



The Effect of Customs Reform on Exports

Empirical Evidence from Egypt

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Abstract:

The study aims to estimate the effect of customs reform on exports in Egypt during the period (2008-2018) by using terminal handling time, customs release time and total customs work time as a measure of the independent variable (customs reform), while Egypt's non-oil exports are used as an indicator for the dependent variable (exports). The study sample consists of a quarterly data series starting from 2008 until 2018. The co-integration method and the MIDAS regression model were used to estimate data with different frequencies. Also, the logarithmic formula is used to build the general model for the study along with conducting a unit root test to test the stationarity of the study's variables.

The study revealed that the customs reform has a significant positive effect on the non-oil exports of Egypt during the stated period since, decreasing the terminal handling time, the customs release time and the total customs work time leads to an increase in the exports by (0.4655).

The study's result is consistent with the findings of (DaSilva-Glasgow, 2020), (Elliott & Bonsignori, 2019), (Siu, 2019), , (Li, 2019), (Fernandes & Hillberry, 2017), , (Martincus & Graziano, 2013) and (Djankov et al., 2006) studies. The Egyptian government needs to carry out more reforms in various aspects simultaneously for example but not limited to, reducing the time and expense of releasing shipments by reducing physical inspections, improving pre-arrival processing of import paperwork, pre-release of trusted cargoes, and incorporating risk-management criteria into all customs operations to reach international standards will generate many government profits and positively affect its economy as one of the lower-middle-income countries.

Keywords: Customs reform, exports, Foreign trad.

Introduction

Foreign trade is a major driver of the country's economic growth, especially in light of the increased globalization and global integration. Government policymakers and economists encourage the growth of foreign trade as an effective strategy to achieve the economic well-being of society (Sen, 2010). Furthermore, the effect of foreign trade is not limited to achieving a higher growth rate of the economy, but it also promotes innovation, allows countries to use their natural resources, and raw materials efficiently, and attracts foreign direct investment (FDI) (Keho, 2017). Moreover, foreign trade enhances manufacturing efficiency and innovation, creates job opportunities, increases state savings, and contributes to Consumer welfare and competition between the domestic and foreign products.(Dzaleva, 2009).

However, the benefits of foreign trade are eliminated by the excessive cost of trading across borders and complicated customs procedures because these extra costs increase the cost of the domestic products and their selling price which negatively affect their competition in the foreign markets. (Akoto & Sakyi, 2019). Taking into consideration the vital role of customs administration being the authorities that control the trade activities, protect the country's borders and society and collect taxes and tariffs that feed the government's treasury, the trend of the global reform programs and countries is to reform the customs administrations, improve their performance and increase the efficiency of the related policies as a tool to facilitate the foreign trade and achieve the global integration and the economic growth. Over time, Customs administrations became the key factor in reforming and designing a country's trade and tariffs policies and implementing regular policy changes,

because it is the primary source of information on which a country designs its trade policy, as well as its continuous reform process. The customs administration also maintains all legal documents pertaining to a country's trade operations, and the manner in which customs procedures are carried out, providing the required information on two important aspects of the country's economy: foreign trade and tax calculations. As a result, reforming the customs administration and evaluating their performance has a significant impact on the success of trade policy and achieving its desired economic objectives. (Keen & Fund., 2003)

Research Problem

The efficiency of customs administrations affects the country's foreign trade in general and its exports in particular. The long period of customs clearance procedures, the complexity of the procedures, and the excessive requirements of the clearance process, lead to the exporter incurring more costs that lead to a higher cost of the local product and consequently a higher selling price compared to its counterpart in foreign markets, which reduces product competitiveness. Over time, the importance of customs authorities increases in facilitating and encouraging commercial transactions and raising the efficiency of the national economy and competitiveness in international markets by reducing the time and cost of their transactions, reducing the rate of physical inspection, adapting a risk management system, and strengthening control and supervision functions to prevent the emergence of fraudulent use of preventive systems and increase the government revenues while ensuring the fast flow of goods. Many studies have demonstrated the losses that countries may incur due to the inefficiency of customs administrations. The expenses of the commercial transactions may reach 7-10% of the total value of

international trade. UNCTAD studies in 1994 showed that improving customs performance would lead to Achieving annual savings of 75 USD billion for the world and that the cost of excessive customs procedures amounts to about 27% of the total value of goods in developed countries and this percentage increases in developing countries, which may reach the cost of delays as a result of routine procedures and inefficiency of management to 10% of the total value of the shipment (Keen & Fund., 2003), The higher these customs transaction costs, the less countries exports, the fewer opportunities for exporters to survive in international markets.(Afonso & Vergara, 2019). In contrast, customs reform eases the movement of goods across borders, reduces the time to release goods and accurately collect the customs tariffs and taxes, will by turn increase the country's trade flows by approximately 5% as well as increases government revenue and foreign direct investment(Elliott & Bonsignori, 2019)and(Milner et al., 2005; Moisé & Sorescu, 2013).

Thus, the main research problem will be addressed in the form of the below question:

- *What is the effect of the customs reform on exports in Egypt?*

Literature Review

Several academic studies investigated the topic of the performance of the customs administrations and its effects, along with customs reform and its impact on the foreign trade of each country, as well as the competitiveness of the domestic products of each country in global markets. Taking in to consideration that exports are one of the most important factors affecting the country's economic growth, (Youssef & Zaki, 2019), sought to determine what are the hinders of the Egyptian exports and assessed the role of the customs tariffs and non-tariffs barriers through Using a sample of 99 sectors (two-digit

HS commodities) of 175 countries' exports involving Egypt, during the period from 1995 to 2016. This study showed that Egypt actual total trade volume is less than what was predicted by the gravity model which refers to Egypt suffering from trade barriers and non-tariff barriers that hinder it from meeting its exporting potential and also there is a need to diversify and boost the domestic production to be able to compete in the international markets and be able to benefit from the local currency depreciation. The results of this study agreed with the results of the study of (Chibira, E., & Moyana, H.J., 2017), who searched for the factors that impact the intra-Africa trade and the potential outcomes from trade facilitation efforts and discovered that the current trade and customs policies, and the regulatory system, and also the bilateral and multilateral arrangements impede boosting the trade of intra-Africa countries and there is a need to direct the efforts toward developing the infrastructure, border, and customs procedures along with decreasing the time and cost of importing and exporting procedures which are the main factors of hindering the growth of intra-Africa trade.

Moreover, (Darballah, k., 2020) measured the impact of the customs reform carried out by Egypt through the application of the single window system, study found that decreasing the customs release time with 1 day will decrease the total customs work time from 505 hours to 361 hours annual which will result in a raise in the customs collections with 62,889,108 US dollars. On the other hand, Egypt rank in doing business index will increase by 6 degrees and 9 degrees in the trade index. In the same context, (Tang & Abosedra, 2019), explained how the country's customs and logistic performance affects its trade flow since he measured the role of the country's logistic performance in boosting the international trade and how it affects the

growth of its exports using a panel data of 23 Asian countries. This study determined that country's logistic performance is an important factor to its exports growth and they are significantly correlated.

All of these studies called for the need to examine the impact of customs reform programs on trade flows, which prompted (Seck, 2017), to examine the effect of reform programs on the performance of exporters in Are sub-Saharan African. The results showed that enhancing the customs reform through improving the customs release procedures, issuing adequate regulations, and improving the country's infrastructure will increase the activity of exporters and encourage new exporters to enter the international markets. (Afonso & Vergara, 2019) tried to measure the trade cost effect on the exports of Africa using a sample of 40 African developing countries and 10 developed countries during the period (1997-2014). The study confirms that the trade costs is a very important factor in explaining the performance of the African exports since it affects the continuance of the existing exporters and the entrance of new exporters.

While (Elliott & Bonsignori, 2019) investigated the effect of the immediate customs release on the trade flows of 139 countries and found that the immediate customs release can increase the international trade by 2.5%. On the other hand, (Li, 2019), focused to measure the impact of the border time-delays on OECD countries' exports using a sample of 22 OECD countries' data and how this impact differs through different manufacturing sectors. The result of this study cleared the border time delays negatively affect the exports volume of OCED countries specially the exports of the time-sensitive goods sectors and decreasing the border time- delays by 10% would result in an increase sectoral export by a percent range from 2.3% to 6.2%. In the same

context, (Martincus & Graziano, 2013) attempted to predict the impact of the customs time-delays on firm exports of Uruguay during the period from 2002 to 2011 and found that customs time delays have a negative impact on the firm exports since a 10% rise in the median of the customs time delays will reduce the exports growth rate of a firm by 1.8% and this effect is severe in the sectors of time-sensitive products. (Djankov et al., 2006), Measured the effect of time-delays on the international trade using World Bank data of in 126 countries sample. The study results a One-day delay that prior shipping of cargo results in a 1% reduction and this effect is much severe on the developing country exports especially those of the time-sensitive sectors that may reach to 7% of total country trade

By reviewing literature related to the impact of improving the customs performance on international trade flows in general and exports in particular, the majority of studies agreed that there is apposite impact of improving the performance of customs administrations on increasing foreign trade flows, as customs reform contributes to reducing export-related costs, whether in terms of the time required for the export process or even the cost related to export activities. The results of most of the empirical studies that depended on the indicator of the number of days and/or the number of documents required to export and release a shipment showed that within a short period of initiating the customs reform program, a significant decrease in customs clearance times was observed, which leads to a decrease in the time and cost of exportation and increase the country's exports as well as diversification of production and increase export destinations. This study focuses on measuring the effect of customs reform on Egyptian exports during the period (2008-2018) which has not been researched and analyzed before.

Research Importance, Significance and Contribution:

Studying the subject of customs reform in Egypt is very important for several reasons; the customs reform is vital for fostering the international trade flows, government revenue, and foreign direct investment in addition to increasing the efficiency of collecting the government taxes which feeds the government revenues. Moreover, the inefficiency of the customs administrations harms the economic growth since it raises the costs of the trade transactions which negatively decreases the efficiency of the domestic products in the foreign markets. Hence, measuring the customs reform's effect on Egyptian exports is important to analyze the outcomes of this reform process and also help the decision-makers to identify the shortcomings aspects that still hinder increasing Egyptian.

Research Objectives & Research Hypothesis

5.1 Research Objectives

The main purpose of this study is to examine the effect customs reform on the flow of exports in Egypt. The rest of this research is organized as follows: Section 2; reviews the theoretical background of customs reform and trade. Section 3; presents the literature review of the relationship between customs reform and exports while section 4; provides the empirical part of the study that investigates the outcomes of the reform process and its impact on exports throughout the specified time period (2008 - 2018) which has not been measured in the previous literature. The research conclusion and recommendations are outlined in section 5.

5.2 Research Hypothesis

The empirical section of this study is mainly attempting to examine main key hypotheses:

H₁: There is significant positive relationship between the customs reform and exports in Egypt. As a consequence, the exploratory variables and their predicted effect (hypotheses) may be summed up as follows:

- H₂: There is significant negative relationship between Port handling procedures time & exports
- H₃: There is significant negative relationship between release clearance time & exports
- H₄: There is significant negative relationship between Total customs release time & exports.

The Descriptive Study

Definition and Importance of the customs reform

Customs reform, is a program aimed at simplifying customs processes and selecting restrictions, increasing the use of information technology, improving the administration of specific customs procedures, and increasing transparency and partnerships with the private sector which leads to a decrease the time and costs of the trade transactions the country(World Bank., 2002) ¹.The success of customs reform and fostering international trade are inextricably linked due to the critical role that the customs authorities play in arranging trade transactions, enhancing the concept and application of trade liberation as a

¹World Bank. 2002. *Best Practices in Customs Reform: Lessons from Morocco*. PREM notes, Public Sector no. 67, April.

determinant of the country's overall progress in improving its economy and competitiveness in international markets. These new obligations of the customs include; facilitating trade flows by decreasing the time and cost of its transactions, minimizing physical inspection rate, adapting risk-system, strengthening the monitoring and supervising functions to prevent the rise of fraudulent use of suspensive regimes that could stem from offering exemption.

Customs' poor performance is inextricably linked to trade barriers, as evidenced by the government's administrative costs as well as the compliance costs borne by enterprises. These trade barriers are extremely costly, their costs were clarified by various studies, according to a study conducted in the early 1990s, which indicated that the expenses of trade transactions might amount to 7-10% of the total value of international trade. Moreover, UNCTAD research from 1994 indicated that enhancing customs performance would result in an annual savings of \$75 billion for the world. Border procedures cost the business community around 27% of the overall value of the cargo, and this percentage may be greater in developing countries, where delays might cost more than 10% of the whole value of the shipment. (Keen & Fund., 2003), trade costs and customs procedures negatively affect the existing volume of country exports as the higher the costs of trade, the less opportunity for exporters to survive and continue on the international markets (Afonso & Vergara, 2019). On the other hand, decreasing the release time of goods significantly increases trade flows by almost 5% (Elliott & Bonsignori, 2019).

The economic impact of customs reform efforts on trade flows, government revenue, and foreign direct investment is found to be substantially positive. Most notably for developing countries, trade facilitation significantly

affects trade flows, government revenue, and foreign direct investment through the implementation of customs modernization programs that result in more effective trade tax collection and facilitating cross-border goods movement helps countries to attract foreign direct investment (Milner et al., 2005; Moïsé & Sorescu, 2013). Improving customs clearance transactions, legislations, trade finance, and infrastructure of energy and telecommunication motivate exporting and importing activities of the country, especially in developing countries in which exports are significantly more responsive than imports. (Seck, 2017) in addition to decreasing informal trade and protecting government revenues (Siu, 2019). another evidence of the vital role of customs and its effect on trade proved when Albania decreased the physical inspections ratio as a means of customs reform, which resulted in significant increases in its imports and this increase was nearly equivalent to a tariff cut of 1.3 % which gave a clear overview of the importance of customs reform. (Fernandes & Hillberry, 2017)

5.2 Overview Egypt's Customs Reform Program

The radical changes in the international world have influenced Egypt's Finance Ministry's perspective on financial reform in general and customs reform in particular, by following some steps including; establishing a workgroup dedicated to customs development and reform, comprised of a renowned group of Customs Authority personnel It researches and seeks out the most effective methods and frameworks for dealing with contemporary customs issues based on worldwide experience and actual trials, enlisting the help of local and international specialists. (Ministry of Finance Arab Republic of Egypt, 2021).The customs reform and modernization initiative began in the mid-1980, and the success of most of these programs in certain countries

served as an incentive to accelerate the pace and speed with which these reform initiatives were implemented. In most countries, the experiences resulted in good consequences in terms of making the best use of resources and avoiding austerity measures that reduced government spending on public services, education, and health. With the beginning of the second millennium, the attention of the Egyptian government was directed towards modernizing the customs administrations to make the process of importing and exporting more easier, and a variety of rules and decrees have been enacted to enhance inspection and control procedures and facilitate trade movements which caused a substantial growth of foreign trade in Egypt in recent years. (Ela, 2012) However, the serious reform initiative in Egypt began with Decree No. 1237 of 2002, when the Egyptian Customs Authority engaged in a real development process that differed from previous reform attempts as a result of increased complaints from both the Egyptian trading community and other countries that exported to Egypt at the time since the World Bank conducted research in 2002 that focused on the reform of Egypt's customs authority to assess the performance of customs and revealed that several technological and administrative constraints hampered the intended effects of these reform attempts and cleared that all relevant departments of the Egyptian Customs Authority need additional reform effort.

Egypt ratified the Kyoto convention (International Agreement on the Simplification and Harmonization of Customs Procedures) that put the basis for effective customs processes and requires the customs procedures to be matched with the standards of the World Customs Organization. The convention serves as a forum for bringing customs performance into line and guarantees that the customs system does not act as a stumbling block to

international trade by setting out several basic guidelines, including clarity and uniformity in customs procedures, standardization, and simplification of declarations of goods, full use of information technology, minimum controls required to ensure regulatory compliance, audit-based risk assessment, and full cooperation with other border agencies.

The revised Kyoto convention became effective in Egypt by February 2006, but there was an issue that Egypt faced at the time was financial incapacity which affected the capability of achieving comprehensive reform process which made Egypt's customs authority (ECA) direct its efforts towards the human resource development and made a significant improvement in their performance, which was recognized by the World Bank since the doing business by WB reported Egypt at this time was as one of the top reformers in 2006 /2007. (Ela, 2012). Since, the 2006 Doing Business report acknowledged that Egypt streamlined its customs procedures and reduced the number of necessary trade paperwork, as part of a customs reform that aims to reduce the number of tariff categories and phrases from 27 to only 6, as well as simplify border procedures.

The accomplishment of Egypt's customs authority at that time was due to the efforts of human resources, who examined the existing rules, identified the necessary modifications, and drafted the executive regulations that were implemented later. The reform plan did not overlook the need for human resource development, establishing a training program that taught over 4800 customs workers from various categories between 2005 and 2006. The reform efforts also took into account the need of producing a handbook for the new customs transactions and adapting the pre-release system, and this phase is

carried out by the selected reform committee, which was the best one to manually put this up. (World Bank, 2006).

However, Egypt was unable to keep up with the rapid development of world standards of customs reform, where the role of customs has shifted from protecting borders and collecting revenue for the government to facilitating and boosting international trade by simplifying procedures as the main tool for enhancing a country's foreign trade. The strategic shift in customs' function toward enabling global trade, necessitated a new operating strategy and the creation of a new organizational structure capable of achieving the desired results from customs and performing its new responsibilities based primarily on transparency and integrity. So; the majority of industrialized and developing nations swiftly adopted the global modernization effort in order to compete in international markets and avoid the negative consequences of ignoring the need for customs reform.

Hence, Egypt's reform plans targeted accelerating international trade transactions in general, empowering as well as ramping up exports in particular, by limiting physical inspections, creating a website, and incorporating the internet into its work, reducing border delays and measuring them, and, most importantly shifting its goal from tariff reduction to cargos time-delays reduction (World Bank, 2008). This made Egypt remain one of the most active reformers in the area of cross-border trade until 2009 since it also upgraded Alexandria port facilities and accelerated the customs clearance transactions, resulting in shorter procedures time. By 2010, Egypt implemented an electronic system for the preparation of export and import documents but this system was not enough; other areas needed to be further

developed, since the electronic system's application, requires good infrastructure, fast internet connection, and sufficient power.

Recently, Egypt has made no substantial progress in terms of cross-border trade facilitation, since Egypt's doing business ranking on the topic of cross-border trade has moved away from the frontier until reached 168 in 2017, then ranked 171 out of 190 in 2020 on the Ease of Doing Business Index which reflects that Egypt still has a long way to go. (World Bank, 2017). Despite this, the Egyptian efforts to reform procedures and facilitate trade cannot be overlooked, as its average trade facilitation performance was 1.149 out of 2 in 2019 as recorded by OECD. The area with notable reform was the appeal procedures which helps to shift up Egypt's score between 2017 and 2019. (World Bank, 2017).

The Empirical Study.

Model Development and Research Variables

7.1.1 Regression Model

The model of King & Levine, and Levine & Zervos is used to analyze the relationship and the asymmetric effects between the customs reform and the Egyptian exports, and describe the dynamic manner of the exports model (King, R. and Levine, R.G.,1993).The research relied on a logarithmic form in order to avoid any measurement issues, such as lowering data dispersion, and to gain the variables' long-term flexibility(Levine, Ross & Zervos, Sara.,1998).Hence, the logarithmic form of the study model has been formulated as shown in the below function (1):

$$\ln Exports_t = C + \sum_{t=1}^T \ln Customs Reform_t + \sum_{k=1}^K \beta_k X_t^k + \epsilon_t \quad (1)$$

Where:

- $Exports_t$: The Egyptian Exports at time t , where $(t=1, 2, \dots, n)$,
- C : a constant function,
- $Customs Reform_t$: the level of customs reform at time t .
- X_t^k : the vector of the control variables which affect the exports,
- ϵ_t : is the error term.

The general model represented in equation (1) can be considered as the potential determinants of the Egypt's exports, since there are other factors that influence exports, we shall use a collection of control factors that were chosen based on past literature as potential exports' determinants.

7.1.2 MIDAS Regressions

The regression models require that the data of the explanatory variables follow the same structure and frequency of the dependent variable in the regression. However, the data of this research are of different frequencies since the customs reform variables are monthly frequency, while the exports (dependent variables) and the controlling variables are quarterly frequency. In this case, we depended on the Mixed-Data Sampling (MIDAS) technique which allows using data with different frequencies on the same regression and it was presented by (Ghysels, E., & Santa-Clara, P., & Valkanov, R.,2004). and (Andreou, Ghysels & Kourtellos, 2010).Hence, the MIDAS regression model will be in the following form:

$$y_t = X_t \cdot \beta + f\left(\left\{X_t^H\right\}, \theta, \lambda\right) + \epsilon_t$$

Where:

y_t is the dependent variable with low frequency at time t , X_t is the set of explanatory variables with the same low frequency as the dependent variable y_t at time t , $\left\{X_{\frac{t}{s}}^H\right\}$ is the set of explanatory variables with the highest frequency., f = function which describes the effect of higher frequency variables on the regression of lower frequency variables., θ, λ, β = The direction of the parameters to be estimated. Estimating the regression coefficients requires firstly ensuring the regressions' quality. Hence the researcher used a set of diagnostic tests as follows; Breusch –Pagan - Godfrey to test Heteroskedasticity, Breusch-Godfrey LM test for Serial Correlation, Jarque-Bera to test Normality, Ramsey RESET Test for Function Form, Variance Inflation Factors (VIF) for Collinearity, Chow test for Breakpoint, Omitting variables test based on the covariance matrix, Auxiliary regression for non-linearity test (squared & log terms), and the CUSUM & CUSUM of Squares for Stability test. The results of all tests showed that the P-value was higher than the levels of significance.

The model regression doesn't have a serial correlation between the residuals, instability of variance (Heteroscedasticity) does not exist, also the residuals are normally distributed, and the regression functional models form was ideally described in addition to following logarithmic form without non-linear (square) relationships in the regression (Auxiliary regression). On the other hand, the cumulative sum of residuals (CUSUM) test, the Cumulative sum of square residuals (CUSUMSQ), and the Chow test showed that there was a structural break in the 4th quarter of 2016 and a break was found in the data of the exports variable, the gross domestic product variable, and the

exchange rate variable. So, a dummy variable will be used to cure this structural break in the data series, and depending upon these tests results which confirmed that the regression model doesn't experience any measurement problems (unless the structural break) MIDAS technique shall be performed.

7.1.3 Measurement of Variables, Their Definition and Reasons for Using Them in The Model:

The study draws on a wide range of data for Egypt from three local sources;

First; the dependent variable; The Egyptian exports; and definitely the non-oil exports are defined as the value of total goods and services exported to other countries excluding oil export. The non-oil exports are used to effectively track the changes to the export volume resulting from the customs reform since the Oil exports will not efficiently reflect their response to changes in the customs performance. The researcher also uses other indicators such as the non-oil exports as a percentage of GDP. The data of exports were obtained from the Central Bank of Egypt and expressed on a quarterly basis according to the data availability.

Second; the independent variable; The independent variable is the customs reform and is expressed by the time of customs work that is divided into three variables to ensure the correctness and consistency of the results. We use the customs time to express the customs reform since increasing the reform basically results in decreased the time of the customs work time both terminal handling time and the customs release time. Customs Reform measurement variables are:

1. *The terminal handling time:* This indicator refers to the period between the time of the container ship arrival until the time of the register of the Customs Declaration (excluding declarations without the traceability, the prior release, and those without a manifest). The time includes official holidays and weekends.
2. *The Customs release time:* This indicator expresses the period between the time of the register of the Customs Declaration until the time of releasing container. The time includes Other regulatory authorities' procedures and official holidays and weekends.
3. *Total customs work time:* Refers to the period between the time of the container ship arrival until the time of releasing container. The time includes Other regulatory authorities' procedures and official holidays and weekends.

The data of customs reform was collected from the Egyptian Customs Authority. Customs reform variables will be expressed more frequently on a monthly basis to allow for fluctuations in time within the model, rather than the average time, to control time fluctuations that may occur due to many factors such as constantly changing regulations and labor terms, weather conditions in ports, international shipping conditions, and other factors that may make terminal handling time or customs release time unstable.

Third the control variables: The model relies on a set of controlling variables including:

1. *Gross Capital formation (domestic and foreign investment);*
 - A) *Gross Domestic Investment*, which is the acquisition of produced assets includes land improvements (fences, ditches, drainage ditches, etc.),

purchases of machinery, equipment, and equipment, construction of roads, railways, etc. Increasing capital formation leads to an increase in the production capabilities of Egypt, which leads to an increase in the capacity of the productive sector to meet the needs of the domestic market, and an increase in exports.

B) *The Foreign direct investment FDI net inflows*; refers to the net investment inflows of a permanent management stake (10 percent or more of the voting shares) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvested earnings and other long-term and short-term capital. Increasing capital formation, whether from domestic or foreign investment, leads to an increase in the production capabilities of Egypt, which leads to an increase in the capacity of the productive sector to meet the needs of the domestic market, and an increase in exports. ("Gross capital formation (% of GDP) | Data", 2022)²

2. *Total Final Consumption* (private and government); this variable refers to the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. In addition to all current government expenditures on purchases of goods and services (including workers' compensation). The increase in domestic consumption expenditure leads to an increase in the country's production and taking into consideration that the domestic consumption expenditure is one of the main sources of Egypt's economic

² Gross capital formation (% of GDP) | Data. (2022). Retrieved 24 April 2022, from <https://data.worldbank.org/indicator/NE.GDI.TOTL.ZS>

growth, it may increase the attraction of investment opportunities that will increase the exporting opportunity and thus the economic growth.

3. Market size; (the domestic market size) which is measured by the gross domestic product (GDP) in the current prices on the basis of the purchasing-power-parity (PPP) valuation of Egypt's GDP. *The Gross Domestic Product GDP* is the sum of the total value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without deducting the depreciation value of manufactured assets or making any liabilities due to the depletion and degradation of natural resources. The effect of the market size on the exports depends on the flexibility of the production system since Increasing the size of the market may raise exports in case of the flexibility of the production system, however, if the production system is inflexible, the production percent that should be exported will be directed to the domestic markets to fulfill its needs. ("TCdata360: Domestic market scale", 2022)³
4. *Exchange rate*; is defined as the price of one currency in terms of another currency. The effect of the exchange rate on exports differs according to the change that occurs in the domestic currency value. In case of currency depreciation (a decrease in the value of the Egyptian Pound currency relative to other foreign currencies), a decrease in the exchange rate of the Egyptian Pound, will increase exports since the prices of the domestic products in the international markets will be cheaper than other foreign products and thus, an increase in international demand on it, Which is the

³ TCdata: Domestic market scale. (2022). Retrieved 24 April 2022, from https://tcdata360.worldbank.org/indicators/8c1b9bab?country=BRA&indicator=40459&viz=line_chart&years=2016,2020

opposite of the appreciation of a currency case (an increase in the value of the Egyptian Pound currency in terms of other foreign currencies) which reflect an increase in the exchange rate. In the case of inflexibility in the production system, however, the appreciation of the currency rate will have little impact on exports. The exchange rate is calculated as a quarterly average based on monthly averages. (Case, K. E., Fair, R. C., & Oster, S. M., 2012)

5. *Inflation*; is defined as the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that can be fixed or changed at specific time intervals, such as a year. Inflation affects exports through its effect on the exchange rate as higher inflation leads to higher interest rates. Higher inflation affects exports by influencing the input costs such as raw materials and labor costs, this will have a substantial impact on the country's exports competitiveness in the international markets("Inflation: Prices on the Rise", 2022).⁴

The controlling variables are used on the basis of a quarterly frequency. The data of these variables collected from the Central Bank of Egypt. However, data of the consumer prices obtained from Central Agency for Public Mobilization and Statistics (CAPMAS).;

As a result, the final research model will be written in a more detailed logarithmic form as follows:

⁴Inflation: Prices on the Rise. (2022). Retrieved 24 April 2022, from <https://www.imf.org/external/pubs/ft/fandd/basics/30-inflation.htm>

$$\begin{aligned} \ln exports_t = & \beta_0 + \beta_1 \ln Customs Reform_t + \beta_2 \ln FDI_t + \beta_3 \ln GCF_t \\ & + \beta_4 \ln Consumption_t + \beta_5 \ln GDP_t + \beta_6 \ln Exchange rate_t \\ & + \beta_7 \ln Inflation_t + \epsilon_t \end{aligned}$$

Where:

- t : The research period (2008Q1 -2018Q4), (44 quarterly observation).
- β_0 :The constant,
- $Exports_t$: The dependent variable, which is the level of Egypt's exports,
- $Customs Reform_t$:The level of customs reform at a time t.
- β_2 to β_7 : The transactions of other economic determinants of Egypt's exports.
- ϵ_{it} :The random error.

6.2. Data description and descriptive statistics

6.2.1 Descriptive Statistics

The research model relay on descriptive statistics including the mean, as one of central tendency measures, and the standard deviation, as a measurement of dispersion, minimum and maximum, in addition to graphs will be used, to clarify the nature and characteristics of the research model variables as seen in the table below:

Table (1): Descriptive summary statistics

	<i>Unit</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Dependent Variable:						
<i>Non-petrol Exports</i>	<i>(% GDP)</i>	44	5.7309	1.536	3.3592	9.4462
Independent Variable:						
<i>Terminal handling time</i>	<i>(Time)</i>	120	6.5469	1.198	4.6458	9.9688
<i>Customs release time</i>	<i>(Time)</i>	120	3.1416	0.524	2.2813	5.3542
<i>Total customs work time</i>	<i>(Time)</i>	120	11.256	1.948	8.2083	16.198
Control Variables:						
<i>FDI net inflow</i>	<i>(% GDP)</i>	44	2.3596	0.689	0.9192	4.4338
<i>Gross Capital Formation</i>	<i>(% GDP)</i>	44	16.603	3.636	10.406	27.778
<i>Total Final Consumption</i>	<i>(% GDP)</i>	44	91.319	4.98	78.082	99.167
<i>GDP</i>	<i>(in Billion US \$)</i>	44	66.3	14.1	40.6	93.9
<i>Exchange rate</i>	<i>(LUC per US \$)</i>	44	8.7399	4.57	5.3601	18.07
<i>Inflation</i>	<i>(Jan 2007 = 100)</i>	44	158.08	55.32	98.2	296.47

Source: By Researcher

The mean value of the quarterly non-oil exports (the dependent variable) over the period (2008-2018), is equivalent to (5.7 percent) of GDP; in addition, the non-oil exports were on a general declining trend during that period, reaching their lowest value in the fourth quarter of 2016. However, the liberalization of the exchange rate in November 2016, resulted in the breakdown of export chains and turned it into an upward trend. Regarding the customs reform (independent variables), the total customs working time for a cargo is between (8.2 - 16.2) days and its mean value is 11.3 days, most of this time proportion is due to the time before the customs work, since its value mean is 6.55 days, and the time of the customs work itself has a mean value of 3.14 days. For the controlling variables; the mean of quarterly net foreign direct investment is 2.36% of GDP, domestic investment is 16.6%, and total domestic consumption expenditure (government and private) recorded a mean of 91.3%. These statistics in addition to exports statistics have resulted in a

rise in the quarterly GDP of Egypt since its value in the start of 2008 was 40.6 billion dollars and reached 93.9 billion dollars at the end of 2018. Regarding the exchange rate, it raised from 5.36 in 2008 to 17.86 pounds per US dollar in 2018. Inflation also witnessed an increase within this period until it recorded 296.47 in the end of 2018(almost tripled from its Initial level the beginning of 2010)

6.2.2. Correlation Analysis

Table (2): Correlation matrix between study variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<i>In Non-petrol Exports</i> (1)	1										
<i>In terminal handling time</i> (2)	-0.1398 [-0.87]	1									
<i>In Customs release time</i> (3)	-0.4997 [-3.56]***	0.5031 [3.588]***	1								
<i>In Total customs work time</i> (4)	-0.3153 [-2.05]**	0.9548 [19.81]***	0.6637 [5.470]***	1							
<i>In FDI net inflow</i> (5)	0.4426 [3.199]***	-0.3393 [-2.22]**	-0.1763 [-1.10]	-0.4151 [-2.81]***	-0.0509 [-0.33]	1					
<i>In Gross Capita Formation</i> (6)	0.7069 [6.478]***	-0.1553 [-0.97]	-0.3233 [-2.11]**	-0.2564 [-1.63]	0.0945 [0.615]	0.2804 [1.893]*	1				
<i>In Total Final Consumption</i> (7)	-0.5482 [-4.25]***	0.5528 [4.089]***	0.3946 [2.647]**	0.6152 [4.811]***	-0.3375 [-2.32]**	-0.4169 [-2.97]***	-0.7754 [-7.96]***	1			
<i>In GDP</i> (8)	-0.9254 [-15.8]***	0.2329 [1.477]	0.4186 [2.841]***	0.3739 [2.485]**	0.0775 [0.504]	-0.3957 [-2.79]***	-0.7116 [-6.56]***	0.6149 [5.054]***	1		
<i>In Exchange rate</i> (9)	0.0923 [0.601]	0.5700 [4.277]***	0.0684 [0.423]	0.5211 [3.763]***	-0.7054 [-6.45]***	-0.1042 [-0.68]	-0.1076 [-0.70]	0.5149 [3.893]***	0.1433 [0.938]	1	
<i>In Inflation</i> (10)	-0.0388 [-0.252]	0.6058 [4.694]***	0.1908 [1.198]	0.5985 [4.606]***	-0.5829 [-4.65]***	-0.1842 [-1.21]	-0.1563 [-1.03]	0.5397 [4.155]***	0.2748 [1.852]*	0.9551 [20.89]***	1

Note: ***indicates significance at 1%, ** indicates significance 5% and * indicates significance 10%.

Source: By Researcher

According to correlation matrix, the correlation between customs reform variables (independent variables) is as follow: the correlation between the terminal handling time and the customs release time is weakly positive (50.3%), while the total time is more correlated to the time before the customs release time (95.5%) than the customs release time itself (66.4 %). When it comes to the correlations between customs reform variables (independent variables) and exports (dependent variables), it's evident that there is a negative relation between customs reform variables and exports. The customs release time phase variable is the most correlated variable of customs reform with exports (-49.9%), followed by the total customs work time variable (-31.5%), and lastly the terminal handling time variable (-13.9%). The correlations between the controlling variables and the exports (the dependent variable) are found to be statistically significant since, there is a significant positive relation between the foreign direct investment and exports (44.2%), and also the gross capital formation (domestic investment) has a significant positive effect on the Egyptian exports (70.6%). While total Domestic consumption expenditure and the gross domestic product GDP are negatively correlated with exports by (-54.8%) and (-92.5%) respectively and this inverse correlation between GDP and exports clears the fact that the degree of trade openness is declined, and also Egypt tends to depend on its self-capabilities. On the other hand, the relation between exports, the exchange rate, and inflation variables was very weak (marginal) and not statistically significant since the correlation between exports and the exchange rate is (9.2%), and between exports and inflation is (-3.8%). The weak correlation between the exchange rate and exports can be explained by the fact that the Egyptian production system is inflexible, which means that the Egyptian exports cannot

take advantage of the local currency depreciation which should make its prices cheaper than the competitive products in the international markets and thus increasing the foreign demand for the Egyptian exports.

6.3 Regression Analysis and Empirical Results

The unit root test shall be used to identify the degree of time-series integration of variables under study to check the stability of the variables. The Dickie Fuller test (ADF) is the most used in empirical researches to test the stability of the variables according to the below function (Wolters, J., Hassler, U.,2005):

$$\Delta y_t = \mu + \delta y_{t-1} + \sum_{i=1}^k \beta_i \Delta y_{t-i} + \epsilon_t$$

Where:

- Δ is the first difference of the time series (y_t) that we want to test its stationarity,
- t is time trend ,
- k refers to the number of lag periods, μ is the constant, and ϵ_t represents the white noise.

The Dickie Fuller test (ADF) is used to test the null hypothesis $H_0: \delta = 0$ i.e., that mean there is a unit root (non-stationary), while, the alternative hypothesis $H_1: \delta < 0$ refers that the series is stationary. Philips-Perron (PP) test will be used also in order to check the stability of the results since the Philips-Perron (PP) developed a generalization of the (ADF) method that allows the existence of autocorrelation in the error limit. (Fuller, W.A.,1976).

The (ADF) and (PP) tests are usually used to analyze the stationary of variables and here the results of both tests as per table 3 which shows that the variables do not have any structural break since these variables (the terminal handling time, the time of customs work, the total customs work time, net inflows of foreign direct investment, and total final consumption) do not have a unit root and are stable at level/ $I(0)$. In addition, the integrated degree of these variables is $I(0)$ except for the inflation whose integrated degree is $I(1)$, and is not stable. On the other hand, the (PP) test showed that the fixed capital formation does not include a unit root, and are stationary at the level, while the (ADF) test recorded that this variable contains a unit root, and is nonstationary at the level, after that it becomes stationary at the first difference on the constant part only. As a result, the possibility of using the cointegration method will not be affected by the stationary of the fixed capital formation variable at the first difference because this variable has become stable on the second difference as the results of both (ADF) and (PP) tests show and that is the condition for the cointegration method to be applicable whether through the (ARDL) or (MIDAS) method to determine the long-run relationship between series with different order of integration. (Nkoro, E., & Uko, A. K., 2016). The following table shows the statistical data obtained from the ADF and Philips-Perron (PP) test:

Table (3): ADF - PP Unit root test results

Variables	ADF			PP		
	Intercept	Intercept & trend	None	Intercept	Intercept & trend	None
<i>ln terminal handling time</i>	-3.3241 (0.016)**			-4.5646 (0.000)***		
<i>ln Customs release time</i>	-5.3912 (0.000)***			-5.3912 (0.000)***		
<i>ln Total Customs time</i>	-3.513 (0.009)***			-4.8233 (0.000)***		
<i>ln FDI net inflow</i>	-3.6602 (0.009)***			-5.7576 (0.000)***		
<i>ln Gross Capital Formation</i>	-2.4079 -0.146	-0.7052 -0.966	- 0.6294 -0.438	-5.2459 (0.000)***		
<i>D(ln Gross Capital Formation)</i>	-3.8269 (0.006)***					
<i>ln Total Final Consumption</i>	-3.3764 (0.017)**			-3.3189 (0.020)**		
<i>ln Inflation</i>	1.2544 -0.998	-1.2494 -0.887	2.2961 -0.994	1.2885 -0.998	-1.2494 -0.887	2.5389 -0.997
<i>D(ln Inflation)</i>	-6.0634 (0.000)***			-6.1005 (0.000)***		
Critical Values	<i>Level</i>			<i>First difference</i>		
1%	-3.7696	-4.4407	- 2.6743	-3.7529	-4.4163	-2.669
5%	-3.0049	-3.6329	- 1.9572	-2.9981	-3.622	-1.956
10%	-2.6422	-3.2547	- 1.6082	-2.6388	-3.2486	-1.609

Note: *** indicates significance at 1%, ** indicates significance 5% and * indicates significance 10%.

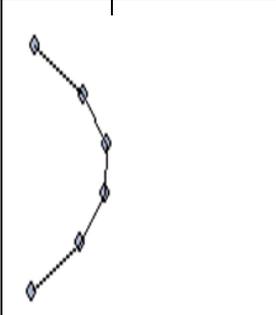
Source: By Researcher

6.3.1 Estimating the Relationship Between Customs Reform and Exports:

Table (4): Estimating the effect of Total customs work time, terminal handling time & Customs release time on Exports

Method: MIDAS [PDL/Almon (polynomial degree: 3)]

Independent variables	ln Total customs work time	ln terminal handling time	ln Customs release time
<i>Reg No.</i>	<i>Reg (1)</i>	<i>Reg (2)</i>	<i>Reg (3)</i>
<i>(PDL01)</i>	-0.4655	-0.1459	-0.086
	[-4.233]***	[-0.979]	[-2.126]**
<i>(PDL02)</i>	0.3558	0.0963	0.0711
	[4.634]***	[1.057]	[2.884]**
<i>(PDL03)</i>	-0.0512	-0.0124	-0.0061
	[-4.676]***	[-1.089]	[-1.932]*
<i>ln FDI net inflow</i>	0.1259	0.1193	0.1124
	[3.770]***	[2.053]*	[5.864]***
<i>ln Gross Capital Formation</i>	0.0784	0.0693	0.1259
	[1.223]	[0.533]	[3.019]***
<i>ln Total Final Consumption</i>	-0.5768	-1.0981	-1.5692
	[-2.254]**	[-2.217]**	[-8.496]***
<i>ln GDP</i>	-0.9164	-0.8901	-0.6896
	[-7.478]***	[-3.909]***	[-8.429]***
<i>ln Exchange rate</i>	0.1229	0.3601	0.4931
	[0.797]	[1.219]	[5.106]***
<i>ln Inflation</i>	0.086	-0.1954	-0.4097
	[0.427]	[-0.524]	[-3.106]***
<i>Constant</i>	26.082	28.892	25.926
	[9.186]***	[5.195]***	[12.39]***
<i>Adjusted R-squared</i>	98.10%	92.60%	99.70%
<i>Obs. after adjustments</i>	35	35	35
<i>Lags selection</i>	6	7	7
<i>DW statistics</i>	1.9383	1.5729	2.4506

<i>Lag</i>	<i>ln Total customs work time / Coefficient (Distribution)</i>	<i>ln terminal handling time / Coefficient (Distribution)</i>	<i>ln Customs release time / Coefficient (Distribution)</i>
0			
1			
2			
3			
4			
5			
6			
7			
8			

Note: *** indicates significance at 1%, ** indicates significance 5% and * indicates significance 10%.

Source: By Researcher

The regression (1) shows that the customs reform that entails decreasing the customs release time result in a rise in the exports in Egypt, because the total customs work time has a negative impact on exports as a percentage of GDP at a level of 1%, which indicates that a reduction in total customs work time will result in an increase in exports in Egypt. Regarding the model coefficients, they reflect that total customs work time has a negative impact on exports since the impact factor of the total customs work time (the customs reform) on exports is (- 0.46.55) which means that the customs reform which guarantee a decrease in the total customs work time, will increase the exports in Egypt with 46.55%. On the other hand, the controlling variables effects differs since, the foreign direct investment positively affect the exports in Egypt as its impact factor is 0.1259. unlike, the domestic investment that does not have any effect on exports. regarding the government

and private domestic consumption expenditures, they have a negative effect on exports as a percent of GDP as their impact factor recorded (-0.5768).

With regard to the impact of the GDP as a proxy for the Egyptian market size effect on exports, regression shows that rising the Egyptian market size by one unit will result in a reduction in the Egypt's exports by (-0.5768) of total GDP. One of the most prominent results of Regression (1) was the effect of the exchange rate and inflation since, Regressions (1) reveals that a rise in the exchange rate doesn't have any impact on exports and inflation does not affect the exports as well. The regressions (2), (3) clarify that there are some asymmetric effects of the terminal handling time, and the customs release time on exports. Because the terminal handling time doesn't have any effect on exports. However, the customs release time has a negative impact on the Egyptian exports since a one-day reduction in the customs release time phase results in a rise in the Egyptian exports by 8.60% of the total GDP and thus working on decreasing the time of the customs release is more important than decreasing the terminal handling time. The key regression statistics shows that the value of the adjusted coefficient of determination (\bar{R}^2) shows that 95.7 percent of the variations in exports are explained by the model, while the remaining 4.3 percent is attributable to other variables and random factors that have not been controlled within the Sample. Furthermore, the Durbin- Watson test statistic value has recorded nearly 2.0, which indicates there is no autocorrelation detected in the sample so the null hypothesis (H_0) was rejected and thus, the alternative hypothesis was accepted.

7. Conclusion and Recommendations

7.1 Conclusion

Egyptian customs have a vital role in managing and developing the Egyptian economy. Apart from being a source of budget financing and collecting government revenues through tariffs, fees and customs taxes, it maintains the security of society and has become an engine for the development and increase of the country's exports and an important influence on the competitive advantage of domestic goods in global markets. Hence, focusing on increasing the customs reform in Egypt by reducing customs procedures and, consequently, the time required to complete these procedures, one of the most important factors that increase Egyptian exports abroad and affect the competitive advantage of Egyptian goods in foreign markets. The Egyptian government has made outstanding efforts during the past years to support the performance of customs authorities and institutions involved in the customs work, which resulted in an increase in Egyptian exports during that period.

7.2 Recommendations

According to the foregoing, customs reform is a very important imperative because of its important impact on foreign trade, especially exports in Egypt. Therefore, the customs authorities should make intensive efforts to enhance reform efforts that include reducing the time and cost of customs procedures, especially the procedures that are occurred at the stage of customs work, because the longer customs work time the more negatively the exports are affected. Therefore, one of the most important recommendations necessary is to reduce the time of customs work to the lower limit through simplifying customs procedures, providing the border and clearance procedures forms

online on their website, using advanced technologies, accepting copies of documents, decreasing the number of documents and signatures required, clarifying the steps of cargo's release process as well as provide data for traders, customs agents, policymakers and any related parties. Moreover, further efforts are deeply needed to decrease the physical inspections, enhance pre-arrival processing of documentation, pre-release of trusted shipments, and full adaption of risk-management criteria in all customs work. On the other hand, customs employees need sufficient training programs on the new systems in order to achieve the expected results of the reform initiative. (OECD, 2021).

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المستخلص:

تهدف الدراسة إلى تقدير تأثير الإصلاح الجمركي على الصادرات في مصر خلال الفترة (2008-2018) عبر استخدام مؤشرات زمن مناولة ساحات ميناء الحاويات وزمن الإفراج الجمركي وإجمالي زمن العمل الجمركي كمقياس للمتغير المستقل (الإصلاح الجمركي)، بينما المتغير التابع فتم استخدام قيمة الصادرات غير البترولية لمصر حيث تتكون عينة الدراسة من سلسلة بيانات ربع سنوية تبدأ من عام 2008 حتى عام 2018. استخدمت الدراسة الصيغة اللوغاريتمية لبناء نموذج العام للدراسة واجراء اختبار جذر الوحدة للسكون للمتغيرات المستخدمة للتحقق من استقرار السلسلة الزمنية المستخدمة وكذلك تم استخدام اسلوب التكامل المشترك ونموذج انحدار ميداس (MIDAS) لتقدير البيانات ذات التكرارات المختلفة لتحديد العلاقة بين متغيرات الدراسة.

أسفرت الدراسة عن أن الإصلاح الجمركي يؤثر إيجابياً على الصادرات غير النفطية لمصر خلال الفترة المذكورة حينما تم تقليل زمن مناولة ساحات ميناء الحاويات، وزمن الإفراج الجمركي، وبالتالي سيؤدي انخفاض إجمالي زمن العمل الجمركي إلى زيادة الصادرات بقيمة تعادل 0.4655.

تتوافق نتيجة الدراسة مع نتائج دراسات كلاً من (Elliott & DaSilva-Glasgow, 2020), (Bonsignori, 2019), (Siu, 2019), (Li, 2019), (Fernandes & Hillberry, 2017), (Martincus & Graziano, 2013) و(Djankov et al., 2006). ومن أهم توصيات الدراسة ضرورة تبني مزيد من الإصلاحات في مختلف الجوانب في وقت واحد، على سبيل المثال لا الحصر، تقليل وقت وتكاليف الإفراج عن الشحنات عن طريق تقليل عمليات التفتيش المادي، وتحسين المعالجة قبل الوصول لأوراق الاستيراد، والإفراج المسبق عن الشحنات الموثوقة، وسيؤدي دمج معايير إدارة المخاطر في جميع العمليات الجمركية للوصول إلى المعايير الدولية إلى تحقيق العديد من الأرباح الحكومية والتأثير بشكل إيجابي على اقتصادها كواحدة من البلدان ذات الدخل المتوسط المنخفض.

الكلمات الدالة : الإصلاح الجمركي والصادرات والتجارة الخارجية.