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Economic Openness, Monetary Integration and Trade Specialization: Evidence from the EA-China Trade

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Abstract

The European Union and China have become major trade partners in recent decades. China's accession to the World Trade Organization and the Euro Area enlargement have radically changed the framework of bilateral cooperation. This paper applies a gravity model in order to examine the impact of economic inequalities and the adoption of the euro on bilateral trade between China and the Euro Area. The results suggest an enhancing effect of mitigating inequalities and the common currency on trade. It also appears that apparent competition patterns between EA members regarding some of the major exported products to China are in fact synergistic, due to decentralization of production processes from the EA core to its periphery.

Keywords: China, economic inequalities, Euro Area, international trade, trade openness

1. Introduction

Over the last two decades, the Euro Area (EA) has constituted a changing spatial and institutional entity, since the gradual adoption of the common currency by EU member states alters not only its geographical boundaries but also the degree of interconnectivity between the states. The fact of a relative heterogeneity within the boundaries of the Euro Area is consistent with the members' differentiated frameworks in terms of economic policies and productive structures. The issues of heterogeneity in the Euro Area context have been critical in studies focusing on the economic effects of the currency union and, among others, trade.

The objective of the present study is to examine the EA members' bilateral trade relations with China. The research covers the period after the Euro Area establishment (1999-2017), taking into account that the exchange rates were locked and forms of nonphysical transactions were already operative from 1999. Special attention is given to the years following the last member's accession (Lithuania) in 2015, during which there has been no change in the composition of the Area.

The European Union and China have become major bilateral partners in recent decades. China's policy framework has not remained unchanged over the last 20 years, marked by the country's accession to the World Trade Organization in 2001 and its gradual opening to international trade. The imperative need for transferring know-how is well accompanied by the gradual increase in imports of sophisticated products, while the rise of living standards of the Chinese population, coupled with the ongoing urbanization process, follows the country's strategic shift towards an economic model based more on domestic consumption (Guo, 2015; Zhang, 2016; Dieppe et al., 2018).

Taking into account the growing economic and trade relations between the EA and China, the present study intends to provide answers to the following questions: To what extent is it possible to detect and evaluate a relationship between economic inequalities and trade openness, based on evidence from the EA members' bilateral trade with China? Does economic development favour the EA members' trade performance? Has the gradual adoption of the common currency by the EU states contributed to the EA-China bilateral trade growth? What conclusions can be drawn from the structural analysis of the EA members' major exported products to China?

2. Theoretical Framework

2.1 Determinants of Trade

On the basis of traditional trade theories and by use of gravity equations and models, various factors of trade flows have so far been determined. The theoretical framework

regarding the use of the gravity equation is based on the original studies of Tinbergen (1962), Pöyhönen (1963) and Anderson (1979). Currency union and institutional effects as well as differences in within-country income distribution can prove to be critical explanatory variables in the case of the Euro Area. With regard to inequality effects on international trade, the literature is quite limited. Martínez-Zarzoso and Vollmer (2016) find that bilateral trade appears to be more intense in the case of pairs of countries with similar income distributions. Mitra and Trindade (2003) argue that the effect of inequalities on trade is a hypothesis that can be verified empirically.

It is a general deduction that exchange rate volatility has a negative impact of diversion on trade flows (WTO, 2013; Bouchoucha, 2015), while currency unions potentially have a positive impact on trade by reducing trade costs and barriers, eliminating exchange rate risk and reducing fluctuations (Traistaru, 2004). However, the latter can also generate significant costs, as by accessing a currency union, each country has to deal with rising prices (Camarero et al., 2014), in order to adjust to asymmetric shocks, which can produce heterogeneous trends in price and unit labour cost (Figueiredo et al., 2016).

It can be inferred that there has been no consensus on the Euro effect on trade (Figueiredo et al., 2016; Glick and Rose, 2016; Mensah, 2017; Polák, 2019). Rose's (2000) initial estimation of a 200 percent positive effect on trade has been widely discussed and acted as a catalyst for the production of much research on the subject, with many researchers disputing the so-called 'Rose effect' (Polák, 2019). Various empirical studies have delved deeper into possible heterogeneous effects, by way of splitting into old and new EMU members (Mensah, 2017) or by accounting for other contributing factors such as previous trade agreements (Camarero et al., 2014), as well as other historical and geopolitical events (Campbell and Chentsov, 2017).

2.2 Competition and Complementarity in Trade

The terms of competition and complementarity are often used in empirical studies regarding international trade. Chandran (2010) and Wei and Tian (2018) refer to competition and complementarity issues regarding bilateral trade between China and Guinea by employing the Export Similarity Index (ESI) and Revealed Comparative Advantage Index (RCA), among others. Hoang (2018) employs the Trade Complementarity Index (TCI) and Spearman's rank correlation coefficients for competitiveness indicators in order to examine the agricultural trade complementarity of ASEAN countries on the global market. Wang (2012) studies China's role in trade cooperation with ASEAN by using the RCA index.

The present analysis is based on ESI, an index developed by Finger and Kreinin (1979) and used to assess the effects of trade barriers' reduction on the exports of developing to developed countries (Erlat and Ekmen, 2009). It is expected that countries with higher export similarity and overlapping trade patterns will subsequently have higher competition between them, since they produce and export the same or similar products (Hoang, 2018). Dissimilarity in exports means a more beneficial relation for the partners under consideration. The ESI is used in various studies, such as the analysis of regional integration's effects on member or nonmember countries or the detection of a country's relative export specialization compared to other developed countries (Erlat and Ekmen, 2009).

3.0 Preliminary Evidence

The relationship between trade openness and economic inequalities is often difficult to identify. By comparing the scores of the above two variables for the EA members and for the years 2006 and 2015 (figure 1) it is indeed not possible to draw concrete conclusions, taking also into account the impact of conjunctural factors, such as the global economic crisis, on the evolution of these variables. Between these two years, it appears that only six of the current 19 members have recorded an improvement in their trade openness performance and at the same time mitigating economic inequalities.

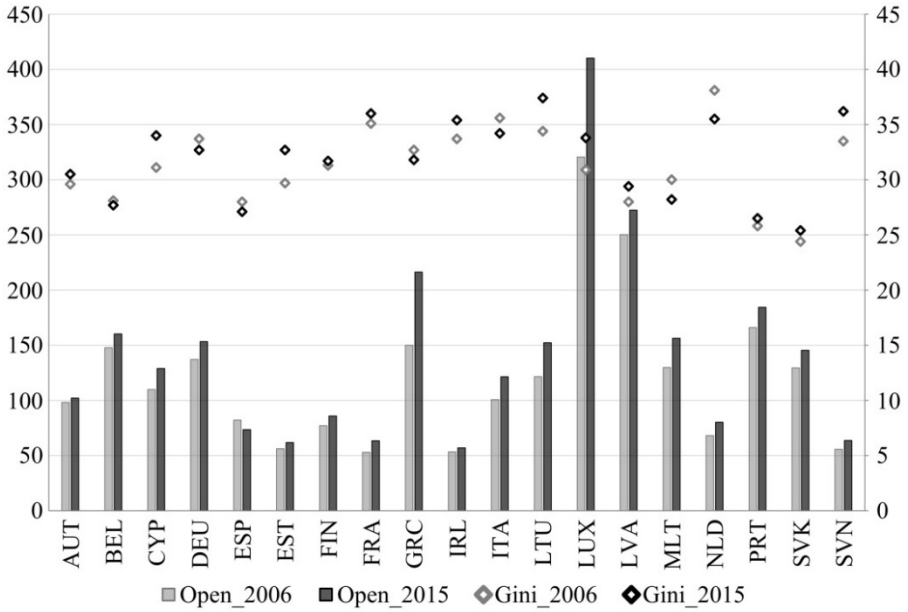


Figure 1 Gini and Openness Indexes (%) in 2006 and 2015: the current EA members.
Notes: On the left, the y-axis for trade openness, on the right for Gini coefficient.
Source: World Bank, 2019 (ind.: SI.POV.GINI), UN COMTRADE / UNCTADStat, 2019 (own calculations for openness index).

These six countries are mainly major trade economies (Germany, the Netherlands, Italy), but also other medium and smaller-sized members (Belgium, Greece, Malta). In all other countries, there is a more or less important increase both in trade openness index and Gini coefficient, except for Spain. It becomes clear that in order to draw some more reliable conclusions, it is necessary to overcome the potential effect of conjunctural factors by performing a longitudinal comparative analysis to capture the effect of economic inequalities on trade.

It seems that three years after the countries' EU membership (figure 2 – left), the increase in import value of products from China is stronger than the fluctuations observed in the corresponding import values three years after the countries' EA membership (figure 2 – right). The aforementioned finding is true at least for most of the members that joined the European Union in 2004 – but adopted the common currency in different years – with the exception of Malta and Cyprus. In this preliminary approach, EU membership effect on trade appears to be stronger than that of EA membership, thus reaffirming previous studies (Glick, 2017).

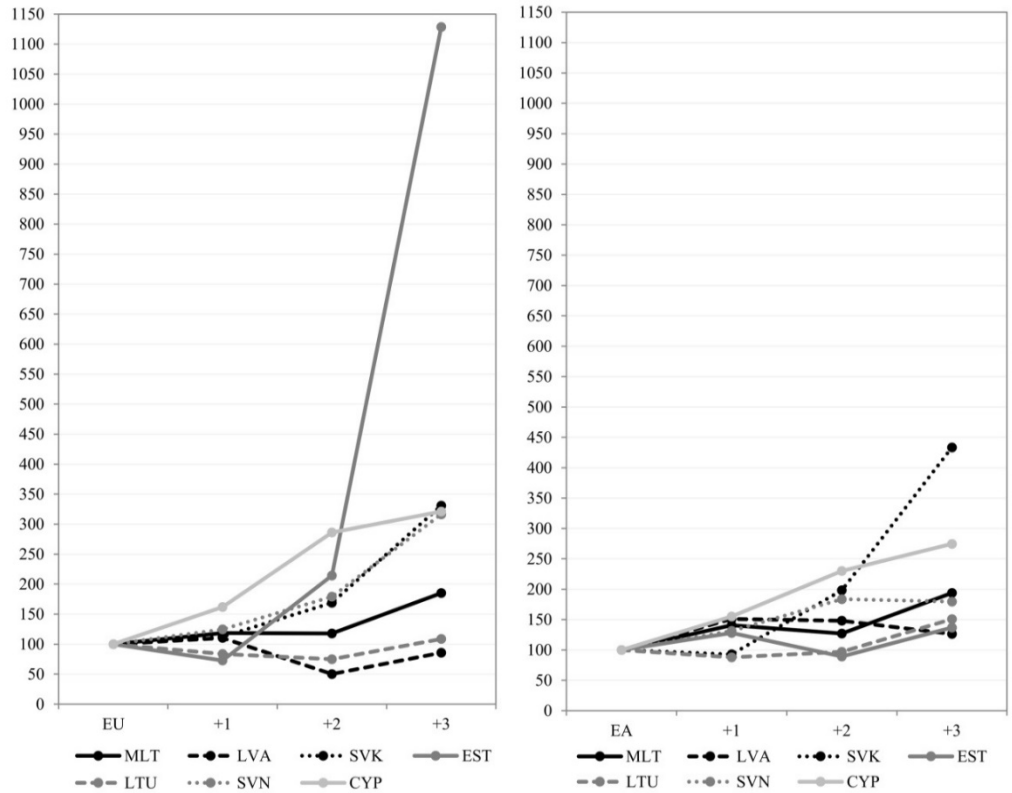


Figure 2 Change (%) in members' import value since their EU and EA accession and three years thereafter (base year = 100).
Source: UN COMTRADE / UNCTADStat, 2019, own calculations.

These findings appear to be reversed in the case of members' exports to China (figure 3). For most of the members, a more significant increase in export value is recorded three years after the adoption of the common currency, compared with the corresponding performance of the members' EU accession and onwards, with the exception of Slovenia and Cyprus. There is some evidence on the positive effect of the adoption of the common currency on new EA members' exports to China, which appears more important than the rather ambiguous effect on imports. It should however be remembered that any decisions with respect to the further development of trade relations between the European countries and China are taken at the institutional level of the European Union. EA members operate within the EU framework, which means that some of the impact on trade may be more relevant to the EU policy framework than to the impact of the single currency (Mensah, 2017; Chen and Novy, 2018).

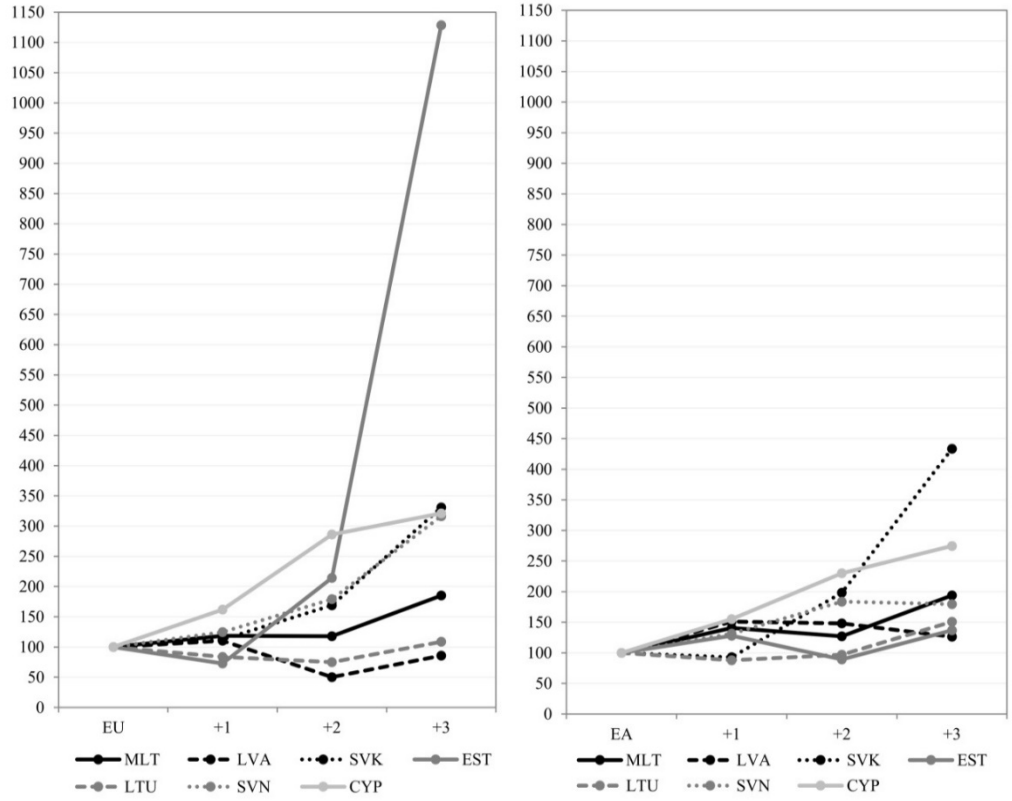


Figure 3 Change (%) in members' export value since their EU and EA accession and three years thereafter (base year = 100).

Source: UN COMTRADE / UNCTADStat, 2019, own calculations.

4.0 The Gravity Model

This section focuses on a gravity model analysis, trying to capture the effect of intra-EA members' economic inequalities, as well as the integration process under the common currency, on EA-China trade flows. The sample contains 361 observations on the current 19 EA members' bilateral trade with China over the period of 1999-2017. Given that Eurostat provides data on Gini coefficient for the years after 2005, the regressions that include Gini coefficient cover the period between 2005 and 2017 (247 observations, regression 2, tables 3 and 4). The gravity equation also includes several geographic, economic and time variables in order to reduce omitted variable bias.

$$\ln Trade = \beta_0 + \beta_1 \ln Distance + \beta_2 Island + \beta_3 Landlocked + \beta_4 EA_{member} + \beta_5 EA_{border}$$

$$+ \beta_6 \ln Population + \beta_7 \ln GDPpc + \beta_8 \ln Gini + \beta_9 \ln Openness + \gamma_t \sum_1^{18} T_t$$

The variable *trade* refers to the export or import value of each EA member to and from China, while data for the *distance* variable derive from the GeoDist database of CEPII (Mayer and Zignago, 2011). The *EA member* dummy takes the value 1 if countries have already joined the Euro Area. The *EA border* dummy takes values equal to the number of each member's EA neighbours, while taking the value 0 if the members i) are island countries, ii) have no neighbouring EA members or iii) are not EA members yet. Population size, per capita GDP and export openness data derive from the UNCTADStat database, while the Gini coefficient variable is provided by the Eurostat database. A dummy for EU entry was initially introduced, but it was finally excluded from the reported models due to collinearity with the *EA member* dummy. Finally, the standard bootstrap methodology, a nonparametric statistical inference method which is commonly used in gravity models (Palm, 2002; Cipollina et al., 2016), was applied for resampling into 1000 samples and confirms the robustness of the results obtained.

A correlation analysis provides a first step towards addressing the questions raised at the beginning of this study (tables 1 and 2). The estimated coefficients indicate a positive effect of geographical and institutional proximity, reinforced through the gradual adoption of the single currency, on both imports and exports. The reverse relationship between Gini coefficient and all trade-related variables suggests that mitigation of economic inequalities matters for trade performance and openness. What is also worth considering is the differentiated relationship between trade performance and openness, depending on whether focusing on exports or imports to and from China, respectively. The negative relationship between import openness and performance, revealed here, provides evidence for multilateral resistance effects to EA imports from

China, which does not apply for Euro Area exports to China and export openness in general. *Ceteris paribus*, the more open the members at the export level, the more significant their export performance with respect to China.

Table 1 Pearson Correlations (EA exports)

N=247	Export	EA member	EA border	Export openness	Gini
Exports	1	0.570[a]	0.669[a]	0.188[a]	-0.281[a]
EA member	0.570[a]	1	0.404[a]	-0.114	-0.220[a]
EA border	0.669[a]	0.404[a]	1	0.126[b]	-0.238[a]
Export openness	0.188[a]	-0.114	0.126[b]	1	-0.407[a]
Gini	-0.281[a]	-0.220[a]	-0.238[a]	-0.407[a]	1

[a]. Correlation significant at 0.01 level.
[b]. Correlation significant at 0.05 level.

Table 2 Pearson Correlations (EA imports)

N=247	Import	EA member	EA border	Import openness	Gini
Imports	1	0.539[a]	0.640[a]	-0.316[a]	-0.133[b]
EA member	0.539[a]	1	0.404[a]	-0.326[a]	-0.220[a]
EA border	0.640[a]	0.404[a]	1	-0.148[b]	-0.238[a]
Import openness	-0.316[a]	-0.326[a]	-0.148[b]	1	-0.322[a]
Gini	-0.133[b]	-0.220[a]	-0.238[a]	-0.322[a]	1

[a]. Correlation significant at 0.01 level.
[b]. Correlation significant at 0.05 level.

Source: UN COMTRADE / UNCTADStat, 2019, own calculations.

The distance variable exerts the expected discouraging role in bilateral trade, as shown in all regressions reported here, as well as in the literature (Sohn, 2005; Wang et al., 2010; Yu, 2010; Haidar and Mirjalili, 2016). However, due to the relatively limited differences in bilateral geographical distances between each of the EA members and China, as well as because transportation costs are significantly affected by the differentiated freight traffic among European ports, the sign of the coefficient regarding the distance variable often appears statistically insignificant (regression 2 both for exports and imports).

Insularity usually affects positively the trade performance of these countries (Karkanis, 2018), as also confirmed here. The Euro Area island countries are characterized by a limited market size, resulting in an even more urgent need to penetrate larger markets in order to optimize profit. The variable for countries' lack of access to the sea often takes a negative sign. The results indicate a discouraging effect of members' landlockedness on imports from China (table 4, regression 2); similar results can be found in Caporale et al. (2015).

The variables chosen to represent market size and the level of development of countries are based on the assumptions expressed in Kucera and Sarna (2006). The size of the market, expressed by the population size variable of each EA member, takes the expected important specific weight in all regressions both for exports and imports. As for the per capita GDP variable, the effect of development levels appears to be positive for bilateral trade (Didier and Koenig, 2016). *Ceteris paribus*, higher levels of

development are associated with the labour markets in which there exists a significant representation of highly skilled human resources, which generally implies highly sophisticated production and commercial processes. Finally, the proxy for export openness aims at capturing multilateral resistance effects on bilateral trade. According to empirical studies in the relevant literature (De Bruyne et al., 2013), the variables related to the countries' trade openness have either a complementary or a competitive effect on bilateral trade. In this study the openness proxy takes a positive sign, revealing a complementary relationship, which means that the more important a member's export activity is, the more important its exports to China will be.

Table 3 OLS Estimations – Euro Area Exports to China

Independent variables	Exports N=361 Regr. 1	Beta	Exports N=247 Regr. 2	Beta	Exports N=361 Regr. 3	Beta
Constant	24.762		-4.571		20.635	
Distance	-2.206 (-2.344)*b*	-0.089	-0.330 (-0.531)	-0.016	-1.753 (-1.985)*b*	-0.071
Island	1.040 (3.072)*a*	0.140	1.283 (6.116)*a*	0.202	1.034 (3.232)*a*	0.139
EA member	2.821 (10.130)*a*	0.435	1.470 (6.317)*a*	0.227	2.477 (9.079)*a*	0.382
EA border	0.392 (6.632)*a*	0.252			0.395 (7.336)*a*	0.254
Population	0.781 (14.482)*a*	0.451	1.167 (27.250)*a*	0.787	0.801 (17.239)*a*	0.463
GDPpc			0.916 (7.186)*a*	0.213		
Gini			-1.436 (-2.395)*b*	-0.079		
Export openness			1.124 (9.963)*a*	0.319		
T_{2000}					-1.542 (-5.636)*a*	-0.127
T_{2001}					-1.381 (-4.809)*a*	-0.114
T_{2011}			0.384 (2.235)*b*	0.044	0.835 (3.295)*a*	0.069
T_{2012}			0.486 (3.091)*a*	0.056	0.966 (4.642)*a*	0.080
T_{2013}			0.566 (3.711)*a*	0.065	1.026 (4.499)*a*	0.085
Adjusted R^2	0.701		0.865		0.746	
F-test	169.753*a*		158.536*a*		106.838*a*	
Durbin-Watson	1.526		1.716		1.754	

Notes: OLS results, all variables except dummies are expressed in natural logarithms. Estimations use White's heteroskedasticity-consistent covariance matrix estimator. t-Statistics are in parentheses. The superscript *a* means p<0.01; *b* means p<0.05.

Table 4 OLS Estimations – Euro Area Imports from China

Independent variables	Imports N=361 Regr. 1	Beta	Imports N=247 Regr. 2	Beta	Imports N=361 Regr. 3	Beta
Constant	33.704		10.857		18.112	
Distance	-2.695 (-3.812)[a]	-0.143	-0.321 (-0.731)	-0.023	-1.185 (-3.353)[a]	-0.063
Island	0.828 (4.038)[a]	0.147			0.796 (7.093)[a]	0.141
Landlocked			-0.881 (-6.075)[a]	-0.208		
EA member	2.108 (11.456)[a]	0.428	0.597 (3.751)[a]	0.138	1.004 (9.391)[a]	0.204
EA border	0.225 (4.588)[a]	0.191			0.218 (8.495)[a]	0.185
Population	0.620 (9.011)[a]	0.471	0.655 (19.933)[a]	0.661	0.694 (20.099)[a]	0.528
GDPpc			0.810 (7.777)[a]	0.281		
Gini			-1.504 (-3.428)[a]	-0.124		
T_{1999}					-0.633 (-2.701)[a]	-0.069
T_{2003}					0.670 (3.930)[a]	0.073
T_{2004}					1.105 (5.971)[a]	0.120
T_{2005}					1.515 (7.969)[a]	0.165
T_{2006}					1.874 (10.213)[a]	0.204
T_{2007}					2.212 (11.983)[a]	0.240
T_{2008}					2.528 (13.351)[a]	0.275
T_{2009}					2.184 (11.177)[a]	0.237
T_{2010}					2.490 (13.419)[a]	0.270
T_{2011}			0.563 (3.805)[a]	0.097	2.747 (14.117)[a]	0.298
T_{2012}			0.604 (4.094)[a]	0.104	2.774 (13.700)[a]	0.301
T_{2013}			0.660 (4.385)[a]	0.114	2.820 (14.048)[a]	0.306
T_{2014}			0.739 (5.071)[a]	0.127	2.844 (14.335)[a]	0.309
T_{2015}			0.547 (3.594)[a]	0.094	2.648 (12.942)[a]	0.288
T_{2016}					2.511 (12.713)[a]	0.273
T_{2017}					2.570 (12.791)[a]	0.279
Adjusted R^2	0.602		0.807		0.868	
F-test	109.931[a]		94.742[a]		113.292[a]	
Durbin-Watson	0.786		1.594		1.991	

Notes: OLS results, all variables except dummies are expressed in natural logarithms. Estimations use White's heteroskedasticity-consistent covariance matrix estimator. t-Statistics are in parentheses. The superscript *a* means p<0.01; *b* means p<0.05.

Previous studies have attempted to model the impact of EU membership on trade (Shepotylo, 2010; Čipkutė, 2016). The analysis on both directions of trade flows confirms that the adoption of the common currency has contributed to the expansion of bilateral trade relations. The findings suggest that, *ceteris paribus*, the larger the number of EA members sharing a common border with another member, the more intensive their bilateral trade activities with China, either in terms of exports or imports. This entails a combined positive effect of institutional and consequent geographical proximity on enhancing trade flows, even in the case of a smaller institutional entity such as the Euro Area.

The introduction of the Gini coefficient variable is based on the assumption that the mitigation of income inequalities within the borders of each EA member is accompanied by a tertiarization process of their productive structure. This in turn implies, *ceteris paribus*, an improving performance in the countries' trade openness. This hypothesis seems to be confirmed here by the negative signs of the statistically significant coefficients both in export and import models (tables 3 and 4, regression 2). The more limited the income disparities in an EA member, and therefore the lower the Gini coefficient, the greater the intensity of trade flows.

The time coefficients describe an initial discouraging effect on bilateral trade, which then appears to be gradually reduced, until it finally becomes stimulating. It could be argued that this positive effect over time is due to the European integration process with the accession of new countries to the EU in 2004. This can be explained by the fact that trade consultations with China are mainly carried out by the institutions of the European Union. This positive effect can also be confirmed by the trade performance of the new member states since their entry into the EU and onwards (figures 2 and 3).

5. Complementarity and Competition Issues in EA-China Trade

For the purposes of the present article, export similarity is taken as the key instrument to comparatively approach bilateral trade between the EA members and China. One way to examine this effect is by studying similarities or dissimilarities between the members' sectoral specializations in trade, particularly exports. Traditional trade theory suggests that trade liberalization impacts sectoral specialization, by way of altering the import-export pattern of a country, as well as its domestic production structure (Lucke et al., 2013).

The first methodological step of the study is to identify the EA members' twenty major exported products to China, in terms of cumulative value, for the last three years under study (2015-2017). Given the significant diversification between sectors of major exported products among EA members, the final sample includes 125 product codes

(SITC – Rev. 3), comprising all export sectors of major importance regarding the total of the 19 members. This correlation analysis finally aims at capturing potential competition or complementarity patterns between the members' export structures. Medium-sized market economies such as Portugal and Austria are those with the most strongly correlated export structures with other members (table 5), in terms of value of exports towards China (9 and 8 correlations at 1 percent level, respectively). They are followed by large market economies such as Germany and Italy (7 correlations at 1 percent level).

High correlations are partly due to the decentralization of production from large economies towards the newer EA members, with regard to major industries such as the automotive industry, in order to reduce labour and, subsequently, production costs. This process is facilitated by the lack of local competitive automotive industry in these countries (Portugal, Finland, Slovakia and Slovenia). This is mostly the case for Germany and, to a lesser extent, Italy, as there exist very few high statistical correlations of export structures between other major economies (France, the Netherlands and Spain) and other members, apart from their closest neighbours (Germany, Belgium and Portugal, respectively).

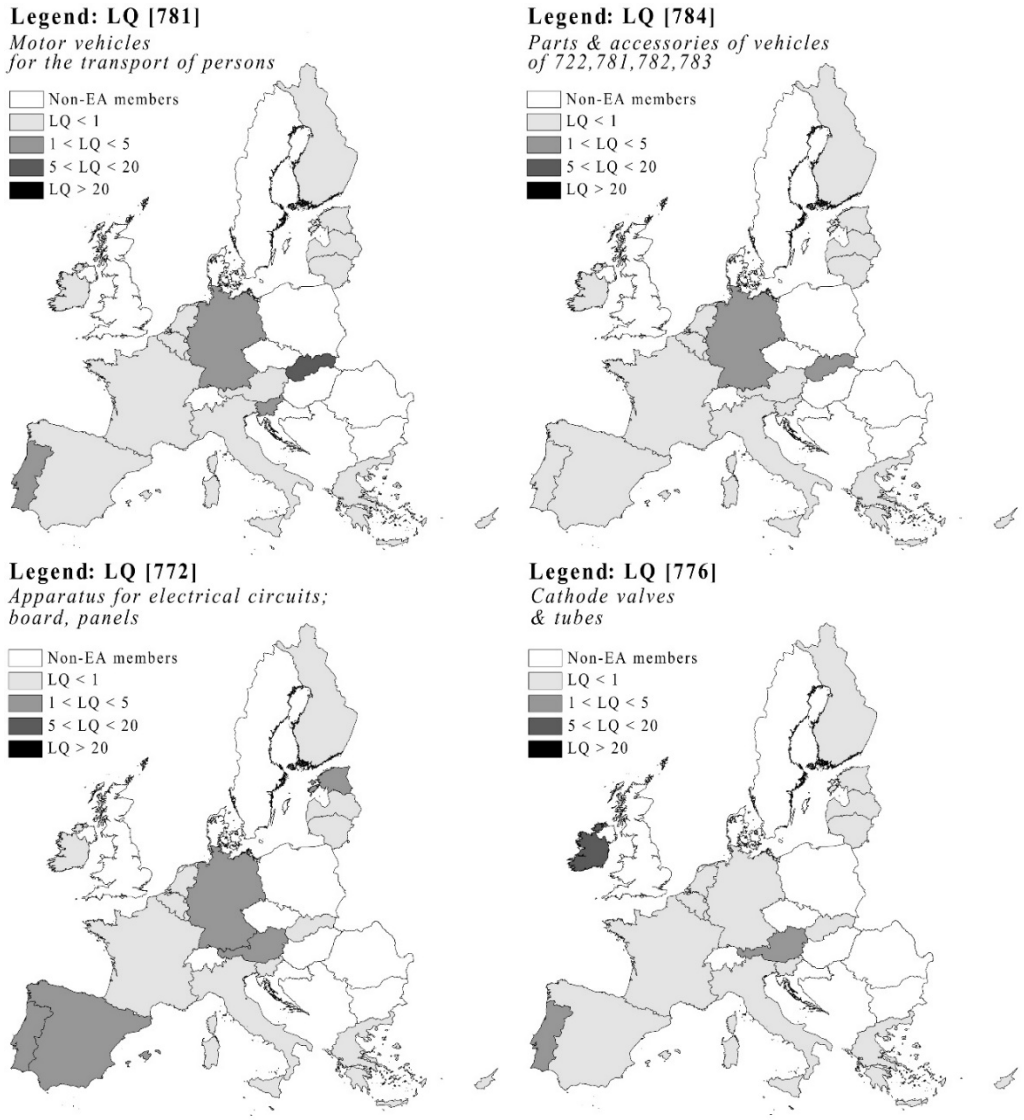
Table 5 Strong Correlations (1%)

DEU-SVK	0.752 [a]	AUT-MLT	0.473 [a]	AUT-FIN	0.319 [a]
IRL-MLT	0.752 [a]	MLT-PRT	0.461 [a]	IRL-PRT	0.317 [a]
DEU-AUT	0.701 [a]	AUT-SVN	0.451 [a]	FRA-DEU	0.314 [a]
PRT-SVK	0.692 [a]	PRT-SVN	0.446 [a]	EST-LTU	0.288 [a]
CYP-GRE	0.625 [a]	ITA-SVK	0.445 [a]	DEU-ESP	0.264 [a]
DEU-SVN	0.615 [a]	AUT-SVK	0.434 [a]	GRE-FIN	0.256 [a]
SVK-SVN	0.607 [a]	AUT-ITA	0.418 [a]	FIN-PRT	0.251 [a]
CYP-ITA	0.605 [a]	AUT-IRL	0.414 [a]	CYP-ESP	0.245 [a]
DEU-PRT	0.596 [a]	GRE-ITA	0.374 [a]	PRT-ESP	0.242 [a]
DEU-ITA	0.586 [a]	ITA-SVN	0.364 [a]	BEL-NLD	0.242 [a]
AUT-PRT	0.553 [a]	LVA-LTU	0.356 [a]	BEL-LUX	0.235 [a]
EST-LVA	0.495 [a]	ITA-PRT	0.350 [a]		

Note: The superscript [a] means p<0.01.
Source: UN COMTRADE / UNCTADStat, own calculations.

Cheap labour in countries where decentralized production processes are destined is combined with human resources of relatively high education level and specialization skills, in order to respond effectively to the production of sophisticated products. This in turn justifies the significant production and export activities towards China regarding pharmaceutical products, as well as electrical machinery and apparatus. Especially for the first product sector, Europe has traditionally been one of the largest exporters of pharmaceuticals worldwide, keeping in mind that the development of this particular

industry is further strengthened by the domestic market, as the population of Europe is constantly ageing.

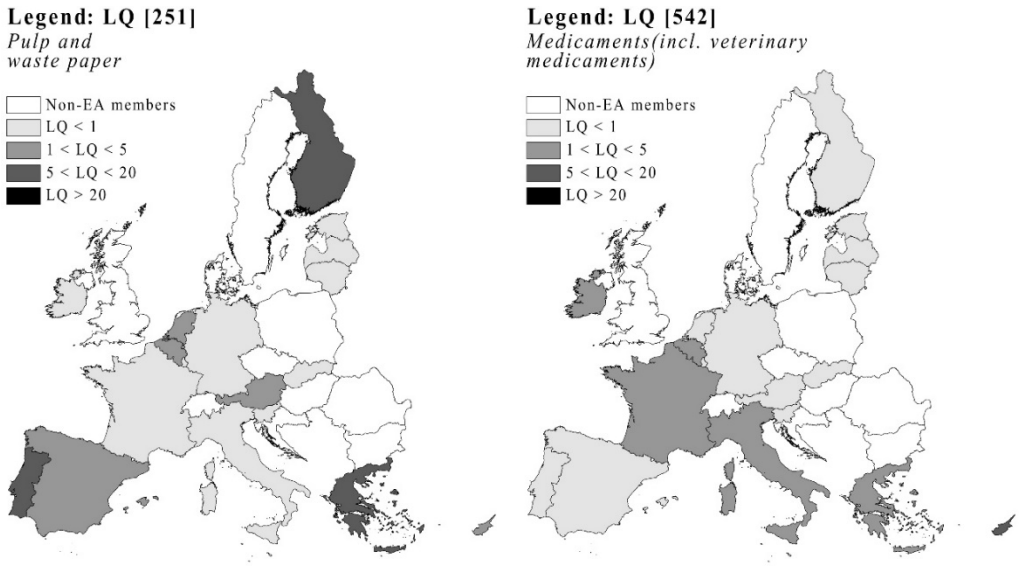


Maps 1-4 Location Quotients for EA members' ten major exported products to China (2015-2017).
Source: UN COMTRADE/UNCTADStat, 2019, own treatment and calculations.

The spatial diversification of exports regarding the Euro Area's ten major exported products to China (maps 1-6, and maps A1-A4 in the Technical Annex) is here illustrated by calculating the Location Quotient for each major product among EA members, which is essentially identical to the Export Similarity Index proposed in the literature (Plummer et al., 2010). Another part of strong correlations is spatially located

among the Mediterranean countries of the Euro Area, mainly owing to exports of medicines, alcoholic beverages, paper products and furniture to China, with the latter product category also concerning the Baltic States and Finland (table 5). The gradual introduction of Western medicine into modern lifestyle in China is reflected in the members' significant export activity in the pharmaceutical sector, with consequent similarities in their export structures.

Based on the above, it does not seem safe to confirm sectoral competition issues between EA members for exported products to China. However, in some cases, the apparent competition patterns among EA members regarding some of the major products exported to China, as for example vehicles for the transport of persons (maps 1-4, SITC 781 and 784), seem in fact to be synergistic. In sectors such as pulp, waste paper and pharmaceuticals (SITC 251 and 542, respectively), significant export activity appears to be mainly due to domestic production of the aforementioned products, which may potentially cause competitive trends among the countries concerned.



Maps 5-6 Location Quotients for EA members' ten major exported products to China (2015-2017).

Source: UN COMTRADE/UNCTADStat, 2019, own treatment and calculations.

Finally, the widespread high availability of specialized human resources in the Euro Area partly justifies the production – and hence exports – of sophisticated products not only in the larger economies of the Euro core, but also in the smaller peripheral economies. This can be seen from the location quotients for exports of products related to the electronics sector, electrical machinery and apparatus (SITC 772 and 776, maps 1-4, and table A-2 in the Technical Annex).

6. Conclusions and Discussion

The present study focused on providing evidence through the analysis of bilateral trade relations between the current EA members and China during the past two decades. The findings showed that the EA enlargement has positively affected bilateral trade, as a result of gradual upgrading of interconnectivity between members through expanding institutional and, consequently, geographical proximity. Apart from the positive effect of the single currency adoption on bilateral trade growth, the role of the integration process in the context of the EU also turns out to be important in order to mitigate international trade barriers. There appears to be a positive effect of the mitigation of economic inequalities on bilateral trade, a finding which concerns both exports and imports to and from China. In the same line, the correlation analysis also highlighted a negative relationship between the Gini coefficient and both export and import openness, suggesting that inequalities can possibly matter for trade openness.

The comparative analysis of the members' export structures highlighted the degree of complexity that an organized export strategy towards China could finally entail. The results revealed the predominance of vehicles, machinery and apparatus, pharmaceuticals as well as wood-related products in the set of the Euro Area's major exported products to China. The correlation analysis has shown apparent competitive patterns for the major exported products which, in some cases, seem to conceal potential synergies. The availability of highly skilled human resources throughout the Euro Area facilitates production and trade of sophisticated products that respond to their high demand in the domestic Chinese market.

Among the limitations of this study, it is necessary to mention the correlation analysis of the members' export structures for the 2015-2017 period. The three-year period under study is a relatively limited period of time, but it is the longest possible in order to equally examine the members' export performance vis-à-vis China. It is certain that similar future studies covering a longer time period and at a temporal distance from the economic crisis – with its long-term effects on some of the members – could lead to additional conclusions. However, the present analysis does include empirical evidence which can positively contribute to the recent debate regarding a common trade strategy, with the aim of better reflecting the comparative advantages of the Euro Area members.

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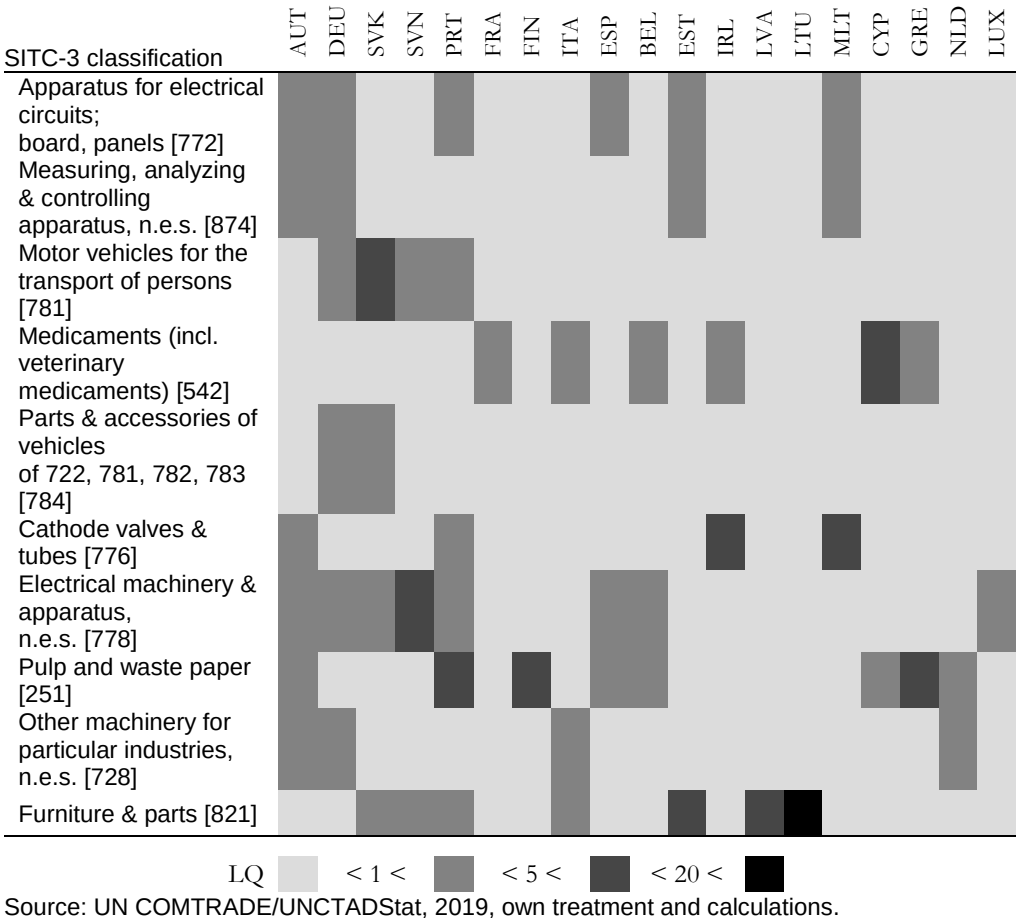
Technical Annex

Economic Openness, Monetary Integration and Trade Specialization: Evidence from the EA-China Trade

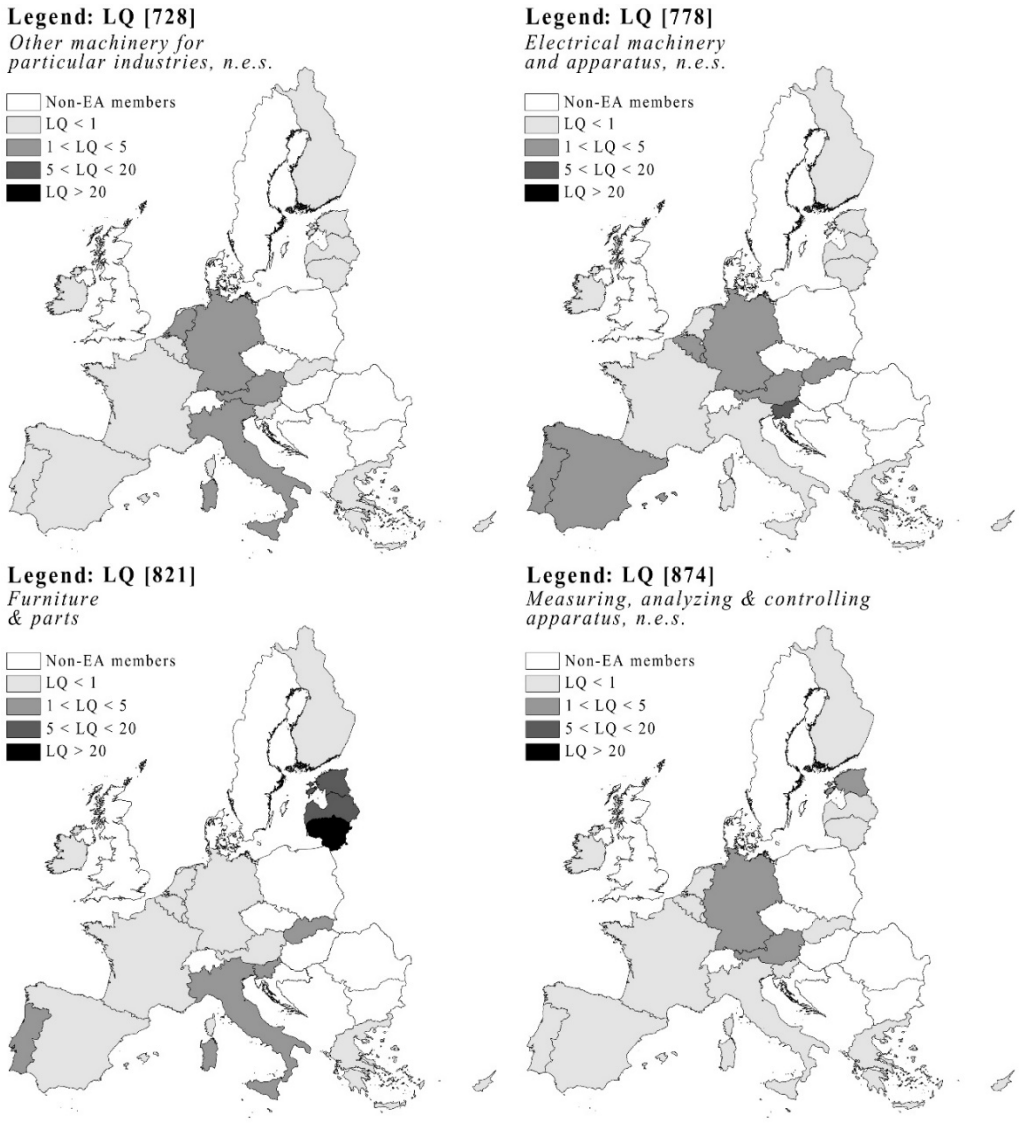
Table A-1 Variables and Data Sources

Variable	Definition	Source
Exports	Chinese exports' value in 2010 constant US dollars	UN COMTRADE, UNCTAD, IMF, Eurostat, values converted in 2010 constant US dollars by own calculations. Data accessed 12.05.2019.
Imports	Chinese imports' value in 2010 constant US dollars	UN COMTRADE, UNCTAD, IMF, Eurostat, values converted in 2010 constant US dollars by own calculations. Data accessed 12.05.2019.
Distance	Distance from China to each EA member	CEPII GeoDist database (2019), *distwces* variable. Data accessed 29.12.2018.
Island	Dummy variable for island EA members, 0 or 1	Own calculations
Landlocked	Dummy variable for landlocked EA members, 0 or 1	Own calculations
Population	EA member's population size	UN DESA Population Division, UNCTAD secretariat estimates. Data accessed 12.05.2019.
Gini	Gini coefficient of equalized disposable income (2005-2017)	Eurostat – EU-SILC survey [ilc_di12], Data accessed 20.05.2019.
GDPpc	EA member's per capita GDP	UN COMTRADE, UNCTADStat, values expressed in 2010 constant US dollars. Data accessed 12.05.2019.
Export openness	Ratio of EA member's exports to GDP	UN COMTRADE, UNCTAD, IMF, Eurostat, the ratios estimated by own calculations. Data accessed 12.05.2019.
EA member	Dummy variable for EA members, 1 for members, otherwise 0	Own calculations, data available at http://ec.europa.eu/.
EA border	Dummy variable, values representing the number of members' EA neighbours	Own calculations, data available at http://ec.europa.eu/.
T_{1999}- T_{2017}	Time dummies, value 1 for the observation year, otherwise 0	Own calculations
Exports by product group	Value of Euro Area countries' major exported products to China	UN COMTRADE, UNCTAD, IMF, Eurostat, values converted in 2010 constant US dollars by own calculations. Data accessed 08.04.2019.

Table A-2 Location Quotients for EA Members' Major Exported Products to China (2015-2017)



Source: UN COMTRADE/UNCTADStat, 2019, own treatment and calculations.



Maps A1–A4 Location Quotients for EA members' ten major exported products to China (2015-2017).

Source: UN COMTRADE/UNCTADStat, 2019, own treatment and calculations.