IMPACT OF ENVIRONMENTAL NON-TARIFF MEASURES-NTMON EGYPTIAN CHEMICAL INDUSTRIAL EXPORTS

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Abstract - The study attempts to assess the impact of the European environmental non-tariff measures (NTMs) on the Egyptian Chemical Exports at the 6-digit level of the Harmonized System over the period 2005-2014. The main hypotheses for this study tests whether the EU environmental non-tariff measures affect negatively the performance of Egyptian Chemical exporters, and are used as a disguised tool for protection or in other words, as a form of a non-tariff barrier.

Index Term - Non tariff measures, Sanitary and phytosanitary measures (SPS),Technical Barriers to Trade(TBT), REACH.

I. INTRODUCTION

In the recent past we used to include the traditional requirements of international markets are: quality product, price and cost of the product, adhere to the time of receipt of the importer port. Recently, these requirements have been expanded by adding new dimension, which is the environmental dimension, which has begun to appear as alternative constraints to customs restrictions, which has been increasing over time.

Environmental requirements are now the passport of any product - or service - that is traded in international markets, The Environmental Requirements Known as "Environmental non-tariff Measures" which include two categories:

First: **Technical Barriers to Trade(TBT).**

Second, Sanitary and phytosanitary measures (SPS), which are considered a major impediments to international trade, which called" the technical measures" Which is one of the pillars of non-tariff measures NTMs Compress to exports and imports Measures, imports measures divided in two categories **Technical Measures and Non-Technical Measures.** In this thesis will focus on **Technical Measures** a major impediments to international trade and can prevent market access,

Although the WTO adopted two environmental agreements, the environment under Phyto-Sanitary Measures Agreement (SPS), as well as Technical Barriers to Trade Agreement (TBT).they did not prevent countries from practicing discriminatory policies, but also they allowed to the private sector to issue standards.These **environmental non-tariff measures**, become increasingly stringent.

According to WTO ,The numbers of SPS account 710 notifications under period from 1/1/2013 till 31/4/2013. In addition, TBT notifications account 423 in the same period.

In our study we will focus on the technical one which the developed countries used "beyond the border" but the second one the developing countries used "at the border "because it is traditional instrument easy to use ,but the technical measures need Professionals to Apply. These technical or environmental non-tariff measures sprouted In place of tariffs, which declined steadily from 19.9 % and 6.7 % in 1995 to reach 7.4% and 2.4% in 2008 respectively. , this decline in tariff has raised the relative importance of NTMs, which are used now more than ever before as both protectionist and regulatory trade instruments "Regulatory protectionism "to control and hamper the free flow of international trade

These instruments were used mainly to protect humans, plants, environment and animals, But some countries have begun to use them intentionally or unintentionally after the customs duties have fallen in recent years which is considered one of the most serious restrictions on international trade currently certified by international organizations .Most restrictive countries that have issued legislations and standards are the United States and the European Union, which are accounted for about three-quarters of non-tariff barriers in the world. Hence, the countries of the European Union are the most area issued these technical regulations and standards, one of these Technical regulations is the "REACH"(Registration, Evaluation and Authorization of Chemicals)which issued . In late 2007, Which are reflected on the volatility of Egyptian chemical exports to the European Union. Especially after highlighting two important studies in these Linkages which are:

First: The **Global Enabling Reports** ,2012 clarified that the problems faced the Egyptian exports They are respectively as follows: price ,quality, finding the potential markets, and the technical regulation and standards

Second: According to the survey results (ITC,2013),The chemicals sector is the second most affected by burdensome NTMs. Hence, We will

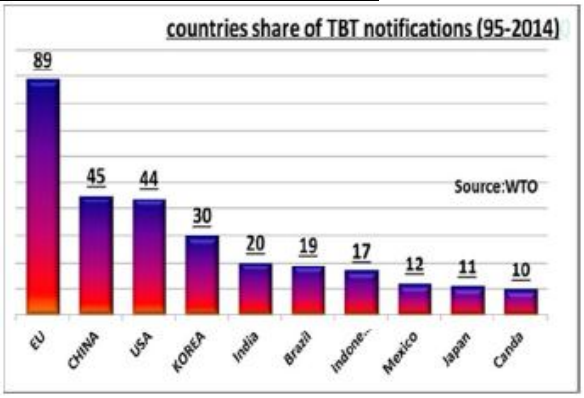
analyze the Egyptian chemicals sector for these fluctuations and we will estimate European environmental non-tariff measures on Egyptian chemicals exports.

II. REACH IS IMPLICIT NON-TARIFF MEASURES

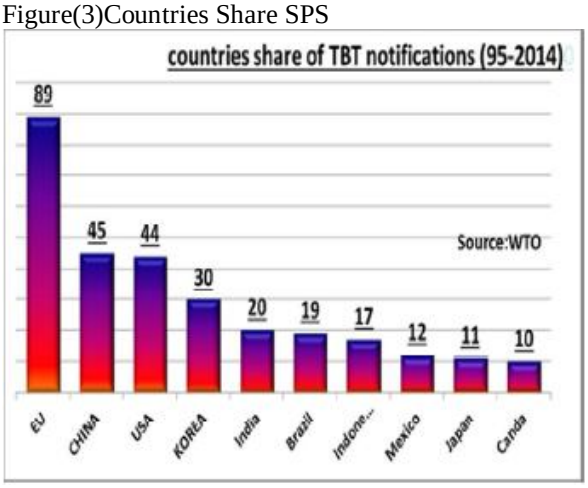
A. (In general) Extended look:

The increasing number of notifications related to sanitary and phytosanitary measures (SPS) and technical barriers to trade, particularly the EU region Which issues the highest notifications in the world during period(1995-2014):

Figure(2) countries share of TBT



Figure(3)Countries Share SPS



In-depth look:

As we seen, The European Environmental non-tariff measures is one of the largest requirements, especially in the chemicals sector. In June 2007, the European Union (EU) issued the REACH (Registration, Evaluation and Authorization of Chemicals) certification to represent an environmental non-tariff measures under the umbrella of the Technical Barriers to Trade (TBT), If it causes a problem for global chemicals, how will it be with Egyptian chemicals exports.

This legislation (REACH) means that any industrial chemical products to be exported to the European Union must pass four stages before their adoption, starting from the registration stage and then the evaluation and then dependence and then restricted

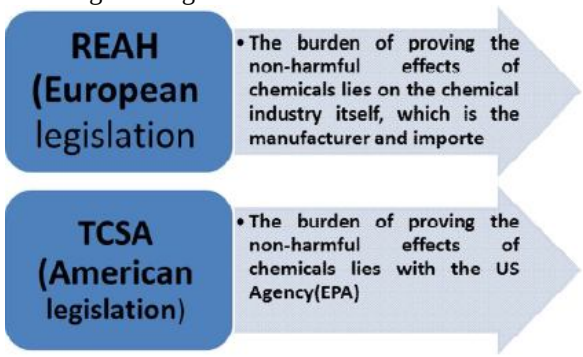
the REACH registration process is very difficult and expensive as it has to be done per substance (300-500 EUR per substance registration)and should be done before the end of 2018 or we will not be able to export to the EU

The REACH Certification, It is the most appropriate example of what we called THE protection under the name of "regulatory protectionism". Which is defined as a distinction for companies and local institutions against foreign companies and institutions. These protective administrative measures are often hidden in the form of high costs that affect the competitiveness of enterprises.

REACH using the precautionary approach , is a basis for further protection of health and the environment. Which is not officially recognized by WTO.

This regulation reflects the transformation of the regulatory burden from legislator to producer or importer on the basis of taking into account the actual risks of these substances to human health or the environment

REACH is based on the system of manufacturers and final importers, which must ensure that the manufacture or place of the market or the use of such materials does not adversely affect human health or the environment where its provisions are based on a precautionary principle. Which is the opposite of similar global legislation



Figure(4) difference between European and American legislation

III. LITERATURE RIVIEW

A. NivenWinchester,January 2008:This study estimated tariff equivalents (TEs) of non-tariff barriers (NTBs) using a series of gravity equations. Focusing on New Zealand, a nation that has a comprehensive free trade agreement (with Australia). This study reported that Simulating reductions in tariffs and NTBs in a computable general equilibrium (CGE) model indicates that gains from trade liberalization are

much larger when tariffs and NTBs are consider than when only tariffs are reduced.

B. XiaohuaBaoand Larry D. Qiu,2010) ,In this study, by construct a TBT database from 1998-2006 to examine the influence of TBT imposed by China on the country's imports. When using the frequency index, we find that TBT are trade restrictive: a one unit increase in TBT will decrease import value by about 0.8%. However, when the coverage ratio is used, we find that the negative effects of TBT are not statistically significant based on the entire period. However, if the focus is shifted to data from 1998-2001, we find that TBT have trade promotion effects. A one unit increase in TBT will increase import value by about 0.2%. Finally, China's TBT (measured by both frequency index and coverage ratio) are trade restricting for agriculture goods but trade promoting for manufacturing goods.

C. **Olivier Cadot, and Sebastin,2012**)Firm surveys on the impact of NTMs, those conducted by the International Trade Centre, have repeatedly shown that, even without protectionist intent, NTMs can raise trade costs, divert managerial attention, and penalize small exporters and those located in low-income countries where access to legal and regulatory information is difficult. Countries imposing NTMs may end up hurting their own competitiveness by making it difficult for domestic producers and exporters to access critical inputs in a timely fashion.

D. Gloria O. Pasadilla, Christine Marie Liao,Many,2016, consider non-tariff measures (NTMs) as another protectionist stratagem to prevent exports, especially of agriculture, from developing countries. Philippine exporters seem to be taking things in stride, however. The estimated cost of less than 3% of sales borne by a Philippine food exporter due to compliance with certification requirements is less than three percent of sales—relatively insignificant. However, the increased cost from NTMs can adversely affect small-scale industries and exporters that sell products to low-margin foreign markets. The paper also traces the Philippine export products affected by non-tariff measures imposed by East Asian markets. In all, the NTMs of Japan, Korea, and China affect a total of US$98 million of Philippine agriculture exports to these markets, or 2% to 22% of Philippine agricultural exports in these three countries. Economic Methodologies

IV. THE EGYPTIAN CHEMICALS EXPORTS

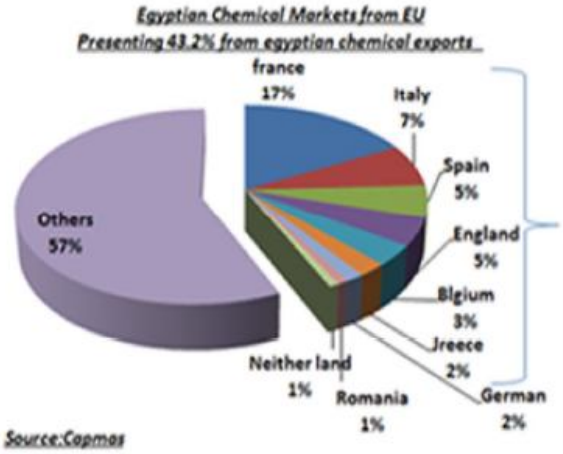
The chemical industries sector is one of the largest and largest sectors of the manufacturing industries, where chemical production accounts for 40% of the total production of manufacturing industries. The value added of the Egyptian industrial sector contributes to 32.9% of GDP in 2016, while the value added of the Egyptian chemicals sector contributes 13.5% to the total output of the Egyptian industry in 2013. The value added of the chemical industry in the GDP represents about half of the output of the industrial sector As a whole

The chemicals industry in Egypt has been facilitated by the strong oil industry and abundant availability of minerals, which is able to provide raw materials feed stocks and manufacturing infrastructure. Egypt has a relatively long experience in this field,major industries were established back in the late 1940's . Egyptian chemicals companies almost 12% of the total registered industrial establishments and around 11% of the total registered labor force in 2010.this sector is mostly dominated by small and medium sized factories(almost 85%) and concentrated in Greater Cairo, Alexandria and Delta.

The chemical sector represent almost 9%of the total Egyptian industrial output valued at marginally 7 billion $ in 2010,where half of this industrial output is directed to exports, representing nearly 30%of the total Egyptian non-oil manufacturing exports during the same year.

A. Egyptian chemicals exports to EU

EU represent the main trading partner with Egypt where it ranked the first market accounting for 25% of total Egyptian exports and the first market importing Egyptian chemicals products accounting for 43% from Total Egyptian Chemicals exports

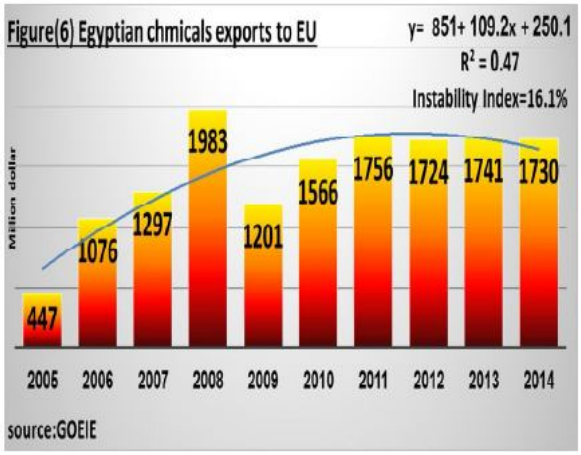


FIGURE(5) EU SHARE OF EGYPTIAN CHEMICALS EXPORTS

this implies that studying the impact of imposing environmental non-tariff measures on chemicals trade exports from Egypt to the EU is analogous to studying the impact of the environmental non-tariff measures on the majority of Egyptian exports due to the high geographic concentration and the high percentage

such products account for in the structure of Egyptian exports

The Egypt's chemical exports to the world are estimated 4.2 billion$, the EU markets receiving about 1.7 billion$, Where EU markets account for 40% of total Egyptian chemicals exports. From The Egyptian and European data indicate that the Egyptian chemicals export of Europe is unstable.Moreover, there are some kind of fertilizer products are out of some European markets.The Egyptian fertilizer products are the largest chemicals exports product to the European Union



From figure(6) The year 2008 is the highest value for Egyptian chemicals to European union markets, Do we consider this a coincidence? no.but indicator to the following years which it are witness to the instability started for the Egyptian chemicals exports until then .

Recognizing trade as one of the central pillars of economic development as well as suffering from a chronic trade deficit, Egypt has pursued an outward-trade policy ,seeking further integration in international markets and improving market access for its exports. .accordingly, Egypt is engaged in a number of regional preferential trade and bilateral agreements, For examples, , European partnership. in 2004:

Despite the Egyptian-European partnership and the reduction of trade protection in the form of customs restrictions, it was not accompanied by an improvement in the performance of Egyptian exports, especially chemicals, hence, The problem is not a customs problem but a non-tariff measures. This leads us to the empirical part of the study

V. ECONOMIC METHODOLOGIES

As our thesis will use the ex post approach, the most commonly used methodology is **the gravity model**, to employ the gravity model, we will estimate the impact of European non-tariff measures on Egyptian chemical exports using the gravity mode during the period (2003-2015) with focus on:

- Prove and discover the use of non-tariff measures on Egyptian chemicals exports in spite of the Egyptian-European Partnership Agreement.
- Assess the impact of non-tariff measures on Egyptian chemicals. Exports.

In order to achieve this objective of estimating the model and thus reaching the results through which the nature of the relationship between the Egyptian chemical industries exports and the variables of the gravity model as well as the variable of customs restrictions and non-tariff restrictions Using the Data Data by applying the three models: the Pooled Regression Model, the Fixed Effects Model, the Random Effects Model,

A. Data set and Sources

Although the applied studies differ in the determination of the gravity model variables explained to the international flows between countries, according to the nature of the study, The gravity has included three basic variables based on the traditional gravity model of Tibergen, which are the GDP of the exporting and importing countries and the distance between them. We will add To these Variables the most important variables which are concerned with measuring the impact of non-tariff measures on Egyptian chemicals exports.

The Eurostat data were based on Egyptian urea exports, while gross domestic product (GDP) was obtained through the World Bank database, the distance from CEPII

At the beginning of the empirical part, we tested the stationarity of the variables. After taken the natural logarithm for all the model variables, except the dummies variables

B. The Equation:

$$\ln(Xij) = \beta_1 + \beta_2 \ln(GDPi) + \beta_3 \ln(GDP_j) + \beta_4 \ln(Distanceij) + \beta_5 LnTr_j + \beta_6 LnVati + \beta_7 ntm_{TBT} + \mu_{ij} \quad \text{…….(1)}$$

where:

the independent variable are

Lnxj the Natural logarithm for the Egyptian (Urea)Exports to EU,For the products, the most important product to be exported to the European Union markets related to Egyptian fertilizer exports (HS31), which is urea expots (HS31021)

the Dependent variable are

Ln(GDP) the Natural logarithm for the Egyptian gross domestic product

Ln(GDP) the Natural logarithm for The European Union gross domestic product represented in five countries Which are the largest importers of Egyptian

chemicals exports.(France, Germany, Spain, Belgium, Italy)

LnDistance : the Natural logarithm for the distance between the five countries and Egypt, which reflects the cost of trade

LTr the Natural logarithm for European tariff measures which imposed on Manufactured products LVat the the Natural logarithm for the European imports value added

NTM_{TBT} is dummy variable for environmental non-tariff measures (TBT) Takes zero in case of no environmental non-tariff measures and take one in case of existing the environmental non-tariff measures. In our case it takes one in 2008 Date of the European Union's announcement of the implementation of the European legislation on chemicals REACH.

C. DERIVING A TARIFF EQUIVALENT OF NTM

- We derive the non-tariff equivalent from the model as follows:
- In equation (1), both Tijt and NTMit represent the customs measures imposed by European Union(I) on EGYPT(j) in the chemicals exports during the period specified (2005-2014), and therefore the equation will be as follows:
- In the case of NTM = 1, where non-tariff measures exist and are applied, and zero if otherwise.
- In order to estimate the impact of non-tariff measures NTM_{TBT} on exports, we need to include a Dummy variable for NTM_{TBT}, takes 1 into account if it is applied and takes zero if it is not applied, and then we derive the tariff equivalent to non-tariff measures:

$$\widetilde{\mathbf{Ln}x}_{ijt=\sum_{n=7}} \left(\widetilde{\beta}_n \psi_{nt}^{ij}\right) + \widetilde{\beta}_7 NTM_{it} \ldots\ldots(2)$$

when compensating by the NTM_{TBT}, in the equation we get:

$$\widetilde{LnX_{ijt,NTM}} - \widetilde{LnX_{ijt,no.NTM}} = \sum_{n=7} \widetilde{\beta}_n \psi_{nt}^{ij} + \widetilde{\beta}_7(1) - \left(\sum_{n=7} \widetilde{\beta}_n \psi_{nt}^{ij} + \widetilde{\beta}_7((0))\right) = \widetilde{\beta}_7 \ldots\ldots(3)$$

The same calculations can be performed for (Tri)if the tariff duty is calculated, if there is a tariff duty applied to imports or if they do not exist:

$$\widetilde{LnX_{ijt,tariff}} - \widetilde{LnX_{ijt,no.tariff}} = \sum_{ijt} \left(\widetilde{\beta}_1 \psi_{it}^{ij}\right) + \widetilde{\beta}_3\left(1 + T_{ijt}\right) - \left(\sum_{n=3} \left(\widetilde{\beta}_t \psi_{nt}^{ij}\right) + \widetilde{\beta}_3((0))\right) = \widetilde{\beta}_3 \widetilde{Ln}\left(1 + T_{ijt}\right) \ldots\ldots(4)$$

The equivalent tariff for NTM_{TBT}, is the tariff that has the same effect on trade, and can be obtained when the two sides of the equations (3),(4) are equal to each :then we get this Equation:

$$\widetilde{\beta_7} = \widetilde{\beta_5} Ln\left(1 + T_{ijt}\right) \ldots\ldots(5)$$

Hence, The equivalent tariff for NTM_{TBT} can be calculated as follows:

Tariff Equivalent(NTM_{TBT})= **$\exp\left(\frac{\widetilde{\beta_7}}{\widetilde{\beta_5}}\right)$-1……(6)**

This calculation is performed after estimating the gravity equation (The Regression)

D. Unit Root test:

There are many tests to test the unit root but we will choose two tests which are Levin, Lin & Chu t* and Im, Pesaran and Shin W-stat. The results were as follows

Table(1): Unit Root Test				
variables	statistic values		Sig.	Conclusions
LX	Levin, Lin & Chu t*	-2.20491	0.0003	I(0)
	Im, Pesaran and Shin W-stat	-1.49984	0.0442	I(0)
LGDPeg	Levin, Lin & Chu t*	-8.4966	0.000	I(0)
	Im, Pesaran and Shin W-stat	-3.85947	0.0001	I(0)
LGDPU	Levin, Lin & Chu t*	-4.02655	0.0137	I(0)
	Im, Pesaran and Shin W-stat	-2.58603	0.0668	I(0)
LTr	Levin, Lin & Chu t*	-2.20491	0.0137	I(0)
	Im, Pesaran and Shin W-stat	-1.71727	0.0668	I(0)
Lvat	Levin, Lin & Chu t*	-2.20491	0.0137	I(0)
	Im, Pesaran and Shin W-stat	-1.49984	0.0668	I(0)

Table (1)Unit Root test for tariff measures

There are no unit root for all variables ,so the data are stationarity . It is clear that all study variables are stationary at the level all , because the probability value is under 5% . All variables are stationary at the level and therefore we do not need to prove the existence of a long-term relationship between variables using the Cointegration test because the variables are stationary on the same level. To increase the emphasis we will do Cointegration test as follows

Table(2) Cointegration Test		
Kao Residual Cointegration Test		
Series: LGDPE LGDPU LX LTR		
Null Hypothesis: No cointegration		
Automatic lag length selection based on SIC with a max lag of 1		
Newey-West automatic bandwidth selection and Bartlett kernel		
	t-Statistic	Prob.
ADF	-3.054508	0.0011
Residual variance	0.010308	
HAC variance	0.012776	

By Using Kao Test, ADF P (Less Than 5%), The Null Hypothesis Rejected And We Will Acceptant The Alternative Hypothesis Are Rejected By The Existence Of A Long-Term Complementary Relationship Between The Variables Urea Exports And Customs Duties And The GDP Of Both Egypt And The EU.

According to the cointegration structure of the residuals, different models can be applied fixed effect or random effect. To determine the appropriate model, we use the Hausman test.

Table(3) (lnx) dependent variable is urea Exports			
independent variables	pooled model	fixed effect model	random effect model
Constant	-6.553024	11.64286	2.4773839-
LnGDPu	0.300197	-1.868694	0.022878
LnGDPeg	4.004386	4.141957	3.529194
lndist	-0.8650661	-1.489	-0.872
Ln(Tr+1)	-2.721776	2.722497-	2.444058-
Ln(VAT+1)	3.238229	1.398636	1.424983
NTM	-1.168573	.8650661-	-0.7900655
By using Eviews			

hausman fixed_group random_group

lnx	(b) fixed_group	(B) random_group	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lngdpu	-1.868694	0.0222878	-1.890982	1.858437
lngdpeg	4.141957	3.529194	0.6127623	0.6117914
lntr_all	-2.722497	-2.444058	-0.2784391	0.2794436
lnvat	1.398636	1.424983	-0.0263469	0.2393372
lntr	-11.31703	-9.457473	-1.859553	2.00693
ntm	-0.8650661	-0.7900655	-0.0750005	0.0754534

b = consistent under Ho and Ha; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 2.00

Prob>chi2 = 0.9200

Table(4)Hausman test results

Because of: prob> chi2 = 0.92 is insignificant. Therefore, the null hypothesis is accepted which imply random effects model is Appropriate for our data, then,we will reject the alternative hypothesis for the fixed effect model in this study. Then, we will run The random effects model again as follows:

The dependent variable=(urea) Fertilizers	
independent variable The	effect random model
Constent	2.473839-
LnGDPeg	3.529194
LnGDPeu	0.0222878
LnTrall	-2.444058-
lvat	-1.424983
NTMs	0.7900655-
Adj R^2	77.13
F	0.000
NTM Tariff Equivalent	22
N	50

Table(5) Random Effect Model Results

All signals for all variables comes according to the economic theory accept the European value added on Imports variable(Lnvat)

The Estimation of the effect of environmental non-tariff measures on Egyptian urea exports from the regression results as follows:

By calculating the tariff equivalent to non-tariff measures from the equation which mention above depending on the regression result:

Tariff Equivalent = $exp\left(\frac{B_7}{B_5+B6}\right) - 1 = \%$

Tariff Equivalent

$= exp\left(\frac{0.79}{2.4+1.4}\right) - 1 = 22\%$

Since the average European customs measures range from 6 to 12 percent, then, the total European customs duties could be 12 Plus 22 respectively, up to 34 percent. Then These Measures are no different than The developing countries customs Duties applied.

CONCLUSION

Through the equation we estimated the tariff equivalent to European environmental non-tariff Measures equal to 22%, which leads us to draw the following:

- The coefficient of European environmental non-tariff measured is negative and therefore the use of these measures has a negative effect on the Egyptian chemicals exports, Because The equivalent of European non-tariff measures on Egyptian chemical (urea) exports is estimated at about 22%
- The average tariff on the chemicals sector by France, Italy, Germany, Belgium and Spain (which is a sample of EU countries) ranges from 4% to 12%. Thus, the use of non-tariff measures will lift European customs measures to about 34%. Which the same Tariff rates applied in most developing countries

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