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Implications of the Doha Round negotiations in services for Poland

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Abstract

Using a computable general equilibrium model we assess the effects of services trade liberalization in Poland and its major trading partners in the context of the WTO Doha Round negotiations and the ongoing process of trade liberalization within the enlarged European Union. The paper provides a thorough descriptive analysis of the data on trade in services. It gives a complete picture of the sectoral and geographical structure of Poland's trade in services in 2007. We also provide an analysis of revealed comparative advantage indices based on sectoral data.

The review of literature is focused on a discussion of the methodology for assessing the barriers to trade in services. The core of the paper consists of a CGE simulation using the GTAP model. We employ the Hoekman (1995) tariff equivalents as a proxy for the initial level of trade barriers. Our four scenarios include those of complete liberalization, EU-only liberalization and two intermediate scenarios. The most optimistic scenario is expected to bring a 0.9% increase in Polish GDP and welfare improvement of close to 0.8% of GDP value. However, more than half of this gain is attributed to the liberalization within the EU that is bound to happen independently from the Doha process.

Keywords: trade liberalization, Doha Round, computable general equilibrium modelling

JEL: F17, F13, C68

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1. Introduction[1]

The Doha Round is the most complicated round of all previous GATT/WTO multilateral negotiations. The most difficult problems arise in the field of agricultural trade. However, the negotiations regarding services are also fairly complicated. It stems, *inter alia*, from the fact that the regulation of trade in services constitutes a new area of GATT/WTO activities.

The first agreement on services liberalization (GATS: General Agreement on Trade in Services) was reached only 20 years ago, during the previous GATT round (1988–1993). During the Uruguay Round the general rules regarding liberalization were formulated. The rules of the GATS are in general quite similar to those of the GATT, governing liberalization of merchandise trade. However, the framework for services negotiations and commitments is different, since there are no tariffs or other similar barriers. Therefore, the negotiators created four modes of the supply of services, constituting the framework for specific market access and non-discrimination commitments. However, the real progress in making specific commitments regarding liberalization within the Uruguay Round was very limited (Egger, Lanz 2008).

The services negotiations in the Doha Round are simpler in comparison to Uruguay, since the GATS framework already exists. However, despite generally more restrictive access regimes and, thus, potentially higher gains from liberalization than in merchandise trade, many governments have found it difficult to undertake economically significant commitments across a broad range of services. This reluctance for undertaking commitments has many reasons; one of them is probably related to the fact that economic implications of services liberalization are not well known. The empirical analysis of the results of services liberalization is usually more difficult in comparison to the effects of merchandise trade liberalization.

The progress in the Doha Round negotiations has indeed been slow so far (Adlung, Roy 2005). Not all WTO members submitted their GATS offers of liberalization. Between May of 2005 and March of 2008 only 30 revised offers were submitted, mainly from developed countries with only a few from developing ones.[2] In fact, many governments exclude all sectors from their offers, which produces a snow ball effect: the more exclusions, the higher vulnerability of governments to domestic lobbies with vested interests and the fewer possibilities for trade-offs between WTO members (Mattoo 2005; Jara, Dominguez 2006). In 2007, Members continued to address the issues of Special and Differential Treatment (SDT) of developing countries in services.[3] But the real progress in negotiations had been stalled till the beginning of 2009. Moreover, the financial and economic crisis of 2008–2009 reinforces protectionist sentiments in many countries and does not facilitate the completion of the Doha Round.

Nevertheless, it is worthwhile to evaluate possible implications of trade liberalization in services for a country such as Poland for several reasons. Firstly, during the internal political

[1] This paper is based on results of a research project financed by the Polish Ministry of Economy. The opinions expressed by authors in the paper do not necessarily reflect the positions of Ministry of Economy or the National Bank of Poland.

[2] Only the following developing countries submitted their revised services offers: Bahrain, Brazil, Chile, Chinese Taipei, Colombia, Egypt, Honduras, Hong Kong (China), India, Macao (China), Malaysia, Mexico, Peru, Singapore, Suriname, Thailand, Turkey and Uruguay (www.wto.org/english/tratop_e/serv_e/s_negs_e.htm).

[3] Document WTO, Special Session of The Council For Trade In Services, TN/S/32, 24 July 2007.

discussions on Services Directive[4] within the EU, Poland has been frequently cited as a country that may be a source of problems for some other "old" members states.[5] Secondly, Poland, being a new member state of the EU, faces a double liberalization challenge from internal (within EU) and external (WTO) competitors.

The paper is organized as follows. In the second part, we present a descriptive analysis of Poland's trade in services. It gives a complete picture of the sectoral and geographical structure of Polish trade in services. We also provide an analysis of revealed comparative advantage (RCA) indices based on sectoral data. In the third part, we will discuss the possible methodologies of assessing the barriers to trade in services. The Hoekman (1995) tariff equivalents will be used in the paper as a proxy for the initial level of trade barriers. In the final part, we will make use of the Hoekman equivalents in order to pursue a CGE simulation based on the GTAP model. We will present four scenarios analyzing implications of complete liberalization, EU-only liberalization and two intermediate WTO scenarios. We will compare the present structure of Poland's comparative advantage (RCA) with simulated changes in trade in services.

2. Structure of Polish trade in services

Polish data on trade in services have only been in line with the EU classification since 2005 and come from the balance of payments statistics. The data presented here are for the year 2007 and are based on the latest available BOP statistics. The data contain some minor errors, mainly in unclassified services, but they usually constitute only an insignificant share of total trade.

Polish exports of services were equal to 20.884 million EUR[6] and imports to 17.499 million Euro in 2007. The major EU partners of Poland in services trade were the following: Germany, Great Britain, France and the Netherlands. The share of EU 25 was equal respectively to 74.0% of total exports and 75.3% of imports and was growing in the recent three years. The main non-EU trade partners (and their share in Polish exports) were the United States (5.88%), Russia (3.46%), Canada (0.57%), Japan (0.29%), India (0.20%), Turkey (0.20%), South Korea (0.17%) and Israel (0.16%).

Given the fact that the trade surplus in services in 2007 was relatively small, a comparison of shares of a sector in total exports and imports reflects roughly the competitive position of that sector. A significantly higher share of exports than imports implies a surplus and a strong competitive position. In the case of transportation (205),[7] its share in total services exports was 32.12% and 23.50% in imports, for travel (236) the share in exports was 36.80% and 32.21% in imports, finally for other services (981) the respective shares were equal to 31.8% and 44.19%.

More disaggregated sectoral data show that in the case of freight sea transport (208) the share of exports was 3.62% and 4.88% of imports, while passenger sea transport was relatively insignificant. Moreover, Poland had a visible surplus in the passenger air transport (211), since

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[4] Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market, Official Journal L 376 of 27 December 2006.

[5] "Polish plumber" threatening local companies in France has been frequently cited in discussions on possible implications of services liberalization in the European Union. The comparative advantage of Poland is presumably in labor intensive sectors (see RCA indices).

[6] An increase by 27.6% in comparison to 2006.

[7] The numbers in parenthesis correspond to BOP classification used in the Appendix (Table 1).

its share of exports was 3.16% and 2.22% of imports; however a deficit in auxiliary and other air transport services (213) was observable. For other transport services (214) the high surplus was mainly due to large net exports of road transport services (223); its share of total exports was equal to 18.77% and 9.95% of imports.

Trade in the sector of "other services" was much more diversified. In the case of construction services (250) Poland had a very strong competitive position with share of exports equal to 4.61% compared to 1.26% of imports, which was increasing in the recent years. The country has a nearly balanced position in postal and courier services (246) and in cultural and recreational services (289). However one can see that in other subsectors Poland was, in general, a net importer. This was the case of telecommunication services (247) with shares of 1.58% of exports against 2.77% of imports, and reinsurance (257) with shares of 0.03% of exports against 1.01% of imports. However the largest trade deficit can be noted in royalties and license fees (266), since its share of exports was 0.36% and 6.54% of imports. This weak competitive position may be attributed to a low overall level of expenditures on research and development in Poland.

The analysis based on export and import shares is only a crude measure of competitive position. This comparison does not say much on the relative position in comparison to other countries. The

Table 1
Revealed comparative advantage of Poland against EU-25 countries (weighted avg. 2006–2007)

Service sector	Code	RCA
Passenger transport on sea	207	0.5
Freight transport on sea	208	0.8
Supporting, auxiliary and other sea transport services	209	0.6
Passenger transport by air	211	1.0
Freight transport by rail	212	0.7
Supporting, auxiliary and other air transport services	213	0.4
Rail transport	219	3.1
Road transport	223	3.3
Inland waterway transport	227	0.9
Other supporting and auxiliary transport services	232	1.2
Travel	236	1.3
Postal and courier services	246	0.4
Telecommunication services	247	0.6
Construction abroad	250	2.7
Reinsurance	257	0.0
Insurance auxiliary services	258	1.7
Financial services	260	0.1
Computer services	263	0.4
Information services	264	0.3
Merchanting and other trade related services	269	0.2
Miscellaneous business, proffessional and technical services	273	1.0
Audio-visual and related services	288	0.4
Other personal, cultural and recreational services	289	1.1

simplest way of doing it is to analyze the Revealed Comparative Advantage (RCA) index. It has been frequently used in the analysis of merchandise trade and can also be applied to trade in services. Polish revealed comparative advantage (RCA) against the EU 25, can be expressed as the ratio of the share of a specific sector in the total exports of Poland to the share of this specific sector[8] in the total exports of the EU 25. The analysis of Polish revealed comparative advantage in transportation (RCA index: 1.71) and travel (RCA index: 1.26). The high RCA index in transportation is mainly due to road transport. However a comparative disadvantage is recorded in other services (RCA index: 0.59). A more disaggregated RCA indices for Poland are shown in Table 1.

Thus, looking at net trade position and RCAs in different sectors we can state that Poland enjoys comparative advantage in sectors requiring large amounts of low-skilled labour force (road and rail transport or construction abroad) and a weak one in sectors requiring substantial quantities of physical and/or human capital (e.g. financial services). This pattern of trade in services reflects relative factor abundance of Poland against its major partners in the EU and is – in general – in line with neoclassical (Heckscher-Ohlin) theory of merchandise trade.

The liberalization of services in the framework of the Doha Round, may have an impact on trade, admittedly a limited one and mainly concerning trade with non-EU partners. Thus, in assessing the implications of WTO negotiations, we should also describe the pattern of Polish trade with major non-EU partners. The relevant data, illustrating relevant average exports' and imports' shares for 2006–2007, are shown in Table 3 and Table 4 in the Appendix.

The major Polish non-EU imports of transport services come from a few countries only. Imports of passenger sea transport (207) come from Japan, and the United States. For freight sea transport (208) the main partners of Poland are the United States, Taiwan, China, Russia, Hong Kong, Japan and Norway. Finally, in the case of supporting, auxiliary and other transport (209), important non-EU partners are China, the United States, Egypt, Norway and Japan. The main destination of Polish exports in passenger air transport (211) are the United States, Canada, Russia, Switzerland and Israel. Imports in this sector come from the United States, Switzerland, Turkey and Russia. In the case of freight transport by air (212), the key trading partners are the United States, Switzerland, Canada, Japan, China and Brazil for exports and the United States, Russia, China, Switzerland, and Hong Kong for imports. Services in rail transport (219) are mainly traded with Switzerland, Russia, the United States and, to a lesser extent, China (only in the case of imports). Trade in road transport (223) services is mainly carried out with Switzerland, Russia and the United States for exports, and Russia, China and the U.S. for imports.

In the travel sector (236), EU countries dominate the Polish trade as well. However one should mention the United States, Russia and Japan as main non-EU destinations for Polish exports and United States, Croatia, Egypt, Turkey and Switzerland as key countries of services' imports.

The geographical pattern of trade in other services (981) is similar to that in previously described sectors; the EU dominates as well and similar countries are the major non-EU partners. In postal and courier services (246), the biggest non-EU partners are Switzerland and the United States in exports, and the United States, Switzerland, Canada, Russia, Norway and Australia in imports. Polish exports of telecommunication services (247) go mainly to the United States, Switzerland and Canada and imports come from United States, Switzerland and Russia. In the case of construction

[8] Thus a RCA index bigger than 1 means that Poland has a revealed competitive advantage relative to the EU 25.

(250), that is crucial for the Polish comparative position, the key non-EU destinations of exports are Russia, Norway and, to lesser extent, the United States while imports come mainly from Russia.[9]

In the insurance services (253) – mainly reinsurance (257) – the key suppliers to Poland are the United States, Switzerland and Russia, while exports go only to Russia and Switzerland. Trade in financial services (260) is dominated by the Unites States and Switzerland in exports as well as imports. Whereas imports of royalties and license fees (266) are coming from the Switzerland, United States, Japan and Norway, while Polish exports are insignificant. Finally, miscellaneous business, professional and technical services (273) are mainly exported to Switzerland, the United States, Norway, Russia and India while imports in this sector are coming from the United States, Switzerland, Russia, Japan and Israel.

Summing up, Polish trade in services is dominated by EU 25 members. Developed OECD countries such as the United States, Switzerland, Norway, Japan and Canada are other significant partners. The other important trading partners are Russia and Croatia in Europe as well as China, Hong Kong, Israel and Korea elsewhere. Trade with those non-EU countries can be affected by Doha Round liberalization of services trade. Will possible expansion of trade be in line with Poland's revealed comparative advantage? Will these changes reflect the neoclassical merchandise trade theory, based on relative factor abundance?

3. Measuring barriers and tariff equivalents in services trade[10]

The theory of trade in services is fairly new and less elaborated in comparison to developments in the neo-classical or modern theory of merchandise trade. In mid-eighties authors argued that trade in services is similar to trade in goods and the same tools of analysis can be applied (see e.g. Hindley, Smith 1984).

Recent studies and new theoretical developments have shown that, in reality, trade in services is different from trade in goods in many aspects; therefore merchandise trade theories can be applied only to a lesser extent than previously thought. The differences result mainly from the heterogeneity of services. The majority of them are intangible, which means that they can neither be stored nor consumed in the future. Thus, in the majority of cases the "unity of time and place" is necessary, i.e. a transaction is feasible only when the service provider and the consumer are in the same place and time. The close contacts between consumers and producers are therefore frequently needed and require movement of natural persons. Thus, either a consumer must travel to the country in which services are provided (as eg. in the case of tourism) or the service provider should be present in the country where the product is delivered (e.g. construction services).

The other distinctive feature is that many services fulfill an intermediation role or generate network externalities, which happens rarely in the case of goods (Hoekman 2006). Horn and Shy (1996) argue that many services are "bundled" with goods, and that the associated service-input bundle is nontradable in the sense that it must be provided locally. In this case, additional direct investment facilitating labour movements is frequently necessary in order to set up sales office and

[9] Poland has a very large trade deficit in construction services with Russia, and high surplus with EU countries. This pattern of trade reflects relative factor abundance as well.

[10] The review of methods may be found in Chen, Schembrii (2002) and Walsh (2006). An excellent recent review of literature is provided by Hoekman (2006).

provide the service itself (e.g. banking services).[11] On the other hand some services can be traded in a fairly similar fashion to trade in goods, and do not require movement of persons (e.g. legal services provided by the internet). In this context, the effects of services liberalization in some sectors should capture network effects and/or should be related to FDI and factors movements.

Thus, it is fairly difficult to apply the merchandise trade theories to all types of heterogeneous services. In the papers reviewing services' literature (e.g. Whalley 2003 or Hoekman 2006), authors focus on describing the differences between trade in goods and in services or present the empirical results of models analyzing effects of trade liberalization rather than discuss potential theoretical framework for trade in services. According to the authors' knowledge, there is no universal theoretical trade model aiming at describing roots, patterns and effects of liberalization in service sectors.

However, in empirical studies the methods applied are usually similar to those in the standard merchandise trade analysis: the often employed models include gravity models for ex-post analysis or CGE models for ex-ante analysis.[12] Nevertheless, authors of such studies usually have to face the challenge of obtaining a measure of existing trade barriers.

Research regarding measurement of trade barriers in services is fairly recent. In many cases, the approach is similar to those that were previously developed to measure non-tariff barriers (NTBs) to merchandise trade (see e.g. Deardorff, Stern 1998). These measures shall reflect existing restrictions and are equivalent to import tariffs in merchandise trade. The restrictions to market access in a given sector are present in the form of legal or administrative constraints, defining obligations of companies providing services at a given territory, and are usually difficult to quantify.

There are a few methods of estimations of tariff equivalents in services. Broadly speaking, they can be classified as frequency, quantity-based and price-based measures.[13] In all cases the goal is to estimate tariff equivalents, measuring the difference between domestic and world price of a given service stemming from different trade barriers. With such estimates in hand it is possible to analyze trade implications of services' liberalization.

There are several approaches, based on the above-mentioned methods. The simplest, proposed by Hoekman (1995), is based on analysis of services' commitments, undertaken by WTO members in the framework of GATS. The main advantage of this method is its simplicity and comparability among large number of sectors and countries. The main weakness of this method is that it is based on historical commitments from mid 1990's (end of the Uruguay Round) and contains some degree of arbitrariness in defining tariff equivalents. Nevertheless, it is particularly useful in the analysis of services liberation in the framework of GATS.

The second approach is based on detailed sectoral analysis of existing various restrictions. This approach is usually based on sector specific questionnaires completed among service providers. The questions refer e.g. to restrictions regarding regulatory and administrative opacity, explicit barriers to trade and investment, administrative burdens on start-ups, barriers to competition, and state control. Then, those restrictions are weighted and aggregated to

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[11] Thus, the local prices can be largely differentiated due to dissimilar regulations affecting prices of local inputs. In other words, the law of one price may not hold in the case of services. The law of one price says that close substitutes should have the same prices in different locations, adjusted for transport costs and trade barriers.

[12] There are also attempts to use firm-level data to analyze implications of services liberalization. In the recent study Arnold et al. (2006) find that services liberalization in the Czech Republic induces changes in services providing firms and has a significant and positive impact on the productivity of downstream manufacturing firms.

[13] Hoekman (2006) provides an excellent overview of methods used and results of empirical studies.

restrictiveness' indices or tariff equivalents. This approach was used by Warren (2001), who developed Restrictiveness Index Scores for Telecommunications Services.[14] A slightly more refined approach was adopted by ENERPI group (De Bruin, Kox, Lejour 2006). The authors measure regulatory heterogeneity among EU member states. An even more elaborate approach was presented in the Copenhagen Economics' (2005) assessment of restrictions on service provision in the EU countries. In this study, questions regarding existing entry barriers were organized in more than 40 subcategories. Then, authors transformed this qualitative information into a single quantitative measure.

The third approach is based on the gravity model of trade. This methodology has been widely used to estimate NTBs in merchandise trade (Deardorff, Stern 1998). Taking the total difference between actual and predicted trade flows frequently enables an estimation of the importance of tariff equivalents. This procedure has been initially used by Francois (1999) and Park (2002). However, this procedure leads sometimes to an overestimation of the significance of NTBs (it is difficult to distinguish if barriers arise from regulatory or other factors, e.g. physical, from trade barriers not accounted for in the empirical model or from a misspecification of consumer preferences). A possible refinement of the specification of the models is to include an explanatory variable measuring NTBs in the gravity equation (e.g. based on frequency measures, such as Hoekman's). Tariff equivalents are then computed using a benchmark "free trade" reference case, where all NTBs are set to zero. Walsh (2006) presented a study, based on this approach. This methodology requires independent information on NTBs and high quality, detailed bilateral statistics on trade in services.

In our paper we follow the first approach, as proposed by Hoekman (1995). We will use his tariff equivalents in order to estimate the implications of services liberalization in the Doha Round. The choice of the method is driven mostly by data availability: detailed surveys are unavailable for the relevant subset of countries and services trade data are not complete enough to perform a full-fledged econometric analysis. In fact, the results provided by Walsh (2006) and Park (2002) and own authors' attempts to estimate service trade barriers with the available international trade in services data have proven not to be robust to the choice of the estimation technique and there was no clear advantage of estimated trade barriers over the ones provided by Hoekman. Similarly, the extent of the research needed to provide global coverage of the type of study performed by Copenhagen Economics (2005) or Warren (2001) seemed infeasible.

The principles of non discrimination and national treatment are the core rules of GATS. Here, in contrast to GATT, the coverage of national treatment is applied only to sectors listed in country's schedule of commitments, and only insofar as existing measures are nor exempted. In addition the GATS agreement introduces the concept of market access. Its scope is determined by a positive listing of sectors in the WTO schedules of commitments.

A specific commitment is an undertaking to provide market access and national treatment for the service activity in question. Thus, specific GATS commitments have a similar effect to a merchandise tariff binding – they are a guarantee that the conditions of entry and operation in the market will not be changed (will not deteriorate) for foreign suppliers.

[14] The report of Warren (2000) was prepared in the framework of Australia's Productivity Commission.

The General Agreement on Trade in Services distinguishes between four modes of supplying services trade:

- Mode 1: Cross-border supply. It is analogous to trade in goods, and arises when a service crosses a national frontier, for example, air or maritime transport across borders, purchase of software or insurance by a consumer from a supplier located abroad.
- Mode 2: Consumption abroad. It occurs when the consumer travels to the territory of service supplier, for example, purchase of tourism, education, health services, and a visit to a law office abroad.
- Mode 3: Commercial presence. It involves foreign direct investment, for example, when a foreign bank, telecommunications or electricity firm establishes a branch, subsidiary or plant in the territory of another country.
- Mode 4: Movement of individuals. It occurs when independent service providers or employees of a multinational firm temporarily move to another country for business consulting or construction.

Among these modes of supply commercial presence (Mode 3) tends to be the dominant mode of supply for a majority of services, and cross-border trade (Mode 1) is the next most important. Since there are 155 non-overlapping service sectors in the GATS classification list, and for each sector there are four possible modes of supply, a total of 620 possible measures of openness/binding factors exist for each WTO member. As commitments scheduled in GATS apply to national treatment and market access separately, there are potentially 1240 data cells for each Member (620x2).[15] In his paper Hoekman (1995) uses several types of frequency measures. The most important one is the so called "average coverage", which is equal to the sectors/modes listed as a share of maximum possible commitment, weighted by the openness/binding factors (similar to import coverage of non-tariff measures in merchandise trade).

According to Hoekman this measure is reflecting the degree of relative restrictiveness of the services regime, with the assumption that the higher is the coverage of commitments, the more open the regime is. The average coverage enables comparisons of degree of restrictiveness between countries and sectors. Hoekman classifies GATS commitments into three categories and assigns a numerical score to each category:

- If no restrictions are applied for a given mode of supply in a given sector, a value of 1 is assigned.
- If no policies are bound for a given mode in a given sector, a value of 0 is assigned.
- If some restrictions are listed for a given mode in a given sector, a value of 0.5 is assigned.

Hoekman calculates tariff equivalents by first constructing a list of benchmark guesstimates of what tariff equivalents of the most protectionist nation might be. Then the "tariff equivalent" of a given country is obtained by multiplying this guesstimate by (1 minus the Hoekman index). Thus, if the most restrictive country worldwide had restrictions equivalent to a 100% tariff, then a country with a 0.9 restrictiveness index, would have a tariff equivalent of 90%.

The comparison of degree of liberalization in GATS schedules of commitments, as measured by Hoekman indices, reveals significant differences among WTO members. The relevant data are shown in Table 2. The high income countries have undertaken more significant commitments in terms of sectors covered (76%) and in terms of weighted coverage (about 40%). The Uruguay Round

[15] The number of entries varies among the countries since many sectors are not included in the list of commitments of a large number of countries.

Table 2
Averages for specific commitments indicators by country income group as of 1995 (Modes 1 and 3 only)

	Mode of supply							
	Mode 1: cross-border supply				Mode 3: commercial presence			
Income group	All	Low	Middle	High	All	Low	Middle	High
Countries	106	25	47	34	106	25	47	34
Number of commitments	42.0	15.4	31.7	76.0	42.0	15.4	31.7	76.0
Coverage	27.1	9.9	20.4	49.0	27.1	9.9	20.4	49.0
Weighted coverage (WCov)	19.2	5.6	12.2	38.7	20.1	6.1	12.4	41.1
WCov, without financial & telecommunication services	19.1	4.5	12.3	39.3	20.8	4.7	12.8	43.5
WCov, only business services	24.2	2.9	14.9	52.7	27.4	4.7	16.5	59.2

Source: Egger, Lanz (2008), Table 2, p. 23.

liberalization commitments of low income developing countries are much more modest. The average sector number of commitments is 15.4%, while weighted coverage is close to 6%.

The results of Doha Round can be similar to GATS commitments undertaken during Uruguay Round negotiations. At present developing countries discus modalities of special and differential (S&D) treatment, which will enable them to limit the scope of commitments and liberalization of trade in services. In our simulations we will take into consideration this likely outcome of Doha Round in services.

There have been many critiques of Hoekman methodology. Some authors point out that his indices reflect only commitments in 1995 and not real barriers as they exist at present. Others argue that in fact there are many hidden administrative barriers (like opacity of procedures) which can be revealed only through detailed questionnaire based analysis of replies of services' suppliers. Finally the "benchmark" tariff equivalents are based on Hoekman's guess evaluation and not on empirical research. Some of them (for example in passenger air transport sector) are probably much lower today in comparison to mid 1990's.

On the other hand there are some obvious merits of Hoekman indices and tariff equivalents. They are easy to calculate for all WTO members, who have listed their schedules of concessions in GATS.[16] They are comparable between countries and sectors. Finally, they are well suited to analyze the implications of new commitments of WTO members, which will (hopefully) be undertaken at the end of Doha Round.

[16] The Hoekman methodology enables to analyze the level of liberalization for new WTO members, which joined the organization after the completion of the Uruguay Round negotiations in 1994 (like P.R of China).

4. Services trade liberalization – CGE simulations

4.1. Introduction

In order to assess the potential effects of services trade liberalization we employ the commonly used GTAP model, a multi-sector, multi-country computable general equilibrium model. The model and the corresponding GTAP database used here are developed by the Global Trade Analysis Project at Purdue University. The model used is of the version 6.2a that is the most current version.[17]

The general structure of the model is relatively simple.[18] The demand side of the model relies on an assumption of the existence of the regional household that takes all the expenditure decisions within the economy. This entity is allocating expenditures to private consumption, government expenditures or savings.

This structure has very convenient characteristics. The utility function governing the division of expenditures is in fact a social utility function and can be used in the analysis of the changes social welfare caused by changes in economic policy instruments. It has its drawbacks however – the expenditure decisions on the part of government are unrelated to the government budget constraints; the expenditures are allocated according to the total budget constraint of the household and not taking into account the government receipts (therefore the budget deficit is partially financed by a foregone current consumption of the households and foregone savings).

The structure of preferences of the regional household is based on the multiply nested utility function. In the top nest the household decides on the allocation of expenditures between the private consumption, government consumption and savings according to the Cobb-Douglas utility function. The government consumption is a Cobb-Douglas composite of goods coming from different sectors. Private consumption demand is governed by a Constant Difference of Elasticity preferences to account for the non-homothetic nature of consumption demand (see McDougall 2002 for implementation details). Two levels of CES aggregates are used to distinguish domestic from foreign goods and to differentiate the foreign goods by country of origin (a so-called Armington assumption).

Firms produce using the primary factors purchased from the regional household and intermediate goods. The sources of primary factors are purely domestic – it is assumed that factors of production are strictly immobile internationally and mobile within a region (with exception of land and natural resources). Intermediate goods can be either domestically produced and imported and goods coming from different sources are assumed to be imperfect substitutes.

The production function is also a multi-level concept. On the top level, given the factor prices the firm formulates its demand for value added and intermediate goods. It is assumed that no substitution is possible between value added and intermediate goods (Leontief production function). The value added is a composite of skilled and unskilled labour, capital and land together with natural resources. Value added production function is a CES and therefore varying degree of substitution between factors is permitted across sectors.

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[17] As of 17th of January 2010.

[18] For a complete description of the model consult Hertel, Tsigas (1997).

The GTAP database has information on 57 sectors in all of the regions.[19] This data includes information on the production volume, sales both domestic and international, intermediate use and primary factor use. It also contains information about bilateral trade between countries in both goods and services. The database is compiled in a fashion that assures a complete picture of each included country's economy – it constitutes a Social Accounting Matrix (SAM) that assumes that all the expenditures are equal to the incomes of all agents in a region (in other words, all the inflows are equal to the outflows). The services sectors are disaggregated, while – in order to complete the GE model – the remaining sectors are aggregated into agriculture, mining and manufacturing. Version 6 of the database uses year 2001 as a reference year.[20]

4.2. Four scenarios of services liberalization

We run four GTAP simulations demonstrating possible implications of services liberalization. This is a comparative statics analysis: we compare "snapshots" of the world economy before and after liberalization exercises. The indicators shown, reflect the relative changes stemming from the assumed reductions of services trade barriers' tariff equivalents.

In the first scenario ("EU") we assume that liberalization of trade in services occurs only among EU members, according to the Services Directive and further liberalization initiatives leading to a "genuine" internal market with no restrictions (i.e. tariff equivalents equal 0). This liberalization happens independently from the undertakings of the Doha Round. In other words, it is a "non-success" scenario of the Doha negotiations.

The second scenario (called: "100-30-10") should – in our opinion – reflect the short run effects of services liberalization in the Doha Round. Those results are "added" to the first scenario. Here we assume that tariff equivalents of all developed countries will be reduced by 30%. According to authors opinion, it reflects the present stage of negotiations. The revised country offers do not include many significant reductions in service trade barriers. We also assume that commitments and reductions of developing countries will be even more restricted, due to Special and Preferential Treatment. At present, commitments of developing countries represent a 1/3 of commitments of developed ones. In this scenario we assume that tariff equivalents in developing countries will be reduced only by 10%.

The third scenario (called: "100-50-25") is a more optimistic one, and reflects – in our opinion – the long run effects of the successful Doha Round. Here, we assume that the creation of a genuine internal market within the EU is accompanied by significant liberalization in all WTO countries. Namely, we assume that tariff equivalents in developed countries are reduced by 50%, while those in developing ones are reduced by 25%. Those results can be achieved through significant progress in services negotiations and more responsive approach of developing countries. Indeed, in early 1990's some developing countries in Asia and South America realized that unilateral liberalization of trade policy can be beneficial for importers. These results should be treated with caution, since GTAP model is a static one (in this version) and compares only two static equilibria.

[19] The GTAP services sectors do not match BOP statistics sectors, which were discussed in the first section of the paper.

[20] Version 7 of the GTAP database was not yet available at the time when the analysis was carried out.

Table 3
Tariff equivalents used in simulations

Region	Sector										
	Construction	Trade	Other transport	Water transport	Air transport	Communications	Finance	Insurance	Business	Entertainment & other	Non-market services
Poland	10	10	32	94	167	183	25	25	27	14	28
Germany	10	10	32	94	167	183	25	25	27	14	28
UK	10	10	32	94	167	183	25	25	27	14	28
Netherlands	10	10	32	94	167	183	25	25	27	14	28
France	10	10	32	94	167	183	25	25	27	14	28
Italy	10	10	32	94	167	183	25	25	27	14	28
Czech Republic	10	10	32	94	167	183	25	25	27	14	28
Region of EU 15	10	10	32	94	167	183	25	25	27	14	28
Region of NMS	10	10	32	94	167	183	25	25	27	14	28
Switzerland	5	8	25	83	169	181	17	17	28	14	40
Croatia	19	34	48	90	170	190	20	20	45	19	50
Region of Europe	5	13	29	95	167	106	21	21	26	16	26
Russia	23	24	42	93	169	166	31	31	38	16	42
Region of Former USSR	23	24	42	93	169	166	31	31	38	16	42
China	26	35	48	90	170	184	37	37	40	20	48
Japan	5	5	38	85	167	143	25	25	29	7	42
United States	5	5	28	95	168	94	13	13	22	3	42
Mexico	24	21	46	95	169	140	40	40	41	16	31
Canada	6	9	22	92	167	106	18	18	26	20	50
Latin America	25	25	49	95	170	130	35	35	44	19	49
India	34	36	50	95	170	186	36	36	47	19	46
Korea	16	21	46	87	169	181	35	35	36	14	50
Thailand	28	33	40	87	168	188	35	35	42	17	48
Region of Asia	23	35	46	90	169	162	29	29	43	18	45
Turkey	5	34	36	85	166	91	9	9	35	19	42
MENA and Middle East	30	33	49	94	170	179	29	29	43	18	48
Region of Africa	19	18	42	95	170	121	41	41	35	17	36
Australia and Oceania	11	8	41	86	167	182	17	17	25	15	31

Source: calculations based on Hoekman (1995).

The last scenario (called "maximum") is only a benchmark one, and not a viable option. It reflects potential effects of complete liberalization of services trade in all countries. Here we assume, that all tariff equivalents are set at zero level after liberalization. This scenario forms a reference point for comparisons with more realistic and limited results of the Doha Round in services.

The initial levels of tariff equivalents in services are taken from Hoekman (1995) original work. The level of tariff equivalents for groups of countries analyzed in our simulations is calculated as a weighted average.[21] Since not all analyzed countries were listed in Hoekman paper, we

[21] We use GDP levels of countries present in the original Hoekman results as weights.

calculated average tariff equivalents, by taking equivalents of listed countries. For example the tariff equivalents for African countries, Russia and other former Soviet Union countries were based on average equivalents for countries listed in the Hoekman paper. The aggregation to GTAP sectors was made by applying the 2-digit ISIC weights given in the Hoekman's original paper. The results of those aggregation are shown in Table 3. Due to the fact that the actual costs of non-tariff barriers in services trade are not accounted for in the GTAP database, in applying the liberalization scenarios to the world economy as presented by the model we follow the approach that does not require us to recalibrate the global SAM. Namely, we incorporate the liberalization in a change of the iceberg--type transport costs by shocking the GTAP AMS parameter – import augmenting technical change. Quoting model documentation: "Shocks to *ams*(i,r,s) represent the negative of the rate of decay on imports of commodity or service i from region r imported by region s. When *ams*(i,r,s) is shocked by 20%, then 20% more of the product becomes available to domestic consumers – given the same level of exports from the source country. In order to ensure that producers still receive the same revenue on their sales, effective import prices (*pms*) fall by 20%" (Hertel, McDougall, Itakura 2001).

4.3. Simulation results

The import price shock imposed on the modelled world economy leads immediately to an increase of imports of services. In most economies the level of GDP goes up. We can distinguish two major sources of those gains:

1. The demand for exported services goes up in all countries (except the scenario where liberalization is limited only to the European Union).

2. Lower prices of imported intermediate services lead to a decrease in the costs of production of all goods in the economy which further leads to an increase of domestic and export supply.

Simulated changes in the level of real GDP are shown in Table 4. According to our simulation, Polish gains from liberalization amount to 0.5% to 0.9% of GDP. If the liberalization is only limited to the implementation of the Services Directive within the EU, the gains vary from 0.5% GDP for Poland to 1.4% of GDP in the Netherlands. It is worth noting that this distribution of gains depends on the initial share of trade in services in the GDP – i.e. countries with larger trade shares gain more.[22] In the "EU" scenario of liberalization, large services traders are likely to slightly loose if liberalization does not include them (e.g. Switzerland).

In the case of multilateral liberalization (100-30-10), the change in GDP in Poland is greater than in the „EU" scenario. However, the difference is not significant and amounts to roughly 0.1 percentage points of GDP. Only in the case of the unrealistic scenario of complete liberalization, the change in gains between the two scenarios is equal to 0.36 pp. Again, this result comes from the fact that Poland has a relatively low trade share in services compared to other analyzed countries and the share of services trade with third countries in the total Polish international trade of services is not very high either.

[22] Given the calibrated trade shares of the utility functions, countries that trade less than other countries are likely to trade less after liberalization, especially if liberalization is multilateral.

Table 4
Changes in real GDP (in precent)

Region	Scenario			
	EU	100-30-10	100-50-25	Maximum
Poland	0.52	0.62	0.69	0.88
Germany	0.73	0.95	1.10	1.49
UK	0.73	0.93	1.08	1.47
Netherlands	1.39	1.79	2.07	2.79
France	0.58	0.67	0.73	0.92
Italy	0.60	0.77	0.89	1.20
Czech Republic	1.04	1.36	1.58	2.17
Region of EU 15	0.86	1.17	1.38	1.92
Region of NMS	0.89	1.12	1.28	1.71
Switzerland	-0.02	0.50	0.83	1.61
Croatia	0.20	0.67	0.97	1.69
Region of Europe	-0.08	0.70	1.16	2.19
Russia	-0.01	0.42	0.70	1.35
Region of Former USSR	-0.03	0.17	0.46	1.79
China	0.03	0.09	0.20	0.76
Japan	0.00	0.17	0.27	0.53
United States	0.00	0.15	0.26	0.50
Mexico	-0.03	0.15	0.27	0.56
Canada	-0.03	0.35	0.59	1.18
Latin America	-0.02	0.09	0.24	0.92
India	-0.01	0.07	0.17	0.60
Korea	0.01	0.56	0.90	1.67
Thailand	0.06	0.20	0.44	1.64
Region of Asia	0.02	0.19	0.45	1.70
Turkey	0.03	0.28	0.43	0.78
MENA and Middle East	-0.01	0.16	0.39	1.50
Region of Africa	-0.03	0.15	0.40	1.55
Australia and Oceania	-0.03	0.37	0.62	1.22

The scenarios of limited liberalization („100-30-10" and „100-50-25") show relatively low gains for developing countries. It is only in the case of the full liberalization, when these gains amount to more than 1% of the GDP in selected cases.

A drop in prices of imported services cause an obvious increase in Polish imports of services. Table 5 shows the simulated changes in services imports. However, given the relatively low initial level of services trade, the large percentage gains do not translate to large values in absolute terms. The largest imports are concentrated in sectors where the initial level of barriers was the highest – communications, air transport and business services.

Given the multilateral character of liberalization scenarios, the demand for Polish exports is also rising. The simulated changes in exports are presented in Tabele 6. Similarly, as in the case of imports, these changes are large and amount to even 40% in the case of communications services and 20% in the case of air transport and financial services and roughly 10–20% for the remaining service sectors. We can observe also a minor decrease in exports of manufactures in the scenarios of asymmetric liberalization (100-30-10 and 100-50-25) indicating a shift in the specialization of EU countries towards services. The scale of those changes is, however, insignificant.

Table 5
Changes in Polish imports (in percent)

Sector	Scenario			
	EU	100-30-10	100-50-25	Maximum
Agriculture	-0.18	0.31	0.61	1.25
Mining and minerals	0.46	0.72	0.91	1.37
Manufacturing	0.73	0.63	0.58	0.49
Utilities	1.22	0.72	0.44	-0.12
Construction	12.60	14.11	15.20	18.23
Trade	9.75	14.71	18.26	28.10
Other transport	19.37	27.45	33.22	49.00
Water transport	13.89	15.27	16.40	19.89
Air transport	30.25	35.48	39.49	51.03
Communications	76.37	87.76	96.77	124.18
Finance	13.57	16.64	18.80	24.60
Insurance	14.02	17.41	19.82	26.37
Business	19.84	25.12	28.91	39.42
Entertainment & other	13.01	15.04	16.46	20.34
Non-market services	15.44	27.88	36.83	61.57

Detailed changes in the direction of Polish services trade in different sectors for the 100-50--25 scenario are given in Table 3 and Table 4 in the Appendix. One can observe that given the asymmetric character of this scenario, in most sectors the decrease in prices leads to an increase of both imports and exports with other EU members. In particular, changes in the trade volume with selected EU countries and in selected services may amount to over 50%. However, due to the

Table 6
Changes in Polish exports (in percent)

Sector	Scenario			
	EU	100-30-10	100-50-25	Maximum
Agriculture	-0.26	0.02	0.24	0.92
Mining and minerals	-3.87	-1.42	0.24	4.54
Manufacturing	-2.55	-1.27	-0.46	1.35
Utilities	-1.39	-0.54	0.00	1.22
Construction	7.15	7.28	7.46	8.28
Trade	4.57	1.89	0.11	-4.38
Other transport	9.12	7.73	6.99	5.81
Water transport	2.50	1.28	0.54	-1.11
Air transport	25.98	19.61	15.79	8.20
Communications	46.14	42.90	41.30	40.56
Finance	26.07	26.57	27.29	30.71
Insurance	9.76	11.07	12.24	16.31
Business	16.60	14.62	13.41	10.77
Entertainment & other	8.34	9.36	10.20	12.92
Non-market services	19.44	14.26	11.39	6.16

Table 7
Changes in output (in percent)

Sector	Scenario			
	EU	100-30-10	100-50-25	Maximum
Agriculture	-0.17	-0.01	0.10	0.36
Mining and minerals	-1.31	-0.71	-0.33	0.58
Manufacturing	-0.71	-0.29	-0.02	0.58
Utilities	0.00	0.13	0.21	0.40
Construction	0.76	0.52	0.37	0.01
Trade	0.52	0.43	0.38	0.27
Other transport	1.48	0.97	0.66	0.02
Water transport	0.93	-0.33	-1.11	-2.91
Air transport	7.71	2.76	-0.36	-7.05
Communications	-2.35	-3.22	-3.82	-5.31
Finance	-0.18	-0.20	-0.21	-0.22
Insurance	-0.86	-1.30	-1.55	-2.02
Business	-0.12	-0.64	-0.99	-1.88
Entertainment & other	0.93	0.98	1.03	1.25
Non-market services	0.51	0.42	0.37	0.29

low initial volume of trade, they do not translate into significant amounts in absolute terms. The changes in the volume of trade correspond to the extent of bilateral trade liberalization – if a pair of countries experienced a similar initial level of trade barriers, similar trade share in services and similar extent of liberalization, they will increase both the level of exports and the level of imports. However, if liberalization is less symmetric, trade balance will deteriorate in a country that liberalized relatively less. This is especially true in the case of developed-developing countries pairs in the asymmetric scenario such as 100-50-25, where imports from developing countries increase by more than exports to developing countries. In such scenarios, the producers in the developing countries are clearly gaining from the liberalization exercise.

The changes in imported services lead to a decrease in domestic demand for domestically supplied services. However due to an increase in external demand, exports go up. The detailed changes in output are given in Table 7, which shows that the increase in output is mostly concentrated in the road and rail transport sectors. Also, output of construction services is expected to go up, as well as trade and other market services. All these sectors are believed to confirm a comparative advantage of Poland as suggested by the simple RCA indices discussed earlier.

As far as output composition in other countries is concerned, the relevant simulated output changes are given for the 100-50-25 scenario in Table 2 in the Appendix. The output changes are modest in service sectors that to some extent require commercial presence: construction and trade;[23] they correspond to low ratio of service trade shares to output in most countries. On the other side of the range are communications (with the major part of output gains concentrated in the Netherlands), where most countries experience significant changes in output and transport. The

[23] These results change, had the effects of FDI and competition been taken into account. See discussion towards the end of the text for details.

Table 8
Changes in producer prices and wages (in percent)

Sector	Scenario			
	EU	100-30-10	100-50-25	Maximum
Land	-2.11	-0.60	0.40	2.85
Unskilled labour	1.29	0.90	0.66	0.08
Skilled labour	1.50	0.99	0.67	-0.07
Capital	1.30	0.80	0.49	-0.26
Agriculture	0.40	0.39	0.38	0.39
Mining and minerals	0.35	0.29	0.26	0.18
Manufacturing	0.76	0.38	0.13	-0.47
Utilities	0.95	0.57	0.32	-0.26
Construction	0.90	0.46	0.17	-0.52
Trade	0.91	0.42	0.11	-0.66
Other transport	0.47	-0.08	-0.45	-1.34
Water transport	-1.85	-2.71	-3.29	-4.73
Air transport	0.09	-0.51	-0.91	-1.88
Communications	0.50	-0.05	-0.41	-1.31
Finance	-0.14	-0.83	-1.29	-2.42
Insurance	0.57	-0.01	-0.39	-1.32
Business	0.84	0.32	-0.03	-0.86
Entertainment & other	0.84	0.34	0.01	-0.78
Non-market services	1.10	0.62	0.31	-0.43

output changes are more concentrated within the high-income countries, where both the degree of liberalization and the initial service trade share are high. Especially very small open economies such as the Czech Republic or Switzerland are affected by the high output changes.

Table 8 shows simulated changes in producer prices and factor wages. Due to liberalization scenarios, the model economy shows an increase in wages of capital and labour in Poland. This is due to the resource constraint and the fact that the supply of labour is chosen exogenously in our simulations. An increase in wages and costs of capital causes an increase in the costs of production of many services (dampened by the drop in costs of imported intermediates). The increase of costs of production together with an increase of demand for exported services leads to an increase of producer prices of many exported services. A drop in producer prices is shown by the sectors where demand falls due to a shift of consumers towards imported services (e.g. financial services).

Given the drop in prices of exported services and an increase in real wages, the welfare effect of all liberalization scenarios is positive (except for the third countries in the "EU" scenario). The welfare gain measured by the equivalent variation is in most cases positive (simulated gains are given in Table 9). The welfare gains for Poland amount to roughly 0.6–0.7% of the initial level of GDP depending on a choice of scenario (except the "Maximum" scenario). More pronounced welfare gains are expected for countries that are relatively bigger traders of services. In most EU 15 countries the gains amount to more than 1% of GDP. This applies also to some open economies of New Member States (e.g. the Czech Republic).

Table 9
Welfare effects – equivalent variation (in percent of initial value of GDP)

Region	Scenario			
	EU	100-30-10	100-50-25	Maximum
Poland	0.61	0.66	0.70	0.83
Germany	0.77	0.95	1.08	1.44
UK	0.89	1.03	1.14	1.45
Netherlands	1.77	2.09	2.32	2.93
France	0.66	0.71	0.76	0.92
Italy	0.71	0.85	0.95	1.21
Czech Republic	1.33	1.58	1.76	2.26
Region of EU 15	0.98	1.19	1.34	1.77
Region of NMS	1.23	1.35	1.45	1.75
Switzerland	-0.20	0.41	0.80	1.73
Croatia	-0.41	0.62	1.29	2.97
Region of Europe	-0.27	0.50	0.97	2.04
Russia	-0.07	0.42	0.73	1.48
Region of Former USSR	-0.09	0.18	0.50	1.89
China	0.00	0.14	0.30	0.94
Japan	-0.01	0.14	0.25	0.49
United States	-0.05	0.10	0.20	0.43
Mexico	-0.05	0.16	0.30	0.65
Canada	-0.09	0.32	0.59	1.25
Latin America	-0.06	0.11	0.29	1.04
India	-0.04	0.09	0.24	0.78
Korea	-0.03	0.47	0.77	1.48
Thailand	-0.05	0.24	0.57	1.97
Region of Asia	-0.03	0.26	0.60	1.98
Turkey	-0.10	0.26	0.49	1.04
MENA and Middle East	-0.09	0.19	0.50	1.72
Region of Africa	-0.07	0.17	0.47	1.71
Australia and Oceania	-0.08	0.34	0.61	1.28

5. Discussion of results

The reader has to be aware that the presented results, showing a rather modest impact of service trade liberalization, partially stems from the fact that we analyse the matter in a simplified setting, applied previously to merchandise trade data. The model assumes perfect competition in product and service markets. Therefore, the analysis does not encompass the pro-competitive effects of trade liberalization that through tightening of price-cost margins and exploitation of specialization and scale economies may lead to further welfare and production gains. These may not only generate direct welfare gains,[24] but also indirect ones through general equilibrium effects and the intermediate use of services by the manufacturing firms (see, for example, Arnold, Javorcik, Mattoo 2006). Some of other peculiarities of the service sectors are not taken into account. Even with the expansion of electronic provision of services, some types of services requires physical and commercial presence, and modelling of

[24] However, even if those effects are taken into account, as demonstrated by the analysis in Decreux, Fontagne (2006), the simulated gains are small at best, amounting to roughly 0.3% of world welfare in the most ambitious scenario encompassing merchandise, agricultural and service trade liberalization, of which more than half is attributed to service trade liberalization.

that phenomenon requires treatment of foreign direct investment, which the standard GTAP model formulation does not offer. Similarly, the labour endowments in the GTAP model are fixed and labour is immobile internationally and therefore we also ignore the effects of labour migrations which may be important, especially when trade liberalization within the European Union Single Market are concerned. According to Whalley (2003), inclusion of those effects in the theoretical framework could impact both the size and direction of results.

6. Summary

Our simulations demonstrate, that benefits for Poland from liberalization of trade in services are modest and do not exceed one percent of the country's GDP. The welfare gains, resulting from lower prices for consumers, are of similar order. All simulations show that thanks to the liberalization the volume of trade in services will grow significantly (in many sectors up to several dozen per cent), both for exports and imports. They also show that internal EU liberalization of trade in services is more important for Poland in comparison to possible liberalization in the framework of the Doha Round. The increase in global demand will push up sales of construction services and transport, in which Poland has revealed comparative advantage. In some other sectors, like business and communication services, Polish providers of services will decrease their sales.

The results of our simulations shall be treated with caution. The GTAP model in the form employed in this paper does not take into consideration benefits resulting from mark-up reduction (increased competition), movement of natural persons (fourth mode of supply) or increase of foreign direct investments. These results should also be treated as short-run since they do not take into account additional capital accumulation nor trade driven knowledge spillovers. Therefore, the scale of changes could have been more pronounced if other channels of interaction had been considered (increased competition, technological progress, capital accumulation and scale economies).

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Appendix

Table 1
Detailed RCA indices

Partner		Service sector												
		Passenger transport on sea	Freight transport on sea	Supporting, auxiliary and other sea transport services	Passenger transport by air	Freight transport by rail	Supporting, auxiliary and other air transport services	Rail transport	Road transport	Inland waterway transport	Other supporting and auxiliary transport services	Travel	Postal and courier services	Telecommunication services
		207	208	209	211	212	213	219	223	227	232	236	246	247
Australia	exp.	0.0	0.1	0.0	0.2	0.9	0.1	0.0	0.0	0.0	0.0	0.2	0.8	0.0
	imp.	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.1	0.0	0.0	0.0	**1.1**	0.1
Brazil	exp.	0.0	0.1	0.0	0.0	**2.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	imp.	0.0	0.1	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Canada	exp.	**1.6**	0.5	0.1	**4.3**	**3.7**	**6.5**	0.2	0.3	0.0	0.0	0.5	0.8	**1.5**
	imp.	0.0	0.1	0.1	0.5	0.4	**1.6**	0.1	0.1	0.0	0.0	0.4	**1.9**	0.2
Switzerland	exp.	0.6	**3.3**	**1.6**	**1.1**	**4.7**	**1.8**	**3.9**	**6.2**	**1.5**	**3.4**	0.3	**14.2**	**3.2**
	imp.	0.0	1.0	0.9	**5.0**	**3.0**	**2.1**	**1.1**	1.0	0.0	0.9	0.8	**10.7**	**1.3**
China	exp.	0.0	0.4	0.6	0.3	**2.3**	**1.2**	0.2	0.1	0.0	0.0	0.0	0.4	0.0
	imp.	0.0	**2.1**	**12.5**	0.1	**4.5**	0.0	**1.0**	**1.8**	0.0	**3.6**	0.3	0.6	0.2
Egypt	exp.	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	imp.	0.0	0.1	**3.7**	**1.8**	0.5	0.2	0.0	0.0	0.0	0.0	**1.9**	0.0	0.5
Hong Kong	exp.	0.0	0.4	0.3	0.1	0.5	0.4	0.1	0.1	0.0	0.6	0.0	0.0	0.1
	imp.	0.0	**1.2**	0.6	0.0	**1.5**	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.2
Croatia	exp.	0.0	0.1	0.0	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.2
	imp.	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	**2.1**	0.0	0.8
Israel	exp.	0.0	0.1	0.0	**1.1**	0.2	0.2	0.1	0.1	0.0	0.0	0.3	0.8	0.1
	imp.	0.0	0.8	0.0	0.1	0.2	0.5	0.0	0.1	0.0	0.0	0.2	0.0	0.3
India	exp.	0.0	0.1	0.2	0.5	0.4	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	imp.	0.0	0.1	0.0	0.1	0.4	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.4
Japan	exp.	**10.1**	0.2	0.1	0.2	**2.5**	0.1	0.1	0.1	0.0	0.0	0.8	0.8	0.1
	imp.	**16.3**	1.0	**1.4**	0.1	0.9	0.0	0.3	0.4	0.0	0.0	0.1	0.0	0.0
Republic of Korea	exp.	0.0	0.3	0.1	0.4	0.5	**1.0**	0.2	0.1	0.0	0.4	0.2	0.0	0.0
	imp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norway	exp.	0.0	**1.6**	**5.0**	0.2	0.5	**3.6**	0.7	0.9	**1.1**	**3.0**	0.6	0.8	1.0
	imp.	0.0	0.9	**1.7**	0.2	0.6	0.2	0.3	0.6	0.5	0.2	**2.0**	**1.1**	0.6
Russian Federation	exp.	0.0	**1.3**	0.5	**3.5**	0.9	**5.7**	**2.2**	**2.7**	0.0	**2.9**	**2.0**	0.0	0.9
	imp.	0.0	**1.8**	0.0	**1.1**	**5.0**	0.6	**8.0**	**6.1**	0.0	0.2	0.7	**1.1**	**1.1**
Turkey	exp.	**1.9**	0.2	0.3	0.3	0.4	**2.3**	0.3	0.3	0.0	0.1	0.1	0.0	0.1
	imp.	0.0	0.4	0.1	**1.8**	0.8	0.2	0.3	0.8	0.3	0.2	**1.1**	0.0	0.5
Taiwan	exp.	0.0	0.5	0.0	0.0	0.7	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0
	imp.	0.0	**2.3**	0.0	0.0	**1.1**	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.1
United States	exp.	0.6	**25.6**	**5.2**	**29.5**	**13.0**	**21.1**	**1.8**	**2.1**	0.0	**4.6**	**3.0**	**10.3**	**7.2**
	imp.	0.9	**18.5**	**8.4**	**8.7**	**5.7**	**40.7**	**1.5**	**1.4**	0.5	**1.6**	**4.5**	**10.1**	**11.0**

Table 1 – cont.

Partner	Service sector											
	Construction abroad	**Reinsurance**	**Insurance auxiliary services**	**Financial services**	**Computer services**	**Information services**	**Merchanting and other trade related services**	**Miscellaneous business, proffessional and technical services**	**Audio-visual and related services**	**Other personal, cultural and recreational services**	**Franchise and similar rights**	**Other royalties and fees**
	250	**257**	**258**	**260**	**263**	**264**	**269**	**273**	**288**	**289**	**891**	**892**
Australia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.2	0.0	0.0
Brazil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0
Canada	0.0	0.0	0.0	0.1	0.8	0.0	0.0	0.5	0.3	0.9	0.0	0.0
	0.1	0.1	**1.2**	0.5	0.3	0.3	0.6	0.8	0.3	**1.4**	0.0	0.2
Switzerland	0.8	**22.5**	**5.2**	**3.0**	**3.5**	**1.1**	**13.0**	**10.3**	**4.6**	**8.4**	0.0	**10.3**
	1.0	**2.8**	**2.7**	**6.5**	**4.0**	**3.9**	**10.8**	**4.7**	**11.9**	**3.1**	**4.4**	**14.6**
China	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.9	0.0	0.0	0.4	0.1	0.0	0.2	0.0	0.0
Egypt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.6	0.0	0.0
Hong Kong	0.0	0.0	0.8	0.1	0.8	0.0	0.1	0.1	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.0	0.0
Croatia	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.5	0.0	0.0
Israel	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.5	**2.2**	0.0
	0.1	0.1	0.0	0.1	0.2	0.3	0.0	0.2	0.3	0.2	0.9	0.0
India	0.0	0.0	0.4	0.0	0.2	0.0	0.2	**1.1**	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.3	0.0	0.0	0.0	0.0
Japan	0.0	0.0	0.7	0.0	0.3	0.0	0.1	0.1	0.3	0.5	0.0	0.0
	0.0	0.2	0.0	0.2	0.1	0.0	0.2	**1.1**	0.0	**1.4**	0.0	**2.2**
Republic of Korea	0.1	0.0	0.0	0.0	0.0	0.0	**1.7**	0.1	0.3	0.2	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norway	**11.4**	0.0	0.6	0.6	0.1	0.0	**3.6**	**1.7**	0.7	0.5	0.0	0.0
	10.7	0.0	0.7	0.6	0.2	**3.0**	**1.2**	0.6	0.4	0.6	0.9	**1.8**
Russian Federation	**11.5**	**38.0**	**2.8**	0.6	**1.0**	**1.5**	**1.1**	**1.6**	0.3	0.5	0.0	**1.2**
	40.6	**1.6**	0.7	0.3	0.6	0.3	**3.9**	**1.2**	0.2	0.0	0.9	0.1
Turkey	0.7	0.0	0.0	0.3	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
	0.2	0.0	0.0	0.5	0.0	0.0	0.4	0.2	0.0	0.2	0.0	0.0
Taiwan	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.3
	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0
United States	**1.1**	0.0	**3.6**	**12.2**	**19.9**	**1.9**	**3.5**	**6.0**	**6.1**	**7.7**	0.0	**22.5**
	0.4	**8.9**	**1.2**	**9.6**	**14.0**	**13.4**	**5.5**	**5.4**	**16.8**	**16.1**	**4.4**	**14.1**

Notes:
Values in the table are in percent; values exceeding 1% are marked in bold.
For each country the upper value is the share in exports, and the lower is the share of imports.

Table 2
Changes in output

Country	Sector										
	Construction	Trade	Other transport	Water transport	Air transport	Communications	Finance	Insurance	Business	Entertainment & other	Non-market services
Poland	0.37	0.38	0.66	-1.11	-0.36	-3.82	-0.21	-1.55	-0.99	1.03	0.37
Germany	0.45	0.45	-2.93	-1.40	-6.57	-0.18	0.32	0.26	-0.88	0.06	0.56
UK	0.87	0.26	-1.64	-2.64	-2.83	-0.47	1.23	1.56	0.38	0.45	-0.10
Netherlands	4.89	0.53	-3.62	-1.36	29.02	4.56	-1.85	1.90	-2.35	1.94	1.03
France	0.94	-0.14	-1.42	-1.32	-5.36	-1.75	-0.17	1.05	-0.76	0.92	0.45
Italy	1.02	-0.11	0.18	3.38	11.56	-0.47	-0.65	-1.28	-0.48	0.75	0.38
Czech Republic	0.36	0.67	-0.71	-5.01	4.59	0.87	-1.80	-3.42	-1.10	1.74	0.94
Region of EU 15	1.36	0.27	1.94	-1.23	5.27	-0.39	-1.92	-3.57	-3.84	-0.12	0.77
Region of NMS	1.61	-0.04	-0.10	-5.42	-2.79	-0.57	-0.74	-0.84	-0.55	2.61	0.87
Switzerland	0.76	0.05	-4.82	-8.15	-5.75	-3.34	-0.43	-0.25	-1.07	0.04	0.70
Croatia	2.86	0.59	0.74	-3.44	-13.72	-0.07	-2.12	-4.03	-0.37	-0.04	-0.17
Region of Europe	1.35	0.27	-0.72	-3.04	-6.22	-2.02	-0.09	-1.36	-2.66	-0.06	0.30
Russia	-0.04	-0.12	-1.56	-7.24	-8.23	-2.70	0.18	0.32	-0.46	0.16	0.43
Region of Former USSR	-0.27	0.13	0.08	-3.75	-7.81	-0.70	-0.19	-0.17	-0.50	0.33	0.47
China	-0.05	1.81	0.42	-4.04	-5.13	-0.96	0.62	-0.61	1.08	0.15	0.27
Japan	-0.17	0.01	-0.48	-1.49	-10.72	-0.83	-0.18	-0.25	-0.76	0.00	0.06
United States	-0.32	-0.01	-1.73	-2.62	-7.69	-1.11	-0.11	-0.13	-0.50	-0.20	0.15
Mexico	-0.18	0.04	0.10	-1.49	-4.43	-1.24	0.24	-0.89	-0.13	0.19	-0.10
Canada	0.31	0.12	-0.99	-4.46	-6.74	-3.45	-0.59	-1.61	-1.73	0.66	0.36
Latin America	-0.26	0.14	0.25	-9.61	-7.72	-0.95	-0.01	0.29	-0.01	0.60	0.17
India	-0.04	0.27	0.24	-1.55	-1.76	-0.07	0.03	-0.09	3.84	0.10	0.10
Korea	0.42	0.22	0.16	7.46	-2.91	-1.36	0.36	0.63	-1.75	0.47	0.53
Thailand	0.71	0.59	0.02	-6.80	-6.25	-1.48	0.12	-0.89	0.43	0.90	0.19
Region of Asia	0.47	0.62	-0.18	-5.07	-7.06	-1.34	0.06	0.48	2.06	0.51	0.33
Turkey	-0.30	0.71	-0.02	-6.44	-8.98	-2.36	-0.72	-1.96	0.47	2.73	-0.15
MENA and Middle East	0.31	0.45	0.73	-4.50	-5.62	-0.79	0.27	-0.80	0.14	0.15	0.08
Region of Africa	-0.03	0.06	-0.08	-8.66	-7.44	-1.51	0.19	0.61	-1.36	0.00	0.20
Australia and Oceania	-0.02	0.10	-0.76	-2.85	-6.98	-2.18	-0.11	-0.58	-0.92	0.54	0.31

Table 3
Detailed exports from Poland

Country	Sector										
	Construction	**Trade**	**Other transport**	**Water transport**	**Air transport**	**Communications**	**Finance**	**Insurance**	**Business**	**Entertainment & other**	**Non-market services**
Germany	11.74	-0.93	27.06	13.94	32.68	41.56	37.54	30.97	22.63	18.43	22.81
UK	10.43	8.10	23.53	34.97	40.93	82.44	45.20	34.81	28.55	15.46	25.02
Netherlands	21.04	1.61	31.27	13.70	28.98	36.57	41.09	20.62	23.62	16.44	13.99
France	11.42	5.54	30.16	14.07	41.15	88.59	39.53	33.46	27.83	20.44	27.54
Italy	12.97	5.49	23.95	12.69	4.52	31.25	44.12	21.72	25.11	16.73	23.65
Czech Republic	11.23	8.17	30.16	51.19	8.68	87.00	33.12	26.18	26.44	19.29	28.73
Region of EU 15	15.80	8.51	30.97	39.71	40.73	76.60	36.26	26.74	23.50	19.23	31.13
Region of NMS	13.43	6.18	32.71	41.96	31.47	83.65	38.36	30.71	27.02	13.22	26.05
Switzerland	1.02	-2.05	1.86	3.38	-1.15	26.44	17.51	1.83	5.49	5.02	1.30
Croatia	5.59	1.47	9.09	25.97	-14.03	36.79	20.73	14.70	5.02	7.91	4.64
Region of Europe	4.45	-1.73	-0.92	-13.50	-6.85	7.31	17.16	4.45	-1.37	-2.39	2.12
Russia	2.20	-1.67	3.84	7.40	11.47	27.75	9.60	-3.52	-4.80	5.79	0.00
Region of Former USSR	0.69	-0.58	4.57	13.38	0.02	15.80	10.68	5.80	2.50	-0.74	0.01
China	1.34	3.31	3.61	11.28	7.99	15.06	10.25	4.18	0.48	2.62	0.15
Japan	1.13	-4.52	3.00	-13.11	5.13	29.00	14.51	10.48	6.66	4.85	-0.62
United States	-2.06	-7.17	5.12	24.43	13.60	24.76	15.02	9.11	5.70	3.00	2.65
Mexico	-1.79	-2.96	6.46	28.52	11.77	29.72	15.34	4.23	5.29	5.34	0.96
Canada	0.71	-3.55	4.11	16.87	15.56	26.01	10.32	5.31	2.45	4.46	-1.04
Latin America	0.26	-2.13	2.28	1.43	2.33	11.93	10.70	5.25	2.78	2.21	-0.59
India	-0.55	-1.38	-0.29	-7.39	-15.16	3.27	10.97	1.60	-3.66	2.76	-3.33
Korea	1.45	-4.49	-1.71	-12.66	-11.91	16.34	18.71	7.14	1.72	5.10	2.16
Thailand	0.34	-3.18	2.16	4.14	1.96	12.13	10.98	2.25	0.18	3.42	0.02
Region of Asia	1.83	-1.66	1.73	2.98	-1.07	11.23	11.14	4.63	1.52	3.76	0.06
Turkey	2.30	-1.98	-3.47	0.42	3.24	21.23	9.51	-0.35	4.32	4.31	-1.17
MENA and Middle East	1.38	-1.49	1.26	5.22	-2.39	17.43	11.08	4.86	2.78	3.24	0.19
Region of Africa	0.44	-2.00	3.58	8.26	2.15	15.05	10.61	4.73	0.95	2.29	-0.62
Australia and Oceania	0.08	-4.46	2.86	-6.48	10.00	23.56	16.49	8.88	5.25	4.11	0.36

Table 4
Detailed imports to Poland

Country	Sector										
	Construction	Trade	Other transport	Water transport	Air transport	Communica-tions	Finance	Insurance	Business	Entertainment & other	Non-market services
Germany	11.59	8.79	34.18	14.33	21.37	86.67	31.19	24.42	24.00	18.36	29.18
UK	10.62	6.03	29.26	6.49	24.66	76.15	28.18	26.32	25.29	19.44	27.12
Netherlands	5.57	1.49	23.76	-2.93	64.39	91.50	18.09	18.57	19.54	15.67	16.72
France	11.84	6.09	31.94	2.77	23.13	73.90	31.39	25.14	24.83	17.20	27.64
Italy	8.50	3.83	28.55	16.95	41.45	74.71	22.48	18.73	20.00	14.58	23.05
Czech Republic	11.15	6.95	30.82	-7.24	20.43	75.52	32.01	27.57	24.79	18.32	25.48
Region of EU 15	14.69	12.71	46.59	7.80	37.32	80.37	-4.04	-4.24	15.94	15.36	36.36
Region of NMS	10.30	5.59	30.18	-5.65	21.67	75.30	27.96	24.15	24.47	19.52	26.05
Switzerland	-5.18	-6.19	-6.19	-39.45	-29.55	-3.24	-6.22	-7.71	-1.50	3.18	7.97
Croatia	5.12	14.73	5.36	-46.02	-35.15	-8.13	-9.17	-11.89	8.04	1.42	7.98
Region of Europe	-6.90	-2.04	0.28	-34.25	-25.08	-15.76	-3.80	-4.55	-4.37	2.18	-3.88
Russia	13.98	12.42	6.32	-43.77	-33.91	-4.89	13.14	6.95	14.80	5.58	11.89
Region of Former USSR	13.22	9.68	5.37	-44.25	-34.90	-6.68	5.50	2.25	5.51	4.35	9.54
China	15.44	18.66	8.52	-43.38	-34.48	-4.91	10.90	7.10	6.23	7.71	13.35
Japan	-4.37	-8.84	4.11	-38.00	-31.81	-8.38	3.31	-0.36	0.38	-3.97	11.09
United States	-3.22	-7.72	-1.28	-42.06	-32.04	-16.95	-7.16	-9.96	-4.13	-6.97	13.04
Mexico	15.76	8.01	9.31	-42.97	-34.04	-9.84	14.70	10.45	8.25	5.04	3.45
Canada	-1.85	-3.19	-6.94	-39.52	-32.94	-14.73	0.30	-5.06	-0.02	10.89	17.60
Latin America	15.30	10.68	10.82	-41.78	-33.68	-11.06	9.51	5.76	9.39	7.59	14.66
India	21.51	17.63	11.43	-43.52	-33.81	-5.54	7.67	4.51	9.69	5.75	10.07
Korea	5.65	7.33	6.91	-19.47	-24.83	-0.22	8.28	5.47	3.35	5.31	13.75
Thailand	17.71	16.20	3.78	-43.58	-34.90	-4.92	8.35	4.88	7.30	4.47	13.17
Region of Asia	12.65	17.18	7.18	-42.40	-33.58	-7.43	3.55	1.11	9.22	4.65	10.40
Turkey	-6.52	17.22	0.59	-42.65	-34.42	-19.66	-11.00	-13.13	3.27	7.32	8.57
MENA and Middle East	19.05	15.98	8.11	-43.07	-35.12	-6.33	3.90	0.71	6.98	5.30	13.23
Region of Africa	10.21	4.25	6.35	-43.86	-34.23	-13.56	13.73	9.69	3.69	5.34	6.21
Australia and Oceania	2.81	-3.96	7.76	-36.72	-32.10	-1.99	-3.65	-6.99	-1.27	5.42	3.87