THE LINK OF INTRA-INDUSTRY TRADE WITH FOREIGN DIRECT INVESTMENTS

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Abstract: nternational trade quite often includes intra-industry trade (IIT) – definition classifies IIT as trading with similar goods or services belonging to the same industry; which are simultaneously imported and exported by a particular country during the specific time period, mainly on a yearly basis. On the other hand, foreign direct investments (FDI) directly influence international trade, and intra-industry trade, as well. According to the recent research during last decades a revival of interest in intra-industry trade has been noted; both on micro and macro level. The standard Grubel-Lloyd formula is still being used for empirical work. This however refers only to international trade, disregarding capital flows, and FDI. Given the overwhelming importance of the latter, this paper tries to research for relevant data in this regard. The objectives of the paper is to present fundamental theoretical framework linked to IIT, and more specifically to research a direct link that IIT and FDI form in contemporary international economic relations. In addition to presented theory related to the subjects of research, further observation includes analysis of empirical research and case studies. This enables the authors to draw conclusions and, therefore, suggest potential implications for development policy.

1. Introduction

The literature on intra-industry trade (IIT), its determinants and its connection with foreign direct investments (FDI) is quite extensive. By definition, this type of trade involves a high level of exports and a high level of imports of products classified in the same sector. Generally speaking, these are industrial, homogeneous products of the same purpose, although this is even more noticeable in both the service sector and even some types of primary products. It is important that similar amounts are also traded during the same year.

This paper intends to present fundamental theoretical framework linked to IIT, and more specifically to research a direct link that IIT and FDI might form in contemporary international economic relations. In addition to presented theory related to the subjects of research, further observation includes analysis of empirical research and case studies. This enables the authors to draw conclusions and, therefore, suggest potential policy implications.

The research paper published by Grubel and Lloyd (1975) brought to light a specific phenomenon that was described as intra-industry trade (IIT). The authors of this paper have noticed and described this economic occurrence, because of the following reasons. The empirical and statistical data have pointed to increasing levels of trade in goods and services from similar sectors of economic production between countries. Furthermore, these were the countries with relatively similar factor availability, which was contradictory to the basics of all of the standpoints of the classical postulates of international trade theory. In addition to that, the increase in intra-industry trade happened at the same time with what is noted as relatively painless adjustment to economic integration in Western Europe, but it has been interpreted in different ways.

According to the available theoretic resources the classification of intra-industry trade can be done as following: trade in homogeneous goods, trade in horizontally differentiated goods, and trade in vertically differentiated goods. At first theory and empirics related to the IIT initially focused on trade in goods, especially in products related to the sector of industry. However, certain authors have observed and analysed a substantial rise in intra-industry trade in the general sector of services (Shelburne & Gonzales, 2004).

The main reasons why we have seen a revival of interest in IIT during last couple of decades may be stimulated by several researches done on analysis of global trade directions, climate changes and consequences on global economic relations. If we are to analyse both a theoretical and empirical research on IIT, the authors mainly note the link of IIT to multinational firms (MNCs), which is the reason why this paper deals with the link between IIT and FDI. In addition to that, we also try to focus and analyse the importance of international production and its link with intra-firm trade, the phenomenon especially actual with the contemporary

rise of MNCs. We have witnessed that FDI have doubled twice in relation to trade over the last decade. It has also been concluded that the principal "senders" and "receivers" of the IIT are mainly developed countries, but also that two-way trade is closely associated with two-way FDI (Egger, Egger & Greenaway, 2004).

Following the introductory part of the paper, the structure of the research begins with the theoretical framework linked to the intra-industrial trade, followed by the main part of the paper. In the main part of the paper the link between IIT and FDI has been analysed. In order to be able to present conclusion of the paper, previous part of the paper deals with the overview of the relevant empirical papers that have studied IIT and its links with FDI.

2. Theoretical framework on intra-industrial trade

According to the traditional trade models developed by David Ricardo and the Heckscher–Ohlin model, we have been able to explain the occurrence of international trade, but in very specific and controlled conditions. Both models have used the idea of comparative advantages and the concept well-known as gains of trade. However, Krugman & Obstfeld (1991) observe that many economists point out that these models provide no explanation towards intra-industry trade. This is based on the position of the classical international trade theory that countries with identical factor disposal would not trade under those conditions. Since then there have been many research attempts by various economists who have tried to explain intra-industry trade. According to Grimwade (2000:71) an explanation for intrA-industry trade may not be explained by classic trade theory postulates, as it describes intEr-industry trade relation, as such.

The economist Finger (1975) has tried to explain the IIT saying that occurrence of intra-industry trade was "unremarkable" due to the fact that classifications place goods of heterogeneous factor endowments in a single industry. On the other hand, it has been analysed and confirmed that even when industries are disaggregated to extremely fine levels IIT still takes place, so this argument can me questionable. The research done by Flavey & Kierzkowski (1987) offers a potential explanation related to the IIT occurrence and its causes. The authors have produced a model which tries to explore the assumption of whether similar products can or cannot be developed and manufactured under the same or similar technical conditions. Proposed model has diversified on the demand and supply side, proposing that demand side goods are mainly distinguished by the perceived quality. Therefore, it has been assumed that high quality goods are produced under conditions of high capital intensity, which may or may not be true. However, it is questionable whether this model can be applied to IIT at all, as it is not directly linked with the trade between goods of similar factor requirements.

On the other hand, the more recent research done by, for example, Donald Davis (1995) has analysed and claimed that both the Heckscher–Ohlin and Ricardian models can still be used in order to explain intra-industry trade. Davis started with the claim that the economies with identical factor availability would still trade due to differences in available and used technology. In that regard, this relation can lead to specialisation in production, and therefore lead to increase in trade. This would mean that the position of Davis would be very similar to the postulates of the Ricardian model.

The next widely accepted thinking within economic theory, which is considered to be the most comprehensive and widely accepted explanation is Paul Krugman's New Trade Theory. Krugman has set the assumption that countries specialise in certain production in order to take advantage of increasing returns. He claims that differences in countries' endowments are not the most important determining factor for production and subsequent trade. The Trade Theory is based on the standpoint that trade allows countries to specialise in limited types of production and thus take up the advantages of increasing returns (i.e., economies of scale). At the same time this does not mean that there will be reduction in the variety of goods available for consumption (Krugman, 2009).

The best known mathematical form for expression of IIT is the Grubel-Lloyd formula for calculating an intra-sector trade index for individual countries and it measured intra-industry trade. The formula was designed by Herb Grubel and Peter Lloyd in 1971 (Grubel & Lloyd, 1971). This type of trade is mainly present in highly developed countries, as only productive consumers with relative high income can claim product differentiation.

$$GL_i = \frac{(X_i + M_i) - |X_i - M_i|}{X_i + M_i} = 1 - \frac{|X_i - M_i|}{X_i + M_i} \qquad ; \ 0 \leq GL_i \leq 1$$

X_i represents export of good *i*, and

M_i the import of good *i*.

If the value of GL_i equals 1, there is only trade within one sector/ industry, and this is called intrA-industry, therefore there is no intEr-industry trade. It shows that the country in consideration exports the same quantity of good *i* as much at it imports. On the other hand, if $GL_i = 0$, there is no intrA-industry trade, only intEr-industry trade exists. It means that the country in consideration only either exports or only imports good *i*, which would be linked to postulates of the classical trade theory. Of course, these are the extreme values, and for the majority of economies the value of *GLi* ranges between 0 and 1 and it indicates the level of intrA-industry trade for the specific country and specific export/import of a certain good. For example, for the former Yugoslavia, the *GLi* was around 0,5 (Kovačević, 2002).

According to relevant literature determinants of IIT are: transport costs, climate factors, but also, in general, profit creation. Other specific factors that can influence the growth of intra-sectoral exchange are: product differentiation, high level of income per capita, consumer's individualisation, integration, exchange between transnational companies and its branches, reduction of customs, tourist services, re-export, long-term production cooperation (Kovačević, 2002: 135).

The most important factors affecting the level of intra-sector exchange between the two countries are: the level of economic development measured through the levels of GDP, the differences in the economic potentials, i.e. the resources of trading partners, the geographical distance as well as the presence of multinational companies (MNCs). In the last few decades, the MNCs have significantly influenced international trade, and consequently in intra-industrial trade. Of course, the concept of MNC development is inevitably linked to the phenomenon of FDI, so it is inevitable to analyse the relationship with intra-industrial trade, or the causal relationship between all three phenomena.

Theoretical modelling and measurement of the extent of intra-industrial trade (IIT) began in the 1960s and 1970s (Balassa, 1966 and Grubel & Lloyd, 1975 cited in Andresen, 2003), resulting in the formula and index IIT that are still in use today. Following these works, the definition of IIT theory through models and works based on monopolistic competition and product differentiation followed (Dixit and Stiglitz, 1977 cited in Andresen, 2003). The works of Krugman, Lancaster and Helpman were summed up in the work of Helpman and Krugman (1985) linked to horizontal IIT, and the work on vertical IIT is a model of perfect competition (Caves, 1981 cited in Andresen, 2003).

3. The link between intra-industry trade and FDI

Among the first papers dealing with the link between intra-industrial trade and FDI were the publications of Helpman and Krugman (1985), which first recognised that MNCs significantly changed international economic relations, both commercial and financial. In particular, it was noticed that differences in factor availability among countries affected the share of intra-industrial trade. These authors conclude that the extent of intra-industrial trade will depend on how closely we define product categories. Furthermore, they consider that when the difference in production factors becomes large enough to allow access to MNCs, a positive relationship is created, as long as the capital-intensive countries have the role of net exporter of goods. At a time when differences in production factors lead to the fact that capital-intensive countries become net importers of goods, a negative link between the redistribution of production factors and the share of intra-industrial trade is regenerating. Therefore, they believe that the greater involvement of the MNCs in the world economy means the smaller effect of changes in the degree of distribution of income per capita in terms of intra-industrial trade. Krugman and

Helpman have based their analysis on the model of vertically integrated MNCs, and Markusen (1984, 2002) and Markusen and Venables (1998, 2000, all quoted in Ambroziak, 2010) designed their analysis on horizontal FDI. These authors have presented the convergence hypothesis, according to which the MNCs presence diminishes the value of trade, as they absorb the effects of convergence, i.e. approximation of countries by size, which would increase the volume of trade. Thus, MNCs represent a substitute for intra-industrial trade.

In theoretical literature, the study of the relationship of intra-industry trade, FDI and the role of MNCs evolves through the work in which Markusen and Markus (2002) analyse three types of firms: national, multinational horizontal and vertical enterprises. This division is based on two variables - trade and investment costs. What the authors add to the previous analysis is the assertion that trade liberalisation leads to an increase in the share of intra-industrial trade between the two trading partners. On the other hand, investment liberalisation contributes to the reduction of the intensity of intra-industrial trade if the trading costs are very high or very low. Therefore, the Grubel-Lloyd index will be high if the two countries are similar or if the smaller country is labour-intensive, which is, if the trade costs are low, and the investment costs are high.

The following theoretical analysis (Fukao, Ishido & Ito, 2003 cited in Amroziak, 2010) views intra-industrial exchange through trade and investment costs across three scenarios: zero cost of trade with prohibitive high FDI costs; zero trading and FDI costs; and significant trade costs in zero FDI costs. The main results of this analysis can be presented in the following way: vertical intra-industrial trade occurs when FDI and trade costs are low. If there are significant FDI costs, there will be no vertical investments that are necessary for vertical intra-industry trade. The share of vertical intra-industrial exchange will depend on the differences in the prices of the production factors in the two countries. If there are small differences in the company, they have a limited motivation to engage in an international division of labour through foreign investments, which also makes vertical intra-sector exchanges small. If trade costs are high, the developed countries will replace the exports from their countries with local production in developing countries, which is a horizontal investment, thus making vertical intra-industrial exchange negligible.

As mentioned above, the most intricate intra-industrial trade is between developed countries due to a number of perceived determinants. However, some authors (Okubo, 2004, cited in Ambroziak, 2010) claim that the current increased volume of this type of trading occurs between developed, mainly OECD countries and developing countries that are not members of this group. Since such an assumption cannot be proved by the Helpman and Krugman models, the author suggests an explanation through vertical intra-industrial trade or the fragmentation of the production process. The main reason and basis of this model is the transfer of technology through FDI, which explains intra-industrial exchange. A slight

difference in educational levels is fuelled by technology transfer, which in turn increases imports. If there is a significant difference in wage and technology levels, intra-industrial exchange is growing, and if technology transfer is small, a greater volume of technology transfers reduces intra-industrial exchange.

Recently, in theoretical literature containing mathematical models and calculations, there is a modification of traditional models by which the form 2x2x2 (2 countries, 2 production factors, 2 goods) is supplemented with an additional factor of production, or the formula 3x3x3. It turned out that such a model better maintains the reality of modern extraneous relationships and the role of multinational companies. Also, division of horizontal and vertical investments no longer reflects the complexity of investment strategies of multinational companies. The influence of MNC on intensity of intra-industrial trade depends on the market and place where parts are produced, as well as final products. If the final products are exported or returned to the country of origin of FDI, while importing raw materials, parts, semi-finished products into the host country, it is obvious that this contributes to the growth of intra-industrial trade. However, if a third country is introduced, for example for exporting final products, with simultaneous import of parts into the host country, then there is a decline in intra-industrial trade between the host country and the country of origin of FDI. Furthermore, the volume of growth of this specific form of trade will depend on how much of the export of final products is returned to the country of origin of the FDI, as well as whether the final and semi-finished products are classified in the same industrial sector.

4. Overview of empirical analyses

Empirical analyses in the field of intra-industrial trade (IIT) deal mainly with the themes of measuring the extent of this trade and/or the assessment of the factors determining this type of trade, all based on previously elaborated theoretical models. The focus of these studies is on IIT between developed countries, but also between them and the developing country. If we are to present different types of measurements and the use of econometric analyses, it should be noted that the following are mainly used: Balassa and Grubel-Llyold's index and all its complementary variants - the dynamic aspect are added by Hamilton and Kniest (1991) through the marginal IIT index. Greenaway et al. (1994) complement the previous index, including the value of exports and imports, and not their proportion, and similar version of this index is also given by Thom & McDowell (1999, all cited in Andresen, 2003). The objective of this paper is not to present a full overview of the IIT analysis, but to present together the conclusions drawn from the measurement and analysis, for certain countries or groups of countries, for individual industrial sectors, and for studies on vertical or horizontal IIT.

Recent, empirical analyses of factors affecting intra-industrial trade are numerous and detailed. Of course, the first studies appeared for the countries of the

then European Economic Community (EEC) or the OECD, as this phenomenon was first observed in trade between developed countries. Since the 1990s, analyses have also been made for the Central and Eastern European countries that mostly trade with the EU countries, as well as for other developing countries. Of course, the MNC and liberalization in the field of FDI have contributed to this. For the eight Central Eastern European countries that joined in 2004 and are often referred to as the EU-8, numerous analyses have been made. Amroziak (2010) generating the previous researches and the results of his own analysis concludes that the volume of intra-industry trade is constantly increasing from year to year and is most likely to occur in trade with other EU countries. If we look at the structure of the IIT, it is noted that in the last years of the observed period the horizontal IIT is growing, which indicates a decrease in the level of development between the EU-8 and the rest of the EU. Furthermore, the decline in vertical FDI points to the structural transformation of the EU-8 countries.

Furthermore, a large-scale study analyzing FDI that underpin intra-industrial data-based trade, in terms of location, ownership and activities, businesses and their 650,000 affiliates (Alfaro & Charlton, 2007:1) indicates to a comprehensive picture of global multinational activities. There are many conclusions that stem from it: most FDI occur between developed countries, the share of vertical FDI is higher than it is commonly considered, even in developed countries. The location argument cannot explain traditional theoretical models in terms of the advantages of the factors of production, especially the lower labour costs abroad. It is unequivocally concluded that the MNCs are striving to have the ownership of a production phase that is close to the location of final production and consumption, which increases the intra-industrial vertical FDI based on the benefits of highly qualified labour.

This is confirmed by the latest study by the European Central Bank (Dautovic et al 2014) on the topic of intra-industrial trade between the EU15 and Central, Eastern and South-Eastern Europe (CESEE), that is, structural changes in the nature of trade flows have occurred since the beginning of the transition process and approximation of these EU countries. General determinants that influence the growth of IIT are fiscal easing, such as corporate tax rates, the flexibility of the exchange rate regime and the quality of political institutions. It can be concluded that, therefore, fiscal policies could significantly influence the acceleration of the process of convergence of candidate countries towards EU trade structures.

On the other hand, unit labour costs and their connection to foreign direct investments have been noted as factors with a negative impact on IIT. However, the factors affecting the IIT differ significantly when considering the relations between the new members of the EU and the EU15 countries on the one hand, and the potential candidate and candidate countries for EU and EU15 countries on the other. For example, for EU candidate countries, trade competitiveness is closely related to FDI and institutional quality, as well as distance from physical capital, while none of these factors influence the explanation of IIT between the new EU

member states and the EU15. Furthermore, the study (Dautovic et al 2014: 23) suggests that corruption perceptions play a critical role in slowing down the country's trade integration into a full-fledged EU membership.

The research paper by Bojnec and Fertő (2016) has focused on analysing the reasons for agro-food intra-industry trade (IIT) within the European Union member states during the period from 2000–2011. It has been concluded that the increased proportion of IIT in agro-food trade within the EU countries is linked with increased economic integration, growth and development of the EU economies. In addition to that, it has also been notices that when export prices were at least 15% higher than the import prices, high-vertical IIT has developed and raised for most of the EU member states. Therefore, it has been summarised that IIT for both horizontal and vertical IIT are in positive relationship with higher economic growth and development levels, new membership linked to EU enlargement processes.

Most recent empirical research on this topic is the paper (Ambroziak, 2016) that deals with the link between foreign investments and intra-industry trade in automotive products in six EU countries (the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia) in the 1995–2014 period. As in any similar research, the basic tool for the analysis has been the Grubel-Lloyd formula in order to record changes in IIT intensity. The research showed that IIT in automotive products has brought benefits to both manufacturers and consumers in the new EU member states and these benefits are to be linked to general benefits of the expanded international economic relations, both in trade and finances.

3. Conclusion

Characteristics of IIT trends are as follows: significant growth since the 1980s in most of the OECD countries; a particularly high level of exchange in highly sophisticated production lines based on the differentiation and fragmentation of products (electronics, chemical industry, machinery, equipment and vehicles), and then a very high percentage of this type of trade in economies that are considered very open, i.e. where exports and imports exceed half of GDP. The IIT is very much related to FDI flows, especially for Central and Eastern European countries; as well as for regions where preferential trade agreements exist, for example, NAFTA; and finally IIT is very much represented on intra-firm exchange, which makes one-third of the exchange between the US and Japan (OECD, 2002). In conclusion, it can be said that analysis of intra-industrial trade is based on the questionable reliability of data due to the fact that different goods and services are classified in the same sector, than the problem of aggregation, horizontal production differentiation or vertical fragmentation, and is particularly related to the production of highly technologically sophisticated industrial goods. The only acceptable definition of IIT says that IIT represents a simultaneous import and export of a similar type of goods and services, which is still the most empirically

measured today through Grubel-Lloyd's index. Despite all this, IIT is an indispensable part of the modern globalised economy, especially the international economic relations between the developed countries.

Research of intra-industry trade is still one of the most intriguing in the field of the international trade. The empirical research and data on intra-industry trade measured mainly by Grubel-Lloyd's index always goes ahead of theoretical research, but it goes back to making slight changes into theoretical work. There are a large number of empirical researches on whether intra-industry trade truly exists, and how to measure the level of intra-industry trade, but also what are determining factors of intra-industry trade. In general, it has been concluded that IIT measured by Grubel-Lloyd index is positively related to country size and the number of export related sectors. On the other hand, it is negatively related to partner country size, the number of sectors related to import, and the trade expenditures.

Finally, all the theoretical and empirical research presented in this paper directs us to interesting and important guidelines for policy makers. The fact that macroeconomic balance is of fundamental importance for the long-term economic performance, but also that it should be linked to all trade policy preparation and definition. The growing importance of IIT also requires additional attention and creators of national development policies and scientific researchers.

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VEZA INTRA-INDUSTRIJSKE TRGOVINE
SA STRANIM DIREKTNIM INVESTICIJAMA

Rezime: Međunarodna trgovina veoma često uključuje i intra-industrijsku trgovinu (IIT) – razmenu sličnih proizvoda koji pripadaju istoj industriji ili istu vrstu roba i usluga koji se istovremeno uvoze i izvoze od strane određene države tokom određenog vremenskog perioda. S druge strane, strane direktne investicije (FDI) direktno utiču na međunarodnu trgovinu, i intra-industrijsku trgovinu, takođe. Brojna nedavna istraživanja, uključujući analizu podataka na makro i mikro, tj. nivoa firmi i adekvatnog prilagođavanje pada troškova trgovine doprinijelo je oživljavanju interesa za intra-industrijsku trgovinu. Većina empirijskih radova i dalje se oslanja na standardnu mjeru Grubel-Lloyd indeksa. Međutim, ovo se odnosi samo na međunarodnu trgovinu, zanemarujući tokove kapitala i direktne strane investicije. S obzirom na veliku važnost ovog drugog, rad pokušava da istražuje relevantne podatke u tom pogledu. Cilj, rada je da se predstavi osnovni teorijski okvir vezan za IIT, kao i određenije istraživanja vezana za odnos između IIT i FDI koji postoji u savremenom međunarodnim ekonomskim odnosima. Uz prezentovanje teorije vezane za oblasti istraživanja, dalja razmatranja uključuju analizu emprijskih istraživanja i studija slučaja. Time se autorima omogućava da iznesu zaključke i, stoga, predlože potencijalne implikacije vezane za razvojne politike.

Ključne reči: intra-industrijska trgovina, strane direktne investicije, teorijske osnove, empirijska podloga, implikacije za politike.

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