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Migrants' remittances and economic growth in Egypt: An empirical analysis from 1980 to 2017

Review of Economics and Political Science (REPS)

Provided in Cooperation with: Cairo University, Cairo

Suggested Citation: Qutb, Rasha (2022) : Migrants' remittances and economic growth in Egypt: An empirical analysis from 1980 to 2017, Review of Economics and Political Science (REPS), ISSN 2631-3561, Emerald, Bingley, Vol. 7, Iss. 3, pp. 154-176, https://doi.org/10.1108/REPS-10-2018-0011

This Version is available at: https://hdl.handle.net/10419/316059

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Migrants' remittances and economic growth in Egypt: an empirical analysis from 1980 to 2017

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Abstract

Purpose – Migrants' remittances to Egypt have increased considerably in both size and importance over the past 40 years. This increase has made Egypt one of the top remittance recipients in the world and the leading recipient country in the Middle East. As migrant remittances are one of Egypt's main sources of foreign capital, this study aims to identify the impact of these remittances on economic growth.

Design/methodology/approach – The study collects annual data on migrant remittances sent to Egypt during the period 1980–2017. The study uses the Augmented Dickey–Fuller test and Johnsen's Co-integration test to establish long-run relationships between variables. Then, a vector error correction model (VECM) is used to combine long-run and short-run dynamics, and a Granger causality test is performed. Finally, diagnostic tests of the VECM are conducted.

Findings – Results reveal that migrants' remittances to Egypt are countercyclical in the sense that they have a long-term negative impact on economic growth. These results are determined by the Granger causality between migrants' remittances, inflation rate and imports.

Practical implications – The study can help policymakers to develop appropriate policies to turn migrants' remittances into a reliable source of capital that could result in a stable economic growth.

Originality/value – Although various empirical studies have examined the growth effect of remittances, most of them are based on cross-country data. This study contributes to the field by attempting to close a gap in the literature by empirically analyzing the impact of remittances on a single country over a long period.

Keywords Egypt, Economic growth, Granger causality, Johansen co-integration, Migrants' remittances, Vector error correction model, Remittances inflows

Paper type Research paper

1. Introduction

Over the past three decades or more, migrant remittance inflows to developing economies have been considered an important economic development tool because of their impact on the overall growth of the recipient economies (Aggarwal *et al.*, 2006, p. 1). Remittance inflows to developing economies have been growing and have become the second main source of foreign exchange after foreign direct investment (FDI); therefore, they represent a major source of international capital flows, exceeding official development assistance and



Review of Economics and Political Science Vol. 7 No. 3, 2022 pp. 154-176 Emerald Publishing Limited e-ISSN: 2631-3561 p-ISSN: 2356-980 DOI 10.1108/REFS-10-2018-0011 © Rasha Qutb. Published in *Review of Economics and Political Science*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence maybe seen at http://creativecommons.org/licences/by/4.0/ legalcode

JEL classification – F24, O4, C22

export revenues as far back as 1997. They have also exceeded private debt and portfolio equity flows in recent years (Giuliano and Ruiz-Arranz, 2005, p. 5; Kamuleta, 2014, p. 1). The role that migrants' remittances play in the growth of global capital flows has attracted much attention due to its stable growth despite financial crises and economic declines. This stability helps to reduce income inequalities and volatility, alleviate poverty, prevent crises that would otherwise occur in the balance of payment and boost the recipient country's economic growth rate (Ratha, 2013, p. 1; Datta and Sarkar, 2014, p. 2).

Broadly defined, remittances are the transfers of cash from migrants working abroad to individuals in their home country through official and unofficial channels (Zohry, 2007, p. 46; Naga, 2015, p. 21; Karagoz, 2009, p. 1893). Recipients can use the remitted funds in various ways but usually invest the money or spend it on living expenses, education and health care (Karagoz, 2009, p. 1891).

As remittances have been a reliable source of foreign exchange for developing economies, they can have a potential impact on the growth of those economies because they can influence consumption, investment, savings, poverty and income distribution (Rao and Hassan, 2012, p. 351; Rahman, 2014, p. 140). However, the increased consumption that results from migrant remittances may also have negative macroeconomic effects (Adam, 1991; Wahba, 2007; Glytsos, 2002, p. 6; World Bank Group, 2006; Rao and Hassan, 2012, p. 352; Rahman, 2014, p. 141; Stratan and Chistruga, 2012; Goschin, 2014, p. 56).

In 2017, global remittances reached \$613bn, which represented a 7% growth rate from 2016 to 2017 (World Bank Report, 2018). Officially recorded remittances sent to low- and medium-income countries reached \$466bn in 2017 amounting to three-quarters of total global remittances and representing an increase of approximately 8.5% from the \$429bn recorded in 2016. This considerable growth in remittances among developing and developed economies can be attributed to many factors including the acceleration of labor migration and ongoing improvement in real wages paid to migrants around the world (Center for Social and Economic Research, 2012, p. 6). Furthermore, transaction costs decreased as technological improvements have created faster, lower-cost mechanisms to facilitate international payments between individuals (Giuliano and Ruiz-Arranz, 2005; World Bank Group, 2006; Abu Siddique and Selvanathan, 2010).

Remittance inflows to the MENA region increased by 9.3% in 2017; reaching \$53bn; \$24.7bn of that total was sent to Egypt, making it one of the top ten remittance recipient countries in the world. Therefore, it is important to analyze the impact of migrants' remittances on economic growth, as such remittances are among the major sources of foreign capital inflows to the Egyptian economy. 'This study tests the hypothesis that – "remittance inflows to the Egyptian economy could promote economic growth along with other types of foreign capital inflows, mainly international development aid and Foreign Direct Investment (FDI)". The study covers the period between 1980 and 2017 and uses "Johansen's co-integration test" – within VECM to test the hypothesis. Granger causality test is used to explore the causal relationship between migrants' remittances and economic growth.

Although various empirical studies have examined the effect of migrants' remittances on economic growth; most of them use data across multiple countries, rather than focusing on an individual country. This study uses data for a single country that is one of the top recipients of migrants' remittances globally, thereby contributing to the literature by empirically analyzing the effect of remittances for a specific country over a long period.

Thus, the study can help policymakers develop appropriate policies to convert the potential for economic growth represented by migrants' remittances into a reliable source of capital that results in stable economic growth.

Economic growth in Egypt

REPS	This study's findings reveal that migrants' remittances have a negative impact on
7,3	economic growth in Egypt, and that the effect of the remittances on the economy is countercyclical because they lead to the increase in imports, which consequently fuels
	inflation.
	The remainder of the study is organized as follows. The next section reviews the history
	of migrants' remittances in Egypt and demonstrates the possible investment opportunities
156	they represent. The third section discusses the potential effects of migrants' remittances on
	economic growth in the recipient country and offers a review of the literature. The fourth section provides the empirical model, data sources and results of the study. The final section offers conclusions.

2. Egyptian migrants' remittances

2.1 Historical background and potential investment opportunities

Emigration from Egypt began in the mid-1970s, triggered by many factors including poverty, persistent high unemployment, rapid population growth and the oil boom in the countries around the Arabian Gulf that led to an increasing demand for imported labor (Zohry, 2007, p. 1). The positive side of the growth in Egyptian emigration was the increase of migrants' remittances to Egypt, which became a vital component of the country's national income. By the mid-1990s, Egyptian migrants' remittances had become one of the country's main sources of foreign exchange, even exceeding revenues from the Suez Canal (International Organization for Migration, 2010, 7:20).

Figure 1 displays the evolution of Egyptian migrants' remittances during the period from 1980 to 2017, which rose from \$2.7bn in 1980 to \$24.7bn in 2017. Despite being private capital inflows, migrants' remittances in Egypt have been noticeably influenced by changes in the country's political and economic conditions over this period, except during the decade of the 1980s, which was characterized by relative stability. For instance, the remarkably high levels of Egyptian migrants' remittances in 1992 and 1993, which reached \$6.1bn and \$5.66bn, respectively, reflected conditions in the period immediately following the first Gulf War.

Separately, the period following the sharp devaluation of the Egyptian pound in 2004 witnessed an unusually high level of migrants' remittances that reached an average of \$6.6bn over the period 2004–2008. In spite of the international financial crisis in 2008–2009 that resulted in a 10% decrease of annual migrants' remittances globally, Egypt ranked seventh in the top remittance recipient countries in 2009, after India, China, Mexico, Philippines, Poland and Nigeria (Ratha *et al.*, 2008, p. 3; Ratha *et al.*, 2009). There was a noticeable increase in Egyptian migrants' remittances during the period from 2010 through 2017, reaching an average of \$18.13bn (a 98% growth rate). This increase covered the period that included the 2011 Revolution and the second devaluation of the Egyptian pound in 2016. It is worth noting that average annual migrants' remittances to Egypt between 1980 and 2017 were nearly \$7.6bn.

Figure 1. Total Egyptians' remittances during the period (1980–2017)



Source: UNCTAD

The importance of migrants' remittances to Egypt can be evaluated based on its share of the country's gross domestic product (GDP). Figure 2 shows the steady growth in the importance of Egyptian migrants' remittances as a share in Egypt's GDP from 1980 to 2017. With the exception of the periods from 1980 to 1982 and from 1989 to 1991, as well as the year 2017 (during which Egyptian migrants' remittances were the country's second largest source of foreign exchange and represented 17.3% of its GDP), the share of the Egyptian migrants' remittances inflows in the country's GDP was generally less volatile and represented a much larger share of international capital flows than other sources, including official development assistance and FDI.

Following the devaluation of the Egyptian pound in 2016 through the end of 2017, remittances to Egypt reached US\$29bn, jumping by 16.2%. This may be an indicator of the success of liberalizing the exchange rate and of the subsequent severe devaluation of the pound that encouraged Egyptians to transfer more funds through legal channels [1].

Although the size of remittances was significant, its share of GDP was less than that of FDI for the fiscal year 2017, due to reforms and incentives created by the Egyptian Government to stimulate investment prospects in the country. In 2018, remittances were the second largest factor in reducing the government's deficit, as they increased by \$3bn between 2017 and 2018.

The Egyptian economy's current account deficit fell sharply to \$3.4bn in 2018, compared to \$9.4bn in 2017, a decrease of 64%. This reduction is largely attributed to significant improvements in key sources of national income, especially Egyptian migrants' remittances. This suggests that the Egyptian economy could capitalize on these growth-driven inflows by making them a reliable source of capital.

Although the economy receives a considerable portion of Egyptian migrants' remittances, they are the second source of migrant household income after labor income, both of which alleviate poverty. The majority of these remittances is used for housing and everyday consumption expenses instead of investment, which can have a negative effect on the country's economic growth (Center for Social and Economic Research, 2012, p. 7; International Organization for Migration, 2010, p. 11).One of the reasons individuals do not invest a significant portion of remittances can be attributed to the average Egyptians' low awareness of the government's investment program.



Figure 2. Remittances, FDI inflows and ODA (as a % of GDP) in Egypt during the period (1980–2017)

Source: WDI, Migration and Remittances Fact-book and GAFI

The largest number of Egyptian migrants resides in the Kingdom of Saudi Arabia (KSA), whereas a smaller and wealthier group live in the USA. Combined, these are the largest source of migrants' remittances to Egypt. Therefore, Egyptians who live in KSA and the USA need more attention from policymakers who should try to encourage Egyptian migrants there to direct remittances into productive investments in Egypt. Moreover, the main concern of migrants when sending remittances to their families in their home country is to transfer enough money to address basic daily needs. Many of Egypt's migrants do not invest in the country for a number of reasons, including individual financial difficulties, lack of easy access to cash or credit, the risky investment climate in Egypt and a lack of awareness of the government's investment programs (International Organization for Migration, 2010, p. 57).

The government has taken several positive steps to improve the investment environment in Egypt and to overcome critical obstacles that impede investment, including changing and amending several laws and creating a "one-stop-shop" for investors. Guidelines have also been designed to help small enterprises gain access to capital more like large-scale businesses. Even with these changes in laws and policies, some existing laws would have to be modified to improve the investment environment for small-scale investors such as migrant families, to help them invest their remittances in a productive way (International Organization for Migration, 2010, p. 58). A family's decision to invest is determined by not only the money that remains after meeting their basic needs but also the overall economic environment.

3. Migrants' remittances and economic growth

3.1 Theoretical background

For relatively small and developing countries, migrant remittances are considered the "second pillar" of financing the development process along with other sources of foreign capital, because the steady growth of remittances helps to lessen the volatility of output and thereby stimulates the rate of economic growth (Rao and Hassan, 2012, p. 351; Datta and Sarkar, 2014, p. 2).

Moreover, remittances can help developing countries to address a number of challenges, including shortages in foreign exchange reserves, problems in the balance of trade, the limited impact of foreign aid and borrowing difficulties, by providing a constant and reliable source of foreign currency, which in turn stabilizes the economies of the migrants' home countries (Ratha, 2005; Lopez-Cordova and Olmedo, 2006; Glytsos, 2002, p. 6; Ratha, 2013, p. 71; Tahir *et al.*, 2015). Moreover, remittances help to reduce current account deficits by inducing investment (Daianu, 2001; Terry *et al.*, 2004; Abu Siddique and Selvanathan, 2010).

Remittance inflows can also play a role in reducing official development assistance, can act as an alternative to debt, thereby helping to alleviate poverty, and can improve the creditworthiness of the receiving countries (Ratha, 2013, p. 2). Furthermore, remittances improve the development of the financial sector, which in turn augments the growth in output by easing credit restrictions for investments (Aggarwal *et al.*, 2006; Giuliano and Ruiz-Arranz, 2005; Rao and Hassan, 2012, p. 352).

Empirical studies have recorded different effects of remittance inflows on macroeconomic variables in the home country. Migrants' remittances stimulate economic growth directly in their home economies through two main approaches. The first is the family approach, referring to the temporary effect of migrants' remittances on the economy through increased consumption. In this case, when economic conditions in migrants' home countries are poor, they send money to their families out of concern about their welfare (Carling, 2004; Lueth and Ruiz-Arranz, 2006; Singh *et al.*, 2011, pp. 315–316, Goschin, 2014, p. 56;

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OECD, 2006). As remittances are less prone to cyclical variations than other capital inflows, migrants from poor countries may actually increase their remittances when economic conditions decline (Center for Social and Economic Research, 2012, p. 7); therefore, remittances can help to reduce income inequality and poverty in the recipient countries by alleviating the true impact of a recession and losses related to other disasters (Quibria, 1997; Taylor, 1999; Adams and Page, 2003; Docquier and Rapoport, 2003; Yang, 2008, p. 3; Datta and Sarkar, 2014, p. 2) [2].

The second approach is the permanent impact of savings and investment; this supplyside impact can be called "the portfolio approach" (Carling, 2004; Rahman, 2014, p. 140; Goschin, 2014, p. 56; OECD, 2006).) . In this approach, remittances are one form of foreign capital where migrants send money to their families in their home country for the purpose of investment (Ratha, 2003, p. 3; León-Ledesma and Piracha, 2004). Both Chandavarkar (1980) and Carling (2005) note that only a small proportion of remittances are productively invested, which is a source of disappointment among policymakers.

It is worth noting that even if remittances are not invested, remittance-based consumption can enhance economic growth because it indirectly raises employment and production through the multiplier effect, injecting capital into the economy through consumption (Aggarwal *et al.*, 2006; Stahl and Arnold, 1986; Rapoport and Docquier, 2005, p. 48). Therefore, if remittances are invested they can contribute to economic growth, and if they are consumed they can generate a positive multiplier effect in the economy (Ratha, 2003, p. 3).

According to Barajas *et al.* (2009), there are three channels through which remittances can affect economic growth: first, by directly investing in capital accumulation; second, by labor inputs through labor force contributions; and third, by affecting total factor productivity growth (Rahman, 2014, p. 141). Furthermore, Glytsos (2005) suggests that remittances can promote economic growth by increasing imports of capital goods. On the other hand, many studies have found that increased consumption due to remittances can have negative macroeconomic impacts on home countries. For example, Wahba (2007) found that remittance inflows to Syria and Egypt caused higher inflation, which in turn negatively affected economic growth. Adams (1991) found a high increase in property values (mainly the price of land) attributable to remittances (Goschin, 2014, p. 56).

In the same manner, Stahl and Arnold (1986), Rahman *et al.* (2006) and Abu Siddique and Selvanathan (2010) pointed out that remittances do not contribute to economic growth because of them lead to unproductive consumption spending, i.e. spending on consumption instead of investing in productive assets. Remittances may also have an indirect negative impact on the real exchange rate. The increase in remittances can cause the real exchange to appreciate, which adversely affects growth, leading to what is known as the Dutch disease (Rao and Hassan, 2012, p. 352). In the end, the net effects of migrants' remittances on economic growth can be measured by analyzing both direct and indirect multiplier effects on macroeconomic variables.

3.2 Literature Review

Remittances remained a vital source of financing for development in recipient economies, due to their stability during periods of economic crises and their being the second largest source of foreign capital after FDI. Therefore, a large portion of the previous literature on remittances focused on their contribution as a source of foreign capital for economic development in migrants' home countries (Ratha and Prabal, 2012; Goschin, 2014, p. 55). While the remittances–growth nexus has been empirically tested to a significant extent in the literature, there is a substantial debate among economists regarding the impact of remittances on economic growth of migrants' home countries.

Economic growth in Egypt Most previous studies have found that remittances have a positive impact on the economies of recipient countries. For instance, Giuliano and Ruiz-Arranz (2005) found that migrants' remittances had the potential to influence growth through the multiplier effects of increased consumption and decreased liquidity constraints. Analyzing panel data for 36 African countries over the period 1980–2004, Fayissa and Nsiah (2010) found that remittance inflows had a positive impact on the economic growth of migrants' home countries by providing an alternative way to finance investment and helping to alleviate cash constraints.

The same conclusion was reached in Rahman (2007), which re-examined the effect of remittances, exports and FDI on the actual GDP of the recipient countries of Bangladesh, Sri Lanka, India and Pakistan for the period 1976–2006, by applying autoregressive distributed lag (ARDL) model.

Using a panel data set of MENA countries, (Algeria, Egypt, Jordan, Lebanon, Libia, Morocco, Oman, Syria and Tunisia), Yaseen (2012) examined the effect of remittances on economic growth through two channels, financial development and institutions. Findings indicated that institutions and financial development both played an important role in how remittances affect economic growth during the period 2000–2010. Using a production function framework, Waqas (2013) found a link between workers' remittances and economic growth in Pakistan between 1991 and 2012.

Similarly, Goschin (2014) found remittances have a positive influence as a source of capital flow for both absolute and relative GDP growth in CEE countries during the period from 1995 to 2011. By applying an ARDL model to analyze time series data covering the period 1977–2013 in Pakistan, Tahir *et al.* (2015) found that remittances promoted economic growth alongside other external determinants such as imports and FDI. More recently, Comes *et al.* (2018) investigated the combined effect of FDI and migrants' remittances on economic growth using data for seven Eastern and Central European countries with a per capita GDP of less than 25,000 Euros. Their findings showed a positive impact for both FDI and remittances have a positive impact on economic growth include León-Ledesma and Piracha (2004), Lueth and Ruiz-Arranz (2006), Mundaca (2009), Abu Siddique and Selvanathan (2010), Ahmed *et al.* (2011), Bugamelli and Paternò (2009), Khathlan (2012), Shafiq *et al.* (2012), Driffield and Jones (2013), Datta (2014), Nwaogu and Ryan (2015) and Olayungbo and Quadri (2019).

However, other researchers have noted that migrants' remittances could have a negative impact on economic growth in the migrants' home countries. For example, Jahjah *et al.* (2003) discovered that remittances reduced work incentives for the recipients. Additionally, they clarified that the effect of remittances on GDP for a large panel of countries translated into labor reduction the migrants' home countries, as remittances could reduce work incentives for the recipients, leading to reductions in the workforce, especially with respect to skilled workers.

Analyzing data collected from 101 developing countries, Chami *et al.* (2005) concluded that the funds emigrants sent back home were only "compensatory transfers" that provided support to poor families during difficult times but were not profit-promoting capital flows. Hence, remittances resulted in fewer work incentives and created moral hazard problems that had a negative impact on economic growth.

A World Bank study conducted in 2006 also showed that large remittances undermined long-term economic growth in 22% of recipient countries because the inflows resulted in exchange rate appreciation and a reduction in subsequent exports. The negative impact of migrants' remittances on economic growth was particularly notable in small economies where reliance on migrants' remittances was high. Singh *et al.* (2011) found that remittances

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were countercyclical and proposed the hypothesis that remittances can work as a shock absorber. Finally, in some studies, such as Spatafora (2005), Barajas *et al.* (2009), Naga (2015) and Njangang *et al.* (2018), remittance inflows were found to have an insignificant effect on economic growth.

In summary, migrants' remittances could, theoretically, have a positive impact on economic growth in the recipient economy by acting as a source of capital that induces investments and compensates for the workforce loss due to emigration. However, migrants' remittances could have a negative impact on economic growth because they may lead to increased demand for high-priced "non-tradable goods", which may then lead to inflation. Furthermore, remittance-based consumption can increase inflation and reduce work incentives. Finally, remittances can have an insignificant impact on economic growth because of recipients are unaware of how they could invest the money. This literature review indicates that the impact of remittance inflows on the economic growth of the Egyptian economy cannot be predicted from previous studies

4. Empirical model of economic growth with remittances

4.1 Theoretical model and data description

This study empirically examines the impact of migrants' remittances, as a source of capital, on the economic growth of Egypt alongside other sources of foreign capital such as official development assistance (ODA) and FDI. The study is carried out within "the traditional neoclassical growth model"; it focuses on the period 1980–2017. The study is based on many previous empirical studies such as Fayissa and Nsiah (2010), Driffield and Jones (2013), Tahir *et al.* (2015) and Olayungbo and Quadri (2019). The adopted function is established as follows:

$$EG_t = f(REM_t, FDI_t, ODA_t, Trade_t)$$

Where t is time trend, EG_b REM_b FDI_t, ODA_t and Trade_t are economic growth, remittance inflows, FDI, official development assistance and Trade openness respectively. The empirical model of the study is as follows:

$$EG_t = \alpha_0 + \alpha_1 REM_t + \alpha_2 FDI_t + \alpha_3 ODA_t + \alpha_4 Trade_t + \varepsilon$$
(1)

By taking the natural logarithm for our variables, the impact of outliers is minimized and elasticity coefficients of variables are obtained. Thus, the structural form of the main estimated model can be represented in a double-log function as follows:

$$ln EG_t = \beta_0 + \beta_1 ln REM_t + \beta_2 ln FDI_t + \beta_3 ln ODA_t + \beta_4 ln Trade_t + \varepsilon_t$$

Where the endogenous variables include the natural logarithm of real GDP per capita (Ln EG_t), the natural logarithm of remittances as a percentage of GDP (Ln REMt), the natural logarithm of FDI inflows as a percentage of GDP (Ln FDI_t), the natural logarithm of net official development assistance as a percentage of GDP (Ln ODA_t) and the natural logarithm of trade openness measured by summing of imports and exports as a percentage of GDP (Ln Trade_t). Note that both variables (Ln FDI_t), and (Ln ODA_t) capture the impact of other sources of external exchange.

The study follows the next three steps; first, the "Augmented Dickey-Fuller" test is used to check stationarity on every single variable to avoid "spurious regression"; second, in order to ensure the long-run "equilibrium" relationship among variables Johansen's CoEconomic growth in Egypt REPS 7.3

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integration test is employed; and third to combine both long and short-run dynamics, VECM is conducted. The "structural" form for the economic growth equation is given as:

$$\Delta Ln EG_t = \beta_0 + \beta_1 \Delta Ln EG_{t(t-i)} + \beta_2 \Delta Ln REM_{(t-i)} + \beta_3 \Delta Ln FDI_{(t-i)} + \beta_4 \Delta ODA_{(t-i)} + \beta_5 Ln Trade_{(t-i)} + \lambda ECM_{t-1} + \varepsilon_t$$

Where:

$$ECM_{t-1} = Ln EG_{t(t-1)} - \alpha_0 - \alpha_1 Ln REM_{(t-1)} - \alpha_2 Ln FDI_{(t-1)} - \alpha_3 ODA_{(t-1)} - \alpha_4 Ln Trade_{(t-1)} - \alpha_4 Ln Trade_{(t-$$

Here the "short-run dynamics" of the variables in the "ECM" are represented by the series in differences while the long-run relations of the variables in levels.

The "speed of adjustment coefficient" λ ', which is expected to be negative, represents the amount of "correction" of the period (t-1) disequilibrium that happens in period t. This test is applied when all variables are appeared to be purely integrated at the first difference. Also, the Granger causality test is conducted between GDP and remittances (Granger, 1981; Brooks, 2008). Finally, the diagnostic Tests of the Model is conducted to ensure that the model is stable and adequately passes the econometric pathology for residual serial correlation, "Lagrange Multiplier test," normality of residuals; "normality test Jarque-Bera," and "heteroscedasticity" test, and this is shown by the *p*-value.

4.2 Data sources and empirical results

4.2.1 Data sources. The data for the variables of interest are collected from various sources. Data about total exports and total imports are gathered from the Central Agency for Public Mobilization and Statistics. Data about GDP per capita, annual inflation rate and net international development aids are obtained from "World Development Indicators" database. Additionally, FDI inflows are obtained from general authority for investment and free zones. Finally, data series about workers 'remittance inflows are obtained from "Migration and Remittances Fact-book."

4.3 Stationarity analysis

Prior to testing of cointegration, a "unit root" test for each variable is conducted using "Augmented Dickey-Fuller" test. The stationarity test results shown by Table 1 reveal that all the variables are non-stationary at levels, while they are all stationary at the "first difference." Thereby, Johansen Co-integration test is conducted to check the long-run relationship.

4.4 Analysis of the results

4.4.1 Johansen co-integration test. The test results, as shown in Table 2, assert that there is a long-run relation between variables according to the values of "Trace statistics" and "Max-Eigen statistics" introduced by Johansen (1988, 1992) and Johansen and Juselius (1988), which test the null hypothesis that "the number of co-integrated variables are less than/or equal *r*" co-integrating vectors." Hence the hypothesis of existing at least one co-integrated vector between the variables can't be rejected.

The "trace" test statistics indicates "one co-integration" equation at a 5% significance level. Therefore, Co-integration indicates that there is a "linear combination" of non-stationarity variables that are stationarity and that they have to be included in VECM.

Economic growth in Egypt		0 <u>0000</u>	Co-integration degree (at first difference)	
163			Co-integration degree (at level)	
		$\begin{array}{c} 0.03\\ 0.000\\ 0.000\\ 0.015\end{array}$	At first difference	lbility*
		$\begin{array}{c} 0.74 \\ 0.64 \\ 0.12 \\ 0.16 \\ 0.57 \end{array}$	At level	Proba
		-1.95 -1.95 -1.95 -1.95 -1.95	level At first difference	
		-2.9 -2.9 -2.9 -2.9	(5%) At level	l value
		- 2.6 - 2.6 - 2.6 - 2.6 - 2.6) level At first difference	Critical
	ulues	– – 3.6 – 3.6 – 3.6 – 3.6	(1%) At level	
	one-sided <i>p</i> -ve	-2.16 -5.0 -4.5 -2.4	ttistic) At first difference	
	innon (1996)	-0.9 -1.3 -2.5 -1.3	(t- sta At level	
Table 1.Augmented Dickey–Fuller unit root testresults	Note: *MacK	Ln EGt En REMt En FDIt En ODAt En Tradet	Variables	

REPS 7,3	Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	0.05 Critical value	Prob.**	Max-Eigen statistics	0.05 Critical Value	Prob.**	Result
164	None $*(r = 0)$ At most $1(r \le 1)$ At most $2(r \le 2)$ At most $3(r \le 3)$	0.690764 0.438220 0.185426 0.157089	76.57588 34.32446 13.56524 6.182014	69.81889 47.85613 29.79707 15.49471	0.0131 0.4842 0.8641 0.6740	42.25142 20.75922 7.383223 6.152160	33.87687 27.58434 21.13162 14.26460	0.0040 0.2910 0.9373 0.5938	Reject H0 Accept H0 Accept H0 Accept H0
Table 2. Johansen co-integration test	At most $4(r \le 4)$ Notes: Trace te rejection of the hy	0.000829 st and Max- pothesis at t	0.029853 eigenvalue he 0.05 leve	3.841466 test indicat l; **MacKir	0.8628 es 1 coir non-Haug	0.029853 ntegrating eq g-Michelis (19	3.841466 jn(s) at the 999) <i>p</i> -value	0.8628 0.05 leve s	Accept H0 el; *denotes

4.4.2 Vector error correction model. Variables can either have short or long-run effects. This study utilizes a vector error correction model (VECM) to disaggregate these effects.

Before discussing the short-run and long-run results of the VECM, The diagnostic tests are used to make sure of the reliability of the model. The results of diagnostic tests indicate that the "VECM" sufficiently passes the econometric pathology for residual serial correlation using "Lagrange Multiplier" test, normality of residuals through "normality Jarque-Bera" test and for homoscedasticity when using the "VEC Residual Heteroskedasticity" test. This is indicated by the "*p*-value" given within the square brackets. The result of the diagnostic test of the model is given in Table 3. Additionally, the stability test of the VECM model is checked by the inverse roots of the characteristic auto-regression polynomial graph as indicated by Figure 3. According to Lutkepohl (1991), the estimated model is stationarity as all roots have modulus less than one and lie inside the unit circle.

4.4.2.1 Long-term results. The estimated long-term relationship between variables are shown in Table 4 [3] (Table 5).

These results reveal that the estimated long-term impact of a 1% increase in annual workers' remittances as a percentage of growth in per capita GDP is approximately [-] 0.24%, which means that an increase in remittances causes a decline in GDP per capita growth. This negative impact is consistent with the result in Chami *et al.* (2005), who found that remittances do not serve as a source of economic growth and is therefore negatively correlated with GDP growth, implying that the money emigrants send back home can be classified as "compensatory transfers" that provide support to poor families during periods of financial difficulties, but are not profit-driven capital flows. For instance, many workers lost their jobs, especially in tourism and other strategic sectors during the economic slowdown in 1991–1992, which was associated with the implementation of Egypt's

	Test	Null hypothesis	
	Jarque-Bera (JB)	There is a normal distribution	Jarque-Bera: 5.319 Prob. 0.86
	Serial Correlation LM Tests	No serial correlation	LM st: 21.8
Table 3. Diagnostic tests ofthe error correction	White (CH-sq)	No conditional heteroskedasticity	Prob. 0.64 Chi-sq: 486.04 Prob. 0.4146
model	Source: Computed by using E-Vie	ews packages	



Note:	***Significant	at	1	%
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Lag	LogL	LR	FPE	AIC	SC	HQ
0	-96.04598	NA	0.000262	5.943881	6.168346	6.020430
1	70.19552 95.46177	273.8095* 34 18375	6.59e-08 7.18e-08	-2.364442 -2.380104	-1.017654^{*}	-1.905149 -1.538066
3	117.1030	22.91424	1.16e-07	-2.182529	1.408907	-0.957746
4	165.9692	37.36830	5.37e-08*	-3.586426*	1.127335	-1.978898*
Note: ³	*Indicates lag ord	ler selected by th	e criterion			

Economic Reform and Structural Adjustment Program, followed by a period of privatization policy adoption. The same happened after the 2009 financial crisis, and in the period that followed the 2011 revolution. During these times of economic difficulties, remittances served as compensatory transfers. As Wahba (2007) observes, a majority of these remittances are spent on housing and consumption expenditures, rather than on productive investments; therefore, they do not benefit the country's economic progress as a whole.

Similar to the results in Eltahir (2013), the findings here reveal a positive effect of trade openness on economic growth. Moreover, these results reveal a significant positive effect of FDI inflows on economic growth, consistent with the result in Wang and Swain (1997), Chang (2007) and Maningi and Martin (2018)). The results also match those of Burnside and Dollar (2000) who show that official development aid has a positive impact on growth [4].

4.4.2.2 Short-term results. Table 6 presents the results of the "short-run dynamics," where the estimated coefficients of the model show the immediate and lagged impacts of remittances $\Lambda(Ln \text{ REM})$, FDI $\Lambda(Ln \text{ FDI})$, official development assistance, $\Lambda(Ln \text{ ODA})$ and imports, $\Delta(\text{Ln M})$, on the growth of GDP per capita $\Delta(\text{Ln EG})$.

The estimates of short-term effects estimates from the first model indicate that the temporary impact of the previous two periods of remittances on GDP per capita is insignificant, while the effect of third lag GDP/capita is negative and significant.

Similarly, both one- and three- period lagged ODA have a significant negative impact on GDP per capita, while the impact of two periods lagged ODA is insignificant.

Therefore, the short-term effect of remittances, FDI and trade openness appear to be largely insignificant in terms of their impact on GDP per capita in Egypt over the period studied.

Lastly, the speed of adjustment coefficient in the model ($\lambda = -0.91$) is significant, asserting the existence of a long-term relationship between variables in the model. This estimated value represents the speed of adjustment of short-term GDP per capita toward its long-run (average) equilibrium level, which means that approximately 91% of the previous deviation of the previous period's GDP per capita, (y_{t-1}) , from its equilibrium value will be corrected in the current period (because the sign of λ is negative). Thus, it takes approximately 13 months for GDP per capita to return to its "equilibrium" level.

4.4.3 Granger – causality. In this section we test for causality between remittances and GDP. As there is co-integration among the variables of concern (remittances and real GDP) as indicated in Table 7, we run a pairwise "Granger-causality" test [5]. Based on the results, we conclude there is bidirectional causality from GDP to remittances; such causality indicates that growth in remittance inflows is derived from economic conditions in the recipient economy and can be either countercyclical or procyclical [6]. There is also causality

	Error Correction	Coefficient	S.E	<i>t</i> -statistics
Table 6. Short-run relationship of the variables estimated	CointEq1 (D(LNEG) D(LNEG(-1)) D(LNEG(-2)) D(LNEG(-3)) D(LNREM(-1)) D(LNREM(-2)) D(LNREM(-2)) D(LNFDI(-1)) D(LNFDI(-2)) D(LNFDI(-2)) D(LNODA(-2)) D(LNODA(-2)) D(LNODA(-2)) D(LNTRADE(-1)) D(LNTRADE(-2)) D(LNTRADE(-3)) C	$\begin{array}{c} -0.123345\\ 0.134107\\ 0.177314\\ -0.370490\\ 0.013711\\ -0.004012\\ -0.001898\\ -0.001567\\ 0.000973\\ 0.004420\\ -0.013196\\ -0.006088\\ -0.012548\\ -0.012548\\ -0.016755\\ 0.010409\\ -0.000305\\ 0.026166\end{array}$	$\begin{array}{c} 0.03414\\ 0.17581\\ 0.18278\\ 0.16800\\ 0.01283\\ 0.01314\\ 0.01230\\ 0.00459\\ 0.00459\\ 0.00425\\ 0.00349\\ 0.00555\\ 0.00655\\ 0.00655\\ 0.00632\\ 0.02234\\ 0.02234\\ 0.02234\\ 0.02113\\ 0.02455\\ 0.00606\end{array}$	$\begin{array}{r} -3.61265^{**}\\ 0.76280\\ 0.97012\\ -2.20533^{**}\\ 1.06870\\ -0.30521\\ -0.15440\\ -0.34166\\ 0.22903\\ 1.26559\\ -2.26015^{**}\\ -0.92928\\ -1.98525^{**}\\ -0.74991\\ 0.49264\\ -0.01241\\ 4.31963^{***}\end{array}$
using vicelvi	Notes: "Significance at 10"	%, ***Significance at 5%, ***Sign	iiiicaiit at 170	

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Economic that runs from remittances to real GDP, which implies a potential impact of remittances on economic growth, and that the causal relationship can be positive (if remittances are directed growth in toward investment projects) or negative (if remittances are directed toward imports of consumption goods). This is one possible explanation of the negative impact of remittances on the Egyptian economy.

In an attempt to find a possible economic explanation for the negative long-term effect of remittances on GDP per capita, we examine a Granger causality test [7] (Table 8) where new variables are introduced in addition to the main variables; these include the inflation rate (Inflation) and imports (LnM) [8]. The results of the "pairwise Granger-causality" test as shown in Table 9. reveal that:

A unidirectional Granger causality runs from remittances to imports. •

- A unidirectional Granger causality runs from remittances to inflation.
- A unidirectional Granger causality runs from the inflation rate to imports. ٠

LNREM does not Granger Cause LNREM LNREM does not Granger Cause LNREM LNREM does not Granger Cause LNREM LNREM does not Granger Cause LNREM	36 36	4.00898 1.14636 4.19523 1.13539	0.0033 0.0283 0.3309 0.0244 0.3343	Pairwise Granger causality results between remittances, inflation and imports
LM does not Granger Cause INFLATION	36	1.41616	0.2579	Table 0
Null Hypothesis	Obs	F-statistic	Prob.	
Cointegration Test – Engle-Granger Specification: LNREM inflaion lnimports C Cointegrating equation deterministics: C Null hypothesis: Series are not cointegrated Automatic lag specification (lag = 0 based on Schwar Engle–Granger tau-statistic Engle–Granger z-statistic Note: *MacKinnon (1996) <i>p</i> -values	rz Info Criterion, 1 	naxlag = 8) Value 1.886675 6.989778	Prob.* 0.7826 0.7684	Table 8. Cointegration test for the variables (remittances, inflation, imports)
Note: *MacKinnon (1996) p-values				GDP)
Engle-Granger tau-statistic Engle-Granger z-statistic		Value 1.566319 1.69075	Prob.* 0.7378 0.2162	Co-integration test for the variables (remittances, real
Cointegration Test – Engle–Granger Equation: UNTITLED Specification: REM RGDP C Cointegrating equation deterministics: C Null hypothesis: Series are not cointegrated Automatic lag specification (lag = 1 based on Schwar	rz Info Criterion n	naxlag = 9)		Table 7.

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These three Granger causality results assert a negative impact of remittances on growth because remittances are countercyclical, as shown in many studies such as Böhnin (1975), Rempel and Lobdell (1978), Oberoi and Singh (1980), and Stahl and Arnold (1986). In the case of Egypt, for example, an increase in remittances can have an adverse effect on economic growth if the increase motivates either unproductive spending or an increase in imported consumption goods, due to the imitation effect. If this effect expands, it can reduce savings and investment, hence decreasing the growth rate of the recipient economy. Therefore, and in accordance with El-Sakka and McNabb (1999), remittances may have a low multiplier impact on growth when used to finance imports, and may consequently result in a high income elasticity of demand (Table 10).

Additionally, this negative impact of remittances on economic growth is reinforced by the fact that they may lead to inflation. The Granger causality test reveals a unidirectional causality running from remittances to inflation and from inflation to imports.

In summary, remittance inflows have not been able to stimulate economic growth and therefore have not led to development in the Egyptian economy for a number of reasons, including the remittances' potential impact on inflation generated by a remittance-induced increase in demand and an unresponsive domestic supply [9]. A steady increase in remittances results in widening the monetary base in the economy and hence increases household demand, which in turn increases pressure on the prices of non-tradable goods. The subsequent increase in the general price level can cancel the positive impacts of remittances on growth and widens the gap between sending and receiving countries since the receiving countries suffer losses in the form of inflation and in rising imports, and the sending countries may reap most or all of the benefits. The results of this study are similar to results in the existing literature, such as Stahl (1982), Feiler (1987), Looney (1989), Adams (1991), Wahba (2007), Glytsos (2002), World Bank Group (2006), Jahjah *et al.* (2003), Chami *et al.* (2005), Barajas *et al.* (2009), Gjini (2013), Datta (2014) and Datta and Sarkar (2014).

In Egypt, migrants' remittances have fueled inflation leading to higher imports. Those who receive remittances can become highly dependent on the "easy money," which many encourage them to reduce their work efforts or participation in the labor market. Such attitudes reflect a "moral hazard" problem that can negatively affect growth rates. Furthermore, consistent with findings in Chami *et al.* (2005) and the IOM's survey (International Organization for Migration, 2010), a significant share of remittances in Egypt is spent on everyday expenses and thus do not act as factor in the country's capital. The results are reinforced by the "one- way" causality that runs from remittances to import growth, as increased remittances raises household incomes that motivates imports of consumer goods, thereby decelerating growth in the local economy. These results run counter to the widely held views that remittances stimulate growth rates (see, for example, León-Ledesma and Piracha, 2004; Mundaca, 2009; and Bugamelli and Paternò, 2009).

Indeed, Egypt's inability to use remittances to contribute to economic growth results in the "Dutch disease" phenomenon, in which the increase in individuals' income resulting from migrants' remittances boosts consumption of non-tradable commodities, especially

	Null Hypothesis	Obs	F-statistic	Prob.
Table 10.Pairwise Grangercausality resultsbetween remittancesand real GDP	REM does not Granger Cause RGDP RGDP does not Granger Cause REM	36	2.89841 5.79816	0.0702 0.0073
	Note: The variables tested are on their secon Source: Computed by using E-views packag	d difference (dd) res		

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in the real estate sector, which increases inflation. Moreover, the positive effect that remittances have on the recipient's income may allow those individuals in the home country to decrease their own work efforts, causing a decline in labor supply and productivity.

4.4.4 Impulse response functions (IRFs). The "IRFs" show the shock effects on the "adjustment path" of the model variables. This helps show the size of the impact of the shock plus the rate at which the shock papens (Hill *et al.*, 2011, pp. 505–507).

Figure 4 shows that, following an impulse in remittances, GDP per capita does not show any response in the first and the second period then it declines slightly in the third period. Again, GDP per capita does not show any noticeable response upon innovation in remittances in the fourth period, then shows a gradual decline in the fifth and sixth periods. After that, the response rises until the tenth period. Thereby it can be concluded that shocks

Response to Cholesky One S.D. Innovations Response of LNEG to LNEG Response of LNEG to LNREM 0.04 0.04 0.03 0.03 0.02 0.02 0.01 0.01 0.00 0.00 -0.01 -0.01 10 1 2 8 9 10 2 3 8 9 3 4 5 6 4 5 6 Response of LNEG to LNFDI Response of LNEG to LNODA 0.04 0.04 0.03 0.03 0.02 0.02 0.01 0.01 0.00 0.00 -0.01 -0.01 2 3 8 9 10 8 9 10 Response of LNEG to LNTRADE 0.04 0.03 0.02 0.01 0.00 -0.01 2 3 5 9 10 6 8

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Figure 4. Impulse response REPS
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 to remittances will have a negative impact on GDP per capita on the short run and long run
as indicated by accumulated IRFS (Figure 5).
Following a one standard deviation shock in official development aid, GDP per capita
starts to rise in the second and third periods. Then, the response declines sharply till the
ninth period and is followed by non- noticeable response in GDP per capita to innovation in
remittances in the tenth period. Thereby it can be inferred from the accumulated response
that shocks to remittances on will have a positive impact on GDP per capita as the response
is in the positive region in most of the periods.
Following an innovation in trade openness, GDP per capita does not show any response

Following an innovation in trade openness, GDP per capita does not show any response in the first period but shows a sharp rise until the seventh period and is followed by a gradual rise from the eighth period until the tenth period. Thereby, it can be concluded that shocks to trade openness will have a positive impact.



6 7 8 9 10

0.10

0.00

-0.05

2 3

Accumulated Response to Cholesky One S.D. Innovations

Figure 5. Accumulated impulse response

Following an impulse in FDI, GDP per capita does not show any response for the first period; it starts to rise sharply until the fourth period. After that, there is no response in GDP per capita to an impulse in FDI in the fifth period. Next, GDP per capita rises gradually in the following innovation in FDI until the eighth period. Again, GDP per capita does not show any response in the ninth period, and it then rises slightly in the tenth period. The accumulated response function concludes a positive impact of FDI on GDP per capita.

5. Conclusion and recommended policies

Remittances are one of the positive spillover effects of the migration process, and at least partly compensate for the loss of skilled labor in developing countries. Migrants' remittances are among the main source of foreign exchange for many developing economies, and their value has increased in importance for several decades. As a source of capital, migrants' remittances can directly increase economic development, and remittance-based consumption can enhance economic growth by indirectly raising employment levels and output. While policymakers increasingly recognize the potential effects of remittances on economic growth, the net growth impact of those remittances is still controversial.

Egypt is among the top remittance recipient countries in the world and is the leading country in the Middle East region. Thereby, it is worthy to examine the influence of remittances in enhancing economic growth and as a source of international capital flows, along with FDI and ODA, over a long period.

This study examined the impact of remittance inflows on the economic growth of Egypt on time series data from 1980 to 2017 using the Johansen co-integration technique and VECM. Additionally, Granger causality test was used to explore the causal relationship between GDP and remittances to identify whether remittances are procyclical or countercyclical. To clarify the results, another test was conducted to show the causal relationships between remittances, imports and the inflation rate. The main result is the significant negative effect of remittances on GDP per capita growth, as a large proportion of these inflows stimulate consumption by family members rather than investment in the economy. This negative effect on growth is supported by the Granger causality tests that reveals causal relationships running from remittances to imports and from remittances to inflation.

We conclude that Egypt can learn important lessons from the experiences of other countries that have succeeded in encouraging their migrants to send remittances to be invested in productive projects. Policymakers in the Egyptian Government should develop guidelines concerning appropriate policies and procedures to promote the use of remittances for investment in the local economy. These guidelines should be based on realistic objectives, tools and time frames that could help to overcome the obstacles that Egyptian families face when they consider the possibility of investing in Egypt. Enhancing the positive effect of remittances on economic growth will require adopting effective policies that may include the following:

- encouraging social financial institutions and credit unions to attract, channel and administer remittances by providing attractive credit opportunities;
- reducing transaction costs associated with remittances, improving the technology used in money transfers and the diffusion of information regarding the types of transfer channels available, as well as establishing voluntary codes of conduct for fair transfers;

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REPS 7,3	 developing remittance-related products (i.e. savings and insurance products that contribute to social safeguard for households); and improving migrants' access to financial services in their home countries as well as in their sending countries by providing ID cards for migrants and allowing domestic banks to operate overseas.
172	Furthermore, incentives should be given to attract migrant remittances (e.g. tax exemption) if remittances are directed into strategic sectors that have the potential for productive investment in the home countries. This would help to generate employment and stimulate economic growth.

Notes

- 1. The decision to float the Egyptian pound was intended to attract foreign inflows and to smother the black market for the US dollar, encouraging people to use their hard currency through the banking system.
- 2. This opinion was true until the international financial crisis of 2008/2009 that resulted in a notable but temporary drop in the overall value of remittances, especially in developing economies, after decades of robust progress. This was because the crisis simultaneously hit many sending and receiving countries. It also had an uneven effect on sectors that included many migrants' traditional jobs in sectors such as construction and travel (Ratha *et al.*, 2008, p. 1).
- 3. To find the optimal lag length (in this case, three), a vector auto-regression analysis is first run on levels; the appropriate lag length is then chosen according to the Akaike Information Criteria (a four-lag period as indicated in Table 5). This lag length minus one is used in the VECM as we lose one degree of freedom for differencing.
- 4. In fact, foreign aid acts as a form of income that is transferred from developed to developing countries; its capability to generate growth depends on how it is assigned and invested.
- 5. To obtain real GDP, data about nominal GDP is collected from government sources, which is then deflated using the wholesale price index (base year = 2010).
- 6. Countercyclical remittances serve as a compensatory transfer during difficult economic times in the home country, thereby working as a shock absorber (Gupta, 2005; Singh *et al.*, 2010; Laniran and Adeniyi, 2015, pp. 3-4). On the other side, procyclical remittances are those that increase under favorable economic conditions in the migrant's home country (Laniran, and Adeniyi, 2015, p. 4).
- 7. The pairwise Granger causality test is conducted after running the co-integration test between remittances, inflation and imports to ensure the long-run relationship between them. This is shown in Table 8 in the Appendix.
- 8. Imports variable is measured as imports as a percentage of GDP.
- 9. Inflation could rise to call off the positive effect of migrants' remittances on economic growth broadening the gap among sending and recipient countries; as the latter bear losses in the form of inflation and uprising imports, whereas the former reap all the benefits.

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