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Exchange Overshooting and Currency Substitution in Iran

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ABSTRACT

If a country's domestic currency fails to perform its functions, foreign currency substitution occurs. This phenomenon is common in developing countries and is influenced by various economic and political factors. The main objective of this research is to estimate the relationship between exchange rate overshooting and currency substitution in Iran. We first use the Kamin & Ericsson method (2003) to evaluate the amount of circulating foreign currency and currency substitution within the Iranian economy, using annual data from 1979 to 2020. Then, we apply the ARDL method to estimate the impact of exchange rate overshooting on currency substitution. The long-term results indicate that exchange rate overshooting consistently increases currency substitution in Iran. Conversely, gross domestic product negatively affects currency substitution, while war and sanctions moderate this effect. Furthermore, the impact of war is greater than that of sanctions. According to the error correction coefficient (-0.92), it takes about 13 months to reach long-term equilibrium. Understanding the relationship between currency substitution and overshooting helps policymakers design better strategies for managing exchange rates and monetary policy.

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1. Introduction

Exchange Rate Overshooting was popularized by economist Rudiger Dornbusch (1976) in his model of exchange rate determination. Suppose there's a sudden increase in the domestic interest rate. This attracts foreign capital, leading to an immediate appreciation of the domestic currency. The appreciation can be more substantial than the long-term effect because the market participants adjust their portfolios quickly, moving capital in and out of the country rapidly. Over time, as goods prices and wages adjust to the new economic conditions, the exchange rate gradually moves back towards its equilibrium level. This process can take time due to sticky prices and wages. Causes of Overshooting are as flowing:

Monetary Policy Shocks: Sudden changes in interest rates can cause exchange rates to overshoot.

Market Psychology: Investors' reactions to news and expectations can lead to excessive movements in asset prices.

Price Stickiness: If prices and wages are slow to adjust, financial markets may respond more quickly than goods markets, leading to overshooting. Imagine a country increases its interest rates to curb inflation. Initially, the higher interest rates attract foreign investors, causing the currency to appreciate sharply. Over time, as the inflation rate decreases and prices adjust, the currency gradually depreciates to a level that's consistent with the new economic environment.

Policy Design: Understanding overshooting helps policymakers design better strategies for managing exchange rates and monetary policy.

Investment Decisions: Investors need to account for the potential of overshooting when making decisions in foreign exchange and asset markets.

A relative depreciation of the national currency is being experienced in most developing countries due to a lack of competitiveness, causing pessimistic expectations about their economic and financial systems. As a result, there is less demand for keeping domestic currencies due to low stability and replacing foreign currencies with high stability.

Having an unstable economic environment affects how much money economic actors are willing to keep. Therefore, uncertainty about the exchange rate and high and unpredictable inflation rates reduce demand for domestic currency and increase demand for alternative assets, such as foreign currency. It is known as the flight from domestic money, which results in a large and fast currency substitution process (Savastano, 1996). Currency substitution is the substitution of foreign currency with domestic currency for money functioning, including exchange facilitation, saving value, and evaluating the value of commodities and services. Currency substitution is often the results of increasing exchange rate fluctuations and economic instability (Isaac, 1989). Petrović (2016) and Kumamoto (2014) stated that currency substitution is an effective factor in exchange fluctuations in developing countries. It has numerous effects on the economy; first, the central bank loses control over a part of the money that people keep as exchange, and the impact of financial policies and seignories and income tax are reduced. Then, if the currency substitution degree is high, small changes in the money supply can cause high changes in the exchange rate. Due to factors such as high fluctuations in the value of the currency exchange rates as well as high inflation, Iran has experienced this event over the past several years. Currency substitution or foreign currency demand by residents was observed widely in developing economies. In these economies, some stable currencies, most often dollars, replace domestic currency first as a source of value and then as a trade tool beside domestic currency (Ramirez-Rojas, 1996). Currency substitution, also known as dollarization when the U.S. dollar is used, occurs when a country adopts a foreign currency in place of or alongside its domestic currency. This can happen for several reasons, typically driven by the need for economic stability. Countries with unstable economies or high inflation rates may adopt a more stable foreign currency to maintain economic stability. Smaller countries may find it impractical to maintain their own currency and instead use the currency of a larger, more stable neighbor. Using a widely accepted currency

can facilitate international trade and investment. Sometimes, historical or political reasons lead to currency substitution. Currency Substitution may happen as;

Full Currency Substitution: The foreign currency completely replaces the domestic currency. Examples include Ecuador and El Salvador, which use the U.S. dollar as their official currency.

Partial Currency Substitution: The foreign currency is used alongside the domestic currency for certain transactions or financial assets. This can be a step towards full substitution.

Benefits of currency substitution:

Reduced Inflation: Adopting a stable foreign currency can help control inflation.

Increased Credibility: It can enhance the country's credibility in international markets.

Simplified Transactions: Easier transactions with countries using the same currency.

Risks of currency substitution:

Loss of Monetary Policy: The country loses control over its monetary policy.

Dependence on Foreign Economy: The country becomes more vulnerable to economic conditions in the foreign currency's country.

Reduced Seigniorage: The country loses revenue from issuing its own currency.

Ecuador adopted the U.S. dollar in 2000 to stabilize its economy after a severe financial crisis.

El Salvador officially adopted the U.S. dollar in 2001 to promote financial stability and economic integration with the United States.

Over all the currency substitution is a complex economic strategy with significant implications. It's a trade-off between gaining stability and losing monetary autonomy. Currency substitution plays a significant role in the performance of financial policy, the determination of a proper exchange

system, and the implementation of stability programs (Sharma, 2005). A high inflation rate and its fluctuations, as well as a severe devaluation of the national currency, results in the domestic exchange being replaced by foreign currency (Kamin & Ericsson, 2003). Different studies considered other factors, in addition to inflation and devaluation of domestic currency, among which exchange rate fluctuations and economic and political uncertainty are the most crucial factors (Ratti and Jeong, 1994). Also, in countries with deposit interest rate gaps, high inflation rates, and exchange rates control, foreign currencies form a considerable portion of individuals' portfolios to save the source of value (Alami, 2001). Currency substitution results in losing seignories income, the autonomy of financial policy, and using exchange rate tools. Seignories incomes are incomes obtained from the money circulation of monetary authorities. When a foreign currency is selected as the legal currency, the monetary authorities should disregard domestic currency and seignories income. Regardless of whether the country is in a financial emergency state, financial policies and exchange rates will be lost (Levy Yeyati, & Sturzenegger, 2003). In an economy with complete currency substitution, exchange rates are unclear and monetary authorities cannot devaluate the currency. In these states, the policy of currency devaluation is less effective in changing the actual exchange rate (Berg & Borensztein, 2000). However, the cost of losing autonomy in financial policy is when monetary authorities can commit an anti-cyclical effective financial policy to stabilize commercial cycles (Alumina & Barro, 2001). In addition, monetary authorities in economies with currency substitution reduce the liquidity guarantee of their bank system. It is unlikely that monetary authorities will be able to play the lender's role by printing money as the final solution for commercial banks in such an economy. The alternative solution for lending to the bank system is tax and releasing government bonds (Berg & Borensztein, 2000, Levy Yeyati, 2003). The main aim and innovation in this paper is to estimate the effects of currency overshooting on currency substitution in Iran which has not been estimated so far. This

paper is organized in 5 sections; section two is devoted to the research background, in section three we have presented the methodology of research, section 4 is concentrated on the empirical estimation, and finally we have reached to conclusion in section 5.

2. Research background

Reviewing foreign studies show that in some developing countries, currency substitution is common due to poor economic policies and tumefacient policies, and most countries with above 20% inflation are exposed to currency substitution. Turkey, Nigeria, and Venezuela are countries with high inflation and currency substitution. Zervoyianni (1988) investigated overshooting, currency substitution, and financial policy. He found that currency substitution has two impacts: anticipation impact and income impact. The first one is the stabilizer, which means reduces both the possibility of over-increasing the exchange rates and its value in case it occurs. The latter, however, can be a destabilizer factor. Bahmani-oskooee & Kara (2000) studied the exchange overshooting phenomenon in the Turkish economy. Their findings indicate that Turkey's economy have been experiencing an exchange overshooting in the long term as a result of the positive error correction coefficient. Beaugrand (2003) analyzed overshooting and dollarization in the Democratic Republic of the Congo. The difference between the inflation rate and currency devaluation (above or below the exchange rate) is observed as a representative of changes in relative demands for domestic and foreign exchange. A simple model for the Democratic Republic of the Congo was calibrated in the 1990s and used for extracting estimations of the dollarization rate. Wdowiński (2007) studied the Dornbusch overshooting under nominal and real deposit interest rate. When the economy reacts to nominal and real interest rates, the focus is on the impacts of money expansion. The difference in adjustment speed under two deposit interest rate increases if the prices are flexible. In addition, the Dornbusch model under the nominal interest rate is always stable in a

standard macroeconomic framework, and the model is constant under the real interest rate. However, the stability states are related to important interactions of commodity market parameters with a direct connection with the money market through the interest rate channel.

Metin-Ozcan & Us (2007), in the research "the non-dollarization of Turkey after decades of dollarization, reality or myth," investigated symptoms of non-dollarization of Turkey's economy from 1985 to 2007. The empirical results using the VAR model show that the lack of balance in the macroeconomy, which is measured by exchange rate reduction fluctuations, inflation fluctuations, and anticipations, is a primary factor in the dollarization of Turkey's economy. Turkey experienced high economic growth and inflation reduction from 2002 to 2005, resulting in decreasing dollarization. According to the results, despite reducing dollarization in this period, it was still prevalent and started to rise after 2006. Therefore, economic macroplanning is critical to continue dollarization reduction. The findings of this research show that non-dollarization in Turkey is rather a myth than reality. Also, the experience of this country showed that even without taking a special policy to reduce dollarization, the continuation of low inflation automatically causes non-dollarization gradually and endogenously. Doguwa (2014) examines the existence, causes and effects of currency substitution in Nigeria by estimating conventional money demand equations based on a partial adjustment and an ARDL model using three definitions of monetary aggregates. The behavior of the foreign currency/Naira deposit ratios have been influenced by devaluation expectations, exchange rate risks and political uncertainties during the Yar'adua-Jonathan presidency. Also, the money demand estimations reveal that short-term foreign interest rates significantly affect the demand for the Naira, suggesting strong evidence of currency substitution and the possibility of importing considerable instability in the economy.

Lai & Tsai (2015) studied different alternative resources and the dynamicity of the exchange rate. The results showed that exchange rate

overshooting occurs when various assets are incorporated in the dynamic optimization NOEM model, and the overshooting amount depends on the level of various exchange assets. Considering the wealth analysis, the expansionary monetary policy of the country improves domestic wealth. Also, it was found that the checking account is crucial in the impact of monetary policy on the exchange rate. Increasing domestic currency through the impacts of checking account improvement drives domestic consumption expenses, resulting in exchange rate expansions. Baek & Miljkovic (2018) analyzed the relationship between monetary policy and overshooting of the oil price in an open economy. Financial shocks cause the adjustment of oil and industrial prices to be very different in the long term, which shows the neutrality of the money in the long term. Also, it was determined that the oil price tends to be adjusted faster than industrial prices (adhesive) with financial shocks to reach a long-term balance and affects relative prices in short term. Suidarma et al. (2018) examined the determinative factors of the exchange rate overshooting of the Indonesian Rupee with US dollars and the Dornbusch model hypothesis test from 2010 to 2017 using the vector error correction model. The results showed that the money bulk variable or the total money has a negative relationship with the exchange rate movement in the long term, in which increasing money total money cause an exchange devaluation. The short-term shock does not affect the exchange rate significantly. The Dornbusch hypothesis about the exchange rate overshooting in Indonesia did not occur during the observation period. Ogiji Usman (2021) studied the asymmetric impacts of the exchange rate on financial demand from 1995 to 2019 in Nigeria by using the exponential Generalized AutoRegressive Conditional Heteroskedasticity. In their analysis, they rejected the hypothesis that currency substitution affects exchange rate fluctuations positively. Sadeghi Shahdani and Mohseni (2019) examine the dynamic conditional correlation and volatility spillover of the exchange rate on the capital market using three multivariate GARCH models

in a 12-year period ending in 2016. The purpose of this study was to explain the effect of shocks and the spillover of the currency market on the Iranian capital market. The results confirm the existence of negative short-term and positive long-term sustainability of exchange rate shocks on capital market returns. Also, the asymmetric and positive volatility spillover to the Iranian capital market was confirmed. Carrière-Swallow et al. (2021) explored the relationship between inflation, exchange rate, and currency substitution in recent economies selected based on the vector error correction model (VECM) from 1998 to 2018. They verified the long-term relationship between variables and stated that increasing inflation rates and devaluations of national currencies affect currency substitution positively over the long run. This paper examines the influence of exchange rates on money demand within ECOWAS countries using a panel ARDL approach. The findings indicate the presence of currency substitution. Specifically, the real effective exchange rate positively impacts money demand in the long run, highlighting the dominance of expectation effects over wealth effects. Conversely, in the short run, the real effective exchange rate negatively affects money demand, with wealth effects prevailing. The results remain consistent when substituting the nominal effective exchange rate for the real exchange rate. Ouattara (2023) examines the influence of exchange rates on money demand within ECOWAS countries using a panel ARDL approach. The findings indicate the presence of currency substitution. Specifically, the real effective exchange rate positively impacts money demand in the long run, highlighting the dominance of expectation effects over wealth effects. Conversely, in the short run, the real effective exchange rate negatively affects money demand, with wealth effects prevailing. The results remain consistent when substituting the nominal effective exchange rate for the real exchange rate.

3. Research methodology

When a country experiences an economic shock (like a sudden change in interest rates or a financial crisis), its currency might overshoot. This short-term volatility can be destabilizing. If overshooting and resulting volatility are severe and persistent, it might erode confidence in the domestic currency. In response, people and businesses may start using a stable foreign currency, leading to partial or full currency substitution. While exchange rate overshooting is a short-term adjustment phenomenon, currency substitution is a long-term strategy that can be used to address the underlying instability causing frequent overshooting. They are interconnected through the impacts on economic confidence, inflation, and monetary policy effectiveness. The exchange overshooting impact on currency substitution will be estimated as follows:

$$LCS_t = (OVER_t, LGDP_t, SANC_t \times LGDP_t, WAR_t \times LGDP_t, PS_t) \quad (1)$$

Where LCS is the currency substitution logarithm, OVER is the currency overshooting, LGDP is the logarithm of gross domestic production, SANC*LGDP is the result of the product of sanction virtual variable in the logarithm of gross domestic production, WAR*LGDP is the product of the virtual war variable in the logarithm of gross domestic product, and PS is the political stability. To examine the short-term and long-term relationship between currency overshooting and currency substitution, the equation will be estimated based on the ARDL model.

Currency overshooting index and currency substitution index:

Overshooting is calculated as follows:

$$\text{O } Overshooting = \left(\frac{\Delta e}{e} - \frac{\Delta m}{m} \right) \times 100 \quad (2)$$

Where Δe is the exchange rate changes and Δm is the change in the money volume. The currency substitution index is obtained as follows:

$$CS_t = \left(\frac{M_t^F * PEX_t}{M_t^D + (M_t^F * PEX_t)}\right) \tag{3}$$

Where M_t^f is the volume of foreign exchange in circulation, PEX is the US dollar rate in the parallel market (non-official exchange rate) and M^D is the domestic currency volume. The volume of foreign exchange in circulation is:

$$M_t^F = \left(\frac{M_t^D}{PEX_t}\right) * \left(\exp\left\{\beta_4 INF_t^{\max}\right\} - 1\right) \tag{4}$$

The following equation is used to estimate the domestic currency demand function β_4:

$$\begin{aligned} LM_t^D = {} & \beta_0 + \beta_1 (WAR_t \times LGDP_t) + \beta_2 (SANC_t \times LGDP_t) \\ & + \beta_3 LGDP_t + \beta_4 INF_t^{\max} + \beta_5 RGPEX_t + \beta_6 ID_t + u_t \end{aligned} \tag{5}$$

Where INF^{max} is the maximum inflation until the considered date, RGPEX is the difference between market exchange rate growth and inflation, and ID is the interest rate.The maximum inflation was calculated based on the household consumer price index in each year, and the month with the highest inflation value was selected as the maximum inflation of that year. The political stability[1] of Iran was extracted from the Kaufmann dataset in association with governance in different countries, which ranges from -2.5 (the weakest state) to 2.5 (the strongest state).

1. The political stability data is related to data of Worldwide Governance Indicators (WGI), which is calculated based on polls (questionary) and evaluations of experts across the world. Details of the calculation method are accessible in the article below.

4. Empirical estimations

First, we have found the currency substitution and the exchange overshooting indices. Doing so, we have used the equations (2), (3) and (4).

Table 1. Cointegration test

Cointegration test		
Cointegration	Model specification	F Pesran, Shane, and Smith
✓	$ARDL(1,5,0,0,0)$	8/27***

*** shows significance in the 1% level.

Source: Research findings

Considering the cointegration among variables of the domestic currency demand equation, the money demand equation can be estimated as follows:

$$\widehat{LM}_t^D = \beta_0 - 0/48978(WAR_t \times LGDP_t) + 0/038605(SANC_t \times LGDP_t) + 5/782281 LGDP_t - 0/019429\, INF_t^{\max} - 0/039049\, RGPEX_t + 0/080065\, ID_t \quad (6)$$

According to the coefficient of INF, which is equal to -0.019429, the currency substitution can be calculated, followed by estimating the equation of currency substitution and exchange overshooting.

4-1. Summary of data description

Data descriptive statistics of the research variables is summarized in Table (2):

Table 2. Summary of data Statistics

Unit	Jarque- Bera statistic	Standard deviation	Minimum value	Maximum value	Average	Variable		
						Symbol	Name	Analysis level
Percentage	2.04	0.15	0.14	0.68	0.40	*CS*	**Currency substitution**	Macroeconomy
A thousand billion Rials	4.09	3,401,220	4,612,211	14,806,361	9,354,261	*GDP*	Gross Domestic Production	
Percentage	7.77**	9.39	4.39	49.66	19.99		Inflation rate	
Percentage	7.56**	9.28	-49.28	-4.14	-19.81	*RGPEX*	Difference between the market exchange rate and inflation	
Percentage	33.77***	29.09	-40.90	93.85	-1.79	*OVER*	**Exchange Overshooting**	
A thousand billion Rials	277.89	1948.575	2.71	9865.8	922.24	*MD*	Domestic Currency	
Percentage	0.12	3.94	8	24	14.14	*ID*	Interest rate	
Percentage	2.24	13.32	7.94	59.09	28.33	INF^{max}	Maximum Inflation rate	
dimensionless	1.98	0.50	-1.71	0.07	-0.70	*PS*	Political Stability	
A thousand billion Rials	1.84	280	1,280	2,274	1,814	*G*	Government expenses	
Percentage	2.82	2.99	15.68	26.17	19.85	*HP _ INF*	Expected inflation rate	
dimensionless	12.17	89.30	54.48	423.09	154.30	*REER*	Effective real Exchange Rate	
dimensionless	13.64***	54.23	-76.06	158.58	1.78	*EX _ RISK*	Exchange rate Risk	

Number of observations is 42, *and*** show significance at 5% and 1% levels, respectively. Therefore, the Jark-Bera statistics show that most variables of the model have a normal distribution.
Source: Research findings

The results of descriptive statistics show that the currency substitution for Iran from 1979 to 2020 was equal to -0.98%, the maximum value was -0.38%, and the minimum value was equal to -1.95%. Thus, it can be concluded that the currency substitution in Iran is around -0.1%. In the following, the exchange overshooting for Iran is equal to -1.79%, its

maximum value is 93.85%, and its minimum value is -40.90%. Therefore, the average of the exchange overshooting is around -2%.

4-2. Unit-root test

Table (3) shows the results of the generalized Dickey-Fuller Unit-root test for the variables.

Table 3. Dickey-Fuller Unit-root test

Cointegration degree	statistic ADF		Variable		
	First order difference	Level	Symbol	Name	Analysis level
I(1)	-7.13 ***	-1.20	*LCS*	Currency substitution value logarithm	Macroeconomy
I(1)	-5.59 ***	3.24**	*LGDP*	Real Gross domestic production logarithm	
I(0)	--	-4/66 ***	*INF*	Inflation rate	
I(0)	--	-4.56 ***	*RGPEX*	Difference between the market exchange rate and inflation	
I(0)	--	-5.42 ***	*OVER*	Currency overshooting	
I(1)	-3.18 **	0.90	*LMD*	Domestic currency logarithm	
I(1)	-4.70 ***	0.45	*ID*	Deposit interest rate	
I(1)	-7.24 ***	-1.06	INF^{max}	Maximum inflation rate	
I(1)	-5.63 ***	-0.68	*PS*	Political stability	
I(1)	-6.007 ***	0.006	*LG*	Government expenses logarithm	
I(1)	-1.81 *	0.61	*HP _ INF*	Anticipated inflation	
I(1)	-4.03 ***	-0.34	*LREER*	Effective real exchange rate logarithm	
I(0)	--	-4.60 ***	*EX – RISK*	Currency rate risk	

*, **and*** show significance levels of 10%, 5%, and 1%, respectively.

Source: Research findings

The results show that most variables in the currency substitution, real gross domestic production, domestic currency, domestic interest rate, maximum interest rate, maximum inflation rate, political stability, government expenses, anticipated inflation and effective real exchange rate are first order Integrated, and only the inflation, difference between the market exchange rate and inflation, overshooting and currency rate risk are integrated at level. Thus, the ARDL method should be used when some variables are I(1) and some I(0).

4-3. Estimation of the model

The main aim in this research has been to understand the relationships between overshooting and currency substitution in Iran. These indices have been obtained as explained above. The simple relation can be observed in Fig. 1.

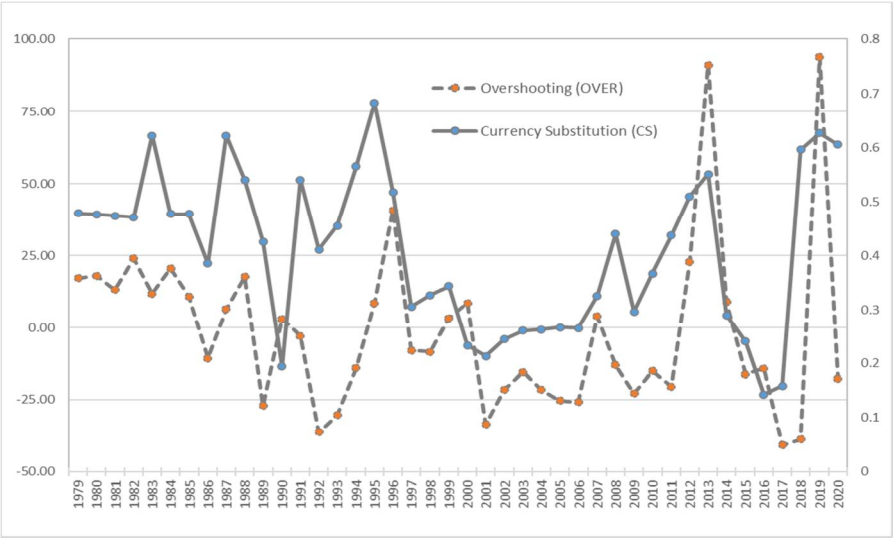

Fig 1. Overshooting and Currency substitution in Iran (1979-2020)
Source: Research Findings

At first, the distribution among logarithms of the currency substitution and exchange overshooting is drawn, which shows the considered shock has

an effective impact, as expected. The Scatter diagram between Overshooting and logarithm of Currency substitution is shown in Fig. (2).

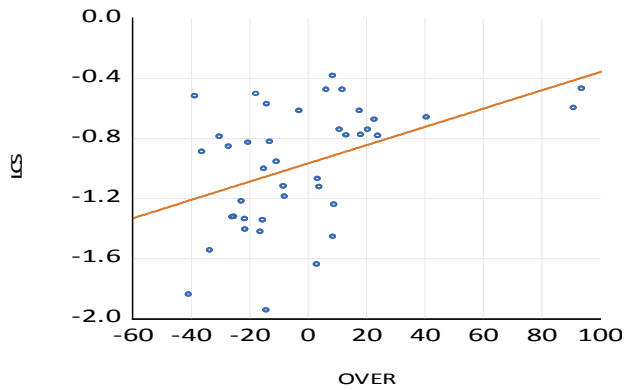

Fig 2. Scatter diagram between Overshooting and logarithm of Currency substitution
Source: Research Findings

According Fig (2) a positive relationship exists between the overshooting and currency substitution as expected. In the following, after conducting a more comprehensive numerical analysis for the long-term and consideration of other effective factors on the currency substitution, the above equation is verified. Based on the Schwartz criteria for selecting the optimal interval of the optimal ARDL (1,0,0,1,0,0) in accordance with Table(4), the autocorrelation exists, but Variance heterogeneity and cointegration hold:

Table 4. Cointegration test and determinative statistics

Determinative statistics			**Cointegration test**		
F Variance heterogeneity (Brush-Pagan-Godfrey)	**F autocorrelation (Brush-Godfrey)**	**χ^2 Normality**	**Cointegration**	**Model specification**	**F, Shane, smith**
0.59	***19.09	0.55	✓	*ARDL*(1,0,0,1,0,0)	***5.43

*, **and*** show significance at 10%, 5%, and 1% levels, respectively.

Source: Research findings

Therefore, to overcome these problems, the estimation method that is compatible with autocorrelation and variance heterogeneity (HAC) was used to estimate the model.

In the following, to ensure the verification of the results, the cumulative sum of the recursive residuals (CUSUM) was carried out. According to the results, the part of the model's error is the white noise, which declines any problem in the model's estimation, and shows the validation of the results.

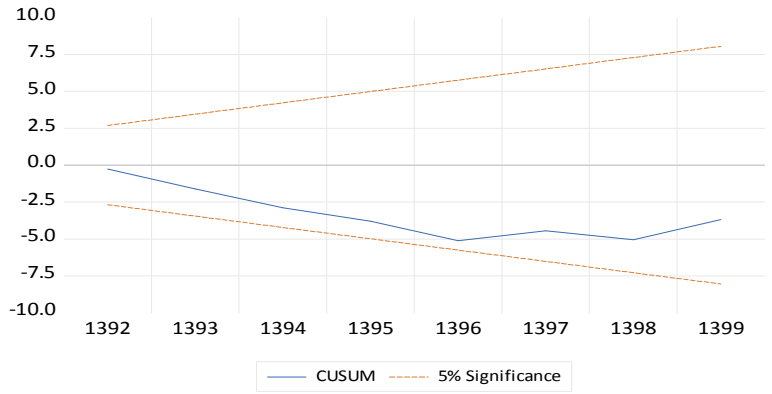

Fig 3. Cumulative sum of the recursive residuals (CUSUM)
Source: Research findings

The results of the short-term and the long-term are presented in Table (5) and Table (6), respectively for interpretations.

Source: Research Findings

Table 5. Results of estimating short-term coefficients

Variable	Coefficients	t statistic	Possibility value
$D(LGDP*SANC)$	0.03	4.25	0.0002
$HPTREND01-INF$	0.05	3.65	0.0010
EX_RISK	0.002	2.48	0.0191
LG	0.57	6.67	0.000
$LREER$	-0.56	-4.35	0.0002
ECM	-0.92	-6.78	0.000
F = 7.15			R^2 = % 56

Source: Estimated Model using EViews

Table 6. Results of estimating long-term coefficients

Variable	Coefficients	t statistic	Possibility value
OVER	0.0048	2.55	0.016
LGDP	-1.18	-2.23	0.033
*SANC * LGDP*	0.005	0.45	0.654
*WAR * LGDP*	0.040	2.64	0.013
PS	-0.51	-2.17	0.038
Intercept	-2.48	-0.14	0.0886

Source: Estimated Model using EViews

Usually, the coefficients of the short-term model are not analyzed. However, the results show that anticipated inflation, exchange rate risk, government expenses, and sanctions have a positive impact on currency substitution, and the effective exchange rate has a negative impact. The error correction coefficient was negative and significant, and its absolute value was below 1, equal to -0.92. This coefficient shows that in each cycle, 92% of the applied momentum to the currency substitution in the short term tends to adjust toward long-term balanced values. In other words, around 92% adjustment is conducted each year, and it takes 13 months for the generated fluctuations in the pattern to approach long-term balanced values. Finally, all coefficients in the long-term were obtained according to theoretical anticipations. According to the results obtained in the long term, exchange overshooting always increases currency substitution in Iran. On the other side, coefficients associated with other effective factors were according to theoretical anticipations. In a way, the gross domestic product had a negative impact on currency substitution, and war and sanctions had an adjusting role in gross domestic product effectiveness on currency substitution. Also, the impact of the war was more intense than the sanctions. Further, political stability affected currency substitution in the long-term, as expected.

5. Conclusion and Policy Recommendations

The main objective of this research has been to estimate the relationship between exchange overshooting and currency substitution in Iran. Currency substitution is a common phenomenon in developing countries, which is affected by different economic and political aspects. First, we have used the Kamin & Ericsson method (2003) to find the currency substitution indices concerning the annual data from 1979 to 2020. Then, the ARDL method was used to estimate the impact of exchange overshooting on currency substitution. The long-term results indicate that the exchange overshooting always increases currency substitution in Iran. On the other hand, gross domestic product affects currency substitution negatively, and war and sanctions have a moderator role in the effectiveness of the gross domestic product on currency substitution. Additionally, the effect of war has been higher than that of sanctions. Also, according to the results of the coefficient of error correction (-0.92), it takes about 13 months to reach the long-term equilibrium. Understanding and identifying the factors affecting the currency substitution problem helps policymakers design better strategies for managing exchange rates and monetary policy.

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Conflicts of interest:
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