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EU-Migration in the Context of Liberalizing Agricultural Markets

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1. Introduction

1.1 Problem Statement

In the last decades migration has become an increasingly regarded topic in economic research in line with the growth of the world's migrant population which more than doubled in the 1960s and 1990s (ILO, 2002). Presently, according to ILO estimates there are 30 million migrants in Europe alone. Driven by the forces of regional integration (NAFTA, EU etc.) and globalization particularly labor market development is affected by job searching migrant flows and is therefore subject of various migration studies. Particularly now - in the light of the forthcoming EU Eastern enlargement with 10 middle and eastern European countries accessing the Union – migration gains importance in research even more. With respect to these future developments several studies have been carried out analyzing various issues, like migration incentives or future migration flows in an enlarged EU.

Nevertheless there are two topics concerning this issue which remained rather unstudied so far: First of all there exists some lack of knowledge about the coaction of migration and one of the most prominent factors of regional integration – trade and therewith trade liberalization. After the accession process trade flows within the EU-25 are supposed to increase as a result of the reduction in trade protection. But while the liberalization of trade in goods is already discussed at length the implications of free movement of labor has proceeded much more slowly. This represents the second point requiring further research. Until today the efficiency costs of labor market interventions and distortions are for example not very well understood. Accordingly, a highly controversial debate on whether labor markets should be included in the process of globalization is still underway. Advocates believe labor market restrictions to be a major impediment to effectively participate in the global economy and to more sustainable growth of output and employment. They also assume that gains from agricultural liberalization are reduced or even compensated due to labor market restrictions. Critics on the other side consider globalization to be the cause of the desolate situation on

labor markets in many countries and are consequently reluctant to abandon the labor market interventions.

It therefore seems to be crucial to consider more intensively the labor market and therewith migration when globalization and/or regional integration is analyzed. In the case of an enlarged EU it is furthermore important to focus particularly on the role of the agricultural sector. Since in the candidate countries there is still a high share of workers employed in agriculture it can be assumed that there exist mutual tendencies between agricultural and labor markets. Regarding the forthcoming heavy adjustments of Eastern agriculture to the EU's CAP strong impacts not only on agriculture but also on the labor markets will occur. In order to reflect the economic developments in the candidate as well as in the current EU member countries as realistic as possible the simulations carried out in this paper comprise a very detailed modeling of the agricultural market and furthermore incorporate migration flows. The purpose of the different simulations is to point out the relevance of migration issues in the course of regional integration and its influence on the different production sectors.

1.2 Structure of the Paper

The first part of the second chapter surveys various migration theories. Thereafter, in the second part of this chapter an overview about recent modeling approaches incorporating these theories is represented. A general and very brief introduction of GTAP and its data base is included in the third chapter. The fourth chapter provides an overview about the model design used for the final experiments including preparative simulations, extensions added to the standard GTAP modeling framework etc. The corresponding results and some concluding remarks are then presented later in chapter 5 and 6. Chapter 7 comprises short-comings and limitations of the study.

2. Modeling Migration

With people migrating being an issue scientists are engaged in since a long time there exist various attempts to analyze migration incentives and to predict migration flows inclusive its economic impacts. Depending on the time period this lead to the development of several theories. The following section comprises a survey of some of the most prominent theories outlining their basic aspects. In the second part of this chapter CGE studies are represented where some of those theoretical approaches found application.

2.1 Migration Theories

Classical and Neoclassical Theory of Migration

The first one who turned his attention to migration as an economical relevant issue was Adam Smith. He is the founder of the classical migration theory suggesting migration to be caused by differences in supply and demand for labor in different regions.

In the next period this classical approach was modified by modern scholars, among others HARRIS AND TODARO, developing the Neoclassical Theory of Migration. According to this theory HARRIS AND TODARO (1970) state that migration is induced by an urban-rural (this can also be seen as home-foreign) wage differential. As a result of the migration process, labor supply decreases and wages rise in the home country and – vice versa - labor supply increases and wages decline in the country of destination. This movement leads to the so-called HARRIS-TODARO Equilibrium where the remaining wage differential reflects merely the costs of migration. Consequently, in this equilibrium situation no migration activities occur anymore since there is no incentive to migrate. In their approach they assume a positive relationship between unemployment and urban wage. HARRIS AND TODARO formulate a two-sector model of rural-urban migration modeling the urban-rural wage differential and unemployment via a minimum wage policy. The minimum wage rate determines the urban

wage at levels significantly higher than agricultural earnings. Thus, the urban employment rate takes the part of the equilibrating force on migration.

In their paper HARRIS AND TODARO use the model to explain why rural-urban migration in spite of unfavorable external conditions represents an economically rational choice for the individual migrant. Furthermore they show that standard policy prescriptions of generating urban employment opportunities can even excerbate the problem of urban unemployment instead of leading to an improvement. The main part of their study is an argumentation about an adequate policy package associated with the problems of unemployment and migration.

Even though this Neoclassical Theory takes already some more features into account than the former classical approach did, it has several limitations. First of all, it is assumed that labor is completely interchangeable between the regions of origin and destination; i.e. there is no distinction between different skills taken into consideration. At the same time there is full employment maintained during migration in both regions. Secondly, with respect to the determinants and incentives of international migration, the Neoclassical Theory eliminates any influence of the international political and economic environment, as well as the effects of political decisions on individual decision-making.

New Economics of Labor Migration (NELM)

Regarding those limitations of the Neoclassical Theory new alternative theories emerged. The most recent one is the so-called New Economics of Labor Migration (NELM) theory. This modern approach focuses on the micro-level and assumes that migration decisions are not made by one individual, but by a group of people who act collectively (e.g. a family or a household). Moreover, the aim of such a community is not only to maximize profits, but also to minimize risk associated with a variety of market failures. According to the NELM approach, the migration of one or more members of the group in order to work in another country where wages and employment conditions remain largely unaffected by local

economic conditions represents a kind of social insurance. Consequently, with regard to the NELM theory migration can occur even in the absence of a wage differential between the home country and the country of destination.

Dual Labor Market Theory

A more macro-based approach is represented by the Dual Labor Market Theory. From a macro perspective migration is considered to be mainly the result of international forces exceeding individual choice and therefore determine individual decision-making. More precisely, the Dual Labor Market Theory states that a permanent demand for foreign labor in advanced industrial economies is responsible for migration. The reason for the structural demand for unskilled labor is a segmented labor market resulting from the coexistence of a capital-intensive primary sector and labor-intensive secondary sector. The primary sector is characterized by stable well-paid, skilled jobs, whereas in the secondary sector workers rather hold unstable, unskilled jobs. Accordingly, wages not only reflect the supply and demand situation, but also confer status and prestige. Since native workers have no incentive to get employed in those unstable jobs of the secondary sector, vacancies in that sector remain unfilled because of a labor supply shortage. In order to overcome this shortage foreign workers are hired.

2.2 Applications

Harris-Todaro Extensions

In several CGE models an extended Harris-Todaro approach is used, characterized by the assumption that migration takes place up to the point where the expected urban wage equates to the rural wage. In the extended form an additional parameter is implemented to reflect some external restrictions on migration incentives. According to FIELDS (1975) migration incentives are negatively influenced by the fact that the migrants' chance of finding

an urban formal job is lower than for persons who already work in towns searching for jobs. On the other hand CORDEN and FINDLAY (1975) and also LUCAS (1997) interpret this parameter simply as the farmers' risk aversion to migrate.

Rather a modification than an extension of the Harris-Todaro approach is represented by BLANCHFLOWER and OSWALD (1994). In their paper they include the so-called efficiency wage theory in the Harris-Todaro approach. In contrast to the Harris-Todaro assumption this theory assumes that wage rate and unemployment has a negative relationship. Accordingly, they link urban wage rate and urban unemployment in an additional equation.

Using both modifications BANSE (1998) analyses the impact of an EU-Accession on Polish and Slovene internal migration flows and therewith on agricultural employment. For this purpose he uses a dynamic multi-sector AGE model for Poland and Slovenia assuming constant returns to scale and perfect competition. In this model intra-industry trade occurs in five different markets (domestic market, markets for imports from the EU-15 and the rest of the world, markets for exports to the EU-15 and the rest of the world) and the corresponding effective trade barriers are represented by an ad valorem tariff equivalent.

In his analysis BANSE compares different EU-accession scenarios with a non-accession scenario involving the phasing-out of all quantitative restrictions on trade-like import quotas. This scenario represents the basis for a total abolishment of bilateral tariffs and export subsidies between the EU-15, Poland and Slovenia except for the trade in agricultural goods.

Against this background two different experiments are carried out. The first simulation involves an analysis of an EU-accession only implying an increase in efficiency and the inflow of structural aid from Brussels to Poland and Slovenia. Similar to the basic non-accession scenario there is no integration of the Polish and Slovene agricultural sector assumed. Finally, in the second experiment the adoption of the CAP by both CECs is simulated. Hereby, a CAP reformed by the proposals of the AGENDA 2000 is assumed.

The results achieved concerning labor market relevant issues, like wages and income, differ with respect to scenario and country. However, summarizing it can be said that the effects in Poland are more significant than in Slovenia and with regard to the scenarios particularly the CAP-inclusion "is responsible" for the strongest impacts. In both regions the adoption of the CAP leads to an increase in rural household income while blue collar wages remain constant and the value-added in agriculture decreases. This is the result of the current CAP system keeping more labor force in this sector and reducing the pressure to a more efficient structure.

Trade Policy and North-South Migration

FRANCOIS and NELSON (1997) focus on the connection between trade and migration. They assume that migration incentives are particularly based on the perspective to improve relative per-capita welfare and/or real relative wages. In a trade model framework comprising two large countries (Home and Foreign) and two different products with one being labor and the other one being capital intensive, they consider differential rates of population growth. Population growth is assumed to be equal to labor force growth and is identified via a certain term. With this background they examine both welfare- and wage-induced migration. For migration flows from the foreign to the home country based on general conditions of overall economic welfare they specify a certain migration function incorporating a time lag mechanism. With unskilled labor wages being higher in the home country migration is based on this divergence between both regions. Thus, a migration elasticity determines the share of the foreign country's unskilled labor force that chooses to migrate.

From this starting-point FRANCOIS and NELSON conduct basically 3 experiments in two different economic situations with the first one assuming fixed capital and the second one allowing for capital accumulation in both countries. With this background their respective simulations involve a benchmark simulation with welfare migration from foreign to home

without any policy response from the home region. In the second and third "round" they include a tariff reduction and capital transfers by the home country respectively.

Their results concerning the pattern of induced migration are similar under both specifications (fixed capital and capital accumulation). Tariff reduction as well as capital transfers lead to an initial drop of the number of migrants over a 25 year period. With respect to the wages of skilled and unskilled labor in the country of destination the impacts on the two skill level differ. While the influence on skilled labor is rather moderate in all scenario unskilled labor suffers due to wage erosion. Particularly in the case where capital is fixed unskilled wages go down immediately after the implementation of capital transfers. Under the capital accumulation assumption these effects only occur in the long run since in the medium term terms of trade effects dominate. In the tariff reduction scenario the pressure on unskilled workers' wages in the home region only experience moderate effects which is valid in both fixed and endogenous capital specifications. This is because the migration accelerating term of trade gains of protection are removed by trade liberalization.

NAFTA and Migration

An analysis about wage changes in a U.S.-Mexico Free Trade Area is provided by BURFISHER, ROBINSON AND THIERFELDER (1994). In order to examine the impacts of migration as well as the impacts of changes in output prices on wages, they develop an analytical trade model including both the production links between factor prices and output prices and specific migration equations. Furthermore the model comprises 3 regions (United States, Mexico and the rest of the world) and 11 production sectors. Regarding the migration part of the model BURFISHER, ROBINSON AND THIERFELDER consider three different migration flows comprising international as well as internal migration: rural Mexican to rural U.S. labor markets, urban unskilled Mexican to urban unskilled U.S. labor markets, and finally internal migration within Mexico from rural to unskilled urban labor markets. Segmented labor

markets restrict rural labor not to get employed in the industrial sectors and urban labor in agriculture. Consequently these labor markets have their own separate migration equations. Furthermore, what concerns the international part they assume linked labor markets in the two countries measured in a common currency. In equilibrium international migration flows adjust to maintain a specified ratio of real average wages between the U.S. and the Mexican labor markets. Thus, in each country labor supply for each skill category adjusts via the migrant labor flow. Accordingly Mexico's internal migration regulates a certain ratio of real wages between the rural and unskilled urban labor markets.

Against the background of trade liberalization they conduct 5 different experiments including 1 basic scenario, 2 migration and 2 Stolper-Samuelson related scenarios and 1 comparative experiment. Focusing on the effects induced by migration flows the simulation results confirm its influence in the case of removed trade barriers. For example, while trade liberalization without migration taking place leads to a fall in rural wages in Mexico and at the same time to an increase in the rural wages in the US the situation is reversed under the assumption of Mexican internal and international movement of labor. Because of the declining labor supply in Mexico rural wages rise, and conversely in the US rural wages get eroded due to an increased work force. Regarding urban unskilled labor markets with Mexican workers moving both from rural areas to urban areas in Mexico as well as from urban areas in Mexico to urban areas in the US the effects are more complex. On the Mexican side one can observe an up-ward pressure on urban unskilled wages. This is the result of the combination of an emerging net decline of the supply and an increase in demand of urban unskilled labor. In contrast the increased migration leads to small wage declines for rural and urban unskilled labor in the US.

GMig

WALMSLEY and WINTERS (2002) examine effects and costs of restrictions on the movement of natural persons. They assume that those barriers impose costs on countries that are even larger than that of trade restrictions on goods. In their paper they conduct an analysis about the benefits from increasing the quotas on both skilled and unskilled labor to 3% of a country's own labor force.

For their analysis they develop a CGE model, referred to as GMig, which is based on the GTAP Model (HERTEL 1997). The model includes a very detailed modeling of migration issues. Basically GMig distinguishes between two regions (home and host) and 3 types of workers: temporary migrants (permanent residents of their home region who work abroad), temporary workers/labor (temporary residents of a host country) and finally permanent workers/labor (persons who work and live in their home region). In addition to those modifications other features of the GTAP Model had to be adapted to the migration problem. On the production side differences between productivity of permanent and temporary labor are implemented considering the wage differentials in the 1997 GTAP database. Furthermore temporary workers are assumed to acquire some of the productivity of the host country whereby the level of productivity can either increase or decline. Labor allocation in GMig is modeled via a global labor pool. All temporary migrants are collected in this pool, allocated across host countries and there allocated further across sectors. The wage migrant workers earn is split up between host and home country where further allocation across consumption, savings etc. takes place. According to this wage distribution welfare is calculated. The welfare of permanent and temporary labor is treated separately, whereas the welfare change for a region as host or home represents the sum of both labor figures. Another special feature implemented in GMig is the sectoral allocation strategy. Regarding this point WALMSLEY and WINTERS consider Mode 4 of the Uruguay Round's General Agreement on Trade in Services (GATS) which restricts migrant labor to services. In order to achieve such a sectoral

segmentation, they divide the sectors into one group of sectors which employ temporary labor and a second group of sectors which do not.

Their analysis particularly takes account of the developed – developing countries problem. Thus, in the main experiment they extend quotas on the number of people permitted into the developed economies by 3 %. Furthermore the results finally confirm that free movement of labor is an important issue for development because the developing countries gain most from the increased quotas. With the substantial overall increase in world welfare the developed countries also gain even though they experience a fall in real wages. This is because besides the losses on the income side there also occur increases in the returns to capital and other factors. Regarding the results it can be observed that most of the benefits is generated as a result of the relaxation of quotas on unskilled labor.

3. Theoretical Framework

3.1 Standard GTAP-Model

The quantitative analyses in this paper are based on the comparative-static standard multi-regional Global Trade Analysis Project (GTAP) model. It provides an elaborate representation of the economy including the linkages between farming, agribusiness, industrial, and service sectors of the economy. The use of the non-homothetic constant difference of elasticity (CDE) functional form to handle private household preferences, the explicit treatment of international trade and transport margins, and a global banking sector which links global savings and consumption is innovative in GTAP. Trade is represented by bilateral trade matrices based on the ARMINGTON assumption. Further features of the standard model are perfect competition in all markets as well as a profit and utility maximizing behavior of producers and consumers. All policy interventions are represented by price wedges. The framework of the standard GTAP model is well documented in the GTAP book (HERTEL, 1997) and available on the internet (http://www.gtap.agecon.purdue.edu/).

3.2 Database

The data set used is the GTAP database version 5 with 1997 as the base year. Basically the data base consists of bilateral trade, transport, and protection matrices that link 66 country / regional economic data bases whereas 14 out of the 66 countries are composite regions, e.g. Rest of Latin America (LAM) or Sub-Saharan Africa (SSA). Moreover, 57 sectors are covered including a very detailed agricultural sector with 12 agricultural primary sectors and 8 food processing sectors. The remaining sectoral part comprises services, manufacturers and other primaries. Finally, besides those country and sector matrices, the database also contains 5 factors, namely, land, capital, unskilled and skilled labor, and natural resources.

4. Model Design

Before the conduction of the scenarios relevant for this paper some preparative simulations had to be carried out in order to provide an adequate basis for the migration related calculations. These preparations comprise some relevant model extensions as well as policy changes resulting from changes of the economic and political framework conditions.

4.1 Extensions of the standard GTAP framework

Instruments of the CAP

One part of these preparative simulations comprises the implementation of the CAP instruments to the EU-15. Therewith according to data of the European Commission (1999) direct payments are incorporated in the GTAP standard framework. Concerning this instrument total direct payments for each sector are fixed while direct payments per animal and hectare adjust endogenously with respect to the current political and economical situation. Besides direct payments output quotas in the sugar and milk sectors are added to GTAP’s standard policy instrument equipment. The implementation of the quotas is subject to the

assumption that the existing production quantity as documented in the GTAP data base represents the corresponding quota. Along with quotas in these preparative simulations the quota rent is reallocated from the regional household among producers. Other CAP instruments added to the GTAP modeling framework are the variable levy applied on wheat and other cereals and intervention prices. For a more detailed documentation of incorporating the CAP instruments into GTAP see BROCKMEIER (2003).

EU-Budget

The EU budget is introduced in the GTAP model using an innovative Social Accounting Matrix (SAM). This SAM not only covers the expenditures and revenues of already existing agents (e.g. producers, government, private household, etc.), but also of the European Agricultural Guidance and Guarantee Fund (EAGGF). As formulated in EU law (EU, 2002b), the EU budget receives 90 percent of the import duties for agricultural and non-agricultural products from producers, the private household, the government and the capital account. Additional revenues result from an endogenously calculated GDP related tax which flows from the regional household to the EU budget. Here, all EU member countries face an equal GDP tax rate. Revenues of the EU budget are used to cover agricultural output and export subsidies as well as direct payments. In contrast to these product specific instruments, expenditures for structural policies are not covered within the EU budget module. Due to their characteristics and specific aims, structural funds can not be allocated to certain commodities. This strongly hampers their implementation into a product specific model like GTAP.

Obviously, revenues of the EU budget from one member country are not identical with the expenditures the EU budget is spending on the same member country. A comparison of revenues and expenditures of each member state therefore shows the net transfer that takes place within the EU financial system. Analogous to capital transfer, the net transfer within the EU is part of the current account balance which makes up the difference between exports and

imports of goods and services. However, the sum of net transfers of all member countries equals zero, since the EU budget is balanced via the endogenous GDP tax rate.

In the standard GTAP model EAGGF revenues and expenditures are organized through the regional household. All components of the EU budget are therefore introduced with the help of dummy variables allowing an easy shift from regional household to EU budget and vice versa. Consequently, a preliminary simulation is employed to move the GTAP data base from the initial situation without an EU budget to an equilibrium where the EU budget is in charge of the EAGGF.

4.2 Pre-Simulations

Based on the results obtained from an extended GTAP model the second part of the pre-simulations is conducted. Since the EU-enlargement will most probably only take place after the implementation of the Uruguay Round and the AGENDA 2000 the proposals of both agreements are incorporated via additional simulations.

Implementation of the Uruguay Round

For the implementation of the Uruguay Round tariff reductions are introduced, which were acquired by FRANCOIS and STRUTT (1999) following the classification of the GTAP data base. Thus, after this simulation the policy level of all countries and regions is equal to the level the Uruguay Round was aiming at. Furthermore, concerning the EU-15 external trade the variable levies are converted into ad valorem duties.

Implementation of the AGENDA 2000

The reform of the CAP under the AGENDA 2000 proposals involves a reduction of intervention prices in the cereal and milk (-15 %) and in the beef sector (-20 %). Besides those changes in intervention prices direct payments concerning cereals, oilseeds and protein

plants are harmonized. In detail this involves an increase of direct payments for wheat and cereals by 22 % while the direct payments concerning oilseeds are reduced to the premium level of cereals by –33 %. The measures in the cereal sector are flanked by a reduction of the set-aside rate from initially 15 % to 0 %.

4.3 Scenarios

Using the extended version of the GTAP standard model various simulations are carried out. The basic aspects of the following experiments comprise the forthcoming EU Eastern enlargement and the migration flows involved. For this reason the following regional and sectoral aggregation (table 1 and 2) has been chosen:

EU-15, Poland, Hungary, MOEL-5 (Middle and Eastern European Countries), FSU (Former Soviet Union), NAFTA (North American Free Trade Area) and ROW (rest of the world). Due to data restrictions (e.g. direct payments) on individual EU-15 member states the aggregated form (EU-15) is used for the simulations. In contrast since there are not this kind of restrictions in place concerning the candidate countries Poland and Hungary are represented on the highest level of disaggregation and the remaining states are put together as MOEL-5. Furthermore FSU and NAFTA are incorporated in the experiments considering their position as the most important trading partners of EU-15 and MOE countries.

Table 1: Regional Aggregation

Regions	Abbreviations
EU-15 Belgium, Denmark, Germany, Finland, France, Greece, United Kingdom, Ireland, Italy, Louxemburg, Netherlands, Austria, Portugal, Sweden, Spain	**EU15**
Poland	**POL**
Hungary	**HUN**
MOEL-5 Bulgaria, Czech Republic, Romania, Slovakia, Slovenia	**MOEL5**
FSU Armenia, Azerbaijan, Belarus, Estonia, Kazakhstan, Republic of Moldova, Russian Federation, Lithuania, Latvia, Kyrgystan,Tadzhikistan, Ukraine, Usbekistan, Georgian Republic	**FSU**
NAFTA USA, Canada, Mexico	**NAF**
Rest of the World Aggregation of the remaining countries	**ROW**

With respect to the level of sectoral aggregation the initially 57 production sectors of the GTAP data basis are summed up to a total of 16 sectors including 7 primary and 5 processed agricultural and food products. The remaining 4 sectors comprise aggregated other products, other primary products, industry and services.

Table 2: Sectoral aggregation

Sectors	Abbreviations
Wheat	**WEIZ**
Other Cereals Other Cereals, Rice	**SOGR**
Oilseeds	**OELS**
Sugar Beets & Sugar Cane	**ZUCR**
Other Plant Products Vegetables, Fruits and Nuts, Other Plant Products	**SOPP**
Cattle, Sheep, Goats, Horses	**RSFL**
Milk	**MILR**
Other Animal Products	**SOTP**
Meat Products Processed Commodities from Cattle, Sheep, Goats, Horses, other neat products	**FLEP**
Vegetable Fats and Oils	**PFOE**
Dairy Products	**MILP**
Sugar	**ZUCP**
Other Food Products wool.fiber plants, forestry, fisherie, coal, oil, gas, other minerals	**SONM**
Industry Textiles, Wearing Apparel, Leather...	**MNFC**
Services Electricity, Gas, Water, Trade, Trasnport...	**SRVC**

EU-Enlargement without migration (PURE)

The first scenario represents an “ordinary” EU Eastern enlargement without taking into account any migration flows and its impacts on the countries involved. In the corresponding simulation the integration process of the 7 MOE countries (Poland, Hungary, MOEL-5) in the EU-15 is represented with all bilateral trade barriers abolished. Thereby no transformation period is assumed. At the same time the new member countries adopt the external trade protection of the EU-15 concerning trade with third countries. The level of protection is subject to the implementation of the WTO’s Uruguay Round and the AGENDA 2000. In contrast to the MOE and EU-15 states trade protection between the remaining third countries remains unchanged. Similar to the trade policy direct payments are granted on EU-15 level to the 7 MOE countries. What concerns the remaining CAP instruments there is no set-aside

assumed in the MOE states, while milk and sugar quotas are treated in the same way like in the EU-15 (compare 4.1). Beside the adjustments of the CAP policy instruments this simulation projects the EU financing system on the 7 new members. This is modeled analogically to the procedure concerning the budget of the EU-15 (compare 4.1).

EU-Enlargement considering average annual migration flows (Pre-Mig)

The next simulation is build upon the basic scenario of an EU-enlargement described in the previous section. But in contrast to the basic approach this experiment considers an additional aspect which is neither related to the CAP nor to other trade in goods policies – migration. Since migration can be defined as the change in population and labor force of a country respectively, migration is modeled via this assumption. According to data from Eurostat (1999) and the World Fact Book (1999) these changes were implemented as percentage changes of the output value of skilled and unskilled labor. The used data represent net migration rates on a 1999 year basis. The corresponding data range from 0.18 % in the EU-15 and NAFTA to –0.04 % in Poland implying the net migration rates in the single regions.

Table 3: Net Migration Rate/100 inhabitants in selected regions before EU-enlargement

EU-15	Poland	Hungary	MOEL-5	FSU	NAFTA	ROW
0.18	-0.04	0.05	-0.03	-0.00	0.18	-0.03

Source: Eurostat (2000), World Fact Book (1999), own calculations

Taking account of the demand side the shocks on the labor force are also applied to each country's population.

EU-Enlargement considering migration flows thereby expected (Post-Mig)

Exactly like in the previous experiment the third simulation is based on the "PURE" EU-enlargement scenario. In contrast to the previous "migration scenario" this simulation

takes account of impacts the enlargement process may have on east-west migration flows. This means an enforcement of migration from Eastern to Western Europe.

According to various studies estimating the migration potential moving from the Eastern candidate countries to the EU-15 an annual migration flow of 0.3 to 0.6 million people can be expected. All corresponding analyses are based on the actual wage differentials whereas differences in the models used can be observed. Nevertheless all results obtained point in the same direction. Against this background net migration of 0.5 million people for the EU-15 was assumed while the rates for Poland, the MOEL-5 and FSU were calculated weighted with respect to pre-accession rates. With regard to Hungary's positive net migration rate (see table 3) a reduction of 0.02 % was assumed. Parallel to the first migration experiments population follows the changes in the labor force. In this scenario no migration related changes are considered for NAFTA and the rest of the world.

Table 4: Net Migration Rate/100 inhabitants in selected regions after EU-enlargement

EU-15	Poland	Hungary	MOEL-5	FSU	NAFTA	ROW
0.3	-0.61	0.03	-0.43	-0.05	0.18	-0.03

Source: Eurostat (2000), World Fact Book (1999), FASSMANN and MÜNZ, own calculations

5. Results

In the following the results obtained from the different simulations are represented. Thereby focus is given to the influence migration has on the results of the "pure enlargement scenario" (PURE) considering migration flows observed before (Pre-Mig) as well as potential migration flows estimated after (Post-Mig) the relevant candidate countries' EU-accession. Due to the plenty of results the result interpretation is mainly limited to the EU-15 and Poland since those two regions turned out to be good examples for covering impacts of positive and negative net migration. Furthermore the result interpretation concentrates on various macro key indicators, production and the labor market situation.

Starting with a general view on changes affecting the whole economy highlights the differences in welfare changes with respect to the various experiments. Particularly in the case of the EU the divergences are outstanding. While a “PURE” EU Eastern enlargement leads to a significant negative welfare effect for the EU-15 this impact is completely reversed in both “migration scenarios”. In the first place the reason for the positive welfare effects induced by the consideration of migration is the change in endowment usage. In this case this corresponds to the increase of the EU’s labor force with more workers being available for production processes. This effect is even enhanced by stronger migration inflows like in the Post-Mig scenario. Along with changes in endowment usage there are also allocative effects contributing to the positive welfare changes. With growing net migration flows positive allocative effects increase. At a sectoral level this is particularly reflected in the manufacturing and service sectors. Regarding the agricultural sector the most prominent allocative effects induced by migration can be observed in the product groups vegetable oils and fats, dairy products and sugar. However, the positive net migration does not only positively contribute to the EU’s welfare situation. The negative terms of trade effect in the PURE-scenario gets enhanced by the migration flows.

Looking at Poland as a country with a negative net migration shows exactly the reversed result. Although Poland’s welfare change induced by the EU-enlargement is positive in all 3 scenarios along with increasing emigration flows a constant reduction of the positive effects can be observed. Vice versa to the migration’s influence on the EU-15 allocative effects decrease and the reduction of Poland’s labor force accounts for a negative effect. Nevertheless, the impacts are not that significant in size like in the EU-15.

Table 5: Welfare changes in the course of an EU Eastern enlargement (in US million $)

PURE	EU15	POL	HUN	MOEL5	FSU	NAF	ROW
Net transfer	-7007.9	1510.1	3084.6	2413.3	0	0	0
TOT effect	-44.8	-96.1	561.8	743.0	-416.6	-206.0	-541.2
Allocative effects	1463.9	1484.2	256.4	1015.8	-91.4	63.5	-179.2
Changes in endowment usage	0	0	0	0	0	0	0
Others	-416.26	-943.25	-629.11	-991.53	47.98	105.93	271.66
Equivalent Variation	-6005.06	1954.95	3273.69	3180.57	-460.02	-36.57	-448.74
Pre-Mig	EU15	POL	HUN	MOEL5	FSU	NAF	ROW
Net transfer	-7014.7	1510.9	3088.8	2415.1	0	0	0
TOT effect	-195.8	-85.6	565.4	754.5	-404.5	-340.5	-293.7
Allocative effects	2268.3	1482.5	258.2	1014.9	-91.6	195.4	-394.4
Changes in endowment usage	7072.3	-21.2	8.0	-21.6	0	9653.0	-1592.0
Others	-390.23	-943.90	-630.59	-991.68	47.42	90.96	272.33
Equivalent Variation	1739.87	1942.70	3289.81	3171.22	-448.68	9598.86	-2007.77
Post-Mig	EU15	POL	HUN	MOEL5	FSU	NAF	ROW
Net transfer	-6992.1	1500.1	3088.4	2403.6	0	0	0
TOT effect	-360.0	-50.9	567.5	790.4	-398.1	-320.2	-228.6
Allocative effects	2797.2	1434.6	257.7	996.7	-104.9	195.0	-397.0
Changes in endowment usage	11784.1	-324.0	4.8	-309.9	-157.5	9653.1	-1592.0
Others	-372.50	-925.24	-630.46	-977.49	46.05	87.89	259.36
Equivalent Variation	6856.70	1634.56	3287.94	2903.31	-614.45	9615.79	-1958.24

Source: own calculations

As already mentioned above the change in each country's labor force also entails impacts on production. Again the most significant effects can be observed among the results concerning the EU-15. Industrial output values (table 6) of the EU show that especially in the manufacturing, service and capital good sector the migrant labor force causes very strong productivity expansions. Compared to the PURE-scenario output values partially even more than double. With regard to the agricultural sector similar effects occur. For example, while the oilseed production value experiences a down-ward trend in the case of an EU-enlargement without migration taken into account (PURE), a positive development is observed in both migration scenarios (Pre-Mig, Post-Mig). Product categories which are subject to outstanding output value changes are meat products and other food products. There exist multiple differences compared to the base scenario (PURE).

In contrast to the situation observed when analyzing welfare related indicators in Poland the changes in output values do not follow the same consistent manner. While in the case of

strong emigration (Post-Mig) sectors are increasingly subject to reduced production, in the Pre-Mig scenario where only little emigration is considered Poland's development is similar to the EU's development; i.e. some sectors expand. This pattern is determined by the positive allocative effects (see table 5) induced by migration. With less labor force available inputs are shifted from sectors with low growing potential to sectors with high growing potential. The corresponding sectors' growing potential mainly relates to improved export opportunities as a result of reduced protection after the EU-enlargement. In line with very significant import tariff reductions the sectors that are particularly positively affected are sugar beet production and dairy production. Outside agriculture the service and the capital good sector experience positive developments. Concerning these two sectors the reason for production expansion is probably attributed to strong national taxation before the EU-accession. Concerning the rest of industries the effects induced by emigration out of Poland are rather marginal.

Table 6: Changes in output (%) and output value at market prices (in US million $)

	EU-15						**Poland**					
	change in output (%)			**change in output value, market prices (US million $)**			**change in output (%)**			**change in output value, market prices (US million $)**		
Sectors	PURE	Pre-Mig	Post-Mig	PURE	Pre-Mig	Post-Mig	PURE	Pre-Mig	Post-Mig	PURE	Pre-Mig	Post-Mig
WEIZ	-0.86	-0.76	-0.71	-215.1	-190.7	-177.6	4.32	4.31	4.05	-296.3	-295.9	-298.2
OELS	-0.09	0.02	0.09	-3.0	13.5	22.1	-8.46	-8.47	-8.67	-35.5	-35.5	-35.8
SOGR	-0.97	-0.88	-0.82	-243.5	-220.7	-208.0	3.09	3.08	2.83	-301.5	-301.1	-303.2
ZUCR	0	0	0	-100.0	-68.1	-49.6	0	0	0	421.9	422.6	419.3
SOPP	0.81	0.95	1.03	970.7	1105.6	1181.1	-12.78	-12.79	-12.93	-131.5	-131.1	-144.0
RSFL	-0.53	-0.43	-0.37	-478.4	-379.0	-326.4	14.21	14.23	14.27	381.5	383.2	381.0
MILR	0	0	0	-1861.9	-1407.8	-1167.2	0	0	0	1326.4	1340.9	1304.5
SOTP	0.72	0.83	0.90	427.0	519.6	573.8	-8.54	-8.56	-8.78	-225.9	-225.3	-236.5
FLEP	0.21	0.33	0.41	150.6	401.9	555.0	-3.09	-3.10	-3.37	-166.5	-165.5	-182.1
PFOE	0.40	0.51	0.58	228.4	302.7	347.2	-9.61	-9.62	-9.82	-265.5	-265.2	-267.9
MILP	-0.25	-0.23	-0.22	-1690.6	-1319.3	-1130.6	8.62	8.74	9.43	639.2	647.5	655.4
ZUCP	-0.10	-0.11	-0.12	-98.0	-74.4	-61.7	1.58	1.58	1.60	382.0	382.8	380.5
SONM	0.07	0.18	0.25	35.3	376.5	584.4	2.81	2.79	2.50	80.4	81.5	58.9
SOPR	0.44	0.51	0.56	1608.6	1864.7	2001.8	-4.90	-4.90	-5.15	-999.4	-997.7	-1028.5
MNFC	0.04	0.17	0.26	4745.0	11067.5	15090.0	5.94	5.91	5.47	4889.6	4869.5	4561.2
SRVC	-0.03	0.06	0.12	6105.0	12800.0	17036.0	-1.92	-1.93	-2.18	220.4	227.1	59.3
CGDS	0.27	0.46	0.57	4256.0	6852.5	8377.6	12.51	12.52	12.22	2959.9	2964.8	2901.5

Source: own calculations

Finally, the last field to look at is the labor market and its related variables. Starting with the comparison of changes in labor demand (table 7) in the EU-15 shows that migration has a positive effect on labor demand in the course of the EU Eastern enlargement. Without

considering migration flows there is a reduction in labor demand taking place in most of the industries (PURE) while along with an increasing net migration rate this reduction is diluted or even reversed (Pre-Mig, Post-Mig). Accordingly in those sectors where the enlargement leads to an increase in labor demand in the first place the demand pressure is enforced by the additional inflow of labor. The sectors accounting for the most prominent influence of migration are the manufacturing, service and capital goods sector. In agriculture other plant products, meat products and other food products represent the most affected product categories. Similar to the “PURE” enlargement scenario wages for unskilled workers increase also in the case when migration takes place. Nevertheless, since labor supply grows stronger than labor demand the wage increase is less in both migration scenarios (table 8). Wage increases are more than halved by the additional labor supply.

In Poland the demand for unskilled labor predominantly decreases after the EU-accession. As expected the introduction of migration enforces this development whereas its impact is rather marginal. However, along with changes in production (see table 7) in some sectors demand for unskilled labor increases. Consequently labor demand increases in the same sectors also experiencing a production expansion; i.e. sugar beet and dairy production sector. According to Poland’s labor force reduction due to growing emigration labor supply is subject to a stronger decrease than labor demand. Thus, wages for unskilled workers experience a slight up-ward trend (table 8).

Table 7: Changes in demand for unskilled labor by region and sector (in %)

PURE							
Sectors	EU15	POL	HUN	MOEL5	FSU	NAF	ROW
WEIZ	-0.95	-6.30	61.31	10.03	-1.79	-0.59	-0.30
OELS	-0.10	-12.48	-20.89	5.55	0.22	-0.11	-0.08
SOGR	-1.08	-7.00	41.56	21.19	-1.08	-0.28	-0.19
ZUCR	-0.06	21.87	-13.36	8.92	-2.02	-0.06	-0.13
SOPP	0.83	-10.62	-21.03	-8.82	0.30	0.07	0.06
RSFL	-0.56	17.92	-18.96	2.86	-0.09	-0.10	-0.01
MILR	-0.18	-5.06	-34.78	-10.72	-0.29	-0.04	-0.13
SOTP	0.74	-6.02	-17.13	-3.36	1.48	0.04	0.03
FLEP	0.21	-3.11	-17.05	-5.32	-0.10	-0.02	-0.02
PFOE	0.39	-9.68	-34.50	-4.09	1.34	-0.04	-0.05
MILP	-0.26	8.62	6.02	4.36	-1.03	-0.10	-0.39
ZUCP	-0.11	1.55	12.45	4.00	-2.50	-0.06	-0.31
SONM	0.06	2.77	-4.10	-4.06	-0.18	-0.03	-0.08
SOPR	0.52	-6.00	-2.41	-5.38	-0.98	0.15	-0.04
MNFC	0.03	5.94	11.72	5.40	0.16	-0.03	-0.02
SRVC	-0.04	-2.04	-6.09	-4.58	0.03	0.02	0.03
CGDS	0.13	8.07	10.80	15.60	-0.00	-0.02	-0.02
Pre-Mig							
Sectors	EU15	POL	HUN	MOEL5	FSU	NAF	ROW
WEIZ	-0.83	-6.32	61.37	10.05	-1.76	-0.53	-0.30
OELS	0.04	-12.49	-20.87	5.56	0.27	-0.02	-0.07
SOGR	-0.96	-7.01	41.60	21.20	-1.07	-0.13	-0.21
ZUCR	-0.04	21.92	-13.35	8.95	-1.99	0.07	-0.14
SOPP	0.98	-10.64	-21.02	-8.83	0.30	0.18	0.05
RSFL	-0.44	17.94	-18.90	2.88	-0.08	0.07	-0.02
MILR	-0.13	-5.02	-34.74	-10.72	-0.26	0.08	-0.13
SOTP	0.86	-6.05	-17.10	-3.39	1.50	0.19	0.02
FLEP	0.39	-3.14	-17.02	-5.35	-0.09	0.15	-0.04
PFOE	0.59	-9.70	-34.50	-4.11	1.33	0.11	-0.07
MILP	-0.15	8.72	6.18	4.48	-0.88	0.13	-0.36
ZUCP	-0.03	1.53	12.48	3.98	-2.46	0.13	-0.32
SONM	0.24	2.74	-4.05	-4.09	-0.18	0.18	-0.11
SOPR	0.65	-6.02	-2.37	-5.39	-0.97	0.29	-0.03
MNFC	0.22	5.88	11.78	5.36	0.16	0.16	-0.06
SRVC	0.13	-2.08	-6.04	-4.61	0.03	0.19	-0.00
CGDS	0.39	8.04	10.88	15.57	0.01	0.20	-0.05
Post-Mig							
Sectors	EU15	POL	HUN	MOEL5	FSU	NAF	ROW
WEIZ	-0.76	-6.60	61.38	9.81	-1.80	-0.53	-0.30
OELS	0.12	-12.75	-20.88	5.37	0.28	-0.00	-0.07
SOGR	-0.89	-7.28	41.57	20.96	-1.10	-0.13	-0.20
ZUCR	-0.03	21.42	-13.36	8.60	-2.05	0.07	-0.13
SOPP	1.08	-10.89	-21.03	-9.03	0.26	0.18	0.05
RSFL	-0.37	17.83	-18.89	2.70	-0.12	0.07	-0.01
MILR	-0.10	-5.20	-34.75	-10.76	-0.28	0.09	-0.12
SOTP	0.95	-6.40	-17.09	-3.61	1.47	0.19	0.02
FLEP	0.51	-3.57	-17.01	-5.68	-0.15	0.15	-0.04
PFOE	0.73	-10.00	-34.53	-4.37	1.30	0.11	-0.07
MILP	-0.09	9.19	6.19	4.57	-0.88	0.14	-0.32
ZUCP	0.02	1.33	12.45	3.86	-2.56	0.13	-0.31
SONM	0.36	2.25	-4.07	-4.46	-0.22	0.18	-0.11
SOPR	0.72	-6.39	-2.41	-5.62	-1.00	0.30	-0.02
MNFC	0.35	5.13	11.76	4.86	0.09	0.16	-0.06
SRVC	0.25	-2.66	-6.07	-4.97	-0.02	0.19	-0.00
CGDS	0.56	7.33	10.86	14.82	-0.08	0.20	-0.05

Source: own calculations

Table 8: Change in supply price for unskilled labor (in %)

Region	PURE	Pre-Mig	Post-Mig
EU15	0.14	0.07	0.02
POL	4.10	4.15	4.55
HUN	9.15	9.14	9.16
MOEL5	5.66	5.69	5.93
FSU	-0.16	-0.15	-0.12
NAF	0.02	-0.05	-0.04
ROW	0.01	0.03	0.04

Source: own calculations

6. Conclusion

Comparing the results shows that migration particularly leads to allocative effects within an economy. These result from the reduced or increased labor force available for a country's production sectors. With regard to the two regions - EU-15 and Poland – examined in this paper migration impacts mainly differ according to country size and net migration. Generally the impacts observed in the EU-15 are in absolute terms more significant than the ones observed in Poland since immigration to the EU-15 is relatively higher than emigration from Poland.

In both regions positive impacts of migration on production are predominantly observed in labor intensive sectors and in sectors which have been heavily protected prior to EU-enlargement. Here the highest expansion potentials lie in the capital good as well as in the manufacturing sector. Concerning agriculture migration flows showed a relatively strong influence on key sectors, like the dairy and the meat production sector.

In general one can say that migration leads to a weakening of the production effects induced by the enlargement and the related reduction in trade protection.

Against all expectations wages in the EU-15 do not decrease as a result from immigration. Nevertheless with labor supply growing stronger than labor demand there is a lower wage increase taking place than in the case of no migration.

7. Limitations

Limitations of the personated simulations are mainly caused by data restrictions. First, regarding the year migration data are not consistent with the GTAP data base since the migration rates are on a 1999 basis while the data base reflects a 1997 situation. The reason for the usage of the 1999 migration data is an unsatisfactory data availability for the year 1997. Furthermore the migration data obtained from the CIA's World Fact Book do not exclusively represent data on labor movements but only an accumulation of workers, children etc. Here the same reason as given above applies – data concerning especially labor migration are not consistent enough.

A very difficult point was the achievement of estimated net migration rates after the EU Eastern enlargement. Since such data were not available "future" migration was incorporated via estimated information from related studies combined with own calculations and in the case of Hungary own estimations (see 5.3). However, since the role of migration from Hungary seems to by rather marginal this remedy measure should not lead to significant distortions.

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