Estimating the Impact of Corruption on the Currency's Value: A Case Study of Iraq Using the ARDL Model

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The phenomenon of corruption has very harmful economic effects that weaken the structure of the economy and cause major imbalances in its economic activities, in addition to the lack of equity in the distribution of income, and imbalance and change in demand patterns. Corruption weakens the productive capacity, whether for the public sector or even by weakening the domestic and foreign investment, and thus, the country's dependence upon imports. This weakens the value of its currency. In our current study, the effect of corruption on the value of the Iraqi Dinar is studied by taking the inflation rate as an indicator of the value of the currency. The study relied on quarterly data for an extended time series spanning from 2004–2018. The econometrics study included testing the stability of the time series by applying the Dickey Fuller (ADF), and the Philip Byron PP tests, and subsequently estimating the short-term and long-term relationship by using the Autoregressive Distributed Lag model (ARDL). The results clearly indicate the direct relationship between corruption and inflation, and therefore, its negative impact on the value of the Iraqi Dinar.

Keywords: *Corruption, Inflation, Gross domestic product, Currency value, ARDL model.*

Introduction

The phenomenon of corruption is not an emerging phenomenon. However, it is a scourge that has grown increasingly worse in industrialised and developing economies, it threatens economies because of the waste of economic resources, and impedes the development that countries strive for, unless strict measures are put in place to limit them.

In this context, and because of this exacerbating problem and the international attention drawn to it, Transparency International was founded in 1995. Corruption has been defined by more than one definition. However, the most commonly used is that corruption is the exploitation of the official work for private gain. From this definition, we can conclude that within the economies that the Government controls, most of its joints suffer from corruption more than other countries, in which the market economy prevails, so corruption is at its lowest levels. In our study, we define corruption as encompassing all that causes a waste of resources, whether because of the embezzlement of public funds or the tolerance of delay and low efficiency in the work of government projects. It is strange that there is a dialectic that corruption has benefits, including that it is quick money which eliminates bureaucracy and reduces its restrictions and costs. However, there is a counter opinion, that corruption may grow and contribute to financing, even in efficient institutions to run its business, and must pay bribes, no matter how much the amount increases (Lui, 1985: 760–781). Moreover, corrupt officials may also cause an administrative delay to attract more bribes, so there are no benefits to be gained from corruption (Myrdal, 1968: 121–122).

Several scholars explain the relationship between corruption and inflation with what is referred to as an 'economic bubble'. This means that corruption generates a kind of prosperity due to an increase in the income of a certain class, but it is not the consumption that is based on the correct economic rules. This means it is the result of an increase in income and production, and a driver of development, but it is a temporary thing that quickly explodes and generates inflationary pressures. Most of the money that is generated by corruption goes to speculation in the real estate and land markets, which means inflation in the prices of these goods. Therefore, it is called a bubble or balloon, which will soon explode because there are no correct economic rules upon which it is based.

It is unfortunate to discover that Iraq is one of the countries which appends the lists issued by Transparency International. Since its inclusion in the index, it has occupied the rank of 168, and has been in a steady decline. This is due to the great corruption that the country suffers from. It is reflected negatively on the economic development index, the weak rates of domestic and foreign productive investment, the high rates of inflation, and the high rate of unemployment, as well as the continuing deficit in its budgets because of the huge current expenditure versus a weak investment expenditure. Moreover, this reflects negatively on the gross domestic product (GDP), and dependence on oil revenues as a source of revenue, not on tax revenues. This facilitates the waste of resources, in addition to monetary policy procedures represented by issuing currency, which exacerbates inflation. An overview of the size of Iraqi imports shows the extent of the GDP deficit, and clearly explains how foreign exchange has gone out, which weakens the value of the local currency. Moreover, even the type of import itself explains the phenomenon of dumping the Iraqi market with consumer goods, and not capital, as the rate of the import contribution to the GDP for the period of 2003–2013 reached 41.62 per cent*, which is almost half of the GDP.

Financial corruption has a negative impact on the value of the local currency. This effect is represented by the phenomenon of inflation, which witnessed a marked increase throughout the study period. It affects both sides of the Government budget. On the one hand, financial corruption amplifies the current public expenditure (Ghosh & Neanidis, 2010: p.2), and inversely, its weakness is on the investment side. This can be explained from the definition of corruption itself. It was defined as the way of using the public position or official job for private gain. From the political reality in Iraq, we find that spending on salaries, especially the salaries of special grades, the three presidencies, and the Parliament (the political class), accounts for a large part of the spending, which amplifies the demand (this demand is often associated with luxury goods) upon prices. On the other hand, decline on the investment side due to corruption and patronage is reflected negatively on the decrease in GDP, and its efficiency. Therefore, low development rates and a decrease in export capacity create an inability to meet the local needs. Thus, the country's dependence on import and currency exit abroad, and this is all reflected negatively on the value of the currency. A study by Tanzi and Davoodi (1977: 4–7) showed the impact of corruption on the formation of government spending. It concluded that corruption weakens private investment versus public investment, despite the weakness of the latter as well, as it is a big opportunity for officials to obtain bribes, and it also weakens the productivity of public expenditures and infrastructure. On the other hand, corruption affects the Government public revenues, and because of bribers, favouritism, and tax evasion, the contribution of tax revenues from the Government general revenue decreases. This reduces the Government's ability and deprives it from very important revenues, especially in the event of low world oil prices, which imports constitute the most important part of public revenue. Consequentially, the country is affected by external shocks, so the Government will resort to the new currency issued, which is financing with inflation. Moreover, this raises inflation rates, which negatively affects the value of the currency.

The aggravation of corruption in the country means the emergence of the so-called underground economy or shadow or black economy. This, as it is known, is not subject to any laws or government policies. Thus, losing the financial and monetary authority of its control over the economy. Especially, as it is also known, that whenever corruption increases, this market has expanded. This means that the Government is unable to control its revenues on one hand or the value of the currency due to trade in this market and smuggling, which threatens the monetary value of the currency and weakens it against other currencies. Several studies have revealed the direct correlation between corruption and the shadow economy, and concluded that the higher the level of corruption will lead to a wider scope of the shadow economy (Schneider, Enste, 2002: p.1–10).

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*Calculated by researchers based on data obtained from the Iraq Central Bank and the Central Statistical Organization

Corruption also determines the type of domestic and foreign investment and weakens it. This can be explained by determining its type, which shows the types of unproductive investment required by the high-income earners. That is, the class created by the spread of corruption. On the other hand, it weakens investment because of bribery and favouritism, investment costs rise, and this weakens investment. Thus, supply decreases, inflation increases, and the value of the currency decreases. On the other hand, high investment costs increase inflation (cost-push inflation), as the producer also raises the price of his commodity. Here, inflation is not due to demand (real inflation). All of these factors will lead to a devaluation of the currency.

Tax evasion and the failure to provide valid tax returns does not only deprive the Government from revenues, but also leads to a loss of the monetary authority's ability to control the cash block in circulation. Therefore, they feed inflation and weaken the value of the currency. The rentier economy is a factor that contributes greatly to the spread of corruption. It opens a wide field for embezzlement and taking bribes for tax evasion. This case is clearly applicable to the Iraqi economy. The Government's dominance on the economy nurtures this phenomenon, and more so than the countries that adopt the market economy, if it is possible. From the researchers' view, a shift towards privatisation will gradually contribute to solving this problem due to a lack of opportunities to obtain such fast money, as it happens in economies dominated by the Government, which provides great opportunities for corruption. Privatisation may also contribute to solving many structural problems in the economy.

Corruption also disturbs income distribution. Rose Ackreman (1997: 30–60) believes that poor people have a very weak ability to pay bribes, so the infrastructure projects that benefit from them will decrease. They will also be deprived of education because of the low productive investment in such projects devoted to the poor class, as they are not profitable in light of corruption. The current study aims to demonstrate the positive relationship between corruption and the devaluation of the Iraqi dinar, taking the consumer price index as an indicator of inflation, which is an indication of the value of the currency. This is an attempt to attract the attention of the political and economic authorities, and to clearly indicate the evils of corruption on the Iraqi economy and prices. The value and strength of the currency from the strength of the economy, as well as the depreciation of the currency as a result of the high prices, has led to the populace preferring to transfer its money to a more stable currency, which is often the dollar, to preserve the value of their money.

Literature Review

There are several studies in economic literature which have dealt with research on the topic of corruption, and its relationship with economic variables. These studies took many forms in the methods of analysis. A review of previous studies provides the researcher with a clearer picture and additional knowledge about the study of the topic, as well as for the purpose of

identifying the differences in the analysis and results between the present study and past studies. A number of them can be reviewed, as follows:

Miguel and Rafael (2000): examined the effect of inflation on corruption through estimating 2SLS, as well as the effect of inflation on investment and growth. The results showed there was a positive relationship, and a strong impact between inflation and corruption, just as inflation reduces investment, and growth.

Patrick and Davina (2007): investigated the impact of corruption on various tax revenues in the Middle East. The study concluded that low tax revenue, as a share of the GDP, is attributable to corruption. The study also found that taxes on foreign trade are more affected by corruption than others. Therefore, a country that tries to increase its wealth must take reforms either by reducing corruption or by raising the rate of revenue from taxes which are less affected by corruption.

Ghosh (2010): focussed on corruption in public finances and its effects on inflation, taxes and growth. This was achieved through an analytical model of the impact of bureaucratic corruption on inflation, taxes, and growth. The study revealed that corruption reduces tax revenue, inflows public spending, and reduces its efficiency. These factors all work to increase the currency issued and reduce the rate of growth.

Yılmaz and Akif (2011): tested a model that links economic variables, such as economic development, growth, inflation, economic freedom, and income distribution, with corruption by using cross-sectional data that included 25 European countries for the period of 2004–2007. The study found that the above economic variables have statistically significant indications of corruption.

Blackburn and Powell (2011): examined the impact of corruption on growth through its effect on public finances. The study found that embezzlement from tax revenues leads to the government's dependence on currency issued to cover its expenditure. This raises the rate of inflation, which reduces investment, and the result is a decrease in capital accumulation and growth.

Akca (2012): examined the relationship between inflation and corruption for a group of developed and developing countries, which were divided into three groups according to income levels. The relationship was tested in one direction by using longitudinal data (panel). The result revealed that inflation has a positive impact upon corruption.

Samimia and Abedini (2012): examined the impact of corruption on inflation in several developing countries by using the panel data regression model (longitudinal data). The results showed that there is a positive relationship between corruption and inflation tax.

Bakri and Zulkefly (2018): investigated the impact of corruption on foreign direct investment by using panel data and by adopting two additional variables: GDP, and inflation. The results showed the important relationship between corruption and the GDP upon the flow of foreign direct investment. The countries with less corruption are more attractive to investment.

Method

Data

Time series data beginning from 2004 to 2018 has been used and includes CPI corruption data, GDP data, and IN data represents the consumer price index, as an indicator of inflation in Iraq, which will be used as an indicator of the value of the currency. All data of the consumer price index, and the GDP was obtained from the annual bulletins of the Central Bank of Iraq. Meanwhile, the corruption index was obtained from the website of Transparency International. This indicator starts from zero to ten. As the score progresses according to this indicator, it means that the country is free from corruption, and vice versa, the closer that the value of the indicator approaches zero, then corruption is rampant.

Empirical Model

Firstly, the data was converted to quarterly data due to the long time series, and for the purpose of yielding more accurate results during evaluation. This was followed by estimating the cointegration between the dependent variable, which is inflation IN, as an indicator of the value of the currency. This was estimated using the consumer price index, and the independent variables, which are GDP, and corruption CPI for the period of 2004–2018. The unit root was tested with the Adjusted Diky-fuller (ADF), and Phillips Byron tests PP, in order to test the time series stability, and then cointegrate the test with an Autoregressive Distributed Lag Model (ARDL). This model was used because on the one hand it addresses the problem of small samples, and on the other, the integration tests require that the time series be integrated at the same degree, and this shows its limited use. Moreover, traditional models suffer from the problem of internal growth. That is, the nonseparation of the effects of the short term from the long, and the inability to determine the effects size of all the independent variables upon the dependent variable. Meanwhile, the ARDL model can distinguish between the dependent and explanatory variables and eliminate problems that may arise due to the existence of autocorrelation and internal growth. Furthermore, the ARDL model can estimate the short-term and long-term relationship simultaneously and provides an unbiased and efficient estimate (Afzal, 2013: p.25), so numerous studies have leaned towards the ARDL model.

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

$$\text{Inflation} = a + B1\ CPI_t + B2\ GDP_t + \mu t \ \dots\dots.\ (1)$$

As inflation is expressed in the Consumer Price Index, 'CPI' is the Corruption Perceptions Index, 'GDP' is the gross domestic product, μ the random variable, and t indicates time. The stability of the variables were tested first by unit root tests, then the boundary test was estimated to see how significant the model is. Subsequently, the ARDL Autoregression was applied to estimate the cointegration and confirm the research hypothesis, which states there is a positive effect of corruption upon inflation, and thus, depreciation of the currency.

Results

By applying the ARDL model to the variables under study, as shown in Table 1, first the stability test of the time series of the variables under study was done according to the Phillips-Byron (PP) test, and the Adjusted Dicky-Fuller test (ADF). It was found that the variables (CPI, GDP, IN) are unstable at the level of data, and that they become stable after taking the first difference I (1) for both tests.

The results of the preliminary estimate indicate that the coefficient of determination reached 95 per cent, and that the adjusted coefficient of determination was 94 per cent, which also provides an explanatory force for the model. In other words, the coefficient of determination ratio explains the changes in corruption to inflation, and GDP. The results also indicate that the model is significant. Furthermore, in order to test the extent of a cointegration relationship between the variables, a statistic (F) is calculated. If the calculated value (F) is greater than the upper limit of the critical values, we reject the null hypothesis (H0), which infers that there is no long-term balanced relationship, and accept the alternative hypothesis (Hi). However, if the calculated value is less than the minimum critical values, then it is not possible to reject the null hypothesis, and we reject the alternative hypothesis. The results showed that the calculated value of the F statistic equals 9.461122, which is greater than the critical value (F) at its highest limit, and at the level of one per cent. This means rejecting the null hypothesis, and accepting the alternative hypothesis. Moreover, it reinforces there is a cointegration relationship among the variables during the research period. After confirming that there is a cointegration relationship, the long- and short-term estimates of the estimated model parameters, and the error correction parameter should now be obtained. Table 2 provides this information.

Table 1: Model variables

Year	GDP	CPI	IN
2004	62.1	21	8815.6
2005	33.4	22	12073.8
2006	20.8	19	18500.8
2007	39.3	15	24205.5
2008	44.6	13	24851.3
2009	-10.6	15	122.1
2010	14.2	15	125.1
2011	33.2	18	132.1
2012	19.7	18	140.1
2013	7.6	16	142.7
2014	-5.3	16	145.9
2015	-25.9	16	148
2016	12.7	17	104.1
2017	10.9	18	104.3
2018	11.2	18	104.7

Source: Central Bank of Iraq (2004–2018), annual statistics, General Directorate of Statistics and Research, and Transparency International reports.

Table 2: Results of estimating the long-term and short-term parameters and the error correction parameter

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IN(-1))	-0.15751	0.102567	-1.53567	0.1318
D(IN(-2))	-0.15751	0.102567	-1.53567	0.1318
D(IN(-3))	-0.15751	0.102567	-1.53567	0.1318
D(GDP)	170.6556	27.93799	6.10837	0.0000
D(CPI)	-1552.06	350.3118	-4.43051	0.0001
D(CPI(-1))	0.0000	510.1268	0.0000	1.0000
D(CPI(-2))	0.0000	510.1268	0.0000	1.0000
D(CPI(-3))	-1029.58	412.9707	-2.49311	0.0165
CointEq(-1)	-0.21637	0.057198	-3.78282	0.0005
Cointeq = IN - (320.4438*GDP + 2228.9718*CPI -38251.8946)				
Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GDP	320.4438	83.47914	3.838609	0.0004
CPI	2228.972	1065.644	2.091667	0.0423
C	-38251.9	18369.09	-2.08241	0.0432

Source: Researchers' work based on the outputs of the Econometrics Program (Eviews9).

The results indicate a short-term relationship between the variables, as well as a long-term balance relationship among corruption, inflation, and GDP. As the error correction parameter is negative and statistically significant at the level of one per cent, the error correction

coefficient expresses the speed of adjustment, in which the imbalance between the short term and the long term is being adjusted.

This requires that it must be negative and significant in order to provide evidence of the cointegration relationship between the variables. Through the results, the error correction value appears to be significant and takes the negative value. The value of probability also indicates the significance of the long-term relationship between corruption, and inflation. The value of the parameter indicates that there is a significant and directly proportional impact relationship at the level of ten per cent, which goes from corruption to inflation, as increasing corruption by 100 leads to increasing inflation by 2228. This is reflected negatively upon the value of the currency.

Through testing the integrity of the model, it appeared that the model neither suffers from problems of autocorrelation or heteroscedasticity because the values of Prob.F, and Prob.Chi-Square are insignificant and greater than the level of significance of five per cent, according to the test of ARCH: Heteroskedasticity Test.

Conclusion

The economy, which has high indicators of corruption, is suffering severe consequences that are reflected in the form of major structural imbalances. This is why its result is at an imbalance. Studies have shown that corruption limits investment, growth, and income, and affects the work of all economic policy tools, whether monetary, financial or commercial, Moreover, it creates problems affecting the price balance in the economy. Our current study examined testing the impact of corruption upon the value of the local currency through the inflation index. Despite the existence of many variables that affect the balance of the value of the currency, and the general level of prices, the impact of corruption on the value of the currency in the economy of Iraq did not acquire much space in the field of scientific research. Consequently, we assumed that the presence of corruption with high indicators affects the value of the currency. The results of the standard study, which were proven by using a Autoregressive Distributed Lag Model, highlighted the existence of a short-term relationship between the variables, as it indicates a long-term balance relationship between corruption, inflation, and GDP. This was reinforced by the error correction parameter being negative and statistically significant at the level of one per cent. The error correction factor expresses the speed of adjustment, in which the imbalance is adjusted between the short term to the long term. This requires that it is negative and significant, in order to provide evidence of a relationship of cointegration of the variables. According to the results, the error correction value appears to be significant and takes the negative value. The value of probability also indicates the significance of the relationship in the long term between corruption and inflation. Furthermore, the value of the parameter indicates the presence of a positive effect correlation at a level of ten per cent, which extends from corruption to inflation, as the

increase in corruption by 100 leads to an increase in inflation by 2228. This is reflected negatively on the value of the currency, and all tests have proven the integrity of the model.

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