

Trade relationship analysis among EU members by means of cluster analysis

Fernando García^a, Ingrida Grigonytė^b and Javier Oliver^c

^aUniversitat Politècnica de València, fergarga@esp.upv.es, ^bVilnius Gedeminas Technical University, ingrida.grigonyte@vgtu.lt and ^cUniversitat Politècnica de València, jaolmun@ade.upv.es.

Abstract

In order to maintain sustainability of economies it is crucial to understand international trade relationships among different countries as well as economic integration. In this article trade relationships among European Union countries are analysed using method of cluster analysis. The research reveals that there are mainly two kinds of trade relationships among EU countries. A hypothesis to explain trade relationships is proposed.

Keywords: *international trade, cluster analysis, economic integration.*

Introduction

The transition economies of Central and Eastern Europe have experienced, since the early 1990s, a very quick trade integration into world markets, particularly with the more mature economies of Western Europe [Bussiere et al, 2005]. During the second half of the 20th century and the first decade of the 21st the world economy has been immersed in an accelerated process of internationalization and globalization. The increasing competition and rivalry in markets have changed the pattern of production and distribution of goods, intensifying international linkages and deepening economic inter-dependence among various areas [Martinez et al, 2012]. International trade and investment flows have experienced a remarkable expansion over the first decade of the twenty-first century, due to factors including a favourable economic climate during the first part of the decade alongside a widespread trend among firms towards geographical reorganization of production [Martínez-San Román, et al, 2015]. It is a common perception that the world has become smaller.. According to the World Bank's 1995 World Development Report, "Markets have become steadily more integrated. This globalizing trend has been driven by breakthroughs in transportation, communications, and industrial technology, and above all by the opening of national markets to international trade" [Yoto, 2012]. Therefore, the importance of regional economic integration is self-evident. [Baldwin, Venable 1995] Indeed, adopting business arrangements and economic-regional integration can be one of necessary actions in globalization and can protect the economies of most developing countries against global competition [Naveh et al, 2012]. Cross-border links evolve over time and, in that evolution, a country's role in its cluster(s) can be unique or similar to others, with different implications [International Monetary Fund 2012]. The aim of this research is to describe the commercial relationships between countries of the European Union applying cluster analysis in order to identify different trade relationship types. The remainder of the paper is structured as follows. Section 2 will present the database. Section 3 applies cluster analyses to describe the trading relationship between the EU countries. Finally, Section 4 concludes.

Database

The database used in the research regarding international trade was extracted from the database of World Bank. The GDP data was taken from the Eurostat database. The countries were arranged into pairs. In order to eliminate the country size effect, the trade of every country pair was divided by the GDP at market prices of that country pair. The countries which were included in the analysis are listed in table 1.

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The data used in cluster analysis was for year 2012. This year is the most recent for which all the data is available.

Table 1. Countries which had their data analysed in the research.

Name of the country	Abbreviation	Name of the country	Abbreviation
Austria	AU	Latvia	LV
Belgium	BE	Lithuania	LT
Bulgaria	BG	Luxembourg	LU
Cyprus	CY	Malta	MT
Czech Republic	CZ	Netherlands	NL
Denmark	DK	Poland	PL
Estonia	EE	Portugal	PT
Finland	FI	Slovakia	SK
France	FR	Slovenia	SL
Germany	DE	Spain	ES
Greece	GR	Sweden	SE
Hungary	HU	United Kingdom	UK
Ireland	IE	Romania	RO
Italy	IT		

Cluster analysis of International trade in EU countries

Cluster analyses was used in order to analyse whether the countries can be grouped in relation to their trade relationship. That is, cluster analyses can make country-pairs groups which can be useful to identify the relationship between and among countries.

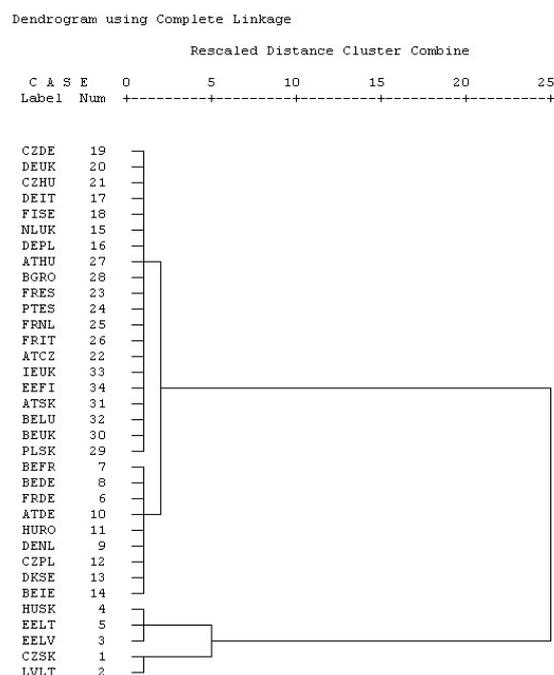
The number of clusters was not determined previously.

Five groups appear after the cluster analysis (see figure 1). The first group covers the majority of the country pairs (316 country-pairs out of 350). This groups does not appear in figure 1 because of space reasons, as it is too big.

The other four groups together only include 34 country pairs. In these four groups, trade relationship seems to be more intense than in first country-pairs group; this is why we can assume that there are essentially two general groups.

The first group (316 country pairs) has ordinary trade relationships and the other 34 country-pairs have intense trade relationships.

Figure 1. Cluster analysis of trade relationship among EU countries.



To explain why trade relationships in the second group of countries are more intense we propose a hypothesis: the relationship of trade is more intense between countries that have a long-lasting relationship and belonged to the same country or union in the recent past years.

So, for example, the country-pairs of the founding nations of the EU, which are, moreover, geographically located in the middle of Europe, belong to this second group. Country-pairs of States that have a long-lasting cultural relationship, like the Baltic countries, or that belonged to the communist economic block are sorted into this group, as well.

In order to contrast this hypothesis, other analysis are required, like, e.g., a gravitational model, where several independent variables are introduced in the model, like distance, language, cultural relationship etc.

Conclusions

Economic integration plays a crucial part in the development of the European Union economy. In order to evaluate economic integration of EU countries it is necessary to analyse and understand trade relationships among these countries.

Cluster analysis revealed that in 2012 there were two main groups of trade relationships among European Union countries. Our hypothesis suggests that most intense trade relationships exist between countries that were members of the same union before joining the EU, or even existed as one country. Intense trade relationships also exist between founding countries of EU, which are located close to one another geographically.

Further research is needed to confirm the hypothesis and to determine which variables describe which country pairs.

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