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The determinants of trade activity among the EU and the ENP countries

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ABSTRACT

Within the framework of the European Neighborhood Policy (ENP), the EU neighboring countries (the ENP countries) operate under "neighborhood Europeanization" conditions, tantamount to economic integration. Within this framework, the objective of the paper is to detect the determinants of exports flows from the ENP countries to the EU countries, and, moreover, to indicate whether significant irregularities in the geographical direction of exports flows from the ENP to the EU countries, if they exist, have any implications for the economic performance of the ENP countries. On the basis of the results derived from a gravity model, the paper estimates a Coefficient of Irregularity in the Geographical Direction of Exports Flows (CIGDEF) in order to measure the degree to which the direction of exports flows from the ENP to the EU countries is diverging or is different from that predicted by the gravity model equation. Plotting the figures of the CIGDEF against the figures of the ENP countries' per capita GDP, the paper detects the possible implications of geographical irregularity for the economic performance of the ENP countries. The findings of the paper indicate that high levels of GDP and population, in the ENP and the EU countries, low distance, low income differences, common land borders and colonial relations in the past are among the factors favoring the increase of exports from the ENP to the EU countries. The latter, however, exhibit, in many cases, significant geographical irregularities in the sense that there significant differences between the actual and the expected (fitted) exports flows. By and large, such irregularities have a negative, though not strong, impact on the ENP countries' economic performance.

KEY-WORDS: gravity model, trade, ENP countries, EU countries
JEL: F12, F14, F15

1. Introduction

The European Neighborhood Policy (ENP), launched in 2004, is a unified European Union (EU) policy framework towards the EU neighboring countries (hereinafter: the ENP countries) (COM 104 FINAL, 2003; COM 373 FINAL, 2004; Wesselink and Boschma, 2012, *inter alia*), aiming at strengthening the prosperity, stability and security of the EU, creating a "ring of friends" around the EU political borders. The ENP framework applies to Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine (the ENP East) as well as to Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Occupied Palestinian Territory (hereinafter: Palestine), Syria and Tunisia (the ENP South). Even though the ENP is a distinct and separate process from the EU enlargement (Emerson, 2004; Browning and Joenniemi, 2008), the ENP countries operate under conditions of "neighborhood Europeanization" (Gawrich et al., 2010; Franke et al., 2010). This indicates an apparent mismatch – the so-called "capabilities-expectations" gap (Monastiriotis and Borrell, 2012) – between ENP requirements/demands, on the one hand, and ENP potential gains/rewards, on the other. To put it simply, the ENP countries understand the ENP as a first step in a long road that will end-up with full membership even though for the vast majority of them the possibility of EU membership has been ruled out. Of course, such an expectation is, partly, justified on the historical record of the EU formation, which, in a series of enlargements, has managed to expand, first southwards and then eastwards, and integrate countries with different development levels and institutional endowments.

Despite the fact that the proper "membership anchor" is missing, the progressive compliance with the *acquis communautaire* (i.e. the corpus of EU laws and policies) is a necessary condition for the ENP countries in order to increase their "weight" on the EU market (Havlik et al. 2012a and 2012b; Artelaris et al., 2013). This is so, since according to the Treaty of Lisbon, forced in 2009, EU policies with a bearing on relations to third countries (such as the ENP countries) should be guided by a common set of principles and objectives such as the consolidation and support of democracy and the preservation of peace (Koopmann and Wilhelm, 2010). Indeed, the common external trade EU policy towards the ENP countries (i.e. the trade component of the ENP) has a strong impact on the EU's external economic links with the ENP countries since its reach not only covers cross-border trade flows but also includes regulatory issues such as investment protection, public procurement and competition policy (Woolcock, 2010). In particular, and in contrast to the rigid Copenhagen criteria that characterize the EU eastwards enlargement, the EU started to conduct Deep and Comprehensive Free Trade Agreements (DCFTAs), bilaterally with the ENP countries, in order to deepen the substance of trade agreements, bringing, thus, the ENP countries closer to the Single Market (Liargovas, 2013). Hence, in practice, the ENP countries operate, within the framework of the ENP, under conditions tantamount to economic integration.

Within this framework, the objective of the paper is to detect the determinants of exports flows from the ENP countries to the EU countries, and, moreover, to indicate whether significant irregularities in the geographical direction of exports flows from the ENP to the EU countries, if they exist, have any implications for the economic performance of the ENP countries. To this end, the paper constructs a gravity model relating the value of exports flows, from the ENP to the EU countries, to a number of explanatory variables. Then, on the basis of the results

derived from the gravity model, the paper estimates a Coefficient of Irregularity in the Geographical Direction of Exports Flows (CIGDEF) in order to measure the degree to which the direction of exports flows from the ENP to the EU countries is diverging or is different from that predicted by the gravity model equation. Plotting the figures of the CIGDEF against the figures of the ENP countries' per capita Gross Domestic Product (GDP), the paper detects the possible implications of geographical irregularity for the economic performance of the ENP countries.

The paper utilizes trade data derived from the United Nations (UN) COMTRADE database[1], and covers the period 2001-2010 so as to gauge the latest shifts operated in the trade structures of the EU and the ENP countries. The remainder of the paper is as follows. The next section provides a literature review about the gravitational logic in empirical economic analysis. The third section compiles and runs a gravity model, aiming at the detecting the determinants of exports flows from the ENP countries to the EU countries, exploiting panel least squares estimation technique, and interprets the results. The fourth section discusses about the corresponding irregularity in the geographical patterns and its implications on the economic performance of the ENP countries. The last section offers the conclusions and some policy implications.

2. The gravitational logic in empirical economic analysis: A review of the literature

Newton (1687/1846) formulated (as a sequent of the well-known "apple incident") the "Law of Universal Gravitation" stating that every point (i.e. point-like) mass in the universe attracts every other point mass with a force that is directly proportional to the product of their masses and inversely proportional to the square distance between them (see Box 1)[2]. In the field of economics, Tinbergen (1962)[3] suggested that the gravitational logic could be applied to international trade flows[4] (see Box 2). This model (the "gravity model"; in analogy to the "Law of Universal Gravitation") imprints, in empirical manner, the geographical (spatial) view of (international) trade activity (see Figure 1).

[1] See http://comtrade.un.org/db/ for details.

[2] Even though the "Law of Universal Gravitation" has been superseded by the "Theory of General Relativity", formulated by Einstein (1916), it continues to be used as an approximation of the gravity effects.

[3] Carey (1858 in Isard, 1960: 498-500), as early as the middle of the 19th century, observed the presence of gravitational force in social phenomena.

[4] Prior to the "official" formulation of the gravity model, Ravenstein (1885), Zipf (1946) and Pöyhönen (1963) seem to follow the gravity approach in their studies. The first two studies concern migration, whereas the last one concerns trade.

Box 1: The Law of Universal Gravitation

$$F = G\frac{m_1 m_2}{r^2}$$

F denotes the force between the masses

G is a gravitational constant (see Gilles, 1997)

m_1 denotes the mass of the first point

m_2 denotes the mass of the second point

r denotes the distance between the centers of the masses

Source: Adjustment from Newton (1687/1846)

Box 2: The gravitational logic in the field of economics

$$F_{ij} = G\frac{m_i^{\alpha} m_j^{\beta}}{d_{ij}^{\theta}}$$

$_i$ denotes the origin

$_j$ denotes the destination

F denotes the flow from origin to destination

G is a gravitational constant (see Gilles, 1997)

d denotes the distance from origin to destination (usually measured center to center)

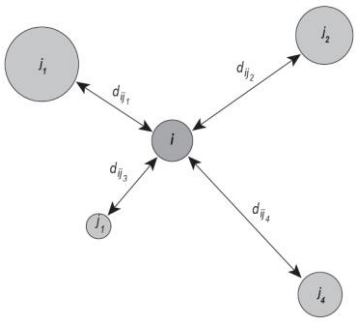
m_i denotes the size of the origin (usually expressed in terms of population or GDP)

m_j denotes the size of the destination (usually expressed in terms of population or GDP)

α , β , θ are coefficients

Source: Adjustment from Tinbergen (1962)

Figure 1: The gravitational logic in the field of economics



Source: Keeble et al. (1981: 212) in Copus (1999: 4)

The gravity model has no (clear) theoretical underpinnings (Bergstrand, 1985; Anderson and Wincoop, 2004; Fratianni, 2009), even though many theoretical justifications have been proposed (see the literature review provided by Evenett and Keller, 2002 and de Benedictis and Taglioni, 2011). Linnemann (1966) attempted to provide a theoretical basis for the gravity model using the general equilibrium theory (see Walras, 1874/1954) as a benchmark. Analogous attempts have been made, *inter alia*, from Leamer and Stern (1970), on the basis of the "potluck assumption"[5], Anderson (1979), on the basis of the "Armington assumption"[6] (see Armington, 1969), Krugman (1980) and Helpman and Krugman (1985), in an imperfect competition framework (see Dixit and Stiglitz, 1977), Deardorff (1998), in a Heckscher-Ohlin framework (see Heckscher, 1919 and Ohlin, 1933/1966), and Eaton and Kortum (2002), in a Ricardian framework (see Ricardo, 1817).

Despite the lack of (a clear) theoretical foundation, the gravity model provides an intuitive general framework for studying and explaining trade activity (McCallum, 1995; Andersson, 2007). Indeed, the gravity model provides "some of the clearest and more robust empirical findings in economics"[7] (Anderson, 1979; Leamer and Levinsohn, 1995:1384) being able to "identify extreme cases of artificial barriers to trade, the role of distance and the effects of membership in various customs union and trade preference groups"[8] (Taplin, 1967:442; Soloaga and Winters, 1999; Anderson and van Wincoop, 2001; Koukhartchouk and Maurel, 2003; Subramanian and Wei, 2003; Baier and Bergstrand, 2007). Being an expression of proximity and (potential) accessibility (connectivity), the gravity model is considered to be something like a workhorse – "one of the greatest success stories" (Feenstra et al., 2001:431), with "a long track record of success" (Henderson and Millimet, 2008: 137) – in empirical international trade literature[9] (Deardorff, 1998; Baldwin and Taglioni, 2006; Baier and Bergstrand, 2007; van Bergeijk and Brakman, 2010; see the survey of the recent empirical literature provided by Kepaptsoglou et al., 2010). Usually with a functional form that is reminiscent of the "Law of Universal Gravitation", the gravity model specifies that "a flow from origin i to destination j can be explained by economic forces at the flow's origin, economic forces at the flow's destination, and economic forces[10] either aiding or resisting the flow's movement from origin to destination" (Bergstrand, 1985:474; Bergstrand, 1989; Eichengreen and Irwin, 1998; Hayakawa, 2013).

3. Gravity Model: Specification and Interpretation of the Findings

The paper compiles a gravity model aiming at detecting the determinants of exports flows from the ENP countries to the EU countries, over the period 2001-2010. Standard gravity models usually use cross-data in order to estimate trade patterns, in a given year. Panel data, however, might provide additional insights, capturing relationships over

[5] Leamer and Stern (1970) introduced the foundation of "potluck assumption" arguing that nations produce their goods and throw them all into a pot; then each nation draws its consumption out of the pot in proportion to its income.
[6] Armington (1969) assumed that products traded internationally are differentiated by country of origin.
[7] Criticisms of the empirical validity of gravity equations are "implicitly (sometimes explicitly) criticisms of the assumptions of theories underlying the gravity framework" (Bergstrand, 1985; Harrigan, 2003; Anderson and van Wincoop, 2004:52).
[8] Or, even, the effects of disintegration (see, for example, Fidrmuc and Fidrmuc, 2000).
[9] And in other fields of social sciences (see Sen and Smith, 1995 for a survey).
[10] Anderson and van Wincoop (2004:20) use the term "multilateral resistance". The presence of "multilateral resistance" introduces substitutability between trade with a country's different partners. Such kind of substitutability was previously (see, *inter alia*, Rose, 2000 and Frankel and Rose, 2002) lacking.

time and avoiding the risk of choosing an unrepresentative year (Antonucchi and Manzocchi, 2006). Theoretical literature on gravity models suggests that a random effects model (REM) would be more appropriate when estimating trade flows for a randomly-drawn sample of trading partners from a larger population. Instead, the fixed effects model (FEM) would be a better choice when one is interested in estimating trade flows between a predetermined selection of countries (Egger, 2000). Following this suggestion, there are papers in empirical literature on gravity models (Martinez-Zarzoso and Nowak-Lehmann, 2003) that use a two-step estimation procedure in order to estimate time-invariant variables (such as distance) and dummy variables. This is so because running a FEM does not allow for the direct estimation of time-invariant variables and dummy variables. Thus, these variables are estimated in a second equation with the residuals of the first equation as dependent variable and time-invariant variables and dummy variables as independent variables. The present paper chooses to run a REM in order to estimate directly the impact of estimation of time-invariant variables and dummy variables on the exports from the ENP countries to the EU countries.

The gravity model takes form:

$$\log(XV_{ij,t}) = a_0 + a_1 \log(Y_{i,t}) + a_2 \log(Y_{j,t}) + a_3 \log(P_{i,t}) + a_4 \log(P_{j,t}) + a_5 \log(D_{ij,t}) + a_6 \log(E_{i-j,t}) + \sum_{\lambda=7}^{n} a_\lambda O_{\lambda,ij,t} + \varepsilon_{ij,t} \quad (1)$$

Symbol i refers to the origin country (i.e. an ENP country), symbol j refers to the destination country (i.e. an EU country), symbol t refers to year, symbol a refers to the coefficients of the independent variables (the first one is the constant), symbol λ refers to dummy variables, and ε is the disturbance term (which follows the normal probability distribution with zero mean and constant variance). All but the dummy variables are expressed in logarithms.

The value of exports (XV) from the ENP countries to the EU countries is the dependent variable of the models. Exports' values are expressed in United States of America (USA) dollars. The dependent variable is expressed in absolute terms in order to avoid an econometric problem that may arise when it is expressed as component of one of the regressors (of GDP, in particular). In this case, by an accounting identity, the regressor is going to be correlated with the disturbance term (McCallum, 1995; Frankel and Romer, 1999).

The value of GDP (Y) is included in the model, representing the economic sizes of the ENP and the EU countries. GDP values are expressed in USA dollars. High level of GDP in the origin country indicates a high level of production, which increases the availability of goods for exports. High level of GDP in the destination country indicates a high level of disposable income, which suggests high capacity to import. Thus, positive coefficients are expected for the GDP level of both the exporting and the importing countries. In the present paper, the variable is included in the model with a time lag of one year.

The level of population (P) is included in the model, representing the market potential of the ENP and the EU countries. High level of population in the origin country indicates either high or low potential to export, depending on the absorption capacity (i.e. low or high, respectively) of the country. High level of population in the destination country indicates either high or low potential to import, depending, also, on the absorption capacity (i.e. low or high,

respectively) of the country. Thus, the coefficients for the level population are expected to be either positive or negative, for both the exporting and the importing country (Oguledo and MacPhee, 1994; Augier et al., 2005).

Geographical distance (D) between the country of origin and the country of destination is included in the model in order to proxy the level of transaction costs. Bilateral distance is expressed as time-distance (i.e. the minutes needed in order to reach from the origin to the destination country by car). Since space is not isotropic, it is preferred not to take into consideration the Euclidean distances (i.e. to express distance in kilometers). The coefficient of distance is expected to be negative in order to verify that the force of attraction diminishes with distance.

An income difference, between the country of origin and the country of destination, variable (E) is added in the model in order to test for the existence of a "Linder effect"[11]. Differences are expressed in the second power (Arnon et al., 1996). The coefficient of income difference is expected to be negative, indicating that bilateral trade will be greater when the per capita GDPs of the two countries are more similar.

A set of dummy variables (O) is order to capture the impact of some idiosyncratic factors that are supposed to favor trade activity. In the present model two dummy variables are considered: the first one is the existence of common land borders; the second one is the existence of colonial relations in the past. The former dummy applies to the many of the ENP East countries that have common land borders with some of the EU countries, whereas the latter applies to many of the ENP South countries that used to be colonies of some of the EU countries. Each dummy is given the value of 1 when the correspondent condition is satisfied and the value of 0 otherwise. The coefficients of both dummies are expected to be positive (Eichengreen and Irwin, 1998; Fratianni, 2009).

Before commenting on the results of the model, there is an important issue that needs to be commented first. There is a related problem with the analogy between the gravitational logic in physics and the gravitational logic in economics is that the former can be very small, but never zero (Santos Silva and Tenreyro, 2006: 642-643). This means in many cases the value of exports from an ENP country to an EU country accounts for 0. These 0s do not allow for the dependent variable to be expressed in logarithmic terms. Rather than throwing away these observations, it seems better to attribute them the value of 1. There are some reservations, of course, that this methodological choice will produce inconsistent estimators; as regards to the present model, however, these reservations belong to the theoretical sphere since 0s are probably the result of rounding-down since they mostly occur for pairs of distant countries.

[11] Linder (1961: 94) hypothesized, as a possible resolution to the Leontief paradox (Leontief, 1953), that "the more similar the demand structure of the two countries the more intensive potentially is the trade between these two countries". Nations with similar demands would develop similar industries. These nations would then trade with each other in similar, but differentiated goods. Empirical examinations of the "Linder hypothesis" have observed a consistent "Linder effect" (Arnon and Weinblatt, 1998). Usually, econometric analyses, following the suggestion made by Linder (1961), proxy the demand structure in a country from the level of its per capita income. In other words, econometric analyses usually assume that the closer are the per capita income levels in two countries the closer are the consumer preferences (Frankel, 1997). This means that the proportionate demand for each good in the two countries becomes more similar, given Engel's law (Engel, 1857), which assumes that consumer's preferences are dependent on the level of consumer's income. Therefore, the factor endowments (relying on specialization to create a comparative advantage in the production of differentiated goods) in the two countries, also, become more similar. "Linder hypothesis" was further developed by Krugman (1980) and Helpman and Krugman (1985) for the development of the concept of "home market effect".

The model is estimated using panel least squares[12] (see Table 1). Its overall explanatory power is quite satisfactory. The $R^2_{adj.}$ figure is relatively high for a gravity model, and all the independent variables are statistically significant (at 1% level of significance), having the expected sign. Thus, based on the results of the model, a number of important observations can be made.

Table 1: A gravity model for the exports of the ENP countries to the EU countries, period 2001-2010.

Dependent Variable: LOG($XV_{ij,t}$)

Method: Panel Least Squares

Sample (adjusted): 2001-2010

Cross-sections included: 312

Total panel (unbalanced) observations: 2940

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTANT	-19.43046	1.802064	-10.78234	0.0000***
LOG($Y_{i,t}$(-1))	0.355789	0.062262	5.714377	0.0000***
LOG($Y_{j,t}$(-1))	1.182237	0.067612	17.48573	0.0000***
LOG($POP_{i,t}$)	5.64E-08	3.87E-09	14.56829	0.0000***
LOG($POP_{j,t}$)	1.44E-08	4.39E-09	3.279782	0.0011***
LOG($D_{ij,t}$)	-0.088319	0.003918	-22.54072	0.0000***
LOG($E_{i-j,t}$)	-0.094300	0.033582	-2.808096	0.0050***
$O_{1,ij,t}$: COMMON LAND BORDER	1.630824	0.378992	4.303061	0.0000***
$O_{2,ij,t}$: COLONIAL RELATION IN THE PAST	1.044809	0.327834	3.187004	0.0015***

R-squared	0.498307	Mean dependent var	16.02331
Adjusted R-squared	0.496938	S.D. dependent var	4.177278
S.E. of regression	2.962812	Akaike info criterion	5.013211
Sum squared resid	25729.07	Schwarz criterion	5.031536
Log likelihood	-7360.421	F-statistic	363.9029
Durbin-Watson stat	0.507527	Prob(F-statistic)	0.000000

*** statistically significant at 1% level

Sources: UN COMTRADE Database / Authors' Elaboration

[12] The current version of the model does not include period FE. Running the model with period FE, similar results are produced.

The first observation is that the estimators of the GDP variables have the expected positive signs for both the exporting and the importing countries.[13] This indicates that higher level of GDP is associated with higher capacity either to export or to import. It is noteworthy, however, that the estimator for the ENP countries is significantly low(er) comparing to the one for the EU countries. This finding verifies that the own-GDP elasticity usually exceeds the partner-GDP elasticity when trade activity concerns differentiated goods (Feenstra et al., 2001). Definitely, this is not the case for the vast majority of the ENP countries since they have been locked-in an inter-industry type of trade relations with their EU counterparts (Artelaris et al., 2013).

The second observation is that the signs of the estimators of the population variables are positive. Thus, higher level of population indicates higher potential either to export or to import. The estimator of population is higher in the ENP countries indicating that these countries have lower absorption capacity in respect to the EU countries.

The third observation is that the variable of geographical distance has the expected negative estimator. This finding indicates that adjacency exerts a strong influence in the formation of trade areas. This means that as the EU – ENP trade activity is expanded to countries situated further and further from the EU core, the EU – ENP trade relations are not characterized by (the same) strength as the force of attraction diminishes with distance. Moving a step further, this finding indicates that the supporters of the "end of geography" (O' Brien, 1992) and the "death of distance" (Cairncross, 1997) are far from being verified, despite the remarkable progress made in transportation and communication technologies.

The fourth observation is that the variable of income differences[14] has the expected negative estimator. This finding verifies "Linder hypothesis", indicating that exports from the ENP to the EU countries will be greater when the per capita GDPs of the trading partners are more similar. Given that EU – ENP trade relations represent a "North-South" type of integration, this finding is of significant importance (Martinez-Zarzoso and Nowak-Lehmann, 2003).

The fifth observation is that the dummy variables have the expected positive estimators. This indicates that the existence of common land border and the past existence of colonial relations are factors favoring trade activity between the EU and the ENP countries. Practically, the first dummy refers to some of the ENP East countries, whereas the second one refers to the ENP South countries.

Overall, the findings of the gravity model indicate that the gravitational logic applies to the case of the EU – ENP trade relations. High levels of GDP and population, in the ENP and the EU countries, low distance, low income differences, common land borders and colonial relations in the past are among the factors favoring the increase of exports from the ENP to the EU countries. Otherwise, the EU – ENP trade activity is hindered.

4. Geographical Direction of Exports: Regular or Irregular Patterns?

[13] The results obtained are analogous when the variables of GDP are included in the model with no time lag.

[14] Removing this variable from the model, the results of the model do not change significantly. Such finding is in harmony with previous studies (Hummels and Levinsohn, 1993).

On the basis of the results derived from the gravity model, the paper explores (a) the geographical pattern of trade for the ENP countries is "normal" (or the expected one); and (b) whether deviations from the "normal" pattern have any consequences for the development prospects of the ENP countries. First, the notion of "normal" has to be defined. What would be the factors determining the geographical distribution of trade flows of a given country? Who are the more likely destinations of these flows? The gravity model for the EU – ENP trade activity, indicates that in an international framework with no major obstacles to commodity flows, the value of exports from the ENP countries to the EU countries is a direct function of the level of GDP, the level of population, the level of distance, the level of income differences, the existence of common land borders, and the existence of colonial relations in the past, *inter alia*. Given that the ENP countries operate under conditions of "neighborhood Europeanization", it is important to know whether (and to what extend) the ENP exports flows to the EU are largely driven by market forces or by a set of less detectable, but existing, political type of considerations. Second, to the extent that there is a bias in the geographical pattern of trade relations, it is interesting to know whether such a bias has affected (and in which direction) the economic performance of the ENP countries.

The notion of "normal" geographical distribution is established on the argument that the economic space that contains the EU and the ENP countries is (or, to say it better, should be) an economic space with no major barriers to interaction (Artelaris et al., 2013). As a result, the ENP countries are expected to have with the EU countries a "normal" type of trade relations, in the sense that the direction of trade flows is driven (explained) by the parameters captured in the corresponding gravity model. Having estimated the gravity model, it is possible to find what would be the volume of trade flows (exports flows, in this particular case) between the ENP and the EU countries in an ideal environment, where trade is driven by the forces captured by the gravity model. To this end, for the estimation of the expected (fitted) or "normal" exports flows from the ENP to the EU countries ($\hat{XV}$), the estimators of the gravity model are utilized.

On the basis of the actual and the expected trade flows, the CIGDEF (see Box 3) can be estimated, for the exports flows from the ENP to the EU countries. The construction of the CIGDEF follows the rationale developed in Jackson and Petrakos (2001) and Rault et al. (2007). The CIGDEF measures, in fact, the degree to which the direction of trade flows of a country is diverging or is different from that predicted by the gravity model equation. A high value of the CIGDEF is, therefore, associated with a geographical trade structure that is "irregular", in the sense that it is very different from the one produced by the gravity model. In contrast, a low value indicates a geographical trade structure that is very close to the one predicted by the model.

Box 3: Coefficient of Irregularity in the Geographical Direction of Exports Flows

Coefficient of Irregularity in the Geographical Direction of Exports Flows

$$CIGDEF_{ij,t} = \sum_{j=1}^{n} (XV_{ij,t} - \hat{XV}_{ij,t})^2$$

XV denotes actual export values

$\hat{XV}$ denotes estimated export values (i.e. the fitted values of exports derived from the estimation of a gravity model)

i denotes country of origin

j denotes country of destination

t denotes year under consideration

Σ is a symbol for sum

$CIGDEF$ takes values greater than (or equal to) 0, from no irregularity to perfect irregularity

Source: Adjustment from Jackson and Petrakos (2001) and Rault et al. (2007)

The results of the CIGDEF (Table 2) indicate that there are cases where significant irregularities in the geographical direction of exports flows arise. It is evident, that the CIGDEF shows great variation both over time and across countries. Some countries (i.e. Armenia, Azerbaijan, Belarus, Egypt, Georgia, Libya, and Moldova) experienced their peak over the period 2001-2003 (i.e. prior to the launch of the ENP), whereas some others (i.e. Algeria, Morocco, Syria, Tunisia, and Ukraine) experienced their peak over the period 2006-2009 (i.e. after the launch of the ENP).[15] The majority of the ENP East countries are the ones that experienced their peak prior to the launch of the ENP. This is so as so as the break-up of the Soviet Union led these countries – former members of the Council for Mutual Economic Assistance (COMECON) – to a state of isolation (Petrakos and Kallioras, 2007). The launch of the ENP led to the normalization of the patterns of trade activity with the EU, and especially with the new EU countries (i.e. acceded in 2004 and 2007). Concerning the majority of the ENP South countries as well as Ukraine, geographical irregularity seems to be associated with the unrest took place, in these countries, over the recent years (Blockmans and van Vooren, 2013).

[15] Unfortunately, there are no CIGDEF figures for Israel, Jordan, and Lebanon as the gravity model suffers for many missing values for these specific countries.

Table 2: Coefficient of Irregularity in the Geographical Direction of Exports Flows from the ENP to the EU countries, years 2001-2010

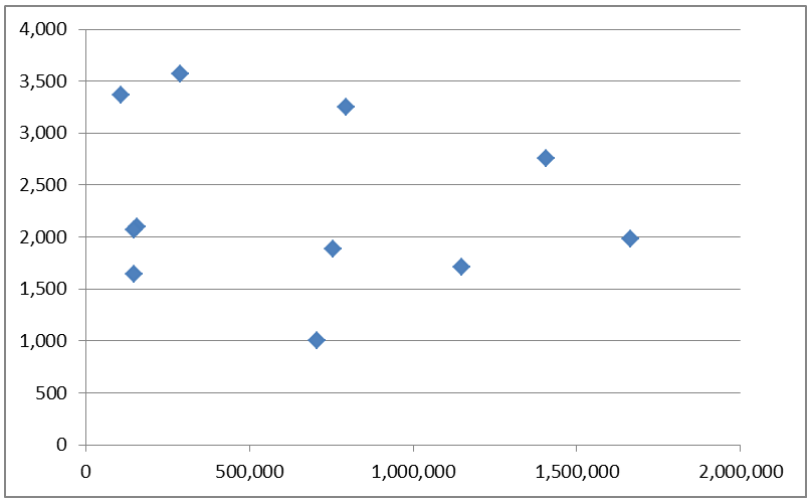
CIGDEF *(to the EU)*	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ALGERIA	959,664	1,209,588	176,383	1,286,140	1,004,588	800,299	1,774,882	131,185	239,306	380,582
ARMENIA	2,659,073	1,276,645	1,725,615	1,978,156	2,112,817	64,243	2,190,822	1,017,931	2,597,128	1,032,167
AZERBAIJAN	1,792,607	1,248,196	2,392,784	1,304,564	1,713,044	1,252,072	158,780	760,761	1,490,241	1,944,535
BELARUS	634,427	138,439	914,263	144,960	112,930	85,254	120,528	594,016	54,320	83,436
EGYPT	233,162	168,540	128,881	135,692	97,585	86,749	113,751	144,458	194,159	162,052
GEORGIA	2,575,706	904,435	1,570,200	616,180	716,702	929,525	337,293	1,585,911	742,895	1,504,491
ISRAEL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
JORDAN	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LEBANON	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LIBYA	1,614,723	1,125,624	2,475,539	1,020,664	2,192,046	1,434,095	1,556,815	424,970	871,505	n/a
MOLDOVA	807,841	113,982	1,517,835	1,381,033	998,422	917,426	944,518	113,827	103,491	161,143
MOROCCO	154,400	209,247	129,777	118,853	96,177	184,811	186,029	122,155	217,637	155,683
PALESTINE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SYRIA	797,975	1,071,345	774,273	467,550	514,979	1,024,820	1,266,188	864,641	717,394	63,891
TUNISIA	36,589	104,543	72,462	165,345	106,939	183,831	88,146	109,659	150,468	57,980
UKRAINE	137,438	136,299	205,110	123,602	41,572	164,425	99,393	238,063	124,698	210,989

n/a: not available

Sources: UN COMTRADE Database / Authors' Elaboration

Given the aforementioned results, a question arises whether significant irregularities in the geographical direction of exports flows from the ENP to the EU countries have any implications for the economic performance of the ENP countries. To address this question, the figures of the CIGDEF (average figures for the period 2001-2010) are plotted against the figures of the ENP countries' per capita GDP (average figures for the period 2001-2010) (Figure 2). Since Libya is an outlier in terms of per capita GDP (its per capita GDP figures is almost 2.3 times as much the corresponding figure of Belarus, which has the second-highest per capita GDP figure among the ENP countries considered), it has been dropped out in order for the picture not to be blurred. It can be observed that, on average, the CIGDEF and the per capita GDP figures of the ENP countries considered have a negative, though not strong (i.e. the corresponding correlation figure is -0.164), relationship. This provided some first indication that the geographical pattern of exports to the EU, at least for the vast majority of the ENP countries, does not facilitate high levels of economic performance.

Figure 2: Relation between average per capita GDP and the average geographical direction of exports to the EU, period 2001-2010



Sources: UN COMTRADE Database / Authors' Elaboration

5. Conclusions and Policy Implications

The paper compiles and runs a gravity model in order to detect the determinants of exports flows from the ENP to the EU countries. Overall, the gravity model explains half of the "behavior" of the dependent variable – a quite satisfactory explanatory power – and the results derived provide valuable insight with respect to the EU – ENP trade relations. The estimator of the GDP variable of the ENP countries, though positive, is significantly low(er) comparing to the one for the EU countries. This finding indicates the inability of the ENP countries to diversify and expand their export bases, implementing export-led growth strategies. Definitely, the inability of the ENP countries to compete (successfully) with their more advanced EU counterparts in the markets for capital-intensive and knowledge-intensive economic activities cannot produce long-term income convergence. The positive sign of the estimator of the ENP population indicates high potential to export. This finding is a signal for the EU to create, through its external trade policy, conditions favoring the ENP exports to the EU market. The reluctance on behalf of the EU to remove its tariff barriers, especially the ones imposed on agricultural products, does favor trade creation conditions, raising major hurdles for the ENP countries to export, to the EU market, the products on which they, mainly, specialize. Given the slow progress of the DCFTAs, the EU may, instead, examine the possibility that mandatory *acquis communautaire* compliance related to political requirements should not be a precondition for trade negotiations (and agreements). The negative sign of the estimator of distance indicates that the ENP exports to the EU countries are not spatially dispersed all over the EU market. In contrast, they present strong trends of spatial concentration since adjacency exerts a strong influence in the formation of trade areas, whereas distance has a negative effect on trade activity. The sings of the coefficients of the income differences variable and the dummy variables support the aforementioned findings.

Such a "crypto-protectionist" approach on behalf of the EU has an impact on the geographical pattern of the ENP exports. Indeed, the results of the CIGDEF, showing great variation both over time and across countries, indicate that there are cases where significant irregularities in the geographical direction of exports flows arise. This means that in many cases the geographical pattern of exports is not "normal" or, to say it differently, there is a bias in the geographical pattern of ENP exports to the EU. Such a bias is, to some extent, expectable since the economic space that contains the EU and the ENP countries is not without barriers to interaction. Of course, for many ENP countries (mostly for many ENP East countries) the launch of the ENP led to the normalization of the patterns of trade activity with the EU (and especially with the new EU countries). These countries experienced their peak, in terms of geographical irregularity, prior to the ENP as a side-effect of the break-up of the Soviet Union. In any case, geographical irregularity exerts a negative, though not strong, impact on the ENP countries' economic performance.

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