

Estimating the Impact of Devaluation the Exchange Rate on Inflation: A Cause Study of Iraq Using ARDL Model

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Abstract

The exchange rate tool is one of the most important macroeconomic tools that affect many variables, including the general level of prices, investment, import and export. In the case of a deteriorating economy such as the Iraqi economy, which suffers from a high import rate of final goods and intermediate goods, which are considered inputs to production processes, means exit Foreign exchange to abroad that affects the position of the balance of payments and its imbalance. It is very abnormal for countries to reduce the value of their currency exchange for financing reasons related to financing their public budget deficit without taking into account macroeconomic variables. All of these matters reflect a clear confusion of the fiscal and the monetary policies. The results of the current study by using the ARDL model have proven the direct impact of currency devaluation on inflation.

Keywords

Exchange Rate, Inflation, Agricultural Production, ARDL Model.

JEL: E00, E6, C01.

Introduction

The optimal exchange system depends on, in addition to the effectiveness of monetary policy, the strength of the link between movements in exchange rates and import prices (Campa & Goldberg 2002). Adopting a higher exchange rate, which is reflected in domestic prices and production costs.

The relationship between the general price level and the exchange rate is not one-way, although the effect of short-term devaluation on inflation is less than the effect of inflation on devaluation and because the movements in the exchange rate are mostly driven by price inflation, the practice of using the exchange rate as an independent tool it cannot last in the presence of inflation. (1999, Eatzaz & Ali).

Studies have shown that domestic inflation is a strong driving force behind the practice of devaluation (Sodersten & Reed, 1994). Meaning that the country, with its current policy, will work to further devaluation the strength of the currency due to economic variables and their interaction with some. The practice of devaluation is the main cause of inflation, and this is what we observe now of high prices, and this explains to us that the general level of prices quickly adapts to the prices of traded commodities, especially since most of them are imported goods whose value has been paid in dollars, which has become high against the value of the local currency.

The importance of the exchange rate lies in the fact that it exerts an important influence on the external economic activities carried out by any country, whether it is a commercial or investment activity. Costs and prices, whether inside or outside the economy, can be used as an indicator of the competitiveness of the country and thus on the balance of payments.

Studies related to the exchange rate have taken up a large space in recent studies due to the global openness and the connection of the economies of countries abroad and with the international monetary system, which determines the mechanism of commercial transactions and their interaction with the exchange rate. The optimal exchange rate is the one that is set according to a mechanism that resists external shocks, this is what developing countries suffer from in determining an exchange rate mechanism that mitigates the impact of exchange rates on domestic prices.

The reflection of fluctuations in the exchange rate may result in inflationary pressures, and it is well known that this problem has economic, social and political dimensions that can distort the structure of the economy and decrease the real growth rate. The rise in prices will be reflected in production costs, which will negatively affect investment and real production in all economic branches, which means deterioration of economic development process.

Inflation also leads to a further decline in the value of the currency and the competitiveness of exports. Higher prices for domestic goods lead to lower exports and

revenues on the one hand, and an increase in import demand on the other hand. This means a deficit in the balance of trade, and a greater decline in the exchange rate of the local currency, and this negatively affects the process of investment and production in the economy, as well as that the decrease in the value of the local currency towards foreign currencies leads to the depletion of reserves of foreign currencies and an increase in dependence on global markets.

Monetary policy plays an important role in this area, and monetary policy is those programs or measures that the monetary authorities pursue to organize cash to reach the desired goals, and in most countries, the central bank takes these measures (Ammer & S. Ammer, 1977).

It controls the volume of cash through its effect on credit and on the interest rate, and this is reflected in economic variables. The monetary policy usually aims to control the amount of money, credit, stability in prices and economic growth, and the goal of achieving stability is the most important goal of monetary policy, especially in developing countries because of the inflation that they suffer more sharply than developed countries.

The transmission of changing exchange rates to the price level and the expected results at the level of the national economy and its variables, which may mean economic destabilization, is a major factor that must be focused on when choosing an exchange rate regime.

This transition from the exchange rate to the prices (pass-through) can be defined as the degree by which fluctuations in exchange rates are transferred to the general price level in the country, as it represents the relationship between the movements of exchange rates and the adjustment in commodity prices, and it means a change in the prices of imported goods according to the change in exchange rates (Eiteman, et al, 2004).

The presence of a high pass-through effect may lose the credibility of the monetary authorities. Therefore, the central bank must quickly intervene to prevent the rapid escape from the rate of inflation and its wildness.

The degree of transformation of the changes from the exchange rate to the prices documents the relationship that says the relationship of inflation to the exchange rate is a reciprocal relationship, not one-sided, as well as on the other hand, it illustrates the speed of investors' response to price changes in response to the change in exchange rates and the

implications that this has on the competitiveness of local products destined for export. (Goldfajn & Werlang, 2000).

The degree of transmission of exchange rate changes to local prices is affected by several factors, including the structure and level of competition in commodity markets and the inflationary environment. The transfer of exchange rate changes to local prices rises according to the level of inflation. Producers are working to transfer these changes directly to the prices of their products, especially in an economy that has always suffered from high inflation. They will also expect that costs will rise as well, and this is what we call cost-push inflation (Taylor, 2000).

The importance of the adopted exchange rate system as a determinant of investment appears through its effect on the volatility of the nominal and real exchange rates. Many studies show that the volatility of the real exchange rate changes according to the exchange rate system, as (Liang, 1998) asserts that the exchange rate system plays a specific role on the behavior of the real exchange rate and thus on investment decisions. The depreciation of the real exchange rate may harm productivity growth in the country, because it protects domestic enterprises from foreign competition, and thus disappears the incentive for investment that can increase production (Campa & Goldberg, 2000).

The decrease in the foreign exchange rate (raising the value of the local currency) leads to an increase in the prices of local goods in the foreign markets. which leads to a decrease in the quantities that foreigners demand of these goods, and since the quantities offered of foreign currency depend on the quantities of cash that foreigners wish to pay in exchange for obtaining local commodities, the foreign currency supply is equal to its supply that preceded the decline in the foreign exchange rate if the elasticity of demand for imports is equal to one. But if the elasticity of demand is less than one, then the supply is greater and vice versa.

In the case of an increase in the foreign exchange rate (a decrease in the value of the local currency), it leads to a decrease in the prices of local goods in the foreign markets, and thus an increase in the quantities that foreigners request of these commodities. But the supply of foreign currencies depends on the elasticity of foreign demand for these goods, and it rises or decreases depending on the elasticity of foreign demand if it is greater or less than one, and the supply of foreign currencies is equal to the supply that preceded the devaluation if the elasticity of demand for domestic goods is equal to one. (Farhan, 2018).

Devaluation of the local currency makes import prices higher internally, while its price in foreign currency remains unchanged. Consequently, the volume of imports will shrink, and the required amount from foreign exchange will decrease. The devaluation of the currency reduces real disposable income and thus consumption, which leads to a decline in imports of consumer goods.

But if the matter is related to capital goods and imported raw materials, they usually constitute an abundant share in the components of the GDP. The reduction of their imports depends on the capacity of the developing countries' ability to replace imported raw materials and their ability to change their production techniques in a way that enables the exploitation of local resources. This is not easy, even if the possibility exists for that, as it requires a period of time that may be long and expensive, but the possibility of replacement is great for raw materials compared to capital goods.

In the case of an increase in the value of the currency or the state resorting to raising it in order to reduce the burden of its imports on the trade balance, which leads to an increase in the volume of imports from abroad, which leads to an increase in the domestic supply of goods, prices will decrease, in addition to reducing the cost of production as a result of reducing the cost of imports of raw materials. The demand of foreign exchange is determined when it matches the desires of foreign exporters and the desires of local importers (Farhan, 2018).

The Central Bank of Iraq represents the highest monetary authority in the country responsible for issuing the national currency, monitoring government, private and foreign banks inside the country, drawing the country's monetary policy, financing government banks, and responsible for economic stability through the use of its tools.

In December, at the end of the year 2020, the Central Bank of Iraq announced the adoption of a new price for the Iraqi dinar against the dollar at the rate of (1450) dinars per dollar, after it was (1190) dinars against one dollar for the year 2020, through its daily sales through Foreign currency sales auction.

The government justified the reasons for this change, what it described as the reform policy of the government that it will adopt during the 2021 budget, as the country faces a stifling financial crisis due to low oil prices, and the government aims from the decision to devalue the local currency to bridge the financial deficit in the operating budget in order to secure domestic expenditures with The decline in the value of the country's oil imports to less than half.

The Economic Effects of Devaluation the Exchange Rate

A deep look at the budgets of Iraq from 2003 until the general budget put to the vote for the year 2021, shows that the percentage of what is allocated to the productive sectors is much less than what must be provided to support this vital and basic activity. Which is from the economic logic is the main tributary of the gross domestic product. So the question is, what is the reflection of the devaluation of the currency on production economic activity? The devaluation of the currency leads to:

First: High rates of inflation, which means a decrease in the real value of income on the one hand, and an increase in production costs at home on the other hand.

Second: The high costs of production in the country - they are basically high - in light of the lack of government support, forcing the producer to raise the value of his commodity, and this procedure is unsuccessful due to his weak competitiveness in front of the imported product, which means great losses. Consequently, production is expected to decrease.

Third: The high rate of import of the commodities and their low price compared to the local product means the consumer switching to imported goods, this will reflect negatively, especially since the ratio of what is imported to what is consumer is very high

Fourth: Economic dumping: The devaluation of the currency may be followed by some producing countries in order to flood the global markets with their locally produced goods, thus creating markets for their products and gaining consumers after that, they correct this situation and raise the exchange rate, either devaluation the exchange rate of the currency with weak GDP This will only be reflected by a rise in the prices of domestic and imported goods, and consequently an increase in inflation (imported inflation).

Table (1) shows the negative effects associated with inflation, so we find that the inverse relationship between inflation and the value of the currency, the higher the inflation rate, the lower the currency value. In recent years, the government has adopted a monetary policy through which it maintained the exchange rate of its currency and fixed inflation levels at a low level compared to what it was in previous years, and the question that arises, where is the result of this policy, which is supposed to be positive for local production? The answer to this is that the domestic product did not increase as expected, because the country does not place any restrictions on import, and the price of imported is less than the price of the domestic product due to the high cost of production for the local one, therefore it does not find the ability to compete in the market because the consumer will search on the lower price, even if the quality of the local product is better, and the government, with its adopted policy, does not provide any production support to

reduce the cost, and here it cannot withstand and there is no motivation to continue production or increase it.

All this means that with the policy followed, which will exacerbate inflation, the situation will worsen, and this will negatively affect the production sectors, whether due to the rise in prices, the competitiveness of foreign goods, or the rise in production costs.

Table 1 Inflation rate and the exchange rate of the dinar against the dollar (2003-2019)

Year	IN	EX	CPI
2003	32.6	1896	-
2004	27	1453	8815.6
2005	37	1469	12073.8
2006	53.2	1467	18500.8
2007	30.8	1255	24205.5
2008	12.7	1193	24851.3
2009	8.3	1170	122.1
2010	2.5	1170	125.1
2011	5.6	1170	132.1
2012	6.1	1166	140.1
2013	1.9	1166	142.7
2014	1.6	1166	145.9
2015	1.7	1167	148
2016	1.2	1190	104.1
2017	0.6	1190	104.3
2018	0.2	1190	104.7
2019	0.1-	1190	-

Source: Central Bank of Iraq (2003-2019), General Directorate of Statistics and Research, Annual Bulletin.

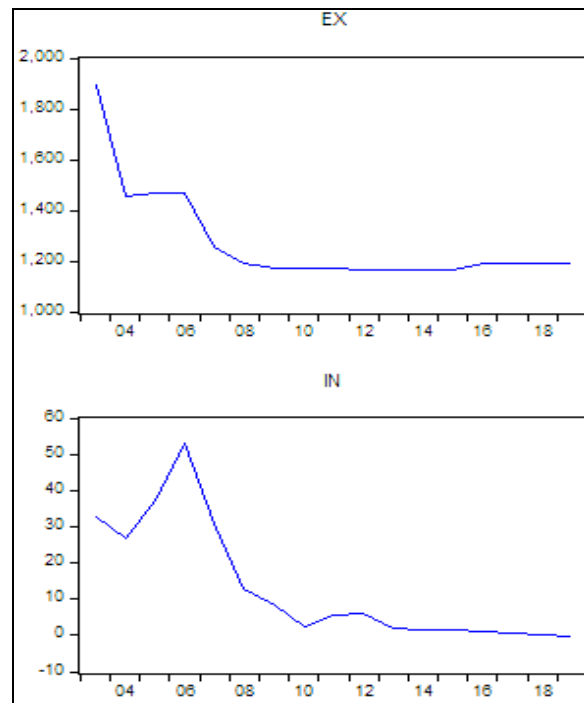


Figure 1 Development of the dinar exchange rate and the rate of inflation in Iraq for the period (2003-2019)

Source: Eviews10 program outputs

The corruption that the country suffers from is the catalyst for this episode, that is, the high rate of corruption that is directly related to the rate of inflation, and this will negatively affect the value of the currency, which is essentially low according to the order of the Central Bank. This will drive further decline and further increase in prices and production costs, and consequently a further decrease in agricultural production.

We have previously conducted a standard study in the impact of corruption on the value of the Iraqi dinar for the period 2004-2018, and the results of the standard study, using the distributed ARDL model, demonstrated the existence of a long-term equilibrium relationship between corruption, inflation and gross domestic product, as well as the significance of the long-term relationship between corruption and inflation, and the existence of a positive moral impact relationship at the level of (10%) that moves from corruption to inflation, as an increase in corruption by (100) leads to an increase in inflation by (2228) and this is reflected negatively on the currency's value (Jarwana..et al, 2020).

So it is a vicious circle that feeds itself, which requires a serious position from economic decision-makers to adopt serious reforms, What should be allocated to the productive sectors in the budget should be a greater percentage, in addition to subsidies and the fight against corruption, in order to ensure an increase in local production.

Data and Empirical Model

Data

Time series data extending from 2004 to 2018 have been used and include CPI data as an indicator of inflation in Iraq, data of the Iraqi dinar exchange rate EX. All data of the consumer price index and the exchange rate were made from Annual bulletins of the Central Bank of Iraq.

The Empirical Model

First, the data will be converted into a quarterly year due to the fact that the long-time series, when estimated, give more accurate results, and then estimate Co- Integration between the dependent variable which is inflation IN, which was expressed in the consumer price index and the independent variable which is the currency exchange rate EX for the period 2004. The unit root will be tested using the Augmented *Dickey-Fuller* (ADF) *Test* and the Phillips and Perron (PP) test in order to test the stability of the time series. And then the Co-Integration test with the Autoregressive Distributed

Lag Model ARDL. This model was used as it addresses the problem of small samples on the one hand and on the other hand the other Co-integration tests require that the time series be integrated of the same degree, and this shows the limitations of its use.

The traditional models also suffer from the problem of internal growth, that is, the failure to separate the short-term effects from the long-term and the inability to determine the size of the effect of each of the independent variables on the dependent variable, while the ARDL model can distinguish between the dependent variables and the explanatory variables and eliminate the problems that may arise due to the existence of Autocorrelation and internal growth. The ARDL model can estimate both the short-term and the long-term relationship, and it provides an efficient and unbiased estimate (Afzal: 2013). So a lot of studies have gone towards the ARDL model.

The regression equation for the study variables takes the following form:

$$IN_t = a + B_1 EX_t + \mu_t \quad (1)$$

Since inflation is expressed in the consumer price index IN, EX the exchange rate, μ the random variable and t indicates time, the stability of the variables will be tested first by unit root tests, then the boundary test will be assessed to find out the significance of the model, then Auto-regression ARDL will be applied to estimate the Co-integration to confirmation the research hypothesis that states the positive effect of corruption on inflation and consequently the devaluation of the currency.

Results

By applying the ARDL model to the variables under study shown in Table (1), first the stability (static) of the time series of the variables under study was tested according to the Phillips- Perron test (pp), and the Adjusted Dickie-Fuller test (ADF). It was found that the variable (IN) was not stable at the original level of the data, and that it became stable after taking the first difference I (1) for it for both tests. As for the variable (EX), it was found stable from its original level I (0).

In order to test the existence of a co-integration relationship between the variables, a statistic (F) is calculated. If the calculated value of the (F) statistic is greater than the upper limit of the critical values, then we reject the null hypothesis (H0) that there is no long-term equilibrium relationship and accept the alternative hypothesis (Hi). If the calculated value is less than the minimum of the critical values, then it is not possible to reject the null hypothesis and reject the alternative hypothesis.

The results showed that the calculated value of (F) statistic is equal to (8.476671), which is greater than the critical value of (F) at its upper limit at the level of (1%), which means rejecting the null hypothesis and accepting the alternative hypothesis, meaning that there is Co-integration relationship between the variables during the period search.

After confirming the existence of a co-integration relationship, the long and short -term estimates of the parameters of the estimated model and the parameter of error correction should now be obtained, and Table (2) shows that.

Table 2 Results of estimation of long-term, short-term and error-correction parameters

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IN(-1))	0.369615	0.118328	3.123652	0.0031
D(IN(-2))	0.180284	0.116392	1.548939	0.1281
D(EX)	-1.03607	15.82515	-0.06547	0.9481
D(EX(-1))	-17.1751	18.30919	-0.93806	0.353
D(EX(-2))	-20.6441	18.63302	-1.10793	0.2735
D(EX(-3))	-36.7612	18.11065	-2.02981	0.0481
CointEq(-1)*	-0.21121	0.04102	-5.14899	0.0000
EC = IN - (61.9653*EX -72214.4154)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX	61.96525	11.74534	5.275729	0.000
C	-72214.4	14466	-4.99201	0.000

Source: researchers' work based on the outputs of the Econometrics program (Eviews10).

The results indicate the existence of a short-term relationship between the variables, as well as the existence of a long-term equilibrium relationship between the exchange rate and inflation, as the error correction parameter is statistically negative and significant at the level of (1%). As the error correction factor expresses the speed of adjustment with which the imbalance in the balance between the short term and the long term is adjusted, which requires that it be negative and significant in order to provide evidence of the existence of a co-integration relationship between the variables.

Through the results, the error correction value appears to be significant and takes the negative value. Likewise, the probability value indicates the significance of the long-term relationship between the exchange rate and inflation at the level of 10%, and the value of the parameter indicates the existence of an inverse significant impact relationship that moves from the exchange rate to inflation, as a decrease in the exchange rate by (1%) leads to an increase in inflation by a factor of 10. (61.97). This confirms the negative impact.

When testing the integrity of the model, it emerged that the model does not suffer from the problem of heterogeneity of variance. Because the values of (Prob. F, Prob. Chi-Square) are insignificant and greater than the significant level (5%) according to the Heteroskedasticity Test: ARCH.

Conclusions

1. The results of the standard study using the ARDL model proved the existence of a short-term relationship between the variables, and also indicates the existence of a long-term equilibrium relationship between the exchange rate and inflation, as the error correction parameter is statistically negative and significant at the level of (1%), likewise, the value of the probability indicates the significance of the long-term relationship between the exchange rate and inflation, and the value of the parameter indicates the existence of an inverse significant impact relationship at the level of (10%) that moves from the exchange rate to inflation, as a decrease in the value of the currency by (10) leads to an increase in inflation by (61.97), this is reflected negatively on the GDP in general and the other economic variable.
2. The stability of exchange rates means the stability of the general level of prices and the decline of the level of inflation, thus the relative stability of production costs and the increase in the gross domestic product, which enhances the value of the currency.
3. Devaluation the exchange rate means bringing in imported inflation, and this will exacerbate the crisis, and weaken the income, thus the producers inability to continue production and then decline in production.
4. The decrease in the product sectors share of the total size of the investment budget means the deterioration of this sector.
5. The monetary policy of the country is not balanced in its decisions, as it may have blocked the general budget deficit, but it did not look at the subsequent economic effects, which will raise the level of poverty, and this may affect the sale of assets, especially in light of the decrease in what is allocated to the product sectors.
6. The weak contribution of the product sectors to the gross domestic product, and the near absence of exports, which led to reliance on imports to meet market demand in light of the absence of price competition with the outside.

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