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Intra-Industry Trade between Eastern and Western Europe
- The Case of the Motor Car Industry

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Abstract

This paper studies and analyses the IIT in motor cars between Eastern and Western Europe. The driving forces and the determinants of IIT are manifold. In this paper the focus lies on the country level determinants and especially the relationship between economic integration, geographical proximity and economic size as determinants of IIT and the per capita GDP as a determinant of the nature of IIT, vertical or horizontal.

The empirical findings show that TIIT between Eastern Europe and the EU is at an intermediate and constant level. Looking at the country level the picture is rather different as the patterns of IIT for each country differ significantly. Studying the nature of IIT it shows that HIIT and high quality VIIT are equally represented. The presence of low quality VIIT is extremely low and close to non-existing.

The conclusion is drawn that the country level determinants discussed in this paper explains the IIT in trade with motor cars between the EU and Eastern Europe to a large extent but not completely. The empirical findings coincide to some extent with the expectations but not enough to say that there is no need to look for other explanations and driving forces of the IIT. In order to get a full understanding of the IIT and its driving forces it is thus necessary to add more determinants to the analysis and also include the industry level determinants.

Keywords

Intra-industry trade, Eastern Europe, EU, motor car industry

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List of Abbreviations

BGR – Bulgaria
CYP – Cyprus
CZE – the Czech Republic
EST – Estonia
EU – European Union
GDP – Gross Domestic Product
GLI/GL-index – Grubel-Lloyd Index
HIIT – Horizontal Intra-Industry Trade
hq – high quality
HRV – Croatia
HS – Harmonised System
HUN – Hungary
IIT – Intra-Industry Trade
lq – low quality
LTU – Lithuania
LVA – Latvia
M – Import
MLT – Malta
OECD – Organization for Economic Co-operation and Development
POL – Poland
ROM – Romania
SITC - Standard International Trade Classification
SLV – Slovenia
SVK – Slovakia
TIIT – Total Intra-Industry Trade
VIIT – Vertical Intra-Industry Trade
X – Export

1 Introduction

International trade has increased dramatically over the last few decades. The share of intra-industry trade (IIT) in world trade is significant and of growing importance. Since the 1960's the concept of IIT has been the focus of many researchers resulting in a large amount of empirical findings and later also theoretical approaches and methods for measuring IIT. In the beginning mainly trade between developed countries in the west was the object of research. Later, an important amount of studies has been made on North-South trade. Albeit the large amount of studies there is a gap in the empirical evidence. IIT between Western and Eastern Europe has, up until today's date, not been thoroughly investigated. Western and Eastern European countries are different in almost all relevant aspects (GDP, factor endowments etc.) but the cleavage between them is not nearly as large as between North-South countries. One of the more important determinants of IIT is economic integration as IIT is thought to increase with deepening economic integration. The two parts of Europe have during the last decade and a half been involved in a deepening process of economic integration and the eastern countries are catching up with the western countries. This process of integration has so far resulted in a substantial trade creation and changing trade patterns. It is therefore of great interest to study the trade between Eastern and Western Europe in order to study whether the trade creation has taken the form of *inter*-industry trade or *intra*-industry trade. Connected to this is the question to what extent the transition and liberalization has lead to an expansion of the IIT and whether the IIT reflects vertical or horizontal specialization.

This paper therefore focuses on the IIT between Western and Eastern Europe and the IIT of the motor car industry in particular. The EU has been chosen to represent the Western Europe since most of the economically important countries of Western Europe are members of the EU. The ten new members of the EU[1] and Bulgaria, Romania (that most probably will be members in 2007) and Croatia (that has started the negotiations for becoming a member) have been chosen to represent the Eastern Europe since they cover a large part of Eastern European countries and also represent a significant part of the world economy in terms of population, area, natural resources and economic potential.

The motor car industry is interesting because of it's characteristics' potential to generate IIT in any form. The following characteristics are the main driving forces for IIT in the motor car

[1] Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.

industry. It's a very investment-intensive industry and the need for fixed capital (both for plants and equipment) is significant also implying that the industry is very capital intensive. This makes the scope for economies of scale considerable. The amount of FDI in the industry is important and there is a widespread production fragmentation taking place with an increasing importance of trade in intermediate automotive products, parts and accessories. Eastern European countries are well integrated into large production networks with Western European car producers. This increases the possibilities production fragmentation and the creation of VIIT. The Eastern European countries have low wages and it might be expected that the assembling of cars are placed there making the export value exceed the import value thus creating high quality VIIT. The motor car industry is therefore an important and expanding industry in many countries of the Eastern Europe.

The integration between Eastern and Western Europe has deepened substantially during the last decade. In the mid-1990's free trade areas were in place between many of the Eastern countries and the EU due to the Europe agreements. The period covered in this paper will therefore be 1996-2004. The purpose of the paper is twofold: first, the patterns of IIT (in the motor car industry) between the Eastern and Western Europe in 1996-2004 will be measured and described. Second, the existing IIT will be explained by identifying the driving forces behind it with reference to the existing theory on the subject. This study will naturally focus on the country level determinants since the study is limited to only the motor car industry which is expected to hold the characteristics necessary for generating IIT. Of the country level determinants, the impact of economic integration, geographical proximity and economic size are of greatest interest in this study.

The paper is organized as follows: chapter two presents the fundamental theory of IIT and the connection between economic integration and IIT. In chapter three a discussion about measuring IIT will be held and the measures used in the paper will be further explained. Chapter four contains the empirical analysis that measures and describes the IIT between Western and Eastern Europe. Chapter five summarizes and concludes.

2 Intra-Industry Trade Theory

The existence and importance of intra-industry trade (IIT) became evident after a series of studies in the 1960's and the 1970's. Before that international trade was considered to be rather uncomplicated and simple. Countries traded because of supply side differences and produced according to their factor endowments and comparative advantages. Specialization increased the production and the surplus was exported, giving rise to international trade. The greater the differences in factor endowments were, the greater were the volumes of trade. The traded goods were of different industries, i.e. trade between industries or inter-industry trade. The trade was characterized by homogenous products and perfect competition. Inter-industry trade is best explained by traditional trade theories e.g. the Heckscher-Ohlin model.

The findings of a different kind of trade, the intra-industry trade, in the 1960's radically changed this picture. Studies revealed that countries with high and similar per capita income had similar demand patterns resulting in trade with similar but differentiated products, intra-industry trade. In other words it was shown that similar countries exchanged similar products within the same industry and not just products of different industries as predicted by traditional trade theories. During the 1960's there was growing empirical evidence of trade in manufactures among highly industrialized countries and there was a substantial need for new theories and models explaining this trade.

2.1 Intra-Industry Trade

The empirical findings of the 1960's and 1970 have made it clear that there existed another type of trade, IIT, which had a considerable and growing importance. It took until 1975, when Grubel and Lloyd introduced their index of IIT, to find a theoretical methodology for studying and measuring IIT. In the wake of their work many other studies, both theoretical and empirical, have been made on the subject. The early models and theories of IIT define it as the simultaneous importing and exporting of similar products with presumably similar production requirements and IIT therefore is expected to mainly take place between developed and similar countries, i.e. countries with similar per capita GDP, income distribution and factor endowments. The more similar the factor endowments are between countries, the larger the amount of IIT in relation to inter-industry trade will be. The relationship between comparative

advantage and IIT is therefore negative.[2] These early theories have resulted in a large amount of studies on IIT between developed countries in the western world. Further studies made it clear that the determinants of IIT differed between studies indicating that there existed different types of IIT: horizontal and vertical. Since the early 1980's it has been possible to disentangle the two types of IIT. According to theory, horizontal IIT is expected to take place between countries with *similar* per capita GDP, income distribution and factor endowments whereas vertical IIT is expected to take place between countries with *different* per capita GDP, income distribution and factor endowments. In order to investigate this empirically, further studies have been made. North-South trade has been studied in order to find evidence for vertical IIT. Today the vast majority of the empirical findings support the theory.

2.2 Horizontal and Vertical Intra-Industry Trade

As the characteristics and determinants of horizontal IIT (HIIT) and vertical IIT (VIIT) differ it is important to distinguish between these two types of IIT. Not enough empirical work seems to have been done on the subject in order to draw any definite conclusion on the differences in determinants of vertical and horizontal IIT respectively. However, there seem to be some common determinants for horizontal and vertical IIT. At the country level the share of IIT depends on both relative factor endowments (proxied by per capita GDP) and the economic size of countries (GDP). The economic size of the country is positively correlated to the share of IIT resulting in higher IIT between larger countries. How the share of IIT is correlated to factor endowments differ depending on whether IIT is horizontal or vertical. The level of economic integration is assumed to increase the IIT irrespective of its nature. Connected to economic integration is foreign direct investments (FDI) which also are assumed to stimulate IIT. Furthermore the share of IIT is negatively correlated to the distance between the trading partners which is connected to the rising transactions costs, especially that of transportation. The level of IIT also varies across different industries and product groups. At the industry-level the degree of scale economies in production is the most important determinant of IIT. Exploitation of scale economies increases the scope for IIT. The level of transportation costs, as mentioned above, is negatively correlated to the share of IIT. This result in increasing shares of IIT in manufactures, e.g. chemicals, computers, industrial machinery, precision instruments, and transport equipment. These products are all subject to

[2] Martín et al. s. 4

scale economies and have a high value in relation to their volume which minimizes the transportation costs. Once established that there is IIT other factors will determine the nature of it: horizontal IIT or vertical IIT.

2.2.1 Horizontal Intra-Industry Trade

Horizontal IIT refers to the simultaneous importing and exporting of differentiated products of the same quality but with different characteristics or attributes. In the motor car industry this would be cars of the same size and in the same class but with different characteristics i.e. design, motor etc. HIIT mainly takes place between similar countries, i.e. countries with similar GDP, income distribution and factor endowments. Traditional comparative advantage models of international trade and specialization are therefore incompatible with HIIT, which then have to be explained by modern trade theories taking into account such things as imperfect competition and scale economies. Scale economies combined with preference diversity cause every firm in a certain industry to specialise in the production of a variety that is not produced by any other firm. This phenomenon is called horizontal specialisation and gives rise to HIIT. The number of differentiated products exported is determined by comparative advantages so that the smaller the difference in initial factor endowments are, the more important will the share of HIIT be. Similarities in demand between countries also increase HIIT. HIIT can be expected to take place mainly between large, rich, industrialized, and equally developed nations that are geographically close to each other and economically integrated in some way.

2.2.2 Vertical Intra-Industry Trade

Vertical IIT is defined as the simultaneous import and export of products in the same industry but of different quality. In the motor car industry this would be completely different cars of different size and in different classes etc. The quality is measured by the capital/labour ratio used in the production, with high quality products requiring more capital-intensive production techniques and having higher prices compared to low-quality products.[3] On the demand-side, quality is determined by the perception of consumers.[4] All the consumers are assumed having identical preferences and demand only one product, which depend on the individual income.

[3] Martín et al. s. 5
[4] Martín et al. s. 5

At an aggregated level there is a demand for a variety of differentiated products. As a result each country will specialize according to its factor endowments so that the country which is relatively labour-abundant will export the lower-quality/labour-intensive component and import the high-quality/capital-intensive component. This kind of specialisation can take place both in the production of final goods and in the production of components and parts, i.e. vertical specialization. VIIT is most common between countries with (very) different factor endowments and is determined by comparative advantage as in traditional trade models (e.g Heckscher-Ohlin). The larger the difference in factor endowments, the larger the share of VIIT will be. VIIT can be expected to mainly take place between large countries with different factor endowments, possibly (but not necessarily) at different levels of development, geographically close to each other and economically integrated in some way.

2.3 Economic Integration and Intra-Industry Trade

Early in the history of IIT economists suggested that international integration would result in intra-industry specialization and IIT.[5] Technical innovations, combined with falling trade barriers, increasing ease of international capital movements, and increasing freedom of establishment have made international and regional integration possible. Several studies (see for example Greenaway et al (1995)) and theories of IIT suggest that the level of IIT, and intra-industry specialization, will be higher between countries engaged in some form of economic integration. Although the positive relationship between integration and IIT is well established and fairly unquestioned, the causes of this relationship seems to be more difficult to determine. In general terms all the determinants of IIT that are somehow influenced by economic integration must be expected to constitute a link between IIT and integration. There also appears to be a link between intra-firm trade and IIT.

2.3.1 Trade Liberalization, Overlapping Demands, and Decreasing Costs in Production

Trade liberalization is one of the most distinctive features of economic integration arrangements and are expected to increase the total amount of trade and therefore also the amount of IIT. However, it is not evident that trade liberalization per se will increase the share

[5] Grubel s. 374

of IIT as opposed to the share of inter-industry trade. In order to explain why economic integration may stimulate IIT in a greater degree than inter-industry trade, one need to focus on complementary factors. Economic integration, especially the deeper forms, often takes place between countries characterized by similar factor endowments, per capita incomes and demand structures hence the relationship between increasing shares of IIT (especially HIIT) and deepening economic integration. The more similar the countries are the greater the potential scope for IIT. Countries involved in deeper economic integration (e.g. the EU) also can be expected to grow more similar as time passes since capital and labour can move more easily and factor endowments become more equal, income disparities are smoothed out and transaction costs decreases. Studies indicate that product differentiation, scale economies and industrial rationalization tend to accompany economic integration activities among similar countries.[6] Exploitation of scale economies and industrial rationalization will result in decreasing costs in production which enables longer production runs and specialization. Thus, the combination of similar demand structures/overlapping demands and decreasing costs in production can facilitate the intra-industry specialization and IIT.[7] The existence of common borders and similar level of economic development are other factors thought to increase IIT that also are connected to economic integration.[8]

2.3.3 Production Fragmentation and Foreign Direct Investments

Production fragmentation refers to the splitting up of the production process (previously integrated) into two or more components, or "fragments".[9] Different stages of production do not need to take place under the same roof in the same plant but may be contracted out to different plants of either the same firm (intra-firm fragmentation) or a different firm (inter-firm fragmentation). The reasons for production fragmentation are manifold. To start with the industry itself, it has to hold certain characteristics. There has to be differences in factor intensities across different processes.[10] The industry also has to be internationally footloose in production, that is have factor requirements that allows it to be located anywhere, and have a high value in relation to its volume so that transportations cost are minimized.[11] Production fragmentation then arises as a response to factor price or endowment differences across

[6] Markusen et al. s. 235
[77] Greenaway s. 156
[8] Markusen et al. s. 236
[9] Jones et al. s. 18
[10] Harris s. 52
[11] Ruane et al. s. 160

countries, in line with the traditional comparative advantage analysis. Other requirements for production fragmentation are decreasing trade barriers, wider markets, greater specialization, lower transports and communication cost, lower transactions costs, technological progress, lower efficient minimum scale of operations, more demanding consumers, more numerous agglomerations generating greater externalities before getting congested and more efficient and demanding capital markets.[12] These factors can all be related to the process of economic integration (both international and regional) or be recognized as determinants of IIT thus constituting a link between IIT, economic integration and production fragmentation. Intra-product trade, as a result of product fragmentation, is an increasingly important form of intra-industry trade showing a clear relationship between IIT (especially VIIT) and production fragmentation. This also means that as product fragmentation increase so does IIT, but only on aggregated levels, where final products are grouped together. On more disaggregated levels, where final products are split up in components, the level of IIT will remain unchanged or fall as production fragmentation implies increasing specialization at this level of disaggregation.

Liberalization of capital flows often come hand in hand with economic integration and studies show that factor movements and IIT can be complementary.[13] The liberalization of capital flows can be expected to increase the amount of FDI from multinational corporations that specializes (either horizontally or vertically) their production in different countries. Specialization on different varieties in different countries gives rise to horizontal IIT whereas vertical specialization and production fragmentation gives rise to vertical IIT. This trade can be either intra-firm or inter-firm trade depending on the preconditions and advantages of a regional location or trade with external parties. Anyhow the trade will be recorded as IIT and therefore economic integration will increase the share of IIT via FDI and production fragmentation.

2.4 Synthesis

In this chapter the determinants of IIT have been identified. It has been made clear that there are great differences between HIIT and VIIT, both concerning the definition and concerning

[12] Price s. 105
[13] Greenaway s. 156

the determinants. Some determinants are common for HIIT and VIIT while others differ. The more important driving forces behind IIT according to theory are the following:

> *Economic integration is positively correlated to IIT so that deeper forms of economic integration generate larger shares of IIT.*
>
> *Geographical distance is negatively correlated to IIT so that the longer the distance between the trading partners, the smaller the share of IIT.*
>
> *Economic size of a country is positively correlated to IIT so that the larger the country is, the higher is the share of IIT.*

The factor endowments and the demand patterns (proxied by per capita GDP) determine the nature of IIT: vertical or horizontal. This implies that:

> *The more similar the countries are in per capita GDP, the larger is the share of horizontal IIT.*
>
> *The more different the countries are in per capita GDP, the larger is the share of vertical IIT.*

This paper studies and analyses the IIT between the Eastern Europe and the EU with the focus on, the above mentioned and most central driving forces behind IIT. As stated earlier, there are many factors driving and explaining TIIT, HIIT and VIIT and focusing on a few of them does not mean that the others are neglected as driving forces.

3. Measuring Intra-Industry Trade

The vast amount of empirical findings has stimulated theoretical work since the 1980's. The first theory and measure of IIT was presented by Grubel and Lloyd in 1975 and this is even today the most commonly used measure. This measure may not be the most advanced and precise one and therefore there is a continuous search for a sharper measurement of IIT. There are numerous new theories of IIT and the concepts of horizontal and vertical IIT are well established but no one has yet specified a fully integrated theory of IIT with appropriate equations for use in empirical studies.[14] In many studies the Grubel-Lloyd measure is modified and/or extended in order to test a specific phenomenon or hypothesis. The measure of vertical and horizontal IIT, first presented by Abd-el-Rahman in 1991, is also widely used and has been modified and/or extended in studies just like the Grubel-Lloyd measure. In this chapter these two, most commonly used, methods for measuring IIT, HIIT, and VIIT will be further presented and some weaknesses will be discussed.

3.1 Measuring Intra-Industry Trade: the Grubel-Lloyd Index

In this paper the Grubel-Lloyd index (GLI) will be used to measure IIT. IIT is defined as the total trade in industry $i, (X_i + M_i)$, minus the inter-industry trade, $(X_i - M_i)$: $IIT = (X_i - M_i) - |X_i - M_i|$ where X_i and M_i are the export and import of industry *i*. The GLI for industry *i* is defined as the share of IIT out of the total trade between two countries or regions in industry *i* expressed as:[15]

$$GLI_i = \frac{2 \times \min(X_i, M_i)}{(X_i + M_i)} = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \qquad (3.1)$$

The index varies between 0 and 1, where zero implies complete inter-industry trade and one implies complete intra-industry trade. Complete inter-industry trade arises when either exports or imports of industry *i* equals zero whereas complete IIT arises when the value of export of industry *i* is exactly matched by the imports of the same industry.

[14] Markusen et al. s. 236.
[15] Se for example Petersson s. 4 and Clark s. 5

3.1.1 Caveats

Already the theoretical concept of IIT has been criticized and this criticism has been passed on to the GLI. It has been argued that IIT is just artificially created by statistical aggregation.[16] The problem can be related back to the definition of an industry. There exists no industry classification that ideally corresponds to and industry which make it difficult to combine the right amount of trade to the corresponding industry.[17] At aggregated levels of trade data the share of IIT is easily over-estimated since the aggregated groups can contain products from different industries and with different factor content, thus products that are not at all similar. If, on the other hand, a too low level of aggregation is used, then the share of IIT will be under-estimated as components and parts can be defined as own industries although they are not. At the deepest levels of aggregation all trade will be classified as inter-industry trade whereas at the highest levels of aggregation almost all trade will be classified as intra-industry trade. It is thus clear that the choice of the level of aggregation is central in order to make a correct analysis. A reasonable level of aggregation groups together similar products with similar factor contents (e.g. the four or five digit level of the SITC and the four digit level of the HS).[18]

In the geographical dimension there is another aggregation problem with the GLI. The share of IIT can be overestimated when calculated with multilateral trade flows.[19] A country may export a product to one trading partner and import the same product from another trading partner. With a multilateral approach this would be considered to be IIT, whereas with a bilateral approach it would be considered to be inter-industry trade. In order to avoid this bias bilateral trade flows are to be preferred over multilateral trade flows.[20]

Another weakness of the GLI is that it is normally unadjusted for aggregate trade imbalance.[21] A country's aggregated trade is normally imbalanced since the export and import of different industries are not equal. This implies that the aggregate GLI will underestimate the level of IIT since trade never can be of complete intra-industry nature when total trade is imbalanced. The larger the size of the overall trade imbalance becomes, the larger becomes the downward

[16] Janda et al. s. 37
[17] Nilsson s. 554
[18] Kinnerup s. 22f
[19] Gullstrand s. 87
[20] Gullstrand s. 87
[21] Brülhart et al. s. 231

bias of the GLI. Trade imbalance also makes it difficult to estimate the level, as opposed to the degree, of IIT with the GLI.[22] The level of IIT is interesting since the degree of IIT can be high if the volume of total trade between two countries is low although the actual volume of IIT is low. To account for this becomes even more important when measuring IIT between countries with large differences in economic size. Many attempts have been made to find a method for correcting this bias but none have been widely accepted or without criticism.[23] Several authors claim that there is no need (neither on theoretical nor empirical grounds) to correct this bias.[24]

There is a need to bear in mind these weaknesses of the GLI and to cautiously interpret the index in studies of IIT. It is also important to remember that different measures may give different results. At today's date no complete measure of IIT exists. The GLI is, by far, the most commonly used measure and is sufficiently accurate for this study. The eventual biases that may be generated due to its weaknesses are not greater than that they can be taken into account when analysing the results. Therefore the GLI is the best measure for this paper.

3.2 Measuring Horizontal and Vertical Intra-Industry Trade

In order to distinguish horizontal IIT from vertical IIT the quality difference in trade has to be assessed. It can be assumed that relative prices reflect relative qualities, at least at a disaggregated level.[25] Therefore information derived from unit values of exports and imports for a high level of disaggregation of trade data can be used to calculate vertical and horizontal IIT.[26] The unit values can be calculated in several ways e.g. per tonne or per item. There are problems associated with both the methods. However, there is empirical evidence suggesting that the variance of average weight per item is relatively low and therefore the unit value per tonne tends to be more widely used.[27] The problem with this measure is that if quality is reflected in material weight, so that higher quality products weigh more than lower quality products, then the UV for higher quality products will be systematically lower than the UV for lower quality products.[28]

[22] Nilsson s. 554
[23] Nilsson s. 559f.
[24] Nilsson s. 560
[25] Greenaway et al. s. 1508
[26] Petrucci et al. s. 194
[27] Greenaway et al. s. 1508
[28] Kinnerup s. 24

3.2.1 Horizontal Intra-Industry Trade

Horizontal IIT is defined as a simultaneous export and import of a product where the unit value of exports is relatively close to the unit value of imports i.e. products with comparable quality. What is meant by "relatively close to" differs between studies and researchers but somewhere around ±15% or ±25% seem to be a fair range.[29] This range is calculated in the following manner.[30]

$$1-\alpha \leq UVX_i / UVM_i \leq 1+\alpha \qquad (3.2)$$

UV stands for unit value, *X* and *M* for exports and import respectively, and subscript *i* for the chosen product or industry. α is a dispersion factor and thus sets the price range (normally somewhere around ±15% or ±25% as mentioned above). Higher values of α are logically associated with increasing horizontal IIT and decreasing vertical IIT.

3.2.2 Vertical Intra-Industry Trade

Vertical IIT is defined as products of different quality and therefore with different prices and unit values. Thus, where relative unit values are outside the range defining horizontal IIT any IIT is considered to be vertical.[31] The vertical IIT can be further divided into low and high quality exports.[32] When the relative unit value index is below the limit (that is 85 % for the ±15% range) the export is considered to be of low quality. Exports of high quality are those with an index above the limit (that is 115% for the ±15% range).

High quality vertical IIT satisfies the condition:[33]

$$UVX_i / UVM_i > 1+\alpha \qquad (3.3)$$

Low quality vertical IIT satisfies the condition:[34]

$$UVX_i / UVM_i < 1-\alpha \qquad (3.4)$$

[29] Se for example Abd-el-Rahman s. 88, Petrucci et al. s. 194, Janda et al. s. 35, and Greenaway et al. s.1507f
[30] Petrucci et al. s. 205
[31] Abd-el-Rahman s. 88 and Petrucci et al. s. 205
[32] Greenaway et al. s. 1509
[33] Petrucci et al. s. 205
[34] Petrucci et al. s. 205

3.2.3 Caveats

It needs to be pointed out that the relationship between price and quality might not be perfect. As mentioned above the relationship is supposedly stronger at more disaggregated levels of trade data. Therefore the method for disentangling horizontal IIT from vertical IIT described above is somewhat imprecise.

The level of aggregation also affects the measure in so that the unit values "change" depending on the level of aggregation. The unit value for an industry is calculated as the ratio between the sum of the value and the quantity traded of all the sub-industries. Therefore an industry that, on a higher level of aggregation, is defined as horizontally (vertically) differentiated can be constituted entirely of sub-industries that are defined as vertically (horizontally) differentiated.[35] This calls for a separation of vertical and horizontal IIT at a rather disaggregated level.

Finally some thoughts about the dispersion factor, α. The choice of α is rather arbitrary and it is difficult to argue why one limit should be superior to another.[36] At the extreme the limit is set very low resulting in almost only vertical IIT. At the other extreme the limit is set very high and the IIT will seemingly be consisted of only horizontal IIT.

3.3 An Empirical Example

The measurement of total, horizontal, and vertical IIT respectively are here illustrated by an empirical example which also will give a better understanding of the weaknesses of the measurement. Data for this example is collected from the OECD database SITC rev.3. Different levels of aggregation are used to illustrate the aggregation problem and different values on the dispersion factor, α.

[35] Gullstrand s. 86
[36] Kinnerup s. 25

Table 3.1 – Intra Industry Trade between the EU and the USA in 2004

	SITC 7	SITC 78	SITC 784	SITC 7841	SITC 7842	SITC 7843
GLI	0,87	0,35	0,42	0,62	0,04	0,43
HIIT or VIIT with:						
α = 25%	VIIT (lq)	HIIT	HIIT	VIIT (lq)	VIIT (hq)	HIIT
α = 15%	VIIT (lq)	VIIT (hq)	VIIT (lq)	VIIT (lq)	VIIT (hq)	VIIT (lq)

hq=high quality, lq=low quality

Source: OECD, own calculations

Table 3.1 illustrates the importance of choosing the right dispersion factor, α, and the right level of aggregation. Some data deserves to be pointed out. The GLI of group SITC 784 indicates a low level of IIT and a predominance of inter-industry trade in that group. When studying the subgroups the results are very different. In one of the subgroups (SITC 7842) there is an intense predominance of inter-industry trade with a GLI almost indicating complete inter-industry trade. In the two other groups the GLI indicates a more balanced distribution between IIT and inter-industry trade with one group (SITC 7843) slightly dominated by inter-industry trade and the other group (SITC 7841) slightly dominated by IIT. When comparing the highest level of aggregation with the lowest level of aggregation the results are surprisingly different. The GLI for group SITC 7 (the highest level of aggregation) indicates a high level of IIT trade whereas the GLI for one of the subgroups (SITC 7842) at the lowest level of aggregation indicates almost complete inter-industry trade. When studying vertical and horizontal IIT it becomes even more difficult to draw any stringent conclusions. The IIT of group SITC 78 converts to VIIT when α is set to 15% instead of 25%. Interesting is also that the IIT of group SITC 784 is classified as HIIT with α set to 25% although the IIT of two of the subgroups (SITC 7841 and 7842) are classified as VIIT. Also the quality of the VIIT changes depending on the level of aggregation. This example clearly shows how important it is to choose the right level of aggregation for the trade data, the right dispersion factor, and to bear in mind the weaknesses of the method. It is thus important to interpret the results with cautiousness.

4 Intra-Industry Trade between Eastern and Western Europe in 1996-2004

4.1 Method

- The calculations are based on OECD trade statistics, 1996-2004.
- The classification system used is the Harmonized System 1996, with (for the purpose of this paper) the best classification of the motor car industry since subgroups to the motor car industry are classified after quality. (Se table A.1 in the appendix for a presentation of the group and its subgroups.)
- The level of aggregation is the four-digit and six-digit level with the groups studied being nr. 8703 Motor vehicles designed for the transport of persons, 870321 Automobiles with reciprocating piston engine displacing not more than 1000 cc, 870322 Automobiles with reciprocating piston engine displacing > 1000 cc to 1500 cc, 870323 Automobiles with reciprocating piston engine displacing > 1500 cc to 3000 cc, 870324 Automobiles with reciprocating piston engine displacing > 3000 cc, 870332 Automobiles with diesel engine displacing more than 1500 cc to 2500 cc, 870333 Automobiles with diesel engine displacing more than 2500 cc. The six-digit groups studied are those where at least one country's average share (1996-2004) of the total average trade (1996-2004) in 8703 is 10 % or more.
- The formula used to calculate IIT is the Grubel and Lloyd measure of intra-industry trade (see formula 3.1). The index is calculated at the disaggregated six-digit level and then aggregated up for the four-digit level and the total trade. To aggregate the IIT from the six-digit level and upwards the following method has been used:

  $$IIT_i = \sum IIT_j / \sum (X_j + M_j)$$

  Where *i* is the more aggregated level (i.e. the four-digit level or the total trade) and *j* is the more disaggregated level (i.e. the six-digit level or the four-digit level)
- When studying each Eastern European country the countries are grouped together according to their level of IIT in 2004 in order to try to find any common characteristics explaining the IIT.
- To identify HIIT and VIIT (high or low quality), the method developed by Abd-el-Rahman is employed (see formula 3.2, 3.3 and 3.4). VIIT and HIIT are calculated using a range of ±15%. Unit values are calculated 'per tonne'.

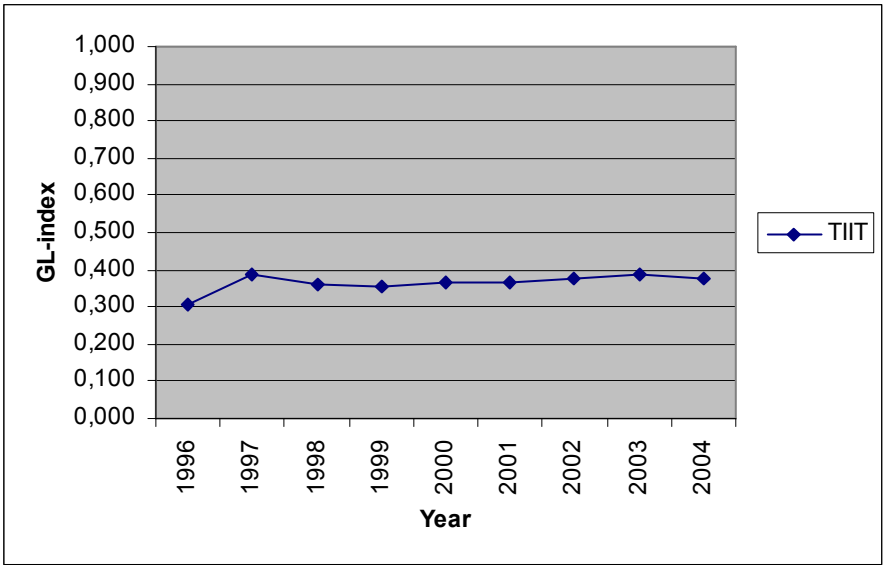
- High/low quality VIIT is calculated for the Eastern European countries' export. High quality VIIT then implies higher value of the Eastern European countries' export compared to the value of their import and the reverse for low quality VIIT.

4.2 TIIT between the Eastern Europe and the EU in 1996-2004

TIIT between Eastern Europe and the EU will be studied and analysed at three levels. First, the total IIT in motor cars (HS 8703) between Eastern Europe and the EU is presented. Second, the IIT in motor cars (HS 8703) between each Eastern European country and the EU is presented. Third, the IIT at a disaggregated level (HS 870321, 870322, 870323, 870324, 870332, 870333) between each Eastern European country and the EU is presented.

4.2.1 TIIT between the Eastern Europe and the EU in 1996-2004

In figure 4.1 below the total IIT between the Eastern and Western Europe in trade with motor cars is presented. (The exact values of the GLI for each year is presented in table A.2 in the appendix) TIIT is at an intermediate level already in 1996 and increasing slightly throughout the period. The overall picture of the IIT in the motor car industry is that the development has settled at this intermediate level.



Source: OECD, own calculations

Figure 4.1 – TIIT between Eastern Europe and the EU in 1996-2004

4.2.2 TIIT between the Eastern European Countries and the EU in 1996-2004 at a four-digit level

In this chapter the IIT between the EU and each Eastern European country is studied and analyzed. The countries are grouped together according to their level of IIT in 2004 then studied and analyzed group by group in order to understand the total IIT.

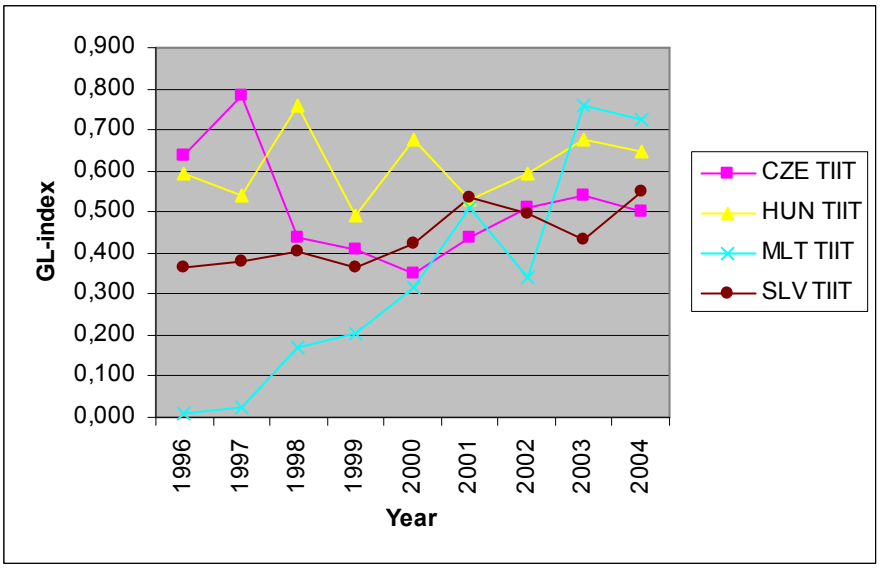
Group 1, with a predominance of IIT i.e. GLI>0,5, consists of the Czech Republic (CZE), Hungary (HUN), Malta (MLT), and Slovenia (SLV).

Group 2, with a medium level of IIT i.e. 0,5>GLI>0,1, consists of Cyprus (CYP), Estonia (EST), Lithuania (LTU), Poland (POL), and Slovakia (SVK).

Group 3, with a low level of IIT i.e. GLI<0,1, consists of Bulgaria (BGR), Croatia (HRV), Latvia (LVA), and Romania (ROM).

Group 1

The development of the IIT between the countries in group 1 and the EU is presented in the figure below. (The exact values of the GLI for each year is presented in table A.3 in the appendix) Initially the share of IIT is high for all the countries except Malta. During the period the share of IIT for Malta increases significantly and ends up as the highest share of IIT in the group. For the Czech Republic the share of IIT is, on the other hand, decreasing significantly during the period but recovers towards the end and ends up at a relatively high level although it is the smallest share in the group.

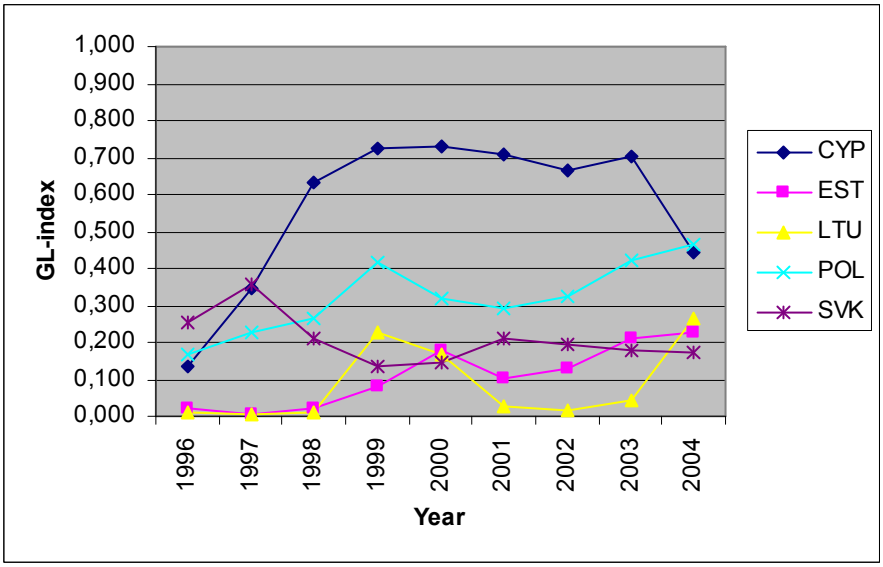


Source: OECD, own calculations

Figure 4.2 - TIIT for Group 1 in 1996-2004

Group 2

For the countries in group 2 the development of IIT is presented in the figure below. (The exact values of the GLI for each year is presented in table A.4 in the appendix) All the countries start with relatively low shares of IIT, especially if compared to group 1. Their shares all increase during the period with the exception of Slovakia whose share decreases slightly. The Cyprian share increases significantly in the beginning of the period, then stagnates and decreases in the last year.

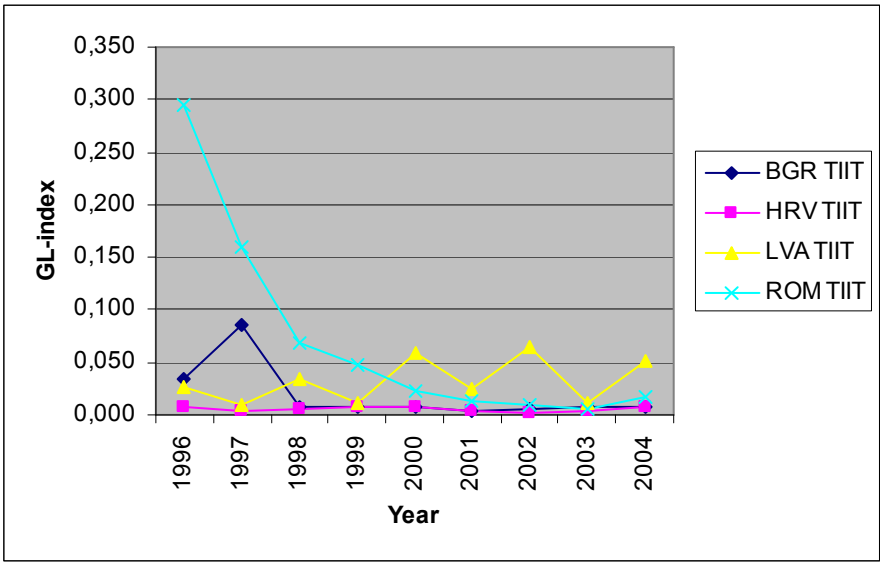


Source: OECD, own calculations

Figure 4.3 - TIIT for Group 2 in 1996-2004

Group 3

In group 3 we find Bulgaria, Croatia, Latvia, and Romania whose shares of IIT are presented in the figure below. (The exact values of the GLI for each year are presented in table A.5 in the appendix.) (N.b. because of the small shares of IIT the scale of the Y-axis is different from the figures of the other groups.) Romania starts with a medium share of IIT whereas the IIT of the other countries is much lower. Only the Latvian share of IIT is increasing during the period, while the shares of the other countries are decreasing.



Source: OECD, own calculations

Figure 4.4 - TIIT for Group 3 in 1996-2004

4.2.3 TIIT between the Eastern European Countries and the EU in 1996-2004 at a six-digit level

In this chapter the IIT of the countries will be further analysed by studying the pattern of IIT at a more disaggregated level. At the six-digit level the number of subgroups is nine whereof the six most important in volumes of trade are analysed here. Going through the GLI for each country, sub-group, and year or presenting them in a table could be confusing without adding much to the analysis. Instead, the sub-groups where at least one of the average shares of IIT (for a period of three years) for each country is 0,4 or above are presented and commented. The countries are continuously grouped together in the three groups presented earlier.

Group 1

The selected GLI at the six-digit level for the countries in group 1 are presented in the table below (shares above 0,4 are in bold and italics). These countries showed high and stable shares of IIT at the four-digit level and as seen below the share of IIT are high in most of the sub-groups as well. Cyprus and Malta, that were the only countries with a significantly positive development of their shares of IIT, are the only countries that have a predominance of IIT in all the six sub-groups studied. Their share of IIT in the sub-groups shows the same remarkable development as at the more aggregated level indicating that the IIT in the motor car industry as a whole has expanded significantly and rapidly. One exception needs to be pointed out namely group 870333 where Malta shows high levels of IIT already in the first period. For the other countries their IIT is concentrated to fewer sub-groups, somewhat different between the countries. For many of the sub-groups there is a predominance of IIT already in the first period, supporting the findings at the aggregated level that the share of IIT is stable at an intermediate level. The Czech Republic had a declining share of IIT at the aggregated level which may be explained by the declining IIT in sub-group 870322, which constitutes on average around one third of the Czech exports in group 8703. (The sub-groups' average shares of total trade in 8703 are presented in table A.6 in the appendix.) No connection between any specific sub-group and the level of IIT can be established here.

Table 4.1 - Selected GLI for Group 1

	HS-group	1996-1998	1999-2001	2002-2004		HS-group	1996-1998	1999-2001	2002-2004
CZE					**MLT**				
	870322	***0,598***	0,249	0,293	cont.	**870324**	0,371	***0,513***	***0,583***
	870323	***0,666***	***0,586***	***0,750***		**870332**	0,371	***0,513***	***0,583***
	870332	***0,625***	***0,416***	***0,622***		**870333**	0,057	0,073	***0,527***
HUN					**SLV**				
	870321	***0,403***	***0,437***	0,351		**870322**	0,380	0,358	***0,437***
	870322	***0,917***	***0,831***	***0,872***		**870323**	0,121	0,381	***0,519***
	870323	0,383	***0,554***	***0,757***		**870332**	***0,927***	***0,817***	***0,680***
MLT						**870333**	0,148	***0,602***	***0,701***
	870322	0,013	0,199	***0,507***					
	870323	0,121	0,249	***0,832***					

Source: OECD, own calculations

Group 2

Moving to group 2 the picture is significantly different, see table below (shares above 0,4 are in bold and italics). Group two showed medium shares of IIT at the aggregated level with Estonia and Lithuania having increasing shares of IIT and Slovakia a plunging share of IIT. Lithuania has no predominance of IIT in any of the sub-groups indicating that the spread of

IIT is even over the motor car industry as a whole. Estonia has a predominance of IIT in one of the sub-groups indicating that there is a concentration of the IIT into one segment of the motor car industry, namely subgroup 870322. Slovakia's declining share of IIT may be explained by the declining shares of IIT in two of the three sub-groups presented in the table below. Interesting is a sharp increase of the IIT in group 870323 indicating that the Slovakian IIT has become heavily concentrated to one segment during the period. This may also explain the decline at the aggregate level since the average share of the total trade for this sub-group is smaller than for the sub-groups with declining shares of IIT. (Se table A.6 in the appendix) There seems to be no connection between the actual sub-group and the level of IIT.

Table 4.2 - Selected GLI for Group 2

	HS-group	1996-1998	1999-2001	2002-2004		HS-group	1996-1998	1999-2001	2002-2004
CYP					**POL**				
	870321	0,274	***0,539***	***0,580***		**870321**	0,124	0,341	***0,600***
	870322	0,446	***0,672***	***0,681***		**870322**	***0,548***	***0,678***	***0,536***
	870323	0,386	***0,783***	***0,543***		**870332**	0,092	0,034	***0,412***
	870324	0,305	***0,628***	***0,574***	**SVK**				
	870332	0,080	0,394	***0,698***		**870321**	0,004	***0,428***	0,136
	870333	***0,837***	***0,867***	***0,686***		**870322**	***0,411***	0,176	0,154
EST						**870323**	0,264	0,194	***0,736***
	870322	0,027	0,167	***0,530***					

Source: OECD, own calculations

Group 3

For the countries in group 3 the share of IIT at the aggregated level was low or even very low. At this more aggregated level the picture remains unchanged, and the shares of IIT in the sub-groups are low. Only Romania shows a predominance of IIT in one of the sub-groups (se table below). This share plunges during the period studied which explains the declining share of IIT at the more aggregated level. The other countries (Bulgaria, Croatia, and Latvia) have low shares of IIT in their sub-groups and no concentration of IIT is found.

Table 4.3 - Selected GLI for Group 3

	HS-group	1996-1998	1999-2001	2002-2004
ROM				
	870332	***0,611***	0,018	0,004

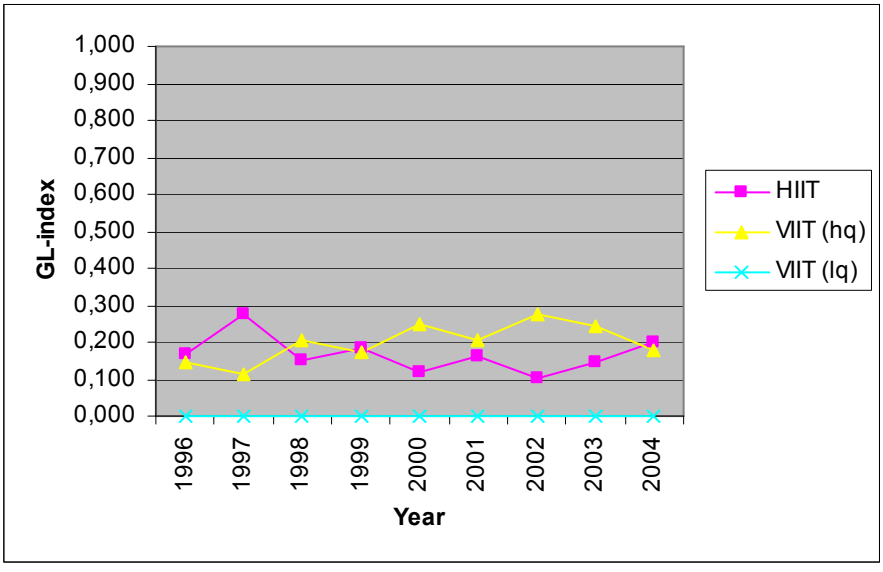
Source: OECD, own calculations

4.3 HIIT and VIIT between Eastern Europe and the EU in 1996-2004

The nature of IIT i.e. HIIT or VIIT between Eastern Europe and the EU will be studied and analysed at three levels. First, HIIT and VIIT in motor cars (HS 8703) between Eastern Europe and the EU are presented. Second, HIIT and VIIT in motor cars (HS 8703) between each Eastern European country and the EU are presented. Third, HIIT and VIIT at a disaggregated level (HS 870321, 870322, 870323, 870324, 870332, 870333) between each Eastern European country and the EU are presented. As briefly mentioned before the high/low quality VIIT refers to the value of the Eastern European countries' export to the EU. High quality VIIT is to be interpreted as a higher value of the export from the Eastern European countries than the value of their import. Low quality VIIT is then to be interpreted as a lower value of these countries export than their import.

4.3.1 HIIT and VIIT between the Eastern Europe and the EU in 1996-2004

The nature of IIT is expressed as the shares of horizontal and vertical (both high and low quality) IIT respectively in the figure below. (The exact values of the GLI for each year are presented in table A.2 in the appendix) The share of low quality VIIT is zero throughout the period whereas the shares of the high quality VIIT and the HIIT respectively go hand in hand during the entire period.



Source: OECD, own calculations

Figure 4.5 – HIIT and VIIT between Eastern Europe and the EU in 1996-2004

4.3.2 HIIT and VIIT between the Eastern European Countries and the EU in 1996-2004 at a four-digit level

Studying the nature of IIT for each Eastern European country gives a better understanding of the IIT between the Eastern Europe and the EU. The countries are studied in the same groups as before. The nature of IIT is expressed as the share of HIIT and VIIT (both high and low quality) respectively. In the tables the dominating share's GLI for each country is marked in bold and italics. As the amount of data is immense only averages for three-year periods are presented here in order to maintain a clear picture and oversight.

Group 1

For the countries in group one the IIT is classified as HIIT or high quality VIIT only (se table 4.4 below). There is no dominance of low quality VIIT. The nature of IIT changes for some of the countries during the three periods studied. In the first period there is a dominance of high quality VIIT (the IIT of 3 of the 4 countries is high quality VIIT and the GLI of VIIT is superior to that of HIIT.) In the second period there is balance between HIIT and VIIT in the sense that two countries are dominated by HIIT and two by high quality VIIT. If looking at the GLI the conclusion is different; then the dominance of high quality VIIT remains. In the last period there is an unquestioned dominance of high quality VIIT (both in number of countries and in GLI). Separating the countries show that for Hungary and Malta the IIT is dominated by high quality VIIT throughout the whole period. The IIT of the Czech Republic changes from HIIT to high quality VIIT whereas the IIT for Slovenia changes from high quality VIIT to HIIT, making Slovenia the only country with a dominance of HIIT (the GLI of the HIIT is also far more important than that of the high quality VIIT).

Table 4.4 - HIIT and VIIT for Group 1

		1996-1998	1999-2001	2002-2004
CZE	**HIIT**	***0,557***	***0,325***	0,215
	VIIT (hq)	0,033	0,074	***0,301***
	VIIT (lq)	0,030	0,000	0,001
HUN	**HIIT**	0,025	0,001	0,040
	VIIT (hq)	***0,604***	***0,564***	***0,594***
	VIIT (lq)	0,001	0,000	0,003
MLT	**HIIT**	0,006	0,031	0,131
	VIIT (hq)	***0,060***	***0,313***	***0,472***
	VIIT (lq)	0,002	0,000	0,005
SLV	**HIIT**	0,111	***0,335***	***0,436***
	VIIT (hq)	***0,271***	0,063	0,000
	VIIT (lq)	0,000	0,041	0,056

hq=high quality, lq=low quality

Source: OECD, own calculations

Group 2

In group two there is a heavy dominance of high quality VIIT (see table 4.5 below). HIIT dominates in some countries during some periods. No dominance of low quality VIIT is found. In the first period the presence of both HIIT and high quality VIIT is strong (the VIIT dominates the majority of the countries whereas the HIIT shows the highest GLI). In the second period there is a heavy dominance of high quality VIIT (both in terms of countries and GLI). For the last period the high quality VIIT remains in the dominant position although it has been slightly weakened (one of the countries is dominated by HIIT). Studying each country, it shows that Estonia, Lithuania, and Slovakia have IIT that is dominated by high quality VIIT in all the periods. The Cyprian IIT changes from HIIT to high quality VIIT. For Poland the IIT begins as HIIT, then changes to high quality VIIT and then changes back to HIIT, thus being the only country with a dominance of HIIT in the last period. Noteworthy is that the GLI of the Slovakian high quality VIIT is rather close to that of the HIIT in the last period. For the other countries (dominated by high quality VIIT) the gap between the GLI for HIIT and high quality VIIT is relatively important.

Table 4.5 - HIIT and VIIT for group 2

		1996-1998	1999-2001	2002-2004
CYP	HIIT	***0,222***	0,103	0,137
	VIIT (hq)	0,124	***0,618***	***0,455***
	VIIT (lq)	0,026	0,000	0,011
EST	HIIT	0,004	0,015	0,001
	VIIT (hq)	***0,009***	***0,101***	***0,187***
	VIIT (lq)	0,004	0,004	0,003
LTU	HIIT	0,000	0,001	0,001
	VIIT (hq)	***0,008***	***0,139***	***0,107***
	VIIT (lq)	0,000	0,002	0,002
POL	HIIT	***0,193***	0,167	***0,266***
	VIIT (hq)	0,005	***0,172***	0,137
	VIIT (lq)	0,022	0,003	0,001
SVK	HIIT	0,000	0,027	0,014
	VIIT (hq)	***0,274***	***0,137***	***0,167***
	VIIT (lq)	0,000	0,000	0,000

hq=high quality, lq=low quality

Source: OECD, own calculations

Group 3

In group three the picture is more scattered than in the other two groups (se table 4.6 below). All the three types of IIT are dominating some country's IIT during at least one of the periods. In the first period there is a dominance of high quality VIIT in terms of countries but a dominance of HIIT in terms of GLI. This is explained by the relatively higher share of IIT in Romania compared to the other countries. As the Romanian share of IIT falls so does the dominance of HIIT resulting in an unquestionable dominance of high quality VIIT in the second period (all the countries' IIT is dominated by high quality VIIT). In the last period there is still an overall dominance of high quality VIIT, but HIIT and low quality VIIT are dominant in one country each. Studying each country it shows that Croatia and Latvia are the only countries where the IIT is dominated by high quality VIIT throughout the whole period. In Bulgaria the IIT in the first and second period is dominated by high quality VIIT. In the last period there is balance between HIIT and high quality VIIT (HIIT is marked as dominant because it is so when adding more decimals). The Romanian IIT changes the most. In the first period it is heavily dominated by HIIT, then by high quality VIIT and in the last period there is a dominance of low quality VIIT and the high quality VIIT has disappeared entirely. The decreasing share of total IIT in Romania is explained by the falling share of HIIT. The other shares are low throughout the whole period.

Table 4.6 - HIIT and VIIT for group 3

		1996-1998	1999-2001	2002-2004
BGR	**HIIT**	0,005	0,000	***0,003***
	VIIT (hq)	***0,032***	***0,006***	0,003
	VIIT (lq)	0,006	0,000	0,001
HRV	**HIIT**	0,001	0,002	0,002
	VIIT (hq)	***0,004***	***0,003***	***0,002***
	VIIT (lq)	0,001	0,001	0,001
LVA	**HIIT**	0,002	0,002	0,004
	VIIT (hq)	***0,020***	***0,028***	***0,037***
	VIIT (lq)	0,001	0,001	0,002
ROM	**HIIT**	***0,167***	0,006	0,004
	VIIT (hq)	0,000	***0,020***	0,000
	VIIT (lq)	0,007	0,001	***0,006***

hq=high quality, lq=low quality

Source: OECD, own calculations

4.3.3 HIIT and VIIT between the Eastern European Countries and the EU in 1996-2004 at a six-digit level

At the six-digit level it is possible to study the nature of the IIT in detail and to better understand the pattern of the IIT than at the four-digit level. The IIT is here characterized as either HIIT, high quality VIIT, or low quality VIIT and the groups studied are the same as for TIIT at the six-digit level.

Group 1

In group one there is an increasing dominance of high quality VIIT throughout the period (see table 4.7 below). For some countries the nature of the IIT changes over the period and for others it is stable. The Czech Republic and Slovenia show a changing nature of their IIT. The Czech IIT changes from HIIT to high quality VIIT whereas the Slovenian IIT changes in the opposite way; from high quality VIIT to HIIT. Malta and Hungary are the countries where the nature of IIT is relatively stable, being characterized as almost only high quality VIIT during the whole period. Low quality VIIT representation is low and detected only two times: in Malta and in Slovenia. There seems to be no connection between the specific sub-group and the nature of IIT. One sub-group's IIT can be characterized as HIIT in one country and as high quality VIIT in another country, e.g. group 870322 in the Czech Republic and in Slovenia. The pattern of IIT at the six-digit level confirms the pattern at the four-digit level and nothing unexpected can be detected.

Table 4.7 - Selected HIIT and VIIT for group 1

	HS-group	1996-1998	1999-2001	2002-2004		HS-group	1996-1998	1999-2001	2002-2004
CZE					**MLT**				
	870322	HIIT	VIIT (hq)	VIIT (hq)	cont.	**870324**	HIIT	HIIT	HIIT
	870323	HIIT	HIIT	VIIT (hq)		**870332**	VIIT (hq)	VIIT (hq)	VIIT (hq)
	870332	HIIT	HIIT	VIIT (hq)		**870333**	VIIT (lq)	VIIT (hq)	VIIT (hq)
HUN					**SLV**				
	870321	VIIT (hq)	VIIT (hq)	HIIT		**870322**	VIIT (hq)	VIIT (hq)	HIIT
	870322	VIIT (hq)	VIIT (hq)	VIIT (hq)		**870323**	HIIT	HIIT	HIIT
	870323	VIIT (hq)	VIIT (hq)	VIIT (hq)		**870332**	VIIT (hq)	VIIT (lq)	HIIT
MLT						**870333**	VIIT (hq)	HIIT	HIIT
	870322	VIIT (hq)	VIIT (hq)	VIIT (hq)					
	870323	VIIT (hq)	VIIT (hq)	VIIT (hq)					

hq=high quality, lq=low quality

Source: OECD, own calculations

Group 2

In group two the picture is somewhat different from that of group one (the nature of the IIT for the countries in group two is presented in table 4.8 below). In the first three-year period there is a weak dominance of HIIT which is replaced by a dominance of high quality VIIT in the last three-year period. As in group one there are some countries where the nature of IIT changes over the period and some countries where it is stable. In Cyprus and in Poland the nature of the IIT changes greatly over the whole period. In Cyprus there is a dominance of HIIT in the beginning which changes to a dominance of high quality VIIT in the end. In Poland there is a dominance of HIIT throughout the whole period but in two of the three groups the nature of IIT changes over the period (and both high and low VIIT are represented). In Estonia and Slovakia there is an immense dominance of high quality VIIT. The presence of low quality VIIT is weak (as in group one) and is detected only in Poland and in Slovakia. No connection between the sub-group and the nature of IIT can be established here either.

Table 4.8 Selected HIIT and VIIT for group 2

	HS-group	1996-1998	1999-2001	2002-2004		HS-group	1996-1998	1999-2001	2002-2004
CYP					**POL**				
	870321	VIIT (hq)	HIIT	VIIT (hq)		**870321**	VIIT (lq)	HIIT	HIIT
	870322	HIIT	VIIT (hq)	VIIT (hq)		**870322**	HIIT	VIIT (hq)	HIIT
	870323	HIIT	VIIT (hq)	VIIT (hq)		**870332**	HIIT	HIIT	HIIT
	870324	VIIT (hq)	HIIT	VIIT (hq)	**SVK**				
	870332	HIIT	VIIT (hq)	VIIT (hq)		**870321**	VIIT (lq)	VIIT (hq)	VIIT (hq)
	870333	HIIT	HIIT	HIIT		**870322**	VIIT (hq)	VIIT (hq)	VIIT (hq)
EST						**870323**	VIIT (hq)	VIIT (hq)	VIIT (hq)
	870322	VIIT (hq)	VIIT (hq)	VIIT (hq)					

hq=high quality, lq=low quality

Source: OECD, own calculations

Group 3

In group three only one sub-group of one country (Romania) is presented (se table 4.9 below). In the two first three-year periods there is a dominance of HIIT which is replaced by low quality VIIT in the last period.

Table 4.9 - Selected HIIT and VIIT for group 3

	HS-group	1996-1998	1999-2001	2002-2004
ROM				
	870332	HIIT	HIIT	VIIT (lq)

hq=high quality, lq=low quality

Source: OECD, own calculations

4.4 Summary of Empirical Findings

Total Intra-Industry Trade

The total IIT between Eastern Europe and the EU is at an intermediate level i.e. 0,5>GLI>0,1 throughout the period studied (1996-2004). The level is constant for total IIT between Eastern Europe and the EU. Looking at the country level (four-digit level) the picture is rather different as the patterns of IIT for each country differ significantly. The countries are divided into three groups according to their level of total IIT in year 2004: group 1/high level (CZE, HUN, MLT, and SLV) with GLI>0,5, group 2/medium level (CYP, EST, LTU, POL, SVK) with 0,1<GLI<0,5, and group 3/low level (BGR, HRV, LVA, ROM) with GLI<0,1. All the countries with high or medium levels of total IIT show increasing shares of IIT except Slovakia and the Czech Republic. Countries with low levels of IIT show decreasing shares of total IIT. Malta and Cyprus have the most remarkable positive development of their shares of IIT whereas Romania has the most remarkable negative development. Studying the IIT in more detail at the six-digit level the findings from the four-digit level are confirmed. No

connections between any specific sub-group and a level of IIT can be established. For the countries in group 1 (high level IIT) the level and development of IIT at this disaggregated level follows well the more aggregated four-digit level. No direct concentration of IIT in any sub-group can be found. In group 2 (medium level IIT) a concentration of IIT can be found in Estonia and in Slovakia. In Estonia IIT is concentrated to sub-group 870322. For Slovakia the IIT at the four-digit level decreases during the period but for one sub-group (870323) the share of IIT increases indicating a strong concentration of IIT into this sub-group. Finally, for group three (low level IIT) there are only in Romania that any predominance of IIT (sub-group 870332) can be found due to the countries' low levels of IIT. Romania's level of IIT decreases during the period and the predominance disappears and no concentration of IIT can be found in the end of the period.

Horizontal and Vertical Intra-Industry Trade

Studying the nature of IIT between Eastern Europe and the EU it shows that HIIT and high quality VIIT are equally represented throughout the period. (Their respective GLI oscillates between 0,1 and 0,3.) In other words the Eastern European countries export cars and or parts similar to those that they import (HIIT) or they export cars and or parts with a significantly higher unit value than what they import. The presence of low quality VIIT is extremely low, close to non-existing, implying that there is almost no import of cars and/or parts with higher unit value than the unit value of the export. At the country level the same groups as when studying TIIT are used. For the countries in group 1 there is on average a dominance of high quality VIIT throughout the period, i.e. these countries mainly export the same type of cars and/or parts as they import. In the last period (2002-2004) only Slovenia has a dominance of HIIT. No dominance of low quality VIIT can be found. In group 2 the picture changes over the period; from a strong presence of both HIIT and high quality VIIT to a dominance of high quality VIIT. This means that these countries, on the contrary to the countries in group one, exports cars and/or parts that are significantly different from their import. Poland is the only country with a dominance of HIIT in the last period. No dominance of low quality VIIT can be found in group 2 either. For the countries in group 3 the picture is more scattered. Both HIIT, high and low quality VIIT dominates a country sometime during the period as a whole. On average, there is a dominance of high quality VIIT in the last period but in Bulgaria HIIT dominates and in Romania low quality VIIT dominates. Romania is also the only country in this study where a dominance of low quality VIIT can be detected. The findings at the six-digit level confirm those at the four-digit level i.e. there is an overall increasing dominance of

high quality VIIT although HIIT and low quality VIIT dominates some sub-group in some countries. No connection between a specific sub-group and the nature of IIT can be found.

5. Summary and Conclusions

The focus of this paper is to study and analyse the IIT of the motor car industry in the trade between Eastern Europe and the EU. It is clear that trade creation following the economic transition and the trade liberalization have increased the levels of IIT in the trade with motor cars and parts between the EU and Eastern Europe. The driving forces and the determinants of IIT are manifold and in this paper the focus lies on the country level determinants and especially the relationship between economic integration, geographical proximity, economic size, factor endowments and demand patterns on one side and IIT on the other side. Applying the most central driving forces of IIT mentioned in part 2.4 on the trade between the EU and the Eastern European countries, the level and the nature of IIT can be predicted to a certain extent, all other things being equal. The level of economic integration differs between the Eastern European countries implying that the level of IIT also should differ between them with the new EU-members showing the highest levels of IIT and Croatia showing the lowest level of IIT. Looking at the geographical proximity the Czech Republic, Hungary, Poland, Slovakia and Slovenia borders the EU while the others are more distant. The countries bordering the EU can be expected to show higher levels of IIT than those that are more distant. The economic size (GDP) also differs between the countries (see appendix A.7 for the GDP measured in PPS of all the countries) with the major difference being between the EU (average of all the EU15-countries) and the Eastern European countries implying that the level of IIT should be intermediate to low. In total, the level of TIIT is expected to be intermediate but different between the countries with some countries showing higher levels of IIT (mainly the Czech Republic, Hungary and Poland) and others showing lower levels of IIT (mainly Croatia). These expectations are to be seen as very rough since all other things are not equal and there might be other factors influencing the end result. The differences/similarities in per capita GDP are supposed to decide the nature of IIT. However, it is not clear how big the differences in per capita GDP need to be in order to create VIIT or how similar the levels of per capita GDP needs to be in order to create HIIT. Comparing to the levels of per capita GDP in other regions and the nature of IIT, it's easier to come to a conclusion. Nort-South trade is characterized as VIIT and the differences in per capita GDP between the regions are immense. The trade between rich, industrialized countries (such as the EU15-countries and the USA) is characterized as HIIT and the differences in per capita GDP are small. As the per capita GDP of the Eastern European countries (see appendix A.8 for the per capita GDP of

each country) not is as high as their western neighbours' but not as low as the southern countries', it can be expected that the levels of HIIT and VIIT are rather equal.

The empirical findings state that there is an intermediate and constant level of IIT between Eastern Europe and the EU. At the country level there are significant differences between the countries with some countries having high and/or increasing levels of IIT whereas others have lower and/or decreasing levels of IIT. This implies that there cannot be drawn any stringent conclusions concerning the driving forces of IIT at the regional level but the determinants have to be studied at the country level.

The first group of countries (consisting of the Czech Republic, Hungary, Malta, and Slovenia) showed a high level of IIT. These countries are rather equal in aspect of the determinants of IIT mentioned above. Let's go through them one by one. Concerning the economic integration the countries are indeed rather equal; they all became members of the EU in 2004. The only difference is that Malta did not have a Europe agreement resulting in an absence of a free trade area for industrial products before the membership came into place. This could explain the sharp increase in IIT as the date for membership came closer and the bonds were tightened. Second, the geographical proximity is another factor binding these countries together, except Malta. The Czech Republic, Hungary, and Slovenia have common borders with the EU indicating that there are considerable zones of overlapping markets driving IIT. Malta is situated closed to Italy but not really bordering the EU so it can be viewed as an outsider also in this category. Third, economic size is yet another factor uniting these countries. The Czech Republic and Hungary are very close in terms of economic size and Slovenia is not far behind. Again, Malta is an exception with a relatively low level of GDP. Studying the nature of IIT it shows that these countries are dominated by HIIT and high quality VIIT. Looking at each country it becomes clear that the per capita GDP might not be a good proxy for factor endowments and does not make a good job in explaining the nature of IIT. Malta with one of the higher per capita GDP:s has a strong predominance of high quality VIIT, although HIIT would be more accurate according to theory. Slovenia has a per capita GDP significantly lower than Malta but still a strong predominance of HIIT. On the other hand, Hungary, with one of the lower per capita GDP, has a predominance of high quality VIIT as could be expected by theory. For the Czech Republic the nature of IIT is rather balanced between HIIT and high quality VIIT and the per capita GDP is at an intermediate level relative the other countries. At the more disaggregated level there is a strong presence of

IIT in numerous sub-groups indicating a spread of IIT in the whole motor car industry. The nature of the IIT at this level supports the findings at the more aggregated level.

In group one the level of IIT seems to be rather well explained by the theory. The nature of IIT seems to be less connected to theory, as the per capita GDP seems to be an unsuitable proxy for factor endowments and demand patterns.

The countries in group two (Cyprus, Estonia, Lithuania, Poland, and Slovakia) showed an intermediate level of IIT. Also these countries are rather equal in terms of the driving forces of IIT presented above. As for the economic integration the scenario is the same as for the countries in group one. They are all members in the EU since 2004. Cyprus is, as Malta, an outsider since it did not have a Europe agreement preceding the membership. The high level of economic integration would imply a higher level of IIT. This, however, is counterbalanced with another factor namely the geographical proximity. These countries are relatively distant the EU and with small (if any) overlapping markets. Poland and Slovakia are bordering the EU but with larger parts of the country more distant to the EU than the countries in group one. Estonia, Lithuania, and Cyprus are situated in the periphery of the EU and cannot be expected to enjoy any benefits from their location. Looking at the economic size of the countries the empirical findings support the theory for all the countries except Poland. They are all very small relative to the EU but Poland is the one country in the Eastern Europe that is somewhat close to the EU-level. Studying the nature of IIT, there is a clear predominance of high quality VIIT. Only Poland has a predominance of HIIT in the end of the period but the presence of high quality VIIT is also strong. This is opposite to what could be expected since Cyprus, Estonia, Lithuania and Slovakia are the countries among the Easter European countries that are closest to the EU-level in terms of per capita GDP. Poland on the other hand is one of the countries that are more unequal the EU. At the more disaggregated level the empirical findings support those at the more aggregated level concerning the nature of IIT.

In group two the geographical proximity and the economic size seems to be the strongest driving forces, explaining the intermediate levels of IIT although deep economic integration. The nature of IIT seems to be less connected to theory as for the countries in group one.

The countries in group three (Bulgaria, Croatia, Latvia, and Romania) show very low levels of IIT, which is not very surprising either. Except for Latvia these countries are not members of

the EU yet and do not reap the benefits of deep economic integration. They are not geographically close to the EU since none of the countries borders a member country. In terms of economic size they are very small. The combination of these three factors working in an unfavourable way explains well the low levels of IIT for these countries. Looking at the nature of IIT there is a predominance of VIIT (including both high and low quality) throughout the period which supports the theory since the per capita GDP for these countries is low.

The level and the nature of IIT for the countries in group three are well explained by the theory.

Cars, from the demand side, have the right characteristics for generating both horizontal and vertical specialization, thus creating IIT (horizontal and vertical). Cars not only meet the need for transportation but are also an element of style through which their owners can express their individuality and status. There is therefore an aggregated demand for a vast diversity of cars creating both horizontal and vertical specialization. To summarize, there is a great potential for the automotive industry to generate both horizontal and vertical IIT. The fact that the VIIT between Eastern and Western Europe is of high quality and not low quality, might be explained by the differences in the standards of living between the east and the west. The demand for cheaper cars can be expected to be high in the east lowering the value of their import.

To conclude it seems like the country level determinants discussed in this paper explains the IIT in trade with motor cars between the EU and the Eastern Europe to a large extent but not completely. The empirical findings coincide to some extent with the expectations but not enough to say that there is no need to look for other explanations and driving forces of the IIT. In order to get a full understanding of the IIT and its driving forces it is thus necessary to add more determinants to the analysis and also include the industry level determinants briefly discussed above.

Bibliography

- Abd-el-Rahman, K. (1990), "Firms' Competitive and National Comparative Advantages as Joint Determinants of Trade Composition", *Weltwirtschaftliches Archiv* 127:83-97
- Brülhart, M., Elloit, R., JR., (1998), "Adjustment to the European single market: inferences from intra-industry trade patterns", *Journal of Economic Studies*, vol. 25, no. 5, pp. 225-247
- Clark, D., P. (2005), "Vertical Specialization-Based Production and Intra-Industry Trade", *The Journal of Developing Areas*, vol. 39, no. 1, pp. 1-13
- EU Commission Competitiveness report 2004
- Fidrmuc, J. (2005), "Trade Structure during Accession to the EU", *Post-Communist Economies*, vol. 17, no. 2, pp. 225-234
- Greenaway, D., (1987), "Intra-Industry Trade, Intra-Firm Trade and European Integration: Evidence, Gains and Policy Aspects", *Journal of Common Market Studies*, vol. 26, no. 2, pp. 153-173
- Greenaway, D., Hine, R., Milner, C., (1995), "Vertical and Horizontal Intra-Industry Trade: A Cross Industry Analysis for the United Kingdom", *The Economic Journal*, vol. 105, no. 433, pp. 1505-1519
- Grubel, H., G. (1967), "Intra-Industry Specialization and the Pattern of Trade", *Canadian Journal of Economics and Political Science*, vol. 33, no. 3, pp. 374-388
- Gullstrand, J. (2002), *Splitting and Measuring Intra-Industry Trade*, Lund Economic Series no 98, Lund
- Hakkala, K., Nilsson P. (1997), "Trade Liberalisation under Transition in Vietnam – A Study on Trade and Specialisation", *Minor Field Study Series*, no. 76
- Harris, R., G. "A Communication-Based Model of Global Production Fragmentation" in Arndt, S.W., Kierzkowski, H. (2001), *Fragmentation – New Production Patterns in the World Economy*, Oxford University Press, Oxford
- Janda, K., Münich, D. (2004), "The Intra-Industry Trade of the Czech Republic in the Economic Transition", *Emerging Markets Finance and Trade*, vol. 40, no.2, pp. 27-50
- Jones, R., W., Kierzkowski, H. "A Framework fro Fragmentation" in Arndt, S.W., Kierzkowski, H. (2001), *Fragmentation – New Production Patterns in the World Economy*, Oxford University Press, Oxford
- Kandogan, Y. (2003), "Intra-Industry Trade of Transition Countries: Trends and Determinants", *Emerging Markets Review*, vol. 4, no. 3, pp. 273-286
- Kinnerup, K. (2005), *Country-Specific Determinants of Intra-Industry Trade - The Case of France*, Master Thesis - Department of Economics Lund University, Lund
- Markussen, J., R., Melvin, J., R., Kaempfer, W., H., Maskus, K., E. (1995), *International Trade – Theory and Evidence*, McGraw Hill, New York
- Martín, C., Blanes, J., V. "The Nature and Causes of Intra-Industry Trade: Back to Comparative Advantage Explanation? The Case of Spain", *European Economy Group Working Paper Series*, Working Paper no1/1999
- Nilsson, L., (1997), "The Measurement of Intra-Industry Trade between Unequal Partners", *Weltwirtschaftliches Archiv* 133:554-565
- OECD (2004), "ITCS International Trade by Commodities Statistics", SITC rev.3 vol.2005 release 01. (www.sourceoecd.org)
- Petersson, L., (2005), "Export Diversification and Intra-Industry Trade in South Africa", *African Journal of Economics*, vol. 73, no. 4, pp. 785-802

- Petrucci, A., Quintieri, B., ”Will Italy Survive Globalization?” in Arndt, S.W., Kierzkowski, H. (2001), *Fragmentation – New Production Patterns in the World Economy*, Oxford University Press, Oxford
- Price, V., C. “Some Causes and Consequences of Fragmentation” in Arndt, S.W., Kierzkowski, H. (2001), *Fragmentation – New Production Patterns in the World Economy*, Oxford University Press, Oxford
- Ruane, F., Görg, H. “Globalization and Fragmentation: Evidence for the Electronics Industry in Ireland” in Arndt, S.W., Kierzkowski, H. (2001), *Fragmentation – New Production Patterns in the World Economy*, Oxford University Press, Oxford
- Venables, A., J., Rice, P., G., Stewart, M. (2003), “The Geography of Intra-Industry Trade: Empirics”, Topics in Economic Analysis & Policy, vol. 3, no. 1, pp. 1105
- Vogiatzoglou, K. (2005), “Trends and Determinants of Intra-Industry Trade between Eastern European Countries and Greece”, *Economic and Business Review for Central- and South- Eastern Europe*, vol. 7, no. 2, pp. 81-99,161

Appendix

A.1 Division 8703 of the HS 1996

8703 Motor veh princ designd for transp person (o/t 8702) incl car/sta wag

870310 Snowmobiles, golf cars and similar vehicles

870321 Automobiles w reciprocatg piston engine displacg not more than 1000 cc

870322 Automobiles w reciprocatg piston engine displacg > 1000 cc to 1500 cc

870323 Automobiles w reciprocatg piston engine displacg > 1500 cc to 3000 cc

870324 Automobiles with reciprocating piston engine displacing > 3000 cc

870331 Automobiles with diesel engine displacing not more than 1500 cc

870332 Automobiles with diesel engine displacing more than 1500 cc to 2500 cc

870333 Automobiles with diesel engine displacing more than 2500 cc

870390 Automobiles nes including gas turbine powered

Source: OECD

A.2 - IIT between the Eastern Europe and the EU in 1996-2004

	1996	1997	1998	1999	2000	2001	2002	2003	2004
TIIT	0,309	0,387	0,359	0,355	0,368	0,366	0,374	0,388	0,378
HIIT	0,166	0,275	0,153	0,182	0,116	0,163	0,101	0,146	0,200
VIIT (hq)	0,143	0,112	0,206	0,173	0,251	0,203	0,274	0,241	0,178
VIIT (lq)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Source: OECD, own calculations

A.3 - IIT for group 1 in 1996-2004 (4-digit level)

		1996	1997	1998	1999	2000	2001	2002	2003	2004
CZE	**TIIT**	**0,638**	**0,783**	**0,439**	**0,407**	**0,352**	**0,440**	**0,511**	**0,541**	**0,501**
	HIIT	0,550	0,782	0,340	0,320	0,281	0,374	0,178	0,193	0,276
	VIIT (hq)	0,000	0,000	0,099	0,087	0,070	0,066	0,333	0,348	0,223
	VIIT (lq)	0,088	0,001	0,000	0,000	0,000	0,000	0,000	0,000	0,003
HUN	**TIIT**	**0,591**	**0,542**	**0,757**	**0,489**	**0,677**	**0,529**	**0,592**	**0,675**	**0,646**
	HIIT	0,038	0,037	0,000	0,000	0,000	0,002	0,019	0,027	0,074
	VIIT (hq)	0,553	0,505	0,755	0,489	0,677	0,527	0,572	0,644	0,567
	VIIT (lq)	0,000	0,001	0,001	0,000	0,000	0,000	0,000	0,004	0,005
MLT	**TIIT**	**0,010**	**0,023**	**0,168**	**0,205**	**0,315**	**0,510**	**0,341**	**0,759**	**0,724**
	HIIT	0,006	0,012	0,000	0,036	0,031	0,025	0,000	0,052	0,341
	VIIT (hq)	0,000	0,011	0,168	0,169	0,284	0,485	0,341	0,706	0,369
	VIIT (lq)	0,005	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,013
SLV	**TIIT**	**0,365**	**0,377**	**0,403**	**0,365**	**0,421**	**0,534**	**0,496**	**0,435**	**0,547**
	HIIT	0,002	0,249	0,080	0,176	0,297	0,533	0,496	0,378	0,435
	VIIT (hq)	0,363	0,128	0,323	0,189	0,000	0,001	0,000	0,000	0,001
	VIIT (lq)	0,000	0,000	0,000	0,000	0,124	0,000	0,000	0,057	0,112

hq=high quality, lq=low quality

Source: OECD, own calculations

A.4 - IIT for group 2 in 1996-2004 (4-digit level)

		1996	1997	1998	1999	2000	2001	2002	2003	2004
CYP	**TIIT**	**0,138**	**0,344**	**0,634**	**0,724**	**0,732**	**0,710**	**0,662**	**0,701**	**0,445**
	HIIT	0,004	0,211	0,451	0,113	0,124	0,073	0,073	0,118	0,218
	VIIT (hq)	0,087	0,124	0,161	0,610	0,608	0,637	0,589	0,583	0,193
	VIIT (lq)	0,047	0,009	0,023	0,000	0,000	0,000	0,000	0,000	0,033
EST	**TIIT**	**0,023**	**0,007**	**0,020**	**0,081**	**0,176**	**0,102**	**0,131**	**0,212**	**0,230**
	HIIT	0,012	0,000	0,001	0,012	0,032	0,000	0,000	0,000	0,004
	VIIT (hq)	0,009	0,002	0,015	0,065	0,143	0,096	0,127	0,211	0,222
	VIIT (lq)	0,002	0,006	0,004	0,004	0,002	0,007	0,004	0,001	0,003
LTU	**TIIT**	**0,010**	**0,005**	**0,010**	**0,228**	**0,169**	**0,027**	**0,017**	**0,045**	**0,267**
	HIIT	0,000	0,000	0,000	0,000	0,000	0,002	0,001	0,000	0,001
	VIIT (hq)	0,010	0,005	0,009	0,225	0,168	0,022	0,014	0,042	0,266
	VIIT (lq)	0,000	0,000	0,001	0,003	0,001	0,003	0,002	0,003	0,000
POL	**TIIT**	**0,168**	**0,226**	**0,264**	**0,418**	**0,318**	**0,292**	**0,326**	**0,423**	**0,467**
	HIIT	0,139	0,177	0,262	0,415	0,045	0,042	0,053	0,350	0,397
	VIIT (hq)	0,000	0,013	0,001	0,001	0,271	0,243	0,270	0,072	0,068
	VIIT (lq)	0,029	0,036	0,002	0,002	0,001	0,006	0,002	0,000	0,001
SVK	**TIIT**	**0,254**	**0,359**	**0,208**	**0,136**	**0,144**	**0,212**	**0,193**	**0,177**	**0,173**
	HIIT	0,000	0,000	0,000	0,001	0,001	0,079	0,014	0,013	0,015
	VIIT (hq)	0,254	0,359	0,208	0,135	0,142	0,134	0,179	0,164	0,157
	VIIT (lq)	0,000	0,000	0,000	0,000	0,001	0,000	0,000	0,000	0,000

hq=high quality, lq=low quality

Source: OECD, own calculations

A.5 - IIT for group 3 in 1996-2004 (4-digit level)

		1996	1997	1998	1999	2000	2001	2002	2003	2004
BGR	**TIIT**	**0,035**	**0,085**	**0,007**	**0,008**	**0,008**	**0,004**	**0,005**	**0,007**	**0,008**
	HIIT	0,014	0,000	0,000	0,000	0,000	0,001	0,000	0,006	0,004
	VIIT (hq)	0,008	0,082	0,006	0,008	0,008	0,003	0,004	0,000	0,004
	VIIT (lq)	0,012	0,004	0,001	0,001	0,000	0,000	0,001	0,001	0,000
HRV	**TIIT**	**0,007**	**0,004**	**0,006**	**0,007**	**0,007**	**0,004**	**0,002**	**0,005**	**0,007**
	HIIT	0,000	0,003	0,001	0,002	0,003	0,001	0,001	0,002	0,003
	VIIT (hq)	0,006	0,001	0,004	0,004	0,004	0,002	0,001	0,001	0,004
	VIIT (lq)	0,001	0,000	0,001	0,001	0,000	0,001	0,000	0,001	0,000
LVA	**TIIT**	**0,026**	**0,009**	**0,034**	**0,011**	**0,059**	**0,025**	**0,065**	**0,012**	**0,052**
	HIIT	0,007	0,000	0,000	0,000	0,001	0,005	0,009	0,000	0,002
	VIIT (hq)	0,019	0,007	0,033	0,011	0,057	0,018	0,052	0,010	0,049
	VIIT (lq)	0,000	0,002	0,000	0,000	0,001	0,001	0,003	0,002	0,000
ROM	**TIIT**	**0,294**	**0,161**	**0,068**	**0,048**	**0,023**	**0,013**	**0,009**	**0,006**	**0,017**
	HIIT	0,281	0,154	0,064	0,010	0,002	0,008	0,001	0,002	0,009
	VIIT (hq)	0,000	0,001	0,000	0,037	0,019	0,006	0,000	0,000	0,000
	VIIT (lq)	0,013	0,005	0,004	0,001	0,003	0,000	0,008	0,003	0,008

hq=high quality, lq=low quality

Source: OECD, own calculations

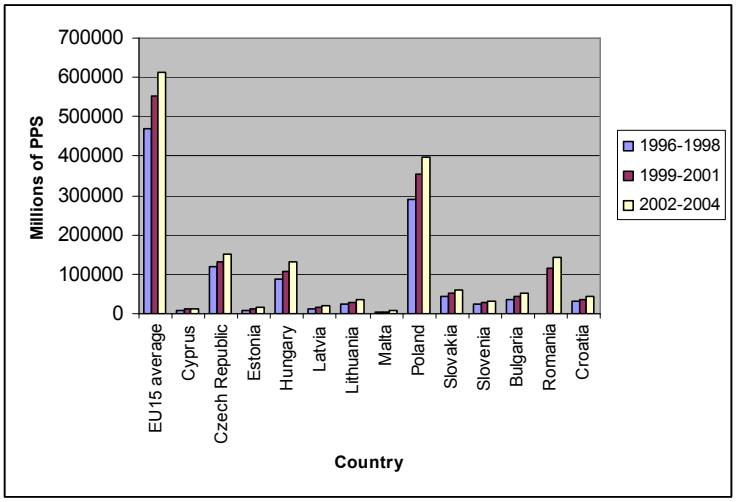
A.6 - Sub-groups' average share of the average trade in group 8703 in 1996-2004

	870321		870322		870323		870324		870332		870333	
	X	M	X	M	X	M	X	M	X	M	X	M
CYP	1,49%	1,11%	17,58%	16,28%	48,60%	54,18%	5,48%	6,28%	9,73%	14,00%	16,36%	7,56%
CZE	0,14%	2,57%	36,24%	17,73%	25,64%	33,00%	0,12%	4,92%	36,26%	36,06%	0,07%	4,87%
EST	0,04%	0,29%	24,82%	8,65%	19,15%	58,62%	1,68%	7,29%	47,78%	18,93%	1,30%	4,24%
HUN	4,76%	2,97%	21,70%	27,92%	66,34%	43,23%	4,16%	2,12%	0,91%	19,18%	0,17%	3,39%
LVA	0,26%	0,27%	7,15%	4,60%	35,68%	54,57%	6,31%	13,63%	49,42%	21,21%	0,84%	5,30%
LTU	0,01%	0,27%	2,95%	6,65%	17,46%	60,78%	1,66%	8,24%	74,28%	20,41%	3,36%	3,16%
MLT	0,35%	2,82%	11,22%	23,57%	39,63%	30,81%	5,56%	4,54%	39,38%	32,66%	1,82%	2,53%
POL	29,00%	4,02%	59,29%	25,90%	1,59%	41,10%	0,06%	2,20%	7,12%	23,50%	0,03%	2,28%
SVK	2,37%	0,54%	23,41%	25,81%	19,00%	30,54%	10,06%	6,95%	23,76%	30,37%	14,54%	4,50%
SLV	0,03%	3,00%	64,64%	21,99%	5,08%	37,59%	0,03%	2,29%	15,26%	28,91%	5,64%	5,07%
BGR	0,58%	1,63%	19,23%	7,90%	43,05%	42,83%	24,11%	9,41%	10,28%	29,92%	2,61%	7,11%
ROM	0,53%	0,52%	14,00%	5,85%	19,04%	30,28%	7,51%	6,72%	54,89%	47,63%	3,34%	7,38%
HRV	1,42%	2,50%	7,91%	24,46%	49,40%	26,64%	18,61%	3,23%	10,63%	37,24%	5,96%	4,20%

X= Export, M= Import

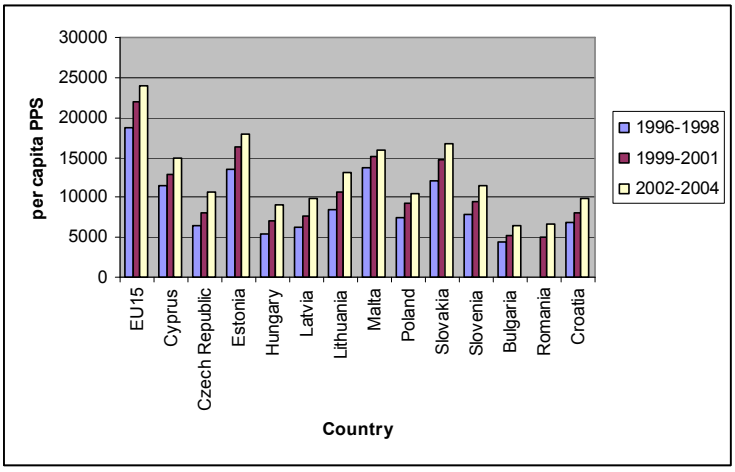
Source: OECD, own calculations

A.7 GDP-averages in 1996-1998, 1999-2001, 2002-2004 for the EU15 and the Eastern European Countries measured in PPS.



Source: OECD, own calculations

A.8 Per capita GDP in 1996-1998, 1999-2001, 2002-2004 for the EU15 and the Eastern European Countries measured in PPS.



Source: OECD, own calculations