# Migrants` remittances and Dutch disease: evidence from Egypt

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## Abstract

As a result of the inflow of foreign currency into an economy, an appreciation of the currency of the recipient country will occur. This paper aims to study the Dutch Disease and its relation with Migrants' remittances in Egypt using the ARDL model in the short run and long run using the error correction model. The data covers the period from 1980 to 2020 in Egypt by examining some variables as such migrants' remittances, real effective exchange rate, trade openness, and interest rates. The results show the significance of migrants' remittances on the real effective exchange rate (REER) only in the long run. Thus there is a negative relation between REER and these remittances and a positive relationship with real GDP per capita. This confirms the existence of the short-run and long-run relationship between them and the existence of Dutch disease in Egypt. Although there are relationships between REER and other variables, remittances are significant only in the short run rather than in the long run.

**Keywords**: migrants' remittances- Dutch Disease- real effective exchange rate- Egypt

**JEL codes**: F24, F31, J61, P45

**الملخص**

ازدياد التدفقات الماليه الاجنبيه الى الدول الناميه، ادى الى زياده سعر صرف العمله ..ولذا تهدف هذه الورقه الى دراسه ظاهره الداء الهولندى التى تفسر هذه الظاهره الاقتصاديه وعلاقتها بتحويلات المهاجرين فى مصر باستخدام نموذج الابطاء الموزع للانحدار الذاتى. قد تم ذلك من خلال الاعتماد على بيانات لبعض المتغيرات مثل تحويلات المهاجرين، سعر الصرف الفعلى الحقيقي، سعر الفائده، ودرجه الانفتاح التجارى. وذلك فى الفتره من ١٩٨٠ الى ٢٠٢٠.

واظهرت النتائج وجود علاقه بين جميع المتغيرات ماعدا معدل التضخم وسعر الفائده فى المدى الطويل فقط. كما توجد علاقه سلبيه بين تحويلات المهاجرين وسعر الصرف الفعلى الحقيقي، وايجابيه بين سعر الصرف الفعلى الحقيقي و نصيب الفرد من الناتج المحلى الاجمالى. وتلك النتائج تدل على ان مصر تعانى من الداء الهولندى. بالرغم من وجود علاقه بين المتغيرات محل الدراسه وسعر الصرف الفعلى الحقيقي الا ان تحويلات المهاجرين تميزت بوجود دلاله غير معنويه فى الاجل الطويل.

## 1. Introduction

Investment is considered one important driver for long-run economic growth in countries all over the world. Dutch disease refers to the capital inflow from one country to the recipient one that may lead to a decrease in net exports and an increase in imports. This disease occurs in developed or developing countries because of natural resources.

Natural resources account for 20% of the international natural reserves. While some nations generate the majority of the world's resources, 15 nations own more than 90% of the world's known oil reserves, and 21 countries export more than 80% of their exports as natural resources (Ruta & Venables , 2012).

The presence of unexpected resources in any country leads to a huge increase in revenues that will affect the prices domestically not internationally and affects the competitiveness negatively over the run. Therefore that paper aims at studying the relationship between the real effective exchange rate (REER) and migrants` remittances in Egypt and that will answer the main research question of the study if Egypt suffers from a Dutch disease or not.

Moreover, the paper will be divided into four parts as the first will deal with the theoretical framework and the empirical literature. The second part will deal with a summary of the shape of remittances and exchange rate policy in Egypt, while the third

will be an empirical presenting the model. Finally, the paper will end with the results and conclusion in the last part.

## 2. Research problem

The Dutch disease is recognized as one of the most important characteristics of the countries that depend on capital flows. Most of the literature linked it to the oil-exporting countries and few recognized Egypt as (Saab & Ayoub, 2010) studied the symptoms of the Dutch disease in four countries and Egypt was one of them. It concluded that remittances affect the economy and high tariffs on imports should be introduced. But this study ignored the effect of REER.

Therefore this study will try to answer the following research questions:

a- What is the relation between migrants` remittances and REER?

b- Are there any symptoms of Dutch disease in Egypt? Especially after the restructuring that Egypt witnessed in 2015?

c- What are the policies that should be adopted to avoid the Dutch disease if it is found?

## 3. Hypotheses

This study will examine its main hypothesis that is;

"Egypt suffers from many symptoms of Dutch disease – as proposed in previous studies"

Therefore this implies the answer to the following sub-hypotheses;

a- There is a direct and significant relation between migrants` remittances and REER

b- Egypt should apply many policies to avoid the Dutch disease in it

## 4. Aim

As stated before, this study aimed to study the relation between REER and migrants` remittances that will prove the validity of the main hypothesis which is whether Egypt suffers or not from Dutch disease.

By examining the research questions and hypotheses, the answer to the main question will be clear and therefore the relation between the main 2 variables will be clear

## 5. Literature review

**This** part will be divided into two parts; the first part will be the theoretical framework. It will deal with the theories that deal with the Dutch disease. While the second part examines the empirical literature that studies the Dutch Disease and Migrants' remittances.

### *5.1 Theoretical framework*

Many theories deal with the relation between Dutch Disease and Migrants' remittances but most studies deal with 2 main theories that were; the core model and the extended exogenous model. The link between Dutch Disease and Migrants remittances is studied under different headings as the link between capital flows and exchange rate, capital outflow and traded and non-traded sectors, and Dutch disease and the supply of labor

Dutch disease was firstly proposed 1960s to study the effects of oil revenues on the manufacturing sector in the Netherlands (Corden & Neary, 1982). Due to the increase in export earnings, booming and lagging sectors in the economy exist (Davis, 1995). The most ideal environment for applying the Dutch disease was the oil-exporting and producing countries.

It has 2 effects on the economy that are spending and resource allocation effects. In the spending effect, aid or capital flows are used in the non-traded sector as health care, education, and construction sectors (Corden W. M., 1984). This will increase the wages of non-traded exports over traded ones. Finally, the

"resource allocation effect" will end up decreasing profitability, exports, international trade, and competitiveness. Theoretically, this phenomenon can be applied in oil-exporting countries in most literature but recently it is mostly applied in countries with huge inflows – not necessarily those oil-exporting countries.

A model was developed by Salter-Swan- Corden- Dornbusch used to study the impact of remittances on the real exchange rates depending on the spending effect (Acosta, et al, 2009) and then the reallocation of resources. Also, this model develops this relation through the labor market as the capital inflow will increase the reservation wage for labor. Therefore it will increase the cost of production of non-tradeable over tradeable goods and finally ends up with an appreciation of the domestic exchange rate.

As proposed in many kinds of literatures the migrants` remittances should be used for development but unfortunately, they become a source of increasing consumption for many families (Chami, et al, 2003).

If the government improves the quality and efficiency of all sectors, the effect of the appreciation of currency can be reduced (Makhlouf & Mughal, 2013). Appreciation of the currency is not the only consequence of Dutch Disease, but there are other consequences such as inflation (Mahama & Gakpe, 2015), and a decrease in productivity (Siakwah, 2017).

### *5.2 Empirical literature*

In examining the relationship between REER and remittances, the empirical literature will be divided into two parts as the first will deal with different experiences. While the second one deals with the literature on Egyptian experience with Dutch disease.

Most of the literatures found that there is a negative impact of immigrants` remittances on the real exchange rate which was considered an important characteristic of Dutch disease. The symptoms of Dutch disease were clear in all literature that deals with Eastern Asia. (Eromenko, 2016) examined the relation between REER and migrant remittances in Kyrgyzstan and Tajikistan and found that remittances lead to deindustrialization and appreciation of local currency- as symptoms of the Dutch disease. Also (Javaid, 2009) concluded that the Dutch disease is clear in South East Asia.

Also, evidence from sub-Saharan Africa concluded that remittances lead to a trade deficit which was considered another characteristic of Dutch disease (Owusu-Sekyere, et al, 2014). The migrants' remittances on the exchange rate was significant in long run in many countries in Africa in many countries such as Nigeria (Urama, et al, 2019), Cape town (Bourdet & Falck, 2006), and Bangladesh (Chowdhury & Rabbi, 2011).

Through works of literature, the characteristics of the Dutch disease in most countries can be found in the following :

- Real effective exchange trade: If the dependence of most of the literatures was on nominal effective exchange rates, the economy will suffer from a steady state status (Fielding & Gibson, 2012; Roy & Dixon, 2015) which leads to a larger appreciation in the short run. Therefore real effective exchange rates were effective in all studies.
- Trade openness and trade barter: The use of trade openness will decrease the cost of production due to the exposure to the different production techniques (Alcala & Ciccone, 2004; Prati, 2006). By examining the relationship between trade and remittances, the higher income countries have negative relations while the lower income countries have positive relationships (Zhang, et al, 2021).
- ODA: Net ODA appreciates REER and therefore increases the GDP per capita (Polat & Andres, 2019).

Regarding Egypt, little literatures was found examining the Dutch disease through exchange rate and immigrants` remittances. (Adams, 2006) found that migrants` remittances are considered the second source of funding for developing countries and it has a great impact on countries as many countries and especially Egypt. This is because many Egyptian migrants worked in the

oil-exporting countries in GCC Region. Thus the literatures studied the Dutch disease but no literature depends on the real effective exchange rate and it will be the aim of that study.

## 6. Methodology

### 6.1 Data and variables

The study will examine the relationship between the real effective exchange rate (REER) and migrants` remittances through some variables. These variables were extracted from the World Bank except REER. REER extracted from the European bank of data that is named "Bruegel". All of these data were on an annual basis from 1980 till 2020.

The independent variable is the real effective exchange rate (REER) that is computed on annual basis. Also, the independent variables are migrants` remittances, interest rates, and net barter from trade, and real GDP per capita as shown in table 1. These variables are lagged to decrease stationary.

Table 1: The variables used in the study

| Variable | Symbol | Units | Source | Expected relation |
|---|---|---|---|---|
| real effective exchange rate | REER | Percentage | Bruegel | |
| Official development assistance | ODA | Percentage | World Bank | + |
| Net barter from trade | OPEN | Percentage | World Bank | + |
| migrants` remittances % to GDP | REM | Percentage | World Bank | - |
| Real GDP per capita | RGDP | US dollars | World Bank | + |
| Interest rate | IR | Percentage | World Bank | + |

## 6.2 proposed model

In running time-series data, consistencies may occur (Dickey & Fuller, 1981). Therefore the author used augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) to avoid stationarity in each series. Moreover, the Schwarz information criterion (SIC) was applied to choose the lag length (Schwarz, 1978).

Then the author applied the ARDL test to examine the long-run relationship between migrants` remittances and REER. The reason behind choosing that model lies in its ability to be used whether in the level or first difference or mixture of both (Ghatak & Siddiki, 2001).

The bound test began with estimating the F-statistic and then comparing it with the critical value. If the F-statistic exceeds the upper bound critical value so the null hypothesis of cointegration will be rejected (Narayan, 2005).

Regarding the cointegration, the Johansen cointegration test cannot be adopted with the ARDL test is used for small samples in the long run (Dutta & Sengupta, 2018). A dynamic error correction model (ECM) can be applied and derived from ARDL in the in short-run (Sakran, et al, 2022). Therefore the ARDL will be shown as follows:

$$\Delta yt = \alpha 0 + \sum \beta i \, \Delta y_{t-i} \, p_{\,i=1} + \sum \delta i \, \Delta x_{t-i} \, p_{\,i=1} + \sum \gamma_i \, \Delta z_{t-i} \, p_{\,i=1} + \lambda_1 \, y_{t-1} + \lambda_2 \, x_{t-1} + \lambda_3 \, z_{t-1} + u_t \; \ldots\ldots \text{Equation 1}$$

Then the proposed model will be the following in equation 2:

$$\Delta REER = \propto o + \beta 1 \ln REER + \beta 2 \ln REM + \beta 3 \ln ODA + \beta 4 \ln OPEN + \beta 5 \ln RGDP + \beta 6 \ln INFL + \beta 7 \ln IR + \beta 8 \ln \Delta (REER)t - 1 + \beta 9 \ln \Delta (REM)t - 1 + \beta 10 \ln \Delta (ODA)t - 1 + \beta 11 \ln \Delta (OPEN)t - 1 +$$

$\beta 12 \ln\Delta(RGDP)t-1+ \ \beta 13 \ln\Delta(INFL)t-1+$

$\beta 14 \ln\Delta(IR)t-1+\mu t$ …….. Equation 2

## 7. Results

### 7.1 descriptive data

These data were presented in table 2 showing the mean, median, maximum, minimum, and standard deviation for the seven variables that the study depends on.

Table 2: descriptive data results

| | Mean | Median | Maximum | Minimum | Std. Dev. | N |
|---|---|---|---|---|---|---|
| IR | 3.603986 | 3.158634 | 17.58479 | -7.80149 | 4.968017 | 41 |
| ODA | 2840000000 | 2750000000 | 975000000 | 14000000 | 18800000 | 41 |
| OPEN | 137.1618 | 136.3843 | 220 | 93.11501 | 34.56062 | 41 |
| REER | 145.2547 | 138.4485 | 282.3285 | 84.24258 | 50.08469 | 41 |
| REM | 7.231956 | 6.182729 | 14.58334 | 2.856612 | 3.034268 | 41 |
| RGDP | 25706.42 | 25298.91 | 39040.63 | 14077.56 | 7374.317 | 41 |

Source: authors` calculations

### 7.2 unit root test results

Table 3 shows the results of conducting a unit root test for Dickey. it shows that the data are non-stationary at first difference. Then it means that the data are integrated at all levels.

Table 3: unit root test results

| Variables | ADF | |
|---|---|---|
| | Level | 1st difference |
| | REER | |
| None | -0.570282 | -4.867359***` |
| Intercept | -2.784761* | -4.798992 *** |
| Intercept and trend | -3.159113 | -4.712417*** |
| | IR | |
| None | -1.068828 | -9.287365*** |
| Intercept | -5.245440*** | -9.109847*** |
| Intercept and trend | -5.453717*** | -8.983057*** |
| | REM | |
| None | -1.250273 | -5.754655*** |
| Intercept | -2.463886 | -5.678636*** |
| Intercept & trend | -2.248394 | -3.207983* |
| | ODA | |
| None | -1.595835 | -5.674238*** |
| Intercept | -2.729795* | -4.551892*** |
| Intercept and trend | -3.273035* | -4.475125*** |
| | OPEN | |
| None | -1.360631 | -2.974691*** |
| Intercept | -2.310197 | -2.960749** |
| Intercept and trend | -1.689220 | -3.597046** |
| | RGDP | |
| None | 3.004235 | -1.825305* |
| Intercept | 0.379027 | -3.847641*** |
| Intercept and trend | -3.259095* | -3.846292** |

Source: authors` calculations

### 7.3 integration test

Therefore the author conducted a co-integration test to estimate the number of lags that has to be used. Table 4 concluded that the

data can be used till lag 2 at 5% using Schwarz Criterion (SIC). As the critical value is smaller than the t-statistic at none, lag1 and lag 2, the data resulted in a stationary error term and there is co-integration between data

Table 4: VAR lag order selection

| | Eigenvalue | t-Statistic | Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.765843 | 152.3315 | 95.75366 | 0.0000 |
| At most 1 * | 0.629715 | 95.71266 | 69.81889 | 0.0001 |
| At most 2 * | 0.509368 | 56.96680 | 47.85613 | 0.0055 |
| At most 3 | 0.419403 | 29.19642 | 29.79707 | 0.0585 |
| At most 4 | 0.173970 | 7.992167 | 15.49471 | 0.4663 |
| At most 5 | 0.013709 | 0.538343 | 3.841465 | 0.4631 |

Source: authors` calculations

### 7.4 ARDL results

The author estimated a long-run coefficient for all variables as shown in table 5. In the long run, some variables are significant at 5% as ODA and RGDP, While IR is significant at 1%. Moreover, REM and open trade don`t affect the REER. This confirms the existence of Dutch Disease in Egypt in the long run.

Table 5: coefficients of integration in the long run

| Variable | Coefficient | Std. Error | t-Statistic |
|---|---|---|---|
| LNREM | -0.301527 | 4.790313 | -0.062945 |
| LNODA | -2.78E-08** | 1.30E-08 | -2.142416 |
| LNOPEN | 0.630360 | 0.448675 | 1.404938 |
| LNRGDP | -0.005753** | 0.002746 | -2.094913 |
| LNIR | -8.772739* | 4.729175 | -1.855025 |
| C | 319.6170 | 127.1779 | 2.513150 |

Source: authors` calculations

Then to test the cointegration in the long run, table 6 shows that the coefficient that is 9.613502 is greater than the lower and upper bounds test at all significance levels. That implies that there is a long-run co-integration relationship that verified the presence of Dutch disease in Egypt.

Table 6: bounds test results

| F-statistic | Significance. | Critical Lower bound | Critical Upper bound |
|---|---|---|---|
| 9.613502 | 10% | 2.08 | 3 |
| | 5% | 2.39 | 3.38 |
| | 1% | 3.06 | 4.15 |

Source: authors` calculations

Through conducting the ARDL test depending on lag 2- as estimated before in table 4, the model will be significant at 91% (the value of adjusted $R^{2)}$ as in table 6. In the none-lag, ODA, and REM are significant at 10%, while OPEN is significant at 1% and RGDP and IR are not significant. In the first lag, Oda, and REM are significant at 5%. IR is significant at 10% and both RGDP and OPEN are not significant. Finally, in the second lag REM is significant at 5% and OPEN is insignificant. As some of the variables are not found in the second lag, the variables will be accepted in the short run till lag 1.

Table 7: short run ARDL results

| Variable | Coefficient | Std. Error | t-Statistic |
|---|---|---|---|
| LNREER(-1) | 0.999577 | 0.184246 | 5.425237 |
| LNREER(-2) | -0.312264 | 0.203050 | -1.537871 |
| LNODA | -5.52E-09* | 2.72E-09 | -2.030066 |
| LNODA(-1) | 5.36E-09** | 2.58E-09 | 2.073962 |
| LNREM | -4.005899* | 1.954215 | -2.049876 |
| LNREM(-1) | 6.408814*** | 2.041231 | 3.139682 |
| LNREM(-2) | -4.295523** | 1.843811 | -2.329698 |
| LNOPEN | -0.949365*** | 0.297211 | -3.194246 |
| LNOPEN(-1) | 0.636083 | 0.425344 | 1.495455 |
| LNOPEN(-2) | 0.466507 | 0.324353 | 1.438271 |
| LNRGDP | 0.006799 | 0.006660 | 1.020938 |
| LNRGDP(-1) | -0.007671 | 0.006670 | -1.150024 |
| LNIR | -0.718888 | 0.893966 | -0.804156 |
| LNIR(-1) | -1.372101* | 0.718888 | -1.908644 |
| C | 62.49707* | 32.57115 | 1.918786 |

Source: authors` calculations

As the short-run deviation is derived from long-run equilibrium, an error correction model (ECM) is adopted. It describes 77% of

the variables to show the significance of all values in the short run.

ECM estimations for the model are significant at 10% while all variables are significant at different levels ranging from 1% to 10% as shown in table 8. Therefore this model shows the dynamic relationship between REER and other variables that gave a clear picture of the Dutch disease in Egypt in the short run.

Table 8: ECM results in short run

| Variable | Coefficient | Std. Error | t-Statistic |
|---|---|---|---|
| D(LNREER(-1)) | 0.312264*** | 0.109260 | 2.857987 |
| D(LNODA) | -5.52E-09*** | 1.46E-09 | -3.773991 |
| D(LNREM) | -4.005899*** | 1.365213 | -2.934268 |
| D(LNREM(-1)) | 4.295523*** | 1.258177 | 3.414084 |
| D(LNOPEN) | -0.949365*** | 0.225172 | -4.216174 |
| D(LNOPEN(-1)) | -0.466507* | 0.258462 | -1.804933 |
| D(LNRGDP) | 0.006799** | 0.002963 | 2.294367 |
| D(LNIR) | -0.718888* | 0.428770 | -1.676627 |
| CointEq(-1)* | -0.312687*** | 0.049695 | -6.292147 |

Source: authors` calculations

Then to test the cointegration in the short run, table 9 shows that the coefficient that is 4.524699 is greater than the lower and upper bounds test at all significance levels. That implies that there is a short-run co-integration relationship that verified the presence of Dutch disease in Egypt.

Table 9: bounds test in the short run

| Value | Signif. | I(0) | I(1) |
|---|---|---|---|
| 4.524699 | 10% | 2.08 | 3 |
| | 5% | 2.39 | 3.38 |
| | 1% | 3.06 | 4.15 |

Source: authors` calculations

## 8. Discussion

In most literature, the Dutch disease was observed due to the presence of some characteristics such as the increase in the real effective exchange rate (REER), the increase in the size of the trade, and the size of ODA. In the results presented below in section 7, positive impacts were achieved between remittances and the size of the trade, ODA, and REER. Therefore any increase in ODA will lead to an increase in migrants' remittances and then diminish the size of appreciation of REER.

Moreover, the use of real GDP per capita will lead to higher productivity and an increase in the net barter from trade and decrease the REER over time or in the long run as estimated in table 5 ending with an increase in the size of aids. As estimated in (Fielding & Gibson, 2012) . As it was discussed before in the literature review, the Dutch disease is linked to the real effective exchange rates compared to the nominal ones. This implies that the selection of the REER is appropriate in the short run as estimated in table 8.

Thus the empirical findings show that the REER is inversely correlated to remittances in both levels- short run only. REER is positively correlated in the short run which implies that the increase in migrants' remittances can enhance the economic growth if it is presented and utilized in the favour of the economic activities and ends with an increase in the exchange rate and appreciation of the domestic currency. In the long run, this relationship turns out to be negative but insignificant between REER migrants' remittances. For that reason, there is a dynamic relationship between REER from one side and ODA, trade openness, and remittances that satisfy the characteristics of Dutch disease and ensure its presence of it in Egypt in the short run. Then ODA, remittances, and trade openness will appreciate the real effective exchange rate (REER). Also, the significant results of the ECM model show a temporary disequilibrium in

the short run between REER and all other variables used which is consistent with much previous literature ( Lartey, et al, 2012: Murshed & Rashid, 2020).

Moreover, the coefficient of real GDP per capita was positive in the short run which is reflected by the increase in the Egyptian international trade size. This ends with an increase in REER.

In the long run, REER is found to be negatively affected by the ODA, interest rates, and real GDP per capita with no significant relationship with trade openness.

Finally, the authors proved the existence of the Dutch disease in Egypt by the appreciation of REER and the increase in ODA and trade openness in Egypt. Thanks to the large inflow of remittances and the increase in the size of international trade, the Egyptian pound appreciates till 2020.

## 9. Conclusion

The main objective of the paper is to examine the relationship between REER and migrants` remittances and to what extent Egypt suffers from the Dutch disease. This paper ends up with different effects of the different variables that were used in the model. It resulted in the significant relation between REER from one side and Migrants` remittances, ODA, trade openness, Real GDP per capita, and interest rate in the short run. While in the long run, migrants` remittances have no relation to REER during

the period between 1980 till 2020. According to the previous results proposed in the model, there is a negative relationship between REER and REM in both of short and long run.

In the short run, there is a negative relationship between REER and other variables such as ODA, migrants` remittances, interest rates, and open trade. Any increase by 1% in ODA, migrants` remittances, interest rates, and open trade, will decrease REER by 278% (due to ODA), 0.57% (due to real GDP), and 877% (due to interest rate). While there is a positive relationship between REER and real GDP, the increase in real GDP by 1% will increase REER by 0.67%.

In the end, the Egyptian government should introduce more reforms to institutions to ensure the best use of the different types of investment. Although Egypt adopts new steps toward that reform in the new administrative capital and other new cities, more reforms in other old cities and institutions should be adopted by depending on artificial intelligence and machine learning techniques.

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