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IS INTERNATIONAL LABOUR MOBILITY A THREAT TO THE WELFARE STATE? EVIDENCE FROM FINLAND IN THE 1990S*

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This paper assesses the factors behind Finnish emigration and return migration in the 1990s. Logit-analysis using combined micro data from the labour force survey and emigration statistics in 1990–1999 reveals that, when controlling for other background characteristics, highly educated individuals are 5 times more prone to emigrate than individuals with secondary education only. There is no similar difference in the return migration propensities within individuals of different educational levels. Panel-data analysis based on country-level data on the migration destination countries of the (even highly educated) Finnish emigrants in 1990–2000 reveals, however, that migration has not been directed towards countries with low tax rates. These findings therefore suggest that while there is some evidence that the Finnish welfare state may suffer from the selection of emigration incidence on highly educated workforce, emigration has mainly been determined by other factors than potential tax competition on mobile labour. (JEL: F22, H77, J61)

1. Introduction

Labour mobility within Europe has traditionally been at a low level, but there are signs that it might be increasing. Free mobility of labour is one of the basic principles of European integration, educational degrees have become internationally standardised, and the introduction of the euro has increased the transparency of income differentials between European countries. Improved language skills and internationalisation of younger generations most likely lessen the hindrances to international migration in Europe. All this has increased the possibility that European countries engage in harmful tax competition to attract mobile labour. As usual in tax competition situations, the size of the public sector must perhaps be cut down to a sub-optimal level.

Labour mobility might be a particularly seri-

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ous threat to Scandinavian type of welfare states. In these countries, pre-tax wage dispersions are small, much redistribution takes place through the tax system, social security schemes are relatively generous, and tuition fees for higher education are almost non-existent. These circumstances create strong incentives for the highly educated to emigrate, whereas immigrants would mainly consist of individuals with little or no educational background. As emphasised recently by Andersen (2002), even if overall migration figures might not be that alarming, the selection of migrants may be a serious problem for public finances: Highly educated individuals with high tax payments move out and are replaced by low-skilled individuals who are more reliant on social security and pay less taxes. This situation increases the distortionary impacts of redistribution schemes. The theory on tax competition indeed predicts – see, e.g., the survey by Cremer et al. (1996) – that the overall level of redistribution under labour mobility is likely to be less than the society would like to have in the absence of labour mobility.

While the theory and analytical arguments concerning tax competition for mobile labour are fairly straightforward, there is surprisingly little empirical evidence on the importance of cross-country tax differentials for labour mobility.[1] This is quite striking, given that there is nowadays a well-developed and relatively wide empirical literature on another potential situation of tax competition, namely tax-induced capital flows; see, e.g., the surveys by Hines (1999) and De Mooij and Ederveen (2001). Labour mobility is determined by a number of economic factors, such as employment and income differentials between countries, and non-economic factors, such as cultural values and family relations. Therefore it is empirically not clear what the contribution is of cross-country tax differentials on labour mobility, which is a prerequisite for tax competition to take place.

This paper approaches the interaction between taxation and international migration in two separate but complementary ways to assess whether migration creates a significant threat to the sustainability of the Finnish welfare state. First, using micro data on Finnish emigration and return migration in 1990–1999, the paper examines which individual level factors can explain emigration choice in a logit model.[2] In particular, the emphasis lies on what the importance of educational background and income level for the migration decision is, when controlling for other factors, such as age, sex, family relations and employment. The time dimension in the sample allows one to investigate whether the factors explaining migration have changed during the 1990s and whether – alongside with integration to Europe and as claimed by the popular press – the highly educated and high-income earners have become more mobile towards the end of the 1990s.

To the extent highly educated migrants return, migration does not create a permanent net loss for a country's human capital. To address the return migration question, the paper follows a sample of Finnish citizens who have emigrated in 1994 to see how many of them actually returned by 2000 and attempts to explain, again by a logit model, whether (emigration time) individual factors explain the probability to return. Again, education and income variables are of key interest.

While the analysis described above can be used to describe what sort of people emigrate and return, it does not reveal whether tax considerations have affected the migration decisions. For this, one would need in an ideal case combined data from labour force surveys from both the origin and destination countries concerning individual migrants to examine how income level before and after taxes have changed because of the migration decision. Such data is, unfortunately, not available. Instead, this paper approaches the question by setting up a dynamic macro panel for 1990–2000, where the number of Finnish citizens migrating to an

[1] *In an indirect way, Altshuler and Goodspeed (2002) provide an exception. They examine whether European countries set their capital and labour tax rates strategically and find that there is no evidence of strategic interaction in setting labour tax rates. This suggests that labour mobility has not constrained the tax policy of European countries.*

[2] *Pedersen and colleagues (2002) have carried out similar analyses for other Nordic countries.*

OECD country *j* at date *t* is explained by destination country characteristics, such as growth and employment, as well as tax variables, such as overall tax rate and OECD data on labour tax wedges. This framework gives a country-level perspective to the allocation of Finnish emigrants to destination countries and to the question if tax levels have affected the country choice. To my knowledge, similar macro-level analyses have not been available before.

Section 2 of the paper briefly summarises some of the lessons from earlier economic analyses of migration. Section 3 provides an overall view on statistics on migration to and from Finland. Section 4 presents the logit analyses of outward-migration determinants while section 5 analyses return migration. Section 6 describes the results from a country-level macro panel of migration destinations. Section 7 discusses the implications of the findings for the sustainability of welfare state in an international environment.

2. *Economic analysis of migration: a brief review*

In the *Theory of Wages* (1932), Hicks argued that 'differences in net economic advantages, chiefly differences in wages, are the main cause of migration.'[3] The differences in earning potential between the source country and the destination country are still seen as a key reason for migration in economic analysis (see, e.g., the reviews by Borjas, 1999, or Lalonde and Topel, 1997). Differences in tax rates across countries are naturally one determinant for the net wage differentials. In a simple model, a person migrates if the economic benefit from migration exceeds migration costs, such as forgone earnings, transportation costs and the disutility of leaving behind family members and friends.

Economic variables affect not only the overall number of migrants, but also their composition. Borjas (1999) demonstrates that emigrants are 'positively selected' (their skill-level is above the average) when the return to skills in the source country is smaller than in the destination country, in other words, if the wage dispersion is smaller in the source country. Likewise, when the income distribution is more unequal in the source country, emigrants are negatively selected. As emphasised by Andersen (2002), differences in tax progressivity are one of the determinants of the net wage dispersion differentials across countries.

International migration is also governed by tight restrictions that limit individuals' migration possibilities. Willingness to move is only a necessary condition for migration to take place. Migrants must also pass the screening of the host country, which may depend on the demand for different kind of skill levels.[4]

Return migration decision can, in general, depend on the same determinants than an outward-migration decision. Borjas and Bratsberg (1996) analyse the return migration process in more detail. They discuss two main reasons for return migration: Return migration may have been planned as a part of an optimal life-cycle residential location sequence, such as acquiring additional human capital while abroad. Alternatively, errors in the migration decision in the first place may trigger return migration. An interesting feature of their analysis is that return migration tends to accentuate the selection that originally characterised the migration flows. If, for example, the emigrants' skill level is above the average among their source country, the return migrants will probably be less skilled than the emigrants, because the benefit for staying abroad is highest for the most skilled.

From the earlier empirical work on international migration, the paper by Lundborg (1991) is particularly relevant here. He examines the causes of, and differences in, the migration flows of Finns, Danes and Norwegians to Sweden in 1968–1985 using logistic models. He finds that the destination (source) country real income, employment, and the level of social welfare subsidies have a positive (negative) impact on migration flows. While there are some differences across migration behaviour from

[3] *Quoted in Borjas (1999).*

[4] *I am grateful to a referee for pointing this out.*

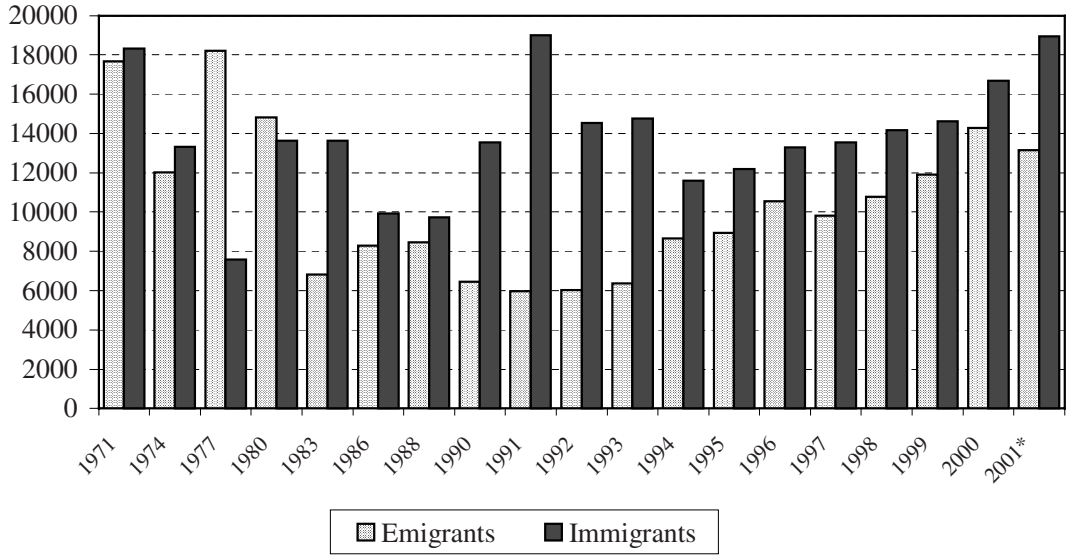

Figure 1. Annual migration to and from Finland 1971–2001 including both Finnish and non-Finnish citizens. Source: Statistics Finland.

different source countries, his findings are in general consistent with theoretical ideas.

Lessons from empirical studies on the role of the public sector for within-country migration are useful as well. Charney (1993) provides a summary of this work. He notes that tax rates have in general been found influential, with predicted signs, for interregional migration flows. His paper also contains recommendations for designing empirical work in the area. The analysis should contain both measures of government revenue and expenditure sides, and control for employment/unemployment changes to capture indirect effects of the public sector on migration through (public) jobs. Westerlund and Wyzan (1995) find that tax rates affect migration between nearby Swedish areas, but not between regions that are located far away from each other. In short-distance migration, migrants can still benefit from local public goods supplied by a high-tax region. Finally, gravity-type of models[5], reviewed by Greenwood (1997), have been extended to include public sector measures.

3. *Migration to and from Finland in the 1990s*

Both emigration from and immigration to Finland have increased during the 1990s (Figure 1)[6]. Immigration increased drastically in the beginning of the 1990s, in part because of migrants from the former Soviet Union. Emigration has picked up more steadily during the 1990s. The country has been net receiver of migrants during that period.

The educational background of Finnish emigrants has changed somewhat in recent years (Table 1). Roughly a third of them has secondary education, and their share out of all migrants has not changed. However, the share of migrants with primary education only has decreased while the share of migrants with university education has increased. A bulk of this shift occurred around 1994.[7] Since then the changes have not been very strong. When the number of emigrants is compared to the overall number of people with particular education

[5] *In these models the idea is that migration is positively related to the size of the source and destination populations and negatively related to distance.*

[6] *All figures presented in this section are based on overall data, not the samples.*

[7] *That might have been preparation for the EU membership, which started in 1995.*

Table 1. Education background of Finnish emigrants, %. Source: Statistics Finland.

	Nr of all migrants	Primary	Secondary	Lowest academic	Lower academic	Higher academic	Doctoral
1991	4 028	37.0	38.2	11.1	4.9	8.2	0.5
1994	5 903	26.8	35.6	16.7	6.5	13.0	1.5
1995	6 150	26.0	34.9	17.2	6.0	14.5	1.5
1999	8 275	23.9	36.2	18.2	7.5	12.9	1.3
2000	8 481	24.8	36.6	16.1	7.9	13.1	1.3

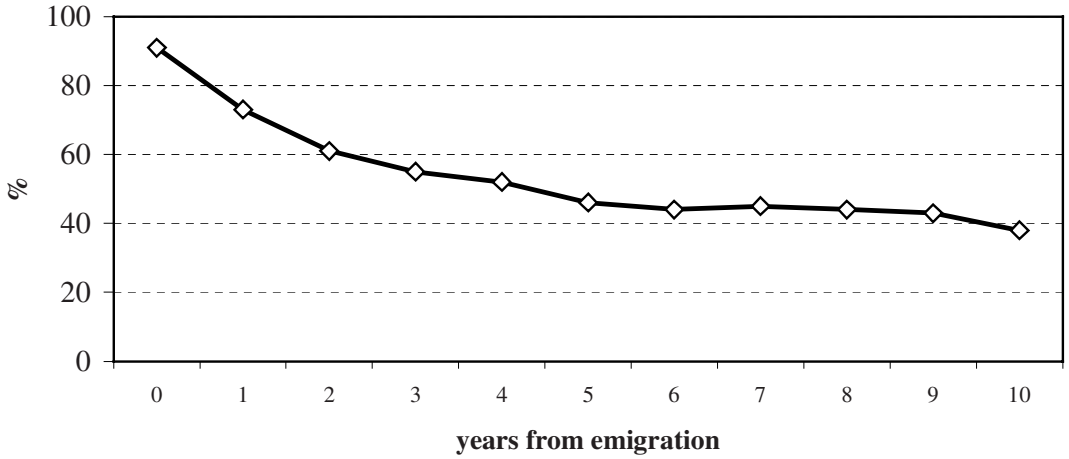

Figure 2. Percentage of Finnish emigrants still abroad. Source: Statistics Finland. Note: Some return within a year so the percentage of those still abroad after 0 years of emigration is less than 100%.

Table 2. Educational background of non-Finnish immigrants, %. Source: Statistics Finland.

	Primary	Secondary	Lowest academic	Lower academic	Higher academic	Doctoral
1994	73.4	14.3	4.6	3.8	3.5	0.4
1995	69.8	17.1	4.7	4	3.9	0.5
1996	69.1	18	4.6	4.2	3.5	0.6
1997	68	17.3	4.6	5	4.5	0.6
1998	69.7	16.2	4.4	4.9	4.4	0.4
1999	71.9	15.4	3.9	4.3	4.1	0.4
2000	80	11.5	2.2	3.5	2.6	0.2

background, the migration propensity (number of emigrants per one year/overall number of the group in the population) for people with secondary education has been on average in 1990–2000 around 0.18%, for people with lower academic education 0.25% and for people with higher academic education a bit less than 0.5%.

Around half of the Finnish emigrants have returned during 5 years from migration (Figure 2). After 5 years, the return migration probability declines. Around 40% of migrants are still abroad after 10 years from migration.

Comparable data on the educational level of non-Finnish immigrants is only available since

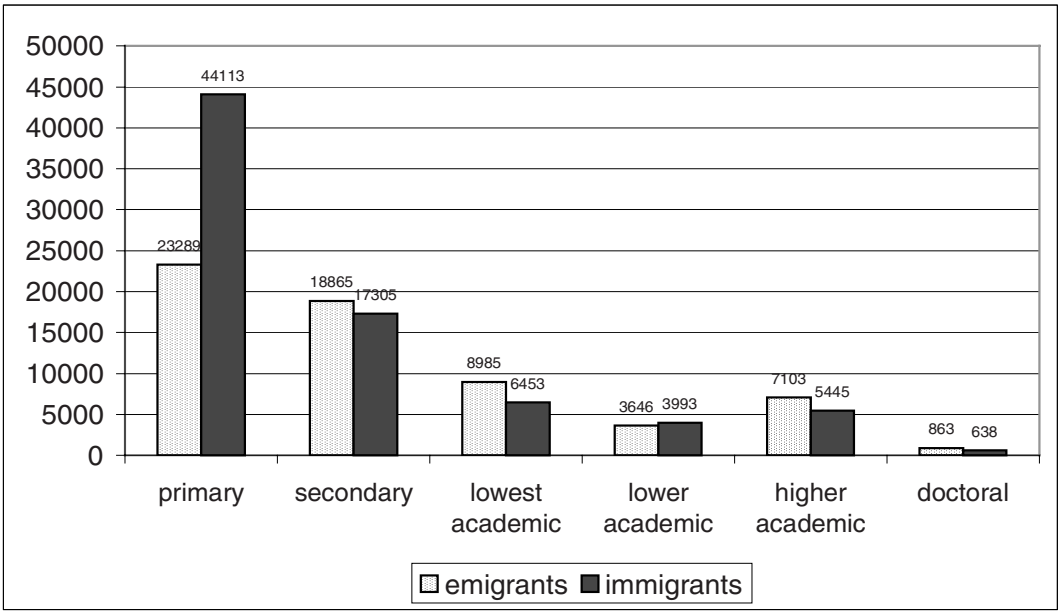

Figure 3. Brain drain in Finland, 1994–2000. Source: Statistics Finland.

1994 (Table 2). The data shows that only 20–30% of immigrants have other than primary education, and even from the skilled migrants, less than half has academic education. Based on the data on all emigrants and immigrants (including Finnish return-migrants) one can calculate an educational balance for migration. Data from Figure 3 shows that Finland has lost in total 5600 persons with at least secondary education during 1994–2000. The corresponding 'brain-drain' concerning the highly educated is around 1500 during the same period.

4. *Logit analysis of migration determinants*

This analysis draws on a sample, obtained from Statistics Finland, that connects information from labour force surveys and immigration statistics. The sample is choice based in that it contains 500 randomly selected emigrants and 500 randomly selected of those who have not emigrated yearly from 1990 to 1999. All are Finnish citizens between 15 and 64 years. The sample includes information about the following characteristics: Age, sex, marital status, family relations, labour market status, educational level, education field, and taxable income. Table A.1 in the Appendix provides more information on the variables used and gives an overview of the data. Sample size is 7900 when those who were children were dropped from the data.

Table 3 presents results from a logit regression on emigration (with 1 indicating that the person has moved abroad during one year and 0 that he has not moved). For simplicity, the lowest and lower academic education as well as higher academic and doctoral level have been combined. From different educational fields, the logit analysis includes technical, commercial, health-sector and general education. The reason to select these fields is the concern expressed among the public that these are the kind of areas where international labour mobility might cause the most serious problems.[8] The reference

[8] *Pedersen et al. (2002), for instance, report that Sweden has suffered from particular brain drain flows in certain academic sectors, such as engineers and accounting and finance specialists.*

Table 3. Emigration estimation results.

Model	1 1990–99	2 1990–93	3 1994–99	4 Interaction terms	5 No education variables
Female	0.8700* (–2.33)	0.9130 (–0.95)	0.8103** (–2.72)	0.8526** (–2.66)	1.0123 (0.23)
Married	0.8548* (–2.59)	0.7753** (–2.70)	0.8884 (–1.47)	0.8452** (–2.76)	0.9464 (0.94)
Has children	0.5019** (–11.10)	0.5024** (–7.16)	0.4900** (–8.63)	0.4968** (–11.21)	0.4653** (–12.63)
Unemployed	1.0989 (1.14)	0.9845 (–0.11)	1.2278* (1.97)	1.1252 (1.41)	1.0018 (0.02)
Student	1.0035 (0.03)	0.7379 (–1.46)	1.2043 (1.32)	1.0247 (0.21)	1.2062 (1.69)
Pensioner	0.9052 (–0.91)	0.5087** (–3.72)	1.2693 (1.72)	0.8927 (–1.03)	0.7875* (–2.23)
Self-employed	0.7606* (–2.46)	0.81917 (–1.27)	0.654** (–2.61)	0.7428** (–2.65)	0.6756** (–3.59)
Primary education	1.3406** (3.36)	1.4597** (2.78)	1.2181 (1.70)	1.3235* (2.46)	
Primary education in 94–99				0.9723 (–0.21)	
Lower university degree	2.2659** (10.24)	1.8720** (4.79)	2.6236** (9.42)	1.8152** (4.97)	
Lower university degree, 1994–99				1.4570** (2.62)	
Higher university degree	4.6759** (14.91)	3.4239** (7.01)	5.6855** (13.32)	3.2515** (6.97)	
Higher university degree, 1994–99				1.7631** (2.76)	
Technical	0.9562 (–0.50)	0.9961 (–0.03)	0.9170 (–0.75)	0.9448 (–0.63)	
Commercial	1.0411 (0.43)	1.0336 (0.21)	1.0379 (0.31)	1.0357 (0.37)	
General	2.5646** (7.89)	2.8618** (5.17)	2.5797** (6.32)	2.6374** (8.09)	
Health care	1.3497** (2.77)	1.4173 (1.90)	1.3681* (2.31)	1.3672** (2.87)	
No income	8.7694** (17.36)	7.9325** (10.84)	9.6446** (13.56)	8.3639** (11.25)	9.1904** (17.88)
No income, 94–99				1.0803 (0.31)	
Income < 50000	2.0737** (10.38)	2.1759** (6.81)	2.1334** (8.33)	2.1150** (6.77)	2.1525** (11.15)
Income < 50000, 94–99				1.0049 (0.03)	
Income 100000–150000	0.6581** (–5.36)	0.5436** (–5.05)	0.7423** (–2.88)	0.5586** (–4.97)	0.7514** (–3.79)
Income 100000–150000, 94–99				1.3111 (1.76)	
Income 150000–250000	1.0275 (0.29)	0.8022 (–1.41)	1.2040 (1.55)	0.8078 (–1.42)	1.5603** (5.07)
Income 150000–250000, 94–99				1.4837* (2.12)	
Income > 250000	2.6369** (6.84)	2.0067** (3.22)	3.4331** (6.42)	1.9526** (3.23)	5.2698** (12.56)
Income > 250000, 94–99				1.7653* (2.08)	
Age 15–24	0.5497** (–5.60)	0.6061** (–2.97)	0.4982** (–5.00)	0.5449** (–5.67)	0.4871** (–6.98)
30–39	0.7186** (–4.05)	0.6758** (–3.07)	0.7574* (–2.59)	0.7253** (–3.92)	0.6937** (–4.62)

Model	1 1990–99	2 1990–93	3 1994–99	4 Interaction terms	5 No education variables
40–49	0.4178** (–9.84)	0.4195** (–6.24)	0.4288** (–7.27)	0.4273** (–9.55)	0.3554** (–12.09)
50–64	0.2374** (–14.14)	0.2462** (–8.62)	0.2435** (–10.69)	0.2456** (–13.73)	0.2004** (–16.50)
Years 1994–99				0.6641** (–3.45)	
Obs.	7900	3132	4778	7900	7900
LR, chi^2 (d.f.)	1998.82 (23)	791.52 (23)	1282.41 (23)	2043.14 (32)	1670.41 (16)
pseudo R^2	0.1830	0.1834	0.1941	0.1871	0.1529
Nr of correct predictions	70.9%	69.92%	71.66%	71.04%	69.23%

Notes: Results reported as odds ratios. t-values in brackets; * and ** symbolise significance at 5 and 1% level. LR test tests joint significance of regressors.

person used in the analysis is male, not married, has no children, is working, is not self-employed, has secondary education which is from a different field than technical, commercial, health or general education, aged 25–29 and whose income is between 50,000–100,000 FIM (in 1994 value).[9]

Let us first concentrate on the analysis for the whole period (model 1 in Table 3). The results (reported as odds ratios[10]) show that education variables are very important for migration propensities. Those with lower level academic education are twice and those with higher level academic education 4.5 times more prone to emigrate than the reference person. From education fields, general education and health are areas where migration is general, whereas persons with technical or commercial education are no different from the reference person.

People whose income is less than 50,000 marks, and especially people with no income, are very prone to migrate. They may have very little to lose in economic terms from moving from Finland and are therefore eager to migrate. On the other hand, migration propensity increases in a statistically significant way only when income exceeds 250,000 marks. The analysis therefore suggests that the relationship between income and migration has a U-shape.[11]

Other important characteristics related to migration decisions are age and family relations. If a person is married and especially if he has children, the emigration probability declines. The age group of the reference person is the most inclined age group to move, whereas elderly people migrate clearly less often. When other things (including age) are controlled for, pensioners and students do not migrate more or less often than others.

The study also examines whether the background factors related to migration have changed during the 1990s. From the separate analyses for 1990–1993 and 1994–1999[12] in models 2 and 3 one may notice that the migration probability for persons with primary education has declined, whereas people with higher academic education move slightly more often. In model 4, education level and income variables are interacted with a dummy for the years 1994–1999 and these variables are added as separate regressors to the model.[13] One can notice that some of the changes in the migration pattern are statistically significant. The migration probability for academically educated and

[9] Year dummies were also added to models 1,2, 3 and 5, but none of these were significant and were therefore dropped out. A logarithm of income was used also as an alternative to income groups. The benefit from analysing income groups is that one does not impose the constraint that migration is related to income in a log-linear way.

[10] The t-statistics have been derived by the delta method.

[11] Pedersen et al. (2002) obtain similar results for Denmark, Norway and Sweden.

[12] 1994 is a year when migration increased rapidly, especially for highly educated. Migration has increased steadily, but less drastically, after that as well.

[13] A dummy for the years 1994–1999 is added as well.

Table 4. Return migration estimation results.

Female	0.6396**	age 15–24	1.3290*
	(–5.61)		(2.53)
Married	1.1037	30–39	0.7818*
	(1.18)		(–2.38)
Has children	0.9547	40–49	0.8960
	(–0.62)		(–0.87)
Unemployed	1.0988	50–64	0.4235**
	(0.91)		(–5.18)
Student	0.7894*	65–	0.4597**
	(0.047)		(–2.75)
Pensioner	0.6118**		
	(–2.60)		
Self-employed	0.8329	Obs.	3593
	(–1.03)		
Primary education	0.9976	LR, chi^2 (d.f.)	175.55
	(–0.02)		(24)
Lower university degree	1.1748	pseudo R^2	0.036
	(1.34)		
Higher university degree	1.0723	Nr of correct predictions	62.9%
	(0.52)		
Technical	1.2472		
	(1.71)		
Commercial	0.9487		
	(–0.4)		
General	1.2677		
	(1.70)		
health care	1.0582		
	(0.38)		
no income	0.9461		
	(–0.30)		
Income < 50000	1.0219		
	(0.22)		
Income 100000–150000	1.1231		
	(0.97)		
Income 150000–250000	1.1675		
	(1.11)		
Income > 250000	0.9261		
	(–0.46)		

Notes: Results reported as odds ratios. t-values in brackets.; * and ** symbolise significance at 5 and 1% level. LR test tests joint significance of regressors.

high-income earners has increased somewhat. Therefore, there is some evidence that highly educated and high-income earners have become more mobile during the period under study, thus exacerbating the selection problem in out-migration.

Since income and education levels are correlated, it may be worthwhile to check if income variables become much more significant when education variables are not included in the model. This is analysed in model 5, where income variables are somewhat more significant and higher income increases migration probability starting from the 150,000–250,000 bracket.

5. *Analysis of return migration*

This sample, obtained from Statistics Finland, consists of 80% of Finnish emigrants in 1994.[14] The data contains information on how many of them returned to Finland by 2000. The purpose is to explain the return migration probability with data on similar background information of the migrants from the time of emigration than in the previous section. Unfortunately no information is available about what

[14] *All are Finnish nationals, and there were no age restrictions.*

happened to the migrants abroad. After omitting children, the sample size is 3593. The data is described in table A.2. The overall return migration share (59%) in the sample well corresponds to the share in overall data (Figure 2).[15]

The logit analysis (reported in Table 4) shows that it is very difficult to explain return migration with the characteristics of emigration date.[16] In particular, income and education levels of emigration time are not correlated with the return migration decision. Therefore it is relatively safe to say that the return migration probability of Finns is 60% in 10 years, and it is the same irrespective of education and income. The analysis shows that women, elderly people, and somewhat surprisingly, students return less often than others.

6. *Factors explaining Finnish migration to OECD countries*

This section adopts a rather different macro perspective on migration. The purpose is to study which factors can be used to explain how many Finnish emigrants moved to a particular OECD country *j* at time *t* in 1990–2000. Both the number of all migrants and that of highly educated migrants are used as a dependent variable. The key interest is in the role of public sector variables and tax rates on migration destination, while other things, such as distance, size of the country, and income level are taken into account. The sample includes 20 OECD countries: Austria, Australia, Belgium, Canada, Denmark, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.[17] In 1990–2000, the countries that attracted most Finnish migrants, Sweden (40% of all migrants), Norway (9%), Germany (7%), the United States (6%), the United Kingdom (6%), and Spain (6%), are hence included in the sample.

It is not clear *a priori* what kind of public sector variables might affect migration decisions. The models include tax rates for labour income (both excluding and including social security contributions) and the overall tax rate and public sector size. It is naturally clear that some of these variables might in fact increase the incentives to choose to move to a country: if migrants prefer high-quality public services they may want to reside in a country with a large public sector. In an ideal case, one would like to have more detailed knowledge about tax structures in the country. For instance, for the highly educated migrants, the progressivity of the tax system may play a role on top of the average income tax rate. Comparable data on such indicators is unfortunately not available for sufficiently long time periods.[18]

Control variables include growth rate, GDP level (lagged one period) and unemployment rate. These variables reflect the overall economic situation in the receiving country. Another potential explanation for the direction of migrants is investments made by Finnish sources to the destination country (Foreign direct investment)[19]. The idea is that Finnish workforce may move alongside with investment. In some of the regressions, time-invariant control variables (distance, population, dummies related to EU membership, being a Nordic country, or an English speaking country) are included as well. Table 5 gives a list of variables used and their sources. The source of the dependent variable (all Finnish migrants to specific countries or highly educated Finnish migrants) is Statistics Finland.

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[15] The analysis admittedly suffers from a self-selection problem, made famous by J. Heckman: return migration is only observed for those who decided to emigrate. In principle one should therefore model emigration and return migration decisions jointly. This caveat should be kept in mind when assessing the results.

[16] This is clear also from the poor predictive properties of the model.

[17] Some countries are dropped from some of the regressions because of paucity of data. All of the 30 OECD countries are not included in the sample, as some have only a very small number of Finnish migrants (such as Mexico), and because the time series for Central and Eastern European OECD member states are very short.

[18] The OECD reports the tax rates for persons earning 167% of the APW since 1995. This variable was tested in the regression, but it turned out that the time span is too short to yield reliable estimates.

[19] Alternatively, one could have used the significance of trade relations.

Table 5. List of variables.

Variable	Explanation	Source
Tax rate	Overall tax revenues / GDP	OECD
Government expenditure	Government expenditure / GDP	OECD
Average labour income tax rate	The tax rate of a single average production worker (APW)	OECD
Labour tax wedge	Average tax rate + social security contributions of an APW	OECD
GDP per capita	GDP per capita in USD, constant 1995 prices	OECD
GDP growth	% from previous year	OECD
Unemployment rate	% from labour force	OECD
Foreign direct investment	FDI from Finland to destination country	Bank of Finland
Population		OECD
Distance	The distance of country capital from Helsinki	Finnair
English speaking country	English as an official language	
EU country		
Nordic country		

The bulk of the analysis is based on the General Method of Moments (GMM) based first-step dynamic panel estimation procedure of Arellano and Bond (1991) with fixed effects. The idea in the estimation is as follows. The specification we analyse is

$$(1) \quad y_{i,t} = \alpha_i + \lambda y_{i,t-1} + \beta x_{i,t} + u_{i,t}$$

where $y_{i,t}$ is the dependent variable (Finnish migrants to country i at time t), α_i is a country-specific fixed effect, $x_{i,t}$ is a vector of control variables (from Table 5), and $u_{i,t}$ is the error term. Taking first differences of equation (1), fixed effects vanish from the model:

$$(2) \quad y_{i,t} - y_{i,t-1} = \lambda(y_{i,t-1} - y_{i,t-2}) + \beta(x_{i,t} - x_{i,t-1}) + (u_{i,t} - u_{i,t-1})$$

Estimating (2) with OLS is problematic, as $(y_{i,t-1} - y_{i,t-2})$ is correlated with $(u_{i,t} - u_{i,t-1})$, since both include $u_{i,t-1}$. Arellano and Bond (1991) suggest using lagged levels of dependent variable as instruments for $(y_{i,t-1} - y_{i,t-2})$. At different time periods, different numbers of instruments are available, and GMM can be used to exploit the different instruments in an efficient way. In particular, $y_{i,1}$ is uncorrelated with $(u_{i,3} - u_{i,2})$, $y_{i,1}$ and $y_{i,2}$ are uncorrelated with $(u_{i,4} - u_{i,3})$, etc.

In the estimations reported in Tables 6 and 7, the estimation is carried out as above in equation (2) in first differences, and lagged levels of the dependent variable are used as instruments for $(y_{i,t-1} - y_{i,t-2})$, using the procedure described above. The Sargan overidentification test does not detect problems in the choice of the instruments. Likewise, the autocorrelation test statistics reveal no diagnostic problems in the regressions.[20] The lagged dependent variable is significant, which supports the choice of a dynamic framework. OLS-based regressions without fixed effects but with time-invariant variables are also reported. The results for all migrants and for the academically educated are reported in tables 6 and 7, respectively. All of the public sector variables are not included in the same model because of potential multicollinearity. Models 1 and 3 include the tax rate and average labour income tax rate, whereas models 2 and 4 include labour tax wedge and public sector expenditure.

The key result from all the specifications is that none of the public sector variables significantly reduces the direction of migration to a country. In contrast, in some cases the variables reflecting the overall size of the public sector (tax rate and public expenditure) actually increase migration to a destination country. Migration seems to be dependent on other factors instead: Higher growth rate and higher level of

[20] *However, one must bear in mind that GMM suffers from potential small sample biases, see, e.g., Hsiao (2003, Chapter 4). For this reason, the model was also estimated with OLS with fixed effects. The qualitative results remained similar than in the GMM-based models. The results from these estimations are available from the author upon request.*

Table 6. Allocation of emigration by country, regression result.

Dependent variable: over 15 year old Finnish emigrants (logarithm)				
Model	1	2	3	4
Estimator	GMM	GMM	OLS	OLS
Years	1992–2000	1992–2000	1991–2000	1991–2000
Lagged dependent variable	0.3353*	0.4746**	0.6937**	0.6848**
	(2.23)	(3.76)	(9.67)	(10.0)
GDP per capita, lagged one period, logarithm	10.0939**	10.428	1.2380**	1.2554**
	(2.76)	(1.13)	(3.55)	(3.76)
GDP growth, %	0.14127**	0.15999*	0.0366*	0.03099
	(4.07)	(2.62)	(2.32)	(1.03)
Unemployment rate, %	0.2688**	0.17973	0.01584	0.00675
	(3.34)	(1.44)	(1.15)	(0.318)
FDI, logarithm	0.0650	0.05780	0.01971	0.01618
	(1.27)	(0.831)	(1.72)	(1.73)
Tax rate	0.09823*		0.003625	
	(2.60)		(0.520)	
Public expenditure / GDP		0.05540		0.000694
		(1.07)		(0.056)
Average labour income tax rate	0.01625		0.004679	
	(0.26)		(0.809)	
Labour tax wedge		0.03354		0.00329
		(0.557)		(0.446)
Distance, logarithm			–0.652837**	–0.6585**
			(–4.38)	(–5.07)
Population, logarithm			0.2552**	0.2626**
			(3.59)	(4.26)
EU dummy			–0.1326	–0.09130
			(–1.39)	(–0.915)
Nordic country dummy			0.03951	0.1187
			(0.23)	(0.852)
English speaking country			0.2526*	0.2808*
			(2.17)	(2.26)
Constant	–0.0122508	–0.08548	–10.6139**	–10.6834**
	(–0.200)	(–0.508)	(–3.04)	(–2.81)
Nr of countries	16	15	16	15
Obs.	141	116	154	128
Wald, all independent variables = 0, p-value	0.000**	0.000**	0.000**	0.000**
AR(1), p-value	0.045*	0.176	0.651	0.107
AR(2), p-value	0.118	0.201	0.470	0.197
Sargan, p-value	0.357	0.997		

Notes: Dependent variable: Over 15-year-old Finnish emigrants. Heteroscedasticity robust t-values in brackets. * and ** denote significance at 5 and 1% level, respectively. GMM estimations are based on the one-step estimator by Arellano and Bond (1991); only the lagged dependent variable has been instrumented. Country dummies are not reported. Australia, Spain, Greece and Portugal are left out from models 1 and 3 and, in addition, Switzerland from 2 and 4 because of lack of data.

GDP increase the movement to a destination country. Countries that are close to Finland and large (in terms of population) also receive more Finnish migrants. FDI has in general correct, positive sign, but is only significant at 10% level. English used as an official language in the destination country is also a positive and significant factor in the regression for all migrants, whereas it is not significant in the case of highly educated migrants. Otherwise the qualitative results concerning all migrants and highly educated migrants are similar. While there are some differences in the significance and the signs of explanatory variables over different specifications, the results are nonetheless in general in line with what one would expect based on eco-

Table 7. Allocation of emigration by country, regression result.

Dependent variable: highly educated emigrants (logarithm)				
Model	1	2	3	4
Estimator	GMM	GMM	OLS	OLS
Years	1992–2000	1992–2000	1991–2000	1991–2000
Lagged dependent variable	0.3303**	0.5622**	0.7134**	0.7188**
	(5.23)	(4.46)	(11.4)	(8.13)
GDP per capital, lagged one period, logarithm	10.9902*	16.271	1.3760**	1.3646**
	(2.00)	(1.59)	(3.26)	(2.95)
GDP growth, %	0.15517	0.2434**	0.0363	0.0322
	(3.26)	(3.12)	(1.81)	(0.967)
Unemployment rate, %	0.3225**	0.2361**	0.02679	0.0261
	(3.59)	(2.05)	(1.68)	(1.16)
FDI, logarithm	0.01058	–0.0056	0.02617	0.0205
	(0.187)	(–0.114)	(1.45)	(1.45)
Tax rate	0.09743		–0.00736	
	(1.13)		(–1.10)	
Public expenditure / GDP		0.14374*		–0.00519
		(1.99)		(–0.353)
Average labour income tax rate	–0.01891		0.00305	
	(–0.297)		(0.402)	
Labour tax wedge		–0.02289		–0.00244
		(–0.279)		(–0.222)
Distance, logarithm			–0.6006**	–0.5833**
			(–4.56)	(–3.06)
Population, logarithm			0.22476**	0.2489**
			(4.02)	(3.99)
EU dummy			–0.05140	0.02338
			(–0.453)	(0.168)
Nordic country dummy			0.0165	0.07148
			(0.073)	(0.412)
English speaking country			0.1536	0.1118
			(1.05)	(0.761)
Constant	0.00228	–0.1181	–11.927	–12.2599**
	(0.0326)	(–0.663)	(–2.90)	(–2.74)
Nr of countries	16	15	16	15
Obs.	141	116	154	128
Wald, all independent variables = 0, p-value	0.000**	0.000**	0.000**	0.000**
AR(1), p-value	0.046*	0.151	0.832	0.217
AR(2), p-value	0.494	0.628	0.681	0.287
Sargan, p-value	0.401	1.000		

Notes: Dependent variable: Highly educated emigrants. Heteroscedasticity robust t-values in brackets. * and ** denote significance at 5 and 1% level, respectively. GMM estimations are based on the one-step estimator by Arellano and Bond (1991); only the lagged dependent variable has been instrumented. Country dummies are not reported. Australia, Spain, Greece and Portugal are left out from models 1 and 3 and, in addition, Switzerland from 2 ja 4 because of lack of data.

nomic theory and earlier empirical results (e.g., in Borjas, 1999): rich and fast-growing large countries that are close to the host country attract more migrants.

Finally, it may be worthwhile to examine the robustness of the results above. Some possibilities for robustness check that come to mind are the following: (i) use of tax rate and tax wedge for married people instead of singles, (ii) adding year-dummies, (iii) using the difference of tax rates, GDP growth and unemployment rate in the destination country vs. Finland as explanatory variables, (iv) dropping other than public sector variables from the model, (v) dropping FDI from the model which enables the inclusion of all of the 20 countries, and (vi) looking at logarithmic versions of the public sector variables. These possibilities were tested in the

case of all migrants using a GMM model with fixed effects. The results[21] indicate that only in the case where the difference of tax rates, GDP growth and unemployment rate in the destination country vs. Finland are used as explanatory variables, the labour tax wedge reduces migration to a destination country at 10% level. In all other cases, public sector variables are either insignificant or they have a positive sign.

7. Conclusions

Logit analysis based on individual level data reveals that Finnish people with higher academic education have been roughly five times more prone to migrate in 1990–1999 than people with similar characteristics but with secondary education only. There is no similar difference in the return migration probabilities; around 60% of Finnish emigrants have returned after 10 years from emigration. Since only 20–30% of immigrants have other than primary education, the Finnish welfare state might suffer from the selection of migrants in a way, which is potentially harmful for human capital and public finances. There is also some evidence that the highly educated high-income earners have become more mobile in the latter part of 1990s, hence exacerbating the selection problem. Nevertheless, the numbers related to the 'brain drain' are still relatively low: during 1994–2000 Finland has lost 1400 people with higher academic education.

Macro-level evidence from a country panel suggests that Finnish emigration flows to OECD countries in 1990–2000 have been determined by factors other than taxation. Even highly educated Finns have moved to fast-growing rich countries that are near irrespective of their labour tax rates. There is even weak evidence that countries with large public sector attract more rather than less Finnish emigrants. If taxation has had a negative impact on the number of migrants, it must have had an indirect effect on GDP growth – a channel on which the empirical evidence is mixed (see, e.g., the survey in IMF 2001).

These findings tend to indicate that, at least for the time being, tax-induced international labour mobility has not created a major constraint to the Finnish welfare state. Some caveats are, however, necessary when assessing the reliability of the results. First, the analysis has concentrated on labour mobility alone. It may be the case that labour taxation mainly affects decisions concerning firm location and therefore it perhaps has an effect on the welfare state through job mobility.[22] Second, one does not necessarily have to observe mobility to deduce that tax competition has existed, because countries may have reduced their tax rates precisely to mitigate the threat towards labour mobility. Third, it is important to bear in mind that the welfare state can be threatened by concentration of immigrants in low-skilled, low-income, individuals. Finally, labour mobility may become a more serious issue in the future with more internationalised younger generations.

This paper analysed the migration to all destination countries at the same time. While this information is important for assessing the overall importance of possibly tax-induced labour mobility, it would be interesting to analyse, in future work, how the individual characteristics of emigrants vary with respect to their destination country. This could shed further light on whether the selection of migrants depends on the conditions in the destination country, in particular, on its tax structure. Similarly, the macro-level migration analysis could be analysed separately for different groups of destination countries.

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[21] *These results are not reported but are available from the author upon request.*

[22] *Andersen (2002), among others, raises this point.*

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Appendix

Table A.1: Characteristics of emigration estimation sample.

Those who emigrated in 1990–1999 vs those who stayed	Nr			%	
	Emigrated	Stayed	Sum	Emigrated	Stayed
All	3711	4189	7900	46.97	53.03
Sex:					
Female	1953	2180	4133	47.25	52.75
Male	1758	2009	3767	46.67	53.33
Marital status:					
Married	1657	2467	4124	40.18	59.82
not married	2054	1722	3776	54.40	45.60
Dependant children:					
has children	1195	2148	3343	35.75	64.25
no children	2516	2041	4557	55.21	44.79
Labour-market status:					
Employed	1775	2814	4589	38.68	61.32
Unemployed	467	484	951	49.11	50.89
Student	362	167	529	68.43	31.57
Pensioner	213	514	727	29.30	70.70
Other	894	210	1104	80.98	19.02
Self-employment:					
self-employed	166	341	507	32.74	67.26
not self-employed	3545	3848	7393	47.95	52.05
The level of education:					
primary education	922	1457	2379	38.76	61.24
Secondary education	1176	1622	2798	42.03	57.97
lowest academic education	692	648	1340	51.64	48.36
lower academic education	297	211	508	58.46	41.54
higher academic education	556	236	792	70.20	29.80
Doctor	68	15	83	81.93	18.07

The field of education:					
Technical education	667	903	1570	42.48	57.52
Commercial	685	565	1250	54.80	45.20
Health	370	322	692	53.47	46.53
General[23]	427	197	624	68.43	31.57
Service	260	390	650	40.00	60.00
Teaching	53	91	144	36.81	63.19
Arts	153	80	233	65.67	34.33
Sciences	110	49	159	69.18	30.82
Agriculture	64	134	198	32.32	67.68
Other	922	1458	2380	38.74	61.26
Taxable income[24]:					
No income	582	97	679	85.71	14.29
0–50000	1197	888	2085	57.41	42.59
50000–100000	800	1390	2190	36.53	63.47
100000–150000	495	1154	1649	30.02	69.98
150000–250000	412	536	948	43.46	56.54
250000–	225	124	349	64.47	35.53
Age					
Age 5–24	502	306	808	62.13	37.87
Age 25–29	836	425	1261	66.30	33.70
Age 30–39	1229	1118	2347	52.36	47.64
Age 40–49	694	1162	1856	37.39	62.61
Age 50–64	450	1178	1628	27.64	72.36

Note: Income in FIM, 1994 value.

[23] *'Yleissivistävä' in Finnish.*

[24] *This includes labour and capital income, as well as most security benefits that are subject to taxation, i.e., unemployment benefits. It does not include social assistance, housing subsidies or grants.*

Table A.2: Characteristics of return migration sample.

Those who returned and those who stayed abroad from emigrants in 1994	Nr			%	
	Stayed	Returned	Sum	Stayed	Returned
All	1474	2119	3593	41.02	58.98
Sex:					
Female	840	1012	1852	45.36	54.64
Male	634	1107	1741	36.42	63.58
Marital status					
Married	574	794	1368	41.96	58.04
not married	900	1325	2225	40.45	59.55
Dependant children:					
has children	653	967	1620	40.31	59.69
no children	821	1152	1973	41.61	58.39
Labour-market status:					
Employed	641	1004	1645	38.97	61.03
Unemployed	316	548	864	36.57	63.43
Student	328	461	789	41.57	58.43
Pensioner	189	106	295	64.07	35.93
Self-employment:					
self-employed	70	88	158	44.30	55.70
not self-employed	1404	2031	3435	40.87	59.13
The level of education:					
primary education	396	475	871	45.46	54.54
Secondary education	501	780	1281	39.11	60.89
lowest academic education	255	373	628	40.61	59.39
lower academic education	95	154	249	38.15	61.85
higher academic education	211	304	515	40.97	59.03
Doctor	16	33	49	32.65	67.35
The field of education:					
Technical education	202	392	594	34.01	65.99
Commercial	251	332	583	43.05	56.95
Health	134	179	313	42.81	57.19
General	245	417	662	37.01	62.99
Other	642	799	1441	44.55	55.45
Taxable income:					
No income	86	110	196	43.88	56.12
0–50000	554	823	1377	40.23	59.77
50000–100000	376	511	887	42.39	57.61
100000–150000	213	299	512	41.60	58.40
150000–250000	149	247	396	37.63	62.37
250000–	107	146	253	42.29	57.71
Age:					
age 5–24	288	526	814	35.38	64.62
age 25–29	329	545	874	37.64	62.36
age 30–39	388	556	944	41.10	58.90
age 40–49	207	332	539	38.40	61.60
age 50–64	191	126	317	60.25	39.75
Age 65–	71	34	105	67.62	32.38

Note: Income in FIM, 1994 value.