Asian Journal of Economic Modelling
ISSN(e): 2312-3656
ISSN(p): 2313-2884
DOI: 10.55493/5009.v10i1.4476
Vol. 10, No. 1, 61-70.

URL: www.aessweb.com

ASSESSING TUNISIAN EXPORTS TOWARDS THE EUROPEAN UNION: INTENSITY, COMPLEMENTARITY AND GRAVITY ESTIMATION

Karim CHAABOUNI

Sfax School of Commerce, University of Sfax, and International Economic Integration Lab, University of Tunis El Manar, Tunisia.
Email: karim.chaabouni26@gmail.com Tel: (+216)98636252

(+ Corresponding author)

Article History
Received: 23 December 2021
Revised: 18 March 2022
Accepted: 4 March 2022
Published: 26 April 2022

Keywords
Regional intensity of trade
Trade complementarity
Gravitational model
Free trade area
Trade costs
Multilateral resistance terms
Panel data estimation.

JEL Classification:
F14; F15; F53.

ABSTRACT

The Tunisian economy faces various challenges. Within a local and international environment full of constraints, several defies call to missing requirements like economic growth, employment, balance of payments' equilibrium, etc… Despite these concerns, Tunisian economy remains open to the Rest of the World. Openness is consolidated since decades by Tunisian membership in the World Trade Organization (WTO), as well as by the country's regional integration with various partners. In this field, the major involvement in world markets is confirmed by the Association Agreement (AA) concluded between Tunisia and the European Union (EU) in 1995, which launched and established a Free Trade Area (FTA) covering industrial products. Indeed the Tunisian trade remains strongly linked to EU and such links are expected to be reinforced since Tunisia and the EU have currently negotiated over the expansion of the FTA to agriculture and services within a project of Deep and Comprehensive Free Trade Agreement (DCFTA). The purpose of this paper is to focus on Tunisian exports towards the EU by assessing both the intensity and the complementarity of the trade side "from Tunisia to the EU". Besides, by considering the Gravitational model, the aim of this paper is to identify the determinants of orienting Tunisian exports towards the EU. The findings highlight the concentration of Tunisian exports towards few EU countries despite a middle trade compatibility with all EU countries. Gravity estimation results, in line with previous works, point out the key roles of language and geographical proximity.

Contribution/ Originality: This study contributes to the existing literature about trade and Gravity models, by using trade intensity and complementarity calculations; and panel data estimation on a Gravity equation for Tunisian exports toward the European Union. It is one of the few studies which have investigated the determinants of Tunisian exports.

1. INTRODUCTION

The Tunisian economy has faced many constraints since more than a decade and still needs to work in various fields such as investments, savings, infrastructure, training, etc. in order to generate sufficient growth rates that is capable of creating and distributing wealth, as well as to offer employment to a young and skilled workforce.

The Tunisian economy is open to the rest of the world as many aggregates like exports, imports, FDI, borrowing, income of migrants prove the same. However, the accentuated deficits in the balance of payments (namely in commercial balance and current balance) were not compensated by sufficient capital inflows, which led to

imbalances in the Tunisian exchange market and consequently to a depreciation of the Tunisian Dinar with respect to the main international currencies (EUR, USD, GBP, CAD, etc.).

In this context, the debate on Tunisian integration within the world economy was subject of hard discussions; should authorities activate safeguard measures and balance-of-payments restrictions? Would it be fair to renegotiate the free trade agreements already established? Which trade policy should Tunisia adopt in the years to come? etc.

Despite such debate, a global status quo portrays the Tunisian commercial policy. Recent figures confirm the preservation of the traditional trade partners of Tunisia, namely the European Union (EU) that hogs almost 75% of Tunisian exports and 55% of Tunisian imports, and with which Tunisia has been in a Free Trade Area (FTA) since 1995. Such FTA might be strengthened by a Deep and Comprehensive Free Trade Agreement (DCFTA), a project that is currently under negotiation between both partners.

The interest of this work is to statistically analyze the figures and indicators related to Tunisian exports towards EU countries. Firstly, through considering both figures of "trade intensity" and "trade complementarity" within each "Tunisia – EU country" pair, the objective is to assess whether the intensity of Tunisian – EU trade is natural (or not). Secondly, the purpose is to look for the bases of Tunisian exports by considering the gravitational model and carrying on a panel data estimation covering the sample data "Tunisia – EU countries".

2. LITERATURE

Literature about trade and export diversification involves both world economy and developing countries. In this context, empirical findings highlight the key roles of human capital, GDP per capita and institutions in exports diversification (Osakwe, Santos-Paulino, & Dogan, 2018).

Theoretical and empirical researches confirm that trade is explained by differences in comparative advantages between countries; nevertheless some findings assert that benefits of exports promotion and diversification require a minimum level of development (Edwards, 1993; Imbs & Wacziarg, 2003).

According to Hausmann, Hwang, and Rodrik (2007), diversification and sophistication in export activities generate economic growth to involved countries. In the same field, Anand, Mishra, and Peiris (2012) argue that more sophisticated exports and higher technology intensity act as a locomotive of growth and promote connexions between sectors. Besides, exports' diversification is perceived as a channel for reducing fluctuations in foreign exchange incomes, generating growth and employment, and improving the quality of manufactured products (Elhiraika & Mbate, 2014; Osakwe, 2007).

Trade links are not limited to the mentioned elements (growth, high technology, institutions…). Indeed, geographical and regional bases also remain the key factors in trade configuration and diversification. Partners with which a country trades have a great influence on productivity, technology transfer and manufacturing development. Furthermore, the diversity and development of such partners have impacts on the country's risks and welfare.

Countries that trade more strongly with each other than with the rest of the world are more able to be in a regional integration to generate a potential welfare. Trade proximity could be assessed by the "Regional Intensity of Trade" (RIT) indices (Yeats, 1997) which are easy to calculate and can be applied to both exports and imports.

Considering the export side from country i to country j, Equation 1 indicates the RIT index (Rijk) that computes the share of country j in the country i's exports of the goods k comparative to j's share in i's global exports:

$$R^{ij_k} = \frac{X^{ij_k}/X^{i_k}}{X^{ij}/X^{i}} \qquad (1)$$

where: X^{ij_k} are exports of goods k from country i to country j.

X^{i_k} are country i's total exports of goods k to the world.

X^{ij} are total exports from country i to country j.

X^{i} are country i's total exports of all goods to the world.

An analogous index can be calculated for imports.

Regional trade between countries can also be highlighted by an additional trade measure: Trade Complementarity Index (TCI) is introduced by Michaely (1996) and it can be calculated on both import and export sides. Precisely, TCI assesses how natural the trade is between the partners, i.e. how much exports' supply of one country fits imports' demand of a partner country. Equation 2 indicates the import TCI (C^{ij}) between countries i and j as follows:

$$C^{ij} = 100\,[\,1 - \Sigma_k\ |m^{j_k} - X^{i_k}|\,/2\,] \qquad (2)$$

Where: m^{j_k} is the share of sector k in j's total imports from the world X^{i_k} is the share of sector k in i's total exports to the world.

Equation 2 points out that in case of perfect correlation between countries i and j, the TCI is close to 100%; while in case of no correlation, the TCI is close to 0%.

RIT and TCI indices give certainly ideas about how important and natural are regional trade proximities between countries; nevertheless, they do not control factors that affect such trade proximities. Indeed bilateral trade depends on the factors controlled in the gravitational model and represented in the gravity equation. Based on the work of Tinbergen (1962); Feenstra (2004) and Head (2003), bilateral trade flows between two countries is correlated to both their sizes of economies and their proximities.

Work of Anderson (1979); Helpman, Melitz, and Rubinstein (2008) and Chaney (2008) tried to give more bases to the gravitational model. In this context, Equation 3 shows a gravity equation, which is amongst the first version and that takes the form of the following multiplicative calculation:

$$X_{ij} = G\ S_i\ M_j\ \varphi_{ij} \qquad (3)$$

Where X_{ij} are Exports from country i to country j, S_i are exporter specific factors, M_j are importer specific factors, G are factors that do not depend on i and j, and φ_{ij} represent the ease of exporter i to access to market j (the inverse of bilateral trade costs). In the same line (Anderson & Van Wincoop, 2003) illustrated more the gravity equation by considering that exports from country i to country j (X_{ij}) are determined by the following factors:

- GDPs of countries i and j.
- Ease of market access from exporter i to j's market.
- Relative trade costs (bilateral trade costs relative to overall MRT i.e. Multilateral Resistance Terms); MRT includes mainly remoteness from other commercial partners or from large markets.

The common procedure to estimate the gravity equation is its transfer to a linear form by getting a log-linear equation from the initial multiplicative form. Equation 4 illustrates the linear form as inspired from work of Anderson and Van Wincoop (2003) and includes MRT, which is a great progress in the gravity work.

$$Ln\,X_{ij} = a_0 + a_1\,ln\,GDP_i + a_2\,ln\,GDP_j + a_3\,ln\,t_{ij} + a_4\,ln\,S_i + a_5\,ln\,P_j + \varepsilon_{ij} \qquad (4)$$

Where: t_{ij} is the cost in country j of importing goods from i (bilateral trade costs).

S_i is the exporter outward Ease of Market Access (EMA).

P_j is the importer inward Multilateral Resistance Terms (MRT).

a_0 is a constant.

$a_1, a_2, \ldots a_5$ are elasticities.

ε_{ij} is an error term.

Regarding trade costs, various proxies are used in empirical studies and consist of commonly bilateral distance, dummies for islands or for landlocked countries, dummies for common language, etc.

Equation 5 indicates trade costs between two countries i and j (t_{ij}), as in the regular following form:

$$t_{ij} = d_{ij\delta_1} . exp\,(\delta_2 cont_{ij} + \delta_3 lang_{ij} + \delta_4 ccol_{ij} + \delta_5 col_{ij} + \delta_6 landlock_{ij} + \delta_7 RTA_{ij}) \quad (5)$$

Where: d_{ij} is the bilateral distance between countries i and j.

$cont_{ij}$ is a dummy variable indicating whether both countries have a common border.

$lang_{ij}$ is a dummy variable indicating whether both countries have a common language.

$ccol_{ij}$ is a dummy variable indicating whether both countries have a common colonizer.

col_{ij} is a dummy variable indicating whether one country was a colony of the other.

$landlock_{ij}$ is a dummy variable indicating whether both countries are landlocked.

RTA_{ij} is a dummy variable indicating whether both countries are members of a regional trade agreement.

In addition to the bilateral variables, the gravity equation takes into consideration the country's specific variables. Such Specific variables should not be limited to GDPs and could include the qualities of infrastructures, regulations and institutions that would affect trade. The "remoteness" variable (Rem) could be taken into consideration as a proxy for MRT and might be calculated as a country's average weighted distance from its trading partners (Head, 2003). Equation 6 indicates whether the mentioned elements are more or less included. It represents an advanced form of the gravity equation.

$$Ln\,(X_{ij}) = a_0 + a_1\,ln(GDP_i) + a_2\,ln(GDP_j) + a_3\,ln(d_{ij}) + a_4\,ln(Rem_i) + a_5\,ln(Rem_j) + a_6\,lang_{ij} + a_7\,ccol_{ij} + a_8\,col_{ij} + a_9\,landlock_{ij} + a_{10}\,RTA_{ij} + \varepsilon_{ij} \quad (6)$$

Since MRT variable may not vary enormously over a period that is not long, it could be replaced in the equation by time invariant exporter and importer dummies (I_i and I_j).

Equation 7 specifies the gravity equation, as the advanced form considered above when panel data:

$$Ln\,(X_{ijt}) = \alpha_i + ß_j + a_1\,ln(GDP_{it}) + a_2\,ln(GDP_{jt}) + a_3\,ln(d_{ij}) + a_4\,lang_{ij} + a_5\,ccol_{ij} + a_6\,col_{ij} + a_7 landlock_{ij} + a_8\,RTA_{ijt} + \varepsilon_{ijt} \quad (7)$$

3. ANALYZING TRADE BETWEEN TUNISIA AND THE EUROPEAN UNION

In this section, the focus is on Tunisian Exports towards the European Union. Relevant data is issued from the TRADEMAP Database in which provided figures correspond to the International Trade Centre (ITC) calculations based on UN COMTRADE statistics. All figures are in thousand US Dollar (USD) and cover annual trade during the period [2009-2017] between Tunisia and twenty (20) EU countries representing almost 98% of the EU population.

3.1. Regional Intensity of Trade (RIT)

As mentioned above, regional trade proximities between partners could be assessed by RIT index that can be calculated for both exports and imports. Since our focus is limited here to Tunisian Exports directed to the EU, Equation 8 points out the RIT index ($R^{ij}{}_k$).

$$R^{ij}{}_k = \frac{X^{ij}{}_k / X^i{}_k}{X^{ij} / X^i} \quad (8)$$

In this work, calculations cover the top 100 exported products (HS6) from Tunisia to the rest of the world (according to the classification of the year 2017). Additionally, the emphasis is on the devisor of the RIT index (X^{ij}/X^i) in order to take into consideration the aggregate trade between Tunisia and the EU. Consequently, the shares of Tunisian exports toward the EU in the global world Tunisian exports are stressed.

Figure 1 and calculations of RIT devisors during the selected period [2009-2017] show that Tunisian exports towards the EU represent a large part from total Tunisian exports (almost 75%), which confirms the geographic concentration of Tunisian exports. Besides, a fine analysis shows that in its exports' efforts with the EU, Tunisia targets mostly three large markets i.e. France, Italy and Germany that contribute around 30%, 20% and 10% respectively to the global world Tunisian exports. Next are the markets of UK, Spain and Belgium with parts

separately between 1% and 5% of the global world Tunisian exports. For the rest of EU countries, market parts in global Tunisian exports are separately lower than 1% Figure 1.

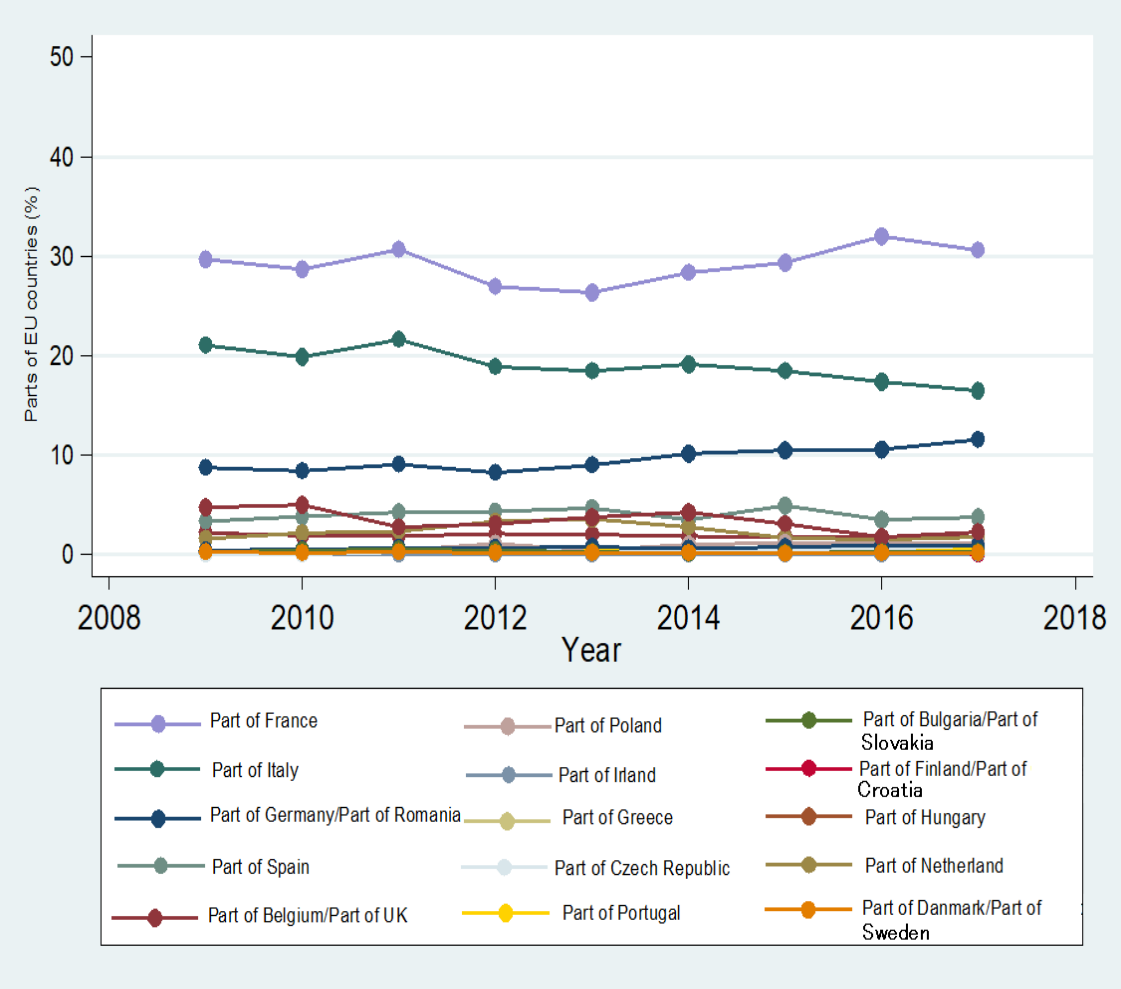

Figure 1. Parts of EU countries in Tunisian exports.
Source: Calculations from TRADE MAP Database.

3.2. Trade Complementarity Index (TCI)

Trade between Tunisia and the EU could also be assessed by Trade Complementary Index (TCI). Equation 9 evaluates the adequacy of Tunisian export supply to the EU import demand:

$$C^{ij} = 100\,[\,1 - \Sigma_k\ |m^{jk} - X^{ik}|\,/2\,] \qquad (9)$$

In this framework, trade statistics are from the same database (TRADE-MAP) and cover all products (HS2) for almost the same sample (Tunisia and 20 EU countries) during the period [2009-2017]. For calculating the TCI Index, relevant data is permitted to compute both all sectors' shares in Tunisian total exports to the world (X^{ik}), and all sectors' shares in each EU country's total imports from the world (m^{jk}).

Results are different from anticipations. Indeed, considering the strong commercial links between Tunisia and three EU countries (France, Italy and Germany), it was expected to get higher rates of TCI from such mentioned countries than from the others. Nevertheless, Figure 2 and calculations show similar rates of TCI between Tunisia and each of the 20 EU countries. All TCI levels are here around 50% in Figure 2, which confirms the middle trade compatibility between Tunisian exports and EU imports.

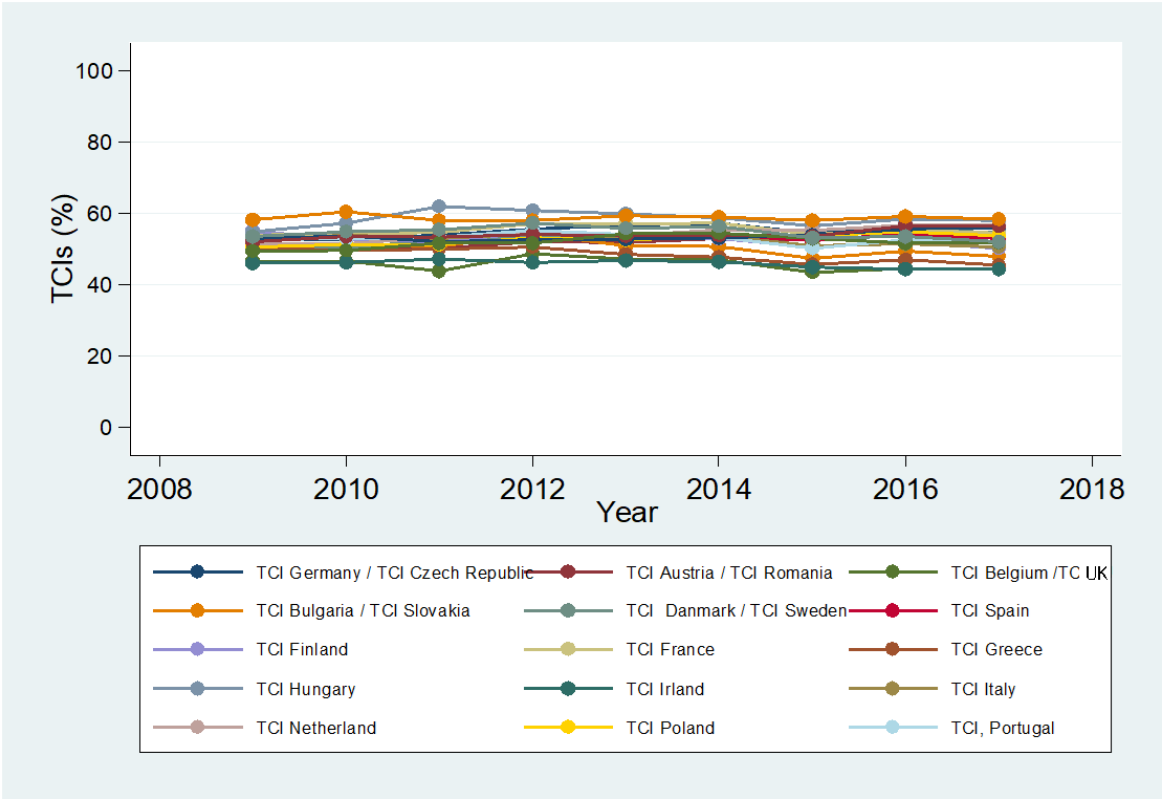

Figure 2. TCIs between Tunisia and EU countries.

4. THE EMPIRICAL STUDY

4.1. Methodology and Model

The purpose in this section is to capture the significant elements that affect Tunisian exports towards the European Union using the gravity equation. The above calculations show a focus on three major EU destination countries and a middle trade compatibility but do not point out the factors that could explain such results. The gravity equation might, therefore, overcome this lack of information by including dependant variables, among which some are considered here for estimation. The applied methodology is a panel data estimation of the gravity equation. Following the equation model mentioned above, Tunisian exports towards EU countries (dependent variable) are linked in a log-linear equation to several exogenous variables that include invariant elements, countries' specific features and countries' bilateral links. It is important to quote here that exogenous variables included in the regression are supposed to capture the main factors that could affect Tunisian exports towards EU. The purpose is to limit consideration to key variables in order to avoid any loss in degree of freedom. Precisely, the gravity equation to estimate in this field tries to test whether Tunisian exports to EU countries depend on GDPs of origin and destination, bilateral distance between both countries, population size of destination country, common language, historical colonial relations and bilateral free trade agreement.

Equation 10 specifies the regression considered for estimation. It represents the gravity equation that includes regular variables and is presented as follows:

$$Ln(exports)_{ijt} = \alpha_i + ß_j + a_1\, Ln(GDP\_o)_{it} + a_2\, Ln(GDP\_d)_{jt} + a_3\, Ln(pop\_d)_{jt} + a_4\, Ln(dist)_{ijt} + a_5\, comlang_{ijt} + a_6\, col_{ijt} + a_7\, FTA_{ijt} + \varepsilon_{ijt} \qquad (10)$$

ε_{ijt} is a white noise;
$a = (a_1 \ldots a_7)$;
i is the exporter country index (Tunisia);
$j = 1 \ldots \ldots N$ is the importer country index;
α_i are exporter fixed effects;
$ß_j$ are importer fixed effects;
$t = 1 \ldots \ldots T$ is a time index.

4.2. Data

Estimation data in this work is annual and covers a period of fifteen years (2001-2015). While origin country is Tunisia, destination countries are twenty (20) EU member countries representing together almost 98% of EU population and include Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Germany, Greece, Finland, France, Hungary, Italy, Netherland, Poland, Portugal, Romania, Slovakia, Spain, Sweden and UK. Thus, the number of observations in the panel estimation is 300 (15 years and 20 countries).

Two databases provide the data: the ITC Trade Map database provides the data of the dependant variable "exports"; the variable includes Tunisian total exports towards EU countries and the values are in current USD.

The CEPII gravity Dataset provides the data of all exogenous variables. It is important to quote here that the CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) makes available a gravity Dataset for all world pairs of countries. Following the labels joined to the CEPII gravity Dataset, the exogenous variables are described as follows:

- GDP_o : the GDP of origin country in current USD.
- GDP_d : the GDP of destination country in current USD.
- $dist$: the weighted bilateral distance between origin and destination countries in km (population weighted). this variable is named "distw" in the CEPII gravity Dataset.
- pop_d : the population of destination country in millions.
- $comlang$: a Dummy variable for common official or primary language (it takes the value of one for this character and zero otherwise); this variable is named "comlang_off" in the CEPII gravity Dataset.
- col : a Dummy variable for colonial relationship post year 1945 between origin and destination countries (it takes the value of one for this character and zero otherwise); this variable is named "col45" in the CEPII gravity Dataset.
- FTA : a Dummy variable for the presence of a free trade agreement between the exporter and importer countries (it takes the value of one for this character and zero otherwise); this variable is named "fta_wto" in the CEPII gravity Dataset.

4.3. Results

The estimation of the regression is carried out using STATA Software. Fixed Effects estimates are considered. As mentioned above, capturing the effects of the Multilateral Resistance Terms (MRT) is crucial in the gravity regression, and Fixed Effects estimation allows such consideration. Moreover, Fixed Effects (FE) also enables to capture any other time invariant partner's characteristic; three exogenous variables with unchanging data (distance, common language and colonial relationship) were omitted from the estimation because of collinearity. Random Effects (RE) estimation is also conducted in this field, which would permit to hold the Hausman test necessary for specifying the individual effects. RE permits the estimation of the three exogenous variables omitted in the FE regression; this overcomes any information lack regarding the estimates.

Table 1 shows all results of the estimation. It presents both Fixed Effects and Random Effects estimation results which permits comparison. Values between parentheses refer to the standard deviations of the estimates. In this context *** denotes that estimate is significant at 1%, ** denotes that estimate is significant at 5% and * denotes that estimate is significant at 10%.

Firstly, it is allowed to affirm the robustness of the regression in both estimation methods (FE and RE) considering the values of the R-squared within and between. Homogeneity tests confirm the presence of individual effects, and Hausman test leads to the acceptance of Fixed Effects within the regression. With the exception of the estimate of the population variable, results in both FE and RE regressions are quiet close and lead to similar interpretations.

Results show that most exogenous variables have significant estimates at different levels of risk (1%, 5% and 10%), except for the variable col (colonial relationships) where the estimate is not significant. Besides, most estimates' signs comply commonly with expectations and with previous empirical work (Archy, 2006; Batra, 2004; Geda & Seid, 2015).

Table 1. Estimation Results.

Estimation method Sample (period) Exogenous variable	**Fixed Effects 2001 – 2015**	**Random Effects 2001 – 2015**
Ln(GDP_o)	1.234 **	0.707 ***
	(0.012)	(0.008)
Ln(GDP_d)	0.732 *	0.899 ***
	(0.080)	(0.000)
Ln(pop_d)	-5.642 **	0.831 ***
	(0.021)	(0.008)
Ln(dist)	-	-2.082 ***
		(0.000)
Comlang	-	2.147 ***
		(0.004)
Col	-	-1.054
		(0.315)
FTA	1.077 ***	1.369 ***
	(0.000)	(0.000)
Constant	-17.308 ***	-11.658 *
	(0.004)	(0.071)
Number of observations	300	300
R^2 within	0.5034	-
R^2 between	-	0.9414
Fixed Effects	Yes	No
Homogeneity Test. F_1 (19,276)	26.20 ***	-
	Prob > F = 0.0000	-
Hausman Test. chi2(4)	-	7.82*
	-	Prob > chi2 = 0.0986

Note: *** denotes that estimate is significant at 1%, ** denotes that estimate is significant at 5% and * denotes that estimate is significant at 10%.

Variables indicating GDPs and FTA have significant positive estimates in both FE and RE regressions. Precisely, elasticities' estimates are positive for GDPs with levels that are more or less close to one (1) in both estimation methods despite the differences in values. This confirms the multiplying effects of GDPs on trade: every 1% growth in local or foreign GDP induces a slightly above or below 1% increase in Tunisian exports towards the EU member country partner. Both variables of GDP act here as proxies for markets' sizes.

The Free Trade Agreement has a positive impact on Tunisian exports towards the EU. Coefficient estimate of the FTA dummy is significant at 1% risk. Considering the FE estimation results, Tunisian exports are 193% higher when the European partner is in a Free Trade Area with Tunisia. For clarification in this context, interpreting the estimated coefficient of a Dummy variable in a Log linear regression invokes exports' effect expressed in percentage by resorting to the following calculation: $[(e^{1.077} - 1) \times 100]$.

Regarding bilateral trade costs variables "bilateral distance" and "common language", estimates are large in RE results and are in natural opposite sides. Notably, Tunisian exporters are negatively sensitive to far markets (distance estimate = -2.082) which is consistent with the literature specifying that bilateral distance acts as a resistance factor in trade since it embodies transport fee and transaction costs (Disdier & Head, 2008; Yotov, 2012). On the contrary, Tunisian exporters are positively sensitive to common language (estimate = 2.147) which is also rationale and consistent with previous empirical findings (Carrère & Masood, 2015) ; Common language is associated with ease of communication and cultural proximity, therefore, when Tunisia shares a common language with a EU partner, it engages 756% more exports than with any different EU partner.

The estimate of the "col" dummy is not significant, which does not allow any interpretation regarding colonial relationships in this regression. Estimates of the population variable (pop_d) are ambiguous indeed. It is firstly remarkable that results in both estimation methods show opposite signs despite the high significance; secondly, population coefficient estimate in FE results is highly negative, which is not consistent with expectations neither with previous empirical works.

All these estimation results, despite being mostly in line with literature, could spell out the high concentration of Tunisian exports on three destination markets. "Easier markets" could describe the behaviour of Tunisian exporters while targeting foreign demand even inside the EU with which the FTA covers at present 27 member countries and almost 500 million citizens. The focus on three destination countries highlights the undeveloped exporting opportunities in other EU markets.

5. CONCLUSIONS

This work tries to approach trade between Tunisia and the EU, its major commercial partner since many decades, by focusing on the side of Tunisian exports towards the EU. All concepts of Regional Intensity, Trade Compatibility and Gravity equation are highlighted in this field. Calculations reveal that Tunisian exports are concentrated on three main partners i.e. France, Italy and Germany, well above the exports' parts with other EU countries. Contrary to expectations, such concentration is not due to higher compatibility between Tunisian supply and the three mentioned countries' demand. Indeed Tunisia shares a similar middle trade compatibility with all EU countries while referring to TCI calculations. The gravity model overcomes such finding by considering specific and bilateral factors that influence trade between both partners.

By estimating the gravity equation in a panel data regression, results that are mostly in line with previous work, sustain the key roles of language and geographical proximities on Tunisian exports' markets targeting. These rational findings validate the behaviour of exporters that aim easier access and communication markets. Nevertheless, they highlight the present Tunisian shortfall on other EU markets and the missing opportunities within the free trade area between Tunisia and the EU. Such situation should be overcome in the future through strengthening Tunisian efforts in diversifying EU partners and promoting exports at the extensive margin.

As a recommendation, this work could be extended to other non-EU partners that arouse the interest of Tunisian decision-makers such as the "Arab Maghreb Union" countries, the "Common Market for Eastern and Southern Africa" countries and BRICS countries. Such enlargement would widen data and allow to include further exogenous variables like "common borders" and "landlocked" dummies.

Finally, as a limit of this work, it is intimated here that the concentration of Tunisian exports could also depend on other factors not included in the gravity equation such as "FDIs origins". The majority of FDIs in Tunisia come from France, Italy and Germany. These FDIs export significant parts of their productions towards origin countries.

Funding: This study received no specific financial support.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

REFERENCES

Anand, R., Mishra, S., & Peiris, S. J. (2012). Inclusive growth: Measurement and determinants. International Monetary Fund (IMF) Working Paper No WP13/135.

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American Economic Review*, *69*(1), 106-116.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, *93*(1), 170-192.Available at: https://doi.org/10.1257/000282803321455214.

Archy, L. (2006). *Assessing regional integration potential in North Africa, United Nations Economic Commission for Africa. ECA Office for North Africa.* Paper presented at the 21st Meeting of the Intergovernmental Committee of Experts (ICE), Rabat Morocco, April 2006.

Batra, A. (2004). India's global trade potential: The gravity model approach. Indian Council for Research on International Economic Relations. Working Paper No 151.

Carrère, C., & Masood, M. (2015). Economic weight of the Francophonie: Impact via trade openness. *Development Economics Journal, 23*(2015/2), 5-30.Available at: http://doi.org/10.3917/edd.292.0005.

Chaney, T. (2008). Distorted gravity: The intensive and extensive margins of international trade. *American Economic Review, 98*(4), 1707-1721.Available at: https://doi.org/10.1257/aer.98.4.1707.

Disdier, A.-C., & Head, K. (2008). The puzzling persistence of the distance effect on bilateral trade. *The Review of Economics and statistics, 90*(1), 37-48.Available at: https://doi.org/10.1162/rest.90.1.37.

Edwards, S. (1993). Openness, trade liberalization, and growth in developing countries. *Journal of economic Literature, 31*(3), 1358-1393.

Elhiraika, A. B., & Mbate, M. M. (2014). Assessing the determinants of export diversification in Africa. *Applied Econometrics and International Development, 14*(1), 147-160.

Feenstra, R.-C. (2004). Advanced international trade. Theory and evidence (pp. 496). New Jersey. USA: Princeton University Press.

Geda, A., & Seid, E. H. (2015). The potential for internal trade and regional integration in Africa. *Journal of African Trade, 2*(1-2), 19-50.Available at: https://doi.org/10.1016/j.joat.2015.04.001.

Hausmann, R., Hwang, J., & Rodrik, D. (2007). What you export matters. *Journal of Economic Growth, 12*(1), 1-25.Available at: https://doi.org/10.1007/s10887-006-9009-4.

Head, K. (2003). *Gravity for beginners.* Mimeo: University of British Columbia.

Helpman, E., Melitz, M., & Rubinstein, Y. (2008). Estimating trade flows: Trading partners and trading volumes. *The Quarterly Journal of Economics, 123*(2), 441-487.Available at: https://doi.org/10.1162/qjec.2008.123.2.441.

Imbs, J., & Wacziarg, R. (2003). Stages of diversification. *American Economic Review, 93*(1), 63-86.

Michaely, M. (1996). Trade preferential agreements in Latin America: An ex ante assessment. Policy Research Working Paper No 1583, Washington D.C. The World Bank.

Osakwe, P. N. (2007). Export diversification and the dilemma of African development. *Applied Econometrics and International Development, 7*(2), 143-156.

Osakwe, P. N., Santos-Paulino, A. U., & Dogan, B. (2018). Trade dependence, liberalization, and exports diversification in developing countries. *Journal of African Trade, 5*(1-2), 19-34.Available at: https://doi.org/10.1016/j.joat.2018.09.001.

Tinbergen, J. (1962). Shaping the world economy. Suggestions for an international economic policy *New York* (pp. 330). The Twentieth Century Fund.

Yeats, A. J. (1997). Does mercosur's trade performance raise concerns about the effects of regional trade arrangements? Policy Research Working Paper No 1729, Washington D.C. The World Bank.

Yotov, Y. V. (2012). A simple solution to the distance puzzle in international trade. *Economics Letters, 117*(3), 794-798.Available at: https://doi.org/10.1016/j.econlet.2012.08.032.