Kiel Institute for World Economics
Duesternbrooker Weg 120
24105 Kiel (Germany)

Long-Run Determinants of Immigration to Germany 1974–1999: A Ricardian Framework

by

Federico Foders

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Abstract:

This paper examines the long-run determinants of immigration to Germany using a modified version of the Ricardo model. After a brief overview of labour flows to Germany and the related empirical literature, a Ricardian model of migration is estimated using static panel data methods. The results show that variables representing factor abundance appear to have no effect whatsoever on labour flows to Germany in a period of rising unemployment (1974–1999), while variables representing income or productivity differences do have an impact. The latter obtains only if the stock of previous immigrants in the country of destination and the distance between sending countries and the receiving country are controlled for.

Dr. Federico Foders
Kiel Institute for World Economics
24100 Kiel, Germany
Telephone: +49/431/8814-285
Fax: +49/431/8814-502
E-mail: ffoders@ifw.uni-kiel.de

Contents

List of Tables

I. Introduction*

During the recent revival of globalisation European countries and particularly Germany experienced large labour inflows and outflows which led to a surge in studies on migration. While a number of studies may be classified as based on ad hoc models and only very few of them seem to be firmly rooted in economic theory, most of them relate in one way or another to the field of labour economics. A recent paper by Davis and Weinstein (2002) recalls that, without diminishing the contribution of labour economics to migration research, many key issues affecting international factor movements could be addressed from the point of view of international economics. In this vein, in this paper we attempt to apply a Ricardian framework to enquire into the long-run determinants of migration to Germany in the period 1974–1999.

Section II gives an overview of the immigration flows to and the stock of foreigners living in Germany and sets them in an international perspective. In Section III the model is presented in some detail, whereas Section IV presents the estimation results. Finally, the conclusions are summarised in Section V.

II. Germany as a Country of Destination

Germany is an interesting case study for migration research: during much of the nineteenth century and until well into the twentieth century, the country had been a source country for emigrants. In the second half of the twentieth century the flows reversed and Germany became a country of destination for migrants from many countries, particularly from eastern Europe. While some foreign

labour already worked in Germany during the Second World War, the demand for foreign labour increased significantly after the war was over and especially during the golden age of economic growth in the period 1948–1966. Also, taking into account the frequent changes occurring to the European national borders, many of which were re-drawn after both world wars and again in the 1990s, and their consequences for the relocation of ethnic Germans and their relatives, the twentieth century qualifies as the *century of migration* for Germany.[1]

Notwithstanding the rich experience the Germans and their governments gathered with continued labour movements in both directions, in recent years a migration dilemma seems to have emerged. On the one hand, Germany has been largely practicing an open door policy for selected groups of immigrants, among them guest workers (and their relatives) and ethnic Germans and their relatives, over many decades. In 2000, a green-card programme was introduced to attract experts in information and communication technology in response to a lack of high-skilled labour in this field. On the other hand, immigration is increasingly being opposed by public opinion in the wake of rising unemployment, the slowdown in economic growth, a mounting public debt and the crisis of the welfare system. Aversion against immigration prevails in Germany in spite of persistently low fertility rates and an irreversibly shrinking native population swiftly approaching the final phase of its demographic transition process.[2]

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[1] For an account of East-West migration in Europe and the importance of Germany as a receiving country see the volume edited by Fassmann and Münz (2000).

[2] See, for instance, the recent survey carried out to test the acceptance of a new immigration law (IfD 2002). This view is shared, among others, by Martin (1994) who christened Germany as a 'reluctant land of immigration' that 'receives but does not want the …newcomers that arrive each year'.

For the German public opinion, a stock of around 7,3 million foreigners (as of December 2001) represents a heavy burden, even if 21 per cent of them were born and raised in Germany (table 1).[3] Moreover, more than half of the stock of foreigners consists of citizens of other European countries (including Turkey this percentage would rise to 80 per cent) and only 20 per cent hold a non-European passport (excluding Turkey). A glance at the average gross immigration flows to Germany in the 1970s, 1980s and 1990s reveals that the share of immigrants from eastern Europe increased from 18 to 52 per cent, whereas that of immigrants from western Europe and Turkey decreased from 36 to 19 per cent and from 30 to 8 per cent, respectively (table 2).[4] The share of immigrants from non-European sources increased somewhat at first but then seems to have stabilised at around 20 per cent.

Table 1 — Germany : Stock of Foreigners by Place of Birth
　　　　　　(as of 31 December 2001)

Citizenship	Foreign born	Born in Germany	Total	
European Union (14)	1 446 257	423 765	1 870 022	(26)
Central and Eastern Europe	1 723 781	247 514	1 971 295	(27)
Turkey	1 240 829	707 109	1 947 938	(27)
Rest of the World	1 293 418	162 537	1 455 955	(20)
Displaced etc.	50 387	23 031	73 418	(1)
Total	5 754 672	1 563 956	7 318 628	(100)
Shares in parenthesis (per cent).				

Source: Statistisches Bundesamt (2002).

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[3] Following German law which is based on the *ius sanguinis* principle, foreigners born in Germany are not automatically entitled to earn the German citizenship.

[4] The decrease in immigrants from Turkey is related to the end of the guest worker programme in 1973; after that only relatives were allowed to immigrate under the legal heading of family reunification. From a historical point of view, Turkish guest workers probably substituted for eastern Europeans, who – with the exception of Yugoslavians – were excluded from the guest worker programme during the Cold War for obvious reasons.

Table 2 — Germany: Average Annual Gross Immigration by Sending Regions, 1974–1999

Region/Country	1974–1980	1981–1989	1990–1999
European Union (14)	170 006 (36)	123 000 (26)	155 547 (19)
EFTA	5 039 (1)	5 356 (1)	5 770 (1)
Central and Eastern Europe	85 953 (18)	173 502 (37)	427 509 (52)
Turkey	142 105 (30)	58 740 (13)	67 565 (8)
Rest of the World	74 868 (16)	104 514 (22)	173 318 (21)
Total	477 971 (100)	465 112 (100)	829 709 (100)
Shares in parenthesis (per cent)			

Source: Statistisches Bundesamt (2003).

Germany's perceived burden contrasts somewhat with the experience of non-European developed countries, but not so much with the stance of most European countries. The relative size of the stocks and flows of migrants who chose Germany as their country of destination does not differ much from that experienced by other member countries of the European Union (EU). It does, however, turn out to be rather moderate in comparison with developments in other advanced countries such as the US, Canada and Australia (table 3). Thus, in a nutshell, the German (and, to a large extent, European) case may be summarised as follows: the perceived burden of immigration by far exceeds the actual burden as documented by available statistics and is clearly reflected in the views and actions defining current migration policies. As the figures given in table 4 show, less than half of EU members (including Germany) feel that the current flows are too high, but more than half of EU members (including Germany) advocate measures aiming at a reduction of inflows. As concerns the enlarged EU (as of May 2004), 11 of 25 old and new members view current flows as too high and 16 old and new members favour more restrictive immigration policies. As it seems from this evidence, new EU members might be inclined to support Germany's stance in shaping future policies affecting migration to the EU.

Table 3 — Migration Indicators, 2000

Country/region	Stock of Migrants[a]		Net immigration rate[b] (per 1,000 pop.)
	thousands	per cent of population	
European Union			
– EU-15	26 429	7.0	2.3[d]
– EU-25[c]	30 507	6.8	1.2[d]
– Germany	7 349	9.0	2.3
– France	6 277	10.6	0.7
United States	34 988	12.4	4.5
Canada	5 826	18.9	4.8
Australia	4 705	24.6	5.1
Japan	1 620	1.3	0.4
World	174 781	2.9	0.0
– Developed countries	104 119	8.7	2.0
– Developing countries	70 662	1.5	–0.5

[a] Including refugees. — [b] Average annual rate of net immigration (immigrants minus emigrants) in the period 1995 – 2000.— [c] Enlarged EU as foreseen as of 1 May 2004. — [d] Unweighted average.

Source: UN (2002); own calculations.

Table 4 — Migration Policies, 2001

Country/region	Immigration[a]		Emigration	
	View	Action	View	Action
European Union				
– EU-15	7 x TH	8 x L	15 x S	13 x NI
– EU-25[b]	11 x TH	16 x L	24 x S	19 x NI
– Germany	TH	L	S	NI
– France	TH	L	S	R
United States	S	M	S	NI
Canada	S	M	S	NI
Australia	S	M	S	NI
Japan	S	M	S	NI

Notes: TH: too high; S: satisfactory; L: lower; M: maintain; NI: no intervention; R: raise.

[a] Including refugees. — [b] Enlarged EU as foreseen as of 1 May 2004.

Source: UN (2002); own calculations.

One of the characteristics of international migration that can be hypothesised to be at the heart of the European (and thus also German) public attitude towards immigration is the rather unequal distribution of the stocks of migrants in the world economy. While at a world level, migration affects less than 3 per cent of the world's total population (of over 6 billion people), developed countries clearly attract most of the flows (and stocks) (table 3). Nevertheless, the question arises why do so *few* people migrate in a world in which large differences prevail between rich and poor countries? Or: why is labour rather immobile as opposed to trade and capital flows? A plausible answer to this question can be found in the empirical fact that a number of barriers to migration exist such as immigration policies, labour market regulations, distance, legal and institutional conditions, language and cultural variety, etc., which tend to reduce actual migration. Another plausible explanation could be related to the 'option value of waiting' (Burda 1995) in the sense that only a small number of potential migrants actually emigrates and that the rest expects the general economic conditions in their respective home countries to improve soon and therefore postpones actual migration, more often than not indefinitely.

The fact that migration flows are so low in the world economy leads to empirical and theoretical challenges for economists: as Hatton and Williamson (2002) have pointed out, the observed flows represent only a small share of the flows predicted by economic theory. The gap between the predicted flows (*migration pressure*) and actual flows is so large that observed flows might be insufficient to adequately test hypotheses derived from theory. And if to this the problems encountered in measuring actual migration flows and stocks of foreigners are added, the attempt to analyse migration could turn out to be extremely difficult indeed. To conclude from this, however, that migration research is a 'mission impossible' would be inappropriate. The reason is that analogous arguments may be readily applied to trade and capital flows too, and despite the increasing

sophistication needed for sound empirical research work in this area, such problems have not really blocked progress in research. As it seems, there are issues which might be much more serious than the mere availability and quality of data, e.g. trends in international migration which could lead to structural changes or even breaks in observed international labour flows. Particularly, as regards regional labour flows, notably in Europe, the indication is that permanent flows are increasingly being substituted for temporary flows, a structural change or break that certainly could question the traditional empirical and theoretical approach to migration research.[5] A case in point is again Germany, which as a member state of the European Union (EU) benefits from the EU's eastern Enlargement in the sense that the latter tends to reduce the pressure for permanent East-West migration from the candidate countries due to the free movement of labour within the Union.[6]

III. A Ricardian Model of Migration and its Extension

In the standard Ricardian trade model international and sectoral differences in labour productivity characterise countries and give rise to trade. The model explains an important share of total trade that is left unexplained by models that focus on factor endowments or scale economies and also performs better than the latter in most empirical investigations.[7] Moreover, by allowing for labour migration between countries the (extended) Ricardian model offers a simple but powerful framework for the study of migration, as pointed out by Davis and

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[5] On the changing structure of labour flows see OECD (2002), p. 68, and OECD (2003), p. 79.

[6] In fact recent data reveals that some of the candidate countries themselves (e.g. Poland) are now becoming prime destinations for migrants from the former USSR and former Yugoslavia (OECD 2003).

[7] On this see the work of Trefler (1995, 2002).

Weinstein (2002).[8] There are several reasons for this. First, the actual pattern of observed migration from eastern to western Europe, from Latin America and the Caribbean to the U.S. and from South Asia, the Near and Middle East and Northern Africa to the Arab oil exporting countries, occurs between countries featuring large differences in labour productivity, with the sending countries generally showing relatively low levels of labour productivity. The extended Ricardian trade model predicts an increase in the total output of sending and receiving countries as a result of international flows of labour. Second, trade in factors strongly resembles trade in goods and should therefore occur for similar reasons and produce similar results. In the case of labour this similarity is revealed by the Ricardian model which, in contrast to the Hechscher-Ohlin-Samuelson model, under certain conditions implies a substitution between trade and migration and a complementary relationship under other conditions (see Appendix A).

The starting point is expression (A7) in Appendix A where the standard Ricardian model with labour mobility is derived algebraically:

$$\frac{M_{it}}{L_{it}} = \alpha \frac{L_{Gt}}{L_{it}} \frac{(w_{Gt} - w_{it})}{w_{it}} \tag{1}$$

In (1) the migration rate, the gross or net number of immigrants from country i as a share of the labour force of that country at point in time t, $\frac{M_{it}}{L_{it}}$, is determined by the taste parameter α (assumed to be the same for all countries), the

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[8] Other efforts to use the Ricardo-Viner model in migration research include Grether, de Melo and Müller (2001). For a discussion of the relationship between trade and migration see also Ethier (1996). On the general difficulty in finding an appropriate theoretical framework for migration see Sala-i-Martin (1994/1996).

ratio of the labour forces in Germany and in the sending country i at time t, $\frac{L_{Gt}}{L_{it}}$, and the relative wage differential between Germany and the sending country i at time t, $\frac{(w_{Gt} - w_{it})}{w_{it}}$.

One of the features of the Ricardo model that makes it so suitable to study migration is that wage equalisation *does not* constitute a precondition for trade equilibrium, i.e. that labour mobility may respond to the existing wage differential in equilibrium.

Taking logs on both sides of equation (1) gives the following basic equation which can be estimated econometrically:

$$\ln\left(\frac{M_{it}}{L_{it}}\right) = \ln \alpha + \ln\left(\frac{L_{Gt}}{L_{it}}\right) + \ln \frac{(w_{Gt} - w_{it})}{w_{it}} \tag{2}$$

or

$$\ln\left(\frac{M_{it}}{L_{it}}\right) = \ln \alpha + \ln\left(\frac{L_{Gt}}{L_{it}}\right) + \ln\left(w_{Gt} - w_{it}\right) - \ln w_{it}. \tag{2a}$$

Finally, (2) or (2a) could also be written in first differences as (for (2))

$$\Delta \ln\left(\frac{M_{it}}{L_{it}}\right) = \ln \alpha + \Delta \ln\left(\frac{L_{Gt}}{L_{it}}\right) + \Delta \ln \frac{(w_{Gt} - w_{it})}{w_{it}}. \tag{2c}$$

Similar equations have been specified and estimated by other authors, notably by Hatton (1995) (for emigration from the U.K.), Karras and Chiswick (1999) (for immigration to Germany), Fertig (2001) (using the Hatton model to explain immigration to Germany from the CEECs), Zimmermann (1994/1996) (also addressing immigration to Germany from the CEECs) and, more recently, by Clark, Hatton and Williamson (2002) (for immigration to the U.S.), Mitchell and

Pain (2003) (based on the Hatton model and applied to immigration to the UK) and Brücker et al. (2003) (also based on Hatton (1995) and applied to immigration to Germany from the CEECs), although none of these authors makes any explicit reference to the Ricardian framework.[9] Furthermore, even researchers engaged in labour economics, who generally resort to close-economy models, also use similar models to analyse intra-regional and international migration (e.g. Borjas 1994).

In his seminal paper Hatton (1995) presents a microeconomic model of migration attempting to explain the probability that an individual might choose to migrate. This probability is modelled as a function of the difference between the expected utility of staying in the country of origin and that of moving to another country, corrected by the probability of finding employment there, minus the costs of migration. The empirical specification of this model (also used by Fertig (2001)) includes lagged variables and variables in their levels as well as their first differences, a procedure that allows it to capture short-run and long-run effects. As far as contemporaneous variables are concerned, almost all of them in logs, it includes the wage ratio, the level of employment in the country of origin, the level of employment in the country of destination and the stock of previous immigrants from each country of origin in the country of destination (not in logs). Lagged variables include the dependent variable (net migrants as a share of the labour force of the country of origin), the log of the wage ratio and the logs of the employment variables. The stock of immigrants is used in Hatton's specification as a proxy for the costs of migration. While Hatton (1995) estimates a purely time-series model, Fertig (2001) prefers to pool time-series and cross-section data.

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[9]   The close relationship between the Ricardian model and Hatton's (1995) model has been pointed out first by Bowen, Hollander and Viaene (2001) on p. 92.

Another way of dealing with medium- and long-run effects in the context of migration is the macroeconomic model estimated by Karras and Chiswick (1999). These authors regress the net migration rate on the lagged dependent variable, the income ratio, the endowment with human capital and the growth rate of per capita income in the sending countries and in the receiving country as well. The growth variables are taken to represent the business-cycle effect, a short-run effect, on migration. In addition, the authors include a dummy for EU membership and experiment with two kinds of coefficients of the lagged dependent variable, a constant one and one that varies across countries. Karras and Chiswick also settle for pooled time-series and cross-section data.

A similar approach was chosen by Zimmermann (1994/1996) and Brücker et al. (2003). Zimmermann (1994/1996) regresses (i) the migration rate (net immigration to Germany from the so-called guest worker sending countries from 1960 to 1991) on GNP growth, the lagged dependent variable, a time trend and a dummy variable (for German immigration policy) in a time-series analysis for each sending country and (ii) the log of the number of asylum seekers and refugees flowing to ten EU countries on the logs of unemployment rates, relative wages, the relative size of the labour market, the stocks of relevant migrants and a dummy variable representing distance in a pooled cross-section and time-series analysis as well as in a random-effects panel data analysis. Brücker et al. (2003) specify and estimate an error-correction model in which the annual change of the migration rate is regressed on levels and first differences of the log of the lagged employment rate, the levels and first differences of the log of the wage differential (as a ratio), the lagged dependent variable and the dependent variable in levels as well as several dummy variables.

Clark, Hatton and Williamson (2002) estimate an equation featuring the wage ratio, several variables representing the characteristics of the immigrants and their countries of origin, some proxies for the costs of migration and immigra-

tion policy variables. The set of immigrant characteristics includes the average years of schooling in the sending country relative to that in the U.S., the share of population aged 15–29 years in the sending country and the degree of inequality in the distribution of income in the country of origin relative to that in the U.S. The costs of migration are approximated by the physical distance between the sending country and the U.S., a variable indicating whether the country of origin is English speaking and the stock of previous immigrants from the sending country. The six remaining variables relate to U.S. immigration policies. The only lagged variable is the stock of previous immigrants; neither first differences nor logs of independent variables are included. The dependent variable is the log of gross immigration to the U.S, divided by the population in the country of origin. The estimation is performed for a panel of pooled time-series and cross-section data. Finally, the work of Mitchell and Pain (2003), also deeply rooted in Hatton's model, differs from other studies in the selection of variables and estimation procedures. Interestingly, Mitchell and Pain (2003) include, among other regressors, bilateral trade and the economic conditions prevailing in competing receiving countries. Despite these and other innovations, though, the authors' findings are very much in line with those of other, less sophisticated studies.

In this paper we first explore an extended and slightly modified version of the Ricardian model (equation (2) above) to study the long-run determinants of immigration to Germany. We then extend the Ricardian model to include some of the variables used by the authors mentioned above as well as some additional variables that appear to be relevant in the German/European context. The extensions and modifications comprise

– the stock of previous immigrants to Germany ($STOCK_{it}$),

– the ratio of the relative wage difference between Germany and the sending country $\left(\frac{\left(w_{Gt} - w_{it} \right)}{w_{it}} \right)$ and, alternatively,

– the absolute wage difference between Germany an the sending country $\left(w_{Gt} - w_{it} \right)$, and

– the wage level in the sending country (w_{it}),

– the demographic characteristics of the sending countries ($DEMO_{it}$),

– the human capital endowment of the sending countries (HK_{it}),

– the physical distance between Germany and the sending countries ($DIST_i$),

– the ratio of the employment rates (E_{Gt}/E_{it}), instead of total labour supply, and, alternatively,

– the employment rate in Germany (E_{Gt}), and

– the employment rate in the sending countries (E_{it}),

– a dummy for Central and Eastern Europe ($DUCEEC_{it}$),

– a dummy for the European Union ($DUEU_{it}$),

– a dummy for the EFTA ($DUEFTA_{it}$),

– a dummy for the Rest of the World ($DUROW_{it}$),

– a dummy for Turkey ($DUTUR_{it}$),

– a dummy for each decade ($DUDEC_{it}$) for t = 1,2,3,

– a dummy for immigration policy in Germany ($DUPOLG_{it}$) vis-à-vis certain regions and changing over time,

– a dummy for emigration policy in the CEECs ($DUPOLEAST_{it}$) changing over time.

Introducing the above mentioned variables, equation (2) expands (the logarithmic form is also assumed for the additional variables) and can be estimated as

$$\ln\left(\frac{M_{it}}{L_{it}}\right) = b_0 + b_1 \ln\left(E_{Gt}/E_{it}\right) + b_2 \ln\left(\frac{\left(w_{Gt}-w_{it}\right)}{w_{it}}\right) + b_3 \ln\left(STOCK_{it}\right)$$

$$+ b_4 \ln\left(DEMO_{it}\right) + b_5 \ln\left(DIST_i\right) + b_6 \ln\left(HK_{it}\right) + \sum_{it} b_{it} DUMMIES_{it} + \varepsilon_{it} \quad (3)$$

or

$$\ln\left(\frac{M_{it}}{L_{it}}\right) = c_0 + c_1 \ln\left(E_{Gt}\right) - c_2 \ln\left(E_{it}\right) + c_3 \ln\left(w_{Gt}-w_{it}\right) - c_4 \ln\left(w_{it}\right)$$

$$+ c_5 \ln\left(STOCK_{it}\right) + c_6 \ln\left(DEMO_{it}\right) + c_7 \ln\left(DIST_i\right) + c_8 \ln\left(HK_{it}\right)$$

$$+ \sum_{it} c_{it} DUMMIES_{it} + \varepsilon_{it} \quad (4)$$

with $b_0, c_0 = \ln \alpha$.

As can be seen from (3) (specification I) and (4) (or specification II) we do not include the mix of variables in their first differences *and* their levels as used by most of the authors mentioned above, and particularly we exclude the lagged-dependent variable employed extensively in other studies. There are several reasons for bypassing the typical variables of time-series analysis. One of them is that the purpose of the present paper is to address the ongoing debate on the long-run determinants of immigration to Germany and not to touch upon the

statistical properties of variables that are commonly required in short-run time-series analyses and possibly also in forecasting exercises but which do not add much from an economic point of view to our enquiry. As far as the lagged-dependent variable is concerned, its inclusion has been severely criticised in the migration literature at least since Gould's article (1979). To the arguments skilfully summarised by Gould (1979) we would like to add that the lagged-dependent variable may be interpreted as representing previous migration or past additions to the stock of migrants in the country of destination, an effect that is already being taken into account by the stock variable itself (if it is included). Moreover, from an econometric point of view, the inclusion of the lagged-dependent variable on the right hand side of the equation violates the exogeneity assumption (in case pooled OLS is performed), and in fact the lagged-dependent variable might be correlated with the unobserved (individual) effects (Baltagi 2002; Woolbridge 2002). Thus, the indication is that unless a correction is undertaken to support the lagged-dependent variable (i.e. choosing an appropriate estimation method), only the stock variable should be eligible for inclusion in the estimated equation. Furthermore, although we decide to control for individual heterogeneity of the source countries by using panel data, we do not draw on the fixed effects model which does not only remove time-constant individual effects through the demeaning transformation, but also increases the probability of multicollinearity among the regressors by increasing the number of dummies.

Following Gould (1979) and others we have chosen to admit the stock variable to our equation, although we are aware that, like the lagged-dependent variable, it generally tends to perform extremely well in terms of statistical significance in econometric estimates albeit without really contributing much to 'explain' the

actual variations in current labour flows either over time or across countries.[10] In the case of Germany we can observe a mixed relationship between stocks and flows. As can be seen from tables 1 and 2 above, Turks constitute one of the major groups of foreigners in the current stock of foreigners in Germany, although their share in the total average annual flow declined from 30 per cent in the 1970s to only 8 per in the 1990s. On the other hand, the stock of foreigners born in the countries of central and eastern Europe, which is as large as that of the Turks, is positively related to the respective share in the average annual inflow of labour, which has been rising over time. Obviously, the interaction between stocks and flows does not seem to be as straightforward and as some authors seem to believe (Brücker et al. 2003) who postulate an arrow of causality going from stocks to flows. As concerns workers of Turkish origin, such a relationship does not hold over the period under study. Furthermore, we do not only settle for the fundamental variables derived from the Ricardo model but, and in contrast to almost all other authors, we also specify a double-log equation which readily obtains from the model of migration derived in (2).

IV. Data and Estimation Results

German Data on Migration

Data on inflows and outflows of labour in Germany are collected and published by the Federal Statistical Office (Statistisches Bundesamt) on the basis of the registration of natives and foreigners with local authorities each time a person changes her address. This data has several shortcomings. First, there is no information about permanent versus temporary migrants or the purpose of the

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[10] In his comments on econometric work done on migration to the U.S. Gould (1979, p. 660) puts it like this: '..all (the) equations are telling us is that the rates of migration from various countries of origin to the U.S.A. in the 1880s and 1890s were determined by much the same factors as in earlier decades – only we don't know what they were!'.

stay (as concerns foreigners). Second, while registration upon arrival is a precondition for other administrative steps, de-registration upon leaving the country is not, which is why only a small share of temporary migrants ever de-register. The implication is that the calculation of net immigration rates could be misleading because the statistics tend to underestimate emigration and overestimate permanent immigration. This is why the analysis in this paper concentrates on gross flows when resorting to data from German sources. Third, the statistics include asylum seekers living in private households, foreign students and ethnic Germans before acquiring the German citizenship.

Estimation Results

Before presenting estimates of the migration equations derived above, a closer look at the stock of foreigners living in Germany should be in order. One of the reasons for focusing on the stock is that the German legal framework generally conforms to the principle of *ius sanguinis* and thus discourages foreigners to acquire the German citizenship, i.e. to definitely settle down in Germany. This institutional barrier tends to inflate the stock of foreigners over time, in spite of some minor reforms that have been carried out in recent years and in spite of the exceptions to the rule prevailing for ethnic Germans and Jews from the former Soviet Union and other parts of eastern Europe and a small number of professions (e.g. soccer players). Using our sample of 25 countries and three decades and resorting to pooled least squares we obtain

$$LSTPOP = 9.7497^{***} - 0.0009^{***} \; DIST - 0.4826^{***} \; HK - 0.1602^{**} \; DEMO$$
$$\qquad\quad (0.0000) \quad (0.0000) \qquad\quad (0.0000) \qquad\qquad (0.0257)$$

$$+ \; 1.4001^{**} \; DUTUR$$
$$(0.0457)$$

Adj. R-squared: 0.4263

F-statistisc: 14.7455 (0.0000)

p-values in parentheses; balanced panel with 75 observations; White heteroskedasticity-consistent standard errors and covariance

The estimated equation shows that *LSTPOP*, the natural log of the stock of foreigners from country *i* as a share of the total population of the sending country, is negatively correlated with the distance, the human capital and the demographic variables, but positively correlated with a dummy variable representing the share of Turks in the stock of foreigners. The first two variables are significant at the 1 per cent level, while the demographic and the dummy variables are significant at the 5 per cent level.[11] The inclusion of other dummy variables (for example, for the CEECs, the EU, the EFTA and the Rest of World, not reported here) did not improve the estimation, and all additional dummies turned out to be insignificant. The fact that the dummy variable for the CEECs and the EU were not significant, despite the large share of immigrants from those regions living in Germany, could be taken as an indication that the message embodied in the distance variable, namely that (economic) gravity could play a role in determining the level of the stock of foreigners in the receiving country, already accounts for inflows from neighbouring countries.

The (negative) impact of human capital (years of schooling) seems to reveal that the stock of foreigners is characterised by unskilled labour, a familiar result also obtained in similar studies for the U.S. (Clark, Hatton and Williamson 2002). In the case of Germany this result is plausible with respect to immigrants from Turkey and the Rest of the World, together amounting to almost half of the stock, and perhaps also for an unknown part of immigrants from the CEECs.

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[11] A GLS estimation with cross section weights of the same equation (not reported here) increases the significance level of these variables to one per cent.

The skill level represented by those born and educated in the CEECs, however, is somewhat difficult to assess: labour moving to Germany from countries such as the former Yugoslavia in the framework of the guest worker programme of the 1960s and early 1970s certainly included low-skilled workers, whereas workers from CEECs immigrating in the late 1980s and in the 1990s appear to have been far more heterogenous as far as their skill profile is concerned. In any case, the average skill level of labour from the CEECs should have been higher than that of labour from Turkey and the Rest of the World but lower than that of native Germans (Foders (1998); Foders et al. (2002)). And formal skills acquired in eastern Europe (before emigrating) might not always be complementary to the skills needed in the country of destination, although they could make it easier for the immigrants to acquire new skills and thus to integrate swiftly into the German economy.

Moreover, and in contrast to the U.S., Germany seems to attract low skilled workers from sending countries with an age structure which is very similar to that of the German population. This is indicated by the sign of the demographic variable: the lower the share of those aged 15 to 29 years in the population of the sending countries, the higher is the share of workers from those countries in the German stock of foreigners. The estimation results presented above were robust to variations of the functional form (e.g. double-logrithmic form (not reported here)).

A glance at the results for the gross immigration rate as the dependent variable (specification I, table 5), reveals that the performance of the explanatory variables derived from the Ricardian model is only in part successful: the income differential is mostly significant (at the 1 and 5 per cent level) and carries the expected sign. The labour supply ratio, however, is insignificant, and, in equation 4, even tends to lower the significance of the income variable. On the other hand, other variables do perform quite well, as for example, a dummy

for immigration policy in Germany over the period under scrutiny (1974–1999) (the policy gradually becoming more restrictive) and a dummy for the 1990s, a decade during which Germany experienced unprecedented inflows from eastern

Table 5 — Pooled OLS: Total Labour Flows to Germany, 1974–1999
(Specification I)

Independent variables	Dependent variable: ln gross immigration rate				
	Equations				
	1	2	3	4	5
– constant	2.5497 (0.1039)	9.1499 (0.0562)	2.4672 (0.1096)	–9.5610 (0.5316)	2.9506 (0.3535)
– ln relative wage difference ((G-S)/S)	0.1813** (0.0469)	0.2444*** (0.0086)	0.1901** (0.0237)	0.1615 (0.0989)	0.1789** (0.0494)
– ln ratio of employ- ment rates(G/S)				2.7090 (0.4335)	
– ln stock 1974–80	0.3166*** (0.0001)	0.3473*** (0.0001)	0.3194*** (0.0001)	0.2952*** (0.0006)	0.3075*** (0.0020)
– ln distance	–1.1718*** (0.0000)	–1.1294*** (0.0000)	–1.1556*** (0.0000)	–1.1835*** (0.0000)	–1.1878*** (0.0000)
– ln human capital					–0.0955 (0.8874)
– ln demography (share of aged 15–29 in pop.)		–2.3646 (–0.1070)			
– ln demography (fertility)			–0.1307 (0.8244)		
– decade dummy (1990–99)	0.8181*** (0.0031)	0.7163** (0.0145)	0.7925*** (0.0097)	0.7647 (0.0102)	0.8306*** (0.0063)
– immigration policy in G dummy	0.3218*** (0.0067)	0.2953** (0.0119)	0.3151*** (0.0063)	0.3468*** (0.0034)	0.3254*** (0.0056)
Adj. R-squared	0.3893	0.4036	0.3810	0.3901	0.3805
F-statistic	10.4332 (0.0000)	9.3464 (0.0000)	8.5927 (0.0000)	8.8871 (0.0000)	8.5756 (0.0000)

Balanced Panel: 25 countries/regions and 3 decades (1974–80; 1981–89; 1990–99) (75 obs.); all estimates show White heteroskedasticity-consistent standard errors and covariances; p-values in parentheses; G: Germany, S: sending country; significant at the 1 per cent level: ***, at the 5 per cent level: **.

Source: Own calculations.

Europe after the end of the Cold War and the beginning of the civil war in the former Yugoslavia. It may be argued that the motivation for the new flows were very mixed, especially that of transitory migrants from Yugoslavia (e.g. Bosnia, Kosovo, Serbia), many of whom returned towards the end of the decade or later to their (new) home countries.

As compared with the equation for the stock of foreigners, the performance of the common variables is in part very different. To begin with, the variables representing human capital and demographic characteristics of the population of the sending countries are insignificant at the 5 and 1 per cent level in the migration equation; also, a dummy for the share of Turks in the flow is not significant (not reported). Moreover, the distance variable performs as well in the migration equation as in the stock equation, again possibly pointing at the locational advantage enjoyed by eastern Europeans.

The estimation of migration equations following a second specification (II) of the Ricardian model (table 6), clearly shows again that labour variables (unemployment) are insignificant and, most importantly, that the significance of the absolute wage difference depends on the inclusion of the stock variable in the equation. Interestingly, the distance variable is robust to alternative specifications. As regards eastern Europe, a dummy variable is significant if it is included together with the stock variable. Finally, running a pooled OLS regression for the (sub)sample of seven eastern European countries (table 7) and including all the time series data (26 years) (without averaging) in a static panel data framework confirms both the relevance of the wage differential and the irrelevance of employment variables, always under the condition that the stock and distance variables are included in the equation. However, the latter equation suffers from autocorrelation.

Table 6 — Pooled OLS: Total Labour Flows to Germany, 1974–1999
(Specification II)

Independent Variables	Dependent Variable: ln gross immigration rate	
	Equations	
	1	2
– constant	23.2205 (0.0792)	–3.8845 (0.7479)
– ln employment (S)	–5.4229 (0.0620)	–0.2599 (0.9195)
– ln absolute wage difference (G–S)	0.1639** (0.0388)	0.0206 (0.7200)
–stock		0.4589*** (0.0000)
–distance	–0.0006*** (0.0000)	–0.0008*** (0.0000)
–dummy CEECs		0.5049** (0.0189)
Adj. R-squared	0.2691	0.5398
F-statistic	10.0800 (0.0000)	18.3563 (0.0000)
Balanced Panel: 25 countries/regions and 3 decades 1970s, 1980s and 1990s (75 obs.); all OLS estimates show White heteroskedasticity-consistent standard errors and covariances; p-values in parentheses; G: Germany, S: sending country; significant at the 1 per cent level: ***, at the 5 per cent level: **.		

Source: Own calculations.

Table 7 — Pooled OLS: Flows from the CEECs to Germany, 1974–1999
        (Specification II)

Independent Variables	Dependent Variable: ln gross immigration rate	
	Equations	
	1	2
– constant	–45.2819*** (0.0000)	–45.6102*** (0.0000)
– ln employment (G)		–0.0109 (0.9325)
– ln employment (S)		0.0792 (0.2810)
– ln absolute wage difference (G–S)	3.2989*** (0.0000)	3.3759*** (0.0000)
– stock	0.6276*** (0.0000)	0.5838*** (0.0000)
– distance	–0.0009*** (0.0000)	–0.0009*** (0.0000)
Adj. R-squared	0.8572	0.8544
F-statistic	356.2361 (0.0000)	213.4250 (0.0000)
Balanced Panel: 7 countries/regions and 26 years (1974–1999) (182 obs.); all estimates show White heteroskedasticity-consistent standard errors and covariances; p-values in parentheses; G: Germany, S: sending country; significant at the 1 per cent level: ***, at the 5 per cent level: **.		

Source: Own calculations.

V. Conclusions

In this paper we analyse labour inflows and the stock of foreigners of Germany exploring a Ricardian framework. In a first step the stock of foreigners, a variable that plays a key role in the literature, is analysed. Then, a migration equation derived from an extended version of the Ricardo model of international trade is estimated. Our results for the stock equation for immigrants from 25

countries over three decades (1974–1999) show that the stock of foreigners in Germany is characterised by low-skilled workers predominantly from source countries with a demographic structure that is very similar to the German one. While workers from Turkey still represent an important share of the stock of foreigners, the inflows are characterised by a large increase of workers from eastern Europe and a continued decrease of workers from Turkey. Workers from eastern Europe accounted for 27 per cent of the stock in 2001 and 52 per cent of average gross inflows in the 1990s. More than half of the stock of foreigners originate in European countries as also do almost three quarters of average gross inflows.

Turning to the Ricardian migration equation, we estimate a static panel model featuring an equation without a lagged-dependent variable and without fixed effects in order to avoid some of the problems raised in the recent econometric literature. The period of estimation, 1974 to 1999, coincides with a period of continuously increasing unemployment in Germany, from some 1.5 to 2 per cent in the early 1970s to over 8 per cent in the late 1990s. We find that the income differential is the only variable that performs well empirically, albeit conditional on the inclusion of the stock of previous immigrants and of a distance variable in the equation. Also, a dummy for immigration policies in Germany and one for the unprecedented inflows in the 1990s are significant and contribute to explain the variance of gross migration rates. Employment-related variables which certainly have a role in the theoretical specification of the extended Ricardo model are not significant in the German case, which in the light of mass unemployment in this country is no surprise. Human capital and demographic variables turn out to be insignificant too.

We conclude from this that variables representing factor abundance appear to have no effect whatsoever on long-run migration flows (or stocks) in Germany in a period of increasing unemployment, while variables representing income or

productivity differences do have an impact. The latter obtains only if the stock of previous immigrants in the country of destination and the distance between sending countries and the receiving country are controlled for. In the case of Germany, the relevance of the stock of previous immigrants could be related to an immigration policy in which family reunification plays a role in attracting foreign labour, especially from source countries favoured by German immigration policies (former USSR, other eastern European countries and Turkey). The distance variable seems to underline the locational disadvantage of immigrants from non-European sources. All in all the results seem to support – in a conditional way – the basic hypothesis derived from the extended Ricardian model that productivity differences between countries drive international labour flows as long as they are not restricted by immigration policies and distance.

Future research will have to draw on improved data for immigration to Germany, possibly switch to dynamic panel methods and, more importantly, take a closer look at the interactions between labour, trade and capital flows and examine whether a joint analysis is warranted and may reveal more about the causes and consequences of migration than competing approaches focusing on the labour market.

Appendix A: Derivation of the Ricardian Model of Migration in a 2x2x1 World[12]

The standard derivation of the Ricardian trade model resorts to the simple case of two countries (home and foreign(*)), two goods (1 and 2) and only one immobile factor of production, labour.[13] Under the assumption that tastes are identical (and preferences homothetic) in both countries, i.e. both countries spend an equal constant share α of their income on good 1, and that the ratio of labour requirements (or inverse ratio of labour productivities) is such that

$$\frac{a_2}{a_1} > \frac{a_2^*}{a_1^*}, \tag{A1}$$

the following trade equilibrium solution obtains, setting

$p_1 = 1$, as

$$p_2 = \frac{a_2^*}{a_1} \frac{(1-\alpha)}{\alpha} \frac{L}{L^*} \tag{A2}$$

which, at the same time, following the definition of p_1, gives the equilibrium relative price of the second good p_2 / p_1. The latter is required to lie between the two countries' cost or (inverse) productivity ratios (A1) and already indicates that the supply of labour plays a role in the determination of the equilibrium terms of trade. Hence it should be stressed that in the Ricardian model comparative advantage does not result from international productivity differences alone, even if these are often taken to be the key drivers, and that changes in the supply of labour with an impact on the ratio of labour stocks

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[12] This appendix draws heavily on Bowen, Hollander and Viaene (2001), pp. 80–91.

[13] Labour is assumed to be immobile across countries but not between domestic sectors.

L/L^* also have an influence on the price ratio. Changes in the supply of labour could occur, for example, in form of migration and/or demographic shocks and/or labour market rigidities.

Interestingly, Ricardian trade equilibrium does not imply at the same time international wage equalisation. In fact $w \neq w^*$ applies. This can be seen starting from the above trade equilibrium (A2) and deriving the wage levels in the home and the foreign country:

$$w = \frac{1}{a_1} \text{ and } w^* = \frac{1}{a_1} \frac{(1-\alpha)}{\alpha} \frac{L}{L^*} . \tag{A3}$$

Assuming now that the home country specialises in good 1 and the foreign country in good 2, the corresponding equilibrium wages are given either by (using (A3))

$$\frac{w^*}{w} = \frac{(1-\alpha)}{\alpha} \frac{L}{L^*} \tag{A4}$$

or by

$$\frac{w^*}{w} = \frac{(1/a_2^*)}{(1/a_1)} \frac{p_2}{p_1} \tag{A5}$$

using $p_1 = a_1 w$ and $p_2 = a_2^* w^*$.

Both equations (A4) and (A5) clearly indicate that international wage equalisation ($\frac{w^*}{w} = 1$) is *not* achieved in trade equilibrium.

It is therefore straightforward to ask how wages might equalise in this model. This can be achieved by allowing labour to move freely from one country to the

another (M), after trade equilibrium has been reached. Thus, for wages to equalise, expression (A4) should become

$$\frac{w^*}{w} = 1 = \frac{(1-\alpha)}{\alpha} \frac{(L-M)}{(L^* + M)} .$$ (A6)

The route to wage equalisation begins in (A4), and after carrying out some transformations we get

$$\frac{M}{L} = \alpha \frac{L^*}{L} \frac{(w^* - w)}{w}$$ (A7)

and assume that w^* and w in (A7) represent the equilibrium wage rates in the foreign and the home country, respectively, before the barriers to international labour mobility are abolished. It is easy to see from (A7) that the migration rate (gross or net emigrants as a share of the domestic labour force) is determined by the relative wage difference, the relative supply of labour and the taste parameter. In case the wage difference is positive, labour is likely to migrate from the home to the foreign country to help expand the production of good 2. At the same time, the production of good 1 decreases in the home country as also does the relative price of good 2. This is tantamount to say that, compared with the equilibrium before labour mobility, the home country (= the sending country) gains in terms of welfare (it can now afford to consume more of good 2 than before) and that the foreign country (= the receiving country) loses (it will have to reduce its consumption of good 1).[14] Notwithstanding the country distribution of welfare gains and losses, world production of both goods increases, as compared with the trade equilibrium before migration. This result

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[14] The welfare implication of the expanded Ricardian model, that the receiving country loses and the sending country gains from migration, also carries over to the case with more countries and goods, as has been shown by Davis and Weinstein (2002).

also holds in the extreme case in which the foreign country is more productive than the home country in both sectors and all workers move from the home to the foreign country to earn the higher wage w^*. In such a situation, the production of both goods takes place only in the foreign country, trade ceases (i.e. is substituted for migration) and the migrants are able to reap all the gains. In all other cases, trade and migration are complements, and migration continues as long as the wage differential persists.

Appendix B: Data and Data Sources

Countries/Regions in the Sample: 25

European Union (14): Austria, Belgium, Denmark, Finland, France, Greece, Luxemburg, United Kingdom, Ireland, Italy, Spain, Sweden, Portugal, Netherlands;

European Free Trade Association (2): Norway, Switzerland;

Central and Eastern Europe (7): Bulgaria, Czechoslovakia, Hungary, Poland, Romania, Soviet Union, Yugoslavia;

Rest of Europe (1): Turkey;

Rest of the World or Non-Europe (1).

Migration Data: Data on inflows and outflows of labour and the stock of immigrants with non-German citizenship in 1954–1999 are published by the German Statistical Office (Statistisches Bundesamt), Wiesbaden. For the estimations we only use the data for 1974–1999. Data for the tables in the text were drawn from Statistisches Bundesamt (2002), ,Ausländische Bevölkerung nach Geburtsland am 31.12.2001', Wiesbaden, Online Databank (www.statistik-bund.de) (free access). Data on gross inflows and the stock of immigrants with non-German citizenship from 1974 to 1999 were taken from Statistisches Bundesamt (2003), Zeitreihenservice, Wanderungsstatistik, Wiesbaden, Online Databank (www.statistik-bund.de) (client access). Data on international stocks and flows and migration policies were taken from UN (2002).

Income Data: As a proxy for real wages in this paper we use real income (GDP) per capita at international prices (Geary-Khanis) and 1990 US dollars. The data (including population) were taken from Maddison (2001) and the GGDC data

base held at Groningen University in the Netherlands (www.eco.rug.nl/ggdc/top) (free access).

Labour Force Data: Instead of the absolute level of the labour force we use data on employment (1 – unemployment rate) from the OECD (Employment Outlook; Labor Force Stataistics; client access) and ILO (www.ilo.org; free access) online databanks. Data for eastern European countries in the period 1974–1989 are taken from ILO and (for Yugoslavia) from Woodward (1995). Reliable data for eastern European countries are only available for the 1990s. We therefore assumed the same average employment rates for all three decades.

Demographic Characteristics: Data (fertility rates and the share of those aged 15–29 in the total population) were taken from United Nations (2001).

Human Capital Data: The average schooling years of the population aged 25 and over were taken from the Barro-Lee data set held at the World Bank (www.worldbank.org/research/growth/ddbarle2.htm) (free access) and from UNESCO (various years).

Distance to Germany: The data is taken from the data base on bilateral distances held at the Centre d'etudes prospectives et d'information internationale (CEPII) (www.cepii.fr/anglaisgraph/bdd/distances.htm) (free access).

References

Baltagi, Badi H. (2002). *Econometric Analysis of Panel Data, 2nd*. ed. Chichester: John Wiley.

Borjas, George J. (1994). The Economics of Immigration. *Journal of Economic Literature* 32 (4): 1667–1717.

Bowen, Harry P., Abraham Hollander and Jean-Marie Viaene (2001). *Applied International Trade Analysis*. Ann Arbor: The University of Michigan Press.

Brücker, Herbert, Gil Epstein, Barry McCormick, Gilles Saint-Paul, Alessandra Venturini and Klaus F. Zimmermann (2003). Managing Migration in the European Welfare State. In Tito Boeri, Gordon Hanson and Barry McCormick (eds.) (2003), *Immigration Policy and the Welfare System. Proceedings of a Conference of the Fondazione Rodolfo Debenedetti* in Triest (23 June 2001) (in print).

Burda, Michael C. (1995). Migration and the Option Value of Waiting. *Economic and Social Review* 27: 1–19.

Clark, Ximena, Timothy J. Hatton and Jeffrey G. Williamson (2002). Where Do U.S. Immigrants Come From, and Why? NBER Working Paper 8998. National Bureau of Economic Research, Cambridge, Mass.

Davis, Donald R., and David E. Weinstein (2002). Technological Superiority and the Losses from Migration. NBER Working Paper 8971. National Bureau of Economic Research, Cambridge, Mass.

Ethier, Wilfred J. (1996). Theories About Trade Liberalization and Migration: Substitutes or Complements?. In Peter John Lloyd and Lynne S. Williams (eds.), *International Trade and Migration in the APEC Region*. Melbourne: Oxford University Press (Australia): 50–68.

Fassmann, Heinz and Rainer Münz (2000) (eds.). *Ost-West-Wanderung in Europa*. Vienna: Böhlau.

Fertig, Michael (2001). The Economic Impact of EU-Enlargement: Assessing the Migration Potential. *Empirical Economics* 26: 707–720.

Foders, Federico (1998). A Note on Economic Growth and Human Capital in Eastern Europe. Kiel Working Paper 864. Kiel Institute for World Economics, Kiel.

—, Daniel Piazolo and Rainer Schweickert (2002). Ready to Join the EU? On the Status of Reform in the Candidate Countries. *World Economics* 3 (4): 43–72.

Gould, John Dennis. (1979). European Inter-Continental Emigration 1815–1914: Patterns and Causes. *Journal of European Economic History* 8 (3): 593–670.

Grether, Jean-Marie, Jaime de Melo and Tobias Müller (2001). The Political Economy of International Migration in a Ricardo-Viner Model. In Slobodan Djajic (ed), *International Migration: Trends, Policies and Economic Impact*. London: Routledge: 42–68.

Hatton, Timothy J., (1995). A Model of U.K. Emigration, 1870–1913. *The Review of Economics and Statistics* 77 (3): 407–415.

— and Jeffrey G. Williamson (2002). What Fundamentals Drive World Migration? NBER Working Paper 9159. National Bureau of Economic Research, Cambridge, Mass.

Institut für Demoskopie Allensbach (IfD) (2002). Das Zuwanderungsgesetz. *Allensbacher Berichte* 1, Allensbach am Bodensee.

Karras, Georgios, and Carmel U. Chiswick (1999). Macroeconomic Determinants of Migration: The Case of Germany, 1964–1988. *International Migration* 37 (4): 657–677.

Maddison, Angus (2001). *The World Economy: A Millennial Perspective*. OECD Development Centre, Paris.

Martin, Philip L. (1994). Germany: Reluctant Land of Immigration. In Wayne A. Cornelius, Philip L. Martin and James F. Hollifield (eds.), *Controlling Immigration. A Global Perspective*. Standford: Standford University Press: 189–225. (also available as paper published 1998 by the American Institute for Contemporary Studies. John Hopkins University, Washington D.C.).

Mitchell, James and Nigel Pain (2003). *The Determinants of International Migration to the UK: A Panel-Based Modelling Approach*. National Institute of Economic and Social Research, London. Mimeo.

OECD (2002, 2003). *Trends in International Migration, SOPEMI*. Paris: OECD.

Sala-i-Martin, Xavier (1994/1996). Comment on *European Migration: Push and Pull*. By Klaus F. Zimmermann. In Proceedings of the World Bank Annual Conference on Development Economics, Supplement to the *World Bank Economic Review* and the *World Bank Research Observer* 1994: 351–360, and reprinted in 1996 in *International Regional Science Review* 19 (1/2): 136–146.

Statistisches Bundesamt (2002). *Ausländische Bevölkerung nach Geburtsland am 31.12.2001*. Wiesbaden, Online Databank (www.statistik-bund.de).

— (2003). *Zeitreihendienst, Wanderungsstatistik*. Wiesbaden, Online Databank (www.statistik-bund.de) (client access).

Trefler, Daniel (1995). The Case of the Missing Trade and Other Mysteries. *American Economic Review* 85 (5): 1029–1046.

— (2002). The Case of the Missing Trade and Other Mysteries: Reply. *American Economic Review* 92 (1): 405–410.

UNESCO (various years), *Statistical Yearbook*. Paris.

United Nations (2001). *World Population Prospects*. The 2000 Revision I and II, New York.

— (2002). *National Population Policies 2001*. New York (www.unpopulation.org).

Woodward, Susan L. (1995). *The Political Economy of Yugoslavia, 1945–1990*. Princeton: Princeton University Press.

Woolbridge, Jeffrey M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Mass.: MIT Press.

Zimmermann, Klaus F. (1994/1996). *European Migration: Push and Pull*. In World Bank (ed.) (1994), Proceedings of the World Bank Annual Conference on Development Economics, Supplement to the World Bank *Economic Review and the World Bank Research Observer*, Washington: 313–342, and reprinted in 1996 in the *International Regional Science Review* 19 (1/2): 95–128.