

MEASUREMENT OF VARIABLES AND DESCRIPTIVE DATA ANALYSIS FOR THE IRAQI ECONOMY RELATED TO THE DUTCH DISEASE PHENOMENON

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Abstract

This research article examines the difference between tradable and non-tradable sectors and their insinuations for economic variables for example relative prices, nominal and real exchange rates. The study delivers an inclusive analysis of price indices employed to measure tradable and non-tradable goods, drawing on earlier studies. It investigates four indices for tradable goods: the wholesale price index (WPI), consumer price index (CPI) for main trading partners, export price index (EPI), and import price index (IPI). On the other hand, for non-tradable goods sector, the domestic CPI and GDP deflator are examined. These indices are employed to gauge the real exchange rate, a crucial variable for measuring a country's price competitiveness.

Keywords: Dutch Disease, Iraqi Economy, Real Exchange Rate.

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1. INTRODUCTION

It is worth examining some information about the data involved in this paper. Making a distinction between the tradable and non-tradable sectors is the first important step, since it is related to the analysis of the relative price of non-tradable to tradable sector, the nominal exchange rate and the output of tradable and non-tradable sectors. However, scholars have experienced significant difficulty in obtaining data alongside tradable and non-tradable goods and this has acted as a constraint upon their empirical investigation.

On the other hand, the issue of price indices will be analysed in detail in this paper. In the previous empirical studies, different price indices have been employed to measure the price of tradable and non-tradable goods. In general, four price indices have been employed in previous empirical literature to measure the price of tradable goods, namely: wholesale price index (WPI) and consumer price index (CPI) for the main trade partners, the export price index (EPI), and the import price index (IPI). At the same time, domestic CPI and GDP deflators have been employed to measure the price of non-tradable goods. All these indices will be analysed throughout the period of the study. Once the price of tradable and non-tradable goods is measured by these indices, the real exchange rate is a key economic variable that allows us to evaluate the price competitiveness of a country.

The paper is organised into nine sections. Section 2 classifies some simple formalised facts regarding the issue of defining tradable and non-tradable goods sectors. Section 3, however, will be about the proxy variables that have been in previous empirical studies for the price indices. Section 4 analyses the relative price of non-tradable goods to tradable goods using different indices. The conclusion of the chapter will be the last section (Section, 5) in this paper.

2. CLASSIFICATION OF SECTORS AS TRADED AND NON-TRADED

The distinction between the tradable and non-tradable goods sector of the economy has become a more important element in various branches of macroeconomics and international economics. Simultaneously, empirical study in the tradable and non-tradable sectors was always covered behind theoretical developments. The division of the economic sector into the traded and non-traded goods sector was first introduced and developed by Meade (1956), Salter (1959) and Swan (1960), while studying the Australian economy. In recent times, however, the impact of the boom sector on the structure of the domestic economy depends on a neat division of the commodities into two different sectors, namely the tradable goods and non-tradable goods sectors. Although this division does not fit with the available data, the objective of such division is for convenience for theoretical purposes. However, the division of commodities into tradable and non-tradable sectors is difficult to support with empirical evidence.

- 1) The tradable sector, by definition, is those goods that can be produced and consumed either domestically or internationally. In other words, tradable goods contain those commodities which are traded in reality, as well as those which are feasibly traded (Knight and Johnson,

1997 and Betts and Kehoe, 2006). Therefore, for a small open economy, the prices of tradable goods are determined by international markets (law of one price).

- 2) Non-tradable is defined, generally, as those goods and services that are produced and consumed domestically. In other words, non-tradable sectors can be defined as those sectors which do not enter into global trade (not exported or imported at all), or have an insignificant share in both total imports and exports (Corsetti et al. 2012). This is because they are not globally traded; these commodities must have their markets cleared in domestic markets (Betts and Kehoe 2006). Consequently, while the domestic prices of traded goods are expected to change closely with their international prices, the price of non-traded goods is determined by domestic supply and demand conditions.

In almost all previous research studies, the manufacturing and agricultural sectors are treated as being in the tradable goods sector, although some of their activities are in the non-traded goods sector. On the other hand, the category of non-tradable goods contains the construction and service sectors, although some activities in the service sector are tradable goods. However, the well-known classification used in most countries is the Standard Industrial Classification (SIC) of the United Nations. According to the SIC, goods and services are divided into nine different categories, as follows:

- 1) Agriculture, hunting, forestry and fishing
- 2) Manufacturing
- 3) Mining and quarrying
- 4) Financing, insurance, real estate, rental and business services
- 5) Construction
- 6) Electricity, gas, water and waste service
- 7) Wholesale and retail trade, restaurant and hotels
- 8) Transport, storage, postal and communication
- 9) Professional, scientific, technical, administrative, and support services, public administration and safety, community, social and personal services.

Overall, goods included in the first three categories (agriculture, manufacturing, mining and quarrying) are generally considered to be included in the most tradable goods sector, while goods and services in the rest of the categories are in general considered to be in the non-tradable goods sector (Dwyer 1992).

Therefore, based on the literature and previous discussion, this study considers the manufacturing and agricultural sectors as the closest approximation for tradable good sectors. Therefore, all activities relating to the manufacturing and agricultural sectors will be treated as being in the traded goods sector, while the service and construction sectors will contain real estate and business services, transportation and communication, personal and other services. This classification is the closest category to employ in this thesis.

The importance of classification of economic sectors into tradable and non-tradable sectors is to facilitate and provide information for an assessment of sectoral changes in the economy during boom (high oil price) and slump periods (low oil price), particularly for oil-exporting countries. Apart from that, our study includes RER as a main variable, in the sense that is how the real exchange rate is affected by boom and slump periods and how the RER affects other variables, such as the output of tradable goods and non-tradable goods. Thus, in order to investigate RER, it is essential to classify the economic sector into tradable and non-tradable goods sectors.

On the other hand, the external oil shocks have played a significant role on the Iraqi economy over the last four decades, influencing changes in the structure of the Iraqi economy (Sanford 2003 and Al-Chalabi 2005). Based on oil revenue, the entire sample has been divided into two types of periods, namely boom period (high oil revenue) and slump period (low oil revenue). The boom period lasted from 1970 to 1980 and from 2004 to 2013, while the slump period lasted from 1981 to 2003.

In the first external oil shock of 1973-1974, the oil price explosion led to an increase in the volume, as well as the growth rate, of non-tradable goods and tradable goods (Khan 2024). However, the growth rate of non-tradable goods increased faster than the corresponding trend in tradable goods. If we look at the sector growth of value added, as shown in Figure 1, it can be seen that, during the boom period (1970s), at the aggregate level, the non-tradable sector was growing faster than the tradable sector until the beginning of the 1980s. An explanation for this could be that the sector (non-tradable sector) was becoming the more profitable economic sector, as its relative price to that of non-tradable goods increased, as predicted by the Dutch disease theory (see; Foote et al. 2004).

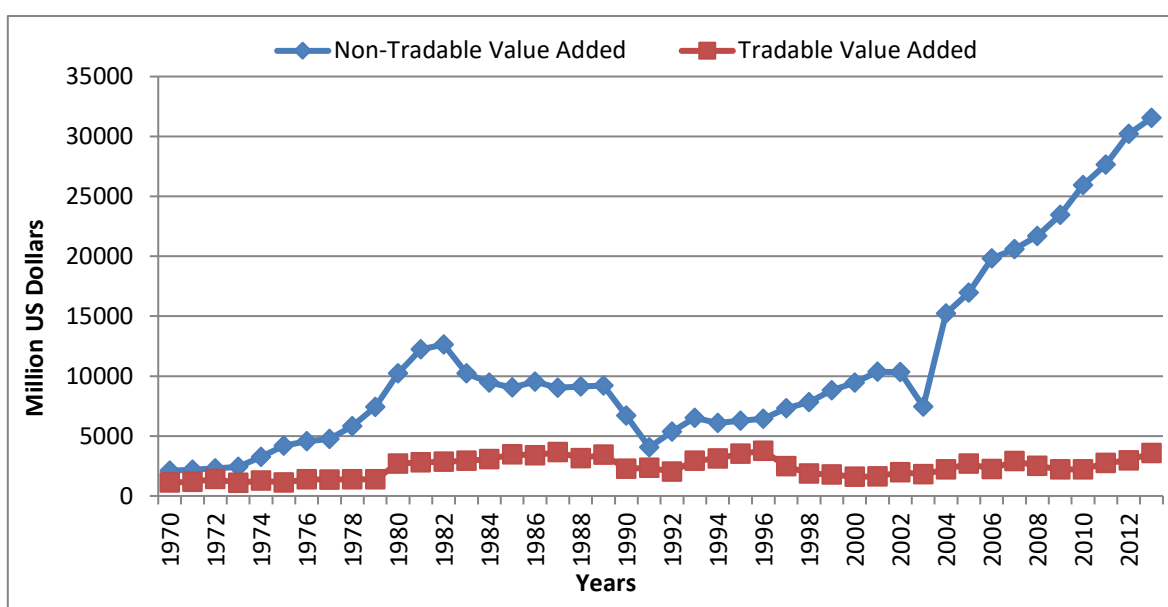
However, the growth rate of non-tradable goods began to slow down during the years 1976 and 1978, despite high oil revenue during that period. This is attributed to the implementation of

tight monetary and fiscal policy by the government in order to prevent high inflation rates in the economy (Central bank of Iraq, 2013).

One the other hand, The Iraqi government introduced enormous subsidies to the manufacturing and agricultural sectors during the 1970s via what was called National Development Plan (NDP) (Ozlu 2006, p. 14). Nevertheless, these development plans have not significantly created a good opportunity to increase a real growth rate in the tradable goods sector. An explanation for this could be that the tradable sector was becoming a less profitable sector compared to the non-tradable sector, since the price of the tradable goods sector had hardly changed as real income per capita or real government expenditure changes because its relative price to that of non-tradable dropped, as predicted by the Dutch disease theory (Foote et al. 2004).

On the other hand, at the beginning of the 1980s, the era of low oil revenue began (due to a fall in oil production and its price). It is noted that the value added of non-tradable goods had started to decline gradually; in contrast, the output of tradable goods had gradually increased. The reasonable justification for these changes is possibly related to two main factors: the first was related to the sharp decline in oil prices in 1982 and 1986; the second may have related to sharp decline in the production of oil at the beginning of the 1980s, due to the Iraq-Iran (Kumins 2005)

Figure 1 Output of Tradable and Non-Tradable Sectors, 1970-2013 (Constant, 2005)



Source: World Bank, World Development Indicator (2014)

The situation grew worse in 1990, when the UN decided to prevent the Iraqi government from exporting oil (economic sanctions due to the invasion of Kuwait by Iraq). This led to a sharp decline in oil revenue that indirectly affected the volume of output of the non-tradeable goods and tradeable goods sector. There was a sharp decline in the output of non-tradable goods due to the second Gulf war in 1991. In general, there was a lower value added of output of the non-tradable goods sector during 1981 to 2003, while the output of the tradable goods sector was greater in the 1980s compared with the boom of the 1970s. Even during economic sanctions (lowest oil revenue), the output of tradable goods has grown more due to the depreciating nominal and real exchange rate (Saxton 2003).

Interestingly, after the removal of economic sanctions in 2003, as well as an increase in production and a rise of the international price of oil, it is noticeable from Figure 1 that the output of non-tradable goods sector has increased sharply, whereas, the output of tradable goods has not significantly changed. The plausible justification is related to lose of competitiveness of tradable goods sector due to appreciation RER. As long as RER is considered as a main factor that affects the structure of economic, thus it is necessary to discuss how to measure and calculate RER. Different indices are analysed in the next section.

3. PRICE INDICES

The objective of selecting price proxies is to show the movement of tradable and non-tradable goods prices, the RER, and how these factors affect the structure of the economy between the non-tradable and tradable goods sector. In economic literature, the prices indexes are used either between countries, or domestic measures as proxies of the prices of tradable and non-tradable goods. There are several price indices that have been used by previous scholars. In economic literature, the conventional proxies for the domestic price are the consumer price index (CPI) and the price deflator gross (GDPDs). In other words, the Consumer Price Index (CPI) and the Gross Domestic Product (GDP) deflators are the most popular indexes that have been used as a proxy for the price of non-tradable goods in most of the developing countries, particularly oil-exporting countries. At the same time, the Import Price Index (MPI), Export Price Index (EPI), the Wholesale Price Index (WSPI) for domestic economy, the Industrial Countries Wholesale Price Index (IWPI) and World Wholesale Price Index (WWPI) for foreign economies can be used as proxies for the price of tradable goods. As long as there are various price indices that can be used as proxies for the price of tradable and non-tradable goods, then it is not surprising that different conclusions are reached. In the next sub-section, the common

price indices, which have been used to measure the relative price of non-tradable goods to tradable goods and real exchange rate, will be analysed.

3.1 Consumer Price Index (CPI)

Although the Iraqi government aims to have a relatively stable price for most consumer goods and services, the price trend has been unstable over the last five decades. A price index is a measure of the percentage changes in a set of price levels over time. The CPI measures changes in the prices of goods and services that households consume. Such changes influence the real purchasing power of consumers' incomes and their welfare (Engel 1999). The CPI in Iraq covers a wide range of goods and services such as food, housing, clothing, manufactured goods and transport services, as well as several other goods and services in the economy. The CPI is traditionally considered as a closed proxy to measure non-tradable goods prices by several scholars, such as Corbo and Stelcner (1983), Rosensweig and Schultz (1987), Edwards (1992), Amano and van Norden (1995), Milner and McKay (1996), and Burstein et al. (2006). These scholars suggest the CPI as an appropriate proxy for the index of non-tradable prices, since they believe that the CPI is greatly influenced by the services sector.

However, other scholars such as Engel (1999) and Betts and Kehoe (2006) have stressed that considering the CPI as a non-traded goods price might not be a good proxy, because it covers many agricultural and manufacturing goods, which are considered as a tradable goods sector. They argued that the CPI includes price movements of imported goods (mostly tradable goods) and, therefore, it may not be an appropriate good measure of the prices of non-tradable goods. For instance, some types of services such as public administration, non-residential construction and business services are excluded, because they are not purchased by households. Moreover, the goods (as distinct from services) components of the CPI (apart from housing) are usually construed as tradable goods; and this, of course, is not met for an index that seeks to proxy non-tradable goods prices (Burstein et al. 2006). Apart from that, since its orientation is to local consumption instead of output, the CPI index includes the price movements of exportable and importable. Therefore, for the above reasons, the CPI cannot be considered as a satisfactory representation of non-tradable goods prices (Ahmed 2023).

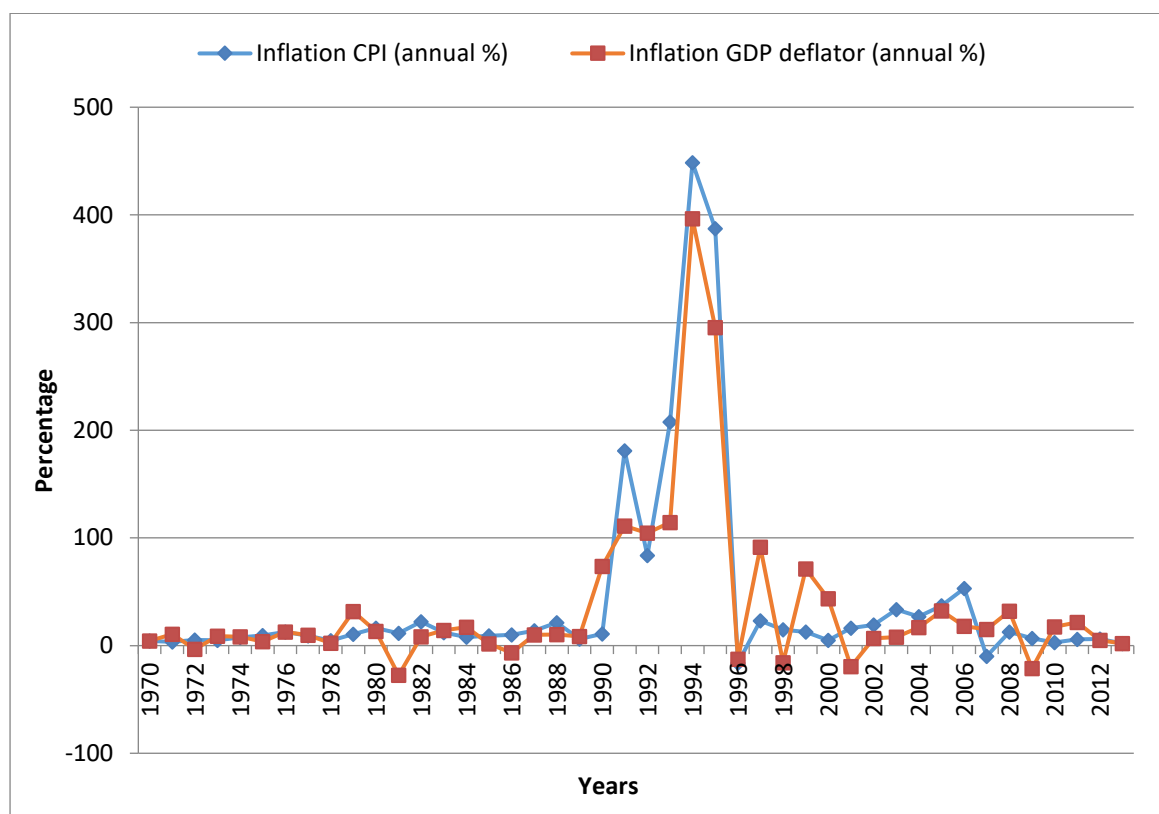
With respect to the Iraqi case, the CPI has a drawback containing a large number of traded and imported goods, so it is not reasonable to use it as a proxy for non-tradable goods prices. If we look at the CPI figure during recent decades, we can see that the movement of the CPI in Iraq

has been significantly influenced by the global economy and international shocks (Sanford 2003). Before 1973, the rate of inflation was around 2% to 4%; then, after increased government expenditure due to increased oil prices, the rate of inflation increased gradually to around 7% to 11% during the period 1974-1979. In the 1980s, however, the situation was different, because the oil revenue had decreased sharply due to the reducing amount of exported oil and collapsing international oil prices. In the same period (1980s), the Iraq-Iran war led to price increases, as shortages resulted from the decline in domestic production in the non-oil sector, particularly the agricultural sector (Mouhammed 1990). The average inflation rate was around 12.49% annually. However, most of the basic items were subject to rationing and the prices of some other items were controlled by the government (Sanford 2003). Thus, the government adopted anti-inflationary policies and the provision of subsidies to limit price increases; otherwise the rate of inflation would have been much higher than what it was (Ali 2024).

On the other hand, the devaluation of the nominal exchange rate was another factor that led to an increase in the rate of inflation during the 1980s (Kenneth 2003). The Iraqi monetary authority followed a fixed exchange rate, but the nominal exchange rate has depreciated which, in turn, led to an increased rate of inflation to 28% in 1988, which was the highest level during the 1980s (Abdlaziz 2022).

During economic sanctions, particularly in the first half of the 1990s, the rate of inflation increased sharply from around 200% to 450%. One can conclude that the increased domestic price level was as a result of a sharp devaluation in the nominal exchange rate; otherwise, if the nominal exchange rate had been unchanged, the inflation rate would have been very low, or even negative, since real government expenditure had been sharply decreased during low oil revenue.

Figure 2 Percentage of CPI and GDP deflator indices (1970-2013)



However, at the beginning of the economic sanctions in 1990-91, the disparity between the nominal market exchange rate change and the rate of market food price inflation reflected the removal of subsidies. Therefore, as a result of the economic sanctions, the government downgraded its effort to regulate and control the foreign exchange and commodity markets, and it has since had to rely upon these markets to obtain its own requirements of foreign currency and some of its imported goods supplies. Consequently, the official exchange rate has been abandoned in practice, and traded commodities have come to reflect global prices in a way which was not familiar in Iraq before the sanctions.

However, once the economic sanctions were partially removed in 1997, the inflation rate declined due to an appreciating nominal exchange rate (Kenneth 2003). This tells us that the imported goods (agricultural and manufacturing goods) have dominated the CPI categories. Again, in 2007, when the monetary authority decided to appreciate the official exchange rate against US dollars, the rate of inflation became a minus rate, because the price of imported goods and services in the domestic currency became cheaper when it was converted to local currency. This means that most of the goods and services, which are listed in CPI categories,

are imported from abroad; therefore, we cannot use them as proxies for domestic prices. Thus, the GDP deflator can be used as a better proxy to represent a country's price level.

3.2 The GDP Deflator

In the literature, the deflator GDP is calculated as the ratio of nominal Gross Domestic Products (GDP) in a given year to real GDP of that year (Dornbusch et al. 1994). Therefore, as long as the GDP deflator is built on a calculation containing all the goods produced in the domestic economy, the GDP deflator (GDPDs) can be considered an appropriate measurement of changes in competitiveness in production since it is a genuine price index of total production and is not subject to direct distortions stemming from price controls, which have been applied in many developing countries.

There are several previous researches that have used the GDP deflator as a price of the domestic economy, such as Heien (1968), Goldstein and Khan (1978), Kravis and Lipsey (1978), Goldstein and Khan (1985), Dornbusch (1987), Harberger (1989), De Gregorio et al. (1994), Micossi and Milesi-Ferreti (1994), Marsh and Tokarick (1994), Chinn (2002), and Driver and Westaway (2005). Their justification for employing GDPDs is related to the fact that the advantage of GDPDs over the CPI is that the GDPDs measure the price movement level of all domestic output on a value-added basis, not only that part of output purchased by households.

Although, the previous discussion supported using GDP deflator as a proxy for domestic price (non-tradable goods price), and even in Iraqi case, the GDP deflators (without oil sector) have a large component of non-tradable goods, compared with non-oil tradable goods. But when we include oil sector into tradable goods sector, the contribution of non-tradable goods sector (service and construction sector) to total GDP (including oil) is not such high because of high contribution of oil sector¹ to GDP in Iraqi economy. Therefore, in this case, the GDP deflator cannot be represented as a non-tradable goods sector since the contribution of oil sector and non-oil tradable goods sector (manufacturing and agriculture sector) are significantly larger than non-tradable goods sector (service and construction sector).

In this regard, some scholars such as Harberger (1986) and Diakosavvas and Kirkpatrick (1990) have advocated the mis-aggregation of the more traditional price indices, such as GDP deflators, to attain better proxies for the price of tradable and non-tradable goods. Harberger

¹ Oil sector is considered as a tradable goods sector.

(1986) suggested that, technically, the best index for the price of traded and non-tradable goods would be one built up from the implicit price deflators for the various sectors. Diakosavvas and Kirkpatrick (1990) also suggested that, in order to construct a proxy for tradable goods prices, the GDP deflators for the agricultural and manufacturing sector should be used, while the GDP deflator for non-tradable goods prices is given by the deflators for other economic sectors, since practical problems limit the applicability of this method (Diakosavvas and Kirkpatrick, 1990).

Based on above analysis, the Iraqi GDP deflator for non-tradable goods is employed as proxies for non-tradable goods price (NTGDPD) in both relative price and real exchange rate, while the GDP deflator for tradable goods sector (TGDPD) and US CPI are used as a proxy for tradable goods price in relative price and RER respectively (see, Harberger (1986) and Diakosavvas and Kirkpatrick (1990)). The detail of these proxies will be analysed in next sections. However, before analysing all proxies that will be used for both relative price of non-tradable goods against tradable goods and RER, it is important to analyse all proxies related to tradable goods in the following section.

3.3 Wholesale price index, producer price index, export price index and import price index,

These four indices (WPI, EPI, PPI and IPI) have been used in the literature as a measure of tradable goods prices. The Wholesale Price Index (WPI) reflects the average price changes of goods that are sold and bought in the wholesale market. This index (WPI) was calculated for the first time during the Second World War, based on Laspeyres's method. WPI is one of the price indices that have been used by some scholars as a measure of the price of tradable goods. It covers the prices of a representative group of traded goods (the cost of a given basket of goods). According to the World Bank classification of goods, the WPI covers nearly 400 products, classified by sectors like manufacturing, fishing, agriculture and livestock from both domestic and imported ones. It is argued that the WPI differs with the consumer price index (CPI) in terms of its coverage of items, since the WPI contains semi-finished goods and raw materials, which the CPI does not. In other words, the WPI was more prone to world price movements of food and oil.

Since the WPI does not include services and its inclusion of a higher proportion of traded goods, in almost all empirical studies, the WPI is often regarded as a logical proxy for the price of traded goods. There have been some empirical researches, which have required price indices

for traded goods. For instance, in their research of the Salter (1959) and Dornbusch (1974) models of devaluation in Mexico, Krugman and Taylor (1978) used the United States WPI as a proxy for the traded goods price index. Others such as Officer (1976), Harberger (1986, 1988), Edwards (1989), Ghura and Grennes (1993) and Papell (1994) used the WPI in their studies as a proxy for prices of tradable goods.

Unfortunately, the WPI, like other indexes, has its own deficiencies. One of the most common deficiencies with WPI is related to double-counting, since its component price indices measure commodities prices at varying stages of production, therefore leading to the probability of double-counting. The fact that the quantitative importance of this double-counting is hard to evaluate renders this defect all the more troublesome. In the Iraqi case, unfortunately this index is not available for the whole period of the sample due to large amounts of missing data. However, the US WPI can still be used as a proxy of tradable goods prices, as has been used in economic literature (see; Edwards, 1985).

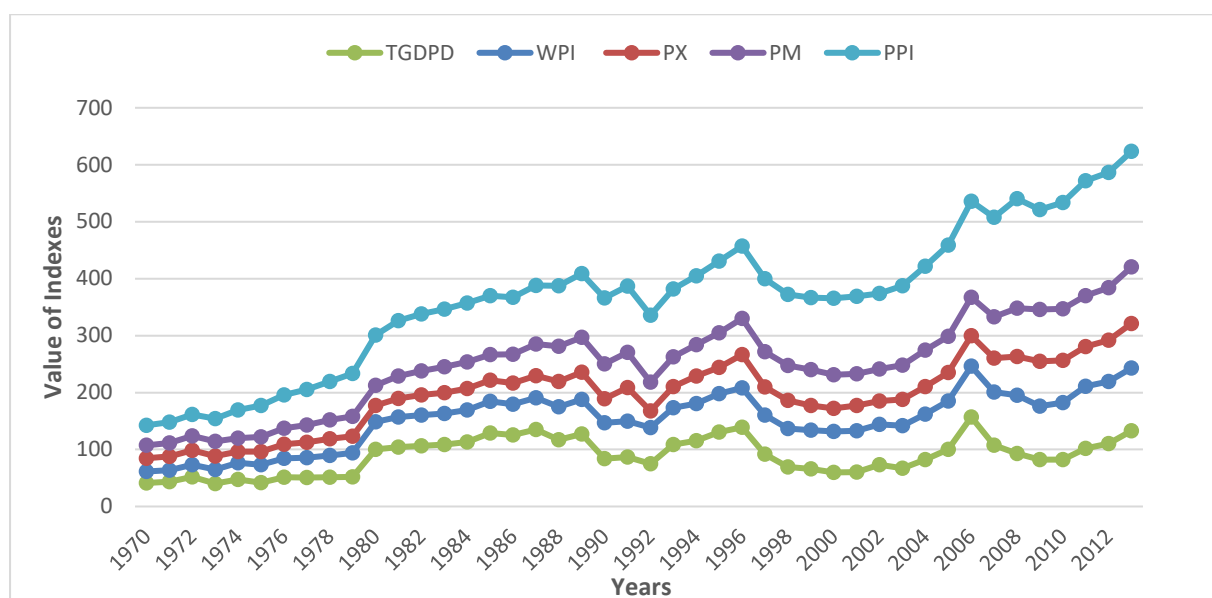
On the other hand, two alternative price indices, which are related to the domestic economy, have been employed in the empirical literature to measure the price of tradable goods, namely: the import price index (IPI) and the export price index (EPI). In economic literature, the IPI and EPI have been used to measure the price of tradable goods, such as Milner et al. (1995), Engel (2000), Burstein et al. (2006), Silver (2007) and Gopinath et al. (2010). IPI is measured as a weighted average of imported goods prices, whereas EPI is measured as a weighted average of exported goods prices. The justification of using these two proxies (IPI and EPI) is that product substitution and arbitrage possibilities in production and consumption are sufficiently powerful to safeguard the fact that domestic price and export of the same commodities in a given country, and the export prices of the identical commodities from different nations, will be closely aligned (Yaquub 2024).

However, price-discriminating monopolists, cost of transportation and trade barriers suggest that departures from the "law of one price" are far from unusual, and this is the case even at fairly fine levels of disaggregation. For instance, Kravis and Lipsey (1977, p. 155) concluded their study of domestic and export price movements in the USA, Germany, United Kingdom and Japan. They found that there are considerable and prolonged divergences between the price of exports among different countries for the same commodities and notable differences within nations between domestic and export price movements. Therefore, considering IPI and EPI as a price measure for the tradable goods price can be a wrong procedure. Apart from that, the

quality of the IPI and EPI as a proxy for imported and exported goods alone is suspect, since, the component price indices are mostly unit-value indices instead of true price measures.

Moreover, using IPI can have some other deficiencies compared to the EPI; this deficiency appears from the fact that the Iraqi import price index does contain imported military equipment (military goods made up 25 per cent of total Iraqi imports during the 1980s). In addition, the price of imported retail items can vary considerably between, before and after the point of entry. This is attributed to some factors such as retailers in transportation costs, changes in the margin of wholesalers and tariffs. For these factors, it is believed that the EPI is the superior proxy variable compared to the IPI to measure the price of tradable goods.

Figure 3 Indices of TGDPD Deflator, US WPI, PPI, PM and PX



-TGDPD and US WPI; World Bank, World Development Indicator (2015).

Notes: TGDPD: Iraqi GDP Deflates for tradable goods (constant 2005).

US WPI: United States Wholesale Price Index.

PPI: Producer Price Index for Industrial Countries.

PM: Iraqi Import Price Index.

PX: Export Price Index.

Figure 3 shows the movement of Iraqi US WPI, IPI and EPI, PPI and TGDPD deflator. It is noticed that, to a large extent, their trends over the last four decades are similar; however, the IPI has a flatter trend than the EPI trend. This can be related to the fact that tariffs and transportation costs affect the level of IPI. It is also noticed that the price of Iraqi exports (oil and non-oil tradable goods) is significantly close to the trend of US WPI. This could be related to the law of one price, where it has been assumed that the price of domestic tradable goods is similar or close to the international tradable goods price. Here, it can be said that using EPI can be a better proxy for measuring the price of tradable goods.

4. RELATIVE PRICE OF NON-TRADABLE GOODS TO TRADABLE GOODS

In the previous section, the issue of different indices to measure the price of tradable and non-tradable goods has been explained. Both CPI and GDP deflators are the most popular indices that were used or represented as a proxy for the price of non-tradable goods by many scholars. On the other hand, other indices such as WPI, industrial countries PPI, industrial countries CPI, IPI and EPI are measured as a proxy for the price of tradable goods. However, it is pointed out that using international price indices (WPI, PPI and CPI) without including a nominal exchange rate may not provide a true measurement in the Iraqi case, since the Iraqi nominal exchange has fluctuated severely during the last four decades. For instance, the rate of inflation in Iraq (GDP deflator or CPI) has increased significantly during the 1980s and 1990s, mostly as a result of depreciating nominal exchange rate (Katzman 2003). The rate of inflation was about 400% during the first half of the 1990s due to the sharp devaluation of the Iraqi Dinar (Iraqi currency), while the rate of inflation in industrial countries or US was only around 2% to 10% (see above figure in this chapter).

In order for there not to be a wrong calculation for the relative price of non-tradable goods to tradable goods, real GDP is divided into tradable and non-tradable goods. Harberger (1986) proposed that the more suitable indices to measure the price of traded and non-tradable goods would be one built up from the implicit price deflators for the various sectors (GDP divided into tradable and non-tradable goods sector). Diakosavvas and Kirkpatrick (1990) suggested that, in order to construct a proxy for tradable goods prices, the GDP deflators for the agricultural and manufacturing sectors should be used, while the deflators for the rest of the economic sector give GDP deflators for non-tradable goods price (Yaqub 2024). Therefore, the analysis used in this section in order to calculate the relative prices was as follows. PNT: price index of non-tradable goods, 2005 = 100. This series is generated by dividing the nominal value

of GDP originating in the non-tradable goods sector by the real value of GDP in that sector (non-tradable sector) and multiplying the result by 100. While PT refers to price index of tradable goods was calculated in the same way, the series was generated by dividing the nominal value of GDP in the tradable goods sector by the real value of GDP of that sector (tradable goods sector) and multiplying the result by 100. Then, the GDP deflator for both tradable and non-tradable goods sector will be given (see Officer (1976); Goldstein and Officer (1979); Harberger, 1986). Finally, the relative price of non-tradable to tradable is calculated by dividing the price of non-tradable sector (GDP deflators for non-tradable goods) by the price of the tradable sector (GDP deflator for tradable goods) and multiplying the result by 100. The result is shown in Table 1.

Table 1 The Iraqi GDP deflator for tradable and non-Tradable sector (1970-2013)

Years	NTGDP	NTGDPD	TGDP	TGDPD	NTGDPD/TGDPD*100= PN/PT
1970	2858.3	15.56529	1119.5	41.46911	37.53465
1971	2930.2	15.95683	1170.2	43.34716	36.8117
1972	3386.9	18.44385	1403.7	51.99659	35.47127
1973	2991.8	16.29228	1088.5	40.32079	40.40665
1974	4207.6	22.91309	1287.5	47.69225	48.04364
1975	5095.8	27.74991	1129.8	41.85064	66.30702
1976	5462.1	29.74465	1386.8	51.37057	57.90213
1977	5644.6	30.73848	1366.5	50.61861	60.72566
1978	6686.3	36.41121	1392.6	51.58542	70.58431
1979	8283.9	45.11117	1395.9	51.70766	87.24273
1980	10113.6	55.07507	2703.3	100.1371	54.99969
1981	13398.2	72.96183	2812.7	104.1895	70.028
1982	14619.1	79.61042	2869.6	106.2972	74.89416
1983	10939.6	59.57317	2929.5	108.5161	54.89801
1984	10036.3	54.65412	3059.2	113.3205	48.22969
1985	9486.9	51.66228	3476.6	128.782	40.11606
1986	11871.2	64.64633	3383.9	125.3482	51.5734
1987	9121	49.66972	3650.6	135.2274	36.7305
1988	9594.5	52.24823	3163.3	117.1766	44.5893
1989	9372.2	51.03767	3439.7	127.4152	40.05619
1990	6994.4	38.08901	2273.1	84.20136	45.23563
1991	6657.1	36.2522	2337.5	86.5869	41.86799
1992	6396.9	56.61782	2024.5	74.99259	75.49788
1993	6969.7	81.51966	2935.1	108.7235	74.97887
1994	6238.4	82.98291	3115.8	115.4171	71.89828
1995	7997.4	76.22486	3530.3	130.7712	58.28871
1996	7340.6	78.09381	3758.9	139.2391	56.0861
1997	7044.6	38.36239	2473.1	91.60987	41.87582
1998	6427.9	35.00406	1876.4	69.50659	50.36077

1999	6659.5	36.26527	1777.8	65.8542	55.06903
2000	6187.3	33.69383	1614.3	59.79775	56.34633
2001	7567.9	41.21209	1626.5	60.24967	68.40219
2002	9185.1	50.01879	1974.9	73.15528	68.37345
2003	6909.3	37.62559	1818.3	67.35442	55.86209
2004	14523.3	79.08873	2225.9	82.45296	95.91982
2005	18363.3	100	2699.6	100	100
2006	20270.9	110.3881	4236.9	156.9455	70.33533
2007	20089.2	109.3986	2898.4	107.3641	101.895
2008	20166.6	109.8201	2507.4	92.88043	118.2382
2009	22677.4	123.4931	2223.4	82.36035	149.9424
2010	25631.9	139.5822	2217.4	82.13809	169.936
2011	27047.7	147.2922	2759.6	102.2226	144.0897
2012	28932.1	157.5539	2974.8	110.1941	142.9785
2013	31537.7	171.7431	3583.1	132.7271	129.3957

Source: World Bank, World Development Indicator (2014)

NTGDP: Value of the GDP for Non-Tradable Goods

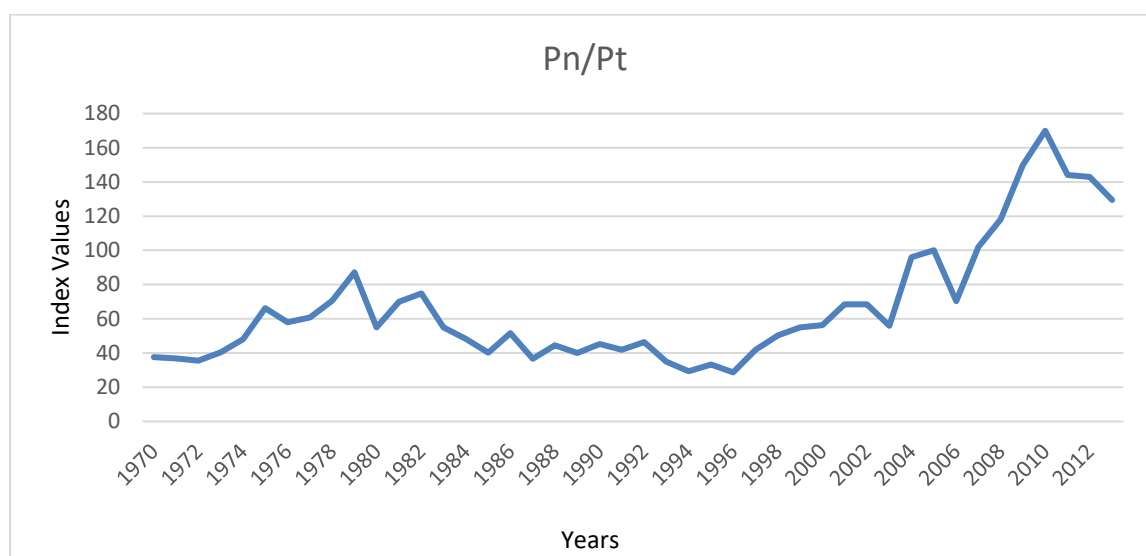
NTGDPD: Index for GDP Deflators for Non-Tradable Goods

TGDP: Value of the GDP for Tradable Goods

TGDPD: Index for GDP Deflators for Tradable Goods

PN/PT: Relative price of Non-tradable goods against Tradable goods.

Figure 4 Relative price of non-tradable goods with respect to tradable goods (1970-2013)



Source: World Bank, world Development Indicator (2015)

According to the Dutch disease theory, the increase of the relative price of non-tradable goods to tradable goods is predicted during a boom period (high oil price). During a slump period (low oil price) the relative price of non-tradable goods to tradable goods decreases. Table 1 show that the relative price of non-tradable goods to tradable goods increased substantially during the years 1970-1980. The reason behind this was related to increasing oil prices and real government expenditure, which made the rate of increase of non-tradable goods prices faster than the rate of increased prices of tradable goods (Hussein and Benhin 2015).

However, once the oil revenue declined sharply at the beginning of the 1980s due to decreasing amounts of oil exports and a sharp drop in the oil price, this followed the relative price of non-tradable goods to tradable goods falling (Yaqub 2024). It can be noticed that the average rate of inflation in the tradable sector was lower than the average rate of inflation in the non-tradable sector during the 1970s (oil boom period). On the other hand, the rate of inflation in the non-tradable goods sector was lower during 1980 and 1990, which in turn led to a drop in the relative price of non-tradable goods to tradable goods (see Figure 4). However, after partially lifting economic sanctions in 1997 (Oil for Food Program), the Iraqi government began to export a limited amount of oil, and the relative price of non-tradable goods to tradable goods increased again. The sharp increase of relative prices after 2003 may related to increased oil prices and enlarged oil production, particularly after the removal of economic sanctions in 2003 (Yaqub 2024).

In general, it can be seen from the figures that, during high oil revenue (boom periods), the relative price of non-tradable goods to tradable goods increases (see 1970s and 2000s). Conversely, when the oil revenues declined, as happened during the 1980s and 1990s, the relative price of non-tradable goods to tradable goods declined. In other words, during the boom period, the rate of inflation of non-tradable goods sector is higher than the rate of inflation of the tradable goods sector, while the situation is vice versa during a slump period. The differentiate inflation rates between the tradable and non-tradable goods sectors, is the main factor for the appreciation or depreciation of the real exchange rate in the economy.

5. CONCLUSION

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 paper.

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