Use of The VAR Model To Measure The Relationship Between Dollarization Rates and Exchange Rates In The Iraqi Economy For The Period 2003-2019.

Namareiq Qasim Hussein[1]Zahra Hadi Abd Rahi[2]
Safa Najah Abdul Amir[3]
[1] Department of Statistics, Faculty of Administration and Economic,
Kerbala University, Iraq
Email: namariq.q@uokerbala.edu.iq
[2] Department of Statistics, Faculty of Administration and Economic,
Kerbala University, Iraq
Email: zahraa.abed@s.uokerbala.edu.iq
[3] Department of Statistics, Faculty of Administration and Economic,
Kerbala University, Iraq
Email: safa.n@s.uokerbala.edu.iq

Abstract: This research paper aims at a standard study of the relationship between the exchange rate and the dollar rates of the Iraqi economy during the period 2003-2019. This is the application of the VAR model. The results indicated a two-way causal relationship between the variables considered (exchange rate, dollarization rates) and statistically significant between dollarization rates and exchange rates.
Keywords: dollarization, dollarization rates, exchange rate, joint integration methodology, self-regression beam.

Introduction

The phenomenon of dollarization in the Iraqi economy emerged during the 1980s and grew considerably during the 1990s during the economic blockade crisis to date. The proliferation of foreign currency speculation has led to the instability of the exchange rate of the Iraqi dinar affecting the stability of the Iraqi economy and thus the emergence of the inflation problem. It can be said that the dollar refers to the partial or total replacement of the local currency and its replacement by a foreign currency in settlement of transactions and exchanges, and the term "dollar" is used to refer to all foreign currencies used in the domestic economy, not just the dollar

The problem of research has been the crisis to which the Iraqi economy is exposed as a result of the effect of the phenomenon of dollarization on the exchange rate of the Iraqi dinar on the stability of the Iraqi economy. This phenomenon has negative effects on the currency-shifting State (Iraq) and may have economic and political consequences, as well as the gradual loss of circulation of the local currency**.**

Search Target

The aim of the research is to demonstrate the impact of dollarization rates on exchange rates under all the circumstances experienced by the Iraqi economy during the research period by relying on the VAR model.

Search hypothesis

Research proceeds from the hypothesis of reducing the effect of dollarization rates on the exchange rate through the study of time series microscopy, the joint integration test, the determination of the appropriate delay period, the Kranger causation test, and the results of the VAR model.

Search number one: Dollarization and exchange rate relationship

First: Dollarization (definition - types - forms)

Definition of dollarization:-

Although there is no agreement on the definition of dollars as a term and its components, it can be said that it refers to the partial or total replacement of local currency and its replacement by foreign currency. (mostly dollar) In the 1970s, Latin America emerged because of high inflation and the loss of the local currency's most important function at the time as a broker in the exchange and store of value (Cato, Tirones, 2016:49). Subsequently, many countries used foreign exchange as an alternative to their domestic currency, including Iraq.

Dollarization can also be defined, within its general meaning, as the acquisition and use of foreign currency by economic units resident in a state that is usually the United States dollar and is not a condition in parallel or in place of local currencies for the performance of a part or all of the basic functions of money. In other words, resident economic units retain part or all of their cash and financial wealth in the form of foreign currency or assets resident in foreign currency.

The dollar is the process of foreign exchange replacing local currency in settling transactions and exchanges (Uzun, Arzu, 2005), and the term dollarization is used to refer to all foreign currency used in the domestic economy, not just the dollar (IMF, 1997).

Types of dollarization:

The phenomenon of dollarization was classified into three main types, some of which included other branches:

1- Full dollar (Official or Full Dollarity): as defined by official dollarization, which means the complete replacement of the local currency and formally the foreign currency that becomes the legal currency that performs all the functions of money (Quispe-Agnoli, 2006: 55-71).
2- Semi-official dollarization (Official Semi Dollarity) refers to the use of foreign currency and de jure as well as local currency to perform the basic functions of money.
3- Informal or partial dollarization, which reflects the extensive use of foreign currency in transactions, transactions, and financial contracts by private domestic economic units, with the local currency remaining the sole legal official currency (Legal Tender).
The unwillingness of residents to retain a share or a whole of their wealth in the form of local currency or financial assets in local currency and the tendency to use foreign currency to do so is a reflection of their loss of confidence in their local currency, in large part as a result of their failure to perform their core functions efficiently and effectively, which drives the return of dollars to reflect all the unbalanced economic, political and institutional variables that are capable of.
Forms of dollarization:-
Dollarization takes multiple forms (bender, no. 3):-
- *Transaction Dollarization:*
In this case, the dollar or any other foreign currency is accepted as a means of settling transactions by replacing the local currency with foreign currency and occurs in economies with high inflation rates.
- ***DollarizationReal*:-**
In this case, prices, salaries, and wages are measured according to changes in the exchange rate between foreign and domestic currencies.
- ***FinancialDollarization***:-
Depending on this situation, all assets and demands held by the banking system are denominated in dollars or any other foreign currency, the latter being preferred as a sadness of value or wealth.

Measures of dollarization:-
For the purpose of accurately identifying and expressing the above concepts in measurable and comparable quantitative formulas, these will be clarified by financial and monetary indicators (al-Iraqi, 2017:8):

1- ***unofficial dollarization index(UDI***):-
It is also expressed in the informal replacement index (USI)

Udi or usi = fcc+fcd / ebm

Fcc: Foreign currency in circulation.
Fcd: Foreign currency deposits at local banks.
Ibm: Offering cash in the broad sense (m2).

2- The transaction dollar index (TDI) is measured according to the following formula:

TDI= fcc /(fcc+lcc) -3

Fcc: Foreign currency in circulation.
Lcc:Local currency in circulation.

The financial dollarization index (FDI) is measured according to the following formula:

Fdi= fcd /(ldd+qm)

Fcd: Foreign currency deposits with local banks.
Ldd: Local currency deposits on the call with local banks. Qm: Money-like.

Positive and negative effects of dollarization:-

Dollarization exercises a range of positive and negative effects on the economy. One positive effect is to achieve economic stability by controlling inflation rates and bringing them closer to inflation rates in the country with the economy's currency, thereby reducing the risk of future inflation.With regard to the negative effects of dollarization, it loses the country the profits of issuing the local currency and reflects the weak political sovereignty of the country. A country's political sovereignty derives from the strength of its national functioning as well as its influence on the country's financial and monetary policies and leads to the emergence of informal economic activities. One of the negative effects of both official and informal dollarization is the loss or decline in the effectiveness of the exchange rate as a tool of monetary policy. Devaluation of the local currency vis-à-vis the foreign currency will adversely affect the banks and companies of this State that receive funds denominated in foreign currency.

Results of the standard study

The Strategy Test for Time Series Considered:

To study and determine the degree of integration of these chains, the Phillips-Perron test is used as being based on the more general hypothesis that the time series is generated by a process (Autoregressive Integrated Moving Average), so it has a better and more accurate test capability than a test.

Using Eviews 8, we conducted PP tests on the all-time series, and the results are presented in the table.

Null Hypothesis: EX has a unit root
Exogenous: Constant
Bandwidth: 65 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.111550	0.0000
Test critical values:	1% level	-3.462574	
	5% level	-2.875608	
	10% level	-2.574346	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	8015.57...
HAC corrected variance (Bartlett kernel)	9057.90...

Phillips-Perron Test Equation
Dependent Variable: D(EX)
Method: Least Squares
Date: 07/02/21 Time: 16:49
Sample (adjusted): 2003M02 2019M12
Included observations: 203 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX(-1)	-0.154324	0.030675	-5.030863	0.0000
C	196.8786	40.62409	4.846350	0.0000

R-squared	0.111836	Mean dependent var	-5.011296
Adjusted R-squared	0.107417	S.D. dependent var	95.23423
S.E. of regression	89.97405	Akaike info criterion	11.84672
Sum squared resid	1627161.	Schwarz criterion	11.87937
Log likelihood	-1200.442	Hannan-Quinn criter.	11.85993
F-statistic	25.30958	Durbin-Watson stat	2.059508
Prob(F-statistic)	0.000001		

The results of the above table for the exchange-rate time series microscopy test suggest that the non-default hypothesis can be rejected and the alternative hypothesis accepted because the calculated value of (5.111550) is greater than its tabular value at a moral level of 5%, i.e., the chain is stable at the level**.**

Null Hypothesis: DL has a unit root
Exogenous: Constant
Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.802740	0.0034
Test critical values:	1% level	-3.462574	
	5% level	-2.875608	
	10% level	-2.574346	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.15188...
HAC corrected variance (Bartlett kernel)	0.13191...

Phillips-Perron Test Equation
Dependent Variable: D(DL)
Method: Least Squares
Date: 07/02/21 Time: 16:55
Sample (adjusted): 2003M02 2019M12
Included observations: 203 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DL(-1)	-0.145075	0.036063	-4.022845	0.0001
C	0.149175	0.045032	3.312669	0.0011

R-squared	0.074514	Mean dependent var	0.005689
Adjusted R-squared	0.069910	S.D. dependent var	0.406117
S.E. of regression	0.391664	Akaike info criterion	0.972979
Sum squared resid	30.83356	Schwarz criterion	1.005622
Log likelihood	-96.75738	Hannan-Quinn criter.	0.986185
F-statistic	16.18328	Durbin-Watson stat	2.816929
Prob(F-statistic)	0.000081		

The stability test for dollarization rates indicates that the series is also stable at the level as per the PP test because the calculated value of t (-3.802740) is greater than its tabular value of (-2.875608).

2-Joint Integration Test:

Date: 07/02/21 Time: 17:04
Series: DL EX
Sample: 2003M01 2019M12
Included observations: 204
Null hypothesis: Series are not cointegrated
Cointegrating equation deterministics: C
Automatic lags specification based on Schwarz criterion (maxlag=14)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
DL	-3.075229	0.0982	-32.24056	0.0030
EX	-6.462433	0.0000	-195.2980	0.0000

The results of this test indicate a relationship of complementarity between the variables considered.

3-Determining the appropriate period of delay:

Before estimating the self-regression model equation (VAR), the number of latency scores for this model should be determined using a test (VAR LAG ORDER), which is based on the AIC and SCC criteria for determining length**.**

VAR Lag Order Selection Criteria
Endogenous variables: EX
Exogenous variables: C
Date: 07/02/21 Time: 17:22
Sample: 2003M01 2019M12
Included observations: 201

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1312.911	NA	27885.65	13.07374	13.09018	13.08039
1	-1180.861	261.4724*	7569.532*	11.76976*	11.80263*	11.78306*

It is clear from the results presented in the table above that the latency scores that give the lowest values to the Akaike and Schwarz standards are the first. This means that the number of delays in the model) is 1**.**

4- Granger causality test:

This test aims to determine the nature of the relationship between dollarization rates and exchange rates in the Iraqi economy over the period of time between 2003 and 2019**.**

Pairwise Granger Causality Tests
Date: 07/02/21 Time: 17:34
Sample: 2003M01 2019M12
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
DL does not Granger Cause EX	203	6.83303	0.0096
EX does not Granger Cause DL		11.1552	0.0010

From the above findings, we can say that dollarization rates affect exchange rates because the probability of accepting this hypothesis is 0.0096, which is significantly lower than the moral level of 5%.

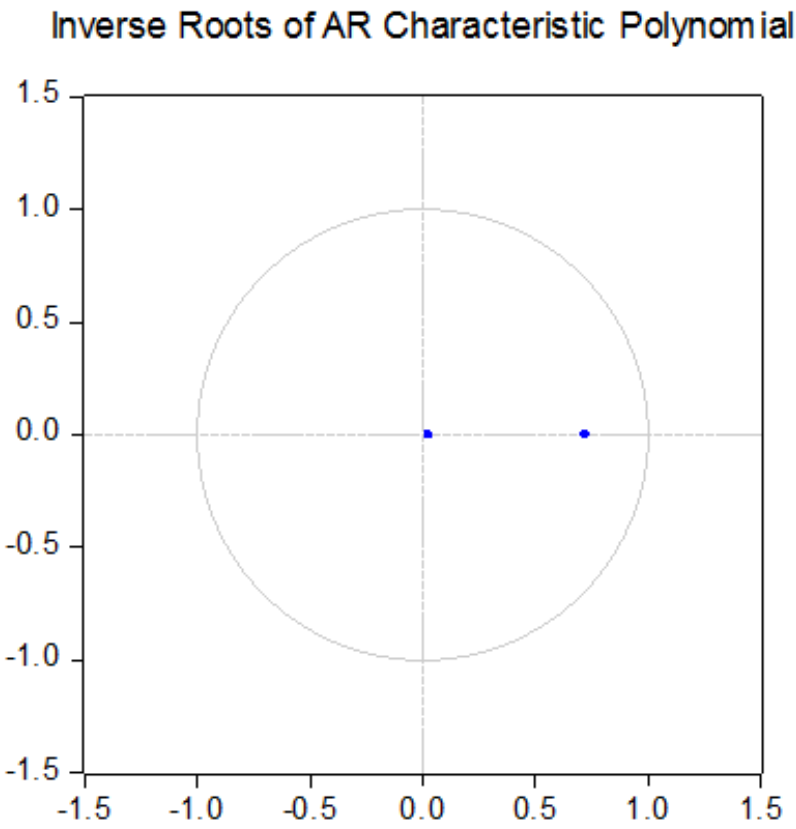
5- Results of the VAR model:

This test depends in its methodology on the existence of many internal variables and that each internal variable is affected by its backward value and the backward values of all other internal variables. The results of the self-binding vector model assessment (VAR1) gave the following abilities**:**

Roots of Characteristic Polynomial
Endogenous variables: EX
Exogenous variables: C DL
Lag specification: 1 2
Date: 07/02/21 Time: 17:42

Root	Modulus
0.719515	0.719515
0.026644	0.026644

No root lies outside the unit circle.
VAR satisfies the stability condition.



$$ex = 0.746158340293 * EX(-1) - 0.0191706001348 * EX(-2) + 385.150155995 - 34.8428223732 * DL$$

(0.068) (0.065) (60.386) (10.403)

(10.878) (-0.294) (6.378) (-3.349)

R2= 0.78 R2 Adj = 0.77

According to the above results, the estimated model is stable and good, and the value of the adjusted identification factor Adjusted R2 was about 77%, so it can be said that 77% of changes in exchange rates were explained by changes in dollar rates. The model can therefore be considered moral.

T-test: We note from the results obtained that the t-test values are greater than the scheduled values for the exchange rate variables and the dollar rate, and thus these variables can be said to be statistically acceptable.

Conclusion

In examining the relationship between dollar rates and exchange rates, we find that the former has both positive and negative effects on the economy as a whole and on the dollar rates. In achieving a set of positive effects, including economic stability and control of inflation rates, the latter also have negative effects, including loss of exchange rate effectiveness as a monetary policy instrument.

Sources:

1- Bashar Ahmed Al-Iraqi, Dollarization of Causes and Results, Arab Democratic Centre for Strategic, Political and Economic Studies, Berlin-Germany, 2017, p. 8.
2- Ragaa Aziz Bender, Reflection of Foreign Exchange Substitution in Monetary Policy Effectiveness, Central Bank of Iraq, Directorate-General for Statistics and Research, p. 2.
3- IMF, World Economic Outlook, October 1997, p. 12.
4- Luis Cato, Marco Tirones, Dollar Dependence, Magazine of Finance and Development, September 2016, p. 49.
5- Quispe-Agnoli, Myriam and Whisler, Official Dollarization and the Banking System in Ecuador and El Salvador. Economic Review,Federal Reserve Bank of Atlant,Third Quarter, Elena (2006), p55-71
6- Uzun, Arzu. (2005). Financial Dollarization, Monetary Policy Stance, and Institutional Structure: the Experience of Latin America and Turkey. Thesis for Master of Science in Economics, Middle East Technical University