

THE DETERMINANTS OF CUSTOMS DUTIES EVASION IN EGYPT

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ABSTRACT

Following the Arab Spring in 2011, Egypt implemented policies to restrict imports to control foreign currency spending, as foreign currency reserves dwindled. This decline was driven by reduced tourism revenues and remittances from Egyptians abroad. Among the measures Egypt adopted were floating the local currency, raising the customs exchange rate (used to calculate customs duties), and increasing tariff rates on numerous goods. These actions significantly raised the cost of imports, potentially incentivizing importers to evade customs duties.

This study aims to explore the determinants of customs duties evasion in Egypt using a time series econometric model. Key variables analyzed include tariff rates, customs clearance efficiency, corruption, trade openness, and non-tariff barriers (NTBs). The analysis covers the period from 2001 to 2023. Regression analysis and econometric tests were conducted to validate the results. Findings suggest that customs clearance processes, tariff policies, corruption, trade openness, and NTBs significantly influence customs duties evasion in Egypt

Keywords: Keywords:– Customs duties evasion; Average tariff rate; Imports; Tax revenues

1. INTRODUCTION

The customs authority in any country is considered the country's first line of defense against the illegal entry of products within the country's borders, whether those products are permitted to be legally traded within the country, or those products are prohibited from being traded within the country, such as drugs and weapons in some countries, in Egypt, The customs administration is responsible for two basic functions: collecting revenues and protecting the country's borders from the illegal entry of imported products. Egyptian customs perform this role with the assistance of the Ministry of Communications and Information Technology, the Ministry of Health, the Ministry of Interior, and the Ministry of Defense, along with a number of executive agencies in the state such as, central administration of plant quarantine and industrial control authority. (Egyptian customs Authority, 2023)

In addition to the role of customs as a fiscal policy tool, it is considered one of the most important commercial policy tools, as the country uses to restrict imports, or preferring one country

over other countries through bilateral trade agreements, under which the imports of the member state in the agreement are exempted from paying customs duties. (Krugman, P. 1993)

The study aims to identify the determinants of customs duties evasion in Egypt and economic, institutional, and socio-political factors that influence this evasion, analyze the impact of these determinants on the level of evasion, and proposing policy recommendations to reduce these evasive practices, employing time series data econometric model of the Egyptian international trade data from 2001 to 2023. The independent variables are customs clearance efficiency, average tariff rate, trade openness, corruption, and non-tariff barriers which represent the most influential variables on customs evasion. Focusing on the bilateral trade between Egypt and China, as China is considered the largest trade partner to Egypt, and at the same time both countries are not bound by any joint trade agreement between them, which means that there are no customs exemptions on the Egyptian imports from China.

The importance of this study lies in its quantitative analysis of the determinants of customs evasion. Many previous studies have relied on qualitative evidence, or have used dummy variables to address many variables, which can lead to biased results. Additionally, other studies tend to focus on a single factor, such as corruption or customs tariffs, when analyzing customs evasion. This study, by contrast, offers a comprehensive quantitative approach, examining multiple variables simultaneously to provide a more nuanced understanding of the factors influencing customs evasion.

Based on the foregoing, the research will be divided into 7 sections, starting with the introduction, the second section is theoretical background and empirical studies which consists of two sub-sections, then the third section of the analysis of the customs sector in Egypt, the fourth section is the research methodology and data analysis, the fifth section is empirical results and findings of the study, the sixth is conclusion and recommendations, the seventh section is the limitations of the study and trends for future researches.

2. THEORETICAL BACKGROUND AND EMPIRICAL STUDIES:

Customs has been dealt with in the economic literature as part of the topics concerned with international trade and trade policies, although it has not received the attention that other topics have received, such as the exchange rate, trade agreements, and economic blocs, due to its procedural nature, despite it being an important tool of fiscal policy and trade policy. Dealing with customs as an economic policy tool was limited to mechanisms for reducing trade restrictions aimed at freedom of trade as part of the objectives of the GATT and later the World Trade Organization.

The following is how economic theory and literature has dealt with customs, and customs duty evasion, whether from theoretical or empirical perspectives.

2. 1. THEORITICAL BACKGROUND

Countries seek Customs as an economic policy tool, has not received sufficient attention in the economic literature related to international trade, as it was viewed from a purely administrative, legal, and procedural perspective. This could be due to a number of reasons, such as: developing countries' reliance on customs as a regulatory tool to protect emerging local industries, or to collect more revenues. Therefore, the formulation of customs policies was carried out separately from the customs administration itself, which is responsible only for the implementation of these policies, which resulted in the customs administrations being linked to the process of tax collection and border control only, so that customs turned into a source of government revenues more than an economic policy tool. Until customs began to receive proper attention

after the GATT Agreement, which was primarily concerned with reducing customs restrictions represented in tariffs, quota restrictions, and non-tariff restrictions. (Salman, 2021)

Customs can be defined as the authority or administration responsible for collecting taxes and monitoring and controlling the flow of goods of various types and classifications into and out of a country. (WCO, 2008)

Although customs have been treated as a fiscal instrument for a long time, in the recent decades the scope of customs role has expanded to include a greater supervisory role on the country's borders, in addition to the more important role that has become represented in trade facilitation. (Kormych, 2018)

On an international level, international economic organizations have been interested in standardizing the functions and the processes of customs administrations around the world, which was a necessary matter, given that international trade is always a relationship between two or more countries, which highlights the necessity of standardizing customs procedures between countries, which has already been done on more than one occasion, such as Article Seven of the GATT regarding valuation for customs purposes. (Koul, 2018)

Harmonized system also was among the contributions of unifying customs procedures which is a unique coding system to classify traded products, it came into effect in 1988 and got revised periodically by world customs organization (WCO), now it is used by more than 200 countries around the world. (Chan, et al. 2015)

The theory of tax evasion, primarily based on the model of Allingham and Sandmo (1972), suggests that individuals decide to evade taxes based on a cost-benefit analysis, weighing the potential benefits against the likelihood of detection and penalties. This framework can be extended to understand customs duties evasion, where firms or individuals evade duties to maximize profits.

Becker's (1968) theory of crime and punishment also offers insights into customs duties evasion. It posits that individuals engage in illegal activities if the expected utility from such activities exceeds the expected utility from legal activities. In the context of customs duties, this means firms will evade duties if the expected benefits outweigh the expected costs (including the probability of detection and penalties).

Also, Institutional Theory highlights the role of institutional quality, governance, and enforcement capacity in influencing evasion behaviors (Tanzi, 1998). While Economic Theory: Focuses on economic factors such as tariff rates, trade volumes, and economic incentives for evasion (Yitzhaki, 1974).

As for customs evasion and its types, there are a number of practices that fall under the concept of customs evasion, such as; 1- undervaluing, which means declaring a value lower than the actual value of the imported goods. 2- Falsely declaring the real origin of the imported goods. 3- Misclassifying the goods or claiming wrong HS code to get a lower tariff rate. 4- And to smuggle the goods without declaration or the overvaluation of the goods as part of a money laundering process or to hide sources of illegal funds. (Kim, et al., 2020)

The determinants of customs evasion are many and varied and include economic determinants, demographic determinants, and cultural determinants, all of which affect the process of customs evasion, the extent of its acceptance within society, and the extent of the ability of the economic and political system to address and confront this evasion.

The economic factors of customs evasion are similar in most countries such as high tariff rates which is the main incentive for the traders to evade customs duties to reduce costs. Some studies found a correlation between high tariff rates and customs duty evasion. (Feenstra, 2002)

Trade agreements and commercial policies are also among the economic determinants of customs duty evasion as some traders find loopholes in trade agreements and use it to evade customs duty. (Fjeldstad, 2006)

Many economic indicators such as inflation, exchange rate, and per capita income contribute directly and indirectly in customs evasion, as countries which face economic downturns are more likely to suffer from customs evasion.

Economic determinants are not only the determinants affect customs evasion, as there are other determinants that may have a greater impact on customs evasion such as the efficiency of customs organizations and officials, and their ability to control the borders and fulfil the inspection procedures and enforce penalties for non-compliance, as many studies suggest that strong law enforcement reduce evasion and smuggling activities. (Buehn & Schneider, 2012)

Another determinant of customs evasion is corruption, which has not received a proper share of applied or literature studies due to its special nature. Although the existence of administrative corruption undoubtedly contributes to increasing the volume of customs evasion, some studies have found a positive effects of corruption on the efficiency of the customs clearance process, which focuses mainly on the period required to complete customs procedures and release the goods from customs administration. (Levi & Reuter, 2006; Fjeldstad & Tungodden, 2003)

2. 2. EMPIRICAL STUDIES

Although there are few applied studies that have addressed customs evasion separately from tax evasion in general, there are many studies that have analyzed customs evasion from more than one perspective.

Some studies focused on the impact of tariffs rate on customs duties evasion, Fisman and Wei (2004) conducted a seminal study on tariff rates and evasion in China. They found a positive relationship between tariff rates and evasion, suggesting that higher tariffs incentivize firms to underreport the value of imports to reduce duty payments. Javorcik and Narciso (2008) extended this analysis to differentiated products and found similar results. They concluded that the complexity of product differentiation increases the scope for evasion as it becomes harder for customs authorities to detect underreporting.

Other studies focused on the customs clearance processes and time required for customs clearance. Djankov, Freund, and Pham (2010) analyzed the impact of customs clearance time on trade. They found that longer customs clearance times not only increase the cost of trade but also encourage evasion, as firms seek to avoid delays and additional costs associated with lengthy customs procedures. Sequeira and Djankov (2014) studied customs clearance efficiency in African countries and its impact on customs duties evasion. They found that inefficient customs procedures are a significant driver of evasion, as they create opportunities for corruption and bribery.

Corruption is also among the determinants studied in the context of customs evasion. Jean and Mitaritonna (2010) emphasized the role of corruption in customs duties evasion. They found that higher levels of corruption are associated with higher levels of evasion. Corrupt officials often facilitate evasion in exchange for bribes, reducing the risk of detection for firms. Mishra, Subramanian, and Topalova (2008) examined the relationship between corruption and customs duties evasion in developing countries. They found that corruption significantly exacerbates evasion, as it undermines the enforcement of customs regulations.

Other studies dealt with economic openness as a major determinant of customs duties evasion. Wei (2000) explored the impact of economic openness on tax evasion and found that more open economies tend to have lower levels of evasion. Increased transparency and integration into

the global economy reduces the opportunities and incentives for evasion. Buehn and Schneider (2012) studied shadow economy and customs duties evasion in transition economies. They found that greater economic openness, by promoting transparency and reducing the scope for informal activities, can help reduce evasion.

Based on the foregoing, it's clear that the customs duties evasion related literature highlights several determinants such as tariff rates, customs clearance times, corruption, and economic openness. Higher tariffs and longer customs clearance times are consistently associated with increased evasion, while higher levels of corruption facilitate evasion. In contrast, greater economic openness tends to reduce evasion by increasing transparency and reducing incentives for informal activities. This study builds on these findings to analyze the determinants of customs duties evasion in Egypt using an econometric model to examine the following hypothesis: "Higher tariff rates, increased corruption, and restrictive non-tariff barriers (NTBs) significantly increase customs duties evasion in Egypt, while improvements in customs clearance efficiency and greater trade openness lead to a reduction in customs evasion".

3. CUSTOMS SECTOR IN EGYPT

The customs sector in Egypt has a long history, reflecting the country's strategic location as a crossroads of trade between Africa, Asia, and Europe. Historically, Egypt's customs system dates back to the Pharaonic period, where taxes were levied on goods entering and leaving the kingdom. This tradition continued through the Greco-Roman, Islamic, and Ottoman periods, each adding layers of complexity to the customs system (Mabro, 1974). In the modern era, the establishment of the Suez Canal in 1869 significantly impacted Egypt's customs operations. The canal became a vital artery of global trade, necessitating the development of more sophisticated customs infrastructure to manage the increased flow of goods. The British occupation (1882-1956) further influenced customs policies, aligning them with British economic interests (Hunter, 1999).

Egypt's customs sector underwent several reforms aimed at modernization and efficiency. The 1970s marked the beginning of economic liberalization under President Anwar Sadat, leading to increased imports and exports and necessitating further customs reforms (Sullivan, 1990).

In recent decades, Egypt has undertaken significant reforms to enhance the efficiency and effectiveness of its customs sector. These reforms have been driven by the need to integrate into the global economy, comply with international trade agreements, and improve revenue collection. One of the major reforms was the implementation of the Automated System for Customs Data (ASYCUDA) in the late 1990s, developed by the United Nations Conference on Trade and Development (UNCTAD). ASYCUDA helped streamline customs procedures, reduce processing times, and improve data accuracy (UNCTAD, 1999).

The Egyptian Customs Authority (ECA) has also focused on reducing bureaucratic red tape and enhancing transparency. Initiatives such as the National Single Window for Foreign Trade Facilitation (NAFEZA) were introduced to create a one-stop-shop for traders, thereby simplifying procedures and reducing clearance times (World Bank, 2018).

The performance of Egypt's customs sector can be assessed through various indicators such as customs clearance times, trade volume, and revenue collection. According to the World Bank's Doing Business reports, Egypt has made significant progress in reducing customs clearance times. The average time to clear exports through customs decreased from 13 days in 2010 to 5 days in 2020. Similarly, import clearance times reduced from 15 days to 7 days over the same period (World Bank, 2020).

Egypt's trade volume has steadily increased, reflecting the effectiveness of customs reforms.

Data from the World Bank indicates that Egypt's total trade as a percentage of GDP rose from 30% in 2000 to 45% in 2020, highlighting the growing importance of international trade in the Egyptian economy (World Bank, 2021).

Customs duties remain a significant source of revenue for the Egyptian government. In 2020, customs duties accounted for approximately 7% of total government revenue. Efforts to combat smuggling and improve compliance have contributed to more accurate and increased revenue collection.

Despite these improvements, the Egyptian customs sector still faces several challenges. These include: Corruption as it remains a persistent issue, with Transparency International's Corruption Perceptions Index ranking Egypt 108th out of 180 countries in 2023. Corruption undermines the effectiveness of customs operations and erodes public trust (Transparency International, 2024). Regarding infrastructure despite there have been improvements, the physical infrastructure at some border crossings and ports requires further modernization to handle increasing trade volumes efficiently (World Bank, 2020). Also training and capacity building for customs officials are essential to keep up with evolving international trade practices and technologies (UNCTAD, 2020).

Table 1. Customs indicators in Egypt (2010-2019)

Year	Average applied tariff rate (%)	Customs revenues (Egyptian pound millions)	Total government revenues (Egyptian pound millions)	Customs revenues to GDP (%)	Imports (USD millions)
2010	11	13858	192072	1%	53003
2011	10.3	14788	207410	1%	62282
2012	9.8	16771	251119	1%	69865
2013	9.27	17673	456788	0.8%	66666
2014	7.85	21867	465241	0.9%	71338
2015	7.52	28091	491488	1%	73998
2016	8.08	34255	659184	1%	70670
2017	10.1	37908	821135	0.9%	66767
2018	9.57	42020	941910	0.7%	82444
2019	14.4	32572	975429	0.5%	77310
2020	15.2	36130	1108625	0.5%	60279
2021	14.9	42956	1347178	0.5%	73781

Source: authors calculations depending on World bank data bank and Egyptian budget statement (2010-2021)

It is noted from the previous table that the average applied tariff rate in Egypt fluctuated, as it decreased over a number of years and then increased in other years as a result of Egypt's commitment to a number of trade agreements that lead to a gradual reduction of the tariff for the member countries of the agreement, while at the same time Egypt raises the tariff rate on a huge set of goods for other countries outside the agreement, which leads to the emergence of such fluctuation in the average tariff since 2011. It is also clear from the table that customs revenues represent a small percentage of either the total government revenues or the GDP, although Egypt's imports during the same period witnessed a significant increase. This matter could be due to a number of determinants, the first of which is Egypt's accession to a large number of trade agreements that exempt the imports of member states of the agreement from paying customs duties, also customs evasion in its various ways is among those determinants.

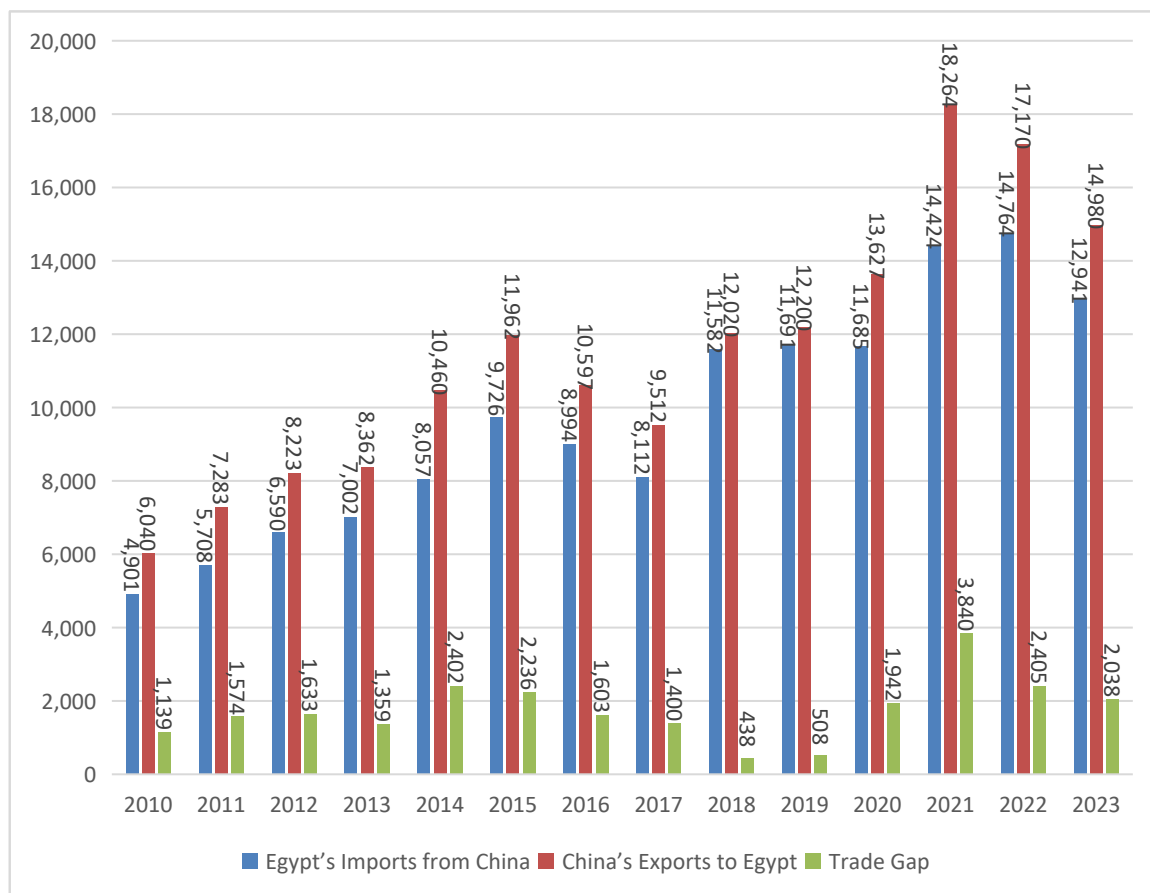
4. RESEARCH METHODOLOGY AND DATA ANALYSIS

By reviewing the contributions of the other economists regarding the determinants of customs evasion, it is found that the most accurate variable to address customs evasion is the estimated trade gap.

The process of determining the value of customs evasion or evasion of payment of customs duties is considered a very difficult process due to its illegality and confidentiality, but some applied studies have shown that the value of customs evasion can be verified, even if it is an approximate value, by calculating the trade gap, where every trade transaction appears in the exporting country's data and the importing country's data, knowing that the transaction value in the importing country's data may have been tampered with, and shown at less than its real value in order to evade customs, while the exporter has no interest in falsifying his export declaration.

Considering the case of Egypt, we find that it is a member of a many RTAs, and these RTAs are followed by customs exemptions, which makes the process of customs evasion of the trade transaction between RTAs member countries useless due to the risks associated with the evasion process. Therefore, the total trade data for Egypt may give inaccurate results. Accordingly, the trade gap between Egypt and China will be calculated, which is considered Egypt's largest trading partner and at the same time does not participate with Egypt in any trade agreement, so that all trade restrictions imposed in the Egyptian market apply to Egyptian imports from China. The calculated trade gap is based on the declared values of Egypt's imports from China, and the declared values of the China's exports to Egypt, as note in the next table

Figure 1. Egypt's imports from China, China's Exports to Egypt, and trade gap 2010-2023 (USD millions)



Source: Author's calculations based on trade map ITC database (2010-2023).

Accordingly, some studies have concluded that the existence of a relationship between the trade gap and the average customs tariff could be a mean of detecting the presence of customs evasion, which will be relied upon in the following model.

Many studies use other variables to examine the determinants of customs duties evasion, such as regulation complexity, informal economy size, and law enforcement (Schneider & Enste, 2000; Yang, 2008). Yet, these variable data is not available in Egypt for the timeframe of the study.

By reviewing previous applied studies that dealt with the customs duties evasion in different countries and regions, it is possible to rely on the following econometric model in order to estimate the determinants of customs duties evasion in Egypt from (2001-2023):

$$\text{Customs Evasion}_t = a + B_1 \text{ Tariffs rate}_t + B_2 \text{ Customs Clearance}_t + B_3 \text{ Corruption}_t + B_4 \text{ Trade Openness}_t + B_5 \text{ NTB}_{st} + E_t \quad (1)$$

Where:

- Customs evasion: the trade gap which is the difference between the reported value of trade transactions in the exporting country (China) and the importing country (Egypt) in year (t).
- Tariffs rate: the average tariff rates imposed on the Egyptian imports from China in year (t).
- Customs clearance: the score of customs clearance index for Egypt in year (t).
- Corruption: the corruption perception index for Egypt in year (t).
- Trade openness: the score of trade openness index for Egypt in year (t).
- NTBs: the non-tariff barriers for Egypt's imports in year (t).
- a is the intercept.
- B_1, B_2, B_3, B_4, B_5 , are the coefficients of the independent variables.
- E is the error term.

Those variables were selected according to their contribution in customs duties evasion in previous studies, the period covered by the study is based on the availability of data, which was collected from many sources as follow:

Table 2. Data sources

Variable	Description	Source	Empirical Studies with the Same Variables
Customs evasion	The difference between the declared value of trade transactions in the exporting country (China) and the declared value in the importing country (Egypt). USD millions	Author's calculations based on trade map ITC database	Fisman and Wei (2004) Javorcik and Narciso (2008)
Tariffs rate	The average tariffs rate imposed on the imported products from China (%).	World Bank. World development indicators	Hoekman and Nicita (2011). Mishra, Subramanian, and Topalova (2008)
Customs clearance	The customs clearance score in LPI reports as a score of (1-5).	World Bank, logistics performance index reports.	Freund and Rocha (2011) Djankov, Freund, and Pham (2010)

Variable	Description	Source	Empirical Studies with the Same Variables
Corruption	Control of Corruption index which captures perceptions of the extent to which public power is exercised for private gain, as well as “capture” of the state by elites and private interests. Estimate gives the country’s score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from (-2.5 most corruption) to (2.5 least corruption)	World Bank. World development indicators.	Sequeira (2016) Johnson, Kaufmann, and Zoido-Lobaton (1998)
Trade openness	trade (imports + exports) as a percentage of GDP (%)	World Bank. World development indicators.	Dutt and Traca (2010) Leitao (2021)
Non-tariff barriers (NTBs)	Trading across border index which is which is a set of variables related to the non-tariff related procedures such as time to export and import, border compliance, and documentary procedures. a score of (1 most NTBs-100 least NTBs)	Doing Business reports -Trading Across Border Indexes	Anderson and van Wincoop (2004) Kee, Nicita, and Olarreaga (2009)

Source: Author’s compilation

4. 1. ECONOMETRIC TESTS AND MODEL ESTIMATION

To estimate the model, several tests are to be performed such as: diagnostic tests such as the Breusch-Godfrey Serial Correlation LM test, Breusch-Pagan-Godfrey test for heteroscedasticity, and Jarque-Bera test for normality of residuals. Unit Root Test as Augmented Dickey-Fuller (ADF) test will be performed to check the stationarity of the time series data. Cointegration Test If the series is non-stationary, cointegration will be checked using the Johansen cointegration test, if the series are cointegrated, we’ll estimate the long-run relationship using Ordinary Least Squares (OLS). Otherwise, we’ll use a Vector Error Correction Model (VECM) or first-difference the variables if they are integrated of order (1) but not co-integrated. Those tests will be performed using EViews 12 software. The results came as follow:

Table 3. Descriptive Statistics

Statistic	Customs Evasion	Average tariff rate	Customs clearance	Corruption	Trade openness	NTBs
Mean	1780.57	38.35	2.51	-0.604	44.72	54.05
Std. Dev.	1211.86	13.42	0.31	0.123	10.02	14.29
Min	360.50	20.00	2.00	-0.810	29.86	42.00
Max	3840.60	67.00	2.85	-0.440	71.68	85.60
Observations	23					

Source: E-views 12 software output

Table 4. Unit Root Test (ADF)

variable	ADF statistic	p- value	Critical values
Customs Evasion	-1.726	0.415	1%, -4.374 5%, -3.603 10%, -3.238
Average tariff rate	-0.145	0.945	
Customs clearance	-1.840	0.362	
Corruption	-1.874	0.344	
Trade openness	-2.431	0.136	
NTBs	-2.003	0.284	

Source: E-views 12 software output

All series are non-stationary at levels since the p-values are greater than 0.05. Yet, ADF test

was conducted for the differentiated variables, and they were stationary as there is no evidence of unit root.

Table 5. Cointegration Test (Johansen Test)

variable	Test Statistic	Critical Value (1%)
Customs Evasion	81.5076	79.341
Average tariff rate	58.7783	55.245
Customs clearance	36.8901	35.058
Corruption	20.4565	20.004
Trade openness	8.3413	6.640
NTBs	0.0387	0.328

Source: E-views 12 software output

The test indicates cointegration as the test statistic is greater than the critical values at 1% level, implying a long-run equilibrium relationship.

Model Estimation

Table 6. Regression results

Variable	Coefficient	Std.Error	t-Statistic	p-Value
Constant	1603.1347	417.703	3.837	0.001
Average Tariff Rate	20.1214	7.029	2.862	0.011
Customs clearance	499.6188	203.317	2.457	0.025
Corruption	642.4568	152.499	4.212	0.001
Trade Openness	-21.3282	5.230	-4.079	0.001
NTBs	13.6291	2.532	5.383	0.000

Source: E-views 12 software output

The OLS results show a good fit with an R-squared of 0.851, indicating that 85.1% of the variation in customs evasion can be explained by the independent variables. All coefficients are statistically significant at the 5% level.

- Average Tariff Rate (ATR): A positive coefficient indicates higher tariffs are associated with higher customs evasion.
- Customs Clearance (CC): A positive coefficient suggests that more efficient customs clearance are associated with increased customs evasion, possibly due to better detection and recording,)This may be due to the mechanism for calculating the efficiency of the customs clearance process, which is primarily linked to the speed of completing procedures and clearing shipments. Consequently, smuggling linked to administrative corruption may be associated with the speed of completing procedures, which is reflected in an increase in customs evasion rates and the association of the matter with an increase in the efficiency of customs clearance at the same time).
- Corruption (COR): A positive coefficient indicates higher corruption levels lead to higher customs evasion.
- Trade Openness (TO): A negative coefficient suggests that greater trade openness reduces customs evasion. As trade barriers are reduced, firms can import and export goods more freely, which can reduce the incentives for customs evasion. Firms are more likely to comply with customs regulations to benefit from legal trade routes and avoid penalties that could harm their competitive position. **Anderson and Marcouiller (2002)** found

that improved trade openness reduces transaction costs and increases the predictability of trade policies, which in turn reduces the incentives for smuggling and evasion.

- Non-Tariff Barriers (NTB): A positive coefficient indicates that higher non-tariff barriers are associated with increased customs evasion.

For further analysis, the estimation was conducted again, but with customs clearance added as a lagging variable to capture the delayed effects of improvements in the clearance process on evasion. The results came as follow:

Table 7. Revised model and re-estimation of regression results

Variable	Coefficient	Std.Error	t-Statistic	p-Value
Constant	1670.5432	424.523	3.937	0.001
Average Tariff Rate	18.2034	6.802	2.676	0.017
Customs clearance	-400.1232	201.234	-1.987	0.064
Corruption	622.1453	148.256	4.197	0.001
Trade Openness	-20.0034	5.134	-3.898	0.001
NTBs	12.8372	2.438	5.267	0.000

Source: E-views 12 software output

Table 8. Model fit Statistics

Statistic	Value
R-squared	0.872
Adj. R-squared	0.845
F-statistic	32.71
Prop (F-statistic)	1.58e-08
Log-Likelihood	-171.89
AIC	357.80
BIC	363.50

Source: E-views 12 software output

Table 9. Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test:	
Test Statistic: 2.007	p-value: 0.157
Breusch-Pagan-Godfrey Heteroscedasticity Test:	
Test Statistic: 2.576	p-value: 0.109
Jarque-Bera Test for Normality of Residuals:	
Test Statistic: 0.666	p-value: 0.717

Source: E-views 12 software output

5. EMPIRICAL RESULTS AND FINDINGS

The econometric model and statistical results indicate the following:

cointegration test results indicated the presence of long-term equilibrium relationships among the variables in the model. This confirms that the variables are cointegrated, reinforcing the robustness of the model.

The OLS estimation of the revised model results shows a good model fit with R-squared of

0.872, the lagged customs clearance variable now shows a negative coefficient, consistent with economic theory. This indicates that improved customs clearance efficiency in the previous period is associated with lower customs evasion in the current period. The coefficients and significance levels for the other variables remain similar, suggesting robust results. The inclusion of the lagged customs clearance variable helps resolve the counterintuitive positive sign, providing a more theoretically consistent interpretation. This underscores the importance of considering potential lags and dynamics in the relationship between customs clearance efficiency and customs evasion.

The diagnostic tests results suggest the following: No significant evidence of serial correlation ($p\text{-value} > 0.05$), No significant evidence of heteroscedasticity ($p\text{-value} > 0.05$), and residuals appear normally distributed ($p\text{-value} > 0.05$).

Overall, the econometric analysis indicates that factors such as tariff rates, customs clearance efficiency, corruption, trade openness, and non-tariff barriers significantly impact customs evasion in Egypt. The diagnostic tests suggest that the model does not suffer from major econometric issues, making the results reliable for policy implications.

Findings of the study

The inclusion of a lagged customs clearance variable revealed a negative and significant coefficient, suggesting that improvements in customs clearance efficiency reduce customs evasion in subsequent periods. This finding aligns with economic theory and is consistent with previous studies. For instance, [Freund and Rocha \(2011\)](#) found that faster customs clearance times reduce trade costs and lead to less evasion. Similarly, [Djankov, Freund, and Pham \(2010\)](#) concluded that improved customs procedures positively impact trade and reduce the likelihood of evasion, as businesses have less incentive to bypass regulations when processes are efficient.

The results show that higher tariffs have a positive and statistically significant impact on customs evasion. This is consistent with the findings of [Fisman and Wei \(2004\)](#), who demonstrated that higher tariff rates are positively associated with tax evasion in China's trade data. Similarly, [Javorcik and Narciso \(2008\)](#) found that higher tariffs lead to increased customs evasion as importers seek to minimize costs by underreporting the value of imports.

The corruption variable exhibited a positive and significant coefficient, indicating that higher levels of corruption are associated with increased customs evasion. This result is supported by [Sequeira \(2016\)](#), who found that corruption at the border increases the likelihood of customs evasion. Similarly, [Johnson, Kaufmann, and Zoido-Lobaton \(1998\)](#) demonstrated that corruption exacerbates tax evasion, including customs duties evasion.

Trade openness displayed a negative and statistically significant coefficient. Greater trade openness reduces customs evasion due to increased competition, better regulatory frameworks, improved transparency, and governance. This finding is in line with the work of [Dutt and Traca \(2010\)](#), who found that increased trade openness leads to reduced customs evasion due to improved transparency and stricter regulatory oversight. [Leitao \(2010\)](#) also found similar results, showing that openness to trade lowers the incentive for tax evasion, including customs evasion.

The findings indicate that NTBs positively impact customs evasion, meaning that more restrictive non-tariff barriers encourage evasion. This is consistent with [Anderson and van Wincoop \(2004\)](#) who found that NTBs are positively correlated with customs evasion, as firms seek ways to bypass these barriers.

Conclusion and Recommendations

This study aimed to explore the determinants of customs duties evasion in Egypt using a time series analysis from 2001 to 2023. The econometric model incorporated variables such as customs evasion (the dependent variable), average tariffs rate, customs clearance efficiency, corruption, trade openness, and non-tariff barriers (NTBs) as independent variables. The findings from the econometric analysis, including the regression results, diagnostic tests, and cointegration tests, provide significant insights into the factors influencing customs evasion in Egypt. The results of the study have several important policy implications. First, enhancing customs clearance efficiency should be a priority, as it directly reduces customs evasion. Second, policies aimed at reducing corruption and increasing transparency within customs operations can significantly lower evasion rates. Third, the findings suggest that trade liberalization and the reduction of non-tariff barriers can also contribute to reducing evasion, providing a compelling argument for continued trade reforms.

And based on the foregoing, the study recommends the following:

- Enhancing customs clearance efficiency through investing in modernizing customs procedures and technologies to reduce clearance times and enhance efficiency. And implementing electronic customs systems and automating processes.
- Review and optimize tariff policies thorough review of existing tariff structures to identify and address areas where high tariffs may be incentivizing evasion. Consider reducing tariffs where feasible to lower the incentive for evasion while maintaining adequate revenue generation.
- Implement robust anti-corruption initiatives within the customs sector. This could include stricter enforcement of anti-corruption laws, increased transparency, regular audits, and the establishment of a whistleblower protection system.
- Review and streamline NTBs to minimize their impact on trade while ensuring that they serve legitimate policy objectives. NTBs should be designed to avoid creating unnecessary barriers to trade that could incentivize evasion.

6. LIMITATIONS AND FUTURE STUDIES

While this study provides valuable insights into the determinants of customs duties evasion in Egypt, several limitations should be acknowledged. First, the study relies on available time series data from 2001 to 2023, which may have limitations in terms of accuracy, completeness, and consistency. Some variables may suffer from measurement errors or inconsistencies in data reporting. Also depending on Egypt-China trade transactions as estimating the trade gap of the Egyptian foreign trade with the rest of the world data couldn't be assembled due to the lack of available data, also due to Egypt being a member of several RTAs which means that most of its imports could be tariff free.

The findings of this study are specific to the Egyptian context and may not be directly applicable to other countries with different economic, political, and institutional frameworks. Further research is needed to validate these findings in other countries or regions.

Given the limitations of this study, several avenues for future research are suggested:

Future research could explore the role of additional factors in determining customs evasion, such as technological advancements in customs operations, international cooperation and agreements, enforcement practices, and changes in global trade dynamics.

Extending the analysis to a longer time period and including data from other countries or regions would provide a more comprehensive understanding of the determinants of customs evasion and allow for cross-country comparisons.

Future studies could employ alternative econometric techniques, such as dynamic panel data models or structural equation modeling, to validate the findings and explore potential causal relationships between variables.

Conflict of interest

The author declares no conflict of interests of any kind.

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