



## Measuring the Impact of Dollarization on Economic Growth in Ecuador Using the ARDL Autoregressive Model for the Period (1970-2021)

**Najah Hawar Saeed Bazzaz**

Department of Economics, College of Administration & Economics, Kirkuk University, Iraq.  
[najahhawar1@uokirkuk.edu.iq](mailto:najahhawar1@uokirkuk.edu.iq)

**Salam Anwar Ahmed**

Department of Economic, College of Administration and Economics, Kirkuk University, Kirkuk, Iraq.  
[salamanewar@uokirkuk.edu.iq](mailto:salamanewar@uokirkuk.edu.iq)

### ABSTRACT

The research aimed to know the impact of the policy of rotation on economic growth in Ecuador during the period (1970-2021) by adopting the autoregressive distributed lag (ARDL) model. The independent variables in the model were dollarization, trade openness, investment, inflation, and net transfers from abroad. Like the dependent variable, economic growth is per capita GDP. One of the research's most notable conclusions is that dollarization had no appreciable effects on Ecuador's economic development, either in the short or long term, and the investment variable was the most influential in economic growth.

### ARTICLE INFO

*Article history:*

Received 10 Apr 2023

Received in revised form  
13 May 2023

Accepted 10 Jun 2023

**Keywords:** ARDL, dollarization, trade openness, investment, inflation

© 2023 Hosting by Research Parks. All rights reserved.

## **Introduction:**

Dollarization, that is, partial or complete replacement of the local currency of a country with a foreign currency, spread widely in the seventies of the last century in Latin America, when hyperinflation robbed those local currencies of their traditional roles as a stable medium for exchanging and storing value. Households and businesses in these countries have begun to use foreign currencies - usually dollars - to save and to buy and sell large items such as real estate. Ecuador started adopting the US dollar as its official currency in 2000, The main objective was to control inflation rates and achieve macroeconomic stability. Empirical studies have proven the role of this policy in achieving acceptable inflation rates. However, the impact of this policy on economic growth and employment was not clear. After about 21 years, this research aims to know the impact of dollarization on economic growth in the short and long term, using the ARDL model for the period 1970-2021.

### **First: The theoretical framework for the relationship between dollarization and economic growth:**

Many economists think certain developing nations should stop using their own money and switch to the legal tender of a developed nation. Despite the fact that it was not the dollar, the developed country's currency, this approach was known as "official dollarization." While economists typically believe that nations who give up their currency and hand over monetary management to a developed nation would have lower inflation than those with effective domestic fiscal policies, Studies carried out by Engel & Rose (2002), Eichengreen & Hausmann (1999) and Edwards (2001) demonstrated that countries who have adopted the dollar as their reserve currency had considerably lower inflation rates than nations that use their indigenous currency.

However, Regarding the effects of dollarization on real economic factors like GDP, employment, and volatility, there is far less consensus. Supporters of dollarization assert that it will stimulate economy in two ways: First, dollarization will promote quicker development, higher investment, and lower interest rates. Abandoning the national currency leads to a lower interest rate. Thus, all the gains associated with it will be realized. In light of the modern financial environment, the decrease in the cost of capital by one or two points is important for investment and growth, according to Dornbusch. The gains of abandoning the national currency are inversely proportional to its quality in the past, present, and future. Along with the benefits of financial sector transformation, it is equally important to note that low or stable inflation and a stable currency will lengthen the horizons of economic agents, which in turn encourages investment and risk-taking, which results in higher economic growth and creates a positive feedback loop. Once the economy emerges from a crisis or state of siege, price and market distortions and resulting inefficiencies become more apparent and thus become an objective of public policy. (Dornbusch: 2001,4-5) The second channel is related to an increase in the rates of trade exchange between monetary unions. According to the study by ROSE & WINCOOP in 2001, dollarization would remove obstacles to trade and encourage the movement of international trade, and thus increasing prosperity.

(ROSE & WINCOOP :2001 ,386)

The general consensus is that dollarization supports international investment and fosters economic growth and development by resulting in more stable exchange rates, interest rates, and transaction costs for multinational corporations operating abroad.

### **Second: Literature review:**

Because the nations that have implemented dollarization are few, very small, and fairly open, there aren't many studies that look at whether more dollarization adds favorably to enhanced financial stability and economic progress. Campbell's (2003) research is one of these studies. It was discovered that dollarization frequently results in reduced interest rates and helps draw foreign direct investment.

With his findings that commerce gets simpler under dollarization, particularly for the smaller countries of Central America and that these nations coincidentally have the United States as their primary trading partner, Singh (2005) validates this.

As Moron & Winkelried (2005), they found that inflation-targeting policies in countries that rely heavily on the dollar are at risk if, in light of dollarization, there will be no active domestic monetary policies that can target inflation, as is the case when there is a local currency.

Magendzo & Edwards (2003) used a conditional impact analysis of “dollarization” in terms of actual performance by jointly estimating the “outcome equations” and the equations for a measure of the likelihood that a nation will being dollarized taking into account two different aspects of the results: growth in per capita GDP and fluctuations in growth. The findings indicated that countries that rely on the dollar expand less rapidly than nations that use local currencies. They discovered that the probability of dollarization is higher in relatively small countries that are very open to international trade, even though this distinction is not statistically significant. They also discovered that the fluctuations in economic growth are higher in countries that depend on the dollar than in countries with a local currency. This is actually seen if Ecuador, Panama, and El Salvador relied on the US dollar as an official currency.

### **Third - the standard aspect of the impact of dollarization on economic growth in Ecuador:**

In order to study the effects of dollarization on economic growth in Ecuador using time series data for the years (1970–2021), this section aims to outline the methodology and the autoregressive distributed lag (ARDL) model.**1-2: Determine the model:**

To study the impact of dollarization on economic growth in Ecuador, this research follows the following general equation:

$$\text{LnGDP} = \beta_0 + \beta_1 \text{dOLLA} + \beta_2 \text{LnINVE} + \beta_3 \text{LnINFL} + \beta_4 \text{LnOPE} + \beta_5 \text{LnTRF} + \varepsilon t \dots (1)$$

Where GDP is the per capita gross domestic product (constant 2010 US dollars) which expresses economic growth.

dOLLA is a dummy variable that expresses dollarization. The years before the transition to the dollar were taken as 0, and the years after the dependence on the dollar were taken as 1.

INVE Gross capital formation (% of GDP) is investment.

INFL Inflation, prices paid by consumers (annual %).

Trade OPE (% of GDP) expresses trade openness.

TRF, net current transfers from abroad (in current local currency prices).

#### **2-4: Results of standard and theoretical analysis:**

**A- Unit root testing** The purpose of the unit root test is to look at the time series' characteristics. In spite of the abundance of unit root testing, we will use the expanded Dickey-Fuller, Augmented Dickey-Fuller (ADF) test. Appendix 1 shows the results for this examination. We point out that the relying variable (LnGDP) is constant at the initial difference. This is shown by the calculated (t) value, which was greater than the tabular (t) value. This means that the series does not contain the root of the unit, and this appeared in the two cases, the situation in the fixed limit and the situation in the fixed limit and the direction of time, and the same words for the independent variables ( LnTRF , LnOPE , LnINFL , LnDOLLA ) except for the independent variable ( LnINVE )

Since the (ARDL) model approach is steady at the base in the scenario in the fixed limit and the situation in the fixed limit and direction, the results of the mixed stability test for the variables permit its usage. According to Pesaran and others in 2001, the variables must be as stable as possible at the first difference (Pesaran & et al: 2001, 315))

#### **B- Test cointegration using the limits method:**

Now that we've discussed the limits test for ARDL, Appendix (2) displays the outcomes of a statistical calculation (F), an estimated value where (F) exceeded the upper limit of the crucial values obtained from the tables and those produced by the model by Pesaran et al. (2001).

At significant levels of 1%, 5%, and 10%, The model's outcomes show that the null hypothesis is rejected at substantial amounts of 1%, 5%, and 10%, and it confirms the fact that a long-term equilibrium connection between economic growth on the one hand and the unrelated factors on the other hand in Ecuador.

#### **C- The long-run model:**

–Once it was shown that there was a co-integration link between the independent variables of choice and the foreign direct investment variable of the ARDL model, the long-term connection was evaluated within the framework.

–The dummy variable (DOLLA), which expresses dollarization, had no statistically significant impact on economic growth, and its sign was negative. This means that the state policy adopted by Ecuador did not help achieve economic growth in the long term, and this is consistent with previous studies that examined the impact of dollarization on macro variables, including economic growth.

–As for the inflation variable (INFL), it had a negative and significant impact on economic growth, and this is consistent with the logic of economic theory, which states that high inflation rates would distort the price mechanism, which negatively affects the allocation of economic resources and economic growth.

-The investment variable (INVE) had a statistically significant and positive impact with economic growth, and this is consistent with the logic of economic theory, which states that increasing investment rates would increase economic growth rates, as investment is one of the most important variables affecting economic growth.

-The variable (OPE), This demonstrates trade openness, has a favorable and considerable effect on economic growth over time. Additionally, this follows the logic of economic theory, which believes that trade achieves gains for the countries participating in it through increased specialization, international division of labor, and opening markets to the products of developing countries to developed countries.

-The variable (TRF), which expresses net transfers from abroad, although it took a positive sign, it was not statistically significant in its impact on economic growth in the long term.

### **D- the short-term model**

Regarding the short-term evaluation, as shown in Appendix (4), we observe that

-The dollarization variable (DOLLA) also did not have a statistically significant impact on economic growth

-Likewise, the inflation variable (INFL) did not appear to have a significant impact in the short term.

-While the investment variable (INVE) had a positive and significant impact on economic growth during the original period and the three subsequent periods, and this is consistent with the logic of economic theory that investment is positive in advancing economic growth in the short and long term.

-The variable (OPE) trade openness had a favorable and statistically significant impact on economic growth in the short term.

-As for the variable (TRF), net remittances from abroad had a positive and statistically significant impact on economic growth in the short term.

The error-correcting mechanism, which is present in the model, improves the accuracy and validity of the equilibrium connection over time. The error correction parameter measures the speed of returning to the equilibrium position over the long term, and the speed of return to the equilibrium situation is approximately (27.5%), the previous residual being equal to the value of the parameter of the error correction limit Coint Eq  $(-1)^*$  is equal to  $(-0.275)$ .

### **2-3 Diagnostic tests:**

**First: Test for heterogeneity of variance:** - We conduct the test based on a test (Breusch – Pagan - Godfrey) and the results are shown in Appendix 5. Since As we observe, the value of Prob. Chi - Square is equal to (0.4039), which is greater than (0.05), and this means that the model does not experience the issue of heterogeneity of variance according to the test hypotheses .

### **Second: The serial correlation test, through the LM test**

Appendix (6) We note that the value of Prob. Chi-Square (2) is (0.2389), which is greater than

(0.05), and thus we accept the null hypothesis, which states that there is no serial correlation.

### **Third: Stability test of the model:**

One of the suitable tests, like the total sum of the leftovers (CUSUM) or the total sum of the squared portions of the remainders (CUSUM of Squares), must be employed to verify that the data utilized in this investigation have not undergone any structural alterations. Both of these tests are among the most important in this field since they show if any structural changes have occurred in the data as well as how stable and consistent the long-term and short-term variables are. And numerous studies have shown that such tests are always connected to the ARDL method, and the overall stability of the believed coefficients is attained for the distributed time gap autoregressive model's error correction formula if the graph of the CUSUM and CUSUM of Squared tests is within the critical bounds at the 5% significance level. Figures (1) and (2) show this, respectively. We used the CUSUM and CUSUMSQ tests proposed by Brown, Dublin, and Evans in light of the majority of these studies.

(Adriush and Abd Al Qadir: 2013, 24)

## **Conclusions and recommendations**

### **First: conclusions:**

1- There was no significant impact of the dollarization variable on economic growth in Ecuador in the short and long terms.

2- In accordance with the logic of economic theory, which views investment as one of the most major factors of economic growth, the standard study revealed that the investment variable had a large and positive influence on enhancing economic growth in both the short and long terms.

3- The research also demonstrated that inflation has a detrimental long-term effect on economic growth, which is in line with economic theory if extremely high inflation rates are the primary drivers behind Ecuador's decision to adopt the dollar as its official currency.

4- Trade and trade openness had the most important impact on bringing about economic growth in the short and long terms.

5- Remittances from abroad had no impact on economic growth in the long term, but their impact was limited to the short term, and this means that most of the remittances may not go to investments but rather to consumption, which raises economic growth in the short term only.

### **Second: Recommendations:**

1- The abandonment of the developing country from its national currency and its reliance on the currency of a developed country may bring stability to the economy and achieve the goal of controlling inflation, but the country will lose one of the most important tools of macroeconomic policy, which is monetary policy in moving the national economy.

2- Investment is one of the most important tools for stimulating economic growth, so interest in it is by providing a climate that encourages private investment, such as infrastructure, facilities for doing business, and the rule of law.

3- Developing the financial system as one of the main pillars in encouraging private and foreign investment, which enhances economic growth.



**List of sources:****First: Arabic Reference**

1. Nassour Abd Al Qadir and Damhani Hammad Adriush (2013) In order to evaluate the effects of public investment programs and their implications for employment, investment, and economic growth between 2001 and 2014, Using the autoregressive model of trailing distributed time gaps, an econometric analysis of the factors affecting private investment in Algeria was carried out.

**Second: foreign Reference**

1. Dornbusch, Rudiger (2001). "Fewer Monies, Better Monies," *American Economic Review* 91(2)
2. Rose, Andrew K. and Eric van Wincoop (2001). "National Money as a Barrier to International Trade: The Case for Currency Union" *American Economic Review* 91(2).
3. Campbell, Monica. 2003. "Dollarization – Adopting the Greenback Brings Mixed Fortunes." *The Banker (August 1): on-line.*
4. Singh, Anoop. Stabilization and reform in Latin America: a macroeconomic perspective on the experience since the early 1990s. Vol. 238. Lippincott Williams & Wilkins, 2005.
5. Eduardo A. Morón & Diego Winkelried(2005) Monetary Policy Rules for Financially Vulnerable Economies, *Journal of Development Economics, Vol. 76, No. 1.*
6. Edwards, Sebastian and I. Igal Magendzo. 2003. "Strict Dollarization and Economic Performance: An Empirical Investigation." *NBER Working Paper 9820*
7. M. Hashem Pesaran, Yongcheol Shin & Richard J. Smith(2001) Bounds Testing Approaches to the Analysis of Level Relationships, *Journal of Applied Econometrics Vol. 16, No. 3, Special Issue in Memory of John Denis Sargan, 1924-1996: Studies in Empirical Macroeconometrics (May - Jun., 2001).*

**Third: Internet links**

<https://data.albankaldawli.org>

**Appendix (1)**

(Phillips-Perron test statistic) Unit root test

The first difference is de1		original level		variables
Fixed limit and direction	fixed limit	Fixed limit and direction	fixed limit	

-3.868903*** (0.0210)	-3.510604*** (0.0118)	-2428585 (0.3610)	-2.590468 (0.1016)	Ln_GDP
-6.936714*** (0.0000)	-7.000001*** (0.0000)	-2.128509 (0.5177)	-0.813676 (0.8065)	DOLLA
-5.856858*** (0.0001)	-5.901473*** (0.0000)	-2.196528 (0.4810)	-1.258070 (0.6418)	LnINFL
		-3.375776* (0.0663)	-3.257156** (0.0224)	LnINVE
-3.486808* (0.0520)	-2.969560** (0.0449)	0.847896 (0.9997)	-1.738339 (0.4062)	LnOPE
-4.070717** (0.0127)	-4.007060*** (0.0030)	0.8492 (-1.397530)	0.6653 (-1.204103)	LnTRF

**Note: Significant \*, \*\*, \*\*\* are significant at 10%, 5%, and 1%, respectively . The brackets represent the p-value.**



## Appendix 2 F-test of limits

Null Hypothesis: No levels relationship				
F-Bounds Test				
I(1)	I(0)	Signif.	Value	Test Statistic
Asymptotic: n=1000				
3	2.08	10%	13.27207	F-statistic
3.38	2.39	5%	5	k
3.73	2.7	2.5%		
4.15	3.06	1%		

### Appendix (3)

long term parameters

Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.7660	-0.300066	0.051811	-0.015547	DOLLA
	***-			
0.0008	3.675185	0.020999	-0.077176	INFL
	***4.77842			
0.0000	3	0.135368	0.646843	INVE

		***2.82503		
0.0080	2		0.170736	0.482334 OPE
0.4882		-0.701098	0.026005	-0.018232 TRF
		***10.4087		
0.0000	2		0.483652	5.034201 C

(\*\*)(\*)and (\*\*\*) mean significant at 10%, 5%, and 1%, respectively.

#### Appendix (4) Results of the short-term relationship test

ECM Regression(GDP depended variable)

Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0062	***2.92455 1	0.026188	0.076587	D(INVE)
0.0000	***_ 4.920024	0.028833	-0.141857	D(INVE(-1))
0.0005	***_ 3.850429	0.027433	-0.105630	D(INVE(-2))
0.0310	**_ 2.252986	0.027248	-0.061389	D(INVE(-3))
0.0000	***5.51124 8	0.012993	0.071607	D(OPE)
0.7275		0.007727	0.002716	D(TRF)
0.0052	***2.99041 5	0.007399	0.022125	D(TRF(-1))
0.0000		0.026308	-0.275666	CointEq(-1)*
0.009921	Mean dependent var		0.794071	R-squared

---

0.032240	S.D. dependent var	0.757109	Adjusted R-squared
-5.292548	Akaike info criterion	0.015889	S.E. of regression
-4.977629	Schwarz criterion	0.009846	Sum squared resid
-5.174042	Hannan-Quinn criter.	132.3749	Log likelihood
		1.877451	Durbin-Watson stat

---

(\*)(\*\*) and (\*\*\*) mean significant at 10%, 5%, and 1%, respectively.

### Diagnostic test results:

#### Appendix (5)

#### Heteroskedasticity Test: Breusch-Pagan-Godfrey

---

0.4465	Prob. F(13,33)	1.031801	F-statistic
0.4039	Prob. Chi-Square(13)	13.58293	Obs*R-squared
0.9766	Prob. Chi-Square(13)	4.934210	Scaled explained SS

---

#### Appendix (6)

#### Breusch-Godfrey Serial Correlation LM Test:

---

0.3774	Prob. F(2,31)	1.005614	F-statistic
0.2389	Prob. Chi-Square(2)	2.863502	Obs*R-squared

---

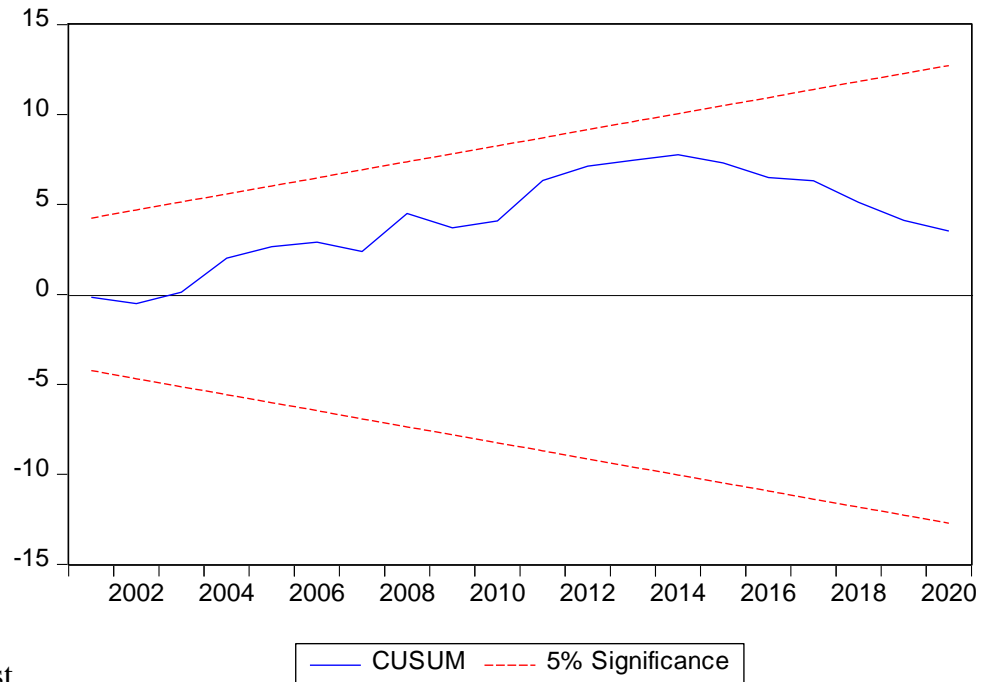
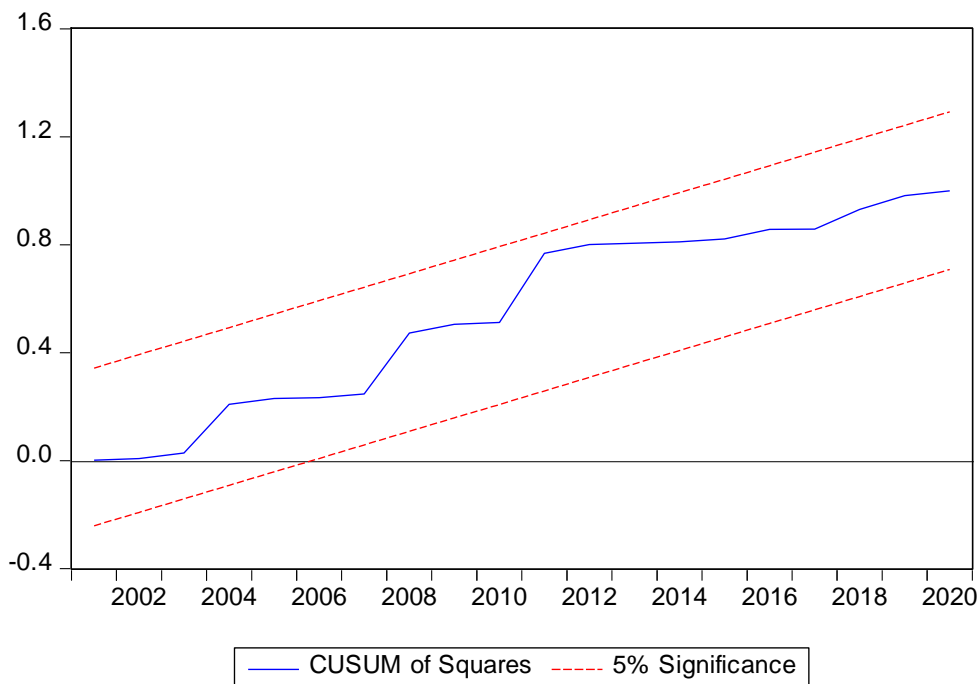


Figure 1 CUSUM test

Source: Figure prepared by the researcher using Eviwes10 program

**Figure (2) CUSUM OF Squares test**



Source: Figure prepared by the researcher using Eviwes10 program