Trade Openness and Economic Growth: Empirical Evidence from Egypt

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Abstract

This paper investigates the impact of trade openness on economic growth in Egypt. It adopts an Autoregressive Distributed Lag (ARDL) model to identify the short run and long run effects of trade openness on economic growth in Egypt during 1982-2020, while using the composite trade share (CTS) introduced by Squalli and Wilson (2011) as a measure of trade openness. The results show that trade openness contributes positively to economic growth in Egypt both in the short run and long run. Long-run results imply that employment, physical capital, and financial development also affect economic growth positively, whereas government size is negatively related to economic growth. Moreover, short-run results are largely consistent with those of the long run, except for physical capital and government size. Accordingly, there some policy recommendations that are related to trade policy such as reducing average tariff rate in some activities, as well as reducing tariff-induced export bias and tariff dispersion. In addition, some complementary reforms are required to increase the benefits of Egypt from trade openness including adopting a flexible exchange rate regime, moving towards increasing the contribution of high-value added and high-tech exports in total exports, ensuring the compliance of Egyptian exports with

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quality and safety standards, increasing the benefits from bilateral and regional trade agreements, improving technical and vocational education and training, as well as providing trade-enhancing laws and procedures.

Keywords:

Trade Openness, Economic Growth, Egypt, Composite Trade Share, Autoregressive Distributed Lag Model

الانفتاح التجاري والنمو الاقتصادي: أدلة تجريبية من مصر

الملخص

تبحث هذه الورقة في تأثير الانفتاح التجاري على النمو الاقتصادي في مصر خلال الفترة ما بين 1982–2020 باستخدام نموذج الانحدار الذاتي للفجوات الزمنية الموزعة، مع الاعتماد على نصيب التجارة المركب (Composite Trade Share) الذي اقترحه Squalli and Wilson (2011) كمقياس للانفتاح التجاري. وقد أظهرت نتائج النموذج الإحصائي أن الانفتاح التجاري يسهم بشكل إيجابي في النمو الاقتصادي في مصر في كل من الأجلين القصير والطويل. كما أشارت النتائج إلى أن كلا من التوظيف، ورأس المال المادي، والتطور المالي يسهم أيضا بشكل إيجابي في النمو الاقتصادي في الأجل الطويل، وذلك على عكس حجم الحكومة الذي يسهم بشكل سلبي في النمو الاقتصادي في الأجل الطويل. وبالنسبة للنتائج في الأجل القصير، فإنها لم تختلف عن نظيرتها في الأجل الطويل باستثناء رأس المال المادي وحجم الحكومة. وبناء على تلك النتائج، فإن هناك مجموعة من المقترحات فيما يتعلق بالسياسة التجارية التي من شأنها زيادة مكاسب مصر من الانفتاح التجاري مثل تخفيض متوسط التعريفات الجمركية في بعض الأنشطة، بالإضافة إلى تخفيض التحيز ضد الصادرات الناتج عن التعريفات الجمركية وتقليل معدل التشتت في التعريفات الجمركية. وهناك أيضا مجموعة من الإصلاحات المكملة للسياسة التجارية مثل الاعتماد على نظام سعر صرف مرن، والعمل على زيادة مساهمة الصادرات ذات القيمة المضافة العالية والمكون التكنولوجي العالي في

إجمالي الصادرات، والتأكد من مراعاة الصادرات المصرية لمعايير الجودة والأمان ، وتعزيز الاستفادة من الاتفاقيات النجارية الثنائية والإقليمية، وتحسين التعليم والتدريب الفني والمهني، بالإضافة إلى توفير القوانين والإجراءات الميسرة للتجارة.

الكلمات المفتاحية:

الانفتاح التجاري، النمو الاقتصادي، مصر، نصيب التجارة المركب،
نموذج الانحدار الذاتي للفجوات الزمنية الموزعة

1. Introduction

The impact of trade openness on economic growth has been extensively studied both theoretically and empirically. On the theoretical grounds, economic theory has largely accepted that trade openness contributes positively to economic growth through different channels including technology transfer and R&D spillovers, physical capital accumulation, and increased efficiency (Dao, 2015). On the empirical grounds, empirical literature did not reach a clear-cut result on the relationship between trade openness and economic growth, though most studies reported a positive impact and fewer studies argued for a negative impact or even no impact for trade openness on economic growth (Tahir and Norulazidah, 2014).

Given that the results of empirical studies differ largely depending on the way in which trade openness is measured and the adopted econometric estimation technique, this paper investigates the effect of trade openness on economic growth in Egypt, while using the composite trade share (CTS) introduced by Squalli and Wilson (2011) as a measure of trade openness instead of adopting trade share (TS), and its related measures as it was the case in most studies. The main advantage of CTS over TS as proposed by Squalli and Wilson (2011) is that CTS considers the two dimensions of trade openness which are the proportion of a country's trade relative to its total income and the relative contribution of a country's trade to world trade, whereas TS focuses only on the first dimension. Furthermore, this paper adopts the autoregressive distributed lag (ARDL) cointegration approach to identify the short run as well as the long run effects of trade openness on economic growth in Egypt during 1982-2020.

In this way, this paper is trying to answer an important research question which is: what is the relationship between trade openness and economic growth in Egypt. In its attempt to answer this research question, the paper contributes to the existing literature by focusing on the Egyptian case given the limited number of studies that adopted time series data for studying this issue in Egypt. Meanwhile, the novelty of this paper stems mainly from measuring trade openness using the CTS rather than using traditional TS and its related measures of trade openness.

However, this paper has some limitations. Among these limitations is that the covered time period starts from 1982 since the data for gross fixed capital accumulation in constant 2015 US$, which is used as a proxy for physical capital, were not available for Egypt before 1982 in the World Bank World Development Indicators (WDI) database. In addition, the calculations of CTS were limited by the availability of trade data for a set of 92 countries during 1982-2020 based on WDI database.

The rest of the paper is organized as follows: the next section reviews the theoretical and empirical literature on the relationship between trade openness and economic growth. Section three analyzes the evolution of Egypt's trade policy and openness indicators since the 1980s. Section four focuses on the adopted methodology while illustrating the model variables, data sources, measurement of trade openness, and the econometric estimation technique. Section five demonstrates and analyzes the main results of econometric estimation, and finally section six concludes and provides some policy recommendations.

2. Literature Review

Literature review starts with an analysis of the relationship between trade openness and economic growth in theory, followed by a review of the empirical studies in that regard.

2.1 Theoretical Background

The importance of trade openness and its gains have been among the main studied topics in economic literature since the emergence of the Classical trade theory introduced by Adam Smith in the late 18th century, and then developed by David Ricardo and John Stuart Mill in the 19th century. The Classical trade theory followed the Mercantilist doctrine which was giving an important role for the government in protecting trade using high trade barriers to increase the country's inflow of precious metals.

Conversely, Adam Smith argued for free trade after being inspired by the rise of industrial activity and free economy in Britain following the Industrial revolution that has taken place in the mid-18th century. According to Smith, free trade allows countries to specialize in their absolute advantage goods that are produced with the least cost, and then achieve gains from trade by exchanging these goods with those in which they have an absolute disadvantage. Such basis for trade was then developed by David Ricardo who believed in comparative advantage as a basis for specialization and trade, claiming that all countries engaging in trade will gain by exporting the goods produced with the least opportunity cost. Thus, countries will gain from trade by diverting their resources to the relatively efficient sectors, which in turn, will improve the well-being of their population (Hassen et al., 2013).

In the early 20th century, Eli Heckscher and Bertil Ohlin separately introduced their trade theory then known as H-O

model. Heckscher and Ohlin show that trade takes place mainly due to the differences in resource endowments between countries and resource intensity between goods. H-O model explains the gains from trade by the specialization of each country in its comparative advantage good; that is, the good that requires in its production more units from the resource that this country is relatively more endowed with, giving an opportunity for trade to take place between countries with largely similar technologies and tastes (Lam, 2015).

Nevertheless, the review of the Classical as well as H-O trade theories shows that both theories have focused on the static gains from trade that accrue to different countries as a result of the efficient allocation of their existing resources after trade. Thus, both theories have ignored the dynamic gains from trade that result from the accumulation of resources after engaging in trade. In this regard, the new trade theories started to identify the gains from trade that are caused mainly by imperfect competition and economies of scale even when countries have identical tastes, technologies, and resource endowments as suggested by Krugman (1979) and Ethier (1982).

Meanwhile, the theoretical analysis of the relationship between trade openness and economic growth has been largely influenced by the evolution of the growth theory, particularly the emergence of the endogenous growth theory in the late 1980s after the dominance of the neoclassical growth theory since the mid-1950s. An important distinction between neoclassical and endogenous growth theories is the source of long-run growth. On the one hand, long-run growth is exogenous according to the neoclassical growth theory that is based on Solow growth model, as it depends on technological change which is considered by Solow model as ‘Manna from

Heaven' not explained in the economic model (Solow, 1957). On the other hand, the main contribution of the endogenous growth theory is that it explains long-run growth by different economic factors, arguing that even technological change can be explained in the economic model (Dao, 2015).

Among these endogenous sources of economic growth is trade openness, which was then incorporated in the endogenous growth models to identify the different channels through which trade openness can enhance productivity and efficiency, and hence, contribute positively to economic growth. One of the main channels through which trade openness affects economic growth positively is that trade allows for technology transfer and R&D spillovers. In this context, Grossman and Helpman (1991) find that trade openness results in knowledge spillovers for local producers through their contact with their foreign counterparts as well as increased incentives for R&D investment resulting from engaging in trade. Similarly, Coe and Helpman (1993) argue using an endogenous growth model that trade openness results in productivity growth through international R&D spillovers accruing to a country from its trading partners through imports of intermediate and capital goods.

Another channel through which trade openness promotes economic growth is its impact on physical capital accumulation. In this sense, Levine and Renelt (1992) find a positive and robust correlation between investment in physical capital accumulation and trade openness. Alternatively, Melitz (2003) shows using a dynamic industry model that trade openness causes intra-industry reallocations across firms, as the most efficient firms will only be able to compete in the export markets, whereas the less productive ones will produce only for

the domestic market, and the least productive ones will be forced to leave the market. In this way, trade openness will increase efficiency at the industry level, which in turn, will result in aggregate productivity gains and economic growth.

2.2 Empirical Evidence

The empirical evidence on the relationship between trade openness and economic growth has evolved since the early 1990s after the emergence of the endogenous growth theory. In the 1990s, most empirical studies in that regard were cross-country studies that accounted for trade openness using different measures. Some studies used direct trade policy measures such as tariff and non-tariff measures to proxy for trade openness, while other studies adopted indirect measures of trade openness such as trade share (TS) which is trade (sum of exports and imports) as a % of GDP, as well as its related measures including exports or imports as a % of GDP. Some other studies constructed an index of openness that includes different proxies for trade openness. However, most of these studies undertaken in the 1990s reported a positive impact for trade openness on economic growth.

For instance, Dollar (1992) finds using two separate constructed indices for openness, which are real exchange-rate distortion and variability indices, that open countries grow more than relatively closed countries in a set of 95 developing countries during 1976-1985. Sachs and Warner (1995) also report a positive relationship between trade openness and economic growth for a set of developing and developed countries during 1970-1989, while adopting a constructed index of openness based on the average tariff rate, the quota coverage, the exchange rate black-market premium, economic system, and state monopoly of major exports. In an attempt to take account

of the endogeneity problem related to trade share measure of openness, Frankel and Romer (1999) use countries' geographic characteristics as instrumental variables in estimating the effect of trade openness on economic growth. The results of such instrumental variable estimates confirm the positive relationship between trade openness and economic growth, and that the causality of this relationship runs from trade openness to economic growth. Nevertheless, the early 2000s witnessed the emergence of some studies that put doubts on the positive impact of trade openness on economic growth. Among these studies was Rodriguez and Rodrick (2000).

Rodriguez and Rodrick (2000) argue that such positive impact reported by the studies of the 1990s arises either from inappropriate measures of trade openness adopted in these studies or econometric misspecification. In this context, Rodriguez and Rodrick criticize the use of some indices such as real exchange-rate distortion, real exchange-rate variability, exchange rate black-market premium, and state monopoly of major exports since these indices are correlated to the exchange rate and monetary policies instead of being largely correlated to trade policy. Moreover, Rodriguez and Rodrick criticize the econometric methodology used by some studies. For example, they claim that the results of the instrumental variable estimates reached by Frankel and Romer (1999) might have an upward bias as trade flows might be correlated to countries' geographic characteristics, and they also argue that the nontrade effects of geography are the main reason behind that positive impact on growth that was observed by Frankel and Romer.

This debate on the contribution of trade openness to economic growth continued with some studies still confirming the positive contribution reached by the studies undertaken in the

1990s, whereas some other studies were favoring the conclusion reached by Rodriguez and Rodrick. On the one hand, Baldwin (2003) argues that the key reason for this disagreement on the impact of trade openness is related to how different economists view what does trade openness mean. Baldwin concludes that the criticisms raised by Rodriguez and Rodrick (2000) stems for their focus on policy-induced trade barriers as the relevant proxy for trade openness.

On the other hand, Wacziarg and Welch (2003) find using an updated dataset of openness indicators that the cross-sectional results of Sachs and Warner (1995) does not hold for the 1990s, and hence, these results are sensitive to the time period under consideration. But the within-country regression results reported by Wacziarg and Welch (2003) confirm the positive association between trade openness and economic growth, implying that it is more important to focus on country-level case studies rather than just focusing on cross-country growth regressions that might be very simplified and subject to many measurement and specification errors.

Alternatively, Chang et al. (2005) argue using Generalized Method of Moments (GMM) panel data estimation for a set of 82 countries during 1960-2000 that trade openness proxied by trade share has a positive and significant effect on economic growth if certain complementary reforms are undertaken including those reforms related to educational attainment, financial depth, macroeconomic stability, governance, labor-market flexibility, public infrastructure, and ease of firm entry and exit.

Recently, empirical evidence on the relationship between trade openness and economic growth show much more mixed results that complicate this debate and leaves it open. Although, these

recent studies include panel-data studies, several studies are time-series studies due to the availability of more country-level data in recent years. In addition, such recent studies are characterized by employing more advanced econometric techniques, mainly cointegration tests that differentiate between the short-run and long-run effects of trade openness on economic growth.

Among the recent studies that report a positive effect for trade openness on economic growth are Hye et al. (2016), Keho (2017), Duodu and Baidoo (2020), and Raghutla (2020). For instance, Hye et al. (2016) find a positive effect for trade openness on economic growth in China during 1975-2009 both in the short run and long run using Autoregressive Distributed Lag (ARDL) cointegration approach. Hye et al. (2016) reach this conclusion using different proxies for trade openness including TS and its related measures as well as a constructed index from the previous measures. Meanwhile, Duodu and Baidoo (2020) also reach similar results for Ghana during 1984-2018 using ARDL cointegration approach, while adopting TS as measure of trade openness.

On the other side, some empirical studies conclude that there is a negative impact for trade openness on economic growth. These studies include Polat et al. (2015), Lawal et al. (2016), Udeagha and Ngepah (2021), and Wani (2022). For example, Lawal et al. (2016) claim that trade openness affects economic growth negatively in the long run and positively in the short run in Nigeria during 1981-2013 using ARDL cointegration approach, while adopting trade share as a proxy for trade openness. According to Lawal et al. (2016), the long-run negative effect of trade openness can be explained by Nigeria's dependence on oil exports which are largely volatile in addition

to the composition of imports which are dominated by consumption goods. The same findings were also reached for South Africa during 1960-2016 by Udeagha and Ngepah (2021) which adopts non-linear ARDL cointegration approach. Udeagha and Ngepah uses an innovative measure of trade openness which is the composite trade share (CTS) introduced by Squalli and Wilson (2011) to overcome the limitations of the conventional TS measure of trade openness.

Some studies investigated the impact of trade openness on economic growth in Middle East and North Africa (MENA) countries, while include Egypt among the panel of MENA countries. In this context, Razmi and Refai (2013) report a positive effect for trade openness on economic growth for a panel of 17 Middle East and East Asian countries during 2000-2009 using fixed- and random-effects panel data estimates. Similar results have been reached by Sghaier (2021) for a panel of four MENA countries including Egypt during 1991-2015. Both studies adopted TS as a proxy for trade openness.

Few studies have focused on studying the relationship between trade openness and economic growth using time-series data for Egypt. Among these studies was Negem (2008) which observes that trade openness affects positively economic growth in Egypt during 1970-2006 using Johansen Cointegration test and a Vector Error Correction Model (VECM) and using each of the real volumes of exports and imports. Furthermore, Eltahir (2013) finds that trade openness has an apparent long-run positive effect on economic growth in Egypt during 1970-2012 using Johansen and ARDL cointegration approaches, while adopting exports, imports, and trade volumes as proxies for trade openness. In addition, Yakubu et al. (2021) argues that trade openness has a positive but statistically insignificant

effect on economic growth in Egypt both in the short run and long run during 1977-2018 using ARDL cointegration approach and TS as a proxy for trade openness.

Based on the above review of empirical evidence, this paper contributes to the debate on the relationship between trade openness and economic growth by focusing on the Egyptian case during 1982-2020 using ARDL cointegration approach. This paper differs from other studies on Egypt, since it uses CTS introduced by Squalli and Wilson (2011) as a proxy for trade openness unlike other studies which adopted mainly the conventional TS and its related measures. Meanwhile, this paper includes some control variables such as financial development and government size along with other traditional regressors such as employment and physical capital.

3. Evolution of Egypt's Trade Policy and Openness Indicators

The study of the relationship between trade openness and economic growth in Egypt will start with an analysis of Egypt's trade policy and its reflection on the indicators of trade openness since the 1980s, while identifying the impact of the implemented trade policy measures on Egypt's trade composition.

3.1 Egypt's Trade Policy since the 1980s

During the 1950s and 1960s, Egypt followed a centralized economic system with an inward-oriented import substitution trade strategy that aims at promoting the domestic industry by setting high walls of tariff and non-tariff barriers against imports. Nevertheless, industrial development faced many problems at that time such as the limited capacity to import due to foreign exchange shortages, low labor and capital productivity, poor infrastructure, as well as inefficient

production due to the lack of competition from imports (Eltahir, 2013).

By the year 1974, the government of Egypt (GoE) initiated the Open-Door policy with more efforts to encourage both domestic and foreign investment, increase the role of the private sector, and liberalize trade through the elimination of state monopoly on importing in the transition towards a market-oriented economy (Negem, 2008). Despite these efforts exerted since the mid-1970s, external trade has been facing several challenges including overvalued Egyptian pound, multiple exchange rates, high tariff and non-tariff barriers, poor infrastructure, and bureaucracy. Moreover, the Egyptian economy faced major macroeconomic imbalances mainly the rising external debt and trade deficit in the second half of the 1970s as a result of the rapid increase in imports that largely exceeded the increase in exports (Abo-Stait, 2005).

In view of such rising external debt, the GoE organized the 1982 economic conference and announced its first 5-year plan with the aim of increasing domestic savings and reducing domestic resources gap (Smith and Kulkarni, 2010). Along with these efforts aiming at facing macroeconomic imbalances, some trade policy measures were taken in 1986 to liberalize trade. These measures included issuing the customs exemption law, reducing the maximum tariff rate that reached 110% in 1986, eliminating several taxes and fees imposed on imports, and reducing the adoption of non-tariff barriers such as import bans (Refaat, 1999).

Since the policies adopted by the GoE in the 1980s failed in reducing the domestic resources gap and trade deficit, Egypt signed the Economic Reform and Structural Adjustment Program (ERSAP) with the International Monetary Fund (IMF)

in 1991 with the aim of stabilizing and restructuring the Egyptian economy. Stabilization involves reducing the macroeconomic imbalances, whereas restructuring involves the liberalization of trade, exchange rate system, and interest rates while giving a greater role for the private sector in the economy (Eltahir, 2013).

ERSAP has been also associated with trade liberalization measures including the reduction of import tariff rates, the removal of most non-tariff barriers, the reduction of domestic restrictions on pricing and distribution, and improving import inspection and clearance activities by the Customs Administration. Some trade-enhancing reform measures have been also implemented such as the adoption of more liberal investment policies and privatization of some public companies (World Trade Organization, 1999). Furthermore, the exchange rates have been unified in February 1991 after limiting foreign exchange markets to the primary and secondary markets only (Refaat, 1999).

Following the trade reform measures in the 1990s, Egypt has bound 98.7% of its tariffs in 1998 in accordance with its World Trade Organization (WTO) obligations. Table (1) summarizes Egypt's Most Favored Nation (MFN) tariff structure. MFN tariff rates are the tariff rates that countries promise to impose on imports from other members of the WTO, unless the country is part of a preferential trade agreement. In this context, the simple average MFN tariff has been reduced from 42.2% in 1991 to 26.8% in 1998, while the maximum MFN tariff has been reduced from 100% in 1991 to 40% in 1998.

However, such tariff reductions have resulted in more tariff dispersion as measured by coefficient of variation for tariff rates which reached 4.75 in 1998 compared to 4.1 in 1991,

since some sectors that were not subject to tariff reductions such as motor vehicles, textiles, and alcoholic beverages have witnessed tariff peaks. In addition, 99.8% of tariff lines were ad valorem tariffs charged as a percentage of the price and just 0.2% of tariff lines were specific duties charged as fixed amount per quantity. In addition, tariff quotas were not adopted by Egypt as shown in table (1).

Table (1): MFN Tariff Structure

	1998	2005	2012	2019
Duty-free tariff lines (% of all tariff lines)	0.2	5.3	10.7	12.1
Simple average tariff rate (%)	26.8	20	16.5	19
• Agricultural products (WTO Definition) [a]	64.9	66.4	50.4	65.1
• Non-agricultural products (WTO Definition) [b]	20.9	12.8	10.2	11.6
Tariff quotas (% of all tariff lines)	0	0	0	0
Non-ad valorem tariffs (% of all tariff lines)	0.2	0.2	0.3	0.2
Coefficient of variation	4.75	7.4	7.3	7.3

a According to WTO Agreement on Agriculture
b Excludes petroleum

Source: Tariff Profile - Egypt, WTO

Despite these significant trade reform measures that were implemented in the 1990s, tariffs were still applied on some products above WTO bound rates, the Egyptian pound was still overvalued, and there were still some institutional challenges that hindered investment in export sectors. Consequently, the export performance has not largely improved as a result of these reforms (World Trade Organization, 1999).

As a result of the severe economic challenges that faced the Egyptian economy during 1997-2003 due to the liquidity crisis and the lack of foreign exchange, the GoE initiated a reform package that involved major trade policy reforms aiming at adopting an outward-oriented export promotion trade strategy (Kulkarni and Smith, 2010). These trade policy reforms involved reducing import tariff rates, granting tariff exemptions for imports into the free zones, allowing drawback schemes and concessional duties for exporters, reducing non-tariff barriers, allowing the establishment of special economic zones, and issuing the export promotion law. Furthermore, Egypt has started adopting a floating exchange rate regime since January 2003 after a decade of having an overvalued Egyptian pound.

Accordingly, the simple MFN applied tariff rate has fallen to 20% in 2005 compared to 26.8 % in 1998, although the simple average MFN tariff rate applied on agricultural products has increased as demonstrated in table (1). Moreover, the duty-free lines have increased from just 0.2% of all tariff lines in 1998 to 5.3% in 2005. Unfortunately, the Egyptian tariff rate structure showed higher tariff dispersion in 2005 as the coefficient of variation for tariff rates was 7.4 compared to 4.75 in 1998. However, it should be noticed that most of this tariff dispersion results from the high tariff rates applied on alcoholic beverages. For instance, the coefficient of variation for tariff rates falls from 7.4 to 1 in 2005 if alcoholic beverages are excluded from the tariff structure (World Trade Organization, 2005).

Following the political and economic disruptions caused by the 2011 Arab Spring, the GoE started in 2014 to implement a reform program that aimed at stimulating economic growth and improving the business environment. The first wave of this program focused on reducing the macroeconomic imbalances

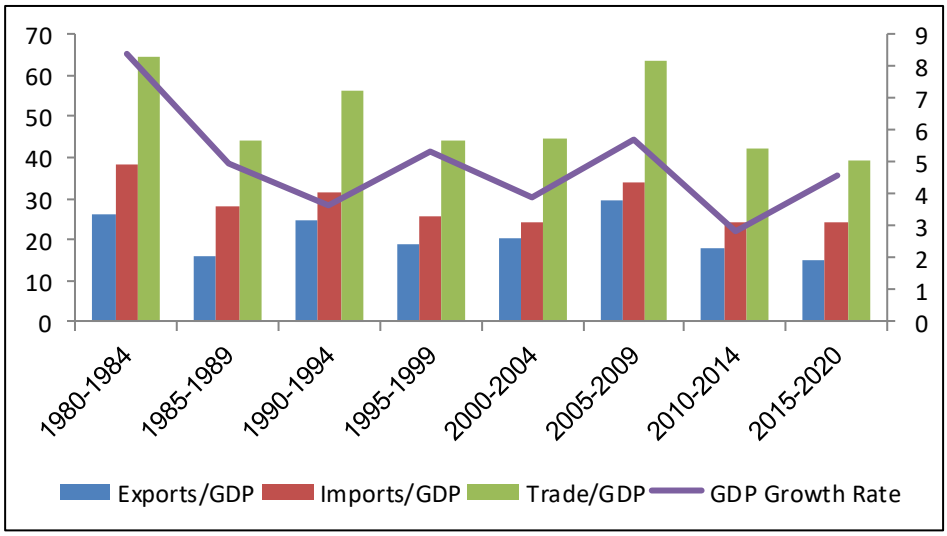
through a set of monetary and fiscal policy measures. As for trade reforms, the Ministry of Trade and Industry introduced the Industry and Trade Development (ITD) strategy for 2016-2020 in accordance with Egypt's Sustainable Development Strategy (SDS) Known as Egypt's Vision 2030. The ITD strategy aimed at increasing the growth rate of exports to 10% annually, while considering industrial development the engine for sustainable economic development in Egypt. In addition, Egypt started adopting a floating exchange rate regime in November 2016.

The Egyptian tariff rate structure shows that several tariff cuts has taken place before 2011 resulting in a reduction in the simple average MFN tariff rate to 16.5% in 2012 with reduction in tariff rates applied on both agricultural and non-agricultural products. Nevertheless, several amendments have been implemented in the Egyptian tariff structure since 2013 and have resulted in higher rates on a wide range of products to face the widening trade deficit. Consequently, the simple average MFN tariff rate has increased to 19% in 2019 compared to 16.5% in 2012. However, Egypt has bound 99.3% of its tariffs in 2019 and the number of duty-free tariff lines has increased to 12.1% in 2019 from 10.7% in 2012 (World Trade Organization, 2018).

The above analysis of the Egyptian trade policy since the 1980s shows that Egypt has taken significant steps in liberalizing trade and adopting an outward-oriented export promotion strategy, though there are still some challenges that hinder export performance and reduce the benefits from trade liberalization. The next sub-section will analyze Egypt's trade openness indicators and trade composition since the 1980s to identify whether the implemented trade policy measures have been reflected on Egypt's trade openness and composition.

3.2 Egypt's Trade Openness and Composition since the 1980s

Trade openness indicators as well as economic growth have shown a volatile record since the early1980s as illustrated in figure (1), where trade openness indicators are represented by the left vertical axis and economic growth rate is represented by the left vertical axis.



Source: World Bank, WDI

Figure (1): Trade Openness Indicators and GDP Growth Rate (%)

In this regard, the first half of the 1980s witnessed a rise in trade as a % of GDP to reach 64.34% on average compared to 55.01% in the second half of the 1970s. Such rise in trade openness was associated with a high economic growth rate 8.42% on average in the first half of the 1980s. However, this strong trade openness and economic growth record has been reversed in the second half of the 1980s despite the trade

liberalization measures that have been implemented since the mid-1980s.

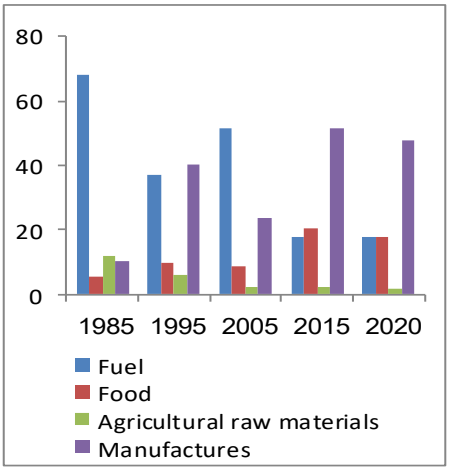
In the first half of the 1990s, trade openness indicators have rebounded with a rise in trade as a % of GDP to reach 56.33 % on average, whereas economic growth has continued its declining trend with an average of 3.63% following the stabilization policies implemented in the first wave of ERSAP. In the second half of the 1990s, both trade openness and economic growth continued moving in opposite directions, since economic growth has risen to 5.35% on average while trade as a % of GDP has fallen to 44.24% on average.

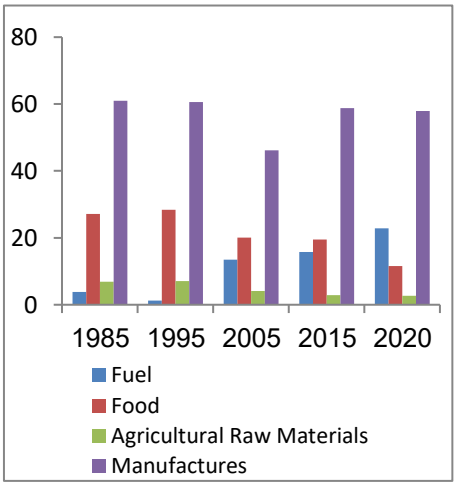
During 2000-2004, both trade openness and economic growth moved again in the same direction showing a declining trend during that period as a result of the economic challenges that have been facing the Egyptian economy since the late 1990s. But both trade openness economic growth restored their strong record during 2005-2009 with trade as a % of GDP reaching 63.56% on average and an economic growth rate of 5.72% following the economic reform package that has been implemented during that sub-period.

Unfortunately, this rising trend for trade openness and economic growth has been reversed during 2010-2014, with a fall in both trade as a % of GDP and economic growth due to the political and economic instability that followed the 2011 Arab Spring. This deteriorating trend for trade openness has continued during 2015-2020 with trade as a % of GDP falling to 39.25% on average, though economic growth rate has increased to reach 4.56% on average during that period following the economic reform measures that have been implemented since 2014.

Consequently, it can be concluded that both trade openness indicators and economic growth have fluctuated in an opposite direction during the economic reform periods of the 1990s and 2015-2020. Thus, it appears that the association between trade openness and economic growth in Egypt is not quite clear and hence, it needs further investigation using appropriate econometric techniques.

Given this unclear association between trade openness and economic growth during the covered time period, it is also important to analyze Egypt's trade composition that is demonstrated in Figures (2) and (3).





Source: UNSD - UN Comtrade Database

Figure (2): Merchandise Exports

Figure (3): Merchandise Imports

As shown in figure (2), Egyptian exports have witnessed a favorable shift with the rise in manufactured exports and the fall in fuel exports since the 1980s. For example, the share of fuel exports in total exports has decreased from 68.14% in 1985 to

just 17.62% in 2020, whereas the share of manufactured exports has increased from 10.08% in 1985 to 47.85% in 2020. Although such fall in the share of fuel exports can be explained by the decline in world oil prices, this increase in the contribution of manufactured exports represents an important step towards increasing the positive contribution of trade openness to economic growth.

On the other side, Egyptian imports have seen an increase in the share of fuel, along with a fall in the share of food imports and a nearly stable large share of manufactured imports as illustrated in figure (3). However, the analysis of Egyptian imports by the degree of use shows that imports of intermediate and investment goods represented 47.4% of total imports in 2018/2019 for instance, which implies that imports of fuel, raw materials, and consumer goods are still unfavorably accounting for more than half of total imports (Central Bank of Egypt, 2020).

4. Methodology

This paper adopts ARDL cointegration approach to identify the short run and long run effects of trade openness on economic growth in Egypt during 1982-2020, while using the CTS as a measure of trade openness.

4.1 Model Specification and Data

This paper aims at estimating the impact of trade openness on economic growth in Egypt during 1982-2020, while employing an endogenous growth model that is based on a Cobb-Douglas production function of the following form:

$$Y = A_t K_t^{\alpha} L_t^{1-\alpha} \qquad (1)$$

where Y is real GDP, K is physical capital stock, L is labor, and A is technological progress. α and $1-\alpha$ represent the shares of physical capital and labor in output. The model is extended by

assuming that technological progress is affected by trade openness as well as other variables such as financial development and government size. Accordingly, the specified model takes the following form:

$$GDPPC = f(PC, EMP, OPEN, FD, GOV) \qquad (2)$$

where $GDPPC$ is GDP per capita, PC is physical capital, EMP is employment, $OPEN$ is trade openness, FD is financial development, and GOV is general government final consumption expenditure, given that all variables are expressed in their natural logarithms. The following table demonstrates the definition and sources of all the variables.

Table (2): Definition and Sources of Variables

Variable	Definition	Source
GDPPC	GDP per capita in constant 2015 US$	WDI
PC	Physical capital measured by gross fixed capital formation in constant 2015 US$	WDI
EMP	Employment measured in millions including all those in the labor force between 15-64 years old who find a job	Central Agency for Public Mobilization and Statistics (CAPMAS)
OPEN	Trade openness measured by the composite trade share (CTS)	Author's calculations based on WDI
FD	Financial development proxied by domestic credit to private sector as a % of GDP	WDI
GOV	Government size proxied by general government final consumption expenditures as a % of GDP	WDI

4.2 Measuring Trade Openness

Literature review on the relationship between trade openness and economic growth has shown that most studies used measures of trade openness that express trade indicators in terms of their share of GDP for a particular country. Such measures of trade openness include exports as a share of GDP (X/GDP), imports as a share of GDP (M/GDP), and trade as a share of GDP (X+M/GDP), and the latter is usually referred to as trade share (TS). Few studies have measured trade openness using trade policy measures, and these studies have focused in this way on the process of trade openness itself and potential trade flows rather than emphasizing the outcome of trade openness in the form of real trade flows as indicated by TS and its related measures of trade openness.

Although most empirical studies have adopted TS as a proxy for trade openness, it has some shortcomings. For instance, TS penalizes the largest trading countries such as the U.S., Japan, China, and Germany by considering these countries as being relatively closed economies, since their trade shares (trade/GDP) are low given their high GDP levels. Thus, TS focuses only on one dimension of trade openness which is the country's share of trade to its relative total income, while ignoring another important dimension of trade openness which is the benefits that accrue to a country from its contribution to world trade. This second dimension uses a country's trade level relative to world trade as a measure of this country's trade intensity, and this measure is referred to as world trade share (WTS) as demonstrated by Squalli and Wilson (2011).

Consequently, Squalli and Wilson (2011) developed a new measure of trade openness which is the composite trade share

(CTS). CTS combines both dimensions of trade openness, namely WTS and TS, in the following way:

$$CTS_i = \frac{(X+M)_i}{\frac{1}{n}\sum_{j=1}^{n}(X+M)_j}\frac{(X+M)_i}{GDP_i} \qquad (3)$$

where i denotes Egypt, j denotes all countries in the world, n is the number of countries, $(X+M)_i$ represents Egypt's trade, and $(X+M)_j$ represents world trade. Simply, equation (3) can be expressed to show how CTS combines both WTS and TS using the following equation:

$$CTS_i = n(WTS_i \times TS_i) \qquad (4)$$

The source for trade data and GDP used in calculating the CTS for Egypt is the World Bank's WDI, given that world trade data used in calculations cover a representative set of 92 countries for which trade data were available during 1982-2020.

4.3 Econometric Technique

Cointegration tests have been introduced since the 1980s with the aim of dealing with spurious regression problem that results from regressing time series that are non-stationary, given that several economic time series are non-stationary. Among the cointegration tests is the autoregressive distributed lag (ARDL) approach which has been introduced by Pesaran and Shin (1999), and then developed by Pesaran et al. (2001). ARDL approach gains superiority over other cointegration approaches, since it is suitable for finite samples with small size. Meanwhile, ARDL approach is applicable for detecting cointegration between time series in the long run unless any of the time series variables is $I(2)$.

The ARDL cointegration approach starts with testing for the stationarity of the variables using unit root tests. If the variables

were not $I(2)$ variables, the autoregressive distributed lag-unrestricted error correction model (ARDL-UECM) is estimated in the form specified by equation (5), given that the optimal lag levels $(p, q_1, q_2, q_3, q_4, q_5)$ for the model are selected based on the lag length criteria such as Akaike Information Criterion (AIC) or Schwarz Criterion (SC).

$$\begin{aligned}\Delta lnGDPPC_t = {} & \alpha_0 + \sum_{i=1}^{P} \alpha_{1i}\, \Delta lnGDPPC_{t-i} + \sum_{i=0}^{q_1} \alpha_{2i}\, \Delta lnPC_{t-i} \\ & + \sum_{i=0}^{q_2} \alpha_{3i}\, \Delta lnEMP_{t-i} + \sum_{i=0}^{q_3} \alpha_{4i}\, \Delta lnOPEN_{t-i} \\ & + \sum_{i=0}^{q_4} \alpha_{5i}\, \Delta lnFD_{t-i} + \sum_{i=0}^{q_5} \alpha_{6i}\, \Delta lnGOV_{t-i} \\ & + \beta_1 lnGDPPC_{t-1} + \beta_2 lnPC_{t-1} + \beta_3 lnEMP_{t-1} \\ & + \beta_4 lnOPEN_{t-1} + \beta_5 lnFD_{t-1} + \beta_6 lnGOV_{t-1} \\ & + \varepsilon_t \qquad (5)\end{aligned}$$

The bounds testing approach is then used to examine the existence of cointegration between the model variables in the long run as proposed by Pesaran et al. (2001). If the computed F-statistic of the bounds test is above the critical value for the upper bound, then the regressors are cointegrated. Conversely, there is no evidence for cointegration if the computed F-statistic for all the lagged levels of the regressors is above the critical value for the upper bound of the bounds test.

If the model variables are cointegrated based on the results of the bounds test, long-run coefficients of the model variables will be estimated using the conditional ARDL model $(p, q_1, q_2, q_3, q_4, q_5)$ of the following form:

$$lnGDPPC_t = \beta_0 + \sum_{i=1}^{P} \beta_1 lnGDPPC_{t-1} + \sum_{i=0}^{q_1} \beta_2 lnPC_{t-1} + \sum_{i=0}^{q_2} \beta_3 lnEMP_{t-1} + \sum_{i=0}^{q_3} \beta_4 lnOPEN_{t-1} + \sum_{i=0}^{q_4} \beta_5 lnFD_{t-1} + \sum_{i=0}^{q_5} \beta_6 lnGOV_{t-1} + \mu_t \quad (6)$$

In the final step, an error correction model (ECM) is estimated using ordinary least-square (OLS) method to estimate the short-run coefficients of the model variables, in addition to an error correction term (ECT_{t-1}) that shows the speed of adjustment of the variables towards the long-run equilibrium. The conditional ECM $(p, q_1, q_2, q_3, q_4, q_5)$ will take this form:

$$\Delta lnGDPPC_t = \alpha_0 + \sum_{i=1}^{P} \alpha_{1i} \Delta lnGDPPC_{t-i} + \sum_{i=0}^{q_1} \alpha_{2i} \Delta lnPC_{t-i} + \sum_{i=0}^{q_2} \alpha_{3i} \Delta lnEMP_{t-i} + \sum_{i=0}^{q_3} \alpha_{4i} \Delta lnOPEN_{t-i} + \sum_{i=0}^{q_4} \alpha_{5i} \Delta lnFD_{t-i} + \sum_{i=0}^{q_5} \alpha_{6i} \Delta lnGOV_{t-i} + \lambda ECT_{t-1} + \varepsilon_t \quad (7)$$

5. Results

The first step in estimating a time-series model is to check the order of integration of the model variables using the unit root tests. In this regard, the results of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests using EViews 10 are summarized in tables (3) and (4) respectively. The results of both tests show that the time series are $I(1)$ showing non-stationarity using both tests, except few cases in which the order of integration differed between the assumption of having an intercept or a trend and an intercept as it was the case with *lnGDPPC* and *lnOPEN* using ADF test and *lnFD* using PP test. Since none of the variables was integrated of the second order, then ARDL cointegration approach is convenient in this case.

Table (3): Results of ADF Unit Root Test

Variable	Intercept		Order of Integration	Trend and Intercept		Order of Integration
	Level	First Difference		Level	First Difference	
lnGDPPC	-1.1177	-3.9704***	$I(1)$	-3.5978**	-4.0275**	$I(0)$
lnEMP	-0.1557	-5.7167***	$I(1)$	-2.6860	-5.6406***	$I(1)$
lnPC	-0.6189	-5.1249***	$I(1)$	-2.3391	-5.0413***	$I(1)$
lnOPEN	-2.8945*	-4.8384***	$I(0)$	-3.0385	-4.7928***	$I(1)$
lnFD	-1.1029	-7.5107***	$I(1)$	-0.9160	-7.2325***	$I(1)$
lnGOV	-1.9726	-4.6203***	$I(1)$	-2.4785	-4.4812***	$I(1)$

*** Significant at 1%, ** Significant at 5%, * Significant at 10%
Null Hypothesis: The series contains a unit root
Reported values represent the t-statistics

Table (4): Results of PP Unit Root Test

Variable	Intercept		Order of Integration	Trend and Intercept		Order of Integration
	Level	First Difference		Level	First Difference	
lnGDPPC	-1.5282	-3.8409***	$I(1)$	-2.8289	-3.9187**	$I(1)$
lnEMP	-0.3320	-5.7914***	$I(1)$	-2.2507	-5.7248***	$I(1)$
lnPC	-0.6485	-5.1026***	$I(1)$	-2.4779	-4.9760***	$I(1)$
lnOPEN	-2.0955	-4.7927***	$I(1)$	-2.1840	-4.7395***	$I(1)$
lnFD	-2.7615*	-7.0072***	$I(0)$	-2.3216	-6.8462***	$I(1)$
lnGOV	-0.7572	-4.6786***	$I(1)$	-1.5567	-4.5489***	$I(1)$

*** Significant at 1%, ** Significant at 5%, * Significant at 10%
Null Hypothesis: The series contains a unit root
Reported values represent the t-statistic

The ARDL model is estimated using OLS method with optimal lags based on the Akaike Information Criterion (AIC) as an ARDL (1, 0, 3, 3, 1, 3). The model variables are then tested for cointegration using the bounds test suggested by Pesaran et al. (2001). The results of the bound test reported in table (5) show that the model variables are cointegrated as the value of computed F-statistic is 15.47 which exceeds the critical value of the upper bound at all levels of significance.

Table (5): Results of Bounds Test

Test Statistic	Value	Significance Level	Critical Values	
			$I(0)$ Bound	$I(1)$ Bound
F-statistic	15.47		Finite Sample: n = 40	
		10%	2.306	3.353
K	5	5%	2.734	3.92
Actual Sample size	36	1%	3.657	5.256
			Finite Sample: n = 35	
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419

Null Hypothesis: No levels relationship

*** denotes statistical significance at 1%

Long-run results summarized in table (6) show that trade openness has a positive and statistically significant effect on economic growth with a 1% increase in trade openness resulting in 0.0312% increase in economic growth rate. This finding complies with the results of the studies that adopted traditional TS and its related measures as proxies for trade openness in Egypt such as Negem (2008) and Eltahir (2013). Meanwhile, this finding is consistent with the theoretical literature that identifies the different channels through which trade openness can contribute positively to long-run economic growth.

Other long-run results show that both employment and physical capital affect economic growth positively in the long run, which

indicates that factor accumulation contributes positively to long-run economic growth and this confirms too with both theory and empirical evidence. Moreover, financial development has a positive and statistically significant impact on economic growth, given that every 1% increase in domestic credit to private leads to 0.0455% increase in economic growth rate and this complies with the results of several empirical studies including Zghidi and Abida (2014) and Sghaier (2021). Finally, the negative and statistically significant coefficient for general government final consumption expenditures indicates that government size is negatively related to long-run economic growth, and this finding is supported by the empirical studies that reported a negative effect for government expenditures on economic growth above a certain threshold such as Nouira and Kouni (2018) and El Husseiny (2019).

Table (6): Long-Run Results

ARDL (1, 0, 3, 3, 1, 3) ***Dependent variable:*** $lnGDPPC_t$

Variable	Coefficient	Standard Error	t-statistic
$lnEMP_t$	0.5176***	0.0541	9.5705
$lnPC_t$	0.2246***	0.0294	7.6270
$lnOPEN_t$	0.0312*	0.0159	1.9663
$lnFD_t$	0.0455***	0.0131	3.4820
$lnGOV_t$	-0.0566**	0.0251	-2.2553
$Constant$	-6.3655**	0.2820	-22.575

*** Significant at 1%, ** Significant at 5%, * Significant at 10%

Short-run results of the ECM are reported in table (7) and also confirm the positive effect for trade openness on economic growth, and thus, it can be concluded that trade openness contributes positively to economic growth in Egypt both in the short run and long run, while adopting CTS as a proxy for trade openness.

Table (7): Short-Run Results: Error Correction Model
Dependent variable: $\Delta lnGDPPC_t$

Variable	Coefficient	Standard Error	t-statistic
$\Delta lnGDPPC_{t-1}$	0.1194**	0.0623	1.9167
$\Delta lnPC_t$	0.0493***	0.0069	7.1264
$\Delta lnPC_{t-1}$	-0.2004***	0.0098	-6.3113
$\Delta lnPC_{t-2}$	-0.0419***	0.0095	-4.4308
$\Delta lnOPEN_t$	0.0162***	0.0049	3.2827
$\Delta lnOPEN_{t-1}$	0.0027	0.0047	0.5704
$\Delta lnOPEN_{t-2}$	0.0163***	0.0046	3.5251
$\Delta lnFD_t$	0.0659***	0.0093	7.0586
$\Delta lnGOV_t$	-0.0721***	0.0167	-4.3117
$\Delta lnGOV_{t-1}$	0.0540***	0.0171	3.1548
ECT_{t-1}	-0.5144***	0.0431	-11.938

Adjusted R^2 = 0.931

*** Significant at 1%, ** Significant at 5%, * Significant at 10%

The short-run coefficients for other regressors are consistent with their long run estimates except for physical capital with one and two lags as well as general government final consumption expenditures with one lag. The unexpected negative coefficient for physical capital accumulation complies with the results reported for Egypt by Sallam (2016) in addition to those reached by Duodu and Baidoo (2020) for Ghana, whereas the positive coefficient for general government consumption expenditures is supported by the findings of empirical studies that argue for a positive effect for government expenditures below a certain threshold.

The negative and statistically significant coefficient reported for the error correction term (ECT_{t-1}) implies convergence of the model variables towards long-run equilibrium, with about 51% of the disequilibrium is being adjusted each year as indicted from the value of error correction term of -0.5144. The value of adjusted R^2 shows that about 93% of the changes in economic growth rate is explained by the explanatory variables included in the model. Furthermore, the results of diagnostic tests in table (8) indicate that the normality assumption is satisfied and the model is specified correctly without serial correlation and heteroskedasticity.

Table (8): Results of Diagnostic Tests

Test	Test Statistic	p-value
Jarque-Bera Test for Normality	Jarque-Bera = 1.070	0.5836
Breusch-Godfrey Serial Correlation LM Test	F-statistic = 0.7922	0.4689
Breusch-Pagan-Godfrey Heteroskedasticity Test	F-statistic = 0.9975	0.4966
Ramsey RESET Test for Model Specification	t-statistic = 0.5360 F-statistic = 0.2873	0.5985 0.5985

Finally, the stability of the model is examined using the plots of the cumulative sum of recursive residuals and the cumulative sum of squares of recursive residuals represented by figures (4) and (5) respectively. The residual plots indicate that the model is stable since the recursive residuals lie within the lower and upper bounds at the level of significance of 5%.

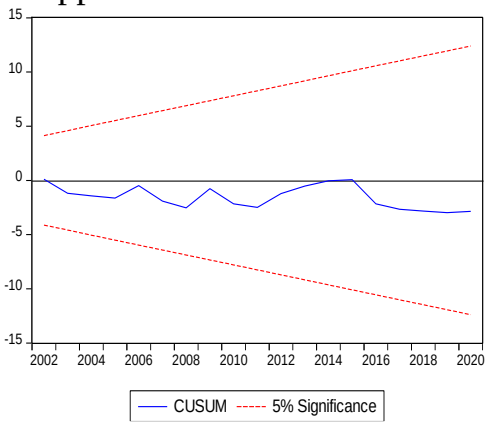


Figure (4): Cumulative Sum of Recursive Residuals

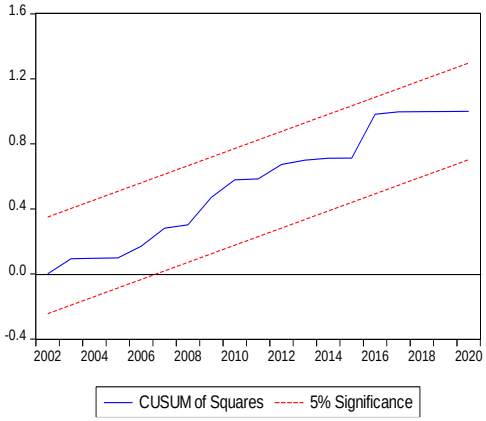


Figure (5): Cumulative Sum of Squares of Recursive Residuals

6. Conclusion and Recommendations

The impact of trade openness on economic growth is still debatable on the empirical grounds. Consequently, this paper adopts an ARDL model to examine the effect of trade openness on economic growth in Egypt during 1982-2020, while using the composite trade share (CTS) introduced by Squalli and Wilson (2011) as a measure of trade openness.

The results show that trade openness contributes positively to economic growth in Egypt both in the short run and long run, and this might be the result of trade policy reforms as well as trade-related reforms that have been implemented since the mid-1980s. This finding is consistent with other empirical studies on Egypt that used traditional trade share (TS) and its

related measures of trade openness. Meanwhile, the long-run results of other regressors indicate that employment, physical capital accumulation, and financial development contribute positively to economic growth, whereas government size, as proxied by general final government consumption expenditures, is negatively related to economic growth. Short-run results comply largely with long-run estimates except for physical capital accumulation with one and two lags as well as government size with one lag.

Based on these findings, some policy recommendations can be suggested to increase the positive effect of trade openness on economic growth in Egypt. On the one hand, some additional trade policy reforms are needed to improve Egypt's trade composition towards the reduction of the dependence on oil exports. These trade policy reforms should involve measures that aim at reducing average tariff rate as it exceeds WTO bounds in some activities, as well as reducing tariff-induced bias against exports and tariff dispersion that discriminates against sectors with a comparative advantage.

On the other hand, some complementary reforms are required to increase the benefits of trade openness. These complementary reforms include adopting a flexible exchange rate regime to increase the competitiveness of the Egyptian exports, boosting the implementation of the industrial development strategy that aims at increasing the contribution of high-value added and high-tech exports in total exports, ensuring the compliance of Egyptian exports with required quality and safety standards, increasing the benefits from Egypt's bilateral and regional trade agreements while considering its WTO commitments, improving technical and vocational education and training, and providing trade-enhancing laws and procedures.

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