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# ANALYSIS OF NOMINAL AND REAL EXCHANGE RATES IN THE IRAQI ECONOMY (1970-2013)

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***Abstract***

*This research paper investigates the distinction between the nominal exchange rate and the real exchange rate, highlighting their insinuations for economic policies and export dynamics in Iraqi economy. The nominal exchange rate measures the relative price between two different currencies, defined as the number of domestic currency units required to purchase one unit of a foreign currency. While the real exchange rate is considered as a relative price of non-tradeable goods against tradable goods. The research paper also analyses numerous indices for evaluating the real exchange rate, recognizing the most appropriate method for the Iraqi economy. Moreover, the key roles of money supply and oil revenues in determining the exchange rate dynamics are considered. Given the dominance of oil sector in the Iraqi economy, its far-reaching effect on macroeconomic circumstance, including the exchange rate, is thoroughly tested. This study delivers a comprehensive outline for empathetic the interaction between exchange rates, money supply, government expenditure and monetary policies in a resource-dependent economy.*

***Keywords:*** *Exchange Rate, Oil Price, Money Supply.*

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## 1. NOMINAL AND REAL EXCHANGE RATE

The distinction between the nominal exchange rate (NER) and real exchange rate (RER) has become increasingly important in the literature. The NER is a monetary concept that measures the relative price between any two currencies between two different countries (specifically, home currency unit per foreign currency unit). Therefore, the NER is defined as the number of units of the domestic currency that can purchase a unit of a given foreign currency.

An increase in home currency (with constant foreign currency) means a depreciation in home currency against foreign currencies, while a decrease in home currency means an appreciation

in domestic currency against foreign currencies. Therefore, the level of the exchange rate can have a significant impact on the range of a country's export sector; for instance, growing it when the exchange rate depreciates, and contracting it when it appreciates (IMF 2006). Concern about the structure of exports away from the tradable goods sector makes the exchange rate a more important policy for the oil-exporting countries, particularly developing ones.

The exchange rate strategy involves selecting an exchange rate regime and determining the particular rate at which a foreign exchange rate transition will occur. In general, the exchange rate regimes are divided into two main regimes. The first regime is the fixed exchange rate, which means a fixed exchange rate to a single foreign currency (pegging the home currency to a single foreign currency), fixing domestic currency to a developed country's currency, or pegging domestic currency to a basket of currencies called Special Drawing Rights (SDR) (IMF, 2016. p, 27). There are still some countries among developing countries that continue to follow a pegged exchange rate regime, even after the collapse of the Bretton Woods system in 1971 (Obstfeld and Rogoff 1995). The second regime is the floating exchange rate regime, its rate determined freely by markets. Most of the developed countries follow a floating exchange rate. However, there are some other exchange rate systems between these two regimes that some countries follow, such as the managed floating rate (Rose 2011).

The main objective of many oil-exporting developing countries in pegging to one currency like the US dollar is to avoid any fluctuations in the exchange rates, which may have a damaging influence on domestic economies in terms of the volatility of domestic price levels and incomes. Most of the oil-exporting countries have experienced a large fluctuation in their revenue due to the fluctuations in international oil prices, particularly countries like Iraq and the Gulf countries, whose oil revenue consists of over 90 per cent of total revenue.

The Iraq Currency Board was established in 1931 for the printing of notes and maintenance of reserves for the new Iraqi dinar. In the beginning, the Iraqi Dinar was pegged to the British pound (Central bank of Iraq, 2013). However, after 1959, the Iraqi dinar was switched to the US dollar. There were some reasons for this policy of pegging the Iraqi dinar to the US dollar instead of the British pound. Firstly, the oil revenues, which accumulate to the government, were priced in US dollars. Therefore, these revenues would be easily converted to Iraqi dinar, so this would enable the budget from the government to be estimated with no severe uncertainty, and would make it easier for the government when planning the annual budget. Secondly, most of the Iraqi trading partners use the US dollar as the main currency when trading with Iraq; thus, pegging to US

dollar would give more stable prices of imports from those major countries that traded with Iraq, and pegging to the US dollar gives more stability at domestic and general price level (Ministry of Planning, 2005).

Regarding the effect of oil revenue on monetary policy, since 1973, Iraq has had abundant foreign exchange due to substantial oil revenues. The impact of this revenue is observable in fiscal policy and monetary policy. Therefore, the monetary policy was affected by the boom and slump periods, thus affecting the exchange rate. In order to identify how the fluctuation of oil revenue affects monetary policy, it is important to distinguish between official and market (parallel) exchange rates. In the following table, the two different types of nominal exchange rate will be shown.

**Table 1**
**The Official and Parallel (Black Market) of Iraqi Nominal Exchange Rate (1970-2013)**

| Year | Official exchange rate (Iraqi Dinars) | Parallel exchange rate (Iraqi Dinars) |
|---|---|---|
| 1970 | 0.355 | 0.359 |
| 1971 | 0.353 | 0.358 |
| 1972 | 0.332 | 0.336 |
| 1973 | 0.302 | 0.308 |
| 1974 | 0.295 | 0.299 |
| 1975 | 0.295 | 0.298 |
| 1976 | 0.295 | 0.299 |
| 1977 | 0.295 | 0.297 |
| 1978 | 0.295 | 0.298 |
| 1979 | 0.295 | 0.299 |
| 1980 | 0.295 | 0.360 |
| 1981 | 0.295 | 0.475 |
| 1982 | 0.298 | 0.480 |
| 1983 | 0.310 | 0.501 |
| 1984 | 0.310 | 0.571 |
| 1985 | 0.310 | 1.176 |
| 1986 | 0.310 | 1.676 |
| 1987 | 0.310 | 1.876 |
| 1988 | 0.310 | 2.014 |
| 1989 | 0.310 | 3.043 |
| 1990 | 0.310 | 4.054 |
| 1991 | 0.310 | 10.3 |
| 1992 | 0.310 | 21.5 |
| 1993 | 0.310 | 74.1 |
| 1994 | 0.310 | 456 |
| 1995 | 0.310 | 1674 |
| 1996 | 0.310 | 1070 |

| | | |
|---|---|---|
| 1997 | 0.310 | 1471 |
| 1998 | 0.310 | 1620 |
| 1999 | 0.310 | 1972 |
| 2000 | 0.310 | 1930 |
| 2001 | 0.310 | 1929 |
| 2002 | 0.310 | 1957 |
| 2003 | 1985 | 1992 |
| 2004 | 1453 | 1473 |
| 2005 | 1472 | 1492 |
| 2006 | 1467 | 1487 |
| 2007 | 1254 | 1275 |
| 2008 | 1193 | 1219 |
| 2009 | 1170 | 1180 |
| 2010 | 1170 | 1185 |
| 2011 | 1170 | 1190 |
| 2012 | 1166 | 1195 |
| 2013 | 1166 | 1190 |

Source: Central Bank of Iraq / Statistical and Research Department / Annual Statistical Bulletin, various issues.

Table 1 demonstrates the movement of official and black (parallel) market exchange rates. The official exchange rate is fixed by the central bank of Iraq, and the central bank sells foreign currencies, particularly US dollars, at fixed prices. In order to buy foreign currency from a central bank, all importers have to comply with the various foreign exchange regulations (Ministry of Planning, 2010). However, as long as all importers or financial institutions who want to buy foreign currencies are not granted approval by the Iraqi Central Bank. Thus, importers whose applications have not been approved by the central bank to provide foreign currencies will depend on the black market (parallel market), and the black market usually provides alternative sources for the purchase of foreign exchange to finance imports (Foote et al. 2004). Furthermore, the level of demand for foreign exchange in the black market is determined by the level of supply of foreign currencies by the central bank. Scarcities in the foreign exchange from the official market necessarily involve a diversion of demand to the black market (Alnasrawi 2002). Therefore, there was an operative black market, under which dollars were widely available at higher rates relative to the official posted rates. The question here is why the parallel market exchange rate appeared.

The Iraqi economy has experienced a number of shocks, large fluctuations in the international price of oil. Political instability and war are examples of such shocks. Such factors possibly have an influence on the nominal exchange rate (Ministry of Planning, 2010). Overall, however, all

shocks have been divided into two different periods; the first is called a boom period (1970-80 and 2003-13), while the second period is called a slump period (1981-2003).

Prior to the first oil boom period in the early 1970s, Iraq operated a fixed exchange rate regime under which the Iraqi dinar was pegged to the US dollar. It officially stood at 0.355 = $1 during the period 1970-1973, while the parallel exchange rate stood at 0.359. It is noticed that the parallel exchange rate had been almost equal to the official exchange rate. More interestingly, once the oil price increased significantly in 1973, bringing about an improvement in the financial and economic conditions. With the improving political climate, the authorities appreciated the official exchange rate to 0.295 dinar for each US dollar (Ministry of Planning 2010). The central bank intervened frequently in support of the dinar in the parallel market in order to stabilise the nominal exchange rate in the fixed rate. Finally, the parallel exchange rate value was very close to the official rate for the whole period of 1974-1979 (Foote et al. 2004).

However, as can be seen from Table 1, the parallel exchange rate gradually depreciated during the 1980s. The possible justification behind the depreciation of the nominal exchange rate during the 1980s was the declining oil price. This factor led to a decline in the size of the Iraqi international reserve and a decrease in the volume of inflow hard currencies into the Iraqi economy (Schnepf 2003). Thereafter, the central bank could not supply enough US dollars; as a result, the Iraqi dinar devalued against major foreign currencies in a parallel market exchange rate. Apart from that, during the same period, Iraq had experienced a larger budget deficit (Alnasrawi 1994). The consequences of this budget deficit brought about a depreciation of the Iraqi dinar, as the monetary authority began to fund its deficit via money creation. This caused an imbalance between domestic and foreign currencies (a shortage of foreign currencies) (Foote et al. 2004).

Moreover, Iraq was involved in a massively destructive war with Iran during the 1980s. An increase in government expenditure towards imports of armaments brought about more devaluation in the parallel exchange rate (Hanke and Sekerke 2003). The Iraq-Iran war forced the Iraqi government to impose some restrictions on importing some types of goods; in other words, imports were restricted quantitatively to save the foreign exchange, and the foreign exchange was allocated to prevent capital flights (Sanford 2003). Thus, the parallel exchange rate was devalued from 0.360 Dinars/$US in 1980 to 1.176, 2.014 and 4.054 Dinars/$US in 1985, 1988 and 1990, respectively. The parallel exchange rate in the Iraqi dinar has depreciated against the US dollar by more than 10 times from 1980 to 1989. Whereas, the official exchange rate has

not changed, since the central bank tried to keep fixing a nominal exchange rate at a constant price.

On the other hand, during the 1990s, the situation became worse when the UN imposed economic sanctions on the Iraqi economy (Iraqi oil was banned from export). During the first year of the sanctions, the foreign exchange market (black market of exchange rate) did not fully reflect the magnitude of the shock. However, by the middle of 1991, one US dollar bought 10 dinars and, by December 1995, it was possible to purchase 1600 Iraqi dinars for one dollar. During that time, the monetary authority adopted a *de facto* managed float instead of an official fixed exchange rate. Factors such as the halt in exporting oil (due to economic sanctions), printing massive domestic currency, and political instability are the main reasons behind the sharp devaluation in the nominal exchange rate (Foote et al. 2004).

However, once the UN lifted the economic sanctions in 2003, the Iraqi dinar appreciated slightly to 1473 dinar/1 US dollars. Then, with increasing oil revenue, the central bank tried to appreciate the nominal exchange rate and to supply enough US dollars to the market and traders in order to affect the parallel exchange rate and make it close to the official rate. Thus, it can be seen from Table 1 above that the nominal exchange rate had gradually appreciated against the US dollar, and the parallel exchange rate was very close to the official exchange rate.

The above analysis has shown that the monetary authority in Iraq has attempted to keep the nominal exchange rate at a fixed rate between the market rate and official rate. But only by doing this during periods of high oil revenues could the Iraqi central bank control the nominal exchange rate under a fixed rate, since the central bank had enough foreign reserves as a result of the balance of payment surplus (Ministry of Planning 2010). Conversely, during low oil revenues (either due to collapse of the oil prices or economic sanctions), the parallel nominal exchange rate was much higher than the official one, particularly during economic sanctions. The reason behind this was related to a budget deficit when the government depended on printing money to fund its deficit instead of implementing austerity (Foote et al. 2004). This led to a devaluation of the domestic currency against foreign currencies, as occurred during the 1980s and 1990s in Iraq.

The importance of analysing appreciation and depreciation of the nominal exchange rate does not only depend on an exchange between the two different currencies. An appreciation or depreciation of the nominal exchange rate can have a significant effect on the rate of inflation,

income per capita, the volume of imports and exports, real exchange rate, international competitiveness (at least in the short run), and output of tradable and non-tradable goods, etc (IMF 2016). Therefore, without analysing the nominal exchange rate, the real exchange rate cannot be examined, since by definition the real exchange rate is equal to the international price time nominal exchange rate divided by domestic price (Edwards 1985). If an appreciation of the nominal exchange rate takes place, the international price (in the case of a small open economy) will be cheaper and the relative price of non-tradable goods to tradable goods increases (appreciation real exchange rate). Conversely, if depreciation takes place, the price of international goods will increase and then the relative price of non-tradable goods to tradable goods will decrease (depreciation of real exchange rate). Therefore, the real exchange rate is affected by the nominal exchange rate and, at the same time, it will affect international competitiveness.

By definition, the Real Exchange Rate (RER) is defined as the nominal exchange rate ($E$) multiplied by the ratio of foreign price level ($P^*$) to the domestic price level (P).

$$RER = E\ P^*/P \quad \ldots\ldots\ldots\ldots (1)$$

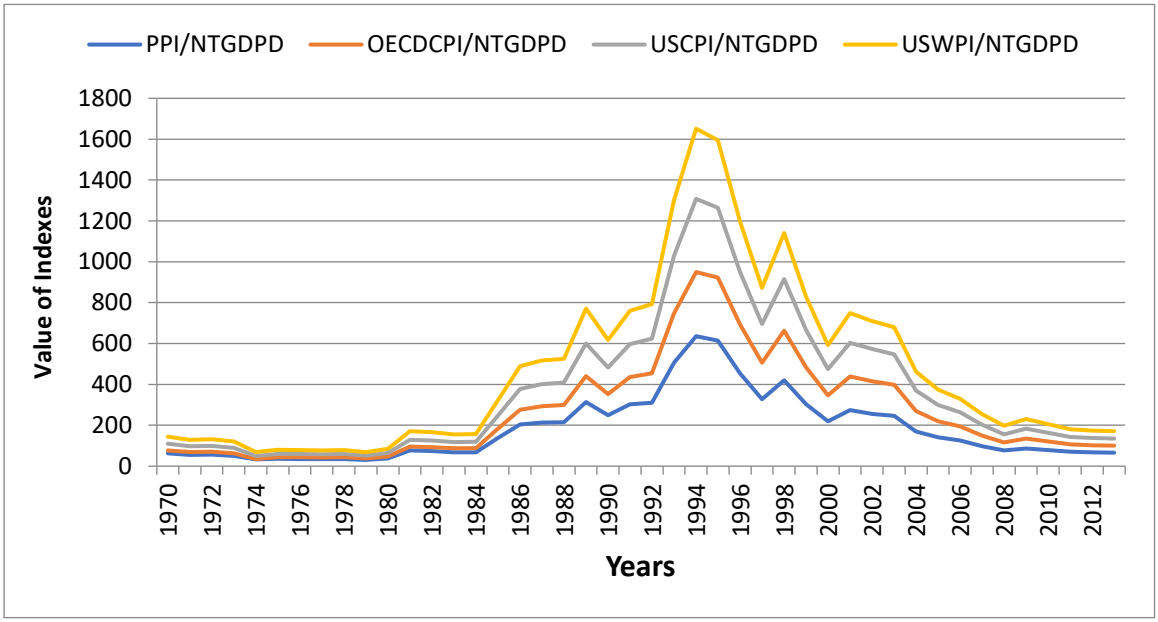
From equation (5.2), RER is a real exchange rate, where $E$ represents the nominal exchange rate (NER), which is defined as the number of units of local currency per unit of foreign currency.

The relative price of traded goods (international price) to non-traded goods (domestic price) as a measure to define RER can be more powerful, and it identifies more willingly the incentives that guide domestic resource allocation (Korhonen and Juurikkala 2009). Its focus on allocation of domestic resources has made this definition of RER a favourite tool for analysing the competitiveness of a home country relative to a foreign country, particularly for developing countries.

According to previous literature any increase in the price of non-tradable goods with a constant price of tradable goods and fixed nominal exchange rate (E) leads to a decline in RER (appreciation of real exchange rate). In this case, the decrease in $P^*/P$ means appreciation in RER of domestic currency and loss of international competitiveness, and reflects an increase in the domestic cost of producing tradable goods (Edwards and Akoi 1983). In the same way, a decrease in domestic price ($P$), while holding constant international price ($P^*$) and with no change in the nominal exchange rate (E), a depreciation of the RER will take place and bring about an improvement in international competitiveness.

To discuss RER changes means being more specific about the different price indexes represented by domestic price (*P)* and international price (*P**), with different RER concepts arising from different choices of price index (see Harberger, 1986). In the Iraqi case, the non-tradable GDP deflators are used as a domestic price (price of non-tradable goods), whereas Producer Price Index for industrial countries (PPI), US Consumer Price Index and US Wholesale Price Index are measured and tested as a price of international tradable goods (tradable goods price). However, most scholars such as Edwards (1985) and Harberger (1986) supported and used the US Wholesale Price Index to represent a price of tradable goods.

**Figure 1**
**Iraqi Real Exchange Rate by employing different indices (1970-2013)**




Source: - Central Bank of Iraq / Statistical and Research Department / Annual Statistical Bulletin, various issues.

-World Bank, World Development indicator, (2015),

- Penn World Table (PWT), Centre for the international Data, (2015).

* Iraqi Nominal Exchange rate: Iraqi Dinars shown in the first column of the table against each US Dollars.

* Real exchange rate is measured as nominal exchange rate times each of the PPI, OECDCPI, USCPI, USWPI divided by the Iraqi non-tradable GDP deflator.

PPI: Producer Price Index for Industrial Countries.

NTGDPD: Iraqi non-tradable GDP Deflator.

OECDCPI: OECD Consumer Price index

USCPI: US, Consumer Price Index.

USWPI: US, Wholesale Price Index.

Figure 1 illustrates the Iraqi RER during the period 1970-2013, as non-tradable GDP deflators represent the domestic price, while PPI, US CPI and US WPI represent the international price. It is noted that the trend for different indices is to be very close to each other. One can conclude that among the various proxies that have been used for the real exchange rate, the best of the conventional proxies seemed to be USCPI/NTGDPD.

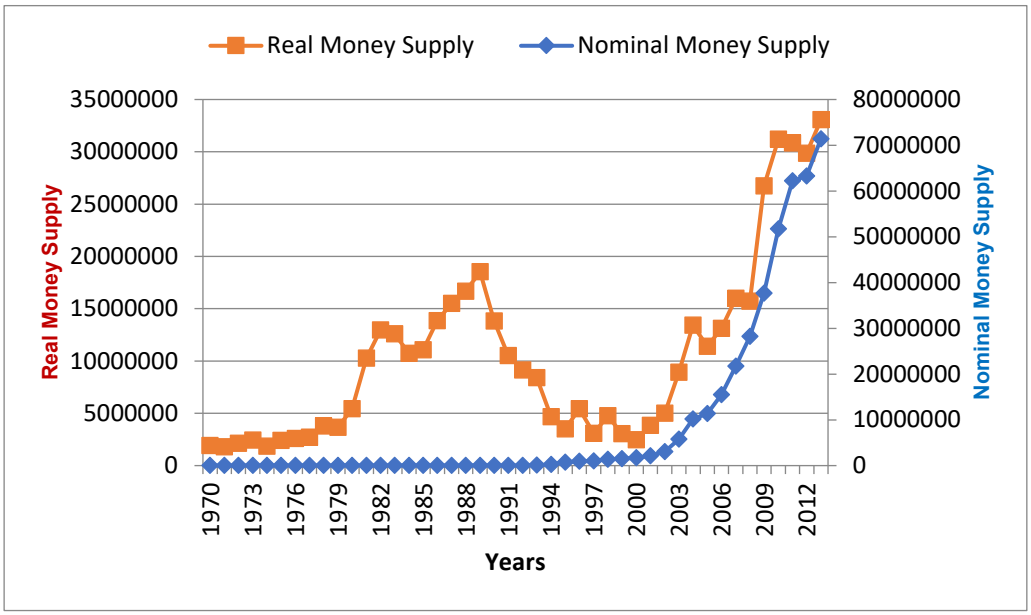
## 2. MONEY SUPPLY

An interesting part of the result is that the shock of international oil prices affects domestic money supply in oil-exporting developing countries. This supports earlier studies by many scholars such as Dornbusch (1973), Edwards and Aoki (1983), Edwards (1985), Kamas (1986), Frankel and Rose (1994), Obstfeld and Rogoff (1995), Hau (1998), Looney (2003); Frankel (2010), and, in that monetary policy responds to international oil price shocks (either positive shocks or negative shocks).

Edwards (1985) pointed out that money supply can be increased during high and low price of export commodities. However, the consequences of increasing money supply on macroeconomic variables are different during high and low price of export commodity (we have discussed in detail in chapter four). In this section, the movement of real and nominal money supply are analysed, in order to show the impact of price of commodity export on real and nominal money supply during last five decades based on Edwards's model (see chapter four) and link to Dutch disease phenomena.

Real and nominal money supply in response to different shocks is shown in Figure 2. However, in order to show a clear picture of nominal and real money supply in Iraq, the whole sample period of money supply was divided into three different periods based on the period of shocks. The first period considered a period of 1970-1989, as shown in Figure 3. The second period is the economic sanctions period (1990-2003) as shown in Figure 4, while the period 2004-2013 is considered as a third period, as shown in Figure 5.

**Figure 2 Iraqi Nominal and Real Money Supply (1970-2013)**




Source: Central Bank of Iraq / Statistical and Research Department / Annual Statistical Bulletin, various issues.

**Figure 3 Iraqi Nominal and Real Money Supply (1970-1989)**

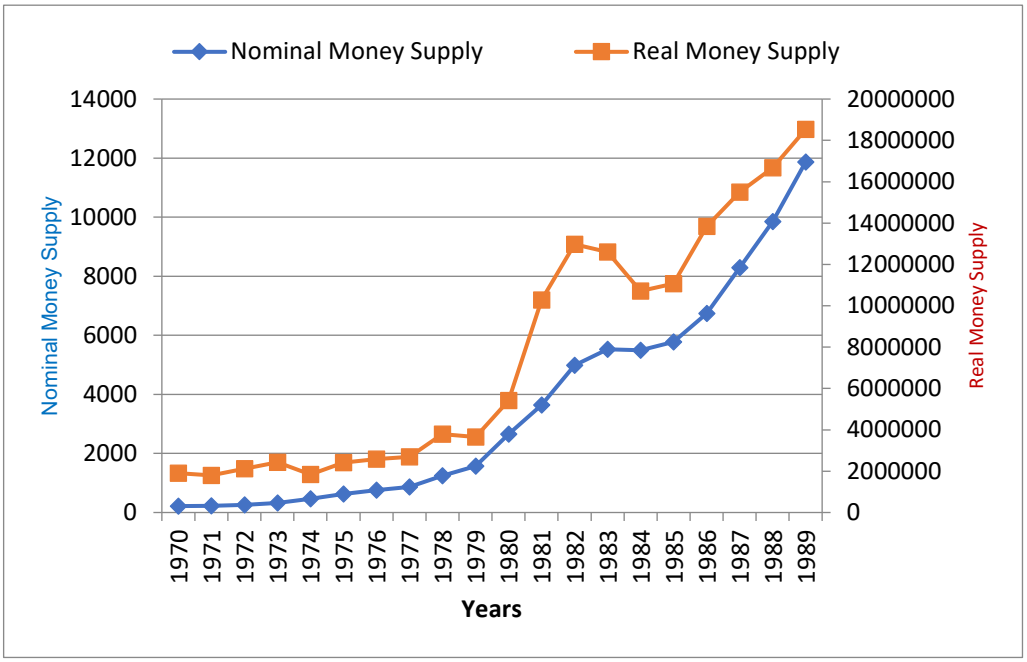


**Figure 4 Iraqi Nominal and Real Money Supply (1990-2003)**

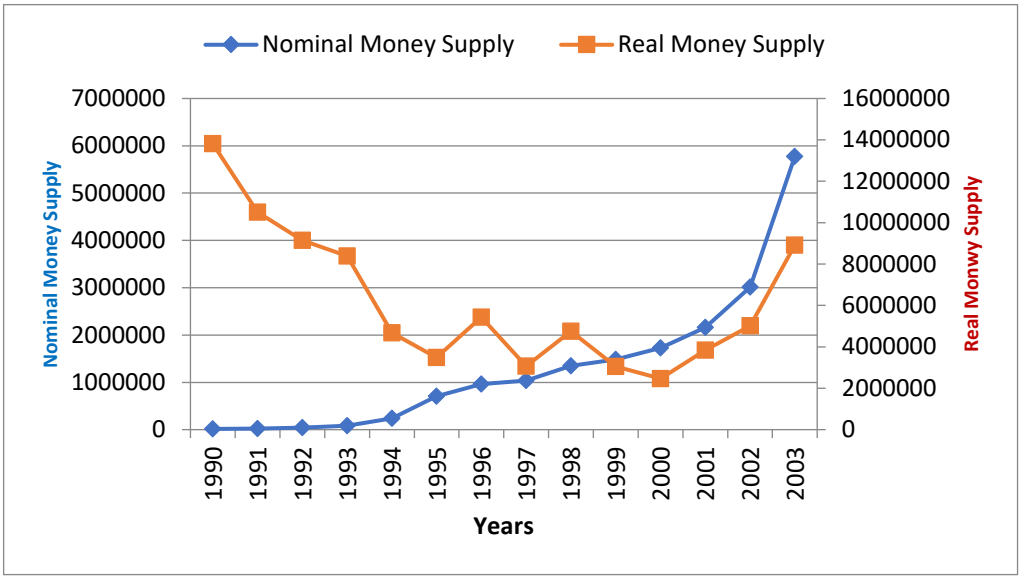
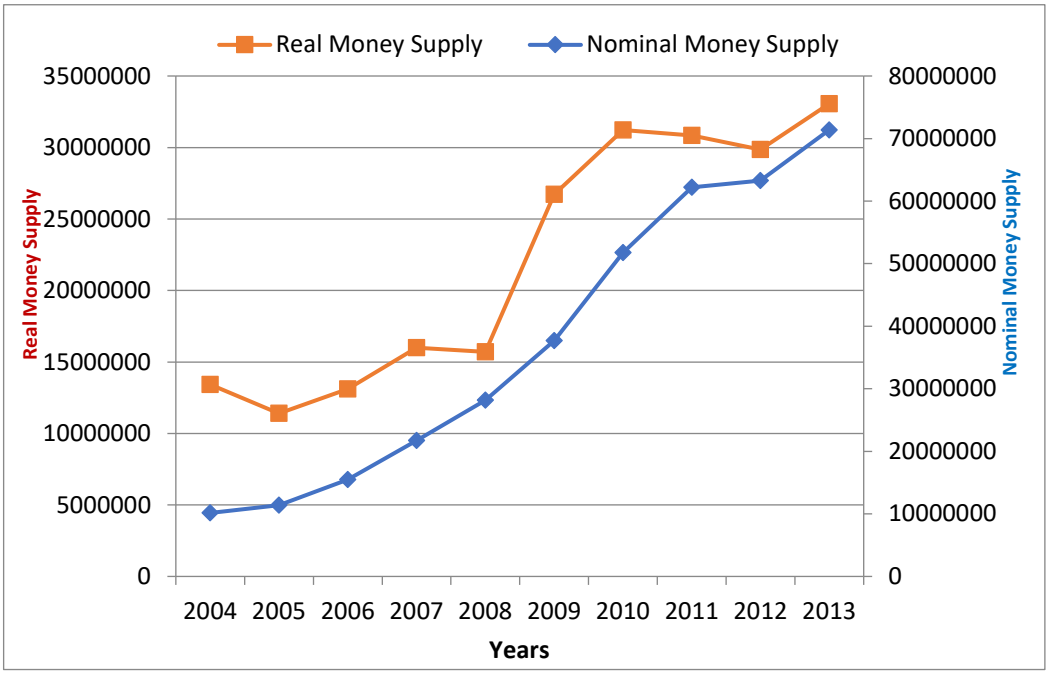



**Figure 5 Iraqi Nominal and Real Money Supply (2004-2013)**




Let us now trace the growth of the real and nominal money supply. As oil, price and production became an increasingly dominant part of all government resources, and its impact on government holdings and money supply could no longer be discounted. Figure 3 demonstrates that the

nominal and real money supply grew remarkably during the period 1970 to 1980. The currency in circulation enlarged sharply at an annual rate of 15.7% on average. This increase in money supply is attributed to the increase oil revenue due to the nationalization of oil and the increase in oil prices during1973-1980 (Ministry of Planning, 2010 p. 55). This is exactly expected by Edwards (1983), that he pointed out if the price of export commodity increases then lead to increase foreign reserve and If this increase of international reserves is not fully sterilized, the money supply will increase (see chapter four). According to Iraqi Central bank data, part of the international reserve was converted to increase domestic money supply during 1970s. One of the major factors influencing the growth of the money supply is domestic government expenditure, since the domestic government expenditure exercises a dominant influence on the money supply through being the major source of liquidity (Ministry of Planning 2010). The expansion of the banking system could be another factor which cause an increase in real and nominal money supply according to ministry of planning, 2010 (see p. 54). The outcomes of increasing money supply led to increase demand on all goods and services which in turn led to higher inflation rate in Iraqi economy (Ibid, p.56). This is expected by outcome by most of scholars we have mentioned such as Edwards and Aoki (1983), Harberger (1989) and Kamas (1986).

On the other hand, during the collapsing in oil price in the 1980s, the trend of nominal money supply continued to be on the increase. As Edwards (1983) mentioned that during low price of commodity exports, the money supply can be increased to fund the deficit of government budget (see chapter four). However, increasing real money, supply is related to keeping the inflation rate below the rate of increased nominal money supply, despite the rate of inflation in the 1980s was higher than the rate of inflation in the 1970s (Hussein and Benhin 2015). Keeping the inflation rate below the rate of increased nominal money supply was related to using massive Iraqi foreign reserves, which had been saved up during high oil revenues in the 1970s in order to keep the nominal exchange rate constant, which eventually led to the inflation rate of tradable goods being at a lower rate. However, it is important to mention that the rate of devaluation nominal exchange rate (see nominal exchange rate table 1) was higher than the rate of inflation. In this case, the increase price of tradable goods is higher than the increase price of non-tradable goods (Corden and Neary (1982) and Edwards (1983)).

However, there was a large excess of nominal money supply in 1990/91, which contributed to chronic inflation and economic instability in subsequent years (Hussein and Benhin 2015). During the first half of the 1990s, monetary expansion was increasingly absorbed by an

accelerating high inflation rate, which led to a sharp decline in real money supply. A sharp increase in the nominal supply of money was related to financing the government budget via money creation (Sanford 2003 p. 48). A nominal supply of money surged, while real demand for money declined further because of a continued depreciation of the Iraqi dinar in the parallel market. The consequences of increasing nominal money supply led the inflation rate to increase, however the rate of inflation of tradable goods sector would be higher than the rate of inflation of non-tradable goods sector. This is exactly happened during first half of 1990s in Iraq (Foote et al. 2004).

However, in the second half of the 1990s, due to the Oil for Food Program, which allowed the Iraqi authority to export a limited amount of oil to import some basic goods and medicine products. Because of this program, the oil revenue increased, then the government less depended on printing money to support its expenditure (printing money was used by government to fund a budget deficit). Although, the nominal and real money supply continued to increase during this period, but the consequences were different because increasing oil revenue led to appreciation nominal exchange rate, in this situation, increasing money supply led to increase demand on both tradable and non-tradable goods, but, since the appreciation nominal exchange rate took place due to increase oil revenue (see previous section), then the rate increasing price of tradable goods was much lower than the increasing price of non-tradable goods (Alnasrawi 1994).

On the other hand, lifting economic sanctions in 2003 and increasing international oil prices led to substantial increases in the country's holdings of foreign assets, which largely accounted for the remarkable growth of domestic liquidity during 2004-2013 (Ministry of Planning 2010). This is because the revenue coming from the oil sector flows directly to the government. Once this revenue is spent in the domestic economy, the inflow of foreign exchange will be translated into domestic liquidity. Therefore, with increasing government expenditure, the nominal money supply has increased as well. The real money supply also increased during 2004-2013 because the rate of increase of the nominal money supply was much lower than the rate of inflation in the same period. Despite increasing government expenditure over the last decade, the rate of inflation was under control via fixing a nominal exchange rate; this was helpful as it kept the imported goods price under control (Hussein and Benhin 2015). Thus, after the lifting of economic sanctions, the real money supply increased in the same way as the nominal money supply.

The volatile nature of the money supply (either in nominal terms or real terms) emanates from the unpredictability of international oil prices. This is because the Iraqi economy depends mainly on oil for its revenue generation (Ministry of Planning 2010). The consequence of this is that the supply of money also follows the same dynamic trend.

## 3. OIL PRICE, REAL EXCHANGE RATE AND STRUCTURAL CHANGE

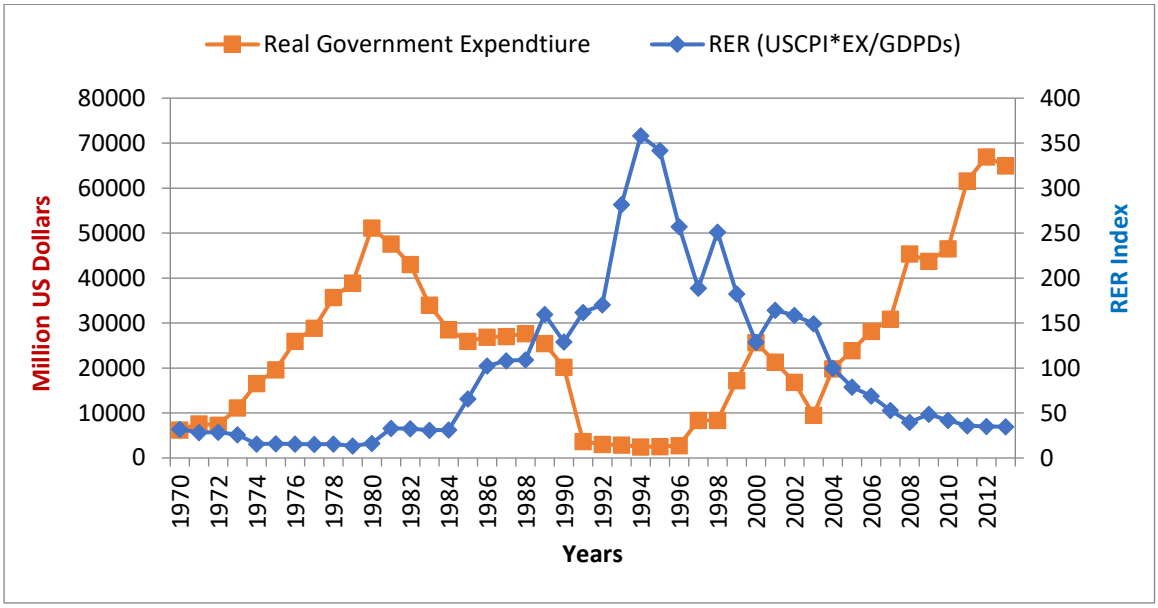
In the following sub-sections, we will analyse how export booms (oil sector, in our case) affect a country's real exchange rate, and how the real exchange rate, in turn, affects the output of tradable and non-tradable goods sector. These are important and integral points in understanding the Dutch disease phenomenon.

### 3.1 Real government expenditure and real exchange rate

Figure 6 demonstrates the relationship between real government expenditure and real exchange rate. As the figure displays, there seems to be a negative relationship between both variables, as when the real government expenditure increases, the real exchange rate declines (appreciates). For instance, during the 1970s, real government spending increased rapidly, while the real exchange rate appreciated (declined). Decreasing real government expenditure began in 1981 up until 1997, and the real exchange rate has increased (depreciated) sharply.

Again, after increasing real government expenditure, the real exchange rate started to decrease (appreciate) after 1997 (except in 2003 due to the Iraq-US war) because the real government expenditure increased again after the removal of economic sanctions, partially in 1997, but also completely in 2003. This is in line with Dutch disease theory, that high government expenditure is associated with appreciating (decreasing) real exchange rates and vice versa.

**Figure 6 Correlation between RER and real government expenditure (1970-2013)**

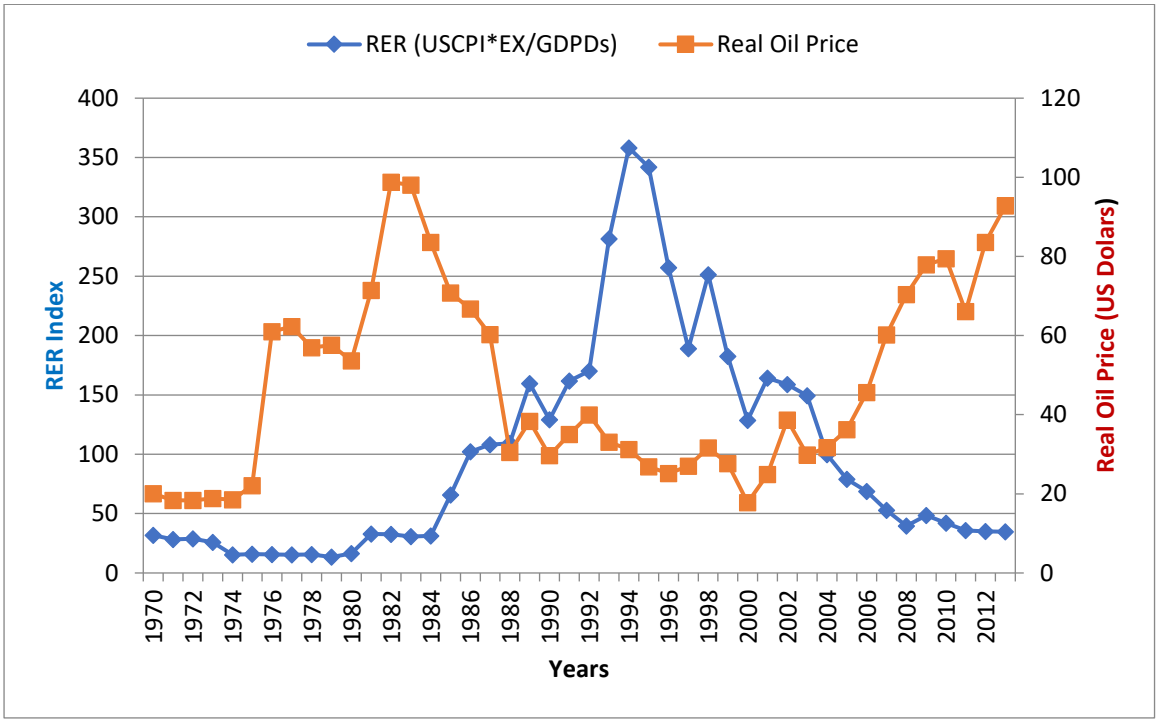



### 3.2 Real oil price, real oil revenue and real exchange rates

Terms of trade are an important and the most frequently used variable in exchange rate analysis. Terms of trade are defined as a ratio of price of exports to price of imports. In empirical works, it is common practice to employ a commodity price as a proxy for terms of trade in cases when a commodity makes up a significant share of a country's exports. However, in Iraq's case, as long as crude oil makes up a significant share of exports, so the real oil price is employed as an approximation for terms of trade. Many papers have previously suggested (see literature review in Chapter Two) that the oil price is considered a fundamental variable, which explains the long-running behavior of RER, when taken in terms of trade.

Figure 7, shows the correlation between the real oil price and real exchange rates from 1970 to 2013. The effect of the sharp increases in crude oil price in the 1970s led to a appreciation of the real exchange rate during the period (Foote et al. 2004 p. 23). Conversely, once the international oil price declined at the beginning of the 1980s, the sharp depreciation real exchange rate occurred.

**Figure 7 Correlation between real oil price and RER (1970-2013)**




However, a sharp depreciation in the real exchange rate during the first half of the 1990s was not related to fluctuating international oil prices, but to international economic sanctions, which were imposed on Iraq in 1990. Therefore, any fluctuation in oil price during the first half of the 1990s did not affect the real exchange rate in Iraq (Sanford 2003). However, with the introduction of OFFP in 1996 (which removed economic sanctions partially), the real exchange rate appreciated sharply, despite the international oil price which had not significantly changed. This is because the Iraqi government gained at least a limited amount of oil revenue from zero oil revenue (Ozlu 2006). Removing international sanctions on Iraq in 2003, and increasing international oil prices, caused an appreciation of the real exchange rate in the following years (IMF 2016).

As we have analysed, due to some political disruption in Iraq, during part of the sample period, the change in international oil price did not affect the real exchange rate, particularly during economic sanctions. Therefore, the correlation between real oil revenue and real exchange rate is essential in order to identify to what extent the oil sector is correlated to the real exchange rate.

**Figure 8 Correlation between real oil revenue and RER (1970-2013)**

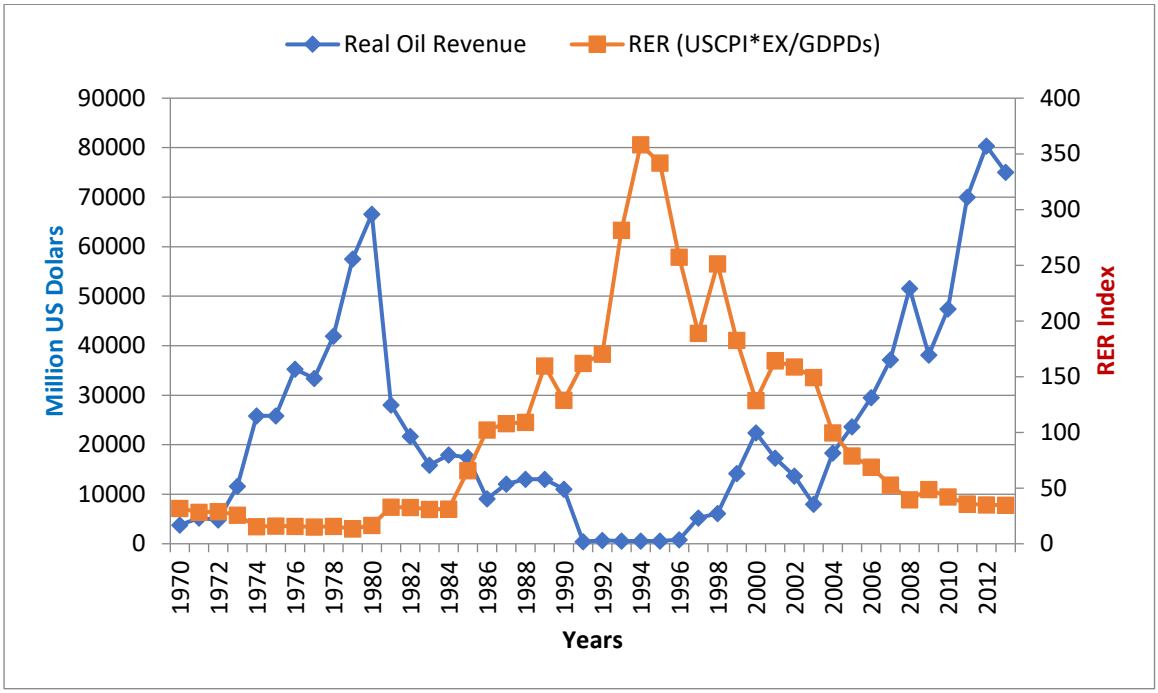



Figure 8 shows the relationship between the real oil revenue and real exchange rate. During the first and second positive oil shocks in the 1970s, the real oil revenue increased sharply, which brought about appreciation of the real exchange rate in the same period (Foote et al. 2004). However, with declining oil revenues, due to a decrease in international oil prices and the Iraq-Iran war, which caused oil production to decline, the real exchange rate began to depreciate (Alnasrawi 1994). Furthermore, the economic sanctions during the 1990s led to the oil revenues being close to zero; this reflected to a sharp depreciation in the real exchange rate. However, increasing oil revenue after 1996 under the OFFP followed the real exchange rate to appreciate again. As a result of some political instability during 2002 and 2003, the oil revenue again declined, which led to a depreciating real exchange rate again. More interestingly, after the lifting of economic sanctions was completed in 2003, the international oil price started to increase, while the real exchange rate started to decline (appreciation) to the lowest level in 2013.

To conclude, it is found in the above analysis that, to a large extent, the appreciation of real exchange rates is caused by increased real government expenditure and real oil prices. Conversely, a depreciation of the real exchange rate is caused by a decline in real government expenditure and real oil prices. In the following sub-section, the effect of appreciation and

depreciation on real exchange rates during the output of tradable and non-tradable goof sector will be analysed.

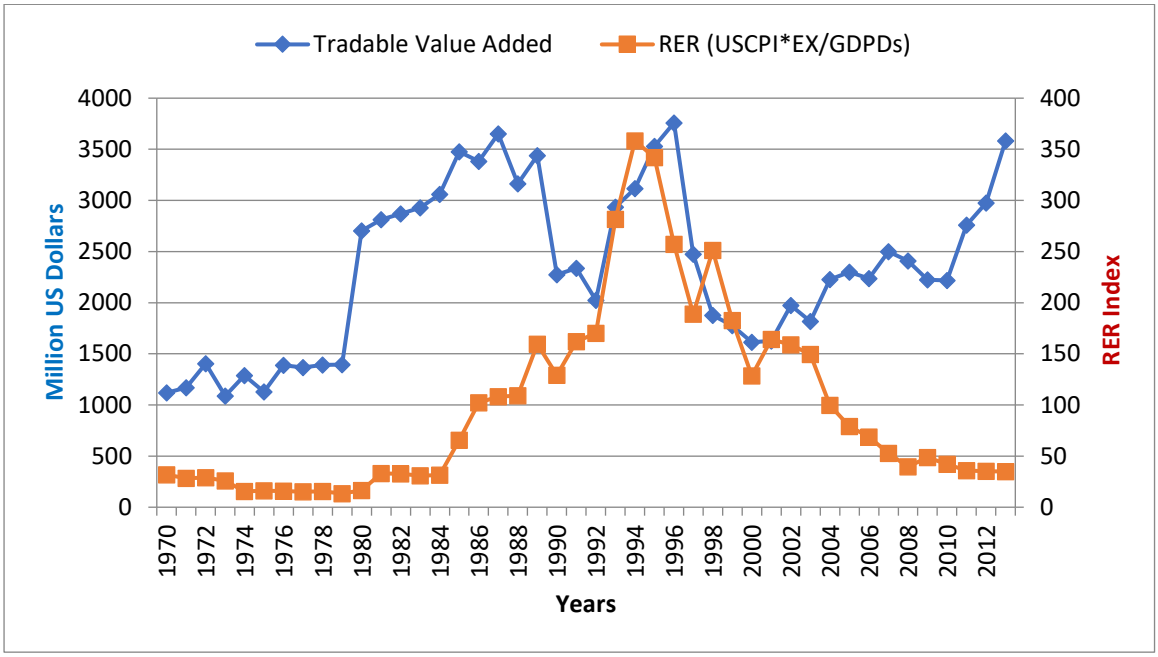
### 3.3 Real exchange rates and output of tradable and non-tradable

We have established the fact that an appreciating real exchange rate did take place during periods of high oil prices and high real government expenditure. Conversely, during period of low oil prices and low real government expenditure, the real exchange rate appreciates. This section seeks to investigate whether relationships exist between the real exchange rate and the output of tradable and non-tradable goods sectors. According to the Dutch disease theory, a positive relationship should exist between the real exchange rate and the rate of growth of tradable goods sectors. This would mean that, when the real exchange rate appreciates (decreases), and the output of tradable goods sector shrinks, a deprecation (increase) of real exchange rate results in an increase in the rate of growth of tradable goods (IMF 2016). On the other hand, the relationship between the appreciations (depreciation) of real exchange rates will be analysed in this section. Here, it is expected that there is a negative relationship between the growth rate of non-tradable goods and real exchange rate.

As Figure 9 shows, during the 1970s, when the real exchange rate appreciated, the output of tradable goods (manufacturing and agricultural sectors) fluctuated slightly and, during some periods, increased. During that time, the Iraqi government attempted to protect domestic producers via subsiding domestic producers (particularly the agricultural sector). This action at least protected the tradable goods sector from collapse (Foote et al. 2004).

However, the output of tradable goods sector began to increase sharply in 1980 and, in 1987, reached $3650 million from $1366 million in 1977. Two main reasons led to the increase in output of tradable goods. First, the Iraqi government introduced a development plan, in use since 1975, to support and encourage the manufacturing and agricultural sectors (Ministry of Planning 2010). Part of the oil revenues during the 1970s were used to subsidise the tradable sector. The second factor, which is the most important factor, was related to the depreciation of nominal and real exchange rates in the 1980s, which caused domestic products to be cheaper than international products for similar products.

**Figure 9 Correlation between output of tradable goods sector and RER (1970-2013)**

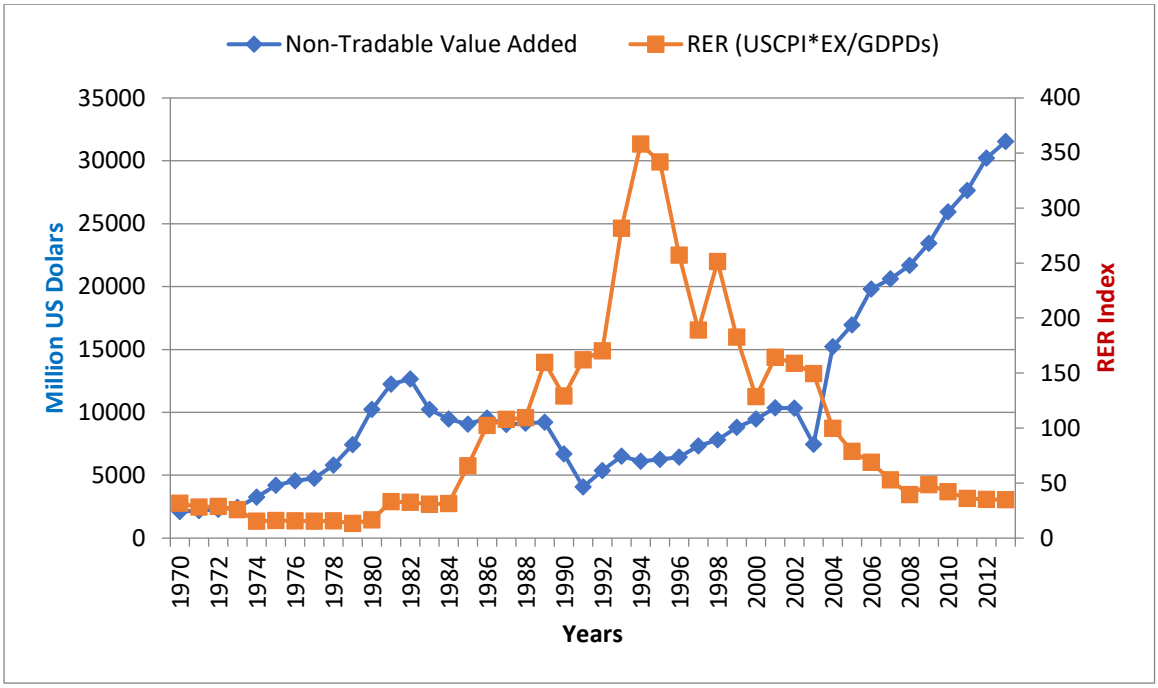



However, it can be seen that there is a sharp drop in the tradable goods output from 1990 to 1992, despite a sharp depreciation in real exchange rate during the same period. This was because of the Iraq-Kuwait war (invasion of Kuwait) during that time (Schnepf 2003). Apart from that, the 1991 uprisings in Iraq were a series of popular rebellions in northern and southern Iraq, in March and April 1991. Thus, the economy was disrupted and most production units in almost all economic sectors were halted due to political instability, which dominated the whole country. When the war ended, at the beginning of the 1990s, the output of the tradable goods sector started to increase with increased real exchange rates (depreciation RER), which are expected according to the Dutch disease theory.

On the other hand, when the real exchange rate began to appreciate again in 1996 (due to OFFP), the output of the tradable goods sector began to decline. However, after 2003, the situation was different when the real exchange rate continued to appreciate, but the output of tradable goods increased instead of decreasing (the opposite of what the Dutch disease predicts). This was because the Iraqi government subsides financed the agricultural and manufacturing sector via development plans (Ministry of Planning 2010). This occurred after the government gained a huge amount of oil revenue after 2003. Despite a rapid increase in tradable goods output, its percentage to GDP is relatively small compared to other sectors, particularly the service sector.

On the other hand, the correlation between the real exchange rate and the output of non-tradable goods is shown in Figure 10. During the first and second oil shocks in the 1970s, the output of the non-tradable goods sector grew sharply due to an appreciating real exchange rate, bearing in mind the appreciation of a real exchange rate occurred when both oil prices and government expenditure increased. However, when the real exchange rate started to depreciate (increase) in 1980, the output of non-tradable goods sector started to decline, as the Dutch disease theory predicts. During the first half of the 1990s, the real exchange rate reached its highest level of depreciation and the non-tradable goods sector was steady in low output until 1996. When the OFFP was introduced by the UN in 1996, the real exchange rate appreciated sharply. As a result, the output of non-tradable goods sector gradually increased, except in 2003, as a result of the Iraq-US war. After the war, the situation was different, particularly when the UN decided to lift economic sanctions on Iraq. The real exchange rate declined (appreciate) sharply, which led to a significant increase in the output of the non-tradable goods sector.

**Figure 10 Correlation between output of non-tradable sector and RER (1970-2013)**




In general, it can be said that there is a negative correlation between the real exchange rate and output of the non-tradable goods sector. When the real exchange rate increases (depreciate), the output of non-tradable goods sector decreases. During appreciation (decrease) of the real

exchange rate, the output of non-tradable goods sector increases. This phenomenon has been explained by the Dutch disease theory.

## 4. CONCLUSION

This article has generally analysed how the changes in oil prices and production affect number of key macroeconomic variables within the Iraqi economy. These variables have been described and analysed in terms of their movement trends during the last four decades. However, before analysing the correlation between these variables, we must distinguish between the value of variables that is measured in real terms instead of nominal terms, since the real term is a more accurate measure in economic literature.

Moreover, all goods and services have been classified into tradable and non-tradable sectors. The standard industrial classification of the UN distinguishes nine different economic sectors. Both agriculture and manufacturing are the most tradable types of goods. Construction, transportation, and the various service groups are considered as comprising the non-tradable sector.

Using different proxies to measure the price of both the tradable and non-tradable goods sector is another important point that has been analysed in this chapter. Both domestic CPI and GDP deflators have been employed as an indicator of non-tradable goods price, while EPI and IPI are local measures of tradable goods, and US CPI, US WPI, PPI as international measures of tradable goods have been analysed. In this study, the Iraqi GDP are deflators that have been considered as a price of the non-tradable goods sector, while the US CPI is measured as a price of tradable goods. Based on these price indices, the relative price of non-tradable goods with respect to tradable goods and the real exchange rate has been measured and analysed by employing these indices. It is found that, in a boom period (high oil revenue), the real exchange rate has appreciated (decreased), while the real exchange rate has depreciated (increased) when the oil revenues decreased. However, the movement of the real exchange rate is also affected by the output of the tradable and non-tradable goods sector. It is found that, during appreciation of the real exchange rate, the output of the tradable goods sector was less encouraged compared to the non-tradable goods sector; at the same time, during depreciation of the real exchange rate, the output of tradable goods has been affected more positively than the non-tradable goods sector. In general, the descriptive analyses are broadly consistent with the predictions of Dutch disease theory. However, in order to reach a precise result, it is important to check the correlation

between those macroeconomic variables that have been analysed in this thesis. An empirical analysis will be necessary and will be applied in the next chapter.

## REFERENCES

Abdlaziz, R.A., Ahmed, Y.A., Mohammed, B.A. and Yaqub, K.Q., 2022. The Impact of Oil Price Shocks on Economic Growth-Iraq A Case Study for The Period (1968-2019) Using Symmetric and Asymmetric Co-Integration Analysis. *QALAAI ZANIST JOURNAL*, *7*(2), pp.1045-1074.

Ahmed, Y.A., Abdlaziz, R.A., Yaqub, K.Q. and Mohammed, B.A., 2023. The impact of economic planning in improving the profits of beekeeping fields-Halabja governorate as a model. *University of Kirkuk Journal For Administrative and Economic Science*, *13*(1).

Ali, B., Nazari, F., Mustafa, K., Yaqub, K.Q. and Alyani, M.A., 2024. Impact of Trade Liberalization on Economic Growth in Developing Countries. *Bulletin of Business and Economics (BBE)*, *13*(2), pp.1128-1133.

Alnasrawi, A. (1994) *The economy of Iraq: Oil, wars, destruction of development and prospects, 1950-2010.* ABC-CLIO. Digest of Middle East Studies*,* Volume. 4, no. 2, pages 77–90.

Alnasrawi, A. (2002) Iraq: Economic Sanction and Consequences, 1990-2000, *Studies on the Iraqi Economy* (Iraqi Economy Forum, London, Al Rafid Press).

Aniba Zia, M.N.J., Gorsi, M.S.R., Sohail, M., Yaqub, K.Q. and Javed, M.U., 2024. THE IMPACT OF MACRO ECONOMIC VARIABLES ON ECONOMIC GROWTH OF PAKISTAN. *Contemporary Journal of Social Science Review*, *2*(04), pp.38-56.

Arslan Arshad, H.B.K., Yaqub, K.Q., Hassan, A. and Khan, U., 2024. The Green Revolution: How Green Innovation And Green Organizational Culture coverage to drive Sustainable Business Success. *Remittances Review*, *9*(3), pp.931-955.

Dornbusch, R. (1973) "Devaluation, Money and Non-traded Goods." *American Economic Review*, Vol. 63, No. 5, pp. 871-880.

Edwards, S. (1983) Floating exchange rates, expectations and new information. *Journal of Monetary Economics,* Vol. 11 no. 3**,** pp. 321-336.

Edwards, S. And Aoki, M. (1983) Oil Export Boom and Dutch Disease: A Dynamic Analysis. *Resource and Energy*. 5, (3) 219-242.

Edwards, S. (1985) Money, the rate of Devaluation and nominal interest rates in a semi-open economy: Colombia, 1968- 1982. *Journal* of *Money, Credit and Banking* 17 (1) 59-68.

Foote, C., Block, W., Crane, K. and Gray, S. (2004) Economic policy and prospects in Iraq. *The Journal of Economic Perspectives,* Vol. 18, no. (3)**,** pp. 47-70.

Frankel, J. and Rose, A. (1994) *A survey of empirical research on nominal exchange rates,* National Bureau of Economic Research (Working Paper No. 4865). Available at: https://www.hks.harvard.edu/fs/jfrankel/NBERw4865.pdff Accessed 2 June 2016.

Frankel, J. (2010). A Comparison Of Product Price Targeting And Other Monetary Anchor Options, For Commodity Exporters In Latin America. *Journal of LACEA Economia*.

Hanke, S. and Sekerke, M (2003) Monetary Options for Postwar Iraq. Foreign Policy Briefing.

Harberger,A (1986). "Economic Adjustment and the Real Exchange Rate", ln *Economic Adjustment and Exchange Rates in Developing Countries,* edited by Edwards, S. and Ahamed, L. Chicago: University of Chicago Press.

Hau, T. (1998), Congestion pricing and road investment: *Road pricing, traffic congestion and the environment: Issues of efficiency and social feasibility***.**

Hussein, J and Benhin, J (2015), Public and Private Investment and Economic Development in Iraq (1970-2010). *International Journal of Social Science and Humanity,* 5, (9), pp. (744-751).

Kamas, L. (1986) Dutch disease economics and the Colombian export boom. *World Development* 14 (9), 1177-1198.

Khan, H., Khan, S.Z., Khan, F.A., Yaqub, K.Q. and Bangash, S.A., 2024. Nexus Between Corporate Governance, Capital Structure, and Market Volatility on Corporate Financial Performance. *Policy Research Journal*, *2*(4), pp.643-653.

Korhonen, I. and Juurikkala, T. (2009) Equilibrium exchange rates in oil-exporting countries. *Journal of Economics and Finance* 33 (1), 71-79.

Looney, R. (1990) Oil Revenues and Dutch Disease in Saudi Arabia: Differential Impacts on Sectoral Growth. *Canadian Journal of Development Studies*. Vol. 11, (1) 119-133.

Ministry of Planning (2005), National development strategy (2005-2007).

Ministry of Planning of Iraq (2010), *National Development Plan, 2010-2014*, Baghdad: Ministry of Planning of Iraq.

Obstfeld, M. and Rogoff, K. (1995) The intertemporal approach to the current account. *Handbook of international economics,* Vol. 3, pp. 1731-1799.

Ozlu, O. (2006) Iraqi Economic Reconstruction and Development: *Center for Strategic and International Studies*. Washington, CSIS.

Rafique, I., Sheraz, A., Aslam, S., Shamsuddin, S., Yaqub, K.Q. and Ullah, K., 2024. National Responses over Climate Change Threats: Implications for Sustainable Economic Growth in Pakistan. *Remittances Review*, *9*(4), pp.1667-1684.

Rose, A. (2011) Exchange Regimes in the Modern Era: Floating, and Flaky. UC Berkeley, NBER and CEPR.

Sanford, J. (2003) Iraq's Economy: Past, Present, Future. Congressional Research Service, Library of Congress.

Schnepf, R. (2003) Iraq's agriculture: Background and status. Congressional Research Service, Library of Congress.

Yaqub, K.Q., 2019. *Impact of oil revenue volatility on the real exchange rate and the structure of economy: Empirical evidence of "Dutch disease" in Iraq* (Doctoral dissertation, University of Bradford).

Yaqub, K.Q., Mustufa, K., Shakoor, M.F., Sarwar, A. and Asif, M., 2024. Examining How Removing Trade Barriers Have Influenced GDP Growth in Emerging Economies. *Bulletin of Business and Economics (BBE)*, *13*(3), pp.338-344.

Yaqub, K.Q., 2024. Volatility of Oil Revenue and the Real Exchange, Empirical Evidence from Iraq. *Education*, *4*(9), pp.1063-1072.

Yaqub, K.Q., 2024. The role of oil revenue in shaping Iraq's public budget. *British Journal of Interdisciplinary Research*, *1*(2), pp.1-24.

Yaqub, K.Q., Fluctuations of the Real Exchange Rate and the Structure of the Iraqi Economy.