

**Labour mobility within the EU -  
The impact of enlargement and the functioning  
of the transitional arrangements**

Tatiana Fic, Dawn Holland and Paweł Paluchowski

National Institute of Economic and Social Research  
2 Dean Trench Street  
Smith Square  
London SW1P 3HE  
United Kingdom

NIESR Discussion Paper No. 379

April 2011

\*\*\*\*Preliminary results - please do not cite without permission\*\*\*\*

*Abstract*

The main focus of this study is an assessment of the macro-economic impact on both host and home countries of the increased labour mobility that has resulted from the two recent EU enlargements in 2004 and 2007. We attempt to quantify the share of population movements that have occurred since 2004 that can be attributed to the enlargement process itself, and the share that is likely to have occurred even in the absence of EU expansion. We next look at the impact that transitional restrictions on the free mobility of labour have had on the distribution of EU-8 and EU-2 citizens across the EU-15 countries.

Corresponding author: Dawn Holland (dholland@niesr.ac.uk)

## Executive Summary

Free movement of workers within the EU was achieved in 1968 and acts as one of the four pillars of the EU Single Market. While the policy was introduced with aim of removing barriers to the functioning of a fully integrated market economy in Europe and improving the matching of labour supply and demand, concerns regarding the sudden shock of opening labour markets in existing member countries have been an issue in all subsequent enlargements where a significant wage differential existed between new and old member states (1981, 1986, 2004 and 2007). While in the long-run, free mobility can be expected to raise potential growth in the EU as a whole, the shock to labour markets and wages can have negative impacts on host economies in the short-term, while the loss of skilled labour can be detrimental for the home economies. To counter-act these factors, member states have been allowed to temporarily restrict the free mobility of workers from acceding countries for a period of 5 years in general, and up to 7 years under certain circumstances. These transitional arrangements are intended to smooth the shock to labour markets of the enlargement process.

The main focus of this study is an assessment of the macro-economic impact on both host and home countries of the increased labour mobility that has resulted from the two recent EU enlargements. We attempt to quantify the share of population movements that have occurred since 2004 that can be attributed to the enlargement process itself, and the share that is likely to have occurred even in the absence of EU expansion. We next look at the impact that transitional restrictions on the free mobility of labour have had on the distribution of EU-8 and EU-2 citizens across the EU-15 countries. There appears to be clear evidence that the pattern of restrictions in place at the beginning of the 2004 enlargement diverted mobile workers away from traditional destinations – namely Germany – and towards the more easily accessed labour markets in the UK and Ireland. We use two approaches to assess the macro-economic impact that the transitional restrictions has had on each of the EU-15 economies. There is less evidence of such a diversion following the 2007 enlargement, but we make an assessment of the likely macro-economic impact of the transitional restrictions that may have affected the location decision of EU-2 citizens moving to the EU-15.

Our preliminary estimates suggest that since the 2004 enlargement, about 1.8 per cent of the EU-8 population has moved to the EU-15, raising the host country population by 0.3 per cent. Of this, approximately 45 per cent can be attributed to the enlargement process itself, while the remaining population shifts are likely to have occurred even in the absence of enlargement. Since 2007, about 4.1 per cent of the EU-2 population has moved to the EU-15, raising the host country population by a

further 0.3 per cent. Of this, approximately 25 per cent can be attributed to the enlargement process itself.

The impact on individual countries within each of the regions depends on the magnitude of emigration/immigration that has occurred relative to the size of the domestic population. Of the sending countries, the biggest effects are expected to be in Romania and Lithuania, where the potential level of output may be permanently reduced by 2¼-3 per cent as a result of the decline in the domestic labour force that can be attributed to acceding to the EU. Latvia, Bulgaria and Estonia can also expect a permanent scar of about 1 per cent or more on the potential level of output in their economies. The impact on GDP per capita, however, can be expected to be negligible.

The macro-economic impact of the population shifts attributable to the 2004 and 2007 enlargement processes on the EU-15 as a whole is expected to be negligible, possibly raising the long-run level of potential output by about 0.1 per cent. The impact on Ireland is expected to be more significant, perhaps raising the potential level of GDP by more than 1 per cent in the long-run. The UK may also benefit from a rise in potential output of about 0.4 per cent. Again, the long-run impact on GDP per capita is expected to be negligible.

Our estimates of the long-run effects on output of the EU enlargement are based on the assumption that all population shifts that have occurred to 2009 are permanent, and we make no assumption about population shifts after 2009. The net emigration rates of both the EU-8 and EU-2 towards the EU-15 had receded towards pre-accession levels by 2009, so it is not clear how much future population movements can be attributable directly to the enlargement of the EU itself.

Our estimates suggest that by 2009, the 2004 enlargement had raised the level of output in Ireland by 0.6 per cent (roughly equivalent to a rise in GDP growth of 0.1 percentage point per annum since 2004), while it had reduced the level of GDP in Lithuania by 1.5 per cent (roughly equivalent to a decline in GDP growth of ¼ per cent per annum). The effects on other sending and receiving countries are smaller. The unemployment rate in Ireland was roughly 0.2 percentage points lower by 2009 than it would have been without the EU expansion, although in 2005-2007 we estimate that the unemployment rate was slightly higher in Ireland as a result of the unexpectedly high inflows of workers from the EU-8. Our estimates point to a slight decline in the unemployment rate in Lithuania in the years immediately following the 2004 enlargement, but this effect should have dissipated by 2009. We would not expect unemployment rates in any country to be permanently affected by the population movements.

The 2007 enlargement has had only a small macro-economic impact on any of the EU-15 economies. The biggest impacts have materialised in Italy and Spain, but by 2009 these had affected the level of GDP by less than 0.1 per cent in both countries. The impacts on the sending countries, on the other hand, have been more significant. Our estimates suggest that by 2009 the level of GDP in Romania was more than 1 per cent below the level it might have achieved in the absence of accession to the EU (although the level of GDP per capita was about 1½ per cent higher than it might have been). In Bulgaria the level of GDP was probably about 0.4 per cent lower in 2009 than it would have been without the loss of labour force that occurred as a result of EU membership (although, again, the level of GDP per capita was slightly higher). The unemployment rate in Romania may have been about 0.2 percentage points lower in 2009 as a result, while the impact on the unemployment rate in Bulgaria is imperceptible at the macro-economic level.

Final transitional restrictions on the free mobility of labour from the EU-8 to the EU-15 are due to be lifted on 1 May 2011. As the existence of support networks for new migrants is one of the most important factors affecting the location decision, any distortion in the distribution of EU-8 citizens across the EU-15 that has resulted from the transitional restrictions is likely to prove permanent. Our estimates suggest that transitional restriction on the free mobility of labour introduced in some countries at the onset of the 2004 enlargement and their extension into the second and third phases of the transitional process, has significantly altered the distribution of EU-8 citizens across the EU-15 economies. Our preliminary results suggest that the long-run effect of these distortions can be expected to raise the potential level of output in Ireland by 1.4-1.7 per cent, in the UK by 0.3-0.5 per cent and in Denmark by 0.1-0.4 per cent, while they will leave a permanent scar on the level of potential output in Germany and Greece of 0.1-0.5 per cent.

It is far less clear that transitional restrictions on the free mobility of labour from the EU-2 to the EU-15 following the 2007 EU enlargement has significantly affected the location decision of EU-2 citizens within the EU-15. The most important shift in location share for EU-2 citizens since 2006 has been away from Spain and toward Italy. Both countries introduced some restrictions on labour market access for citizens of these countries in 2007. Spain lifted all restrictions at the beginning of 2009, while the restrictions in Italy remain in place, so the existence of restrictions itself cannot explain the shift in location preference towards Italy. These shifts are more likely to reflect factors such as the employment opportunities in Italy compared to Spain, which experienced a severe recession in 2009 and where the unemployment rate soared above 20 per cent last year. However, if we can attribute the shift in location shares to transitional arrangements following the 2007 enlargement, this would suggest that they have reduced the long-run potential level of output in Spain by 0.5-0.7 per cent, and increased potential output in Italy by about 0.3 per cent.

## **Data sources and issues**

Before we can assess the impact of enlargement and transitional arrangements on labour mobility within the EU, we must first establish the pattern of population movements from the new member states (EU-8 and EU-2) to the old member states (EU-15), both before and after enlargement. There are three primary data sources that we have used to establish this baseline pattern: Eurostat's Population data on population stocks by citizenship; Eurostat's Population data in International Migration Flows; Eurostat's Labour Force Statistics (LFS). We have supplemented these with information from the OECD International Migration Database in some instances.

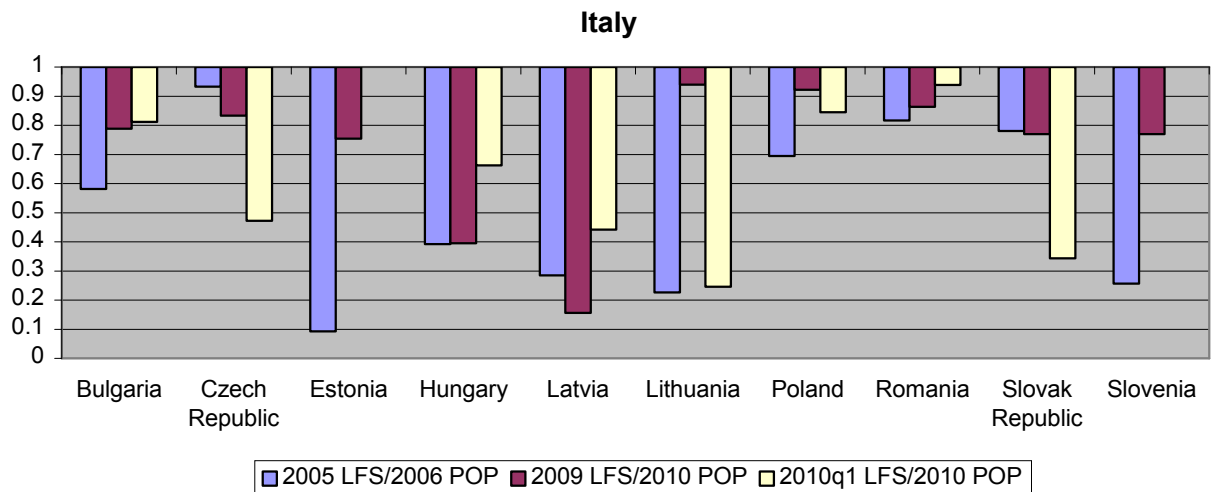
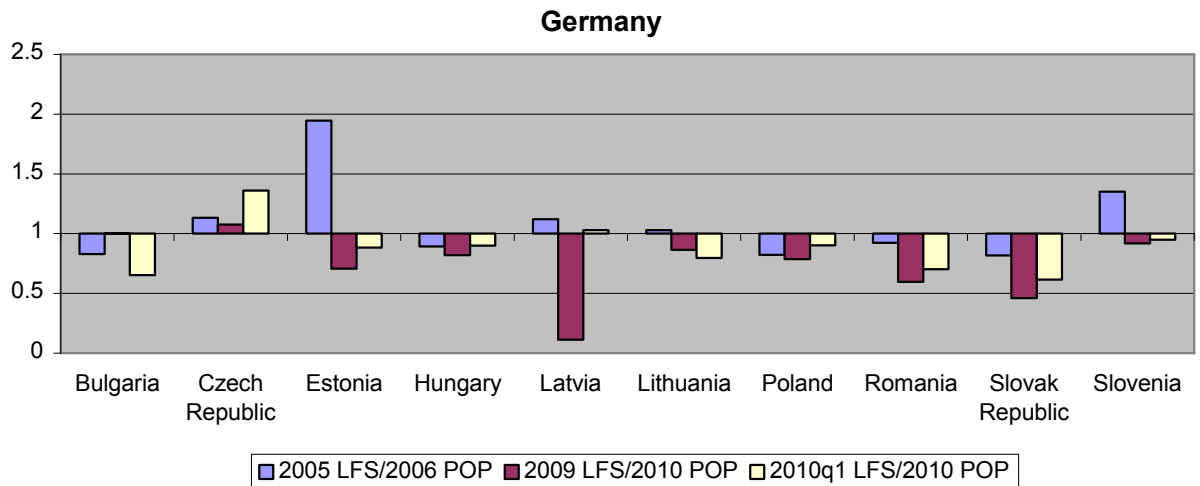
There are some key methodological differences between the LFS and Population Statistics, which means there are likely to be some discrepancies between the sources. The LFS is based on a quarterly sample survey covering 0.2-3.3% of the population, based on a common approach across countries. The Population Statistics are based on a range of sources (administrative records, national surveys, census, migration statistics, vital statistics) and there is no common methodology across countries. However, the Population Statistics are more comprehensive in their coverage of the population. The rules for defining usual resident population may differ between LFS and Population statistics, and the LFS only covers persons living in private households. The timing also differs, with the Population statistics reflecting the population as of 1 January in the given year, whereas the LFS provides a quarterly or annual average.

Given these potential sources for discrepancy, it is somewhat surprising to discover that the level of the population calculated for the EU-27 as a whole is only 1.2 per cent smaller in the LFS statistics compared to the Population statistics (based on 2006 figures). However, at the bilateral level within individual countries the discrepancies are far larger, and show no clear pattern over time and across countries. In the figures below we compare the stocks of population by citizenship from the EU-8 and EU-2 in a selection of EU-15 countries<sup>1</sup> as reported in the LFS and the Population statistics. We compare the ratio of LFS to Population statistics estimates in 2005 (January 2006 for the Population statistics) and 2009 (January 2010 for the Population statistics). We also include figures for 2010q1 from the LFS relative to January 2010 from the Population statistics to see if this is a better fit. The columns in the figures are centred around 1, so if the series are identical no column appears, if the LFS series is smaller than the Population series the column is below the centre line and if the LFS series is higher the column rests above the centre line.

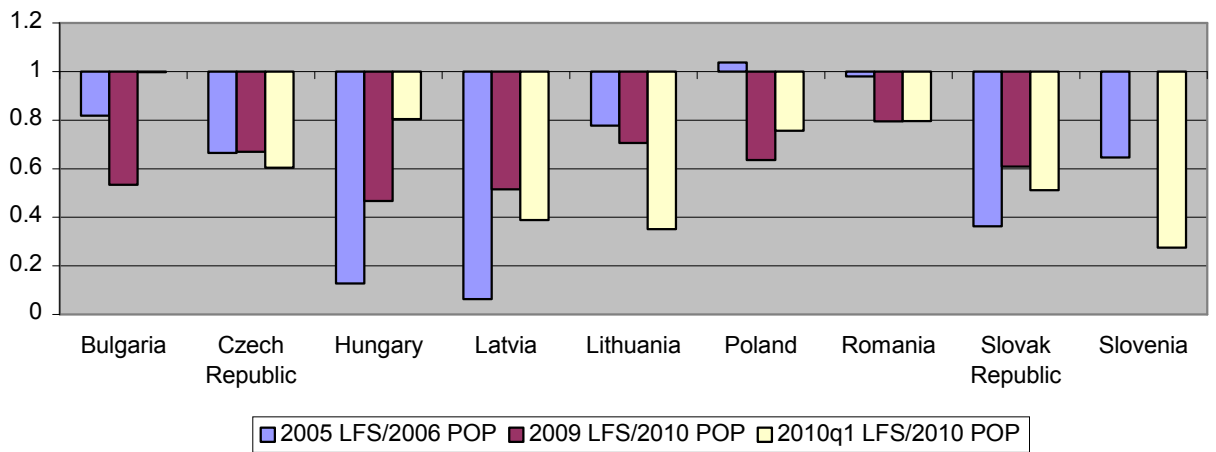
---

<sup>1</sup> The selected countries were those that had near complete data sets in the relevant years in both the LFS and Population statistics.

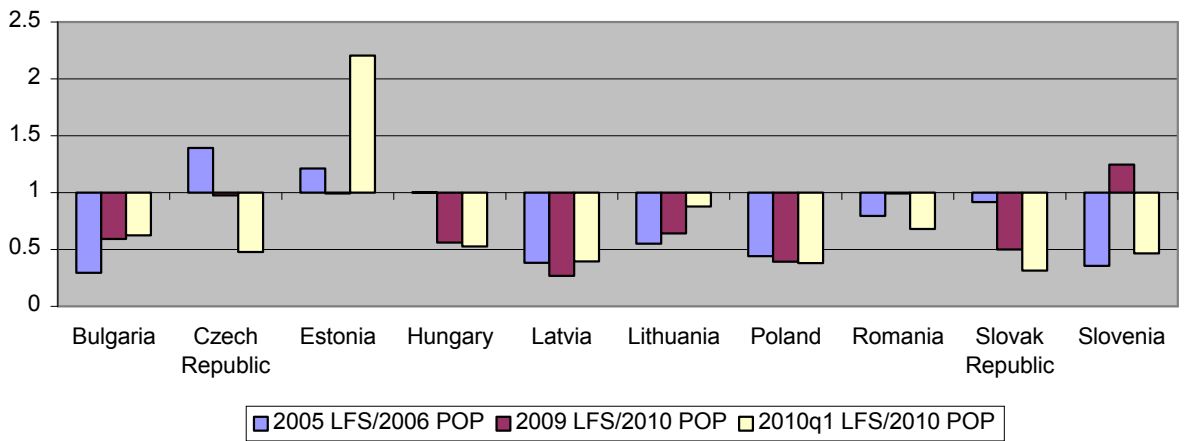
In Spain, Italy and Sweden the LFS series are consistently smaller than the Population series. This is what we would expect to see given the aggregate data for the EU-27 discussed above. However, the magnitude of discrepancy is very far from what we would hope to see, averaging about 50 per cent smaller, compared to the 1.2 per cent discrepancy for the aggregate data. The magnitude of discrepancy shows little in the way of stability across the time periods and there is no clear evidence that the 2010q1 LFS fit is more closely correlated with the 2010 Population statistics than the 2009 LFS figures.



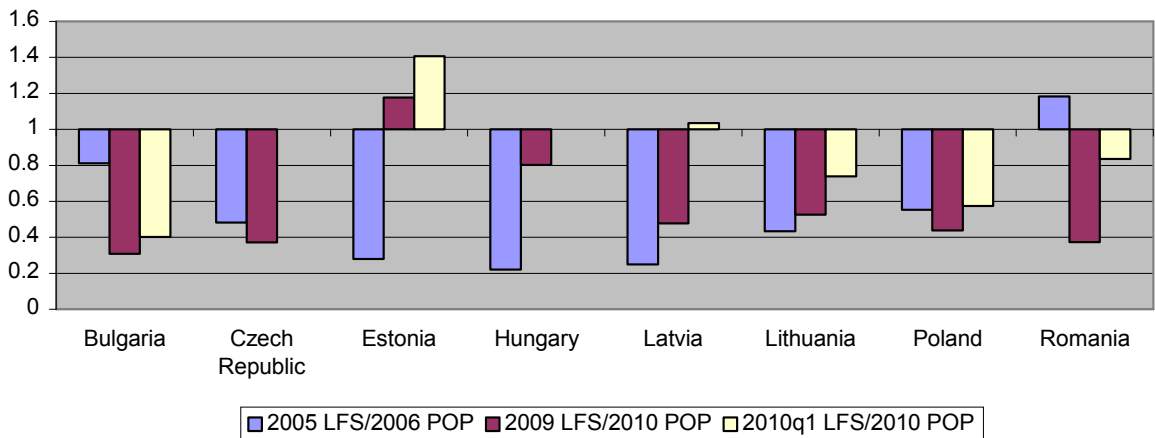
### Spain



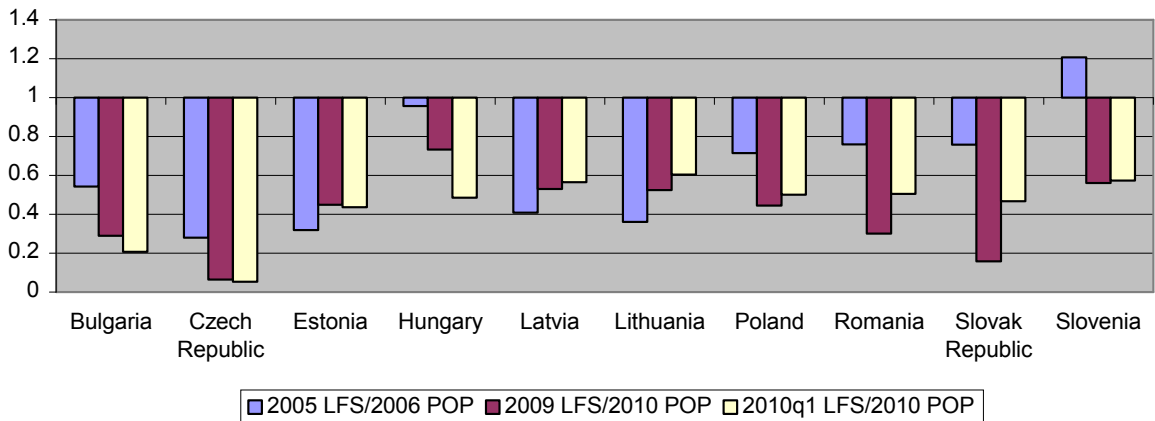
### Netherlands



### Denmark

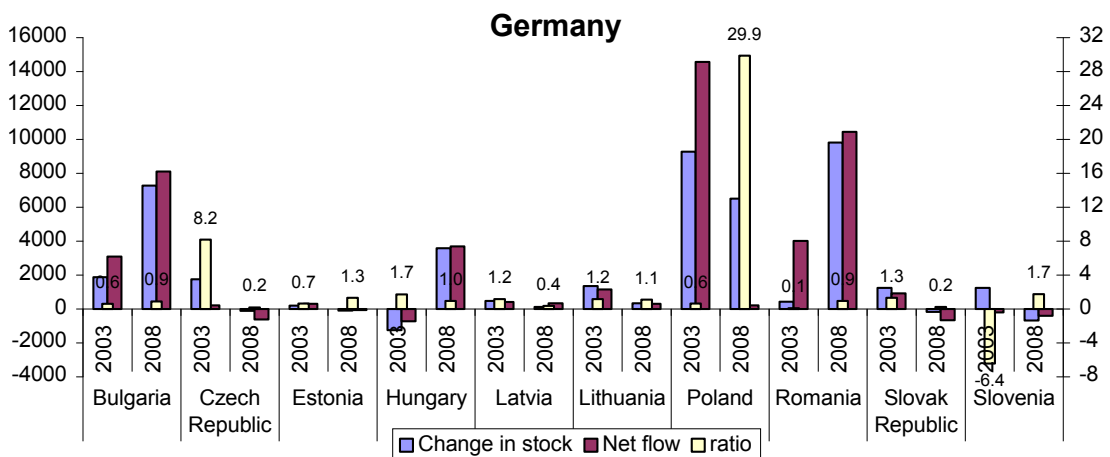


### Sweden

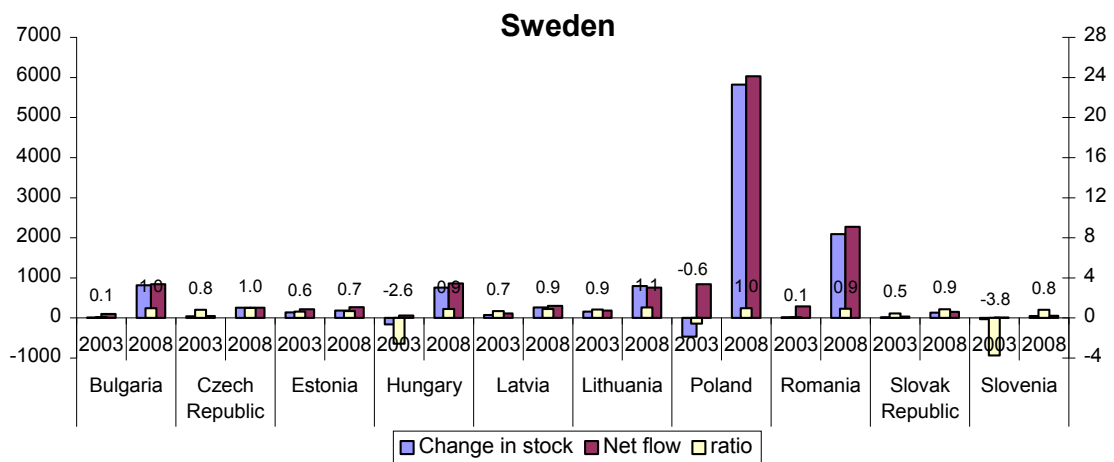
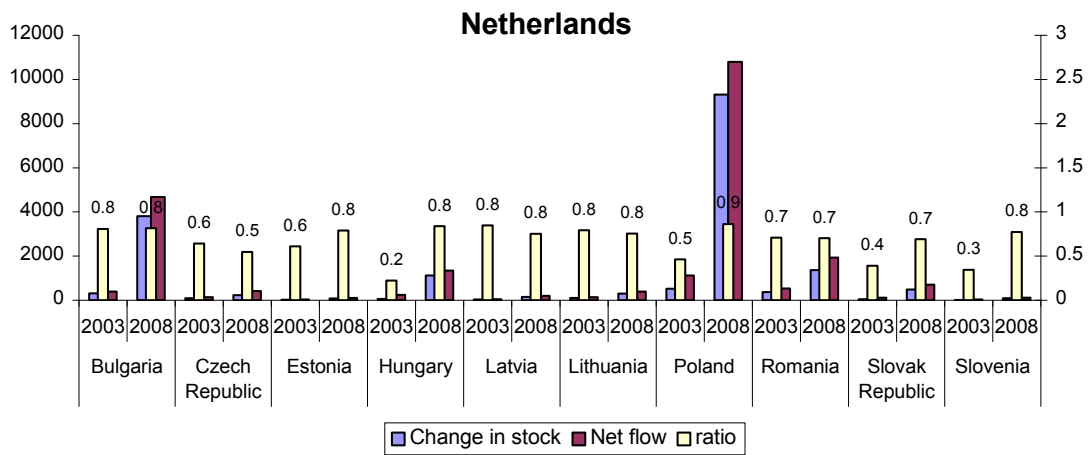
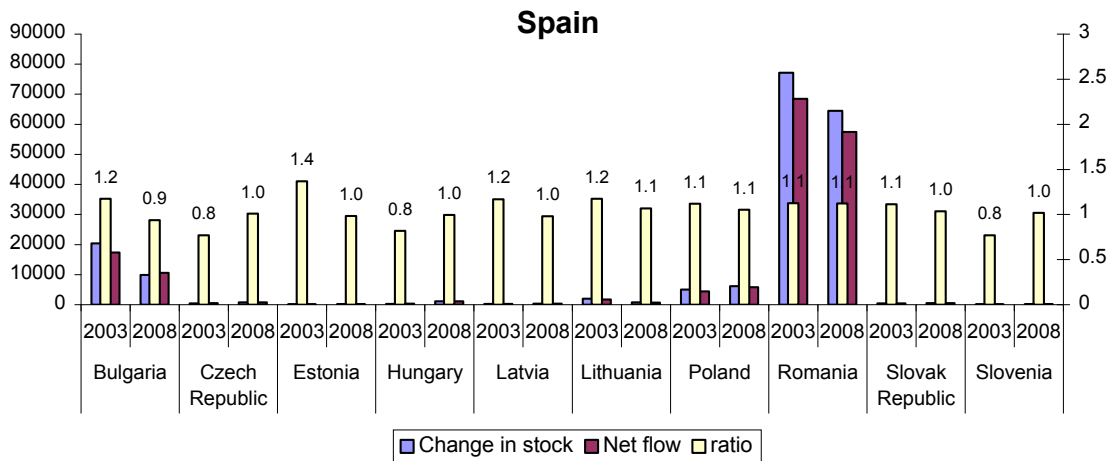


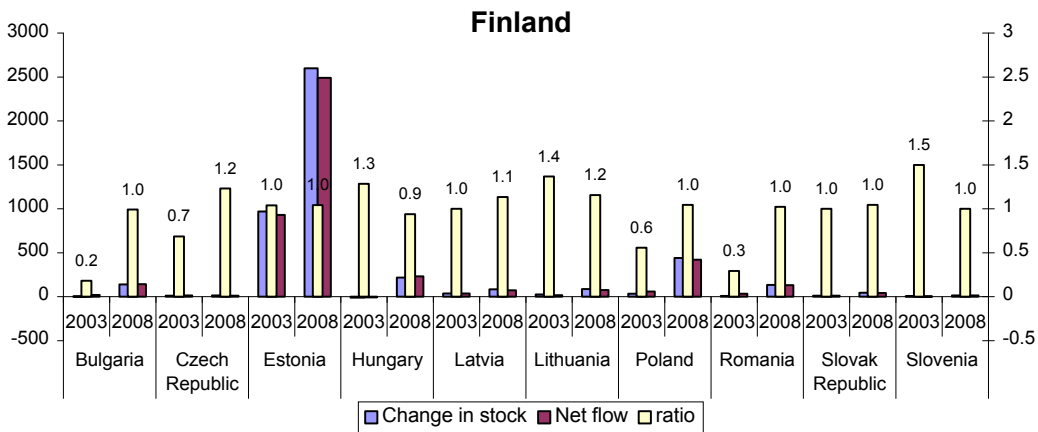
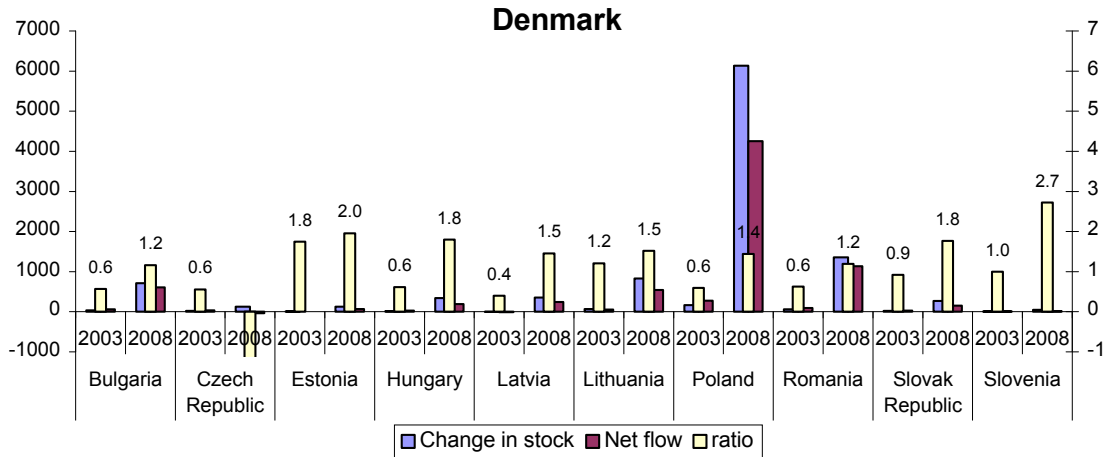
The patterns for Germany, the Netherlands and Denmark are even more variable than for the other three countries, with the LFS figures sometimes larger than those of the Population statistics, but with little consistency over time and across countries. At the outset this tells us that the data we will be working with is subject to a high degree of uncertainty and a wide margin of error. The results that we produce based on these estimates should be viewed with this in mind.

We made a similar assessment of the comparability of the stock and flow data from Eurostat’s Population Statistics, to determine how closely the change in the stocks matches the net flow from the same dataset. We found a similar degree of discrepancy across these two series. Theoretically the two should not match exactly, as the change in stock includes the net birth rate (births less deaths). However, this should be a very small factor over such a short time period. The figures below illustrate the change in stock and the net flow (inflows less outflows) in 2003 and 2008 in a selection of countries, as well as the ratio of the two. A ratio of less than 1 indicates that the flow data is larger, whereas a ratio of more than one indicates that the change in stock is larger. Both series are taken from Eurostat’s Population statistics.





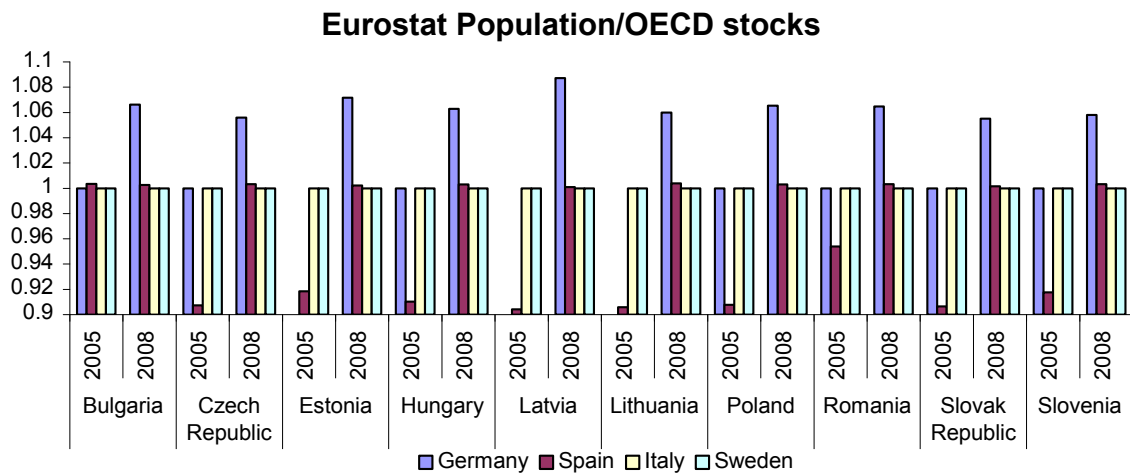




The figures for Spain show a relatively high degree of consistency across the two series, with a ratio of close to 1 in many countries and time periods. However, even in Spain these figures sometimes differ by up to 40 per cent. Finland and the Netherlands also show a relatively consistent pattern, although in the case of the Netherlands the change in stock is always at least 20 per cent below the level of the flow. The figures for Germany and Denmark show very little consistency across the two data sources.

The final source that we use for comparison is the OECD International Migration Database. This source is less comprehensive and less timely than the Eurostat sources, so would not be used as a primary data source. However, it does show a very strong correlation with the Eurostat Population statistics for population stocks by citizenship. The figure below illustrates this relationship, by the ratio of Eurostat Population statistics to the relevant OECD series. In most cases (of the examples shown) the ratio is very close to one, so Eurostat and the OECD have clearly used the same source for the data. The figures for Germany are somewhat higher in the Eurostat series in 2008, although the discrepancy is less than 8 per cent, which in the current context is very close. This may reflect the timeliness of the series, with the 2008 figures recently

revised by Eurostat. The figures for Spain in 2005 are also significantly different, but again this discrepancy is less than 10 per cent, compared to the 20-50 per cent differences seen in the other data sources.



Having determined that the available data sources are not consistent, the next problem that we face is that no single source is complete, as they all contain a large number of missing values for certain countries and certain time periods. Were this not the case we could simply use the three primary data sources as alternative baseline scenarios. However, as this is not possible we need to choose a primary data source, and establish a consistent methodology for estimating the missing observations from that source.

We choose to adopt Eurostat's Population statistics on population stocks by citizenship as our primary source. This choice is supported by the fact that this is the primary source used for the development and monitoring of harmonised immigration policies. The broader coverage makes it a better choice than the LFS, which may suffer from small sample biases. Marti and Rodenas (2007) undertake a review of the sampling procedures for the LFS in several EU countries. They highlight the fact that the sample size used is not always sufficient to capture changes in the small populations of residents from a given home country in an individual host country. They find that the LFS approach is more likely to capture population statistics in some countries than others: Austria, Belgium, France, Luxembourg, Sweden and the UK.

Our primary data source contains a complete time series from 1997 for 6 of the EU-15 countries (Denmark, Germany, Spain, Netherlands, Finland, Sweden). There is a fairly comprehensive coverage of 4 other countries (Belgium, Italy, Austria, Portugal), with sporadic information on the remaining 5 countries (Ireland, Greece, France, Luxembourg, UK). We treat the 1 January 2010 data as the year-end data for 2009. Missing observations were filled using information from the OECD

International Migration Database in the first instance, as this showed a very strong correlation with the Eurostat Population statistics. This allowed us to fill most of the missing observations in 4 countries (Greece, Italy, Luxembourg, Portugal). Further missing observations were filled using information from the LFS (primarily for France and the UK). The remaining missing observations were filled by assuming either a constant growth rate between two stock values or else using the average growth rate of stocks from the host country to the other EU-15 host countries for which data was available. In general, value of 0 were treated as missing values.

This allows us to establish a complete annual matrix of population stocks from home country  $i$  (EU-8 and EU-2) to host country  $j$  (EU-15) for the period 1997-2009. We approximate the net bilateral flows by the change in these stock values. The table below reports our full bilateral population stock matrix.

We also report a smaller matrix for population stocks of EU-2 citizens in each of the EU-10 countries, since 2003. There is very limited data availability for some countries (and none for Estonia). The magnitude of EU-2 citizens moving to EU-10 countries since 2004 is small, amounting to just 0.1 per cent of the populations of Bulgaria and Romania. The inflows into most EU-10 countries have also been 0.1 per cent or less, except in the case of Cyprus, where the population stocks of Romanian and Bulgarian citizens has risen by nearly 2 per cent of the Cypriot population.

CITIZEN	TIME	Belgium	Denmark	Germany	Ireland	Greece	Spain	France	Italy	Lux	Neths	Austria	Portugal	Finland	Sweden	UK	EU-15
Bulgaria	1997	799	341	34463	479	7043	1673	2209	3599	100	535	3868	318	320	1331	7346	64425
Bulgaria	1998	846	357	31564	443	6742	1583	2047	3335	93	630	3584	296	333	1171	8225	61249
Bulgaria	1999	929	394	32290	454	6968	2685	2095	4374	107	713	3892	321	317	1065	8472	65076
Bulgaria	2000	1069	408	34359	490	8093	10188	2260	5662	113	870	4217	348	297	1002	7258	76634
Bulgaria	2001	1529	426	38143	599	12552	23468	2766	6537	138	1074	4690	2213	308	805	6468	101716
Bulgaria	2002	1907	460	42419	728	18591	43418	3360	7603	142	1360	5335	3503	326	796	5328	135276
Bulgaria	2003	2233	493	44300	743	17278	63814	6021	11530	146	1678	5856	4004	330	805	11903	171134
Bulgaria	2004	3482	536	39167	1031	25296	83418	7089	15374	139	1924	6284	3837	329	810	12195	200911
Bulgaria	2005	4918	572	39153	1652	27942	101975	6864	17746	199	2076	6480	3264	342	834	13857	227874
Bulgaria	2006	4297	583	41947	1295	29518	124973	9632	19924	265	2202	6419	3575	357	828	20297	266112
Bulgaria	2007	6753	823	50282	877	30670	154886	16483	33477	446	6378	7636	5076	477	1838	14059	330161
Bulgaria	2008	9201	1533	57555	2100	40210	164784	22329	40880	580	10190	9015	6456	618	2655	45591	413697
Bulgaria	2009	12092	2321	66238	1991	55265	167849	18120	46026	495	12340	16510	7202	721	3252	24051	434472
Czech Rep.	1997	476	133	19583	713	712	637	1119	1549	76	855	6325	87	118	267	8045	40697
Czech Rep.	1998	505	163	20782	756	536	666	1185	1641	81	1005	6699	87	138	331	7738	42313
Czech Rep.	1999	536	197	22038	803	607	920	1259	1932	86	1014	6929	96	155	371	6758	43700
Czech Rep.	2000	597	225	24361	894	677	1447	1402	2326	97	1174	7313	217	174	433	7596	48933
Czech Rep.	2001	731	254	26667	981	850	1910	1539	2321	111	1382	6231	113	187	471	14843	58592
Czech Rep.	2002	885	279	28429	1080	1957	2576	1694	2621	105	1434	6597	119	187	527	21177	69667
Czech Rep.	2003	1202	298	30186	1189	1353	2970	4821	3526	177	1525	6896	143	198	566	17738	72787
Czech Rep.	2004	3276	368	30301	924	849	3782	2750	4328	270	1776	7360	166	196	581	6651	63578
Czech Rep.	2005	1718	507	31983	2905	1047	4682	4145	4709	417	1937	7733	190	201	609	7628	70410
Czech Rep.	2006	1868	487	35382	5110	1039	6570	2729	4905	506	2057	7986	213	244	715	25563	95374
Czech Rep.	2007	2086	566	36418	6524	1163	7999	4568	5499	571	2290	8287	313	268	845	35540	112937
Czech Rep.	2008	2368	691	36312	7938	794	8767	5405	5801	645	2519	9078	203	284	1102	29055	110962
Czech Rep.	2009	2820	709	36378	7431	1312	9082	2228	6009	223	2602	5446	223	312	1212	28260	104248
Estonia	1997	68	384	3173	1633	39	22	171	38	17	100	40	1	9689	1124	830	17329
Estonia	1998	72	411	3348	1740	44	33	182	41	18	100	43	1	10340	1216	884	18473
Estonia	1999	75	395	3429	1800	49	55	188	72	18	111	47	1	10652	1350	914	19156
Estonia	2000	78	458	3649	1878	54	89	197	122	19	121	54	11	10839	1554	954	20077
Estonia	2001	88	503	3880	2018	63	176	211	177	26	147	58	9	11662	1662	1563	22243
Estonia	2002	119	534	4019	2139	73	317	224	232	30	165	74	15	12428	1768	2171	24308
Estonia	2003	403	541	4220	2291	82	421	309	333	69	187	96	24	13397	1906	2780	27059
Estonia	2004	467	539	3775	2656	95	563	394	482	133	284	129	33	13978	2155	3577	29261
Estonia	2005	635	611	3907	3614	129	720	485	555	258	318	158	42	15459	2371	3843	33105
Estonia	2006	550	682	4277	2840	86	1008	576	630	310	321	171	51	17599	2588	4571	36260
Estonia	2007	586	807	4382	4817	142	1176	666	734	340	365	194	86	20006	2809	6906	44016
Estonia	2008	776	934	4290	4082	118	1355	757	838	390	444	236	79	22604	2994	2892	42790
Estonia	2009	1186	958	4422	3861	163	1478	848	928	372	547	640	111	25510	3389	13325	57738

CITIZEN	TIME	Belgium	Denmark	Germany	Ireland	Greece	Spain	France	Italy	Lux	Neths	Austria	Portugal	Finland	Sweden	UK	EU-15
Hungary	1997	966	366	52029	576	609	298	2740	1754	50	1275	11536	96	454	2925	6580	82253
Hungary	1998	1022	377	51905	578	789	412	2754	1762	50	1400	11591	97	508	2954	5879	82078
Hungary	1999	1089	406	53152	590	593	540	2811	2034	111	1385	12140	112	597	2992	7133	85685
Hungary	2000	1534	391	54437	604	399	778	2874	2408	143	1538	12729	158	654	2988	4273	85908
Hungary	2001	1629	445	55978	619	411	1060	2948	2264	183	1719	13069	136	708	2727	7258	91154
Hungary	2002	1564	447	55953	622	860	1457	2961	2610	194	1832	13684	161	687	2463	6599	92094
Hungary	2003	2322	463	54714	604	414	1724	2958	3207	234	1886	14151	184	678	2303	6021	91863
Hungary	2004	2015	527	47808	525	1359	2298	2954	3734	323	2029	15133	206	634	2309	5157	87011
Hungary	2005	2754	624	49472	717	789	3044	4243	4051	491	2271	16284	229	687	2349	4419	92423
Hungary	2006	2497	724	56075	2357	425	4704	4018	4389	597	2386	17428	251	724	2560	9576	108711
Hungary	2007	2917	1019	60221	4581	124	6628	3793	5467	688	2921	19318	386	900	3104	18567	130634
Hungary	2008	2577	1357	63801	5884	2176	7791	3568	6171	756	4044	21527	333	1117	3862	22328	147291
Hungary	2009	3122	1586	65443	5543	2724	8365	5844	6868	1679	5294	19653	352	1198	4525	19718	151913
Latvia	1997	96	449	6147	1134	71	32	215	110	2	110	82	3	134	387	959	9931
Latvia	1998	108	509	6853	1278	60	41	243	124	2	140	92	2	175	489	1514	11630
Latvia	1999	118	558	7446	1396	48	70	265	175	9	146	100	7	201	582	1654	12776
Latvia	2000	129	742	7915	1522	37	178	289	248	8	173	152	10	227	694	1803	14127
Latvia	2001	169	860	8543	1674	116	417	318	388	9	188	173	12	276	780	1840	15763
Latvia	2002	195	909	8866	1769	195	698	336	514	12	244	228	17	300	858	2887	18028
Latvia	2003	184	905	9341	2406	274	994	493	697	46	283	272	38	338	934	4945	22150
Latvia	2004	211	942	8844	2760	353	1246	650	862	142	361	342	60	392	1072	4429	22665
Latvia	2005	564	1085	9477	7393	945	1565	392	1085	234	450	359	81	473	1217	6283	31604
Latvia	2006	590	1261	10684	13183	1474	2183	399	1286	265	491	370	102	515	1470	17080	51353
Latvia	2007	687	1531	10724	19394	1257	2533	405	1559	304	564	400	193	593	1677	15817	57638
Latvia	2008	975	1885	10851	25604	1785	2870	412	1782	347	713	461	240	677	1943	24478	75023
Latvia	2009	1204	2521	12699	24264	1539	3399	418	2020	93	1143	590	311	802	2781	26530	80314
Lithuania	1997	115	555	6631	1037	112	65	297	12	10	260	152	11	163	358	7794	17571
Lithuania	1998	128	731	7240	1156	115	77	331	13	11	325	169	11	180	413	7934	18834
Lithuania	1999	142	884	8042	1290	118	149	369	69	9	338	179	14	194	469	7863	20130
Lithuania	2000	169	1221	9442	1531	121	1565	438	173	14	346	208	29	204	574	7936	23971
Lithuania	2001	192	1496	11156	1818	140	3913	520	347	18	393	208	18	245	727	7909	29100
Lithuania	2002	250	1616	12635	2071	160	6548	593	476	25	487	237	22	288	943	15239	41590
Lithuania	2003	355	1681	13985	5089	179	8546	914	864	64	595	282	75	314	1102	15315	49359
Lithuania	2004	277	1946	14713	3967	198	11389	1234	1278	130	970	383	127	351	1451	26115	64529
Lithuania	2005	887	2372	17357	12717	103	14332	745	1735	231	1175	493	180	398	2071	26200	80997
Lithuania	2006	882	2945	20307	24434	87	18946	851	2184	280	1262	530	232	466	2821	49177	125404
Lithuania	2007	1005	3489	21165	35201	69	21234	1042	3006	337	1447	589	430	527	3613	55763	148916
Lithuania	2008	1799	4315	21499	45967	51	22013	1033	3640	397	1743	651	505	615	4408	73780	182417
Lithuania	2009	1563	5234	22812	43492	315	22075	1836	4141	250	2126	960	558	655	5484	63374	174874

CITIZEN	TIME	Belgium	Denmark	Germany	Ireland	Greece	Spain	France	Italy	Lux	Neths	Austria	Portugal	Finland	Sweden	UK	EU-15
Poland	1997	6034	5457	283312	1845	5246	5496	29783	16581	635	5680	21447	190	684	15842	40910	439142
Poland	1998	6319	5508	283604	1819	208	5685	29371	16352	626	5905	21151	190	698	15925	39660	433021
Poland	1999	6749	5571	291673	1906	6744	7245	30770	19113	643	5645	21394	205	718	16345	39055	453776
Poland	2000	7800	5548	301366	1988	10431	11448	32100	23739	666	5944	21841	382	694	16667	38340	478955
Poland	2001	9633	5735	310432	2042	11182	14849	32960	26209	707	6312	21433	249	743	15511	41441	499437
Poland	2002	11022	5689	317603	2091	13510	20458	33758	29482	763	6912	21750	284	768	13878	43225	521193
Poland	2003	12238	5854	326882	8954	14112	25453	23578	39927	862	7431	22249	353	802	13412	76748	578854
Poland	2004	19472	6199	292109	10333	15932	32843	36643	50794	1036	10968	26554	422	810	14664	109994	628772
Poland	2005	28310	7353	326596	13606	17007	41572	23967	60823	1318	15202	30580	490	899	17172	155334	740230
Poland	2006	23124	9701	387958	62674	16146	62910	34393	72457	1576	19645	33319	559	1083	22410	262623	1010578
Poland	2007	30768	13753	413044	75763	16627	78928	27513	90218	1834	26189	35485	913	1446	28909	466014	1307404
Poland	2008	37919	19890	419555	88851	21420	85075	36184	99389	2213	35499	36879	925	1888	34733	554699	1475119
Poland	2009	36996	21119	425608	83012	14998	85513	34156	105608	4146	43083	38849	1042	2078	38587	540868	1475664
Romania	1997	2150	1095	95190	4384	6078	2385	9385	55745	280	1145	17188	169	397	3213	3932	202737
Romania	1998	2063	1046	89801	4083	4327	2723	8741	51917	261	1285	16008	12	398	3051	3974	189690
Romania	1999	2311	1099	87504	4065	6020	5682	8701	62426	320	1397	16611	65	404	2981	5204	204790
Romania	2000	2481	1106	90094	4159	5225	26779	8901	81563	355	1694	17470	202	489	2949	5324	248791
Romania	2001	3198	1176	88102	4488	7208	53087	9606	94549	375	2094	17750	8197	546	2495	6184	299055
Romania	2002	4069	1270	88679	4910	13803	112861	10510	111854	382	2360	19482	11162	547	2327	6809	391025
Romania	2003	4674	1329	89104	2006	14602	189979	15529	185974	376	2735	20483	11873	557	2343	7481	549044
Romania	2004	8285	1405	73365	2408	16195	287087	23638	248849	406	3020	21314	12310	580	2360	17619	718840
Romania	2005	12877	1563	73043	4967	18948	388422	17785	297570	489	3006	21942	10892	628	2371	18117	872619
Romania	2006	10217	1672	78452	7633	18949	539507	42701	342200	606	3225	21882	11877	732	2252	13300	1095205
Romania	2007	15310	2386	90614	11553	25735	734764	41693	625278	887	4894	27646	19280	911	4442	20457	1625850
Romania	2008	16365	3744	100429	15473	29456	799225	43404	796477	1098	6256	32341	27769	1045	6536	39250	1918868
Romania	2009	21205	5076	112230	14651	36917	823111	48991	887763	943	7118	47596	32457	1170	7661	66689	2113578
Slovak Rep.	1997	260	51	9242	2996	361	148	591	868	66	355	6182	8	21	228	2594	23971
Slovak Rep.	1998	279	65	9808	3213	351	184	633	931	71	485	6628	8	27	263	2314	25260
Slovak Rep.	1999	341	111	12097	3929	342	303	775	1186	73	579	7136	9	40	284	8448	35652
Slovak Rep.	2000	412	127	14657	4745	332	739	935	1541	74	719	7739	22	51	349	5459	37901
Slovak Rep.	2001	556	127	17049	5494	286	1159	1083	2099	76	915	7508	14	71	363	4238	41038
Slovak Rep.	2002	824	140	18327	5879	240	1778	1159	2495	84	940	8516	15	82	400	10891	51770
Slovak Rep.	2003	1377	164	19567	6259	194	2253	3100	3227	147	983	9484	28	94	415	18455	65746
Slovak Rep.	2004	1930	184	20244	1817	148	3188	1959	3895	245	1239	11322	41	90	505	24289	71095
Slovak Rep.	2005	2901	303	21685	5450	249	4093	2801	4345	333	1560	12982	53	128	559	28711	86154
Slovak Rep.	2006	2699	301	25309	8046	350	6050	3763	5416	391	1876	14223	66	145	656	28653	97944
Slovak Rep.	2007	3001	507	25987	9589	180	7418	2677	7463	460	2178	15665	187	173	781	60890	137156
Slovak Rep.	2008	4404	777	25823	11132	264	7980	1591	8091	512	2666	18065	173	219	914	47972	130583
Slovak Rep.	2009	3736	848	26419	10379	126	8058	2303	8675	1643	2844	16605	197	248	1047	69366	152494

CITIZEN	TIME	Belgium	Denmark	Germany	Ireland	Greece	Spain	France	Italy	Lux	Neths	Austria	Portugal	Finland	Sweden	UK	EU-15
Slovenia	1997	213	32	18093	56	29	56	686	1498	53	110	6875	6	5	516	538	28766
Slovenia	1998	218	35	18412	58	99	52	705	1538	54	150	7058	6	7	581	552	29525
Slovenia	1999	222	40	18648	59	169	92	717	1691	56	144	6945	8	8	600	562	29960
Slovenia	2000	225	51	18766	59	239	152	726	1878	58	165	6893	18	10	625	569	30434
Slovenia	2001	215	50	19395	61	138	188	746	1913	56	193	6267	13	10	627	585	30457
Slovenia	2002	212	50	20550	64	128	244	786	2026	60	225	6215	17	11	539	616	31743
Slovenia	2003	141	57	21795	68	117	311	788	2196	112	235	6192	22	17	509	651	33210
Slovenia	2004	131	57	21034	63	99	426	789	2382	167	256	6452	28	17	520	605	33025
Slovenia	2005	745	78	21195	359	349	568	1073	2516	257	299	6554	33	21	529	649	35225
Slovenia	2006	528	102	22452	129	208	819	1052	2948	292	356	6679	38	25	537	505	36670
Slovenia	2007	559	135	22336	188	67	1055	1032	3096	334	411	6973	57	44	574	1267	38128
Slovenia	2008	399	184	21652	247	180	1217	1368	3101	359	503	7187	44	60	619	554	37674
Slovenia	2009	451	204	21279	233	519	1267	1705	3057	132	562	7886	49	74	644	2472	40533
EU-8	1997	8228	7427	398210	9991	7179	6754	35603	22411	908	8745	52639	402	11268	21647	68250	659661
EU-8	1998	8651	7799	401952	10598	2202	7150	35404	22402	913	9510	53431	402	12073	22172	66475	661134
EU-8	1999	9273	8162	416525	11772	8670	9374	37154	26272	1005	9362	54870	452	12565	22993	72387	700835
EU-8	2000	10944	8763	434593	13221	12290	16396	38962	32435	1079	10180	56929	847	12853	23884	66930	740306
EU-8	2001	13213	9470	453100	14707	13187	23672	40326	35718	1186	11249	54947	564	13902	22868	79676	787784
EU-8	2002	15071	9664	466382	15715	17122	34076	41511	40456	1273	12239	57301	650	14751	21376	102805	850392
EU-8	2003	18222	9963	480690	26861	16725	42672	36960	53977	1709	13125	59622	866	15838	21147	142653	941029
EU-8	2004	27778	10762	438828	23046	19033	55735	47373	67755	2446	17883	67675	1081	16468	23257	180817	999937
EU-8	2005	38515	12933	481672	46762	20619	70576	37851	79819	3539	23212	75143	1297	18266	26877	233067	1170148
EU-8	2006	32738	16203	562444	118773	19815	103190	47780	94215	4217	28394	80706	1512	20801	33757	397748	1562293
EU-8	2007	41609	21807	594277	156055	19629	126971	41695	117042	4868	36365	86911	2565	23957	42312	660764	1976828
EU-8	2008	51218	30033	603783	189705	26788	137068	50317	128813	5619	48131	94084	2502	27464	50575	755758	2201858
EU-8	2009	51078	33179	615060	178215	21696	139237	49337	137306	8538	58201	90629	2843	30877	57669	763913	2237777
EU-2	1997	2949	1436	129653	4863	13121	4058	11594	59344	381	1680	21056	487	717	4544	11278	267162
EU-2	1998	2909	1403	121365	4527	11069	4306	10787	55252	354	1915	19592	308	731	4222	12199	250940
EU-2	1999	3240	1493	119794	4519	12988	8367	10797	66800	427	2110	20503	386	721	4046	13676	269867
EU-2	2000	3550	1514	124453	4648	13318	36967	11162	87225	468	2564	21687	550	786	3951	12582	325425
EU-2	2001	4727	1602	126245	5087	19760	76555	12372	101086	513	3168	22440	10410	854	3300	12652	400771
EU-2	2002	5976	1730	131098	5638	32394	156279	13870	119457	524	3720	24817	14665	873	3123	12137	526301
EU-2	2003	6907	1822	133404	2749	31880	253793	21550	197504	522	4413	26339	15877	887	3148	19384	720178
EU-2	2004	11767	1941	112532	3438	41491	370505	30727	264223	545	4944	27598	16147	909	3170	29814	919751
EU-2	2005	17795	2135	112196	6618	46890	490397	24649	315316	688	5082	28422	14156	970	3205	31974	1100493
EU-2	2006	14514	2255	120399	8928	48467	664480	52333	362124	871	5427	28301	15452	1089	3080	33597	1361317
EU-2	2007	22063	3209	140896	12430	56405	889650	58176	658755	1333	11272	35282	24356	1388	6280	34516	1956011
EU-2	2008	25566	5277	157984	17573	69666	964009	65733	837357	1678	16446	41356	34225	1663	9191	84841	2332566
EU-2	2009	33296	7397	178468	16642	92182	990960	67111	933789	1438	19458	64106	39659	1891	10913	90740	2548051

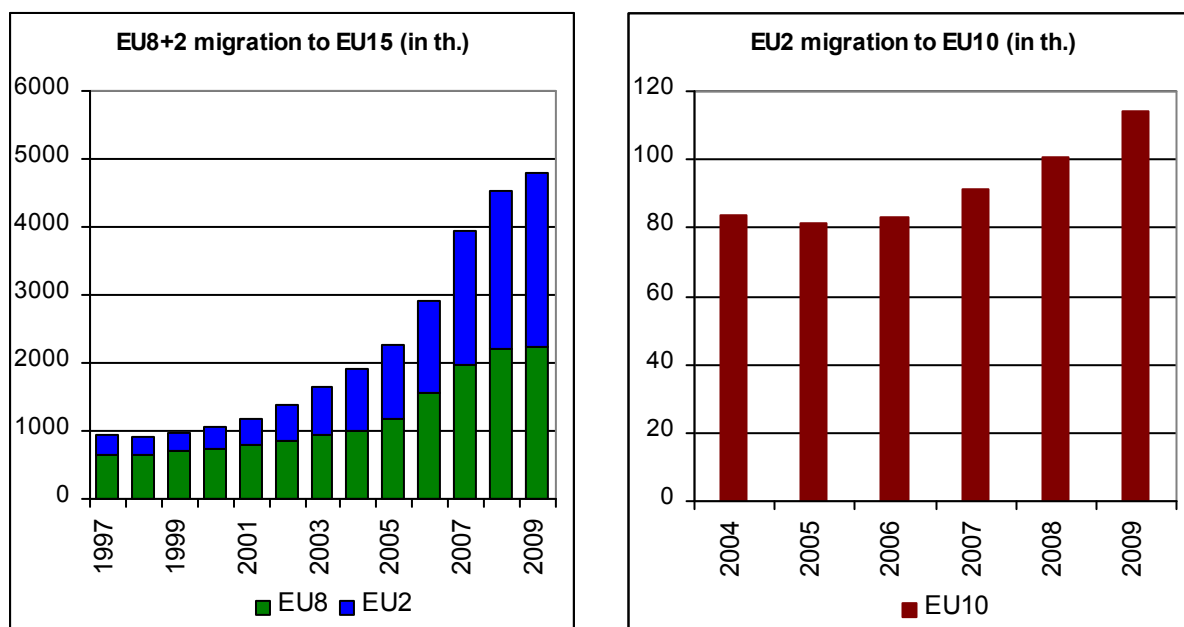


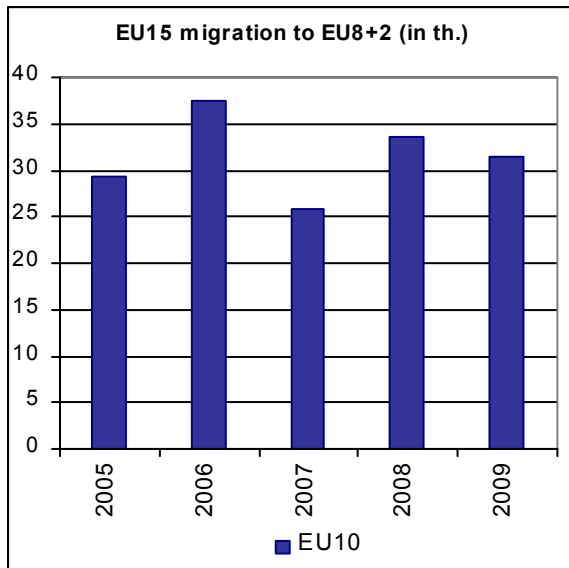
		Czech Republic	Estonia	Cyprus	Latvia	Lithuania	Hungary	Malta	Poland	Slovenia	Slovakia	EU-10
Bulgaria	2004	3593	:	2389	26	28	1177	:	2372	68	634	10287
Bulgaria	2005	4153	:	2521	27	42	1140	:	996.6	72	552	9503
Bulgaria	2006	4285	:	3057	32	97	1123	:	1023	118	547	10282
Bulgaria	2007	5046	:	5260	328	123	1128	763	1039	780	985	15452
Bulgaria	2008	5926	:	7865	562	120	1133	:	1350	599	1355	18909
Bulgaria	2009	6402	:	10057	570	:	1211	157.5	1122	770	1515	21804
<b>Cumulative change as % 2007 Population</b>												<b>0.15</b>
Romania	2004	2445	:	2586	10	5	67608	:	:	131	417	73202
Romania	2005	2634	:	2231	10	4	66250	:	:	136	419	71684
Romania	2006	2697	:	2167	12	10	66951	:	228	166	700	72931
Romania	2007	3298	:	3012	76	13	65903	249	232	225	3005	76013
Romania	2008	3649	:	5650	247	:	66435	:	376	240	4966	81563
Romania	2009	4095	:	8954	301	:	72781	52	266	195	5424	92068
<b>Cumulative change as % 2007 Population</b>												<b>0.09</b>
EU-2	2004	6038	0	4975	36	33	68785	0	2372	199	1051	83489
EU-2	2005	6787	0	4751	37	46	67390	0	996.6	208	971	81187
EU-2	2006	6982	0	5224	44	107	68074	0	1251	284	1247	83213
EU-2	2007	8344	0	8272	404	136	67031	1012	1271	1005	3990	91465
EU-2	2008	9575	0	13514	809	120	67568	0	1726	839	6321	100472
EU-2	2009	10497	0	19011	871	0	73992	209.5	1388	965	6939	113872
<b>Cumulative change as % 2007 Population</b>		<b>0.04</b>		<b>1.80</b>	<b>0.04</b>	<b>0.00</b>	<b>0.05</b>	<b>0.05</b>	<b>0.00</b>	<b>0.04</b>	<b>0.11</b>	

## Descriptive statistics

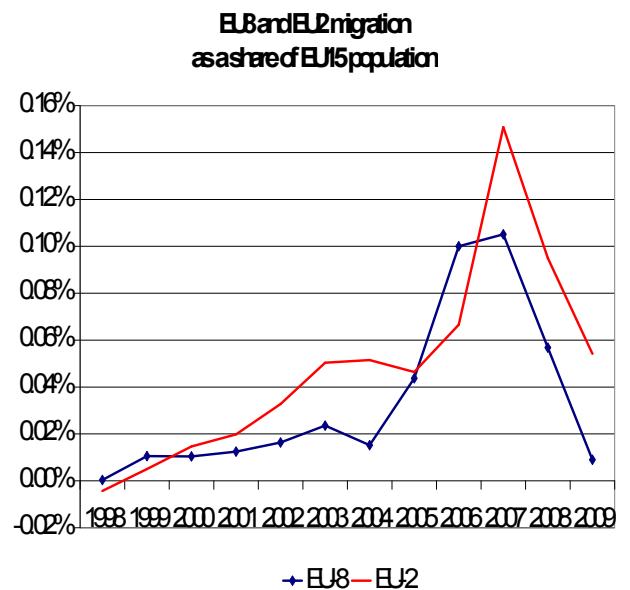
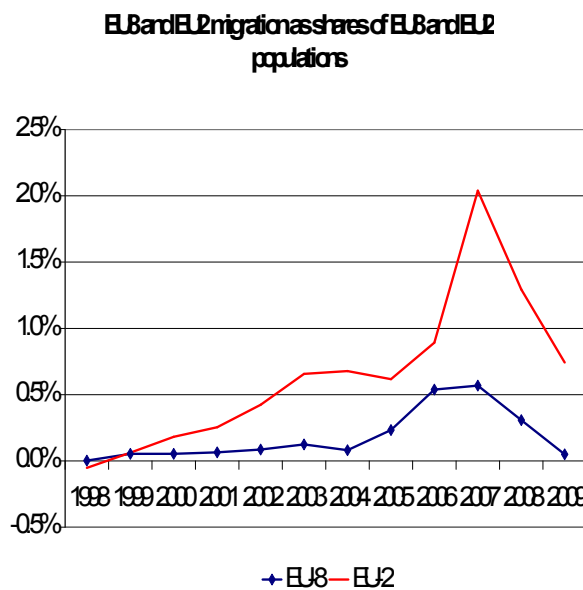
The EU enlargement has resulted in a substantial increase in labour mobility. More than 99 per cent of total migration flows within the EU have been East West migration flows from EU8+2 to EU15 countries. Although many EU15 members have applied transitional restrictions on access of EU8+2 migrants to their labour markets, the stock of EU8+2 nationals residing in EU15 countries tripled over the period 2003-2009, increasing from about 1.6 million in 2003 to about 4.8 million in 2009. The share of West-East migration has remained marginal, at much below 1 per cent and has not shown any monotonic trend over time. Figure 1 shows stocks of EU10 nationals in EU15 countries, stocks of EU2 nationals in EU10 countries and stocks of EU15 nationals in EU10 countries.

**Figure 1. Intra EU migration**





Below we present the scale of EU8 and EU2 migration flows to EU15 countries relative to population in their home and host regions.



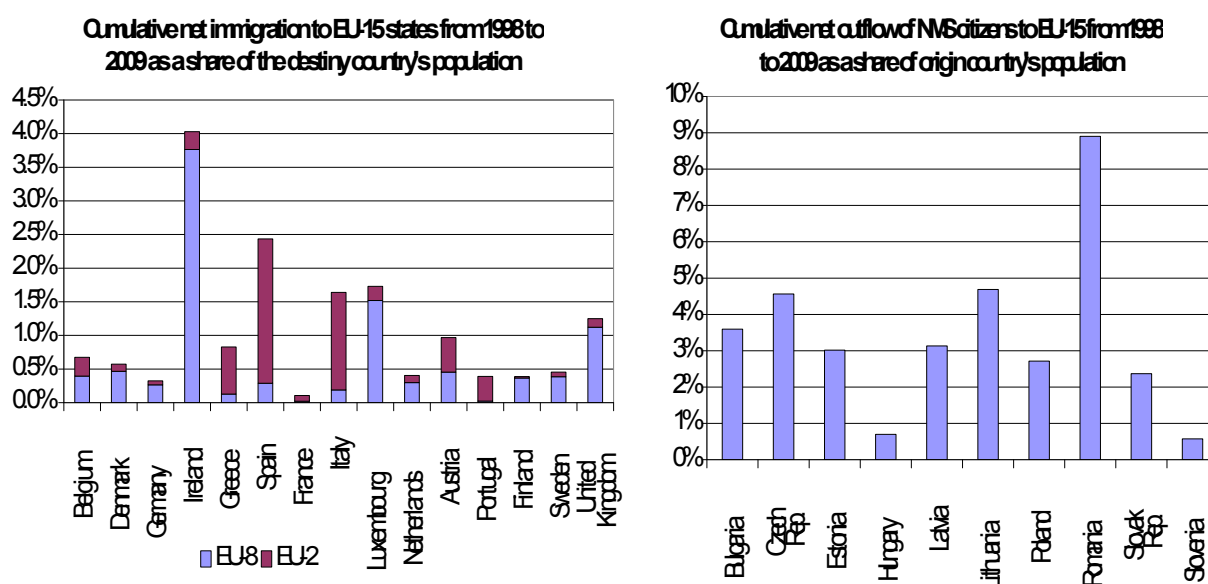
The figure illustrates a continuous growth trend of net emigration flow with a sharp acceleration after the first accession in 2004 for the EU8 and after the second accession in 2007 for the EU2, respectively. Following the global crisis that started in mid 2007, the net emigration rates dropped sharply but remained in the positive range.

The EU2 population exhibits a higher degree of inter-EU mobility. Their net migration rates are almost continuously higher than those of the EU-8 countries. This phenomenon may be explained by the higher economic disparities between EU2 and

EU-15 countries than it is the case between EU8 and EU15 states – see discussion of push and pull factors below.

Figure 3a shows the cumulative immigration rate (as of destiny country’s population) from 1998 to 2009. With over 4 per cent, Ireland had the highest relative inflow of NMS citizens over the respective time period. The inflows were also remarkable in Spain, Italy, Luxembourg and the United Kingdom. Relatively low were the net inflow rates in France and Germany. The chart illustrates different destination preferences of EU-2 and EU-8 citizens. While EU-2 citizens targeted EU-15 states in the South, EU-8 citizens predominantly moved to destinations in Central and Western Europe, in particular the UK, Luxembourg and Ireland.

**Figure 3. Cumulative net migration: a) as a share of host populations, b) as a share of home populations**



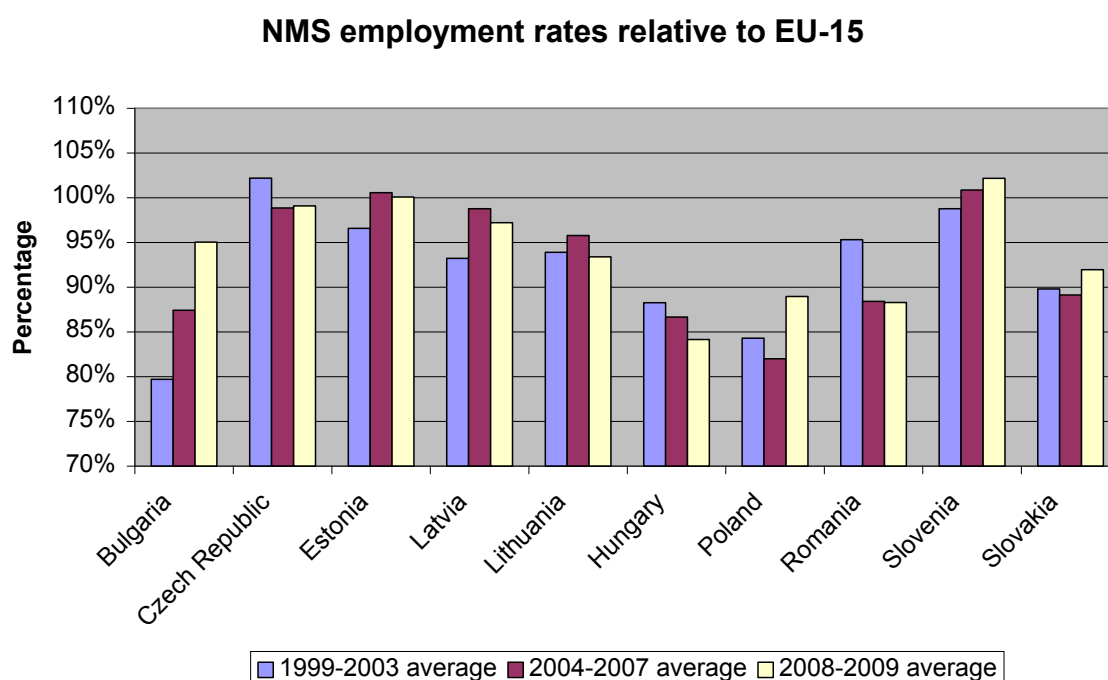
The cumulative flows of NMS citizens to the EU-15 have been of relative higher importance to the NMS countries due to their smaller populations – see figure 3b. Striking is the exodus of Romanians. Between 1998 and 2009, almost 9 per cent of the entire Romanian population have moved to Eu-15 countries. Whilst almost all NMS countries experienced a cumulative net outflow of above 2 per cent of their population, the citizens of Hungary and Slovenia recorded only low net outflow rates. Slovenia is the wealthiest NMS and thus, the wages and employment push-factors for migration are lower than for other EU-10 countries. Moreover, Slovenia’s proximity to Italy would allow a significant part of the population to work in Italy without having to move out of the country. International commuting might also be the reason why the Hungarian outflow of citizens to the EU-15 was significantly lower than that of other EU-10 countries. A large commuting activity occurs between Hungary and its wealthy neighbour Austria.

The above analysis suggests that as migration constitutes a relatively large share of populations of both home and host countries it may have significant consequences for developments on the labour market, and in particular aging of societies – East West migration will aggravate the aging problem in EU8+2 countries, while it may relieve pressures in EU15. See discussion of individual countries below.

We turn now to an analysis of active population in EU8+2 and EU15 countries as its characteristics will also determine the strength of effects of migration for the labour market.

Figure 4 presents average employment rates relative to the EU-15 average employment rate for the time periods 1999-2003, 2004-2007 and 2008-2009.

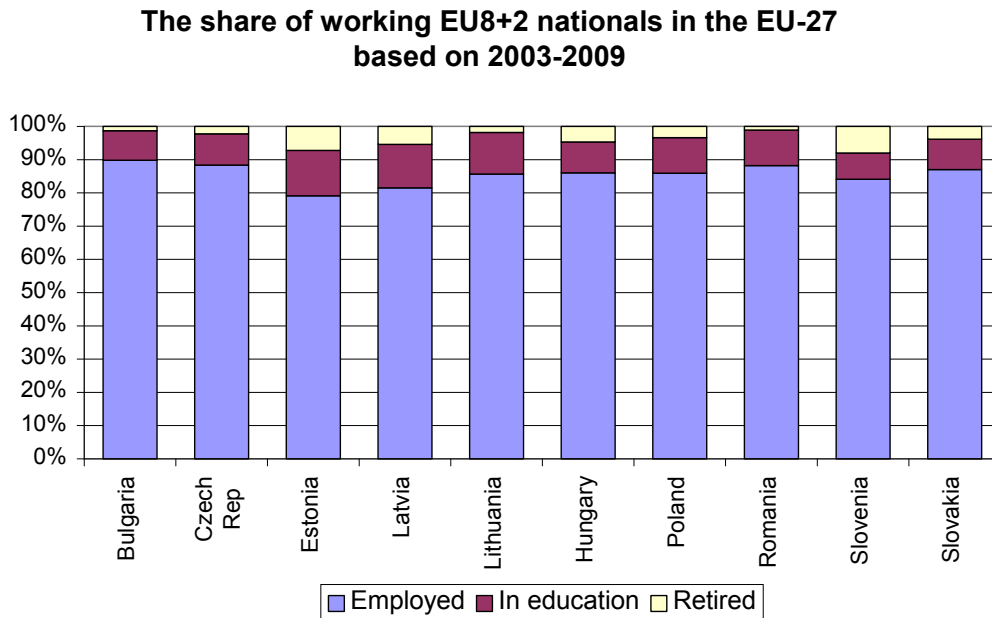
**Figure 4. Employment rates**



According to the graph, the employment rates in Slovenia, Estonia and the Czech Republic were at approximately EU-15 level throughout all the observed time periods. What also can be observed is a general trend of improvement relative to the 1999-2003 period. This can be explained by gradual liberalisation and improved functioning of EU8+2 labour markets and the fast economic expansion in EU-10 countries and an “outsourcing” of unemployed workers to EU-15 countries. Employment rates in the Czech Republic, Hungary, Romania and the Baltic countries decreased somewhat over 2008-2009. The most striking outliers are Bulgaria with its rapid improvement and Hungary with its steady worsening of the employment figures.

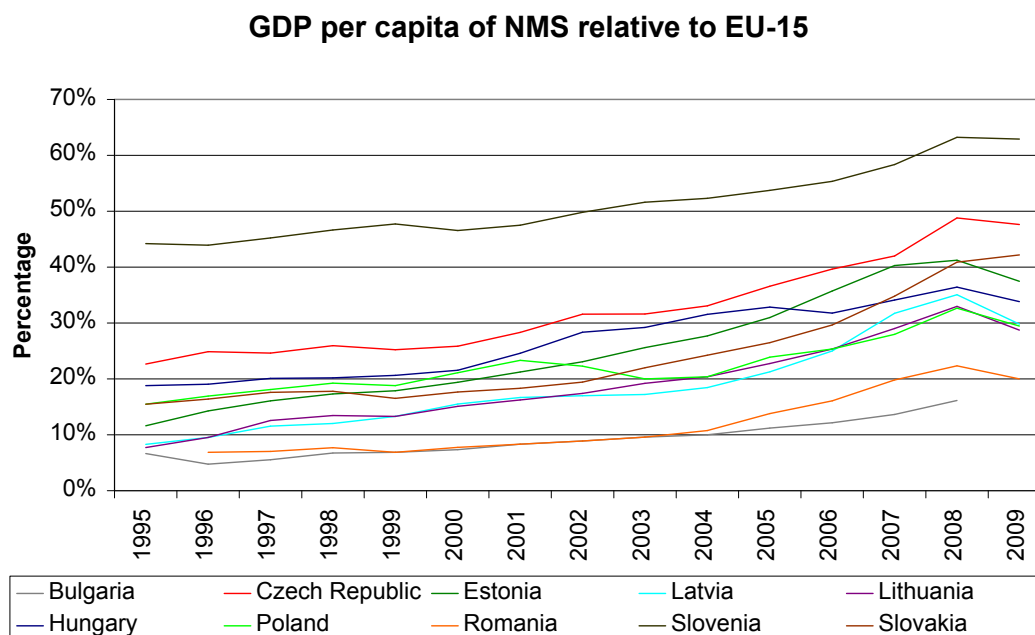
In comparison with employment rates registered for both EU8+2 and EU15 countries, the share of active among migrants is comparable - see figure 5.

**Figure 5. The share of working migrants**



The figure clearly outlines that the majority of foreigners moves to other EU countries for work purposes. This is related to the fact that the vast majority of migration from EU8+2 to EU15 countries is of economic nature. In terms of GDP per capita the EU8+2 members remain relatively poorer than their Western European neighbours – see figure 6.

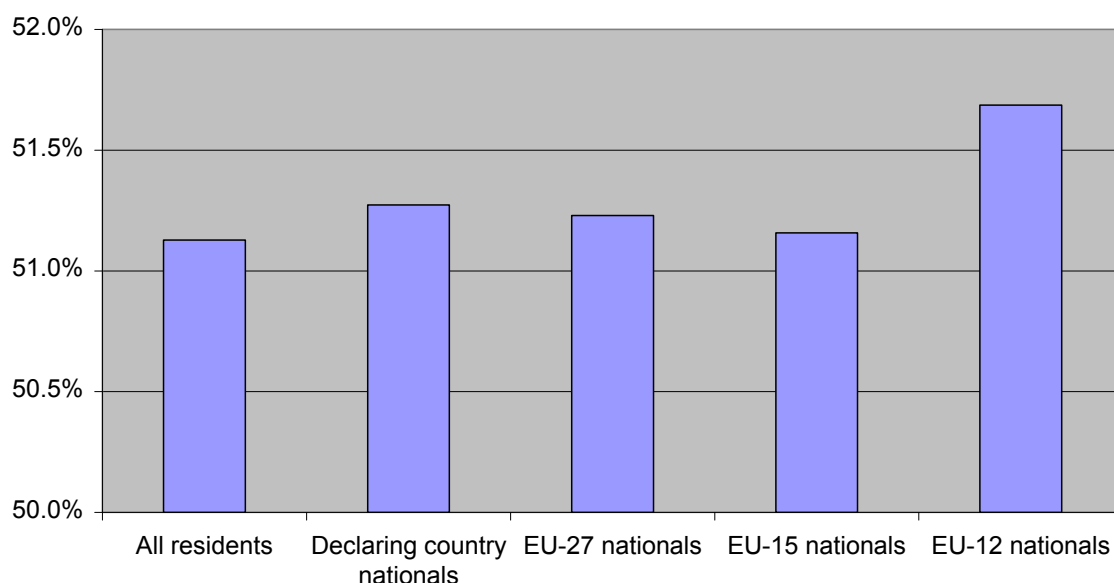
**Figure 6. GDP per capita in EU8+2**



The above figure shows the continuous convergence of the GDP per capita between EU10 and EU15 countries. The deep recession of 2009 might have brought this trend to a halt in some countries, and in particular in the Baltic economies.

While the levels of GDP per capita in EU8+2 are remain below those of the EU-15 countries, there also exist significant differences between EU10 countries themselves. Slovenia is by far the most wealthy country amongst the EU8. The EU-2 countries have the lowest level of GDP per capita.

### Female share of NMS citizens in the EU-15 in 2010



Source: Eurostat Population Statistics

The above chart illustrates ratio of the female population of NMS citizens in EU-15 countries in the year 2010. The chart was created using Eurostat population data and for some countries, data had to be estimated based on previous observations. However, the estimated figures can be assumed very accurate. In most instances, figures had to be estimated for smaller countries such as Luxembourg or Greece which should not have a big impact on the total outcome for the EU-15.

In general, it can be observed that the NMS citizens residing in EU-15 countries have a higher share of female population than all other groups. Since recent immigration from the Eu-2 has been very male-dominated, a distinction between EU-2 and EU-8 might reveal substantial differences in gender balances between the two categories.

## ***Macro-economic impact of population flows 2004-2009***

In this section we consider the macro-economic impact of the population flows from the EU-8 and EU-2 to the EU-15 economies since 2004, based on our migration matrix reported above. At this stage we do not attempt to identify the extent to which these population movements can be attributed to the EU accession process, but the results reported here could be viewed as an upper limit to the macro-economic impact of the 2004 EU enlargement. We consider the EU-8 separately from the EU-2, and look at the impacts on both the sending and receiving countries<sup>2</sup>. Flows from the EU-2 to the EU-10 have relatively small (except in the case of Cyprus) and so are omitted from the analysis reported below.

The methodological approach we adopt to assess the macro-economic impact of populations movements is a series of model simulation exercises, using the National Institute's model, NiGEM, following the approach adopted by Barrell (2009), Barrell, Gottschalk, Kirby and Orazgani (2009) and Barrell, Riley and Fitzgerald (2010). NiGEM has been in use at the National Institute since 1987, and is also used by a group of about 50 model subscribers, mainly in the policy community. Current users include the Bank of England, the ECB, the IMF, the Bank of France, the Bank of Italy and the Bundesbank as well as most other central banks in Europe along with research institutes and finance ministries throughout Europe and elsewhere. NiGEM is a global model, and most EU countries are modelled individually (with the exception of Luxembourg, Cyprus and Malta). All country models contain the determinants of domestic demand, export and import volumes, prices, current accounts and net assets. Economies are linked through trade, competitiveness and financial markets and are fully simultaneous.

Further detail on NiGEM is available from <http://nimodel.niesr.ac.uk>, but the core parts of the model relevant to the scenarios presented in this paper are the labour market and the production function in each economy. The speed of response of employment to labour supply increases varies between countries, and is estimated, as are the long run structural parameters of the production function, which are similar across countries.

The labour markets on the model are based on wage equations published in Barrell and Dury (2003) and labour demand equations based on Barrell and Pain (1997) and

---

<sup>2</sup> We do not include flows from Malta and Cyprus in this analysis, as they are very small and we cannot separately identify the impacts in these countries within the modelling framework we adopt. We also cannot separately identify the impact on Luxembourg. Total inflows from the EU-8 into Luxembourg over the period 2004-2009 amounted to about 1.3 per cent of the Luxembourg population with much smaller inflows from the EU-2, in relative terms similar to the flows to the UK. We could therefore make the assumption that the macro-economic impact in Luxembourg has been roughly the same in terms of magnitude as in the UK.



subsequent publications. Wages on the model have a degree of rational expectations embedded in them, rise with productivity, and adjust to unemployment, with the speed of response being determined after looking for structural changes. Wages adjust to bring labour demand in line with labour supply. Employment depends on real wages, output and the parameters of the production function, again with speeds of adjustment depending upon data and upon evidence of recent structural changes induced by policy. Labour supply is treated as exogenous to factors other than population projections. Inward migration raises the population, which feeds directly into labour supply.

Production functions are based on a CES framework, with labour and capital as factor inputs, estimated rates of labour augmenting technical progress and an elasticity of substitution of around a half. The speed of adjustment of the equilibrium capital stock is estimated, and adjustment is toward expected output and its effects 4 years ahead. Forward looking adjustment means that it is possible to look at anticipated as well as unanticipated migration. Inward migration raises potential labour supply, and therefore raises potential output through the production function.

NiGEM allows us to model the bilateral labour flows from each of the EU-8 and EU-2 countries to each of the EU-15 countries, adjusting for shifts in the skill level and allowing for remittances. NiGEM is a quarterly model, allowing an empirical assessment of both the short-term and long-term impact on key macro-economic variables such as GDP, inflation, unemployment, wages, government spending and revenue and current account balances. As all countries are simulated simultaneously, we can fully capture the positive and negative spillovers between countries. A rise in demand in one country will raise import demand in that country, raising exports and hence GDP in all of its trading partners. This will be offset to some degree by any shifts in competitiveness. For example, if wages fall in response to an inward migration shock the price level in that country will fall relative to the rest of the world, allowing a gain in competitiveness. This is particularly important within the single currency zone, as there will be no offsetting adjustment in exchange rates.

In the tables below we show the shock population shocks applied in each year between 2004 and 2009 in our scenario. The final two columns also put this into perspective, showing the aggregate inflows or outflows over the six year period, in total and relative to the size of the domestic population.

### EU-8 Population flows to EU-15, 2004-2009

	2004	2005	2006	2007	2008	2009	Total 2004-9	% 2004 Domestic Population
Czech Rep	9209	-6832	-24964	-17563	1975	6714	-31461	-0.3
Estonia	-2201	-3845	-3155	-7756	1226	-14948	-30678	-2.3
Latvia	-516	-8939	-19748	-6286	-17385	-5291	-58165	-2.5
Lithuania	-15170	-16468	-44407	-23513	-33501	7543	-125515	-3.6
Hungary	4852	-5412	-16288	-21923	-16658	-4622	-60050	-0.6
Poland	-49918	-111457	-270348	-296826	-167715	-545	-896809	-2.3
Slovenia	185	-2200	-1445	-1457	454	-2860	-7323	-0.4
Slovakia	-5349	-15059	-11790	-39212	6573	-21911	-86748	-1.6
Belgium	9678	10806	-5787	8885	9641	-152	33071	0.3
Denmark	809	2185	3276	5613	8254	3424	23560	0.4
Germany	-42393	43121	80912	31883	9538	12274	135335	0.2
Ireland	-3864	23869	72136	37341	33762	-12506	150739	3.7
Greece	2338	1596	-805	-186	7183	-5543	4582	0.0
Spain	13229	14937	32670	23818	10131	2361	97146	0.2
France	10545	-9583	9946	-6094	8650	-1067	12397	0.0
Italy	13953	12142	14421	22863	11810	9244	84433	0.1
Neths	4818	5363	5191	7984	11805	10961	46122	0.3
Austria	8155	7516	5573	6215	7197	-3761	30895	0.4
Portugal	218	217	216	1055	-63	371	2014	0.0
Finland	638	1810	2539	3161	3519	3715	15382	0.3
Sweden	2137	3643	6892	8568	8291	7721	37253	0.4
UK	38647	52588	164966	263430	95312	8876	623819	1.0

### EU-2 Population flows to EU-15, 2004-2009

	2004	2005	2006	2007	2008	2009	Total 2004-9	% 2004 Domestic Population
Bulgaria	-29776	-26963	-38238	-64050	-83536	-20775	-263338	-3.4
Romania	-169796	-153779	-222586	-530645	-293018	-194710	-1564534	-7.2
Belgium	4860	6033	-3283	7555	3506	7722	26393	0.3
Denmark	119	194	120	955	2070	2118	5576	0.1
Germany	-20874	-336	8209	20513	17104	20461	45076	0.1
Ireland	690	3182	2311	3506	5147	-930	13906	0.3
Greece	9612	5403	1578	7944	13273	22491	60302	0.5
Spain	116726	119987	174205	225345	74427	26921	737611	1.7
France	9178	-6083	27704	5848	7564	1376	45587	0.1
Italy	66727	51133	46841	296862	178766	96325	736653	1.3
Neths	531	138	345	5850	5179	3009	15051	0.1
Austria	1259	825	-121	6986	6080	22725	37754	0.5
Portugal	270	-1993	1297	8911	9878	5428	23791	0.2
Finland	22	61	119	299	275	228	1004	0.0
Sweden	22	35	-125	3202	2914	1720	7768	0.1
UK	10431	2162	1624	920	50372	5892	71400	0.1

The tables show that the population flows have had the biggest impact on Romania, with 7.2 per cent of the population emigrating to the EU-15 between 2004 and 2009. Bulgaria and Lithuania have also had a significant population loss over this period. Of the receiving countries, the biggest impact has been in Ireland. Elsewhere combined

inflows from the EU-8 and EU-2 have amounted to 2 per cent or less of the total population.

In order to assess the macro-economic impact of population shifts between the EU-8/EU-2 and the EU-15 since 2004, we run two NiGEM model simulations applying the population shocks detailed in the tables above over a six year period. For the purposes of this baseline scenario, we assume that the cumulative population shift between 2004-2009 is permanent, allowing us to assess the expected long-run impact as well as the short-run effects. The tables below report the expected impact on output, inflation and the unemployment rates in each country. We also report the expected impact on real wages (from the consumer's perspective) in the EU-15 countries plus Poland, Hungary and the Czech Republic<sup>3</sup>.

<b>Impact of migration from EU-8 to EU-15 on GDP (%)</b>								
	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Long-run</b>	<b>Long-run GDP per capita</b>
<b>EU-8</b>	-0.01	-0.06	-0.19	-0.33	-0.41	-0.42	-1.69	
<b>Czech Rep</b>	0.01	-0.01	-0.05	-0.08	-0.08	-0.07	-0.20	0.09
<b>Estonia</b>	-0.02	-0.09	-0.19	-0.39	-0.55	-0.93	-2.45	-0.11
<b>Hungary</b>	0.01	-0.02	-0.05	-0.08	-0.08	-0.07	-0.33	0.29
<b>Lithuania</b>	-0.11	-0.29	-0.79	-1.36	-2.29	-2.88	-4.31	-0.10
<b>Latvia</b>	0.00	-0.03	-0.24	-0.59	-1.34	-1.76	-2.80	-0.06
<b>Poland</b>	-0.03	-0.09	-0.27	-0.44	-0.47	-0.36	-1.42	1.02
<b>Slovenia</b>	0.01	0.01	-0.01	-0.08	-0.14	-0.19	-0.34	0.00
<b>Slovakia</b>	-0.01	-0.11	-0.28	-0.60	-0.83	-1.11	-1.67	-0.07
<b>EU-15</b>	0.02	0.05	0.08	0.12	0.16	0.20	0.16	
<b>Belgium</b>	0.01	0.03	0.07	0.09	0.12	0.15	0.28	-0.02
<b>Denmark</b>	0.01	0.04	0.08	0.12	0.18	0.24	0.42	-0.02
<b>Finland</b>	-0.01	-0.02	-0.01	0.00	0.02	0.04	0.18	-0.09
<b>France</b>	0.01	0.03	0.04	0.05	0.07	0.08	0.04	0.02
<b>Germany</b>	0.00	0.00	0.01	0.01	0.02	0.02	0.15	-0.02
<b>Greece</b>	0.03	0.06	0.09	0.11	0.13	0.15	0.07	0.03
<b>Ireland</b>	0.03	0.11	0.28	0.59	0.98	1.31	2.43	-0.59
<b>Italy</b>	0.01	0.02	0.04	0.05	0.06	0.07	0.12	-0.02
<b>Neths</b>	0.02	0.05	0.08	0.09	0.11	0.13	0.25	-0.02
<b>Austria</b>	0.02	0.05	0.08	0.11	0.13	0.15	0.30	-0.06
<b>Portugal</b>	0.01	0.03	0.04	0.06	0.07	0.09	0.06	0.04
<b>Sweden</b>	0.01	0.02	0.04	0.06	0.09	0.11	0.32	-0.06
<b>Spain</b>	0.01	0.03	0.05	0.07	0.09	0.10	0.17	-0.03
<b>UK</b>	0.06	0.15	0.26	0.38	0.51	0.62	0.84	-0.07
<b>EU-27</b>	0.01	0.04	0.06	0.09	0.12	0.16	0.00	

<sup>3</sup> The model we are working with does not explicitly measure wages in the other countries covered by this study. The biggest impacts can be expected in countries that exhibit the biggest short-term shifts in the unemployment rate.

<b>Impact of migration from EU-8 to EU-15 on unemployment rate (percentage points)</b>							
	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Long-run</b>
<b>EU-8</b>	-0.04	-0.12	-0.33	-0.48	-0.45	-0.27	-0.05
<b>Czech Rep</b>	0.06	0.00	-0.17	-0.23	-0.14	-0.03	-0.01
<b>Estonia</b>	-0.08	-0.16	-0.14	-0.31	0.00	-0.53	0.00
<b>Hungary</b>	0.04	-0.01	-0.13	-0.26	-0.29	-0.20	-0.04
<b>Lithuania</b>	-0.23	-0.30	-0.71	-0.49	-0.54	0.07	-0.03
<b>Latvia</b>	-0.03	-0.18	-0.48	-0.23	-0.37	-0.16	-0.01
<b>Poland</b>	-0.07	-0.22	-0.57	-0.88	-0.89	-0.55	-0.10
<b>Slovenia</b>	0.00	-0.06	-0.04	-0.05	0.02	-0.07	0.00
<b>Slovakia</b>	-0.05	-0.14	-0.12	-0.35	0.02	-0.17	0.00
<b>EU-15</b>	0.01	0.01	0.04	0.04	0.02	-0.01	-0.01
<b>Belgium</b>	0.06	0.09	0.00	0.04	0.07	0.03	0.00
<b>Denmark</b>	0.00	0.01	0.01	0.04	0.07	0.02	0.00
<b>Finland</b>	0.01	0.02	0.04	0.04	0.04	0.03	0.01
<b>France</b>	0.01	-0.02	-0.01	-0.03	-0.02	-0.02	0.00
<b>Germany</b>	-0.01	0.02	0.04	0.02	0.01	0.01	0.00
<b>Greece</b>	0.00	0.00	-0.02	-0.01	0.03	-0.02	0.00
<b>Ireland</b>	-0.06	0.25	0.78	0.15	-0.14	-0.50	-0.02
<b>Italy</b>	0.01	0.01	0.00	0.01	0.00	0.00	0.00
<b>Neths</b>	0.01	0.00	-0.01	0.02	0.06	0.06	-0.01
<b>Austria</b>	0.05	0.03	0.00	0.02	0.04	-0.04	0.00
<b>Portugal</b>	0.00	-0.01	0.00	0.00	0.00	-0.01	0.00
<b>Sweden</b>	0.01	0.01	0.02	0.01	0.02	0.01	0.00
<b>Spain</b>	0.01	0.02	0.04	0.03	0.01	0.00	0.00
<b>UK</b>	0.03	0.02	0.11	0.23	0.11	-0.01	-0.01
<b>EU-27</b>	0.00	-0.01	-0.03	-0.05	-0.06	-0.06	-0.02

<b>Impact of migration from EU-8 to EU-15 on real wages (%)</b>							
	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Long-run</b>
<b>Czech Rep</b>	-0.02	-0.04	0.02	0.19	0.36	0.43	0.25
<b>Hungary</b>	-0.01	-0.02	0.04	0.21	0.46	0.68	0.62
<b>Poland</b>	-0.01	0.08	0.39	1.04	1.91	2.65	2.37
<b>Belgium</b>	0.00	-0.01	-0.03	-0.04	-0.06	-0.09	-0.09
<b>Denmark</b>	0.00	0.01	0.00	-0.03	-0.11	-0.19	-0.22
<b>Finland</b>	0.00	-0.02	-0.04	-0.07	-0.13	-0.19	-0.38
<b>France</b>	0.00	0.00	0.01	0.02	0.02	0.03	0.07
<b>Germany</b>	0.01	0.02	-0.02	-0.08	-0.13	-0.16	-0.17
<b>Greece</b>	0.00	0.00	0.00	0.01	0.01	0.01	0.06
<b>Ireland</b>	0.03	0.02	-0.34	-0.90	-1.32	-1.60	-1.64
<b>Italy</b>	-0.01	-0.02	-0.03	-0.04	-0.06	-0.07	-0.07
<b>Neths</b>	0.00	0.00	0.00	-0.02	-0.05	-0.09	-0.24
<b>Austria</b>	-0.03	-0.08	-0.13	-0.18	-0.28	-0.31	-0.33
<b>Portugal</b>	0.00	0.00	0.01	0.01	0.01	0.01	0.05
<b>Sweden</b>	-0.01	-0.02	-0.03	-0.06	-0.09	-0.12	-0.18
<b>Spain</b>	0.00	0.00	-0.01	-0.04	-0.08	-0.11	-0.12
<b>UK</b>	-0.01	-0.01	-0.04	-0.16	-0.31	-0.38	-0.36

<b>Impact of migration from EU-8 to EU-15 on inflation (percentage points)</b>							
	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Long-run</b>
<b>EU-8</b>	0.03	0.04	0.07	0.12	0.10	0.07	-0.01
<b>Czech Rep</b>	-0.01	-0.01	0.00	0.02	0.03	0.02	0.00
<b>Estonia</b>	0.09	0.14	0.19	0.31	0.36	0.36	-0.04
<b>Hungary</b>	0.00	-0.01	0.00	0.01	0.02	0.02	0.00
<b>Lithuania</b>	0.18	0.37	0.68	1.29	1.28	0.98	0.03
<b>Latvia</b>	0.13	0.00	0.38	1.14	0.79	0.75	0.02
<b>Poland</b>	0.03	0.04	0.05	0.04	0.01	0.00	-0.02
<b>Slovenia</b>	0.02	0.05	0.12	0.13	0.08	0.04	-0.04
<b>Slovakia</b>	0.09	0.19	0.22	0.33	0.33	0.14	-0.02
<b>EU-15</b>	0.00	0.00	-0.01	-0.03	-0.06	-0.06	-0.01
<b>Belgium</b>	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.01
<b>Denmark</b>	-0.01	-0.02	-0.01	-0.03	-0.05	-0.05	-0.02
<b>Finland</b>	-0.02	-0.04	-0.04	-0.05	-0.05	-0.06	-0.05
<b>France</b>	0.01	0.01	0.02	0.02	0.02	0.02	0.00
<b>Germany</b>	0.00	-0.02	-0.03	-0.05	-0.05	-0.04	-0.01
<b>Greece</b>	0.01	0.02	0.02	0.02	0.02	0.02	-0.01
<b>Ireland</b>	-0.05	-0.10	-0.28	-0.38	-0.23	-0.07	0.00
<b>Italy</b>	0.00	-0.01	0.00	-0.01	-0.01	-0.01	-0.02
<b>Neths</b>	-0.01	-0.01	0.00	-0.01	-0.02	-0.03	-0.01
<b>Austria</b>	-0.03	-0.05	-0.04	-0.03	-0.05	-0.04	-0.03
<b>Portugal</b>	0.01	0.01	0.01	0.00	0.00	0.01	0.00
<b>Sweden</b>	-0.02	-0.04	-0.04	-0.04	-0.05	-0.05	-0.03
<b>Spain</b>	0.00	-0.01	-0.01	-0.02	-0.03	-0.02	-0.03
<b>UK</b>	0.02	0.04	0.03	-0.08	-0.23	-0.24	-0.02
<b>EU-27</b>	0.00	0.00	0.00	-0.02	-0.04	-0.04	-0.01

Impact of migration from EU-2 to EU-15 on GDP (%)								Long-run GDP per capita
	2004	2005	2006	2007	2008	2009	Long- run	
<b>EU-2</b>	-0.29	-0.52	-0.89	-1.72	-2.39	-3.10	-7.26	
<b>Bulgaria</b>	-0.09	-0.18	-0.39	-0.79	-1.36	-1.85	-3.99	-0.13
<b>Romania</b>	-0.36	-0.64	-1.07	-2.04	-2.75	-3.54	-8.40	-0.64
<b>EU-15</b>	0.01	0.03	0.05	0.08	0.12	0.15	0.38	
<b>Belgium</b>	0.01	0.02	0.05	0.07	0.09	0.11	0.22	-0.02
<b>Denmark</b>	0.00	0.01	0.01	0.01	0.02	0.03	0.09	-0.02
<b>Finland</b>	-0.02	-0.03	-0.05	-0.06	-0.06	-0.07	-0.05	-0.07
<b>France</b>	0.01	0.02	0.04	0.06	0.07	0.08	0.08	0.00
<b>Germany</b>	-0.01	-0.02	-0.02	-0.02	-0.02	-0.03	0.04	-0.01
<b>Greece</b>	0.04	0.10	0.16	0.21	0.27	0.32	0.45	-0.08
<b>Ireland</b>	0.00	0.00	0.02	0.04	0.06	0.08	0.23	-0.06
<b>Italy</b>	0.02	0.07	0.14	0.23	0.34	0.45	0.92	-0.29
<b>Neths</b>	0.01	0.02	0.02	0.02	0.02	0.01	0.07	-0.02
<b>Austria</b>	0.00	0.00	0.01	0.04	0.06	0.09	0.35	-0.10
<b>Portugal</b>	0.01	0.03	0.05	0.07	0.10	0.12	0.20	-0.02
<b>Sweden</b>	0.00	0.00	0.00	0.00	0.00	-0.01	0.04	-0.04
<b>Spain</b>	0.07	0.18	0.33	0.49	0.66	0.80	1.33	-0.21
<b>UK</b>	0.00	0.01	0.01	0.02	0.03	0.04	0.11	0.01
<b>EU-27</b>	0.01	0.02	0.05	0.07	0.10	0.12	0.00	

Impact of migration from EU-2 to EU-15 on unemployment rate (percentage points)							
	2004	2005	2006	2007	2008	2009	Long-run
<b>EU-2</b>	-0.31	-0.35	-0.49	-1.10	-0.86	-0.54	-0.01
<b>Bulgaria</b>	-0.21	-0.23	-0.30	-0.49	-0.66	-0.25	-0.01
<b>Romania</b>	-0.35	-0.39	-0.56	-1.32	-0.93	-0.64	-0.01
<b>EU-15</b>	0.03	0.03	0.03	0.08	0.05	0.02	0.01
<b>Belgium</b>	0.03	0.04	-0.01	0.02	0.02	0.05	0.00
<b>Denmark</b>	0.00	0.00	0.00	0.01	0.02	0.03	0.00
<b>Finland</b>	0.00	0.01	0.02	0.02	0.01	0.01	0.01
<b>France</b>	0.01	-0.01	0.01	0.00	0.00	-0.01	0.00
<b>Germany</b>	0.00	0.01	0.01	0.02	0.01	0.02	0.00
<b>Greece</b>	0.03	0.01	-0.03	0.00	0.04	0.09	-0.01
<b>Ireland</b>	0.01	0.03	0.01	0.02	0.04	-0.04	0.00
<b>Italy</b>	0.06	0.04	0.00	0.23	0.15	-0.01	0.00
<b>Neths</b>	0.00	-0.01	-0.01	0.02	0.03	0.03	-0.01
<b>Austria</b>	0.01	0.00	-0.01	0.04	0.02	0.12	0.00
<b>Portugal</b>	0.00	-0.02	-0.01	0.04	0.05	0.02	0.00
<b>Sweden</b>	0.00	0.00	0.00	0.01	0.01	0.00	0.00
<b>Spain</b>	0.13	0.15	0.17	0.23	0.05	-0.07	0.00
<b>UK</b>	0.01	0.01	0.00	0.00	0.05	0.02	0.00
<b>EU-27</b>	0.02	0.02	0.01	0.04	0.02	0.00	0.01

Impact of migration from EU-2 to EU-15 on inflation (percentage points)							
	2004	2005	2006	2007	2008	2009	Long-run
<b>EU-2</b>	-0.12	-0.10	0.03	0.08	0.55	0.91	0.03
<b>Bulgaria</b>	0.20	0.30	0.36	0.54	0.82	0.95	-0.06
<b>Romania</b>	-0.24	-0.24	-0.09	-0.09	0.46	0.90	0.06
<b>EU-15</b>	0.00	-0.01	-0.01	-0.02	-0.04	-0.04	-0.01
<b>Belgium</b>	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01
<b>Denmark</b>	0.00	0.00	0.01	0.00	-0.01	-0.02	-0.02
<b>Finland</b>	-0.01	-0.02	-0.02	-0.02	-0.03	-0.02	-0.04
<b>France</b>	0.01	0.01	0.02	0.01	0.01	0.01	0.00
<b>Germany</b>	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.01
<b>Greece</b>	0.01	0.01	0.01	0.02	0.02	0.00	-0.02
<b>Ireland</b>	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	0.00
<b>Italy</b>	-0.03	-0.05	-0.02	-0.06	-0.18	-0.15	-0.03
<b>Neths</b>	0.00	0.00	0.01	0.01	0.00	-0.01	-0.01
<b>Austria</b>	-0.01	-0.02	-0.01	-0.01	-0.03	-0.05	-0.03
<b>Portugal</b>	0.02	0.01	0.01	0.02	0.00	0.00	-0.01
<b>Sweden</b>	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02	-0.03
<b>Spain</b>	-0.04	-0.07	-0.10	-0.14	-0.18	-0.14	-0.04
<b>UK</b>	0.00	0.00	0.00	0.01	0.01	-0.03	-0.01
<b>EU-27</b>	0.00	-0.01	-0.01	-0.01	-0.03	-0.03	-0.01

Impact of migration from EU-2 to EU-15 on real wages (%)							
	2004	2005	2006	2007	2008	2009	Long-run
<b>Belgium</b>	0.00	-0.01	-0.02	-0.02	-0.04	-0.06	-0.09
<b>Denmark</b>	0.00	0.01	0.01	0.01	0.00	-0.05	-0.13
<b>Finland</b>	-0.01	-0.01	-0.02	-0.04	-0.06	-0.08	-0.22
<b>France</b>	0.00	0.00	0.00	-0.01	-0.01	-0.01	0.01
<b>Germany</b>	0.00	0.00	-0.01	-0.03	-0.05	-0.08	-0.13
<b>Greece</b>	0.00	-0.02	-0.02	-0.03	-0.05	-0.09	-0.22
<b>Ireland</b>	0.00	-0.02	-0.04	-0.06	-0.11	-0.15	-0.16
<b>Italy</b>	-0.03	-0.09	-0.11	-0.26	-0.53	-0.68	-0.71
<b>Neths</b>	0.00	0.00	0.01	0.01	-0.01	-0.03	-0.15
<b>Austria</b>	0.00	-0.01	-0.01	-0.03	-0.06	-0.19	-0.44
<b>Portugal</b>	0.00	0.01	0.01	0.01	0.01	-0.01	-0.06
<b>Sweden</b>	0.00	0.00	-0.01	-0.02	-0.03	-0.04	-0.09
<b>Spain</b>	0.00	-0.04	-0.13	-0.30	-0.53	-0.73	-0.69
<b>UK</b>	0.00	-0.01	-0.02	-0.02	-0.03	-0.06	-0.04

As regards the EU-15 economies, the first thing to note is that the impact of population flows from the EU-8 and EU-2 thus far has been small. The level of output may have risen by about 0.4 per cent over the six year period to 2009 as a result of the population movements, adding less than 0.1 percentage points to GDP growth per annum on average. Ireland and the UK have benefited more than others from populations flows from the EU-8, whereas Spain, Italy and Greece have benefited more from population flows from the EU-2. The impact on the unemployment rate in the EU-15 as a whole has been negligible, while we estimated that any temporary rise in unemployment rates in Ireland, the UK and Spain would have been more than offset by the rise in output by 2009. There should be no long-run impact on the

unemployment rates in any country as a result of the population shifts. Real wages can be expected to fall in the receiving countries in order to bring the unemployment rate back into line, with negligible impact on inflation.

The shock to the sending countries is larger in magnitude than in the receiving countries, especially in Romania, Bulgaria and Lithuania. The loss of the labour force reduces potential output, and we estimate that GDP in Romania was 4 per cent lower in 2009 than it would have been had the population remained immobile. However, if we instead look at GDP per capita, we see a rise in this level by 2009 rather than a decline, reflecting a higher real wage. In the long-run, however, there is a small negative impact on GDP per capita in Romania, reflecting a small rise in the long-term real interest rate. Unemployment rates in the sending countries are expected to have declined temporarily as a result of the population shifts, although as wages adjust this impact should dissipate over the next few years.

The tables above also report our estimated long-run impact on GDP and GDP per capita in each of the countries in our study. For the most part, the impact on GDP per capita of the shock is negligible. There is a significant positive impact expected in Poland, and a smaller negative impact in Ireland and Romania. Because we are working with an assumed underlying CES production function with an elasticity of substitution of about  $\frac{1}{2}$ , factor prices and input shares adjust in response to the population shocks, so that the impact on output of the shock is generally slightly smaller than the population shock itself.

### ***Quantifying the impact of the EU enlargements***

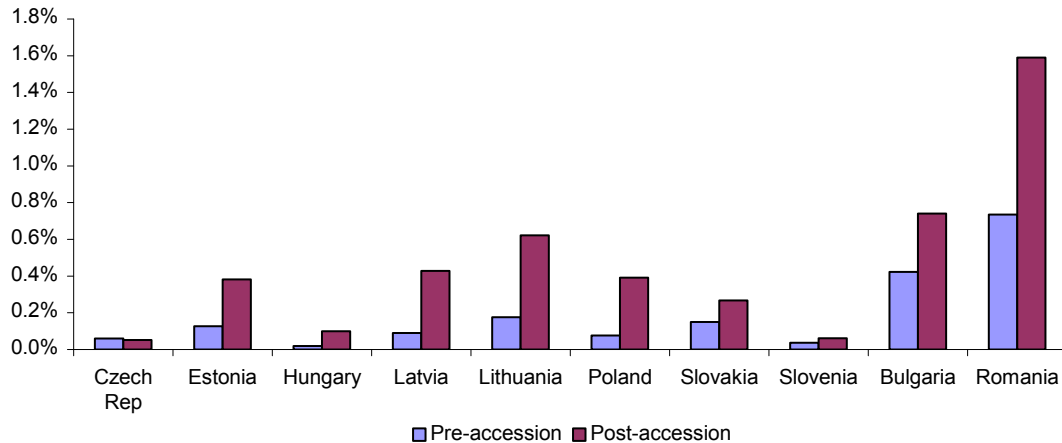
Our baseline estimates reported above report a simple estimate of the macro-economic impact of population shifts between the EU-8/EU-2 and EU-15 since 2004 under a very simple set of assumptions. However, we have not yet attempted to quantify the share of this impact that can be attributed to the enlargement of the EU in either 2004 or 2007. As our migrant stock matrix shows, there was a pre-existing stock of EU-8 and EU-2 citizens in each of the EU-15 economies prior to the enlargements, and these stocks had predominantly been rising over time. It is likely that net inflows to the EU-15 would have continued for some time given the opportunity for higher wages and in some cases employment opportunities in the EU-15 relative to the home economies, even in the absence of freer access to EU-15 labour markets following accession.

In order to quantify the macro-economic impact of the population movements directly related to the EU enlargements, we must establish a counter-factual scenario describing the population flows that might have occurred in the absence of the enlargements. One simple approach is to assume that the emigration from the EU-8/EU-2 would have continued at the same rate as in the preceding years. This



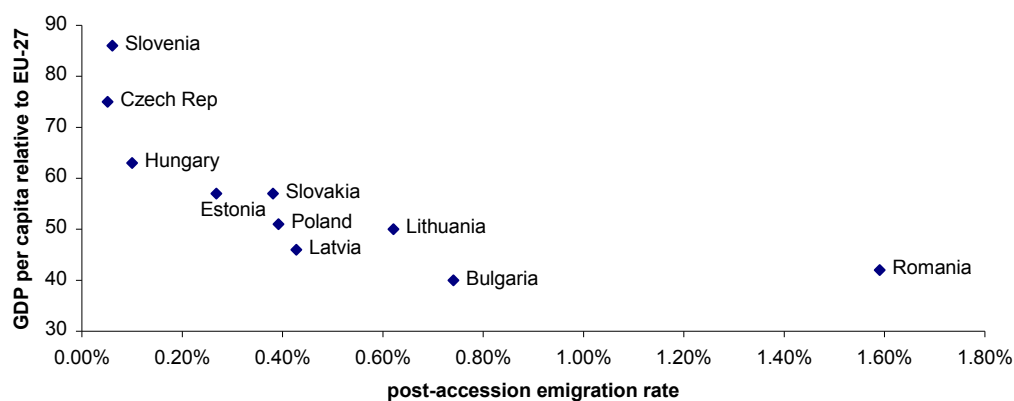
approach was adopted for the counter-factual analysis reported by Baas, Brucker, Hauptmann and Jahn (2007) and also by Barrell *et al* (2009). The figure below illustrates the average rate of emigration (relative to the domestic population) in the 5 years prior to accession (1999-2003 for the EU-8 and 2002-2006 for the EU-2), compared to the average emigration rate since accession (2004-2009 for the EU-8 and 2007-2009 for the EU-9).

### Average emigration rates to the EU-15

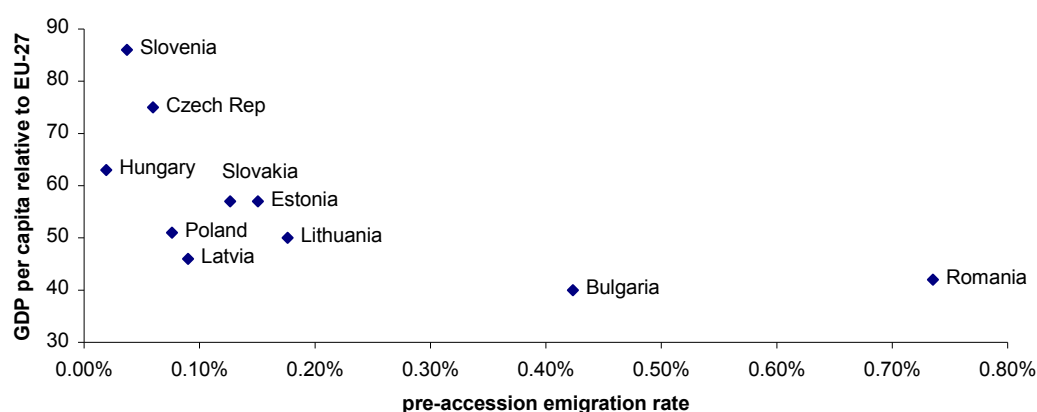


In most countries there has been a clear rise in the average emigration rate to the EU-15 since acceding to the EU. The impact in the Czech Republic and Slovenia is very small, where emigration rates are already very low. This may reflect the relatively high standards of living in these countries, which raises the costs of emigration. The propensity to emigrate towards the EU-15 shows a strong correlation with relative GDP per capita. The figures below plot the pre-accession and post-accession emigration rates against GDP per capita in the year of accession relative to the EU-27 average. Romania is a clear outlier in both figures, showing a much higher propensity to emigrate towards the EU-15 than the other countries, given its relative GDP per capita.

### Post-accession emigration rate and relative GDP per capita



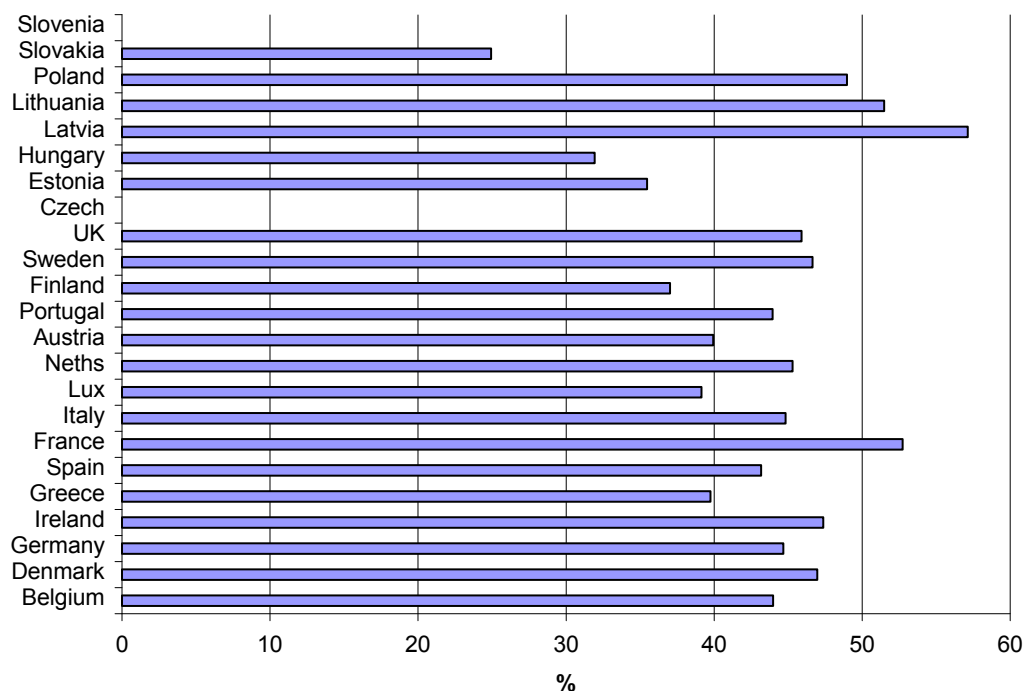
## Pre-accession emigration rate and relative GDP per capita



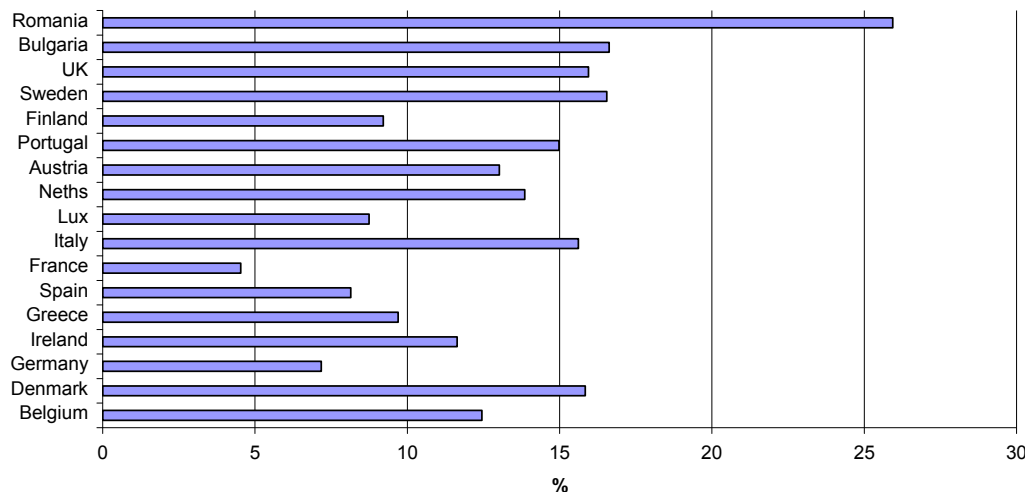
Based on the information presented above, we assume that accession to the EU had no impact on emigration from the Czech Republic and Slovenia to the EU-15. For the remaining countries, we assume that the share of migration since accession over and above the average emigration rate in the five years prior to accession is attributable to the accession process itself. This approach suggests that just less than 60 per cent of the macro-economic impact reported for Latvia in the previous section can be attributed to the accession of Latvia to the EU, while the remaining 40 per cent of the impact is likely to have taken place even in the absence of accession. The impact on other countries is smaller, ranging from 0 impact in the Czech Republic and Slovenia to close to 50 per cent in Lithuania and Poland, 30-35 per cent in Estonia and Hungary, about 25 per cent in Romania and Slovakia, and 16 per cent in Bulgaria. In the case of Bulgaria and Romania, bear in mind that the small percentage attributed to the enlargement process reflects the fact that we are comparing population flows from 2004, when these countries only acceded to the EU in 2007, and so by definition the flows in the first three years of our sample are not attributable to their EU accession.

As to the EU-15 economies, our approach suggests that about 45-55 per cent of the EU-8 shock to Ireland, the UK, the Netherlands, Denmark, Italy, France, Germany, Spain, Portugal, Belgium and Sweden can be attributed to the EU expansion, and less than 40 per cent in Finland, Austria, Luxembourg, and Greece. About 15 per cent of the reported EU-2 shock can be attributed to the 2007 enlargement in Denmark, Italy, Portugal, Sweden and the UK, while a smaller share can be attributed elsewhere. These estimates are illustrated in the figures below. Overall, we attribute about 45 per cent of the population shifts from the EU-8 to the EU-15 between 2004 and 2009 to the 2004 enlargement, and about 25 per cent of the population shifts from the EU-2 to the EU-15 since 2007 to the 2007 enlargement.

**Percent of population shifts from EU-8 to EU-15 2004-2009, attributed to 2004 enlargement**

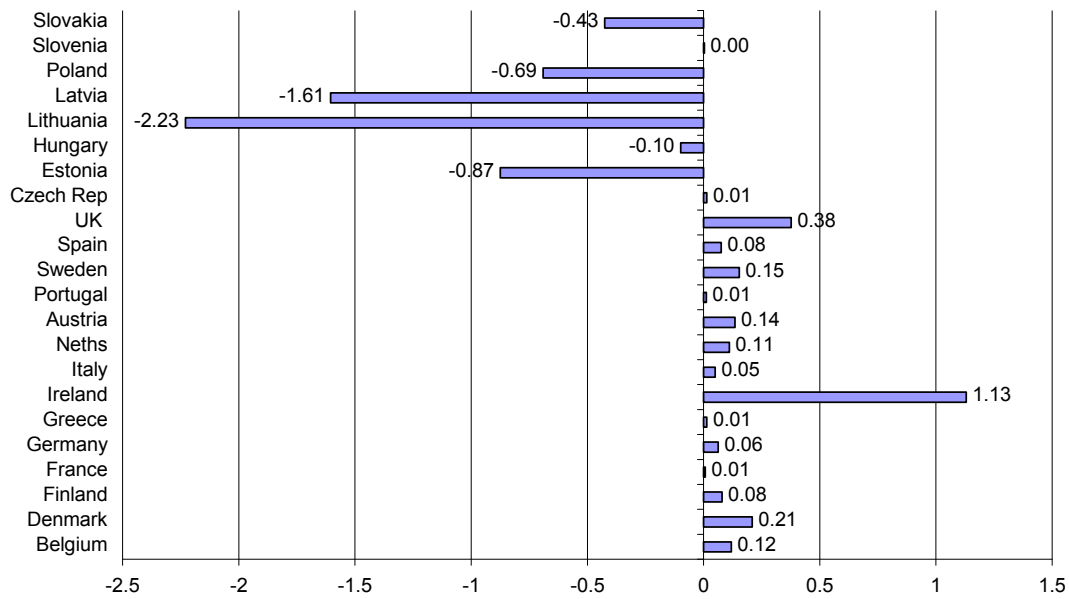


**Percent of population shifts from EU-2 to EU-15 2004-2009, attributed to 2007 enlargement**

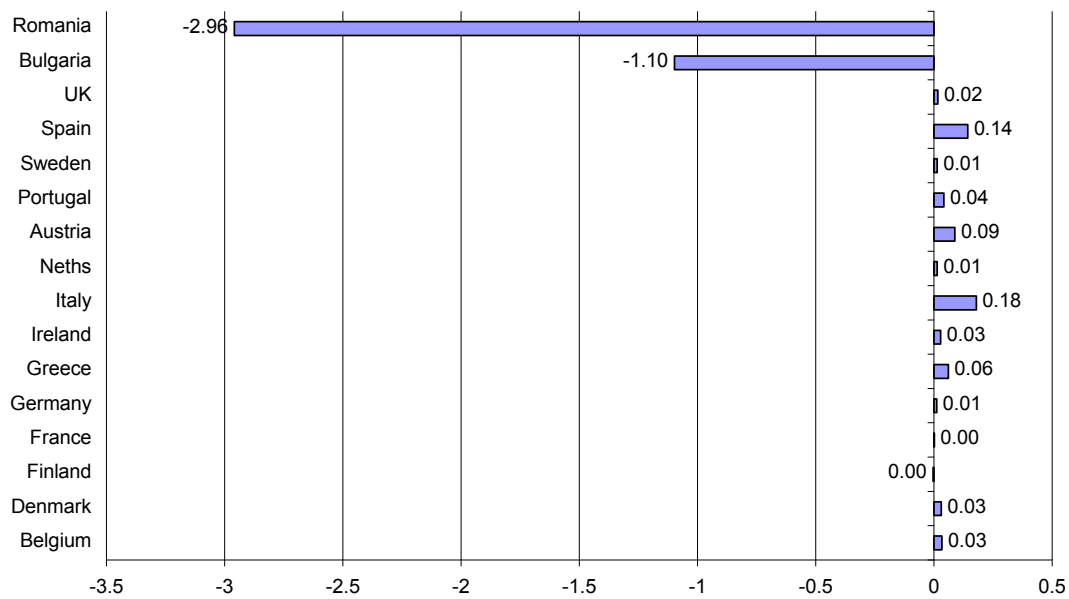


The figures below illustrate the estimated long-run impact on output of the 2004 and 2007 EU enlargements on the EU-8, EU-2 and EU-15. As we discuss above, the impact on GDP per capita can be expected to be negligible in most countries. The other macro-economic impacts can be determined by adjusting the figures reported in the tables in the previous section by the shares illustrated in the figures above.

**Long-run impact of population shifts to 2009 attributable to the 2004 enlargement on output**



**Long-run impact of population shifts to 2009 attributable to the 2007 enlargement on output**



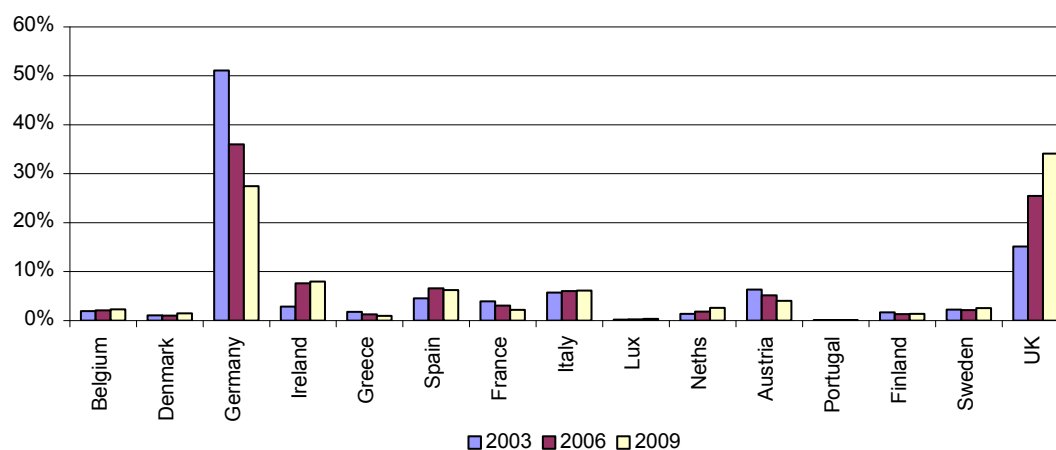
***Estimates of the impact of transitional arrangements on migration***

The analysis reported above is based on the assumption that the EU enlargement process itself did not lead to any shifts in the distribution of the stock of EU-8/EU-2 citizens across the EU-15 countries. However, there have been some significant shifts in this distribution following the enlargement processes. Most studies have found that an existing network or diaspora is most important factor driving the destination

decision of migrants (see for example Mayda, 2007) so all else equal, we would expect the distribution of EU-8 citizens across the EU-15 economies to remain largely constant over time. The distributional shifts that have occurred have been widely attributed to the differences in transitional arrangements across the EU-15 countries, with some countries maintaining restrictions on free mobility longer than others.

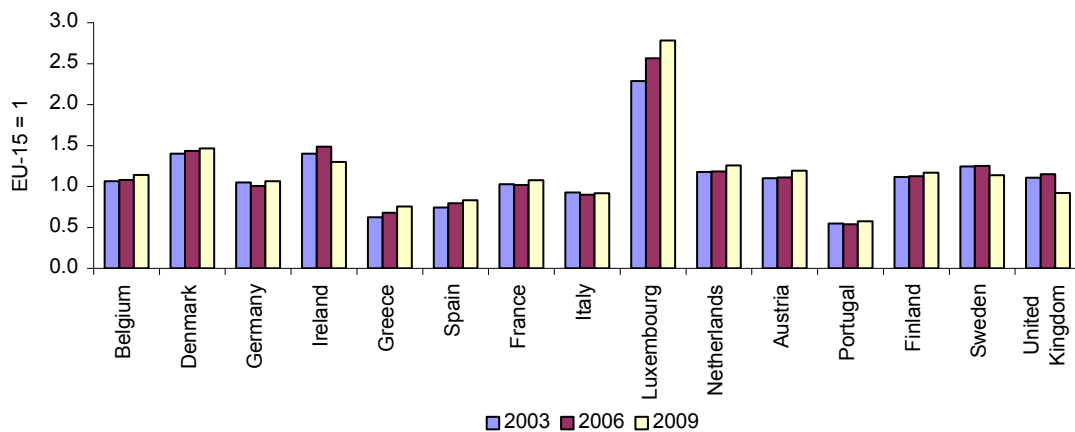
The figure below illustrates the share of EU-8 citizens resident in each of the EU-15 economies in 2003 (just prior to the 2004 enlargement), in 2006 (at the end of the first stage of the transitional arrangements), and in 2009 (at the end of the second stage of the transitional arrangements). The most striking changes are in Germany and the UK. In 2003, just over 50 per cent of EU-8 citizens resident in the EU-15 were located in Germany, whereas by 2009 this share had fallen to less than 30 per cent. Over the same period the share of EU-8 citizens resident in the UK rose from about 15 per cent to over 35 per cent, overtaking Germany as the primary destination. As the UK was one of the few countries not to introduce transitional restrictions on the free mobility of labour from the EU-8, there would appear to be a clear link between these factors. Ireland, which along with Sweden was the only other country not to impose temporary restrictions on labour mobility, also exhibits a strong rise in share, and as we showed above, given the size of the country in percentage terms the population shock in Ireland was far bigger than in any of the other EU-15 countries. Despite the ease of access to the Swedish labour market, there was little shift in the share of EU-8 citizens resident in Sweden over this period, suggesting that the transitional arrangements cannot fully explain the changes we see. Transitional arrangements were lifted in Greece, Spain, Italy, Portugal and Finland in 2006, at the end of the first phase of the transitional arrangements. If the transitional restrictions prevented labour mobility to these countries during the first phase of the arrangements, we would expect to see some recovery in their shares in the second phase. However, there is not a clear rise in share in any of these countries between 2006 and 2009.

### Distribution of EU-8 citizens resident in the EU-15 across destination countries

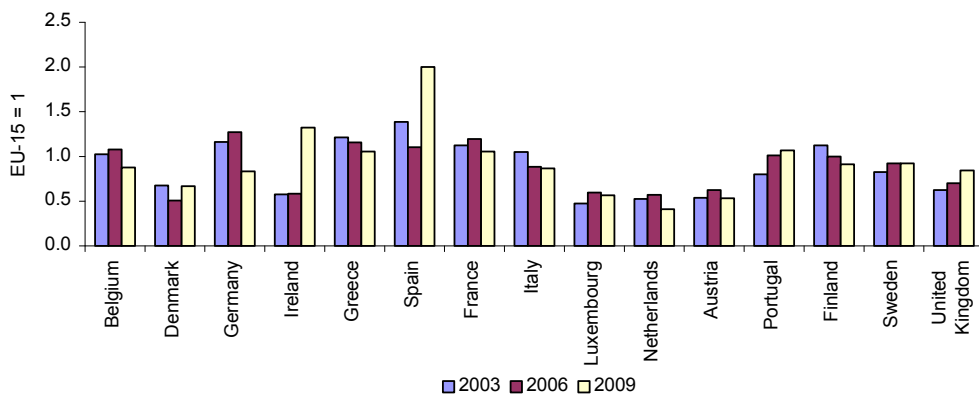


Other factors that have been found to affect the location decision include employment opportunities, captured by variables such as the unemployment rate relative to elsewhere, and the earnings potential, captured for example by GDP per capita relative to elsewhere. The figures below illustrate the unemployment rates and GDP per capita in each of the EU-15 economies relative to the EU-15 average in 2003, 2006 and 2009, to see if these can explain any of the unexplained shifts in the distribution of EU-8 citizens across the EU-15 over this period.

### GDP per capita relative to the EU-15 average



### Unemployment rate relative to the EU-15 average

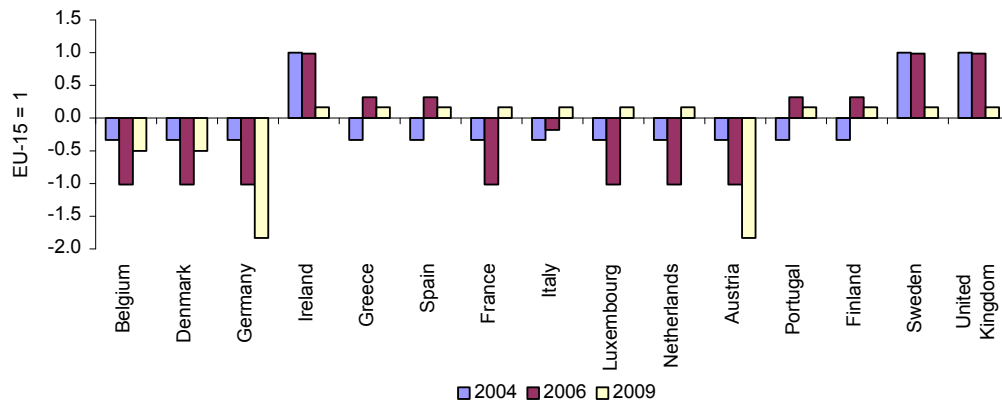


GDP per capita in both the UK and Ireland declined between 2006 and 2009 relative to the EU-15 average, while the unemployment rate rose relative to the average, suggesting that the macro-economic factors can do little to explain the persistent rise in their share of EU-8 citizens over this period. Neither can they explain any of the loss of share in Germany.

In order to assess the likely impact of the transitional arrangements on the distribution of EU-8 citizens across the EU-15, we constructed a simple index to illustrate the degree of mobility restrictions in the host country compared to the EU average. The

index gives a value of 1 where no restrictions are present, and a value of -1 where restrictions are present (and a weighted average of the two when restrictions were lifted part-way through the year. The average value across the 15 countries is calculated for the year, and the final relative figures is the absolute difference between the host country value and the EU-15 average value in the given year. This approach ensures that a host country is more attractive if it is one of few destinations that do not impose restrictions, while it becomes less attractive if it is one of few countries that continue to impose restrictions. The constructed measure is illustrated in the figure below. Germany and Austria become increasingly less attractive destinations over time, as other countries lift restrictions on mobility. The UK, Ireland and Sweden are highly attractive in 2004, but relatively less attractive once other countries begin to lift their restrictions. As of 1 May 2011 the value of our restriction index will fall to 0 in all countries, as the final restrictions on mobility from the EU-8 are lifted.

### Restrictions on mobility from the EU-8 relative to the EU-15 average



We ran a simple panel regression to assess the correlation between our relative restriction index and the change in share of EU-8 migrants in each of the EU-15 host countries. The estimated equations can be described as follows:

$$\Delta migsh_{it} = \alpha_1 relrestrictions_{it} + \alpha_2 \Delta relGDPpercapita_{it} + \varepsilon_{it}$$

Where *migsh* is the share of EU-8 citizens in the EU-15 residing in host country *i*, *relrestrictions* is relative restrictions on mobility index illustrated in the figure above, adjusted by the size of GDP in each country to capture differences in the capacity to accommodate migrants in each country<sup>4</sup>, *relGDPpercapita* is GDP per capita in host country *i* relative to the EU-15 average, as illustrated in the figure above.  $\Delta$  is the absolute change operator. The sample period runs from 2004-2009, for a panel of 15 countries, giving a total of 90 observations. The results of this simple estimation procedure are reported below.

<sup>4</sup> Clearly small countries like Luxembourg cannot absorb the same number of migrants as a large country like Germany.

Dependent Variable:  $\Delta$ MIGSH  
Method: Panel Least Squares  
Date: 04/14/11 Time: 16:18  
Sample: 2004 2009  
Periods included: 6  
Cross-sections included: 15  
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
relrestrictions	0.009420	0.001488	6.331420	0.0000
$\Delta$ relGDPpercapita	0.043432	0.037998	1.143008	0.2561
R-squared	0.315225	Mean dependent var		-2.56E-11
Adjusted R-squared	0.307443	S.D. dependent var		0.017285
S.E. of regression	0.014385	Akaike info criterion		-5.623340
Sum squared resid	0.018209	Schwarz criterion		-5.567789
Log likelihood	255.0503	Hannan-Quinn criter.		-5.600938
Durbin-Watson stat	1.070411			

Our relative restrictions index is highly significant, but the equation can explain just 30 per cent of the share shifts overall. The point estimates of the results suggest that if the UK lifts restrictions on mobility while the other 14 retain restrictions, the share of EU-8 citizens resident in that country can be expected to increase by about 4 percentage points per annum. This simple model can only go a long way towards explaining the 20 percentage point increase in the EU-8 migrant share in the UK over the six year period to 2009.

Without developing a more elaborate model to explain the shifting shares of EU-8 citizens across the EU-15 economies, we have two options for estimating the macro-economic impact of the transitional arrangements on the EU-15 economies. Our first option is to assume that all the shift in location shares can be attributable to the transitional arrangements. This can act as an upper bound to the estimates. Our second option is to use the simple model estimated above to calibrate the share of the location shifts that can be attributable to the transitional arrangements. We will use this as our lower bound<sup>5</sup>.

The figures below illustrate these upper and lower estimates of the impact of transitional arrangements in place following the 2004 enlargement on the level of GDP and the unemployment rates in 2009 in each of the EU-15 economies and also the impact on the long-run level of output. Our estimates suggest that the transitional arrangements in place raised the level of output in the UK by 0.2-0.4 per cent by

<sup>5</sup> It is possible that the transitional arrangements themselves have restrained to overall level of mobility from the EU-8 to the EU-15, as suggested by Brucker et al (2007). However, their estimates of this impact are very small in magnitude, and given the small magnitudes of the macro-economic impact overall we omit this potential source of bias in our calculations.

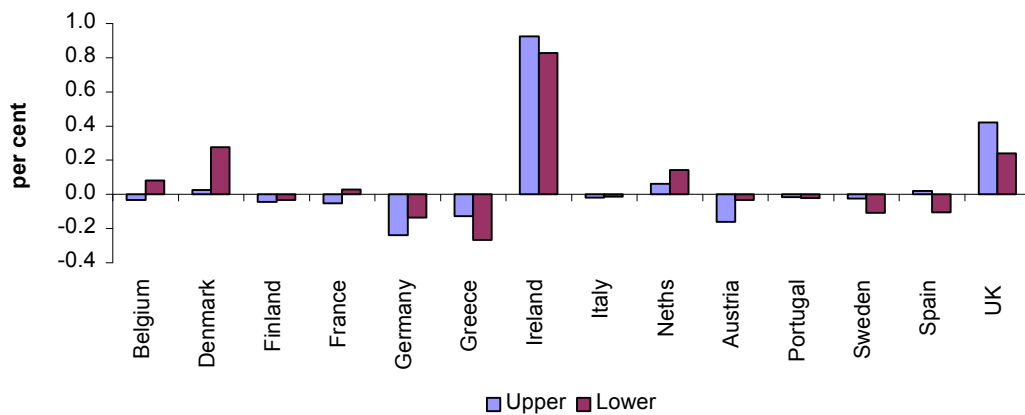


2009, and in Ireland by 0.8-0.9 per cent. In the case of Ireland, this reflects a rise in the growth rate of GDP by more than 0.1 percentage point per annum since 2004. The transitional arrangement probably reduced the level of output in Germany and Greece by 0.1-0.3 per cent by 2009, with smaller effects elsewhere.

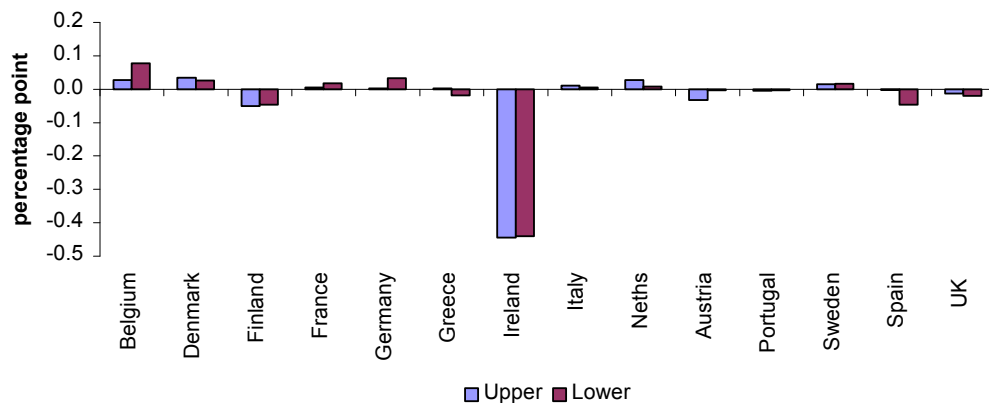
The only significant impact on unemployment rates is seen in Ireland, where we estimate that the rate of unemployment was about ½ percentage point lower in 2009 than it would have been in the absence of the transitional arrangements, which diverted EU-8 migrants from elsewhere in the EU-15 towards Ireland.

In the long-run, the transitional arrangements can be expected to raise the potential level of output in Ireland by 1.4-1.7 per cent, in the UK by 0.3-0.5 per cent and in Denmark by 0.1-0.4 per cent, while they will leave a permanent scar on the level of potential output in Germany and Greece of 0.1-0.5 per cent.

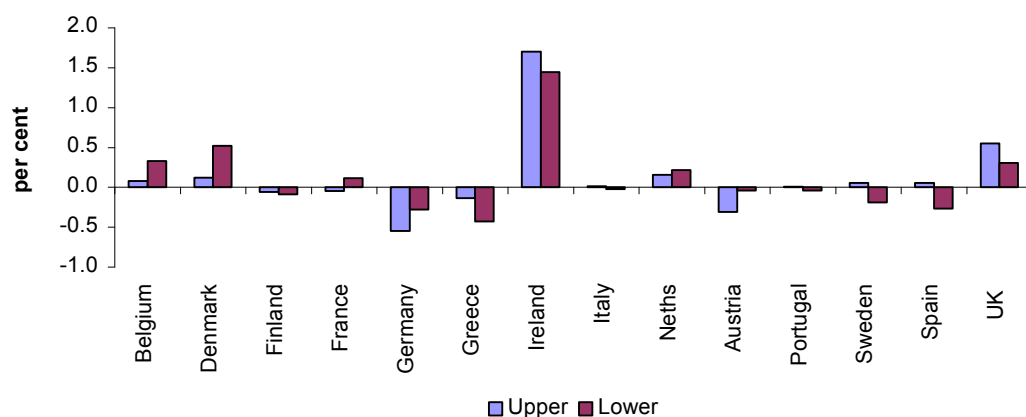
### Impact of transitional arrangement on the level of GDP by 2009



### Impact of transitional arrangement on the unemployment rate by 2009

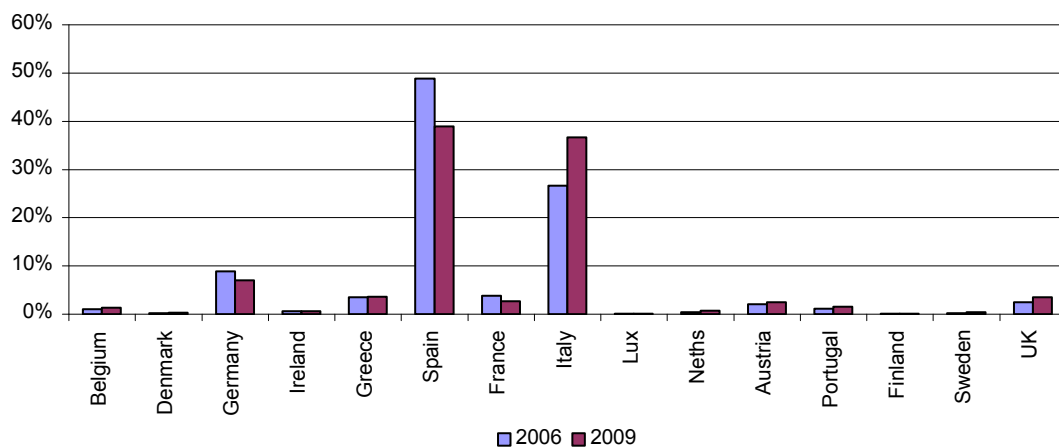


## Impact of transitional arrangement on the long-run level of GDP



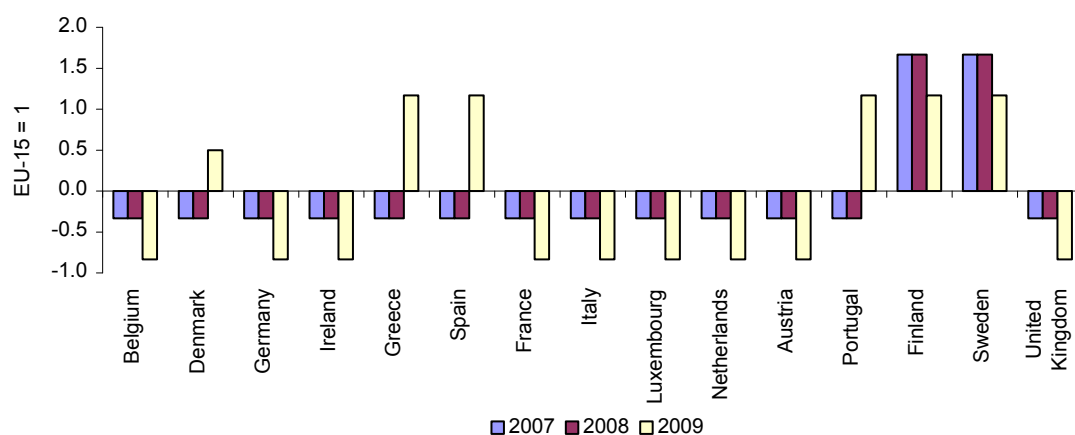
If we apply the same approach to the 2007 enlargement, we can estimate the effects of the transitional arrangements in place following this enlargement as well. The figure below illustrates the distribution of EU-2 citizens across the EU-15 countries in 2006, just prior to their accession to the EU, and in 2009, at the end of the first phase of the transitional arrangements. Nearly 80 per cent of EU-2 citizens in the EU-15 reside in either Spain or Italy. The share residing in Spain declined significantly between 2006 and 2009, while the share in Italy rose by a similar magnitude.

## Distribution of EU-2 citizens resident in the EU-15 across destination countries



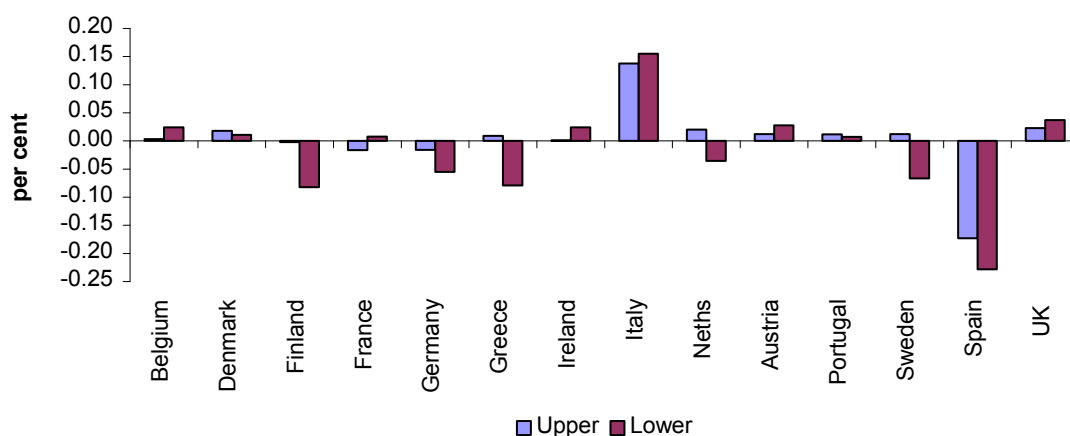
We calibrate a relative restrictions index for the EU-2 in the same way as for the EU-8 discussed above. This is illustrated in the figure below. Only Finland and Sweden allowed completely free access to their labour markets for citizens from Bulgaria and Romania in 2007, neither of which are traditional destinations for migrants from the EU-2 countries. Denmark, Greece, Spain and Portugal allowed free access in 2009. But it is not clear that the restrictions on labour market access through transitional arrangements had a significant impact on the location decision of migrants from the EU-2 in the same way as they did following the 2004 enlargement.

### Restrictions on mobility from the EU-2 relative to the EU-15 average

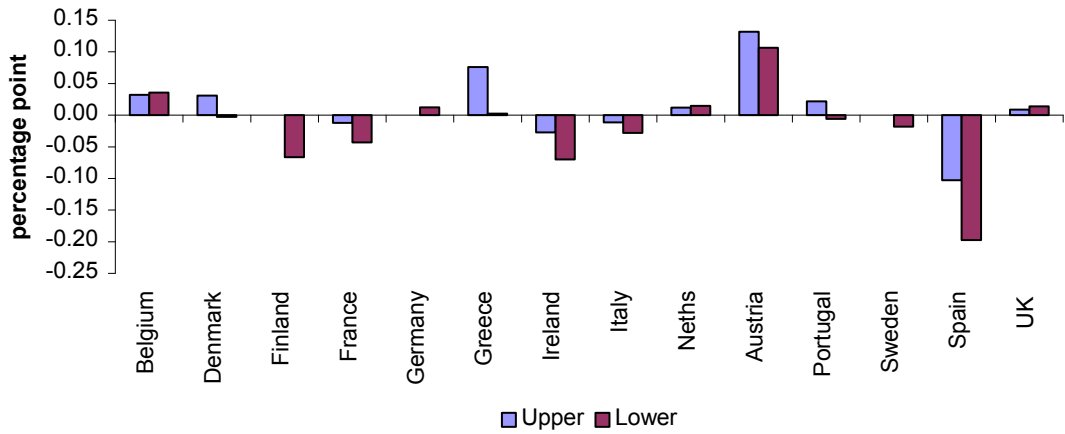


The figures below illustrate the estimated impacts on GDP and the unemployment rate by 2009, and the expected long-run impact on GDP, under the assumption that migration to end-2009 is permanent. This suggests that the level of output in Spain was somewhat lower by 2009 due to the existing transitional arrangement than it would have been in the absence of these arrangements. The unemployment rate was also lower than it might have been, although we can expect this effect to dissipate over the next few years. The impact on the other EU-15 economies is probably small and more likely to be positive, reflecting the fact that the transitional arrangements appear to have largely diverted migration away from Spain and towards other EU-15 destinations.

### Impact of transitional arrangement following the 2007 enlargement on the level of GDP by 2009



**Impact of transitional arrangement following the 2007 enlargement on the unemployment rate by 2009**



**Impact of transitional arrangement following the 2007 enlargement on the long-run level of output**

