CIDE

LATIN AMERICAN ECONOMIC REVIEW

2026 | Volume 37 | Article 2

Macroeconomic Effects of Dollarization in El Salvador

Miguel Andueza Purgimon* Georgios Karras*,†

Submission received: May 27, 2025
Final version received: November 5, 2025
Accepted: January 22, 2026
Published: February 11, 2026

Abstract

We examine the effects of dollarization on El Salvador's macroeconomy and test whether they have been consistent with standard theoretical predictions. Our evidence suggests that the answer is mostly affirmative. In particular, consistent with the theory, we find that dollarization reduced both the average inflation rate and inflation volatility in El Salvador. Also consistent with theory, this was accompanied by lower business-cycle volatility and without statistically significant effects on trend growth in El Salvador. Contrary to the "endogeneity" hypothesis, however, El Salvador's originally positive business-cycle correlation with the US decreased (and likely became negative) after dollarization.

Keywords: El Salvador, Dollarization, Inflation, Business cycles.
JEL codes: E42, F36, F42.

*University of Illinois at Chicago, Department of Economics, 601 S. Morgan St. UH 725 Chicago, IL 60607, USA. Email: gkarras@uic.edu. We wish to thank, without implicating, Paul Pieper, Darren Lubotsky, Ben Feigenberg, and Brenden Mason. We are also grateful to the Editor and an anonymous Referee of this journal for helpful comments and suggestions. Any errors and omissions are our responsibility.

†Corresponding author

1. Introduction

Dollarization is a form of monetary integration where a country replaces its local currency with the US Dollar as legal tender. This policy has been most commonly adopted by small, open economies seeking to stabilize inflation, secure exchange rate stability, and foster economic integration with larger economies. Among the countries that have fully dollarized, El Salvador stands out, having adopted the US dollar as legal tender in 2001.

While dollarization is a notable phenomenon in international economics, and has been the subject of extensive theoretical and empirical research,[1] we believe it is crucial to examine individual cases to best understand the unique circumstances and challenges associated with this policy. El Salvador provides an excellent case study as it is a small, open economy that has produced occasionally volatile macroeconomic outcomes, making the lessons from its dollarization experience particularly valuable to other economies that are considering dollarization or other forms of monetary unification, such as joining the euro. Both the World Bank (World Bank, 2025) and the IMF (International Monetary Fund, 2025) have elaborated on the relevance of El Salvador and its macroeconomic progress and continued challenges.

El Salvador began its path toward dollarization in 1995 by pegging its currency to the US dollar, with plans for full adoption. This early attempt, however, faced opposition and skepticism from international organizations, which doubted the country's fiscal viability (Schuler and Joint Economic Committee, 1999). The late 1990s saw renewed interest in dollarization, particularly following the Argentinian currency crisis. In El Salvador, newly elected President Francisco Flores capitalized on this momentum, promising to defend the economy from potential currency devaluations by fully adopting the US dollar.

These policy shifts took place alongside broader economic reforms throughout the 1990s, including tariff reductions, the elimination of export taxes, and pension plan reforms. The Central Reserve Bank of El Salvador (BCR) also changed its focus during this period, moving from financing public and private sectors to prioritizing inflation control and maintaining a stable nominal exchange rate with the US dollar.

This paper focuses on the outcomes of these economic changes, investigating their impact on El Salvador's post-dollarization real economic growth and price stability. Guided by the theoretical literature, our research investigates three key elements: the synchronization of business cycles with the US, the behavior of inflation pre- and post-dollarization, and the implications for output growth and its volatility.

Theoretical models of dollarization are often extensions of broader models of monetary policy and monetary integration, such as Alesina and Barro (2001, 2002), and Alesina and Stella (2010). These models deliver a number of predictions suggesting that, under favorable conditions,[2] dollarization should result in lower inflation, reduced volatility of both inflation and output growth, but no effect on average growth of real GDP. We will treat all of these as testable hypotheses and we will examine their empirical validity using pre- and post-dollarization data from El Salvador.

Another theoretical prediction we leverage is related to the "endogeneity" hypothesis of Frankel and Rose (1998) and Rose and Engel (2002). Simply put, the general argument here is that monetary unification will increase business-cycle synchronization between the integrating economies – or between the dollarized economy and the US in the special case of dollarization. This is another testable hypothesis that we will investigate for the case of El Salvador.

Finally, in a recent theoretical contribution, Caravello et al. (2023) develop a dollarization model that makes use of seignorage dynamics and predicts that scarcity of dollars in the dollarized economy could result in an inflation and devaluation spike between the announcement and implementation of dollarization. As the

[1] See for example Berg and Borensztein (2000), Alesina and Barro (2001), Karras (2002), and Caravello et al. (2023).

[2] The exact nature of these conditions will be fully specified in the next section of our paper.

announcement and implementation dates are well known in the case of El Salvador, we treat this theoretical prediction as another testable hypothesis.

In a nutshell, our findings suggest that, with a single exception, the experience of El Salvador with dollarization has been consistent with the consensus theoretical predictions. In particular, we show that dollarization has been followed by reductions in average inflation, inflation volatility, and business-cycle volatility, while it has had no statistically significant effect on trend growth. We also find no evidence of dollar scarcity between the announcement and implementation of dollarization. The exception is our finding that after dollarization El Salvador has been less cyclically correlated with the US, a result that runs counter the "endogeneity" theoretical prediction.

The rest of the paper is organized as follows. Section 2 presents a simple theoretical framework that motivates most of our testable hypotheses. Section 3 discusses some background information and introduces data for El Salvador, while section 4 conducts the formal empirical tests and presents our evidence. Section 5 discusses our findings and concludes.

2. Simple Theoretical Framework

To motivate our testable hypotheses as simply as possible, the theoretical model builds on the approach of Alesina and Barro (2001) and Karras (2011). Output in El Salvador is given by a standard expectations-augmented Aggregate Supply relationship

$$y_{SLV} = \pi_{SLV} - \pi^e_{SLV} + u_{SLV}, \tag{1}$$

where y is output, π is inflation, π^e expected inflation, and u an output shock. We assume that $u_{SLV} \sim \text{iid}(0, \sigma^2_{SLV})$, and trend output has been normalized to zero.

The preferences of the Central Bank of El Salvador are given by the loss function

$$L_{SLV} = \frac{a_{SLV}}{2}\left(y_{SLV} - k_{SLV}\right)^2 + \frac{1}{2}\pi^2_{SLV}, \tag{2}$$

where a_{SLV} is the relative weight of missing the output target, and k_{SLV} is the target level of output. The central bank is assumed to control the inflation rate. We will next compare Central Bank behavior and macroeconomic performance under two regimes: (i) monetary independence and (ii) dollarization.

First, without dollarization, the Central Bank enjoys monetary independence and, taking inflation expectations as given, behaves in a way that minimizes (2) subject to (1). The first-order condition requires:

$$\pi^{IND}_{SLV} = \frac{a_{SLV}}{1 + a_{SLV}}\left(\pi^e_{SLV} - u_{SLV} + k_{SLV}\right), \tag{3}$$

where the "IND" superscript will indicate outcomes under monetary independence. With rational expectations, $\pi^e_{SLV} = \mathbf{E}(\pi_{SLV})$, it follows that $\pi^e_{SLV} = a_{SLV}k_{SLV}$, and thus (3) determines inflation under independent monetary policy as:

$$\pi^{IND}_{SLV} = a_{SLV}k_{SLV} - \frac{a_{SLV}}{1 + a_{SLV}}u_{SLV}, \tag{4}$$

and, substituting in (1), output under independent monetary policy (in deviation from the trend) as:

$$y_{SLV}^{IND} = \frac{1}{1 + a_{SLV}} u_{SLV}. \tag{5}$$

The economy's macroeconomic performance under monetary independence can be characterized as follows. First, average inflation is given by:

$$\overline{\pi}_{SLV}^{IND} = a_{SLV} k_{SLV}, \tag{6}$$

while output volatility equals:

$$\mathbf{Var}\left(y_{SLV}^{IND}\right) = \left(\frac{1}{1 + a_{SLV}}\right)^2 \sigma_{SLV}^2. \tag{7}$$

Note that we obtain the usual trade off between average inflation and output volatility: a lower a_{SLV} (i.e., a more target-conservative Central Bank) reduces the "inflation bias" given by (6), but raises business-cycle volatility as shown in (7).[3]

Next, suppose El Salvador gives up monetary independence and adopts the US dollar as the domestic currency. We assume the US central bank, the Federal Reserve, has a loss function analogous to the one specified by (2), but evaluated at US values, indicated by the "US" subscript:

$$L_{US} = \frac{a_{US}}{2} \left(y_{US} - k_{US}\right)^2 + \frac{1}{2} \pi_{US}^2. \tag{8}$$

The Fed's objective is to minimize (8) subject to the US aggregate supply equation

$$y_{US} = \pi_{US} - \pi_{US}^e + u_{US}. \tag{9}$$

We assume that $u_{US} \sim \text{iid}(0, \sigma_{US}^2)$, and we define $\rho_{SLV,US} \equiv \mathbf{corr}(u_{SLV}, u_{US})$ as the output shock correlation between El Salvador and the US. The Fed's first-order condition implies:

$$\pi_{US} = a_{US} k_{US} - \frac{a_{US}}{1 + a_{US}} u_{US} = \pi_{SLV}^{DOL}, \tag{10}$$

where a "DOL" superscript indicates outcomes under dollarization. Note that this means that expected inflation in El Salvador is now given by $\pi_{SLV}^e = \pi_{US}^e = a_{US} k_{US}$. Substituting into equation (1), this gives Salvadorian output under dollarization as:

$$y_{SLV}^{DOL} = u_{SLV} - \frac{a_{US}}{1 + a_{US} u_{US}}. \tag{11}$$

El Salvador's macroeconomic performance under dollarization can now be described as follows. Average inflation is given by:

$$\overline{\pi}_{SLV}^{DOL} = a_{US} k_{US}, \tag{12}$$

[3] It is easy to see that a similar trade off exists between output volatility and inflation volatility. However, no such trade off exists between inflation and average output: from (5), average output (in deviation from the trend) is given by $\overline{y}_{SLV}^{IND}$, and it is independent of a_{SLV}.

while output volatility equals:

$$\mathbf{Var}\left(y_{SLV}^{DOL}\right) = \sigma_{SLV}^2 + \left(\frac{a_{US}}{1+a_{US}}\right)\sigma_{US}^2 - 2\rho_{SLV,US}\left(\frac{a_{US}}{1+a_{US}}\right)\sigma_{SLV}\sigma_{US}. \tag{13}$$

Comparing (12) to (6) shows the potential macroeconomic benefit of dollarizing: provided a_{US} and k_{US} are "jointly" smaller than a_{SLV} and k_{SLV} (in the precise sense that $a_{US}k_{US} < a_{SLV}k_{SLV}$), then El Salvador's inflation bias will be reduced under dollarization. Put differently, if the Fed's parameter values satisfy $a_{US}k_{US} < a_{SLV}k_{SLV}$, then El Salvador will end up with a lower average ("steady-state") inflation under dollarization.[4] In addition, as noted earlier (see footnote 2), the variance of π_{SLV}^{DOL} is lower than the variance of π_{SLV}^{IND}, so that, under dollarization, El Salvador does not benefit just from lower inflation but from more stable inflation, as well. We rely on these theoretical predictions to derive our first testable hypotheses:

H1: Dollarization should reduce the average (long-run) inflation rate in El Salvador.

H2: Dollarization should reduce inflation volatility in El Salvador.

An additional theoretical prediction about inflation follows from the work of Caravello et al. (2023). As discussed earlier, Caravello et al. (2023) argue that in the pre-dollarization period, a scarcity of US dollars may lead to a spike in short-term inflation, driven by the anticipated conversion of domestic currency and the government's reliance on seigniorage to finance deficits. Their theoretical model predicts that such scarcity can result in rising inflation and devaluation rates as the implementation of dollarization approaches. This scarcity is testable in the case of El Salvador, as the announcement of dollarization (1995) preceded the implementation (2000). Therefore, we derive our third testable hypothesis:

H3: A scarcity of US dollars during the announcement period should result in a temporary spike in short-term inflation as the implementation of dollarization approaches.

Turning next to implications about output, we start by comparing average output under monetary independence (equation (5)) and dollarization (equation (11)). As the literature has repeatedly noted (for example Alesina and Barro (2002)), dollarization is expected to have no effects on average ("trend") output. In particular, average output (in deviations from trend) in both cases is $\overline{y}_{SLV}^{IND} = \overline{y}_{SLV}^{DOL} = 0$, so that dollarization is predicted to have no effect on "trend" real GDP growth. We formalize this as our fourth testable hypothesis:

H4: Dollarization should not lead to any significant changes in average real GDP growth, consistent with the long-run neutrality hypothesis.

Comparing (7) and (13), however, shows the potential macroeconomic cost of dollarizing: El Salvador's output volatility may increase substantially, especially if its correlation with US output $(\rho_{SLV,US})$ is not sufficiently high. Intuitively, if output deviations from the trend in El Salvador are highly correlated with those in the US, then the monetary policy of the Fed will be sufficiently countercyclical and thus stabilizing for El Salvador. If, however, El Salvador and the US are poorly (or worse, negatively) correlated, then the monetary policy of the Fed could end up being procyclical for El Salvador and thus destabilizing there. This stabilization cost is smaller, the closer $(\rho_{SLV,US})$ is to 1. Our data suggest that the pre-dollarization correlation coefficient was substantially positive, so our prior is that dollarization will not increase output volatility in El Salvador.

[4] Alesina and Stella (2010) consider the special case when $k_{US} = 0$.

H5: Dollarization should not lead to an increase in business cycle volatility in El Salvador.

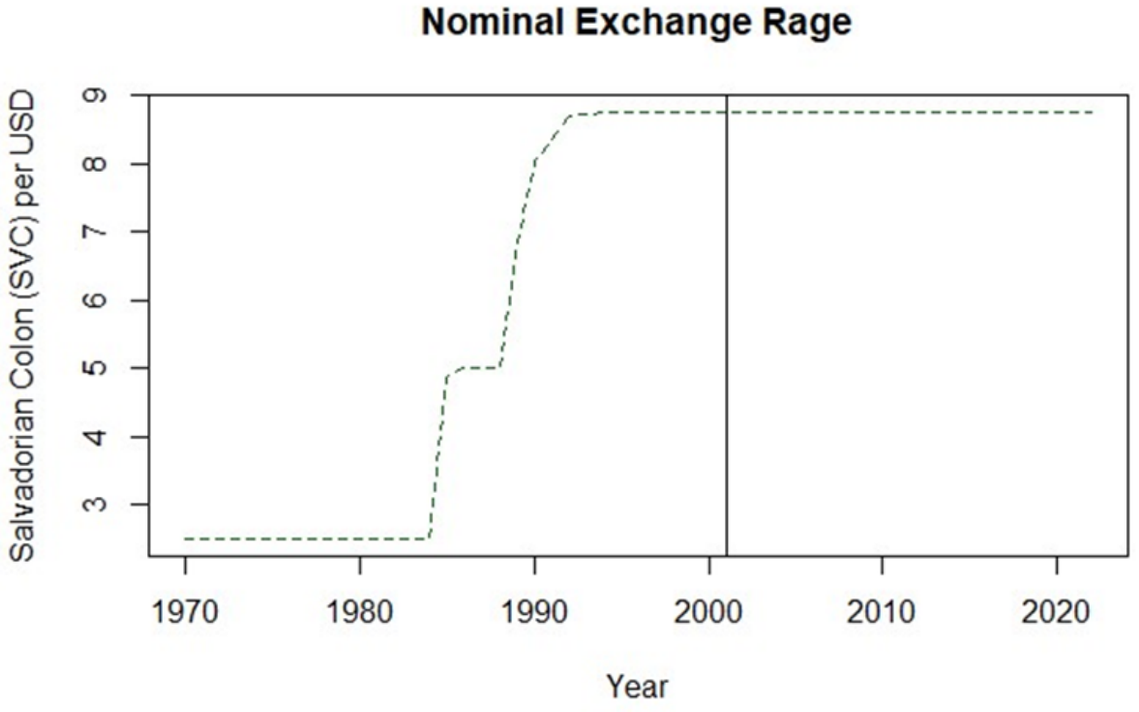
Finally, we rely on another strand of the literature that has explored the possible "endogeneity" of dollarization (and, more generally, Optimal Currency Area) criteria that implies that monetary integration would lead to a more synchronized business cycle among countries that adopt a common currency. Frankel and Rose (1998) and Rose and Engel (2002) emphasize that business cycle synchronization occurs because countries that share a common monetary policy reduce idiosyncratic monetary shocks that might otherwise cause divergence. This process could be self-reinforcing: countries with already synchronized business cycles are more likely to join a currency union, and being in such a union can further enhance synchronization through shared monetary policies and deeper trade integration. This insight forms the basis for the final hypothesis:

H6: Dollarization will lead to greater synchronization of El Salvador's business cycle with that of the US.

3. Background and Data

El Salvador underwent a process of political liberalization in the decade of the 1990s. With the end of the 12-year Civil War in 1992, a right-wing political party, called ARENA, ruled from 1989 to 2009 in 5-year presidential terms. In an early attempt to dollarize the Salvadorian economy, the Salvadorian government pegged the SVC to the USD and froze its exchange rate to 8.75 SVC per USD in 1995 as depicted in Figure 1.

Figure 1: SVC to USD Exchange Rate.

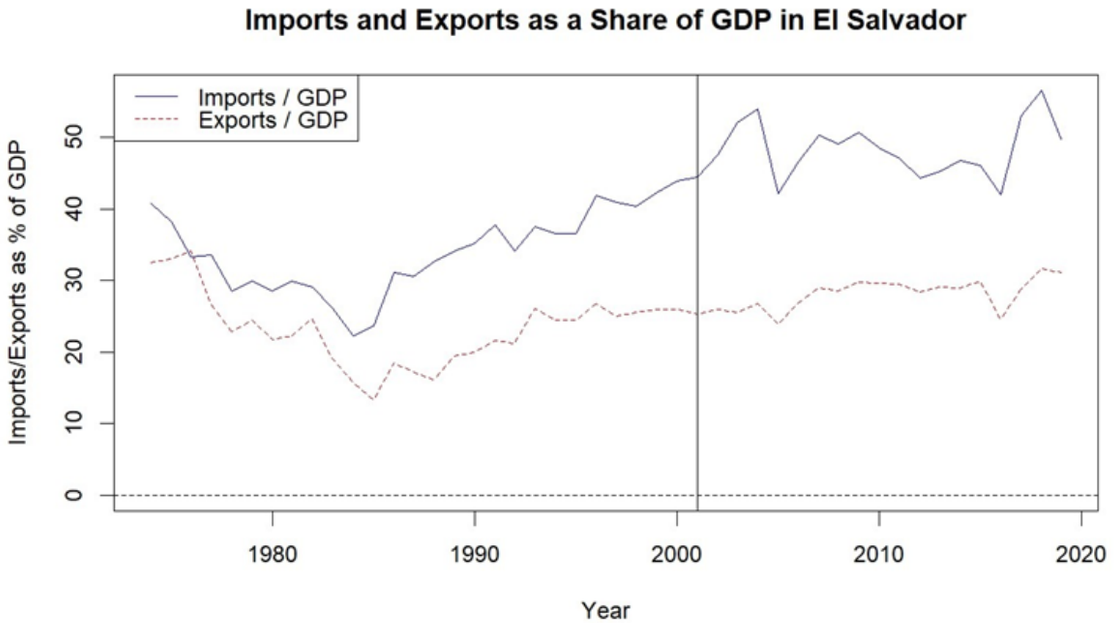


Note: The vertical line indicates the time of dollarization in 2001Q1

Other real-side macroeconomic indicators signal a change after dollarization. Using the World Bank's World Development Indicators, we provide summary statistics for Imports, Exports, the Inflation Rate and the Unemployment Rate. First, we have some evidence of trade liberalization after dollarization as the volume of imports and exports increase after 2001. Figure 2 also shows an increase in net exports after 2001.

In addition to net exports, one can observe changes in the Real Exchange Rate (RER) at the global level as shown in Figure 3. Also, on Figure 4, we can observe that the RER with the United States, El Salvador's top trading partner, decreased and gained stability post-dollarization. On the other hand, the RER with Central America increased (indicating a real currency depreciation), potentially making Salvadorian exports more competitive in the Central American market.

Figure 2: Imports and Exports in El Salvador.



Furthermore, as we will discuss more extensively later, one can see a decrease in the average Inflation and Unemployment Rates as shown in Table 1. Full time-series information is provided in Figures 5 and 6 for the Inflation and Unemployment rates, respectively. Figure 5 clearly shows a decrease in the annual inflation rate as well as its volatility; while in Figure 6, we observe a downward trend in unemployment, decreasing further a decade post-dollarization.

Table 1: *El Salvador Average Inflation and Unemployment Rate (%)*

	1973-2000	**2001-2022**	**1973-2022**
Inflation Rate	6.76%	2.71%	4.94%
	1990-2000	**2001-2022**	**1990-2022**
Inflation Rate	8.07%	5.28%	6.13%

Figure 3: El Salvador Real Exchange Rate (Global).

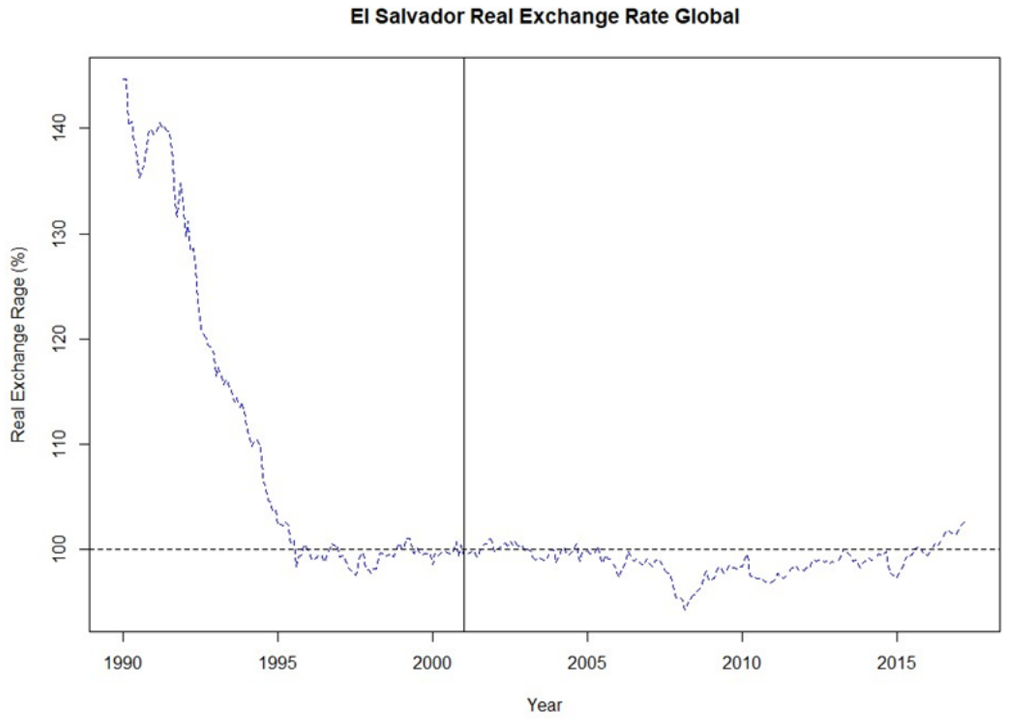


Figure 4: El Salvador Real Exchange Rate with USA and Central America.

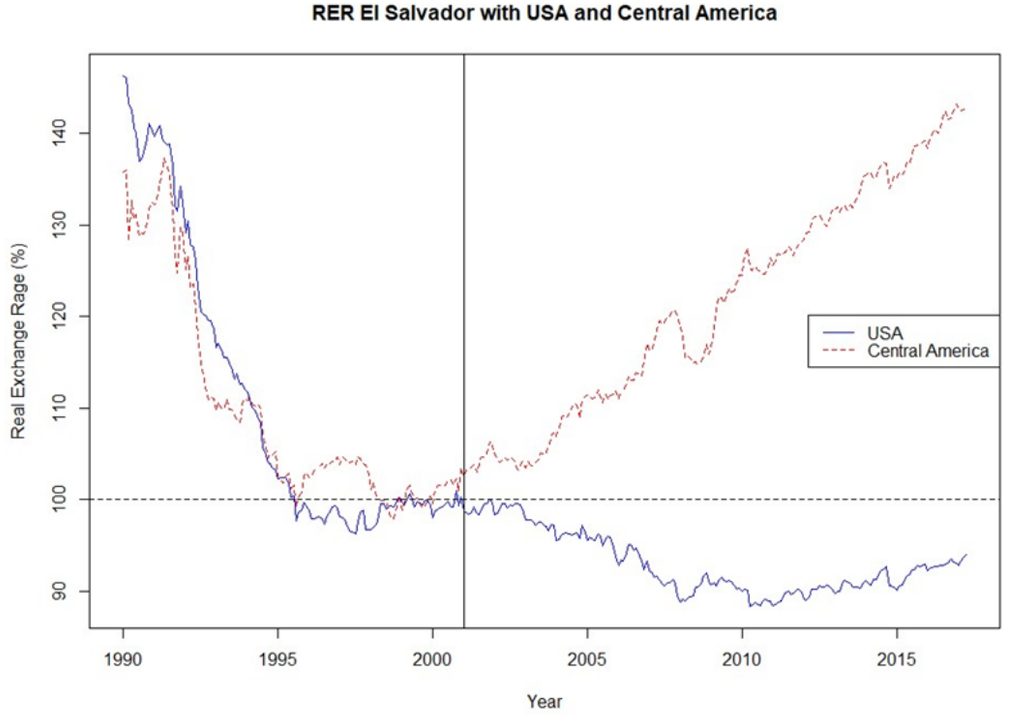


Figure 5: El Salvador Inflation Rate.

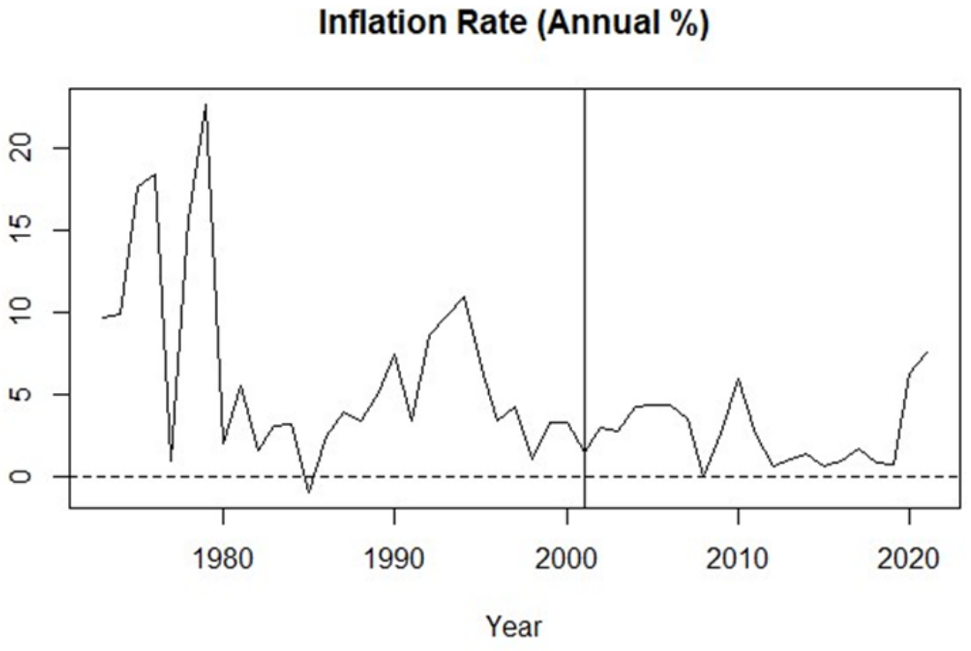
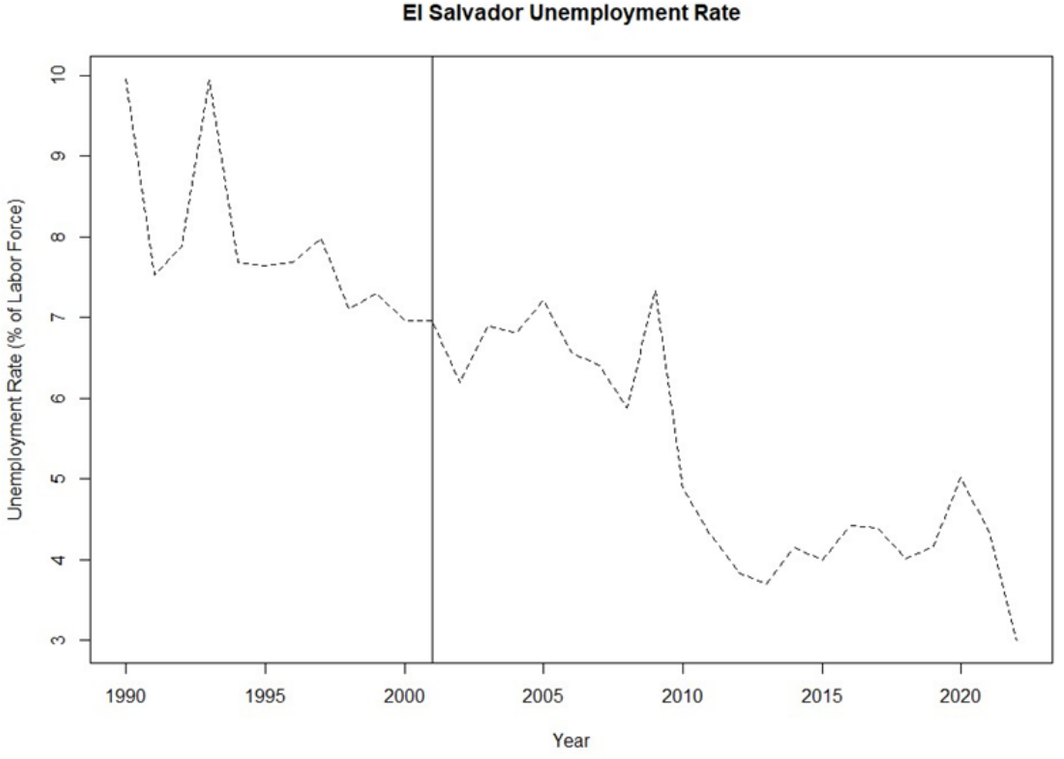


Figure 6: El Salvador Unemployment Rate.



We now turn to an examination of the business cycles correlation between El Salvador and the United States. To that end, we use Real GDP Expenditure data from Penn World Tables Version 10.01. Figure 7 plots the cyclical components of real GDP for the United States and El Salvador from 1951 to 2019. The plot shows that prior to 2001, the two economies exhibited a stronger correlation, though El Salvador's business cycle fluctuations were more pronounced.

Additionally, we calculate business-cycle correlation values between El Salvador and the United States across different time periods, as presented in Table 2. For comparison purposes, we include some other Latin American countries, as well as Panama, Ecuador, and Argentina, all of which have experienced varying degrees of dollarization.

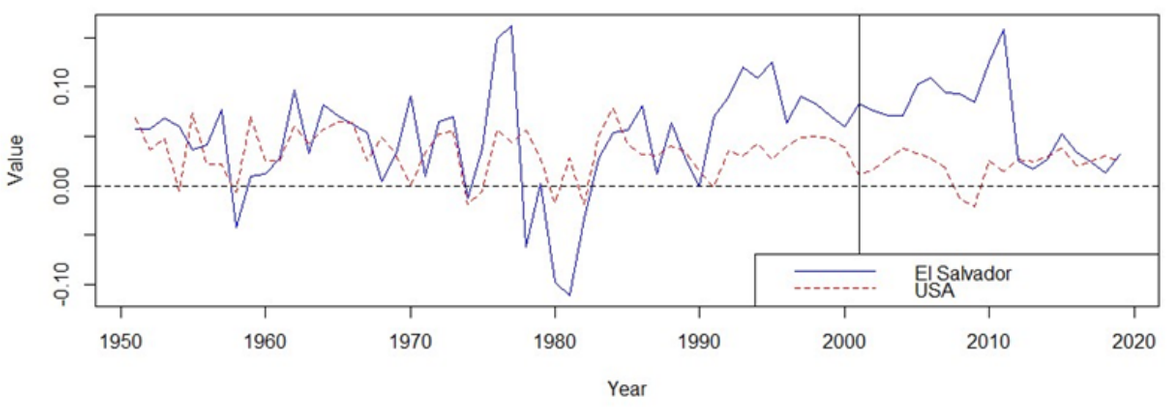
The data suggest that El Salvador's business cycle was positively correlated with that of the US up until dollarization. Despite similar socioeconomic and demographic characteristics, El Salvador's neighboring countries exhibit significantly different correlations with the US. For instance, Honduras maintains a consistently strong positive correlation with he US, while Guatemala's weaker positive correlation turns negative after 2001. Interestingly, economies that underwent partial or full dollarization, such as Panama, Ecuador, and Argentina, do not show an overall positive business cycle correlation with the US.

Table 2: *Business Cycle Correlations with the USA*

Country i	**1951-1980**	**1970-2000**	**2001-2019**	**1951-2019**
SLV	.3954	.4070	-.2751	.2028
HND	.4655	.4434	.4470	.3408
GTM	.0797	.1500	-.1262	.0290
PAN	-.0627	-.1607	-.0030	-.1300
ECU	-.4306	-.3140	.0852	-.2043
ARG	-.1350	-.0598	.2144	-.0212

Note: The table reports the correlation of each country's growth rate with that of the US. The growth rate is computed as the first difference of the log of real GDP, $(\log GDP_{i,t} - \log GDP_{i,t-1})$.

Figure 7: Cyclical Component for El Salvador and the United States 1951-2019.



Next, guided by the logic of our theoretical framework (section 3 above), we attempt a visualization of the determinants of the trade-off between macroeconomic costs and benefits faced by El Salvador and other Latin American countries in the case of potential dollarization. Figure 8 presents scatter plots of average inflation rates on the vertical axis versus business-cycle correlations with the US on the horizontal axis. We

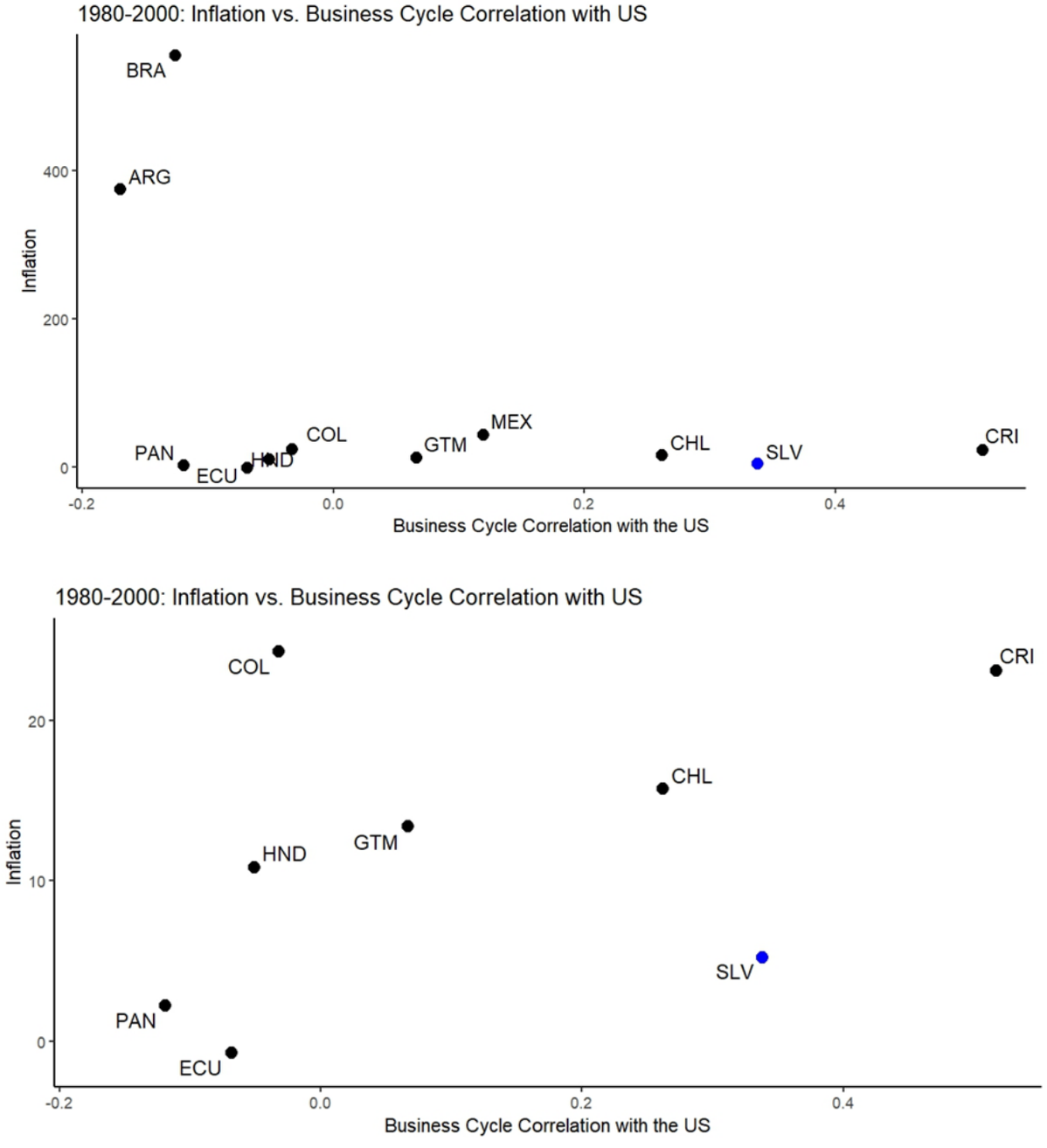
have selected 1980-2000, the 20-year period immediately prior to El Salvador's (and Ecuador's) dollarization.

Recall the theoretical model's prediction that a major benefit of dollarization is a reduction in the inflation bias; while the stabilization cost of giving up independent monetary policy is decreasing when the correlation with the US is high. In terms of Figure 8, therefore, high average inflation values predict a sizable benefit from dollarization, and high correlation values with the US predict a lower stabilization cost.

Figure 8 can be used to make comparisons across countries from the viewpoint of 2000. The top graph includes all countries but the bottom graph is easier to interpret as it removes the inflation outliers of Argentina and Brazil. Costa Rica emerges as the best candidate for dollarization: it had the highest long-term inflation, and thus the highest potential benefit, while it also had the highest cyclical correlation with the US, thus the lowest stabilization cost. El Salvador was also a better dollarization candidate than Ecuador: both average inflation and correlation with the US were higher in the former than in the latter.

Not all comparisons yield unambiguous results of course. For example, comparing El Salvador with Colombia (or Honduras), there is a clear trade off. The macroeconomic benefit of dollarization (lower inflation) is expected to be larger in Colombia than El Salvador because of higher inflation in Colombia. However, the stabilization cost of dollarizing is also expected to be higher in Colombia because its business cycle is less well correlated with that of the US.

Figure 8: Average Inflation vs. Business Cycle Correlation with the US for Selected Countries: 1980-2000; Top panel includes Brazil and Argentina.



4. Empirical Results

In this section, we empirically test the theoretical predictions derived from the theoretical model outlined earlier. We begin by specifying a simple AR(p) model for the inflation rate and real GDP growth

$$y_t = \alpha + \sum_{i=1}^{p} \rho_i y_{t-i} + \varepsilon_t \tag{14}$$

where y_t is the variable of interest (the inflation rate or real GDP growth, both measured year-over-year), α is the intercept, ρ_i are the autoregressive coefficients, p is the number of lags, and ε_t is the error term. Based on the Bayesian Information Criterion (BIC), the data suggest that four lags are appropriate.

To investigate exactly how dollarization has affected the time-series properties of inflation and real growth, we will look for changes in the α and ρ_i parameters in model (14). We first define a binary variable DOL that takes the value 0 before dollarization, and 1 after. Using the AR(1) specification to illustrate, we estimate and compare the following models:

1. **Baseline**: model constraints both α and ρ to be equal before and after dollarization:

$$y_t = \alpha + \rho y_{t-1} + \epsilon_t$$

2. **Different Intercept only**: model constraints ρ to be equal before and after dollarization:

$$y_t = \alpha + \delta DOL_t + \rho y_{t-1} + \epsilon_t$$

   where δ captures the effect of dollarization on the intercept.

3. **Unrestricted**: model allows both α and ρ to differ before and after dollarization:

$$y_t = \alpha + \delta DOL_t + \rho y_{t-1} + \gamma(DOL_t y_{t-1}) + \epsilon_t$$

   where γ captures the effect of dollarization on the autoregressive parameter.

We now proceed to discuss the evidence for each of the testable hypotheses derived above.

H1: Dollarization should reduce the average (long-run) inflation rate in El Salvador.

Initial evidence for this can be observed in Figure 9, which shows that the average inflation rate decreased after 2000Q4, so that the pre- and post-dollarization inflation rates are significantly different. Specifically, the post-dollarization inflation rate (2.63%) is considerably lower than the pre-dollarization rate (6.83%). As Table 4 will confirm below, these differences are statistically significant, solidifying the evidence in favor of **H1**.

Results from the inflation AR models are presented in Table 3. Note that parameter values change post dollarization, and the changes are statistically significant.[5] In particular, both the estimated γ and δ tend to be significant indicating that dollarization was accompanied by structural change in the AR models.[6]

[5]Table **??** in the appendix shows AR(1) inflation pre- and post-dollarization differences in detail.

[6]It should be noted here that we performed normality tests on the residuals of Table 3 regressions, which pass for the GDP specifications but not for the inflation models. To address this, we allowed for structural stability by estimating the AR models separately for the pre- and post-dollarization periods, a method that is econometrically equivalent with the dummy approach, but which allowed us to compute heteroskedasticity- and serial-correlation ("Newey-West") robust standard errors. These results are reported in the Appendix. We are grateful to an anonymous referee for this suggestion.

To visualize the nature of the change that dollarization brought about for the inflation process, Figure 10 reports the Impulse Response Functions of inflation to its own shock when the AR(1) model is estimated separately for the two periods. The comparison is striking: before dollarization an inflation shock raises inflation by more and has more persistent effects. After dollarization, not only is the effect more subdued, but it dies out much faster. These findings provide strong support for **H1**, implying much lower inflation pressures in the post-dollarization period.

Figure 9: Inflation Rate (YoY) from 1991Q2 to 2016Q3, with period averages (dashed lines) for (i) Pre-Dollarization period, (ii) 1995 to 2001, and (iii) Post-Dollarization period.

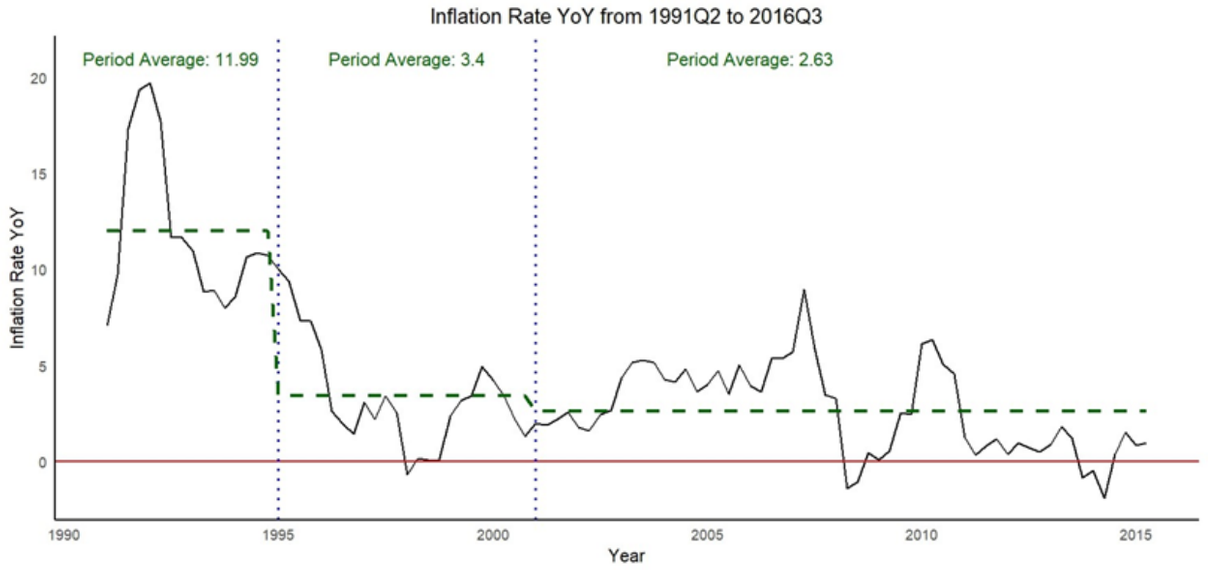


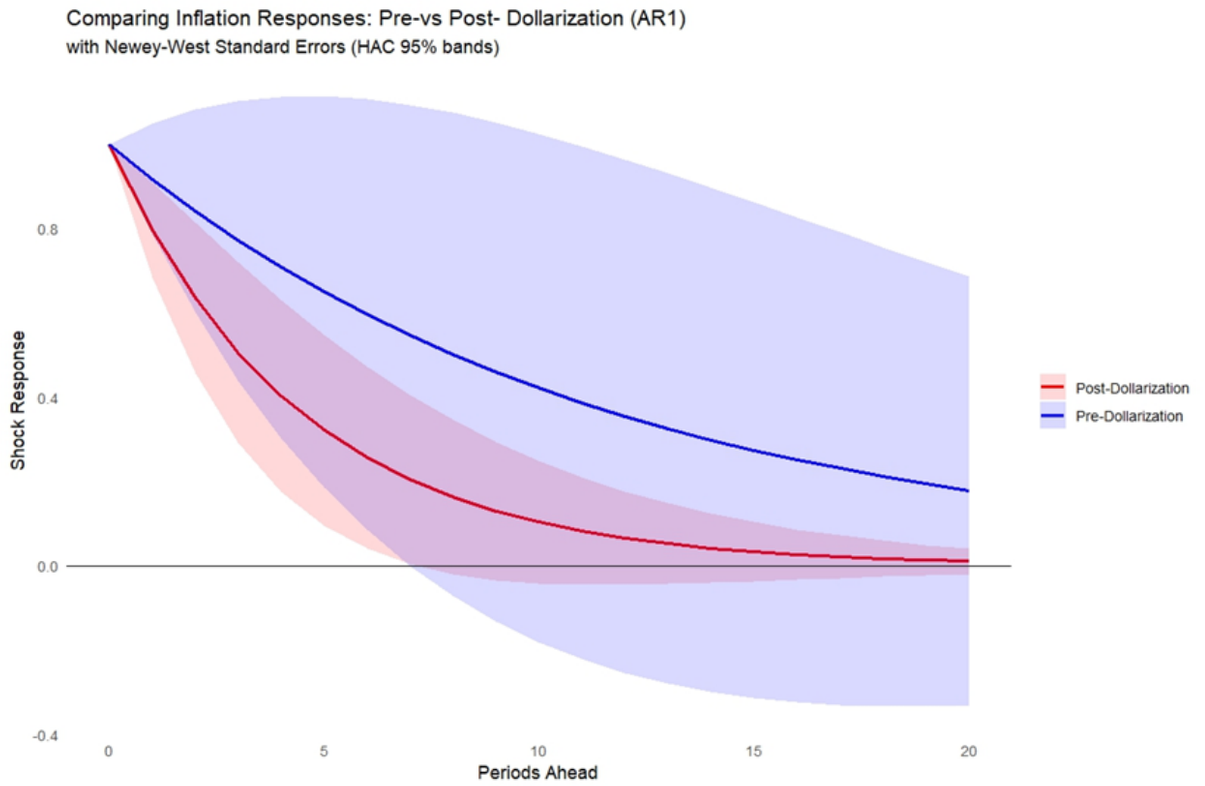
Table 3: Policy Shift Analysis with Interactions[7]

	GDP (1)	**GDP (2)**	**GDP (3)**	**Inflation (1)**	**Inflation (2)**	**Inflation (3)**
Constant	2.3676***	2.1398***	2.3326**	4.2785***	4.2785***	4.8344**
Standard Errors	(0.6378)	(0.6946)	(0.9658)	(0.1908)	(1.8899)	(1.9732)
Lag 1	0.6940***	0.7387***	0.7354***	0.9195***	0.9195***	0.9110***
Standard Errors	(0.0721)	(0.0662)	(0.0671)	(0.0571)	(0.0368)	(0.0413)
δ	–	-0.3339	-2.2362***	–	-0.9678	-2.4835**
Standard Errors	–	(1.1769)	(0.8215)	–	(1.6693)	(1.3575)
γ	–	–	0.9995***	–	–	0.9984***
Standard Errors	–	–	(0.1105)	–	–	(0.1237)
Observations	98	98	98	98	98	98
AIC	350.08	405.27	407.19	341.11	386.85	388.52
Log Likelihood	-170.04	-199.63	-199.59	-165.56	-190.42	-190.26

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

[7]The models were also re-estimated for the period 1993Q1–2016Q2 with consistent results.

Figure 10: Inflation Impulse Response Functions.



H2: Dollarization should reduce inflation volatility in El Salvador.

To test the second Hypothesis, we examine El Salvador's inflation volatility before and after dollarization. To that end, we detrend the inflation data using the following techniques: first-differencing, fourth-differencing, Hodrick-Prescott (H-P) filter (Hodrick and Prescott, 1997), Christiano-Fitzgerald (C-F) filter (Christiano and Fitzgerald, 2003), and Baxter-King (B-K) filter (Baxter and King, 1999). We then measure inflation volatility by the standard deviation of the differenced series for the first two techniques, or the standard deviation of the cyclical components from the three filters. Table 4 presents the standard deviations for each method, showing a clear decrease in inflation volatility in the period after dollarization. While the magnitudes of the standard deviations vary by method, the decrease after 2001 is robust across all specifications. Moreover, the reductions in inflation volatility are statistically significant, again across all differencing and filtering techniques. We conclude that the evidence is consistent with hypothesis **H2**: dollarization has indeed reduced the volatility of inflation in El Salvador.

Table 4: Standard Deviations and Observations for Inflation (Full, Pre-Dollarization, Post-Dollarization)

Method	**Full Model SD**	**Obs**	**Pre-Dollarization SD**	**Obs**	**Post-Dollarization SD**	**Obs**	**P-value**
First-Diff	1.4875	98	1.8548	35	1.0337	63	0.0000
Fourth-Diff	4.3890	98	5.6043	35	2.2326	63	0.0000
H-P Filter	0.0163	98	0.0217	35	0.0121	63	0.0000
C-F Filter	0.0133	98	0.0177	35	0.0105	63	0.0002
B-K Filter	0.0046	95	0.0060	35	0.0036	60	0.0004

Note: The tests compare the following hypotheses:

- $H_0 : \frac{\sigma^2_{Post}}{\sigma^2_{Pre}} \geq 1$
- $H_a : \frac{\sigma^2_{Post}}{\sigma^2_{Pre}} < 1$

This test follows an F-distribution with degrees of freedom (n_{Pre}, n_{Post}), where n_{Pre} is the number of observations in the Pre-Dollarization period and n_{Post} is the number of observations in the Post-Dollarization period.
Periods: Pre-Dollarization: 1991Q1–2000Q4; Post-Dollarization: 2001Q1–2016Q3.

H3: A scarcity of US dollars during the announcement period should result in a temporary spike in short-term inflation as the implementation of dollarization approaches.

So far we have divided our time period into two subperiods: before and after dollarization. To test **H3**, we need to allow for the possibility that possible scarcity of US dollars during the policy announcement period (1995Q1-2001) may have contributed to a short-term inflation increase. This requires that we look separately at the announcement period and compare it with both the pre-announcement and post-dollarization periods. Put differently, we now look separately at three subperiods: pre-announcement period (1991Q2 to 1994Q4), announcement period (1995Q1 to 2000Q4), and post-dollarization period (2001Q1 to 2016Q3). According to the Caravello et al. (2023) Caravello et al. (2023) model, scarcity of dollars should have caused an inflation spike in the second subperiod.

Figure 9 has already previewed the evidence, but we supplement it here by the comparisons in Table 5. The evidence is clear that there is no spike of inflation during the announcement period. Instead, there is a significant decrease in inflation, of approximately 850 basis points, which is also statistically significant, as confirmed by the test results in Table 5. We conclude that there is no evidence of a dollar shortage during the announcement period of dollarization in El Salvador.

Table 5: Test Results: Pre- and Post- Dollarization and Announcement Comparisons

Test	**Mean (Pre)**	**Mean (Post)**	**T-Statistic**	**p-value**
Pre vs Post-Dollarization (GDP Growth)	2.5908	1.8423	1.275	0.1031
Pre vs Post-Dollarization (Inflation)	6.8342	2.6299	4.6193	0.0000
Pre vs Post-Announcement (GDP Growth)	2.6022	2.5831	0.0173	0.4932
Pre vs Post-Announcement (Inflation)	11.9877	3.3985	7.2324	0.0000

Note: The tests are performed to compare the following hypotheses:

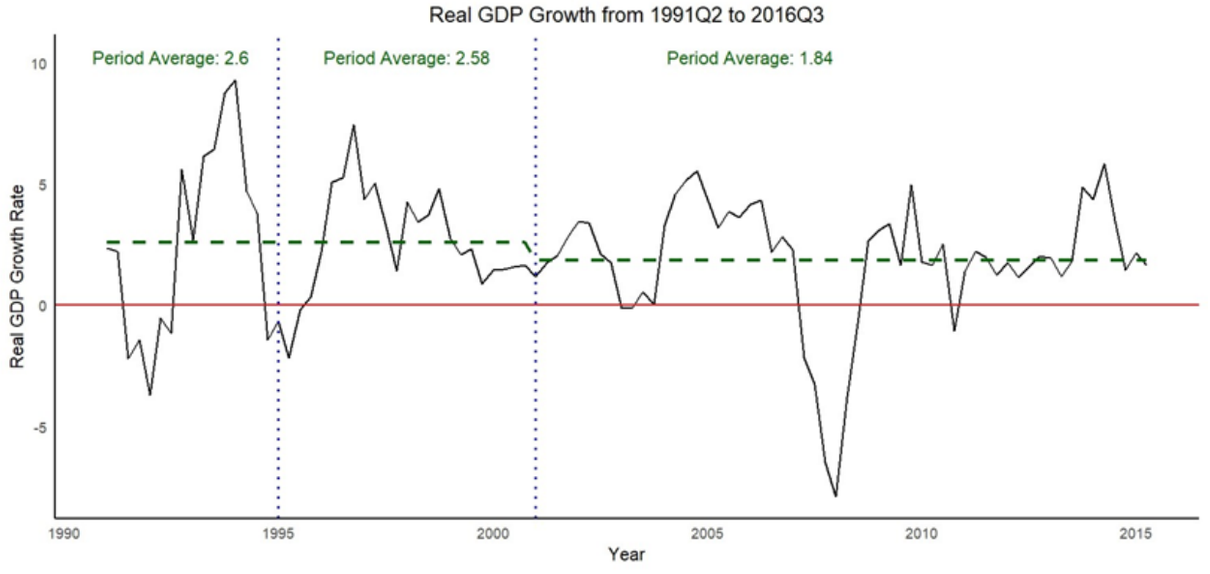
- H_0: The mean of the Pre period is less than or equal to the mean of the Post period.
- H_1: The mean of the Pre period is greater than the mean of the Post period.

This test follows an F-distribution with degrees of freedom (n_{Pre}, n_{Post}), where n_{Pre} is the number of observations in the Pre-Dollarization period and n_{Post} is the number of observations in the Post-Dollarization period.
Periods: Pre-Dollarization: 1991Q1–2000Q4; Post-Dollarization: 2001Q1–2016Q3.
Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

H4: Dollarization should not lead to any significant changes in average real GDP growth, consistent with the long-run neutrality hypothesis.

We test this by comparing real GDP growth rates before and after dollarization. Looking at this graphically first, Figure 12 shows changes in average Real GDP growth across periods that are small and, as the tests of Table 5 confirm, also statistically insignificant.

Figure 11: Real GDP Growth Year-over-Year (YoY) from 1991Q2 to 2016Q3, with period averages (dashed lines) for Pre-Dollarization, 1995 to 2001, and Post-Dollarization.

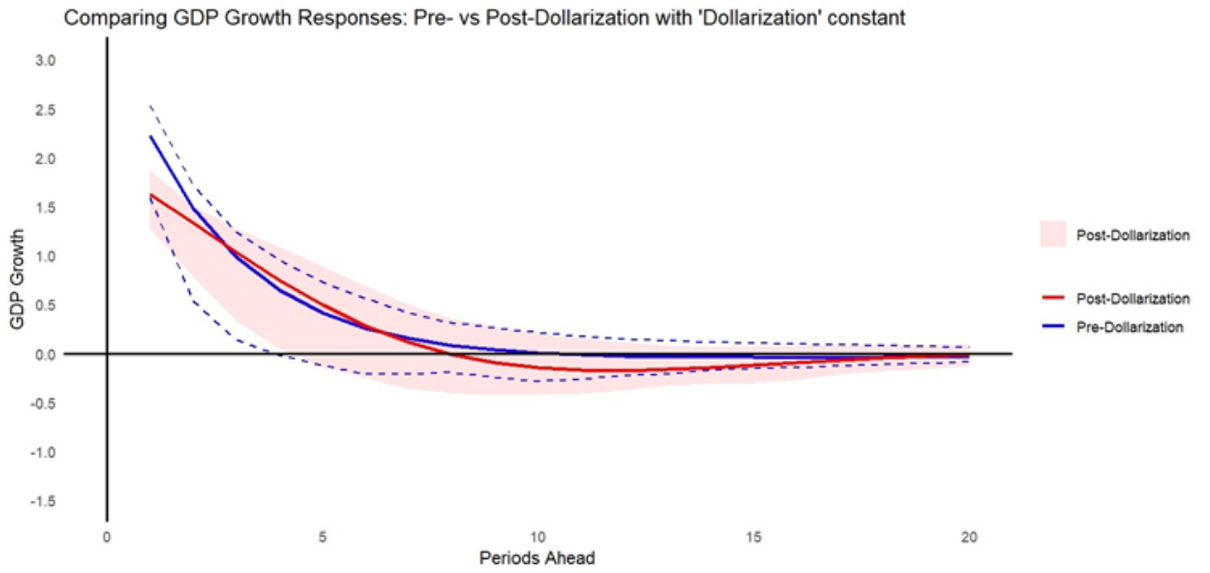


More formally, we also estimate restricted and unrestricted AR models for the real growth rate that allow for structural change between subperiods. We summarize the evidence with the Impulse Response Functions reported in Figures 12 and 13, which illustrate the dynamic response of GDP growth to a one-standard-deviation shock in its own innovation, as obtained from the AR(1) model.. We note that these estimated responses are virtually the same before and after dollarization, suggesting no structural change between the two periods. Not only is the magnitude of the contemporaneous response to a shock virtually the same, so are the dynamics of the subsequent decay. We conclude that dollarization has not resulted in statistically significant changes to average real GDP growth, consistent with Hypothesis **H4**.

H5: Dollarization should not lead to an increase in business cycle volatility in El Salvador.

To test Hypothesis **H5**, we examine El Salvador's business cycle volatility before and after dollarization, in a way similar to our testing of Hypothesis **H2**. Specifically, we now detrend (log) real GDP using the following techniques: first-differencing, fourth-differencing, Hodrick-Prescott (H-P) filter (Hodrick and Prescott, 1997), Christiano-Fitzgerald (C-F) filter (Christiano and Fitzgerald, 2003), and Baxter-King (B-K) filter (Baxter and King, 1999). We then measure inflation volatility by the standard deviation of the differenced series for the first two techniques, or the standard deviation of the cyclical components from the three filters. Table 6 presents the standard deviations for each method, showing a decrease in business-cycle volatility in the period after dollarization. While again the magnitudes of the standard deviations vary by method, the decrease after 2001 is robust across all specifications. Moreover, the reductions in inflation volatility are generally statistically significant, though the HP filter is an exception. We conclude that there is sufficient evidence to suggest that there was no increase in business cycle volatility post-dollarization, and likely there was a

Figure 12: GDP: AR(1) with Constant Impulse Response Function.



decrease.

Table 6: Standard Deviations and Number of Observations of Real GDP (Full, Pre- and Post-Dollarization)

Method	**Full Model SD**	**Obs**	**Pre-Dollarization SD**	**Obs**	**Post-Dollarization SD**	**Obs**	**P-value**
First-Diff	1.4650	98	1.8169	35	1.2300	63	0.0038
Fourth-Diff	2.7885	95	3.1969	35	2.4965	60	0.0454
H-P Filter	0.0184	98	0.0204	35	0.0174	63	0.1378
C-F Filter	0.0257	98	0.0257	35	0.0182	63	0.0101
B-K Filter	0.0050	95	0.0057	35	0.0046	60	0.0754

Note: The tests compare the following hypotheses:

- $H_0 : \frac{\sigma^2_{Post}}{\sigma^2_{Pre}} \geq 1$
- $H_a : \frac{\sigma^2_{Post}}{\sigma^2_{Pre}} < 1$

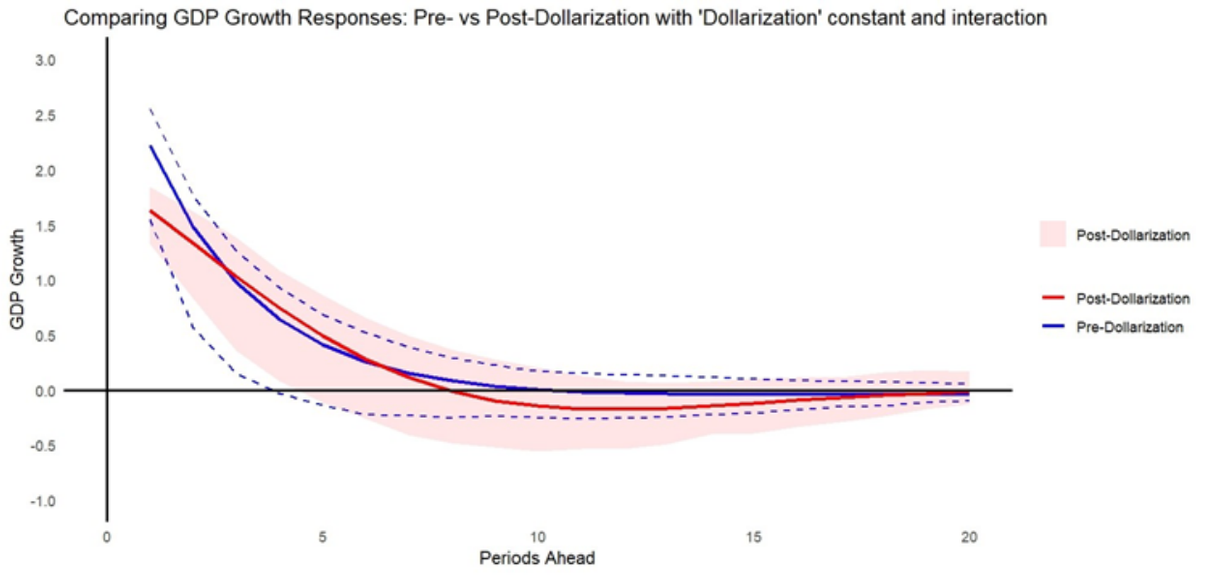
This test follows an F-distribution with degrees of freedom (n_{Pre}, n_{Post}), where n_{Pre} is the number of observations in the Pre-Dollarization period and n_{Post} is the number of observations in the Post-Dollarization period.
Periods: Pre-Dollarization: 1991Q1–2000Q4; Post-Dollarization: 2001Q1–2016Q3.

H6: Dollarization will lead to greater synchronization of El Salvador's business cycle with that of the US.

Did the macroeconomy of El Salvador become more highly correlated with the US after it adopted the US currency, as suggested by the "endogeneity" hypothesis? To test this, we examine the correlation between the business cycles of the United States and El Salvador before and after 2001. Similar to our treatment of Hypotheses **H2** and **H5**, we detrend (log) real GDP for both countries using first-differencing, fourth-differencing, the H-P filter, and the C-F filter. For this hypothesis, we rely on yearly data from the Penn World Tables for both the US and El Salvador. The pre-dollarization period spans from 1980 to 2000, while the post-dollarization period covers 2001 to 2019.

Table 7 shows the correlations between the US and El Salvador business cycles for the pre- and post-

Figure 13: GDP: AR(1) with Constant and Interaction Impulse Response Functionx



dollarization periods. Contrary to the hypothesis that synchronization should increase following dollarization, all filtering techniques indicate a decrease in synchronization. Even more strongly, all techniques except the HP filter, suggest that the business cycles in the two economies went from positively correlated before dollarization to negatively correlated the period after.

To formally test whether this decline is significant, we apply a Fisher Z transformation to compare the pre- and post-dollarization correlations.[8]The results confirm that the observed decline is statistically significant (at the 10% level) across all methods. We conclude that, contrary to the "endogeneity" argument from Frankel and Rose (1998), dollarization has been followed by a statistically significant reduction in business cycle synchronization between El Salvador and the United States.

[8]The Fisher Z transformation is applied as follows:

1. Transform the correlation coefficients $(r_{pre} and r_{post})$ using Fisher's Z transformation:

$$Z_i = \frac{1}{2} \ln \left(\frac{1 + r_i}{1 - r_i} \right)$$

where $i = pre, prost$.

2. Calculate the standard error of the difference between the Z-values:

$$SE = \sqrt{\frac{1}{n_{pre} - 3} + \frac{1}{n_{post} - 3}}$$

3. Compute the Z-statistic:

$$Z_{test} = \frac{Z_{pre} - Z_{post}}{SE}$$

The Z-statistic follows a normal distribution.

Table 7: Business-cycle correlations of El Salvador and US (Pre-Dollarization, Post-Dollarization, Full Sample)

Method	**Full Sample**	**Obs**	**Pre-Doll.**	**Obs**	**Post-Doll.**	**Obs**	**P-value**
First-Differencing	0.2028	38	0.5059	20	-0.7246	18	0.0793
Fourth-Differencing	0.0838	32	0.1329	17	-0.6378	15	0.0122
HP Filter	0.4154	40	0.5608	21	0.0284	19	0.0873
CF Filter	0.0239	40	0.5059	21	-0.7246	19	0.0000

Note: The tests compare the following hypotheses:

- $H_0 : \rho_{Pre} = \rho_{Post}$
- $H_a : \rho_{Pre} \neq \rho_{Post}$

The p-values are based on a Fisher Z-test for comparing correlations, testing whether the Pre-Dollarization correlation significantly differs from the Post-Dollarization correlation. Obs indicates the number of observations used in each period (Pre, Post, Full Sample).

5. Conclusion

This paper investigated the effects of dollarization on El Salvador's macroeconomy and asked whether they have been consistent with the predictions of standard theoretical models of monetary unification. To reiterate, the theoretical consensus is that, under favorable conditions (such as lower inflation bias by the Fed and sufficiently high cyclical correlation with the US), dollarization should reduce both average inflation and inflation volatility, but without adverse effects on business-cycle volatility or trend output growth. Two additional theoretical predictions are that dollarization may cause a temporary spike in inflation between announcement and implementation if there is a scarcity of dollars; and finally that dollarization will lead to better to a higher cyclical synchronization between the dollarized economy and the US.

We test all of these theoretical predictions for the case of El Salvador and, in a nutshell, our empirical evidence is consistent with all but one of them. Specifically, we find that both average inflation and inflation volatility fell after dollarization, and the decrease is statistically significant. We also show that all measures of business-cycle volatility show increased stabilization after dollarization, while there was no statistically significant effect on the average growth rate of real GDP. We also find no evidence of a spike in inflation between the dollarization announcement and implementation, so we conclude that scarcity of dollars did not play a role.

However, we also find that the cyclical correlation between El Salvador and the US decreased after dollarization, contrary to the consensus theoretical prediction. Remarkably, our findings suggest that this correlation did not just statistically significantly decline, but actually swung from positive before dollarization to negative after. While beyond the scope of the present paper, we believe it would be valuable for future research to investigate the reasons behind this as well as how widespread this phenomenon may be in other dollarizing economies.

References

Alesina, Alberto and Robert J. Barro (2001), "Dollarization." *The American Economic Review, Papers and Proceedings*, 91, 381–385.

Alesina, Alberto and Robert J. Barro (2002), "Currency Unions." *The Quarterly Journal of Economics*, 117, 409–436.

Alesina, Alberto and Andrea Stella (2010), "Chapter 18 - The Politics of Monetary Policy." In *Handbook of Monetary Economics*, volume 3, 1001–1054, Elsevier.

Baxter, Marianne and Robert G. King (1999), "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series." *The Review of Economics and Statistics*, 81, 575–593.

Berg, Andrew and Eduardo Borensztein (2000), "The Pros and Cons of Full Dollarization." Working Paper WP/00/50, International Monetary Fund.

Caravello, Tomas E., Pedro Martinez-Bruera, and Ivan Werning (2023), "Chronicle of a Dollarization Foretold: Inflation and Exchange Rates Dynamics." Working Paper 31763, National Bureau of Economic Research.

Christiano, Lawrence J. and Terry J. Fitzgerald (2003), "The Band Pass Filter." *International Economic Review*, 44, 435–465.

Frankel, Jeffrey A. and Andrew K. Rose (1998), "The Endogeneity of the Optimum Currency Area Criteria." *The Economic Journal*, 108, 1009–1025.

Hodrick, Robert J. and Edward C. Prescott (1997), "Postwar US Business Cycles: An Empirical Investigation." *Journal of Money, Credit and Banking*, 29, 1–16.

International Monetary Fund (2025), "El Salvador: 2025 Article IV Consultation." IMF Country Report 25, International Monetary Fund.

Karras, Georgios (2002), "Costs and Benefits of Dollarization: Evidence from North, Central, and South America." *Journal of Economic Integration*, 17, 502–516.

Karras, Georgios (2011), "From Hero to Zero? The Role of the Euro in the Current Crisis: Theory and Some Empirical Evidence." *International Advances in Economic Research*, 17, 300–314.

Rose, Andrew K. and Charles Engel (2002), "Currency Unions and International Integration." *Journal of Money, Credit and Banking*, 34, 1067–1089.

Schuler, Kurt and Joint Economic Committee (1999), *Basics of Dollarization: Joint Economic Committee Staff Report*. United States Congress.

World Bank (2025), "The World Bank in El Salvador." Technical report, World Bank.

A. Appendix

Table A1: Inflation 1991Q1 – 2016Q3 [Previous Table 3]

	Full Model AR(1)	**Pre-Dollarization AR(1)**	**Post-Dollarization AR(1)**	**Differences AR(1)**
Constant	4.2785***	6.8374***	2.6335***	−0.1078***
Standard Errors	(0.1908)	(0.3994)	(0.1924)	
Lag 1	0.9195***	0.905***	0.7972***	−4.2039
Standard Errors	(0.0571)	(0.0660)	(0.0572)	
Observations	98	36	62	–
AIC	386.85	163.29	217.43	–
Log Likelihood	-190.42	-78.61	-105.72	–

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. The statistical significance of the differences is determined using the Chow Test. To ensure robustness, the standard errors of the AR(1) models were recalculated using the Newey–West heteroskedasticity- and autocorrelation-consistent (HAC) estimator with a lag of four quarters. The models were also re-estimated for the period 1993Q1–2016Q2; however, the results remained consistent despite the higher volatility observed during the post-war years.

Table A2: Jarque–Bera Test of Normality

Table III Models	**Time Periods**	
	1991Q1–2016Q2	**1993Q1–2016Q2**
GDP(1) – AR(1)	0.1419	0.1059
GDP(2) – AR(1) with dummy	0.1516	0.0872
GDP(3) – AR(1) w dummy and interaction	0.2655	0.1194
Inflation(1) – AR(1)	0.0000	0.0099
Inflation(2) – AR(1) with dummy	0.0000	0.0095
Inflation(3) – AR(1) w dummy and interaction	0.0000	0.0041

We assess residual normality using the Jarque–Bera (J-B) test applied to each inflation AR specification. The table reports p-values.
Hypotheses:
$H_0 : \epsilon_t \sim N(0, \sigma^2)$ (Model residuals are normally distributed)
H_1: Model residuals are not normally distributed.
The test statistic is calculated as:

$$JB = \frac{n}{6}\left(S^2 + \frac{(K-3)^2}{4}\right)$$

where n denotes the sample size, S denotes the skewness or residual asymmetry, and K denotes the residuals' kurtosis. The statistic follows a $\chi^2(2)$ distribution under the null.