

FORSCHUNGSINSTITUT FÜR EUROPAFRAGEN
WIRTSCHAFTSUNIVERSITÄT WIEN

RESEARCH INSTITUTE FOR EUROPEAN AFFAIRS
UNIVERSITY OF ECONOMICS AND
BUSINESS ADMINISTRATION VIENNA

Working Papers

IEF Working Paper Nr. 14

FRITZ BREUSS AND JEAN TESCHE

A General Equilibrium Analysis of East-West Migration: The Case of Austria-Hungary

January 96

Althanstraße 39 - 45, A - 1090 Wien / Vienna
Österreich / Austria
Tel.: ++43 / 1 / 31336 / 4135, 4134, 4133
Fax.: ++43 / 1 / 31336 / 758, 756
e-mail: europafragen@fgr.wu-wien.ac.at

Impressum:

Die IEF Working Papers sind Diskussionspapiere von MitarbeiterInnen und Gästen des Forschungsinstituts für Europafragen an der Wirtschaftsuniversität Wien, die dazu dienen sollen, eine noch nicht publikationsreife Arbeit im Fachkreis zur Diskussion zu stellen. Die Working Papers geben nicht notwendigerweise die offizielle Meinung des Instituts wieder und dürfen nicht ohne Zustimmung des Autors/der Autorin zitiert werden. Sie sind gegen einen Unkostenbeitrag von öS 100 im Institut erhältlich. Kommentare sind an die jeweiligen AutorInnen zu richten.

Medieninhaber, Eigentümer Herausgeber und Verleger: Forschungsinstitut für Europafragen der Wirtschaftsuniversität Wien, Althanstraße 39—45, A—1090 Wien; Für den Inhalt verantwortlich: Univ.-Prof. Dr. Stefan Griller, Althanstraße 39—45, A—1090 Wien.

Nachdruck nur auszugsweise und mit genauer Quellenangabe gestattet.

**A General Equilibrium Analysis of East-West Migration:
The Case of Austria-Hungary**

Fritz Breuss and Jean Tesche

1. Introduction.....	1
2. The Dimension of East-West Migration in Europe and Austria.....	2
2.1 Immigration in Europe.....	2
2.2 The Emergence of a European Immigration Policy.....	4
2.3 Immigration Reality and Policy in Austria.....	7
3. The Economics of Migration.....	9
4. The linked Austria-Hungary CGE Model.....	14
5. Migration Experiments.....	16
5.1 The Five Scenarios.....	16
5.2 Results.....	20
6. Conclusions.....	22
References.....	23
Bisher erschienene IEF Working Papers.....	25
Bisher erschienene Bände der Schriftenreihe des Forschungsinstituts für Europafragen.....	26

A General Equilibrium Analysis of East-West Migration: The Case of Austria-Hungary^{*})

*Fritz Breuss and Jean Tesche^{**})*

1. Introduction

The opening-up of Eastern Europe in 1989 has highlighted a new „old“ phenomenon in Europe, East-West migration. Earlier, the Iron Curtain shielded rich Western Europe from poorer Eastern Europe. After the break down of political and economic barriers, it was feared that there would be a wave of migration towards Western Europe. Sensational figures that as many as 25 million people could eventually emigrate from Eastern Europe and the former Soviet Union have been circulated.

Following the first wave of migration between 1989 and 1992, which coincided with persistent unemployment and weak growth, Western European countries have tightened immigration procedures and asylum laws considerably. The most prominent target countries in Western Europe were Germany, the Scandinavian countries and Austria. Whereas the present tight immigration regulations deter massive immigration, the European Union (EU) may be a potential target in the future when up to ten Central and Eastern European countries (CEECs) may enter the EU as full members. The free movement of persons is one of the basic pillars of the Single European Market.

We use a three-country, 14-sector computable general equilibrium (CGE) model to examine the effect of immigration on the labor market, production sectors and the macroeconomy of Austria and Hungary. We analyze the phenomenon of immigration in an empirical model in order to get an idea of the quantitative dimension of the economic problems involved, rather than introduce new integration theory. Our study aims more at the impact of

^{*}) This is a revised version of a paper presented at the OECD/WIFO Seminar on „Migration, Free Trade and Regional Integration“, on 29 February 1996 in Vienna.

JEL Codes: C68, F22; Keywords: International migration, computable general equilibrium models.

^{**}) Fritz Breuss, Research Institute for European Affairs at the University of Economics and Business Administration, Vienna, Austria; Jean Tesche, Barents Group LLC, Moscow, Russia.

migration than at forecasting future migration flows. Recently, Weyerbrock (1995) used a similar empirical approach to study the issue of immigration to the EU. We compare her results for the EU as a whole to those for one individual country, Austria.

The paper is organized as follows. Section 2 examines past and current immigration policies in Europe and Austria. Some aspects of immigration theory and how they relate to our approach are discussed in section 3. Section 4 describes the model used for estimation of immigration effects in Austria and Hungary. The migration experiments are explained in section 5. The paper concludes with some implications for policy options based on our model results.

2. The Dimension of East-West Migration in Europe and Austria

2.1 Immigration in Europe

Recently, many studies have documented the emergence of migration in Europe (Ardittis, 1994; ECE, 1995; Fassmann/Münz, 1995; Hamilton, 1994; Siebert, 1994; Giersch, 1994; Weyerbrock, 1995; Zimmermann, 1994). Zimmermann (1994, p. 316) divides immigration in Europe in decades of „pull migration“ (in the 1950s and 1960s) and „push migration“ (in the 1980s and 1990s). Pull migration - immigration drawn in by a strong economy and sometimes by active government encouragement in order to overcome labor shortages - is seen as economically beneficial. However, there is concern that push migration - migration spurred by conditions in the home, or sending country - will accelerate the current employment crisis.

Zimmermann (1994, p. 316) distinguishes four distinct periods of European migration after World War II: 1) War adjustment and decolonization (1945 - early 1960s), 2) labor migration (1955-1975), 3) restrained migration (1974-88), and 4) the dissolution of socialism and its aftermath (from 1989 onwards). Some 20 million people were displaced by the war. 12 million Germans had left Eastern Europe by 1950, of which about 8 million went to the Federal Republic of Germany. Between 1950 and the construction of the Berlin Wall in 1961, some 2.6 million Germans moved from East to West Germany. Belgium, France, the Netherlands, and the United Kingdom were affected by return migration of their colonists and by inflows of native workers from their former overseas territories. More than 1 million French residents of Algeria resettled in France during and after the Algerien war of independence, 1954-62.

The second period, 1955-1973, was characterized by labor migration. In the 1950s labor shortages in some countries led to more openness towards labor immigration, and even active recruitment of workers. Germany (and also

Austria) established a „guest worker“ system through recruitment treaties with Italy, Spain and Greece, Turkey, Marocco, Portugal, Tunisia and Yugoslavia. On balance, 5 million people migrated to the north from the Mediterranean countries. Especially in the cases of France and Germany, immigration in this period was procyclical (Zimmermann, 1994, p. 316).

The period of restraint migration (1974-1988) began when labor recruiting halted after the first oil price shock, in the face of increasing social tensions and fear of recession. The foreign population increased in Europe because of higher fertility rates, continued immigration of family members, and the admission of refugees and asylum seekers. In addition, the number of illegal immigrants rose significantly.

**Table 1: Foreign or Immigrant Population and Labor Force in Selected European OECD Countries
1983 and 1993**

1. Data include the unemployed.

Source: OECD (1995), Tables 1.2 and A.5.

The period from 1989, as socialism was dissolving, was dominated by east-west migration and a heavy inflow of asylum seekers and refugees. The number of asylum seekers and refugees in Europe (mainly due to the war in Bosnia) soared from 189,500 in 1987 to 700,850 in 1992. Another large part of the east-west migrants was made up of ethnic Germans moving directly to Germany, particularly in 1989, when the Berlin Wall fell. In 1992

Germany received 1.49 million new immigrants. Net immigration was 0.79 million and the number of new asylum seekers and refugees was 0.44 million (Zimmermann, 1994, p. 317). According to OECD (1995) statistics, the share of foreign population and foreign labor force has risen in most Western European countries in the last decade (see *Table 1*).

Whether or not the Eastern European enlargement of the European Union will lead to massive „immigration“ is an open question. First of all, the new CEEC member states would obey the same rules of the Single European Market concerning free movement of persons. That means no barriers to entry can hinder people from moving to the richer EU countries. Empirical evidence on European integration, however, leads to the conclusion that massive migration will not take place with eastern enlargement of the EU. Free movement of people was not allowed at the accession of the poorer southern countries (Greece, Italy, Portugal, and Spain). Free movement was established only after considerable transitional periods. Hence, any potential massive migration movements were dampened (Gächter, 1995, p. 73). In case of Eastern European enlargement, such transitional rules are also possible.

Even though there are still considerable income differences within the European Union, migration between the South and the North is restricted to some specific areas. Recently, there was an increased inflow of Portuguese construction workers in Germany. On a national level („Entsendegesetz“ in Germany) as well at the EU level (the Council „directive“ concerning the posting of workers in the framework of the provision) will counteract this arbitrage behavior on the labor market by stipulating that Portuguese and other poorer country workers in richer EU countries must be paid at the same level as domestic workers. Such provisions together with language barriers could also deter mass migration from the East to the West.

2.2 The Emergence of a European Immigration Policy

Before the Maastricht Treaty, immigration policy in Europe was largely a national problem. Nearly every European country preferred limited immigration. This was true in both the pull and push migration periods. Each country defines a quota for immigrants from other countries. These quotas differed greatly, as can be seen from the data of *Table 1*. Among European countries, Luxembourg and Switzerland have the highest share of foreigners in per cent of population and labor force. The United Kingdom and Italy, on the other extreme, have a relatively low proportion of foreigners.

Already in the Treaty of Rome of 1957, the European Economic Community provided for the free movement of labor. This right was reinforced by the Single European Market Act, which came into force in January 1, 1993.

Through the „four freedoms“ - the free movement of people, capital, goods, and services - a single European market was created. The EU now has 15 members, after the addition of three new countries, Austria, Finland and Sweden, on January 1, 1995. In addition, the European Economic Area (EEA) Agreement between EU and EFTA states, the four freedoms also cover the remaining EFTA countries belonging to the EEA since January 1, 1994 (with the exception of Switzerland, which voted against EEA participation). Therefore, in 1994, the 12 EU countries and six EFTA countries established an unrestricted internal market for labor in Europe. The same will be true for the CEECs which will become members of the EU in the near future.

European immigration policy, therefore pertains to non-EU and non-EEA-members. The Treaty on European Union (TEU) or the „Maastricht Treaty“, which entered into force on November 1, 1993, deals with Justice and Home Affairs (JHA) in Title VI, the so-called „Third Pillar“. This is intergovernmental, and hence there is no common community policy involved. The main thrust of the provisions is to oblige the Member States to co-operate in a number of areas which are declared to be of „common interest“. These are stated in Article K1 to include asylum, and immigration¹).

The Commission has made proposals which go some way towards „communitarising“ the Third Pillar (O’Keeffe, 1995, p. 27 et seq.). On December 10, 1993 the Commission made a communication to the Council and to the European Parliament concerning (i) a proposal for a decision, based on Article K3 TEU, establishing a Convention on the crossing the external frontiers of the Member States; and (ii) a proposal for a regulation, based on Article 100c EC, determining the third countries whose nationals must be in possession of a visa when crossing the external borders of the Member States. Two Council Regulations²) are now regulating a harmonized visa policy in the EU as well as establishing a negative list of countries whose nationals require a visa (Griller, 1996, p. 82).

In its Communication of February 23, 1994, on immigration and asylum policies, the Commission estimated that total immigration into the Union in

¹) In addition, Article K1 includes also the combat of fraud and drug addiction, judicial co-operation in civil and criminal matters, customs co-operation and police co-operation, including, if necessary, certain aspects of customs co-operation in connection with the creation of a Union-wide system of exchanging information within a European Police Office (Europol).

²) Reg(EEC) No. 1683/95, OJ 164/1, July 14, 1995; Reg(EEC) No 2317/95, OJ 234/1, October 3, 1995.

1992 was 2 million persons, half of which related to third country nationals. Mass movements from the former Soviet bloc have apparently not yet materialised, but migration pressures from the South, particularly North Africa, have increased for economic and demographic reasons (O’Keeffe, 1995, p. 30). The Commission proposed a comprehensive approach to the development of a European immigration and asylum policy based on (i) taking action on migration pressure; (ii) controlling migration flows; and (iii) strengthening integration policies for the benefit of legal immigrants. It proposes the creation of two informal clearing houses, structures which bring together national experts on an occasional basis: the Centre for Information, Discussion and Exchange on Asylum (CIREA) and the Centre for Information, Discussion and Exchange on the Crossing of Borders and Immigration (CIREFI; O’Keeffe, 1995, p. 31).

The price of abolishing internal frontier controls as required by Article 7a EC would appear to be the increased controls at the external frontiers. The *Schengen Convention* has largely become a model for the initiatives at the level of the Fifteen, including, the Dublin Convention; the draft decision establishing the External Frontiers Convention; the draft Visa Regulation; and a computerised information system, which has made the position of asylum seekers more difficult. In 1985, five Member States, Germany, France, Belgium, the Netherlands and Luxembourg, signed the Schengen Convention on the gradual abolition of checks at their common borders. The 1990 Schengen Implementing Convention entered into force for these countries on September 1, 1993, and for Spain and Portugal on March 1, 1994. All the member states except Denmark, Finland, Ireland, Sweden and the United Kingdom, have signed the Convention. The Implementing Convention has only been ratified by seven member states. Austria, Greece and Italy have not yet finished the ratification process (Griller, 1996, p. 82). The Implementing Convention deals with immigration and asylum, as well as with police co-operation, extradition, narcotic drugs, firearms and ammunition, judicial co-operation and other subjects. A feature of the Convention were the mechanisms set up for the exchange of information on persons and goods through the Schengen Information System (SIS). Due to technical problems in implementing the SIS there was a delay in implementing the Schengen Convention. It has been in force only since March 26, 1995. France suspended its participation after several terrorist bombs the summer of 1995.

2.3 Immigration Reality and Policy in Austria

Austria³) has experienced similar phases of active immigration policy as in Germany, (pull migration) during the 1960s and early 1970s, a phase of restrained immigration policy, thereafter and was confronted with push migration after the breakdown of the iron curtain in 1989. An early peak of foreign labor in Austria was reached at the end of the pull migration period in 1993 with 226.800 foreign workers (or 8.7 percent of total employment). During the phase of restrained immigration policy the share of foreign labor decreased to 5.4 percent of total employment in 1988. The dissolution of communism as well as the turmoil in former Yugoslavia led to a wave of supply-push migration to Austria. Foreign labor reached a share of 9.5 percent of total employment or 291.000 in 1994. However, as a consequence of participating in the EEA, from 1994 onwards only non-EU members need a work permit in Austria, thus reducing the number of total work permits. After this correction, in 1994 268.843 foreign workers were employed Austria (Biffl, 1995, *Table 14*). The inflow of foreign workers reached its peak in 1990 with 103.400. The increasingly restrictive immigration policy since then reduced the inflow considerably (see *Table 2*).

A similar pattern can be found in the development of the total foreign population (see *Table 3*). The share of foreign population in percent of total population increased from 4.5 percent in 1988 to 8.9 percent in 1994. Both the number of naturalised foreigners and of asylum seekers increased in the past five years. Since 1989 net migration contributed increasingly to population growth in Austria. The speed of the flow of immigrants decreased considerably in the last three years due to the tightening of immigration legislation. With a „cascade“ of legislation - the Unemployment Insurance Law, Foreign Labor Employment Law, Residence Law, Asylum Law, Foreigner's Law - Austria is now shielding its labor market from foreign workers (Gächter, 1995, pp. 51 et seq.). The inflow of foreigners is differentiated by the following types of status: (i) foreign workers (seasonal or year-round work), dependent employees or self-employed; (ii) family reunion (after two years of legal employment the partner plus dependent children may join); (iii) foreign students; (iv) refugees; and (v) others (Biffl, 1995, p. 7). Since there is more universal legislation concerning foreigners from 1993, the statistical information on migration has improved. Starting in 1994, the governors of the federal states along with the Ministers of Domestic Affairs and Labor have decided resident quotas for citizens of non-EEA and non-EU member states annually.

³) The aspects of migration from the viewpoint of Hungary is described in Redei (1994).

Table 2: **AUSTRIA, Stock of Foreign Labor by Nationality**¹
Thousands

1. Annual average of valid work permits. Figures may be over-estimated as a result of persons holding more than one permit. The self-employed are excluded.

2. Not corrected for break in the series. As a consequence of Austria's entry in the EEA in 1994, from 1994 onwards only non-EU members need a work permit in Austria, thus reducing the number of total work permits.

Total „foreign“ labor (on-EU) in 1994 therefore amounts to 268.800.

Sources: OECD (1995), Table A.7 (p. 197) and Table B2 (p. 212); Biffl (1995), Table 12 (for the year 1994).

The quota for 1996 is 10.520, of which 5.540 can be workers and 4.980 family reunion. This is lower than 1995, when the quota was 17.000, of which 6.700 workers and 10.300 family reunion. An additional quota for students of 2.340 was fixed for 1996, down from 2.500 in 1995.

The sectoral structure of foreign labor (see *Table 4*) sheds some light on the qualification of foreign labor. The biggest share can be found in labor-intensive sectors like household services (29.8 percent), textiles (29.2 percent), restaurants and hotels (27.7%), cleaning and personal services (26.6 percent), leather industry (19.4 percent), agriculture and forestry (19.2 percent) and construction (18.7 percent). This pattern seems to support the perception that foreigners work in low-income jobs, although there are no exact statistics about the qualifications of foreign labor.

Table 3: **AUSTRIA, Components of Total Population**
Thousands

1. Yearly average.
2. Change between beginning and end of year.
3. NI: Natural increase (birth-death); NM: Net migration.

Source: Biffl (1995). Tables 7. 7a. and 9; EUROSTAT (1995), Table 1

3. The Economics of Migration

There is no single theory of migration. However, related theories (geography of trade theory, international trade theory, location theory, macroeconomics, regional theory) can help to explain the effects of migration. There are two strands of immigration analysis: one is a more macroeconomic approach and the other a general equilibrium approach.

Macroeconomic analysis deals with the impact of immigration on output (GDP) growth, employment and inflation (for Austria see Breuss/Schebeck, 1995). The distinction between pull and push immigration made by Zimmermann (1994) is useful in this context. The macroeconomic effects of migration critically depend on the acceptance of foreign workers in the recipient country. In this framework, if immigration is desired - the case of pull-demand migration in the 1960s - then the economic effects on growth, inflation and wages are beneficial for the recipient country. In the case of surprise or push-supply migration (for instance, after the breakdown of communism), the short term macroeconomic effects may result in higher unemployment.

The macroeconomic effects depend on several factors concerning the labor market, of which two are important: (i) the responsiveness of the labor market, that is the degree of wage flexibility, and (ii) the character of the labor (substitutional or complementary). Furthermore, Zimmermann (1994, p.

327) stresses important differences between the United States and Europe. The European labor market is less flexible and adjusts slowly to economic changes, so labor inflow could compensate for these characteristics. Unemployment and labor market imperfections are more persistent in Europe, which makes the effects of immigration less predictable. Finally, views on cultural variety and social networks in Europe make cultural assimilation much more important than in the United States.

Table 4: Distribution of Foreign Labor by Industries¹

¹) Total employment excluding persons on paternal leave and military service.

²) Schoolleavers included; distribution according to foreign employment by economic branches.

Source: Biffl (1995), Table 15

General equilibrium analysis of migration is based on neoclassical (Heckscher-Ohlin) trade theory. With (at least) two-factor and two-sector models, one can study migration (factor movement of labor) in a two-country context. Depending on the implied market structure and the qualification

of the production factors (skilled and unskilled labor) one can derive the following implications of migration in the emigration country and in the recipient country: (i) allocation of production (from capital intensive to labor intensive production); (ii) the distributional impact of migration (does capital or labor gain the most from immigration?); (iii) the implications for the labor market; (iv) the macroeconomic implications (GDP, exports, imports, relative prices, exchange rates); and (v) fiscal implications (cost of migration in the recipient country).

The *allocative and distributional effects* of migration depend on a number of crucial assumptions (Rivera-Batiz, 1983). An increase in the aggregate labor endowment (through immigration) increases the economy's production possibilities. According to the Rybczynski theorem, an increase (decrease) in the endowment of any factor at constant prices (both commodity and factor prices - a short run view) results in an increase (decrease) in the output of the industry that uses the factor intensively (non-intensively). If one assumes that immigrant labor is mostly unskilled labor working in labor-intensive nontraded goods sectors, as is the case in Austria (Table 4), immigration leads to a decrease in wages for both skilled and unskilled labor and the rental rate on capital increases. The wages of skilled workers decrease because the initial impact of the immigrants is to increase the rental rate in the nontraded sectors, inducing capital to leave the traded goods sectors. With less capital to work with, skilled workers will face lower marginal products, and thus lower wages. Therefore, even if nationals are predominantly employed in industries where there are few immigrants, they will still not necessarily be insulated from the effects of immigration (Rivera-Batiz, 1983, p. 186). Thus, the normal outcome is that immigration tends to change the functional distribution of income against labor and in favor of nonlabor factors. If capital is freely mobile among countries, capital inflows may partially reverse immigration-related wage losses. The increased rate of return to capital in sectors with declining wages also represents an incentive for domestic investment. The bigger the increase in capital stock, the smaller is the decline in the wage relative to the rental rate of capital (Layard et al., 1992). The results for workers depends also on the character of labor. Immigration normally benefits workers whose skills are complementary to those of immigrant workers and hurts those whose skills are substitutes to those of immigrant labor.

Immigration need not, however, necessarily lead to a reduction in wages. As Rivera-Batiz (1983, p. 184) demonstrated under the assumption of unchanged relative prices and homogenous labor, the additional workers can be absorbed without any sector having to use labor more intensively. This may occur because of output compensation effects. The additional labor leads to downward pressure on the wage-rental ratio, which increases the

relative profitability of the labor-intensive sectors. As a result, the output of the labor-intensive (or nontraded goods) sectors increases while the output of the capital-intensive (or traded goods) sectors decreases. Since the labor-intensive sectors demand relatively more labor than the capital-intensive sectors, the labor-intensive sectors absorb all the immigration labor without either sector having to use more labor-intensive techniques. The overall increased demand for labor in the economy eliminates any tendencies for wage rates to decline.

General economic theory of international factor movements suggests that the (competitive) market will eliminate regional disparities in prosperity over time, if they are other than „compensating differentials“ (differences in industrial structure, public goods, the environment, individual preferences, language differences, and so on; Zimmermann, 1994, p. 327). Factor price equalization is the theoretical consequences of free factor movements. However, it is not necessary for differences in economic conditions (income) to disappear in the long run to rule out migration. Preferences for regions to live may not coincide with regions for work.

Since the *labor market effects* of immigration are different in the short, medium and long-run, we follow the approach used by Weyerbrock (1995, pp. 96 et seq.) in our analysis of migration between Hungary and Austria. In combining different theoretical outcomes, she distinguishes two wage regimes: a fixed wage regime and a flexible wage regime.

In the very short-run real wages and employment may be fixed (the „Europe model“). In this case, immigration leads to excess labor supply and creates or increases unemployment, as in the period shortly after the opening-up of Eastern Europe 1989-1992. Immigration affects factor returns and aggregate household income. Per capita income decreases because the population increases, even though aggregate household income remains nearly unchanged. Immigration under a fixed wage regime does not benefit capital owners. Under a fixed wage regime, the macroeconomic effects of immigration are small. Since immigration does not increase employment, output and real GDP remain almost unchanged. In a full competition general equilibrium model this situation masks the underlying unemployment problems which can arise in the case of supply-push immigration.

In the very long-run, on the other hand, wages are flexible and unemployment rates are independent of the size of the labor force. The resulting excess labor supply through immigration leads to a decrease in wages. Lower wages induce an increase in labor demand and aggregate employment. Immigration induced unemployment disappears. The effect on aggregate household income and per capita income are ambiguous. In contrast to the fixed wage regime, in a flexible wage regime the

macroeconomic effects of immigration are noticeable on real GDP, real exports and imports. Factor inputs and output increases. The larger output and demand affect the country's trade balance and the exchange rate. In our integrated two-country general equilibrium framework we can study not only the equilibrium effects of migration in the recipient country (in our case Austria), but also the effects in the emigration country (Hungary). The positive output effects in the immigration country are mirrored by negative output effects in the emigration country.

The *fiscal effects* of immigration depend on the wage regime and the time horizon. In the short-run asylum-seekers and immigrants must be housed and fed. They use public goods such as schools, health institutions, and infrastructure. In the long-run, immigrants contribute to government income. So, whereas in the short-run the net-fiscal effect of immigration may be negative, it can be positive in the long-run, as taxes surpasses transfers. Again, in a flexible wage regime with positive output effects, increased income contributes to tax revenues. In addition government transfers are usually lower because unemployment and welfare transfers are smaller under a flexible than under a fixed wage regime (Weyerbrock, 1995, p. 98 et seq.).

Table 5: Economic Determinants of Migration

1. GDP per capita of EU-15 = 14.761 ECU (PPP).

Sources: For GDP per capita: Breuss (1995), Table 7; for wages and unit labor costs: Havlik (1995).

The usual *determinants* for potential migration are: (i) expectation of higher income; (ii) better employment opportunities; and (iii) costs involved with migration (travel costs, language problems, and so on). Obviously, the income differences between East and West Europe are considerable (see *Table 5*). Hence, an unrestricted migration should lead to massive East-West migration. The present national and increasing Community-wide immigration legislation will deter East-West migration for the near future. EU membership for some of the potential CEECs after 2000 will only be feasible with some sort of transitional regulations regarding the free movement of people. By 2010, we can expect that most of the CEECs will have at least reached one half of the EU's average GDP per capita, which would reduce incentives for migration.

4. The linked Austria-Hungary CGE Model

We examine the economic effects of immigration from East to West in a three-country, 14-sector static computable general equilibrium model made up of single-country CGE models of Austria and Hungary linked by trade flows⁴). To these are added a set of export-demand and import-supply equations to represent the rest of the world. Both country models are based on a 1990 data base. The Austrian input-output table was updated (RASed) from 1976 to 1990 and the Hungarian model is based on the 1990 input-output table. The model is based on a model of the US and Mexico developed by Hinojosa-Ojeda/Robinson (1991) with a model of the US and Mexico, which was subsequently used for Hungary, Austria and the EC by Hinojosa-Ojeda/Robinson/Tesche (1994). The same framework was recently used by Weyerbrock (1995) for studying the EC's potential to absorb more immigrants from the East. A previous version of our model was used to study the effects of bilateral and multilateral trade liberalization in both Austria and Hungary, in particular for the case of the asymmetric tariff cuts through the Interim and Europe Agreements Hungary had concluded with the European Union (Breuss/Tesche, 1994).

Each model follows the standard theoretical specifications of trade-focused full competition static CGE models. Each of the 14 sectors produces a composite commodity made up of imports and domestic production. This is sold on the domestic market or exported through a constant elasticity of transformation (CET) function. Output is produced according to a Cobb-Douglas production function in labor and capital, with fixed input-output coefficients for intermediate inputs. Prices and quantities adjust to clear markets.

⁴) The GAMS code of our model can be found in the appendix of Breuss/Tesche (1993).

Each country model traces the flow of income from producers to households, government, and investors, and back to demand for goods in product markets. The two factors of production capital and labor are split into rural and urban factors. The sectors food (FOO) agricultural and forestry (AGF) use rural capital and rural labor. All other industrial sectors and the service sectors use urban capital and urban land.

Personal consumption, intermediate demand, government expenditure and investment make up domestic demand. Consumer demand is based on Cobb-Douglas utility functions, which generate fixed expenditure shares. Households pay income taxes to the government and save a fixed proportion of their income. Real government demand and real investment are fixed exogenously.

Full employment is assumed. Aggregate supplies of both factors are set exogenously. Sectoral distortions in factor markets appear in the differences between sectoral wages and the economy average. We assume that both factors are mobile within each country only. This is a long-run view. Migration of either factor between countries is exogenous.

To investigate as much as possible of the economic effects of migration in both countries we follow Weyerbrock (1995, p. 101) and differentiate between wage flexibility and intersectoral capital mobility. The flexible wage CGE model is a full employment model: all factor supplies, including rural and urban labor, are given exogenously and factor prices adjust to clear factor markets. In the fixed wage model we allow unemployment. We fix the Austrian urban wage level and solve for aggregate employment. To study the impact of intersectoral capital mobility on the macroeconomic effects of immigration, we combine the two wage regimes with mobile and immobile capital variant. In the mobile capital case capital is reallocated to maintain equal rental rates across sectors. In the immobile capital variant, rural and urban capital are sectorally fixed. Sectoral capital rental rates are determined endogenously and will differ across sectors. In all versions we assume rural and urban labor are mobile between sectors. The different combinations illustrate different time horizons: (i) the fixed wage, immobile capital model reflects the shortest-run focus; (ii) the flexible wage, mobile capital model has the longest-run horizon; and (iii) the fixed wage, mobile capital and the flexible wage, immobile capital variants are intermediate cases.

There are three main macro balances in each country model: the government deficit, aggregate investment and savings, and the balance of trade. Government savings is the difference between revenues and expenditures, with real spending fixed exogenously but revenue depending on tax revenues. The government deficit is therefore determined endogenously. Real

investment is set exogenously, and aggregate private savings is determined residually to achieve the nominal savings-investment balance. Enterprise savings rates are assumed to adjust to achieve the necessary level of aggregate savings in each country. The balance of trade in each country is set exogenously, valued in world prices. The real exchange rate for each country with the rest of the world adjusts. The Austrian Schilling/Hungarian forint exchange rate is determined implicitly. The GDP deflator is the numeraire in each country model, and the currency of the rest of the world (dollars) defines the international numeraire.

Sectoral export supply and import demand functions are specified for each country. The model solves for a set of world prices that achieve equilibrium in world markets. Demanders in each country differentiate goods by country of origin and exporters differentiate goods by country of destination (the Armington assumption).

Often in trade-focused CGE models, it is assumed that domestic and imported goods are imperfect substitutes and a constant elasticity of substitution (CES) import aggregation function is specified. In a multi-country model, the function aggregates imports from all countries of origin, in this case from the trading partners and the rest of the world. The use of CES functions in multi-country trade models with imperfect substitution has led to empirical problems due to their restrictive nature. Here import demand equations based on the Almost Ideal Demand System (or AIDS) are used.

All parameters are derived from base year data with the exception of the trade elasticities. All of the import substitution elasticities in the AIDS functions and the export substitution elasticities in the CET functions are greater than one. They vary between 1.5 and 4 and are slightly higher for Austria than for Hungary. The expenditure elasticities in the AIDS functions are also greater than one and slightly higher for Austria. The results are fairly robust to changes in these elasticities.

5. Migration Experiments

5.1 The Five Scenarios

Due to the uncertainty about future migration flows, we examine migration of 10 thousand people from Hungary to Austria and 100 thousand from Eastern Europe to Austria (10 thousand of which come from Hungary). We assume that this migration will occur over a period of five years.

We perform five different migration experiments, each with short-run and long-run variants, one with (intersectorally) mobile capital and the other with immobile capital⁵):

(i) Immigration under a *fixed wage regime*: This implies the short-run situation in Austria, assuming that the real urban wages are fixed.

(ii) Immigration and *growth* under a *fixed wage regime*: Here, we investigate to what extent the immigration-related adjustment problems under a fixed wage regime can be eased by increasing the capital stock in Austria by 3.2 percent, as projected for capital growth in the EU (Weyerbrock, 1995).

(iii) Immigration under a *flexible wage regime*: Will the shift from a fixed to a flexible wage regime lead to a better macroeconomic outcome in Austria?

(iv) Immigration and *growth* under a *flexible wage regime*: In addition to the flexibility of wages capital is added to the Austrian economy, in order to study the impact of the combination of the increase of increased factor endowment (via immigrated labor and increased national capital).

(v) Immigration with *wage adjustment*: In this experiment we follow Weyerbrock (1995, p. 107), in order to study the impact of immigration in case of exogenously reducing the levels of urban wages by 0.5 and 1 percent respectively.

Before commenting the results one should be aware of the following limitations of our CGE model. Our model includes only one type of labor in each sector. We can say nothing about the distributional effects of immigration among different types of domestic labor. Our model is a fully competitive general equilibrium model with constant returns to scale. Imperfect competition in some sectors might change the results. No assumption is made as to specific government transfers to immigrants, in addition to existing transfers. We ignore that immigrants could also bring capital and do not model international capital transfers. In our earlier papers (Breuss/Tesche, 1993, 1994) we examined the effects of an exogenous factor movement from Austria to Hungary (capital) and vice versa (labor). We assume that all immigrants enter the Austrian labor market. Our labor market results for 10 thousand and 100 thousand immigrants would be associated with higher numbers of total immigrants because children and old people will not seek a job.

⁵) These experiments are comparable to those of Weyerbrock (1995) looking at the immigration effects for the EC.

Table 6: Experiment 1 - Immigration Under a Fixed Wage Regime
(Percent change from base run)

Note:

AU: Austria, HU: Hungary.

1. Hicks CV: Change of compensating variation in percent of GDP.
2. Change of government deficit in percent of GDP.
3. Exchange rate change: an increase means that Austria devalues against the rest of the world.
4. Bilateral exchange rate: Austrian Schilling/Hungarian Forint: an increase means that Austria's Schilling devalues against the Forint.

Table 7: Experiment 2 - Immigration and Growth Under a Fixed Wage Regime
(Percent change from base run)

For notes, see Table 6.

Table 8: Experiment 3 - Immigration Under a Flexible Wage Regime
(Percent change from base run)

For notes, see Table 6.

**Table 9: Experiment 4 - Immigration and Growth Under a Flexible
Wage Regime**
(Percent change from base run)

For notes, see Table 6.

Table 10: Experiment 5 - Immigration With Wage Adjustment
(Percent change from base run)

For notes, see Table 6.

5.2 Results

The simulation results for the overall economy are summarized in *Tables 6 to 10*. The sectoral results can be found in the Appendix.

Labor immigration into Austria increases Austria's total supply of labor by 0.34 percent in the case of 10 thousand migrants from Hungary and by 3.44 percent in case of 100 thousand migrants from Eastern Europe. In Hungary the migration leads to a decrease in total supply of labor of 0.22 percent.

Macroeconomic results:

The focus of the analysis is on Austria. In Hungary the negative overall impact on output and employment is nearly the same in all experiments (with the exception of immigration with growth, which leads to more net exports to Austria). GDP falls and the government deficit increases in Hungary in all experiments. Rural wages increase, but other wages fall. The results for Austria vary considerably with the different wage regimes.

In the short run, with fixed wages (*Experiment 1*), the impact of immigration of 10,000 Hungarian workers to Austria on the Austrian economy is negligible (*Table 6*). There is a slight distributional effect: the rental rate of urban capital increases. The only significant effect is exhibited in the bilateral exchange rate. The Austrian Schilling (ATS) revalues against the

Hungarian Forint by 4.5 per cent. This leads to a slight decrease in Austrian exports to Hungary. Since GDP is lower in Hungary, there is no increased demand for imports. In the case of 100.000 immigrants from Eastern Europe (10.000 of which from Hungary) even under a fixed wage regime, there is a positive output (GDP) and budget effect. With the exception of the reaction on exports and imports, 100.000 immigrants results in just ten times the effects in nearly all macroeconomic variables in Austria. The only difference in this proportionality effect in the model simulations are the bilateral relations between Austria and Hungary. Because of a slightly lower revaluation of the Schilling, Austrian exports to Hungary are dampened somewhat less in case of 100.000 immigrants than with 10.000 immigrants.

If we allow for growth in the capital stock in Austria, but still keep wages fixed (*Experiment 2*), the proportionality effect between the immigration simulations with different dimensions (10.000 versus 100.000) vanishes (*Table 7*). More growth in Austria induces many more exports from Hungary to Austria, although the change in the bilateral exchange rate is similar to experiment 1. Again the rental rate of (mobile) urban capital increases. The reaction of rural labor wages is positive in case of only 10.000 immigrants from Hungary, whereas it is negative in case of 100.000 immigrants. The increase in capital increases GDP and wages, if there is a small amount in immigration. With 100.000 immigrants, the capital growth is not enough. Employment does increase, but rural wages fall.

Under a flexible wage, or long-run, regime (*Experiment 3*) the macroeconomic effects are much more pronounced than in the case of fixed wages (*Table 8*). Again, we see the proportionality effect when comparing 10.000 immigrants with 100.000. GDP grows (0.2 per cent with flexible wages compared to 0.03 per cent with fixed), the impact on the budget is positive and consumer welfare increases. If both factors are mobile, we see a strong impact on the distribution of income: the functional distribution of income turns against labor and in favor of capital.

The distributional results change if we examine immigration under a flexible wage regime with growth (*Experiment 4*). GDP and household income increase substantially, but by only half as much as with fixed wages and growth when there are 10.000 immigrants. With 100.000 immigrants the increase in GDP is similar to that with fixed wages. The large increase in capital, without a similarly large increase in labor, drives up the urban wage rate, and lowers the rental rate on capital, compared to the 100.000 immigration case. In the case of 10.000 immigrants from Hungary the rental rates of capital decline as well as those of rural wages. Urban labor wages, however increase. Only if we increase the dimension of immigration to 100.000

do urban capital rentals increase, as do urban wages. In both cases the factor prices for rural labor and rural capital decrease (*Table 9*).

The intermediate step of cutting wages by 0.5 per cent, with immigration (*Experiment 5*) leads to a strong improvement of capital income at the expense of wage income (*Table 10*). GDP increases more than with fixed wages, but less than with flexible wages, as we would expect. Other macroeconomic results are also in-between the fixed and flexible wage results.

Sectoral results:

The sectoral results for Hungary are nearly the same for all experiments, because they are carried out with the same assumptions concerning wage regime and factor mobility. Output decreases in all sectors, with the effects slightly less when capital is immobile.

For Austria, production is higher in virtually all cases, particularly in the capital growth experiments. With the exception of the „rural“ sectors (FOO and AGF) we see again the proportionality effect when comparing 10.000 immigrants from Hungary with 100.000 immigrants from Eastern Europe (*Appendix: Tables A1 to A16*). Factor demands (for labor and capital) react according to relative factor price changes, which means that factor demand and output increase in the rural sectors.

6. Conclusions

Our results mostly support those of Weyerbrock (1994) and are, hence, also in line with general equilibrium theory of migration. The short-run effects of immigration do include an increase in unemployment and decrease in income, even though the macro effects are minimal. Her results indicate that migration plus capital growth increases employment and per capital income only for 3.5 million immigrants to the EC, but not for 7 million. We, on the other hand, find that GDP increases the most with fixed wages and capital growth and flexible wages and higher migration. Even in the long-run, if the large increase in capital is not matched with a large increase in labor, GDP does not increase as much as with fixed wages and growth.

If the labor market were more flexible in Austria (*experiment 3*), immigration has a positive effect on output. This positive effect is larger with larger immigration. As stated above, capital growth with flexible wages does have a positive effect on GDP, but less than with fixed wages if the number of immigrants is relatively small. Given that it is unlikely that Austria will liberalize labor markets completely in the near future, lowering urban wages slightly (0.5%), is able to ease the adjustment of immigration substantially. Unemployment does increase, but by less than with no adjustment in wages.

References

- Ardittis, Solon (1994, Ed.) *The Politics of East-West Migration*, Houndmills and London: The Macmillan Press Ltd.
- Biffi, Gudrun (1995) *SOPEMI Report on Labour Migration: Austria 1994/95*, November, Vienna: WIFO Publication.
- Breuss, Fritz (1995) *Cost and Benefits of EU's Eastern European Enlargement*, WIFO Working Papers, No. 78, June, Vienna.
- Breuss, Fritz, Schebeck Fritz (1995) *Opening Up of Eastern Europe and EU's Eastern European Enlargement: The Impact on the Austrian Economy*, WIFO Working Papers, No. 82, November: WIFO Publication.
- Breuss, Fritz, and Tesche, Jean (1993) *A General Equilibrium Evaluation of Trade and Industrial Policy Changes in Austria and Hungary*, WIFO Working Papers, No. 62, June, Vienna.
- Breuss, Fritz, and Tesche, Jean (1994) *A General Equilibrium Evaluation of Trade and Industrial Policy Changes in Austria and Hungary*, *Weltwirtschaftliches Archiv - Review of World Economics*, Band 130, Heft 3: 534-552.
- Economic Commission for Europe (1995) *Economic Survey of Europe in 1994-1995*, New York and Geneva: United Nations Publication.
- Eurostat (1995) *Erwerb der Staatsbürgerschaft durch Einbürgerung in der Europäischen Union - 1993*, *Statistik kurzgefasst: Bevölkerung und soziale Bedingungen*, November (11), Luxemburg: Europäische Union.
- Fassmann, Heinz, Münz, Rainer (1995), *Geschichte und Gegenwart europäischer Ost-West-Wanderung, Österreichische Osthilfe*, Heft 3: 747-778.
- Gächter, August (1995) *Auswirkungen einer allfälligen Osterweiterung der Europäischen Union auf die Zuwanderung nach Österreich und auf die Akzeptanz von Zuwanderern*, In *Europa 1996. Auswirkungen einer EU-Osterweiterung*, Vienna: Schriftenreihe Europa des Bundeskanzleramtes, pp. 47-86.
- Giersch, Herbert (1994, Ed.) *Economic Aspects of International Migration*, Berlin-Heidelberg-New York: Springer Verlag.
- Griller, Stefan (1996) *Grundzüge des Rechts der Europäischen Union*. SpringerNotes Rechtswissenschaft, Vienna: Springer Verlag.
- Hamilton, Kimberly, A. (1994, Ed.) *Migration and the New Europe*, Washington: Center for Strategic and International Studies.

- Havlik, Peter (1995) *CEEC-EU trade: recent trends and some hypotheses for the future integration and competitiveness*, Internal paper of WIIW: Vienna.
- Hinojosa-Ojeda, Raul, and Robinson, Sherman (1991) *Alternative Scenarios of U.S. - Mexico Integration: A Computable General Equilibrium Analysis*, University of California at Berkeley: Department of Agricultural and Resource Economics, Working Paper No. 609.
- Hinojosa-Ojeda, Sherman Robinson, and Jean Tesche (1994), Hungary, Austria, and the European Community: *A CGE Model of Economic Reform and Integration*, Paris: OECD.
- Odin Knudsen, and Antonio S. Brandao, eds, Modelling Economywide Reforms, O'Keeffe, David (1995) The Emergence of a European Immigration Policy, *European Law Review*, Vol. 20, No. 1, February: 20-36.
- Layard, R., Blanchard, O., Dornbusch, R., and Krugman, P. (1992) *East-West Migration - The Alternatives*, Cambridge: The MIT Press.
- OECD (1995) SOPEMI: *Trends in International Migration. Annual Report 1994*, 1995 Edition, Paris.
- Redei, Mary (1994) Hungary, In *The Politics of East-West Migration*, Edited by Solon Ardittis (1994), Houndmills and London: The Macmillan Press Ltd: 86-97.
- Rivera-Batiz, Francisco, L. (1983) Trade Theory, Distribution of Income, and Immigration, *The American Economic Review* Vol. 73(2), May: 183-187.
- Siebert, Horst (1994) *Migration: A Challenge for Europe. Symposium 1993*, Tübingen: J.C.B. Mohr (Paul Siebeck).
- Weyerbrock, Silvia (1995) Can the European Community Absorb More Immigrants? A General Equilibrium Analysis of the Labor Market and Macroeconomic Effects of East-West Migration in Europe, *Journal of Policy Modeling*, 17(2): 85-120.
- Zimmermann, Klaus, F. (1995) European Migration: Push and Pull. In *Proceedings of the World Bank Annual Conference on Development Economics 1994*, Washington: The World Bank: 313-342.

Bisher erschienene IEF Working Papers

- 1 *Gerhard Fink*, A Schedule of Hope for the New Europe, Oktober 1993.
- 2 *Gerhard Fink* und *Jutta Gumpold*, Österreichische Beihilfen im europäischen Wirtschaftsraum (EWR), Oktober 1993.
- 3 *Gerhard Fink*, Microeconomic Issues of Integration, November 93.
- 4 *Fritz Breuss*, Herausforderungen für die österreichische Wirtschaftspolitik und die Sozialpartnerschaft in der Wirtschafts- und Währungsunion, November 93.
- 5 *Gerhard Fink*, *Alexander Petsche*, Central European Economic Policy Issues, July 94.
- 6 *Gerhard Fink*, *Alexander Petsche*, Antidumping in Österreich vor und nach der Ostöffnung, November 94.
- 7 *Fritz Breuss*, *Karl Steininger*, Reducing the Greenhouse Effect in Austria: A General Equilibrium Evaluation of CQ-Policy-Options, March 95.
- 8 *Franz-Lothar Altmann*, *Wladimir Andreff*, *Gerhard Fink*, Future Expansion of the European Union in Central Europe, April 95.
- 9 *Gabriele Tondl*, Can EU's Cohesion Policy Achieve Convergence?, April 95.
- 10 *Jutta Gumpold*, Nationale bzw. gesamtwirtschaftliche Effekte von Beihilfen - insbesondere Exportbeihilfen, April 95.
- 11 *Gerhard Fink*, *Martin Oppitz*, Kostensenkungspotentiale der Wiener Wirtschaft - Skalenerträge und Kostendruck, August 95.
- 12 *Alexander Petsche*, Die Verfassung Ungarns im Lichte eines EU-Beitritts, September 95.
- 13 *Michael Sikora*, Die Europäische Union im Internet, September 95.
- 14 *Fritz Breuss*, *Jean Tesche*, A General Equilibrium Analysis of East-West Migration: The Case of Austria-Hungary, January 95.

Bisher erschienene Bände der Schriftenreihe des Forschungsinstituts für Europafragen

(Zu beziehen über den Buchhandel)

- 1 Österreichisches Wirtschaftsrecht und das Recht der EG. Hrsg von *Karl Korinek/Heinz Peter Rill*. Wien 1990, Verlag Orac. XXIV und 416 Seiten. (öS 1.290,-)
- 2 Österreichisches Arbeitsrecht und das Recht der EG. Hrsg von *Ulrich Runggaldier*. Wien 1990, Verlag Orac. XIII und 492 Seiten. (öS 1.290,-)
- 3 Europäische Integration aus österreichischer Sicht. Wirtschafts-, sozial und rechtswissenschaftliche Aspekte. Hrsg von *Stefan Griller/Eva Lavric/Reinhard Neck*. Wien 1991, Verlag Orac. XXIX und 477 Seiten. (öS 796,-)
- 4 Europäischer Binnenmarkt und österreichisches Wirtschaftsverwaltungsrecht. Hrsg von *Heinz Peter Rill/Stefan Griller*. Wien 1991, Verlag Orac. XXIX und 455 Seiten. (öS 760,-)
- 5 Binnenmarkteffekte. Stand und Defizite der österreichischen Integrationsforschung. Von *Stefan Griller/Alexander Egger/Martina Huber/Gabriele Tondl*. Wien 1991, Verlag Orac. XXII und 477 Seiten. (öS 796,-)
- 6 Nationale Vermarktungsregelungen und freier Warenverkehr. Untersuchung der Art. 30, 36 EWG-Vertrag mit einem Vergleich zu den Art. 13, 20 Freihandelsabkommen EWG - Österreich. Von *Florian Gibitz*. Wien 1991, Verlag Orac. XIV und 333 Seiten. (öS 550,-)
- 7 Banken im Binnenmarkt. Hrsg von *Stefan Griller*. Wien 1992, Service Fachverlag. XLII und 1634 Seiten. (öS 1.680,-)
- 8 Auf dem Weg zur europäischen Wirtschafts- und Währungsunion? Das Für und Wider der Vereinbarungen von Maastricht. Hrsg von *Stefan Griller*. Wien 1993, Service Fachverlag. XVII und 269 Seiten. (öS 440,-)
- 9 Die Kulturpolitik der EG. Welche Spielräume bleiben für die nationale, insbesondere die österreichische Kulturpolitik? Von *Stefan Griller*. Wien 1995, Service Fachverlag.
- 10 Das Lebensmittelrecht der Europäischen Union. Entstehung, Rechtsprechung, Sekundärrecht, nationale Handlungsspielräume. Von *Michael Nentwich*. Wien 1994, Service Fachverlag. XII und 403 Seiten. (öS 593,-)
- 11 Privatrechtsverhältnisse und EU-Recht. Die horizontale Wirkung nicht umgesetzten EU-Rechts. Von *Andreas Zahradnik*. Wien 1995, Service Fachverlag.
- 12 The World Economy after the Uruguay Round. Hrsg von *Fritz Breuss*. Wien 1995, Service Fachverlag. XVII und 415 Seiten. (öS 540,-)
- 13 European Union: Democratic Perspectives after 1996. Von *Gerda Falkner/Michael Nentwich*. Wien 1995, Service Fachverlag. XII und 153 Seiten. (öS 385,-)