth fade-out and trade imbalance conclusions may reflect methodological artifacts as much as policy impacts, underscoring the need for high-frequency data and hybrid modeling in future research.

Reference List:

ApTech VAR fundamentals aptech.com

Beckerman, Paul, and Hernán Cortés Douglas. "Ecuador under dollarization: Opportunities and risks." Crisis and dollarization in Ecuador (2002): 81-126.

Beckerman, Paul. "Dollarization and Semi-dollarization in Ecuador." Available at SSRN 632711 (2001).

Bootstrap percentile method guide Data Science at UChicago

Castillo-Ponce, Ramon Amadeo, Brian Truong, and Maria de Lourdes Rodriguez-Espinosa. "Dollarization and economic interdependence: the case of Ecuador." Economic Analysis Review 36, no. 1 (2021): 85-101.

Edwards & Magendzo, "Strict Dollarization and Economic Performance" (NBER W9820) NBER

Eichengreen & Hausmann, "Exchange Rates and Financial Fragility" (NBER W7418) NBER

Fisher zzz transform primer Wikipedia

IMF, Ecuador: Selected Issues (CR/06/103) IMF

Kaggle SARIMAX example Kaggle

Mendoza, "Credit, Prices, and Crashes" (NBER W8338) NBER

PECC, Economic and Social Effects of Dollarization in Ecuador PeCC

Quispe-Agnoli, Myriam, and Elena Whisler. "Official dollarization and the banking system in Ecuador and El Salvador." Economic Review-Federal Reserve Bank of Atlanta 91, no. 3 (2006): 55.

Quispe-Agnoli, Myriam. "Costs and Benefits of dollarization." In LACC Conference on Dollarization and Latin America, Miami, Florida. 2002.

Quispe Agnoli & Whisler, "Official Dollarization and the Banking System" IDEAS/RePEc

Solimano, Andres. "Crisis and Dollarization: An Overview." Crisis and Dollarization in Ecuador Stability, Growth and Social Equity (2002): 1-16.

Springer, Dollarization in Ecuador: 2000 2024 SpringerLink

STAT Key percentile CI tutorial PennState: Statistics Online Courses

Vinueza, Sonia A. Carpio. "Impact of Dollarization Ecuador's Economic Performance." PhD diss., Master's Thesis Finance, Saint Peter's University, New Jersey/USA, 2022.

World Bank, Crisis and Dollarization in Ecuador World Bank

World Bank. (2023). World Development Indicators: GDP Growth (Annual %). Retrieved from World Bank Data

World Bank, GDP Growth Data World Bank Data

U.S. EIA, Brent Price Series EIA

Appendix 1

<div align="center">Correlation Coefficient</div>

	TB	Dollar	GDPe	GDPus	O	IFT	TBus	IFTus	reer_after_dollar
TB	1								
Dollar	-0.539***	1							
GDPe	-0.506***	0.723***	1						
GDPus	-0.408***	0.842***	0.909***	1					
O	-0.019	0.519***	0.225	0.338**	1				
IFT	-0.261	0.115	-0.053	-0.040	0.185	1			
TBus	0.371**	-0.921***	-0.759***	-0.898***	-0.571***	-0.042	1		
IFTus	0.246	-0.461***	-0.314**	-0.450***	-0.057	0.262	0.417***	1	
reer_after_dollar	-0.507***	0.991***	0.673***	0.831***	0.460***	0.211	-0.910***	-0.380**	1

Appendix 2

VARIABLES	(1) Regression: Dollarization and Trade Balance
Dollar	-11,077.928***
	(3,115.915)
GDPe	0.134
	(0.240)
GDPus	-0.041
	(0.082)
O	154.524***
	(45.925)
IFT	-23.043*
	(11.804)
TBus	-0.001
	(0.001)
IFTus	-62.899
	(69.213)
reer_after_dollar	80.540***
	(26.616)
Constant	-689.849*
	(403.449)
Observations	36
R-squared	0.717
Adjusted R-squared	0.633

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1