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ACCESSION POLAND'S TO THE EU

Some Lessons from International Trade Theory

by

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Abstract

The Eastern enlargement of the European Union is significantly increasing the area, where free trade of goods and services are among the core principles of all member countries. Existing economic borders between the applicant countries and the current EU members will have to be broken down, leaving no room for the protection of non-viable industries. In this paper, we apply traditional as well as new theories of international trade in order to identify sectors of the Polish economy with a comparative (dis)advantage. As a main result, human capital- as well as capital-intensive industries will be among the prominent losers of Poland's accession to the EU. This structural change will be accompanied by significant changes in the income distribution. In the long-run, inter-industry trade will be substituted by intra-industry trade. However, because of a high number of determinants, relatively little can be said about the industries which will successfully participate in intra-industry trade.

JEL classification:

F1

Keywords:

EU Eastern Enlargement, International Trade Theory, Intra-industry Trade

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1. Introduction

Eastern enlargement of the European Union (EU) is discussed at length by politicians, economists, entrepreneurs and researchers. The arising questions range from cost and benefit estimations (e.g. *Baldwin and Portes, 1997*), through migration (e.g. *Sinn et al., 2001*), to institutional issues (e.g. *Steinherr, 2000*). This paper focuses on the consequences of the enlargement process for international trade. Theories of international trade are used to project potential changes in the specialization patterns between the EU and Poland. We concentrate our attention on Poland because of its population size and its economic potential. The case of Poland may be considered as representative, since similar economic conditions can be observed for the majority of the EU applicants in Eastern Europe.

Analyzing the changes in trade patterns and – as a side-effect – in factor prices is important from the perspective of economic policy, as well as from the firms view. For example, understanding the relationship between free trade, comparative advantage and factor income allows for the projection of structural change and of distributional effects. These conclusions from trade theory may assist the formulation of economic policy even in the pre-accession period (e.g. by appropriate measures concerning public infrastructure or distributional instruments). As for private companies, optimal timing of investments is a key to success. The identification of viable and non-viable sectors after enlargement is therefore of relevance before the integration takes place.

Our basic hypothesis is that Poland's accession to the EU is a movement towards free trade. Of course, one could argue that even before the integration only a few trade barriers remained (*Hauser and Kamm, 1998*). As a consequence, the free trade situation would have been established before the enlargement, and therefore trade models wouldn't be appropriate for the projection of future developments. However, there are two strong arguments in favor of our position. The first one is historical evidence from the accession of Spain and Portugal, when (formally) free trade has also been established before the accession of these countries. After integrating Spain and Portugal, growth rates of international trade were far higher than before – clearly a result of the membership in the Single European market. A second argument, which also supports our assumption, are the significant factor price differentials between Poland and the EU. These differentials should narrow or even disappear in the long-run free trade equilibrium.

In our analysis, we consider both traditional and new theories of international trade. Traditional theories are based on the concept of comparative

advantage, resulting from international differences in technology, factor endowments or preferences. Among the traditional trade theories, we apply the Ricardo approach, the specific factors model, and the Heckscher-Ohlin model. Finally, we also analyze the neo-technological approach, which extends the Heckscher-Ohlin theory into a non-static view of comparative advantage.

In contrast, new theories of international trade are based upon the general assumption that market imperfections are prevailing for real-world problems. These imperfections may originate on the demand and/or the supply side. For example, many wholesale products are differentiated, reflecting the preferences of consumers towards variety or towards specific characteristics. Imperfections on the producer's side are often caused by the appearance of firm-level returns to scale, resulting in some market power of one single enterprise.

New trade theories are especially useful in an analysis of phenomena of intra-industry trade, constituting an important part of international trade. In order to concentrate on the most significant effects on Poland, we selected two models of horizontal intra-industry trade (*Krugman, 1979, 1981; Lancaster, 1979, 1980*), and one model appropriate for the analysis of vertical intra-industry trade (*Falvey and Kierzkowski, 1987*).

The structure of this paper is as follows: Chapter 2 will discuss the accession Poland's on the basis of traditional trade theories. The main assumptions as well as the most important results of these approaches are presented, before – as a second step – the models are used to make some projections concerning Poland. In chapter 3, models of horizontal and vertical intra-industry trade are introduced. We also apply these models to the integration Poland's into the EU, and indicate the main conclusions. The summary is presented in chapter 4.

2. Trade between Poland and EU: The framework of traditional trade theories

The enlargement of the European Union will eliminate all economic borders between the applicants and the current EU members. This will increase the degree of international specialization and enhance the wealth of both partners. However, any specialization is related to a structural change, which eliminates single firms or even whole industries from the market, as their output becomes substituted by imports. This raises the question, which industries can be considered as internationally „viable" or „non-viable", respectively. Traditional trade theories can give an – at least rough – answer to this question, with international specialization being considered a natural result of comparative advantage between countries. Using four models of traditional trade theory[1], the expected trade pattern as well as distributional effects will be discussed.

2.1 Ricardo approach

The oldest and most famous model of international trade is the Ricardo approach. Within this economic world all goods are produced with just one factor of production, typically assumed as labor. Countries exhibit different levels of technological knowledge, resulting in (labor) productivity differences between them. The main result of the Ricardo analysis is that only relative (comparative) productivity matters: Specialization on goods, having higher relative productivity than abroad, increases consumption possibilities in both countries. The exchange rate mechanism transforms domestic prices of goods into world prices fully compatible with the projected trade pattern.[2]

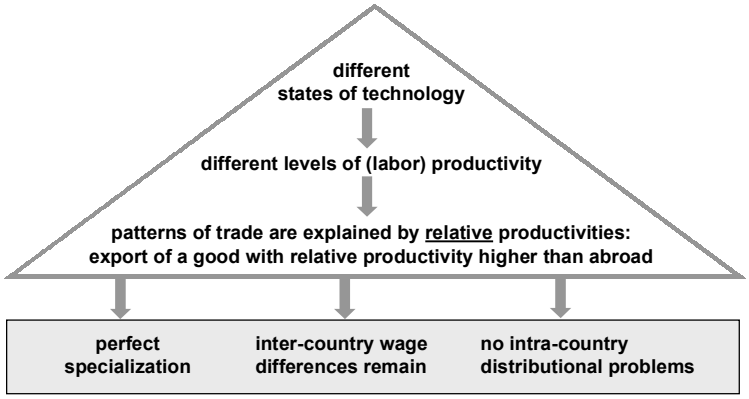
Before we apply the Ricardo model to the case of Poland, we need to underline three results which are important for further discussion. First, to realize a national advantage from trade, at least for one good perfect (complete) specialization is necessary. Secondly, there is no mechanism to level off the international productivity differences. Opening the border will enhance purchasing parity of the workers in both countries, but the inter-country wage differentials will remain. Thirdly, there are no losers from free trade, because

[1] For details on these models see e.g. *Caves et al. (1999, ch. 5 to 8)*.

[2] The considered theories allow international trade and the realization of the advantage from trade without money and exchange rate system.

there is just one factor of production. These elements are presented in Figure 1.

Figure 1: Ricardo-Approach



What can we learn from the Ricardo approach applied to Poland? By all means, the answer is a disappointing "not much". The assumptions of the model are clearly too far from reality, leaving only limited room for meaningful application. For example, there is little reason to assume that Poland wouldn't be able to import or to produce a technology comparable to West-European standards. Therefore, with the opening of the border for capital movement, relative productivities could easily change. The endowment with other factors of production, like specialized human capital or land, will significantly determine capital movements and future productivity structures. Considering more than one input, those scenarios lay outside of the Ricardo model, however.

One example of the misleading results of the Ricardo approach is the agricultural sector. As can be seen from Table 1, in which absolute productivity coefficients in agriculture are put into relationship with the economy-wide mean figure, Poland would be the only applicant from Eastern Europe with a disadvantage in that sector. That is probably far from realistic. Polish farmers should be among the biggest winners of EU membership due to EU's agricultural policy. Higher prices and other transfers will enhance their relative income position, while subsidies for rural infrastructure and for investments in farming will propel absolute as well as relative productivities. We also shouldn't forget that low labor productivity in Polish agriculture is mainly due to hidden unemployment: An astonishing share of all employees, which lies in the range between 19% (EU statistics) and 27% (Polish statistics), is defined as farmers.[3] Another issue, discussed in the next chapter, is the availability and the quality of land, a very special input in producing food. The next chapter will discuss that topic.

[3] Data from *Piazolo (2000, 267)*, and *GUS (2000, 131)*.

Table 1: Agriculture and the Ricardo-Approach

	Labor productivity*			
	economy (mean)	agriculture	ratio	
Poland	7,0	1,6	4,4	➡ comparative disadvantage against EU
Hungary	10,0	7,0	1,4	comparative advantage against EU
Czech Republic	8,0	5,7	1,4	
Slovenia	16,4	11,5	1,4	
EU-15	46,9	15,6	3,0	

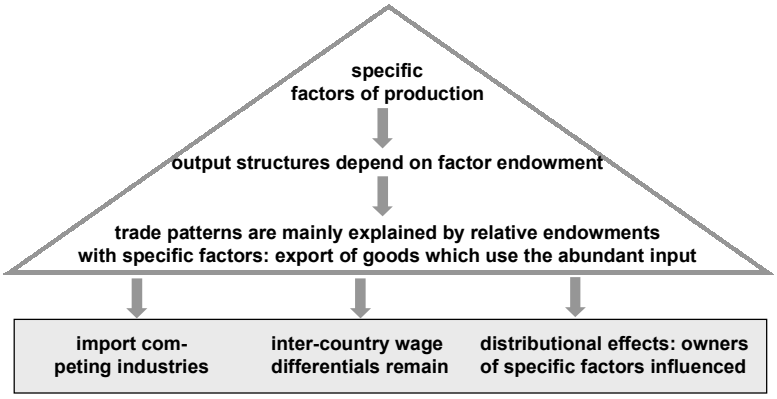
* Productivity measured as value added (in 1000€) per worker.
Calculation based on purchasing power parity exchange rates.
Source: *Wissenschaftlicher Beirat (1997)*; own calculations.

2.2 Specific Factors Model

Different than the Ricardo approach, specific factors models assume a multi-input world. There is at least one mobile factor of production used in all industries. Additionally, there are specific inputs employed only in a part of the economy. For example, capital and labor may be the mobile factors of production, whereas land and human capital are specific for agriculture and research-intensive industries, respectively. The specific factors model is often viewed as a short-run approach, because many inputs may be very flexible in the longer term: *Mussa (1974)* uses the example of (unskilled) labor, which can be transformed into human capital within some periods.

Figure 2 illustrates the main lines of the economic argumentation. After opening the border the prices of goods will change. The result is a specialization pattern where all goods produced with the relatively abundant (specific) input will be exported. As in contrast to the Ricardo approach, opening the border will not bring complete specialization. Hence, the predictions of this model are more realistic than of the former one. A broad range of outputs may be produced in both countries, with only a tendency towards specialization. Finally, distributional effects are of relevance, what may be important for the identification of interest groups in favor of or against EU membership. The model clearly identifies the owners of the abundant specific input as the main winners of free trade. Owners of the relative scarce specific factor face a deteriorating income position, whereas no clear result can be found with respect to the mobile inputs. However, the free trade situation is clearly positive for the country as a whole, because the winners could compensate the losers for their loss and still stay with a profit.

Figure 2: Specific Factors Model



What conclusions can be drawn from the specific factors approach with respect to Poland's EU membership? An answer to this question has to start with the identification of mobile and specific factors of production. However, it is no easy task to solve. Take capital, for example. Before the investment decision, capital may be considered a mobile input because it may be used for the purchase of a whole range of capital goods. After the investment decision, the bulk of the capital stock is specific for the production of one or just a few outputs. As a result, only free capital – investments decisions which can be realized within the short time – should be ranked among the mobile inputs. Indeed, most inputs are specific in very short run, leaving only unskilled labor and free capital as mobile factors of production. Prominent examples for specific inputs are human capital, land, natural resources, and probably also "environment" (interpreted as the ability to absorb pollution).

With this set of specific inputs, the expected patterns of free trade are obvious: Poland will specialize in the production of those goods, requiring relatively intensive use of land, some natural resources, and environment. In contrast, human capital-intensive sectors, as well as owners of human capital, will lose. That is due to the currently low level of human capital, now taking advantage of the existing trade restrictions, but which will be substituted by human capital from the EU in the future. Exceptions may be found in sectors producing non-tradable goods. Indirect information on the scarcity of human capital in Central and East European countries can be found in *Brenton and Gros (1997, 66)*, who observe a lack of major changes in the nature of exported products in comparison to those resource- and labor –intensive goods sold abroad under communist regimes.

With regard to land as a specific factor, Table 2 shows its abundant endowment in most Central and East European countries, especially Poland. Farmers will not only benefit from artificially high prices within the EU market, but also from an ample endowment with land and therefore a comparative advantage against the current EU members.

Table 2: Endowment with land of Eastern European countries

Country	Agricultural population		agricultural area		
	in 1000	% of population	total (mio. ha)	farmland (mio. ha)	ha per inhabitant
Poland	3.661	25,6	18,6	14,3	0,37
Hungary	392	10,1	6,1	4,7	0,46
Czech Republic	271	5,6	4,3	3,2	0,31
Slovenia	90	10,7	0,9	0,2	0,13
EU-15	8.190	5,7	138,1	77,1	0,21

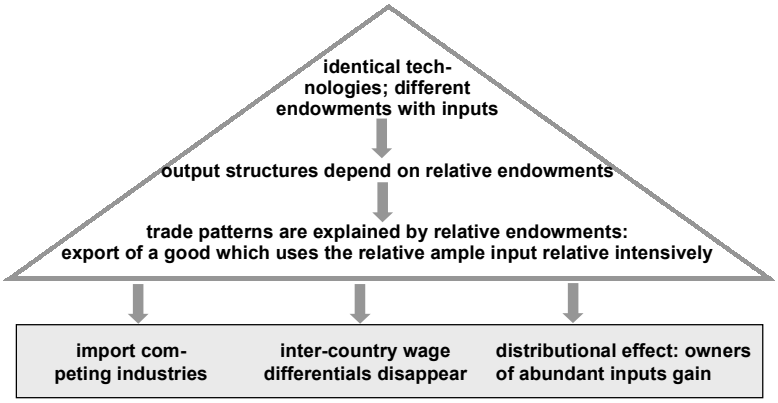
Source: *Wissenschaftlicher Beirat (1997).*

2.3 Heckscher–Ohlin Approach

The Heckscher-Ohlin approach, which links a country's endowment with inputs to its trade with these factors as embodied in goods, is the most preferred model explaining trade patterns. Because of its multi-input setup, it is quite similar to the specific factors model. However, by assuming free movement of inputs between the industries (no specific inputs), it shows the long-term scenario after opening the borders. As can be seen from Figure 3, the main conclusions are similar to the specific factors world: Relative endowments with inputs matter, and the trade patterns can be evaluated by a comparison of relative input quantities with relative factor intensities in production. Again, not a complete specialization, but a tendency towards specialization can be expected. Domestic distributional questions are also included in the Heckscher-Ohlin approach: Owners of the ample inputs are expected to step up the relative income ladder, because the export of goods using the owners' factors intensively is increasing prices for these goods. In turn these price increases enhance the demand and therefore the prices of the relatively ample inputs.

Some of the most important results of this model are the conclusions regarding the international level of input prices. According to the Heckscher-Ohlin approach, inter-country wage differences will disappear (factor price equalization theorem). This very impressive result holds for a free-trade case in which both countries produce a full spectrum of goods. Therefore, in such a case free trade is a perfect substitute for factor movements (migration, capital flows) because of disappearing inter-country wage differentials. In the case of a small country integrating with a large free-trade-union, the smaller partner will just adopt the goods and factor prices from the larger one.

Figure 3: Heckscher-Ohlin Approach



Applying the Heckscher-Ohlin approach to the Eastern enlargement of the EU, not only the endowment with specific factors, but with all factors of production has to be observed. As illustrated above, the most important mobile inputs are (unskilled) labor, which is abundant in Poland (in comparison to human capital and to capital), and capital, which therefore is relatively scarce. Because the results of the specific factors model do not change, the projected trade pattern is in favor of land-, labor-, resource- and environment- intensive goods. Agriculture and some manufacturing sectors producing standard goods will expand. Wood processing, leather and textiles, food industry, and metal processing may be amongst the main winners of free trade with the EU. High-tech industries and therefore human capital could come under pressure because of a comparative advantage of the developed countries. Some other losers may be found within capital-intensive industries. Probably, this effect will be less significant than in the case of human capital, because high international mobility of capital may offset national scarcity of this input.

Such a structure of future trade between Poland and the European Union finds some support by the trade flows observed since the opening against the Western world *(Plucinski, 2000, 224)*. As *Rollo and Smith (1993)* noticed, labor- and resource-intensive products comprised 43% of Polish exports to the EU at the beginnings of the nineties. *Gabrisch (2000, 214-215)* reported, that since then no important changes occured. Interestingly, this may be due to the fact that the past trade liberalization measures did not include these "sensitive" products. EU trade policy is reflecting the expectation that the production of these goods will find a comparative advantage in the East.

When discussing about winners and losers of economic integration, an one-sided adaptation of factor prices from the large EU seems to be realistic. As a consequence, the disadvantage of high-skilled labor against unskilled labor is only a relative one. If the factor price equalization theorem holds, the owners of high-skilled labor would reach the slightly higher income level of

the EU. In contrast, earnings of unskilled labor would jump towards the much higher level of EU countries.

Obviously, some question marks remain if international factor price equalization will occur. The current empirical work on the North American Free Trade Association (NAFTA) does not give a clear answer on this important question. As regards the US-Mexico case, *Trefler (1998)* argues that the observed wage equalization between less skilled workers takes place because of migration from Mexico to the USA. Wage equalization would therefore result rather from a shift of the labor supply curves, than from free trade. In contrast, *Hanson and Slaughter (1999)* find only limited impact of immigration on local wages, clearly dominated by changes in the mix of goods and enhanced trade between the US and Mexico.

2.4 Neo-technological approach

The neo-technological approach is often seen as a dynamic version of the Heckscher-Ohlin theory. It assumes that comparative (dis)advantage changes with time. The best known representative of this approach is the idea of a product life cycle (*Vernon, 1966*; see also *Posner, 1961*). According to this model, countries trade because of the existence of three production stages: innovation, maturity, and standardization. The developed countries specialize in innovative – and therefore human capital-intensive – products, whereas the less developed have a comparative advantage in producing standardized goods.

In this context Poland can be classified as the less developed partner, while the EU is representing the industrialized one. Poland is expected to import human capital-intensive products from the EU and simultaneously export the standardized goods. Similar to the specific factors and the Heckscher-Ohlin approach, winners and losers of the integration process can be identified. Because of its comparative advantage in standardized goods, increasing export prices will drive up wages of (unskilled) labor and incomes of some resource owners. Potential losers will be the owners of capital trapped in the Polish high-tech industry and human capital. These results are quite similar we got from Heckscher-Ohlin, and the product life cycle hypothesis can be considered a supplement rather than an own-standing theory.

Another stream of neo-technological theories is based on firm-level increasing returns to scale explaining the expansion to foreign markets. According to this approach, firms operating on large domestic markets have a comparative advantage in producing goods on the basis of technologies with firm-level increasing returns to scale. Such firms have lower average production costs due to a larger quantity produced for the domestic market.

Because Poland is a relatively small partner when compared to the EU, Poland may be in a disadvantage in the production of returns-to-scale sensitive products. EU rivals are backed by a strong home market demand and are able to use their sheer size-advantage when exporting into Eastern Europe.

3. Intra-industry trade between Poland and the EU from the perspective of the new trade theories

Traditional trade theories, as discussed in chapter 2, are important tools to analyze and to predict trade patterns between countries with significant differences in factor endowments, technologies or consumer preferences. They are based on the comparative advantage concept and describe international trade with homogenous goods.

In the real world, however, the bulk of international trade occurs between countries with similar levels of productivity and factors availability (*Helpman and Krugman, 1985*). This fact is contradicting theoretical considerations, in which advantage from trade is increasing with comparative cost differences. Moreover, intra-industry trade – simultaneous import and export of goods of the same categories – is dominating the trade patterns between developed countries. The reaction of trade theory to this phenomenon is the introduction of imperfect competition[4], originating either on the supply and/or on the demand side of the market. There may also exist some other types of market imperfections, e.g. increasing returns to scale in the production process, which also entered the framework of traditional trade theories (neo-technological approach).

Before turning to the economic analysis of intra-industry trade, the problem of defining a proper level of agreggation has to be mentioned. The majority of product groups used for statistical analysis consists from very different versions of one product, which are not necessarily close substitutes from the view of consumers. *Pomfret (1991, 77)* writes about SITC 793, embracing tankers and canoes, which are hardly perfect substitutes, and which also drastically differ in the production technology.

Aside from this empirical question, there is a wide consent that intra-industry trade can be expected to be most intensive between similar countries. Similarity is a multi-dimensional variable, with economic size, per–capita incomes and productivity representing the most important determinants. The last mentioned element is relevant because similar productivity levels are

[4] This stream of international economics is called new trade theories. They differ in their assumptions, in the analyzed economic structures, and in their conclusions. The large number of new trade theories can be seen as a proof of the inability of researchers to deal with the problem. However, their difficulties are partly justified by complexity of the problem (there is no unique and generally accepted theory of imperfect competition).

reflecting a similar stage of technological development as well as a comparable factor endowment.

Perspectives of intra-industry trade between Poland and the EU will be separately analyzed for horizontal and vertical forms of such trade. The horizontal trade is defined as a parallel export and import of differentiated products with similar quality, but differences in other characteristics important for consumers (e.g. color, design). On the contrary, vertical intra-industry trade is the international exchange of varieties of a product differing in quality. Vertical intra-industry trade also includes trade following the value-added-chain, e.g. export of an intermediate product and import of the final product *(Balassa, 1986; Hummels, Rapoport, Yi, 1998, 80)*. In the last interpretation the intermediate products are seen as an imperfect final product.

From the broad range of models, which can be found in the literature, we select two approaches of monopolistic competition (*Krugman, 1979, 1981; Lancaster, 1979, 1980*), and the (im)perfect competition model of *Falvey and Kierzkowski (1987)*[5]. The first are models of horizontal intra-industry trade, whereas the last one is an approach with vertical intra-industry exchange of goods. We exclude models analyzing oligopolistic markets (e.g. *Brander, 1981; Eaton, Kierzkowski, 1982; Shaked, Sutton, 1984)*) because most Polish firms are far from the crucial mass necessary for global oligopolistic markets. As for vertical intra-industry trade with intermediaries and final goods, we use the approach of *Jones and Kierzkowski (1990, 1999, 2000).*

3.1 Horizontal intra-industry trade

The existence of horizontal intra-industry trade has been shown in models of monopolistic competition designed by *Krugman (1979, 1981)* and *Lancaster (1979, 1980)*. Both types of models are characterized by similar assumptions regarding technology and industry structure. Key elements are the absence of barriers to entry, a large number of firms in the industry, the production of horizontally differentiated products with similar technology, and intra-firm increasing return to scale. There are, however, crucial differences in modelling demand characteristics. In both models consumers clearly identify the varieties produced by every firm, though in the Krugman model they want to have as many different types of one product as possible (preferences characterized by love of variety), whereas in the Lancaster approach everyone has her own ideal variety (love of characteristics). In both models there is no single variety accepted by the whole society as superior to all rival products.

[5] The model of *Falvey and Kierzkowski (1987)* is often interpreted as a representative for traditional trade theories, in which export specialization is present due to a country's comparative advantage. In their approach firms are acting like perfectly competitive, but are producing a vertically differentiated good. Since consumers don't see the varieties as perfect substitutes, but strictly prefer the one providing the highest quality, we include this approach among the new trade theories.

To be more precisely, the consumers of the Lancaster society are preferring different types of one product. The preferences are uniformly distributed among all possible varieties. Turning to the production side, the industry consists from many firms producing different models (exactly as by Krugman). However, for Krugman it is not important which varieties are produced. He doesn't describe characteristics of the produced varieties as consumers care only about the number of them and not about their features. In contrast, Lancaster models are following the location theory from *Hotelling (1929)*. Consequently, the characteristics of the product range are precisely defined.

A clear conclusion regarding the question of international trade can be drawn from both models. The first result is that horizontal intra-industry trade can be definitely expected within this framework. The second one is that the intensity of this trade is dependent on economic similarity between the observed countries. Economies show a tendency towards higher similarity as a response to stronger bilateral intra-industry trade flows. As described above, the degree of similarity is measured by a number of determinants, with the most important ones being technology used by the firms, number of consumers as a proxy for the market size, consumer's incomes, and preferences.

Consequently, when applying the cited models to the Eastern EU enlargement, the economic similarity between Poland and the EU has to be analyzed. The result is somewhat disappointing: Significant differences in the employed technologies don't allow to be too optimistic about the potential volume of horizontal intra-industry trade. One indicator of these differences is the huge gap in labor productivity, where Poland is at just 20% of the EU-level (Table 1). A second indicator is the different structure of the economies, with the prominent position of agriculture in Poland being the most obvious example. Short-run growth rates of horizontal intra-industry trade are also dampened by differences in the economic potential of both partners. For example, the 15% decrease in public investments in 1998/99, accompanied by non-increasing private investments in Polish manufacturing, leads us to the conclusion that currently the Polish capital stock is shrinking *(GUS, 2000, 501)*. This trend is confirmed by a decrease in the production of machinery and equipment during the same period *(GUS, 2000, 370)*.

When considering the demand side, the perspectives for horizontal intra-industry trade between Poland and the EU are clearly better even in the short run. The main argument for this optimistic view is the similarity in the preferences of consumers, which leaves only income differences as a natural intra-industry trade barrier. Given a long-term convergence of factor prices in Poland and the EU[6], the income differences between them will narrow.

What are the reasons for the assumed similarity in consumer preferences? As one hypothesis, the traditional orientation of Poland towards the West European culture has to be mentioned. This orientation is intensified by many Polish emigrants living in the USA, UK, and Germany. A second source of similar demand structures are experiences of Polish people traveling around

[6] See the discussion about factor equalization in Chapter 2.

Europe even under the former communist regime. As a matter of fact, Polish consumption patterns are heavily influenced by the Western way of life.

Putting the results together, horizontal intra-industry trade may become more important in the longer term. Increasing incomes because of factor price equalization and factor movements as well as fast technological assimilation resulting from significant inflows of foreign capital into Poland are the main forces behind this trend. The activities of foreign investors are expected to increase after Poland's accession to the EU because of decreasing risks. It can hold especially for goods produced in the sectors experiencing already today significant inflows of foreign capital. In the short-run, however, the projections for intra-industry trade are modest[7].

Finally, somewhat disappointing is that not much can be said about the industries involved in horizontal intra-industry. Increasing returns to scale and horizontal product differentiation can be found in many manufacturing industries, and the actual patterns of international specialization are supposed to be a mixture of historical development, comparative advantage and foreign financial involvement. One candidate for successful intra-industrial trade is the foreign-owned automobile industry, where the varieties produced in Poland and in the EU don't differ in quality.

3.2 Vertical intra-industry trade

Another form of intra-industry trade can be found in the paper of *Falvey and Kierzkowski (1987*; see also *Falvey, 1981*), which analyzes the production of a commodity with varieties of different quality. Product differentiation is therefore assumed as vertical differentiation, and international exchange of this type of good is called vertical intra-industry trade. The technology is described as a two-inputs process, with the amount of labor being independent from the quality of the product, and the amount of capital increasing with the quality of the output.

Given this set-up of the model, *Falvey and Kierzkowski* reach the conclusion that trade patterns are critically dependent on the factor endowments of the countries. Trade partners are specializing in quality segments in which they have a comparative advantage. Capital abundant countries are producing capital-intensive high-quality versions of the product. In contrast, labor abun-

[7] One version of the Lancaster model shows trade between differing partners: One relatively abundant in labor (like Poland), one (EU) in capital. During autarchy, both are producing differentiated capital intensive manufactures and (homogeneous) labor intensive food. The first good is produced for a monopolistic competitive market with the firm-level increasing return to scale, the second under perfect competition. Within this framework bilateral trade has a dominantly inter-industry character. The capital abundant country is the net exporter of the differentiated product, whereas the partner becomes a net exporter of food. Intra–industry trade increases with the similarity of the economies (as in the typical Lancaster model).

dant countries produce low-quality types of this good, which are – because of unchanged labor decreasing capital requirements – relatively labor-intensive.

In the framework of the *Falvey-Kierzkowski* model, vertical intra-industry trade between Poland and the EU is more likely to occur. Using the arguments from chapter 2, Poland can be characterized as a labor abundant country. Consequently, the low-quality versions of the product would be produced there. The capital abundant European Union is a producer and net exporter of high quality types. Because economic similarity is not necessary for vertical intra-industry trade, the economic relevance can be expected to be higher than with horizontal trade (this result is confirmed by empirical data – e.g. *Rosati, 1998, 51ff*).

An alternative approach to analyze vertical intra-industry trade refers to the fragmentation of production. Within this context, tradable goods include final goods and intermediaries from the same industry. *Jones and Kierzkowski (1990, 1999, 2000)* and *Jones (2000)* analyzed the economic rules of production fragmentation. They argue that the production of a single good can be divided into production blocs in which components are produced and/or parts of the production process are realized.

The Jones-Kierzkowski model then assumes that firms have to pay constant initial and marginal cost. Initial costs are higher the more production blocs are created. However, marginal costs of production are decreasing with a higher degree of fragmentation. Therefore a trade-off between initial costs and variable costs will occur, and firms will have to solve a cost minimization problem. As a general result, the number of units produced is positively influencing the degree of fragmentation. Of course, the different production stages may be located in different countries. Vertical intra-industry trade is then the logical consequence of this firm-level optimization problem.

This type of trade can be very relevant for the Poland-EU case. Using the comparative advantage pattern from the Heckscher-Ohlin approach, Poland will specialize in the production of relatively labor-, land-, resource-, and environment-intensive components. *Winiecki (2000)* points out that it is easier for Poland to be internationally viable in producing labor-intensive components of capital-intensive final products, than to produce the final good for export markets. Similar to Heckscher-Ohlin, we can expect an increase in wages, accompanied by decreasing returns on capital.

3.3 A few remarks about adjustment costs

The outlined scenario is not necessarily advantageous for Poland. Its trade pattern is expected to be similar to the one of developing countries. Inter-industry specialization in labor-, land-, resource- and environment-intensive products makes Poland dependent on the challenging international markets with extremely keen competition (there are many producers of standardized goods in comparison with the segmented markets of individualized and differentiated products). Furthermore, this kind of specialization has the disad-

vantage to be more affected by economic fluctuations. Finally, if the price equalization theorem holds, Poland may easily lose its comparative advantage after accession – in favor of some East European countries like Russia or Ukraine.

Our scenario for Poland's intra-industry specialization is very similar to the one of developing countries. As a consequence, its intra-industry trade is like the North-South two-way exchange. Opening the economy seems to be relatively costly for Poland, because vertical intra-industry trade causes higher adjustment costs than the horizontal one. In the case of horizontal trade firms have only to exchange the type of produced commodity. Since all firms use similar technologies and the costs of changing varieties is assumed to be zero, factors of production remain employed at their firms, which stay in the market and only have to adapt their product portfolio. Factor prices will remain at their original levels because factor intensities don't change significantly (all firms are using similar technologies). Although there is some intra-industry adjustment, the expected structural changes as well as structural unemployment are modest in comparison to opening the borders for inter-industry trade. The Krugman approach even allows that no firm has to change the produced variety after opening the economy, but the general welfare increases with a growing number of available varieties.

In contrast, with vertical trade the technologies used to produce different qualities are quite different. Usually, higher quality is accompanied by higher capital requirements. In the long-term, Poland's specialization on the production of low-quality types can be extremely disadvantageous. The reason is that consumers are preferring high-quality products if their incomes increase. That is exactly what we expect after acceding the EU, when factor prices tend to converge. Low-quality goods will loose their market position. This phenomena could also be observed for the EU, where such types tend to disappear from the market with continuing economic growth and increasing incomes per capita.

4. Conclusions

Trade theories indicate that the accession of Poland to the EU is a complex issue. The final result of accession depends on the time horizon and the assumption of economic similarity between Poland and Western Europe. The higher the degree of dis-similarity, the more appropriate are traditional trade theories, with the specific factors model being attractive for short-run projections, and the Heckscher-Ohlin approach offering interesting results for the long-run. Furthermore, vertical intra-industry trade is more likely to occur in different economies. In contrast, if one is considering Poland's economic conditions as not too far from the EU, horizontal intra-industry trade models are of special interest.

Starting from the current situation with GDP per capita in Poland equal to just 40% of the EU average (measured in PPP), this significant differential is a strong argument in favor of the traditional theories. The traditional approaches may be complemented by vertical specialization models. In the short run, comparative cost advantages can be expected in the production of land-, environmental-, and – eventually – resource-intensive goods. Losers may be found especially in human-capital intensive industries. Thus highly skilled workforce, especially many academicians, will be among the most prominent losers of the Eastern enlargement of the EU. From the view point of vertical intra-industry trade, Poland will evolve as a supplier of intermediate products for Western (end-) product lines.

In the long run, labor intensive industries also have the potential to join the group of winners, while capital intensive sectors are in a disadvantage because of the low domestic capital base. Parallely, with steadily increasing wage levels from internationally converging factor prices, inter-industrial trade patterns will at least partially be substituted by intra-industry trade. Determinants of specialization are less foreseeable than with the traditional theories, because increasing returns to scale and market imperfections are observed in many industries. As a side effect of the levelling-off in factor prices, migration from Poland to the EU will clearly be retarded. What remains are the changes in national income structure, in which human-capital owners will find themselves only slightly better off than before the accession, in contrast to the sharp rise in income of workers with low skills.

We are aware that the future development of the economic relations between Poland and the EU-countries cannot be solely predicted with international trade theories. There are other factors of high relevance. For example, one cannot forget the bundle of liberalization and harmonization measures which have to be introduced by the Polish government. A significant part of

the established Polish firms will be affected by these regulatory reforms. Another important issue to be discussed are cross-border factors movements, which are assumed to be nonexistent in the international trade theories (both traditional and new ones). Especially capital inflows are very common within a globalized world and need to be discussed. We mentioned some consequences of factor movements using theoretical apparatus, but clearly a more in-depth analysis is necessary.

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