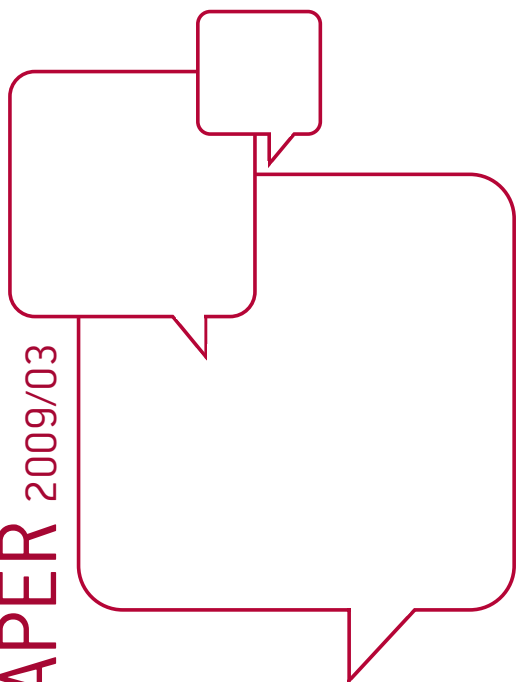


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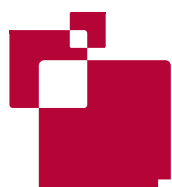
CYCLICAL DIMENSIONS OF LABOUR MOBILITY AFTER EU ENLARGEMENT

ALAN AHEARNE, HERBERT BRÜCKER, ZSOLT DARVAS AND JAKOB VON WEIZSÄCKER

Highlights

- At a time of symmetric global slowdown, migration cannot contribute as much to absorbing economic shocks as it could if the shock were asymmetric.
- Early evidence suggests that the crisis has led to a drop in immigration and even net return migration from some countries. This has helped the adjustment of former EU15 host countries and has exacerbated adjustment in former source countries in the new member states. In the short run, the stock of new member-state migrants in the EU15 will fall owing to diminished job opportunities for migrants.
- Changes in the unemployment rate in the host country are found to impact migration more than that of changes in the unemployment rate in the source country. In part, this can be explained by the disproportionate risk of migrants losing their jobs in the downturn.
- In the longer run, the crisis is set to increase migration from the new member states compared to what would have been the case without the crisis. This is because the crisis has undermined the economic growth model of those new member states that relied heavily on external financing to fuel their growth.

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Cyclical dimensions of labour mobility after EU enlargement

Alan Ahearne^{a,b,c}, Herbert Brücker^{d,e}, Zsolt Darvas^{a,f,g}, Jakob von Weizsäcker^a

Bruegel

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Abstract: This paper explores the influence of the economic cycle on labour mobility within the EU, focusing on the likely impact of the present economic crisis. To do so, we use an econometrically calibrated simulation and a case study of Ireland. We find that, in the short run, the crisis is likely to lead to a somewhat lower stock of migrants from the new member states in the EU15 than would have been the case without the crisis on account of diminished job opportunities for migrants. By contrast, in the longer run the crisis might lead to a moderate increase in migration from some of the new member states compared to what would have been the case without the crisis. The latter is driven by the observation that the crisis may have undermined the economic growth model of some of the new member states, thereby slowing down their economic catching-up process.

Keywords: labour mobility; economic cycle; crisis; European Union

JEL: F22; C33; J61; O11; O15; O24

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^aBruegel, ^bNational University of Ireland in Galway, ^cTrinity College Dublin, ^dInstitute for Employment Research, Nürnberg, ^eUniversity of Bamberg, ^fHungarian Academy of Sciences, ^gCorvinus University of Budapest

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1. Introduction

Economic migration generally leads to an improved allocation of productive resources, thereby increasing global output. This is achieved by workers moving from locations where their earnings and productivity is relatively low to locations where their earnings and productivity prospects are higher. The eastern enlargement of the EU has been a success story in this respect as recent studies show. Brücker et al. (2009) estimate that the migration of one million persons from eight new member states in central and eastern Europe which joined the EU in May 2004 has raised the GDP of the enlarged EU through this mechanism by 0.2 percent or € 24 billion (for similar evidence see Barrell et al., 2007). And these gains could double in the next decade in a business-as-usual scenario.

However, what global and European economies are experiencing during the present crisis is anything but business as usual. Historic experience teaches us that, in times of economic crisis, there is a political temptation to engage in protectionism not only with respect to trade but also with respect to migration (see O'Rourke and Williamson, 1999), which has the potential to exacerbate the crisis further as happened during the Great Depression. Fortunately, history will not repeat itself, because of much better awareness of the dangers of protectionism and because of better institutions that help resist the temptations of protectionism. These institutions include the WTO but also the EU with its four freedoms of the EU's single market that assure, among other things, free movement of workers within the EU.

Notwithstanding the free mobility principle, which does not yet fully apply to all citizens of the new member states¹ because many countries of the EU15 maintain temporary restrictions, the protectionist mood is on the rise. As unemployment in the EU increases substantially over the coming months, immigration and labour mobility within the EU are set to become the subject of intensified public scrutiny. Already, news reports of political tensions regarding labour mobility within the EU have become more frequent even in those countries that welcomed migrants from the new member states with open arms immediately following accession, such as Ireland and the UK. Those immigrants who keep their jobs will be accused of taking away the jobs of natives. And those immigrants who lose their jobs and claim unemployment benefits will be accused of living off the taxes of natives. Challenging this flawed 'heads you win, tails I lose' view of migration will not be easy politically.

It is against this background that the present report examines the role of migration in the economic cycle and specifically in the present economic and financial crisis. In particular, we explore how the present crisis may affect the scale of East-West migration in the enlarged EU and, as a consequence, the economic benefits from labour mobility.

¹ In this paper we consider the ten central and eastern European (CEE) new member states of the EU. For Cyprus and Malta data are typically not available, these two countries are very small and these countries did not face any temporary migration restriction after their 2004 EU entry.

When an economic shock is asymmetric (see Blanchard and Katz, 1992, and Decressin and Fatas, 1995), the response to the critics of migration is comparatively easy. In that case, migration essentially allows people from the hard-hit areas to move to booming areas with the potential substantially to reduce unemployment overall. However, even then the story is somewhat less clear-cut when real estate bubbles are involved, since migrants enhance the supply of construction capacity as construction workers but also increase the demand for housing.

The argument becomes more complicated in the current crisis since the European economies are all facing an adverse economic shock at the same time. Unemployment is going up everywhere and immigration, while not the cause of the problem, cannot contribute as much to absorbing the economic shock as it could if the shock was asymmetric.

In principle, one might even be tempted to argue that the present synchronised shock will end up having little impact on worker mobility within Europe at all. From the perspective of migrants, it could be argued that the shock does little to change the relative attractiveness of different places because, given its synchronised nature, it hits all locations with similar force. On the policy front, there might not be that many changes either since those countries that have already introduced full worker mobility cannot now back-track and those EU15 countries like Germany which still rely on the transitional restrictions for worker mobility had typically announced even before the crisis that they anyway planned to uphold the restrictions until the final deadline in 2011 (and 2014 for Bulgaria and Romania).

Based on the arguments put forward so far, the following question naturally arises: will the economic crisis have any impact at all on worker mobility between the new and old member states? There are two main reasons suggesting that the crisis will in fact impact migration flows in the coming years.

- First, migration theory and the experience from previous business cycles demonstrate that changes in the economic situation in the destination countries influence migration in different ways compared to changes of a comparable size in the countries of departure. The reason is that migration is not only driven by the earnings differential, but also by job opportunities in the destination countries that translate into lower job search costs. These are in turn determined by the unemployment rate, as standard job search models indicate (see eg Damm and Rosholm, 2003). Since job opportunities in the EU15 are diminishing, so is the scope for migration. Moreover, migrants face a higher unemployment risk than natives. For a variety of reasons, including typically less seniority, occupational overrepresentation in cyclical sectors such as construction and possibly discrimination, migrants have a greater risk of being made redundant than natives as firms adjust employment in an economic downturn. Consequently, return migration stands to increase in the course of an economic down-turn even where a down-turn is simultaneously occurring in the sending country too. This has implications for the

adjustment of the enlarged EU to the economic crisis. While the adjustment of migration will reduce labour supply in the receiving countries relative to the no-crisis counterfactual and thus alleviate the economic shock in the receiving countries, the labour-market impact in the sending countries is aggravated in the short run.

- Second, it is simply not true that every country is hit equally hard both in a short-run and a long-run perspective. Countries with bursting real estate bubbles or a large financial sector are currently suffering from country-specific shocks that can to some extent be alleviated by migration. Key destinations for migrants from the new member states such as Ireland, the UK and Spain are more than proportionally affected in the EU15. Poland, from which the largest number of migrants arrived in the EU15 before the crisis, has been affected less so far, on the other hand. At the same time some new member states, especially Hungary and the Baltic states, are suffering severely from the consequences of the crisis and those countries that run double-digit current-account deficits will probably have to confront a slowdown in the catching-up process. Hence, we may expect increased migration from these countries in the medium term as a consequence of the present crisis.

In order to assess the two main channels above, we first look at available evidence on the effects of the crisis on migration in the EU15 using the example of Ireland and then estimate and simulate formal econometric models. In particular, we estimate a panel error correction model to explore how traditional determinants of migration and the economic cycle interact in influencing migration flows. We then set up growth and employment scenarios for the EU15 and the new member states and use these scenarios and the estimated panel error correction model to simulate future migration flows.

Our analysis confirms that both channels are significant. In the short run, the rapidly deteriorating job prospects for migrants in the receiving countries – Ireland and the UK in particular – are likely to depress the stocks of migrants below the level one would have expected without the crisis. In that sense, labour mobility can be said to act to some extent as a short-term buffer for the labour markets in the receiving countries while imposing some additional stress on the labour markets in sending countries.

In a medium-term perspective, however, there are two effects that need to be highlighted. The first one is relevant for all new member states while the second one is relevant for those countries that will face a slowdown in the catching-up process.

First, our simulation indicates that migration from all new member states will probably drop in the next few years but that the migration stock will revert in about a decade to our baseline. This implies that, while migration will be lower in the short run, migration will be larger in the medium term and will reach practically the same level of migrant stock.

Second, the new member states are expected to fare differently as a result of the crisis in the longer term. Four countries (the Czech Republic, Poland, Slovakia and Slovenia) might end up performing even better than the EU15, at least in the short run. By contrast, we argue that the economic crisis may slow down the catching-up process of at least the other six new member states. This could lead eventually to higher migration from the new member states overall to the EU15 than would have been expected without the crisis. In that sense, labour mobility insures the populations in the new member states that suffer most from the crisis against the possibility of lower-speed catch-up with the EU15.

While these effects are discernible in our simulation, they are relatively small compared to overall migrant stocks and flows. We conclude that there is little reason to be alarmed about labour mobility in the EU during the present crisis and that in certain ways labour mobility can indeed be expected to help cope with the fallout of the crisis despite the fact that the crisis is affecting all EU economies at the same time.

The remainder of this paper is structured as follows. In the second section, we briefly survey the literature on migration after the 2004 enlargement and discuss its macroeconomic impacts under EMU, using Ireland as an instructive example. The third section details an empirical regression we use to capture the drivers of migration within the EU, incorporating cyclical explanatory variables. The fourth section discusses the historical impact of EU enlargement on East-West migration flows. The fifth section develops and discusses different scenarios that capture growth and employment prospects in the EU15 and the new member states of eastern Europe. The sixth section provides the results of our simulations, predicting the likely impact of the current crisis on migration until 2020 on the basis of our migration regression and the various growth scenarios. Finally, section seven provides a brief summary of our findings.

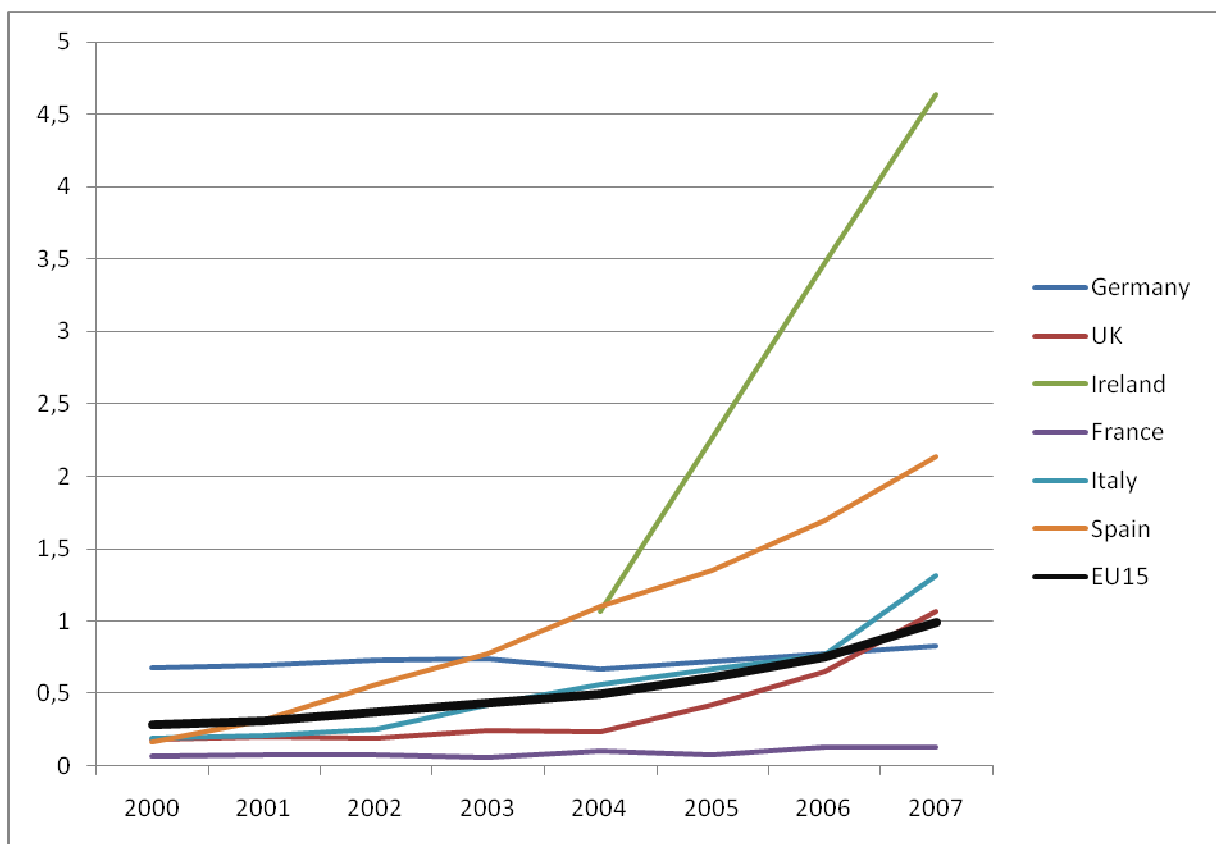
2. Migration in the enlarged EU

2.1. Migration trends and expectations

In the past decade there has been a rapid build-up in EU15 of immigration from the new member states of central and eastern Europe. To an important extent this occurred even before eight countries of central and eastern Europe (the NMS8) joined the EU on 1 May 2004, followed by Bulgaria and Romania on 1 January 2007, as can be seen in Figure 1.

Figure 1: Immigration from the 10 new member states of central and eastern Europe

(stock as a percentage of resident population)



Source: Brücker et al. (2009).

The various factors that led to marked differences in the build-up of immigrant stock in EU15 have been much discussed in the literature (see European Commission, 2008, and Brücker et al., 2009, for recent accounts). Clearly, the previously booming economies in Ireland, Spain, and the UK were particularly attractive to immigrants and these countries opened up their labour markets relatively early.² Also, geographic and cultural proximity played a role, for

² Sweden also opened up its labour market in 2004, but the more regulated labour markets, the higher language barrier, and the slightly less dynamic growth prospects meant that migration from the new member states to Sweden remained limited.

example in attracting many Romanians to Italy. Finally, some diversion was occurring. In particular, Germany and Austria have opted for a relatively restrictive immigration policy in recent years, albeit starting from a relatively high immigrant stock. This diverted many migrants from the new member states who then moved to geographically more distant destinations instead of Germany and Austria. Despite the rapid catching up of eastern Europe with the EU15, substantial net migration is set to continue for the time being, driven by the still-significant income differences.

Before the eastern enlargements of the EU in 2004 and 2007, there was considerable debate about the migration flows that this would spark under the EU's free movement of workers regime. Critics were fearful of massive migration flows from eastern Europe. In particular, there was a concern that these migrants would take away the jobs of natives and exploit generous welfare states in the EU15. These is why transition arrangements were introduced that allowed the old member states temporarily to restrict mobility for workers from eastern Europe for up to seven years after accession. In a number of receiving countries, these transition arrangements even remain in place today. At the same time advocates of free mobility argued that there would be huge economic gains to be reaped, but these arguments did not convince policymakers in some EU15 countries.

We know that migratory movements ended up being somewhat larger than some had predicted, in particular for Ireland and the UK, leading to some social tension in the process (see for example the Commission's Report on Five Years of Enlargement, 2009). Part of this difference can be explained by diversion effects since other natural destination countries such as Germany and Austria did not open up their labour markets at the same time. We know that the economic benefits have been substantial, with an estimated gain of 0.2 percent of EU-wide GDP. There is solid evidence to suggest that the arrival of migrants has sparked the creation of new jobs so that the fears that migrants would essentially take away the jobs of natives have not been confirmed. And the data show that the propensity for migrants from the new member states to rely on the welfare state in the receiving country has been rather small to date and much lower than the critics of labour mobility had feared.

2.2. Macroeconomic impact of migration under EMU

What we also know is that migration from the new member states has been a valuable lubricant for the euro area, which will be discussed in more detail in the remainder of this section.

The literature on the optimum currency area (OCA) has established that a high degree of factor mobility is needed to make it optimal for a country to give up its nominal exchange rate as an instrument of economic adjustment in the face of asymmetric shocks (Eichengreen, 1991). In theory, an economic boom in a member of a currency union puts upward pressure on real wages as the demand for labour rises. Immigrants, attracted by

improved employment prospects and higher wages, increase the supply of labour, thereby containing inflationary pressures. During a downturn, net outflows of non-nationals reduce the supply of labour, which eases the downward pressure on wages and softens the reduction in living standards for national residents.

However, as mentioned in the introduction, mobility has traditionally been much lower in the euro area than in, say, the United States. So the concern was that perhaps mobility within the euro area might not be sufficient for the euro to become a success. This is where migration from the new member states was key. By disproportionately moving into the boom countries of the euro area, the relative changes in population were as if greater mobility within the euro area had occurred. In that sense, immigration from outside is a very close substitute for mobility within for the purpose of the optimum currency area argument.

These macroeconomic benefits of migration from the new member states have been evident in the euro area in the past couple of years. Two of the fastest growing members of EMU over the past decade, Spain and Ireland, have also enjoyed the highest rates of inward migration. These migration flows alleviated inflationary pressures during the booms, thereby allowing more rapid and prolonged convergence of real GDP (Barrett and Duffy, 2008).

One complication that is normally not considered by traditional OCA theory, but that may have particular relevance during the recent boom in some countries, is the effect of migration flows on the non-traded goods sector. While this may seem a small omission, developments in the non-traded sector, and the housing sector in particular, may be significant in explaining the recent migration experience in countries such as Ireland and Spain. Instead of reducing prices, large inflows of migrants could in fact push up the price of non-traded goods, and real estate in particular. By affecting the dynamics of housing markets, migration may therefore have contributed to the booms and busts in housing markets witnessed in many countries over the past decade. The impact of migration on housing markets also gives rise to wealth effects associated with changes in house prices. While this caveat does not fundamentally call into question the beneficial impact of labour mobility, it does raise the issue of how governments should best respond to the build-up of real estate bubbles in a currency union (see Ahearne et al., 2008).

To explore further both the macroeconomic context of the recent immigration build-up and future dynamics of labour mobility in the crisis, we provide a case study of Ireland. Like Spain and the UK, Ireland experienced rapid economic growth, large immigration flows, and a property boom over recent years. Ireland is a particularly suitable example because of the rapid immigration build-up from eastern Europe in the recent past and because of the extremely rapid change in its economic outlook in the past year that occurred somewhat before the downturn in most other EU15 countries. Thus, the Irish experience may to some extent help to anticipate what will – in a somewhat milder form -- be the immigration impact of the crisis elsewhere. Moreover, unlike the UK, Ireland is a member of EMU, which adds another dimension to the country's experience.

2.3. Case study of Ireland

Ireland represents a potentially useful case study of an economy in a currency union with a very open labour market that has experienced large macroeconomic shocks. The Irish economy enjoyed extraordinarily rapid growth in real GDP, averaging roughly seven percent annually over the period 1994-2007. This performance saw living standards in Ireland converge rapidly to levels in other advanced countries, with real income per capita increasing from about 50 percent of the US level in the early 1990s to nearly 80 percent of the US level and well above the EU15 average a decade-and-a-half later. Growth was boosted by significant inflows of foreign direct investment which raised the country's stock of business capital and productivity. Membership of Economic and Monetary Union also spurred growth, reflecting the initial weakness of the euro versus other major currencies after the launch of EMU in 1999; the sharp drop in interest rates in Ireland as Irish interest rates converged to lower German rates in the run-up to EMU; and the greater access to wholesale funding that Irish banks enjoyed which facilitated a credit boom in Ireland.

The boom in Irish economy was associated with a remarkable turn-around in the flows of international migration in Ireland. A long history of large net outflows of migrants gave way to substantial net inward migration from the late 1990s. Inflows accelerated sharply in 2004 when the number of immigrants from eastern Europe grew substantially after EU enlargement.

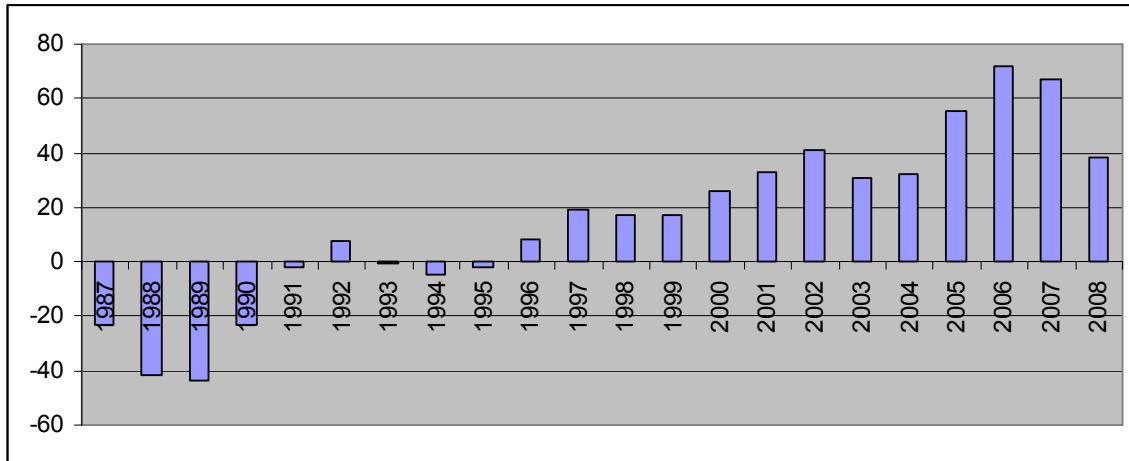
Growth slowed markedly in 2007 and the economic boom turned to bust in 2008. The turning of the housing cycle as the housing bubble burst triggered a severe contraction in economic activity, a collapse of housing-related tax revenues, an accompanying rapid deterioration in public finances and a marked reduction in the stability of the banking system. Employment has begun to shrink at an alarming rate and unemployment has soared at an unprecedented pace. The international credit crisis compounded these problems by adding to the stress on the banks, by pushing many of Ireland's largest trading partners into recession and by precipitating a sharp rise in the value of the euro against sterling and the dollar. Although data on migration flows during the ongoing bust period are not yet available, this section examines recently released labour market data and some anecdotal information in an attempt to shed light on how the economic adjustment now underway in the Irish economy is affecting migrants – and how that adjustment process is being affected by possible changes in the pattern of migration.

2.3.1. Migration flows during the boom

During the boom, Ireland experienced a dramatic swing from average annual net outward migration of about 40,000 in the late 1980s when the Irish economy was still suffering from a decade-long slump and high levels of unemployment (Figure 2). Net inward migration of

between 20,000-40,000 (equivalent to 0.5-1.0 percent of the population) was recorded annually over the period 2000-2004. Following the accession of the new EU member states in 2004, net inward migration jumped and peaked at 72,000 in 2006.

Figure 2: Ireland – Estimated population migration (thousands)



Source: CSO. Data for 2007 and 2008 are ESRI estimates.

Data for net migration from the EU accession states are only available from 2005. Those data show that in 2005 the accession states accounted for 60 percent of Ireland’s total net migration. That share increased in 2006 and 2007 so that roughly two-thirds of net migration came from accession states in those years.

In terms of employment by sector, workers from the new accession states are disproportionately represented in manufactured industries, hotels and restaurants and construction compared with Irish nationals and national from EU15 countries (Table 1). Workers from the new accession states are underrepresented in banking and finance and in the public sector.

Table 1: Ireland – Distribution of workers by industrial group and nationality (percent)

Industrial Group	Irish nationals	UK	EU15 (excl. Irl. & UK)	NMS10	Rest of world
Agriculture, forestry and fishing	5.3	2.1	1.6	3.9	2.0
Mining, quarrying and turf production	0.4	0.4	0.1	0.4	0.2
Manufacturing industries	13.1	13.8	14.9	21.4	11.7
Electricity, gas and water supply	0.7	0.4	0.5	0.2	0.2
Construction	11.7	11.6	4.4	20.8	8.3
Wholesale and retail trade	14.4	15.3	9.7	17.0	11.7
Hotels and restaurants	4.3	6.2	14.2	16.5	17.0
Transport, storage and communications	6.1	5.7	7.0	3.7	3.6
Banking and financial services	5.0	4.6	6.4	0.9	2.8
Business activities	9.6	12.8	24.3	9.0	12.9
Public administration and defence	6.3	2.4	1.5	0.2	1.4
Education	7.7	6.6	6.1	0.6	3.1
Health and social work	10.8	11.8	5.7	2.4	20.8
Other community, social	4.5	6.1	3.7	3.1	4.3
	100	100	100	100	100

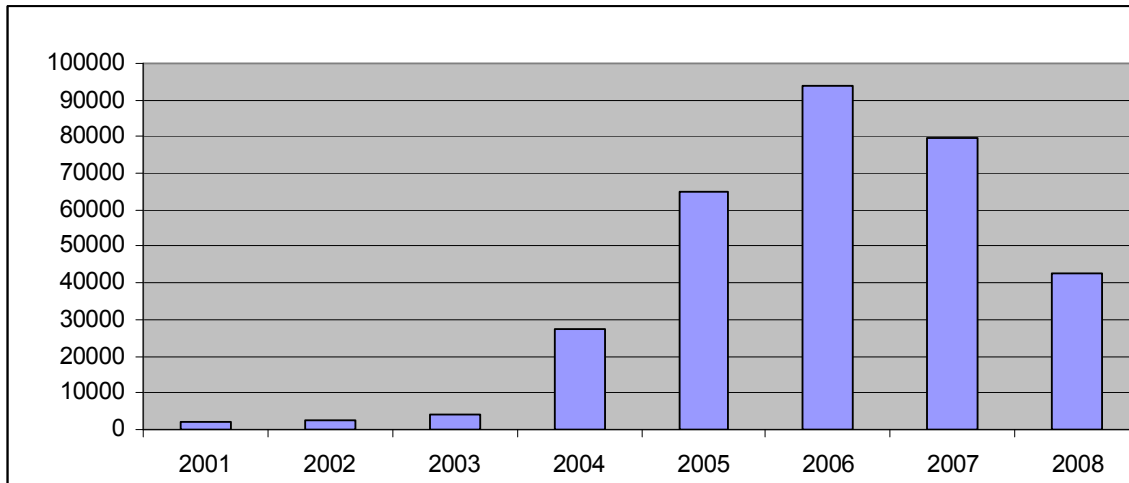
Note: NMS 10 refers to the 10 countries that joined the EU in 2004.

Source: Central Statistics Office, Ireland.

2.3.2. Labour market adjustment during the bust: locals versus migrants

Data for migration flows for 2008 are not yet available. As shown previously, the Economic and Social Research Institute (ESRI) estimate that net migration declined to 38,500 in 2008 from 67,000 in 2007. The fall reflects an easing in gross inward migration from 110,000 to 84,000. The slowing in inward migration occurred against a backdrop of a 0.5 percent fall in total employment and an increase in the unemployment rate from 4.5 percent in 2007 to 6.5 percent in 2008. The estimates for migration are consistent with data on registrations for work. All employees in Ireland require a Personal Public Service (PPS) number. Figures show that 33,200 people from the EU accession states were granted PPS numbers between July and December 2008, a fall of 47 per cent on the same period in 2007. The trend was particularly striking among Polish migrants, with their take-up of PPS numbers falling by 53 per cent in the second half of 2008. For the year as a whole, the number of Poles registering was down by one-half from the year before (Figure 3). Fewer Poles registered in December 2008 than in any month since their country joined the EU in May 2004.

Figure 3: Ireland – Worker registrations from Poland



Source: Department of Social and Family Affairs

Net migration is expected to turn negative in 2009, marking the first net outflow since 1995. The ESRI is forecasting net outward migration of 50,000, compared with a projected drop in total employment of about 120,000 to below 2 million by the end of the year. In addition to migration, this fall in employment will be reflected in changes in unemployment and labour force participation.

Evidence about the role of migrants in the ongoing adjustment in Ireland's labour market is provided by data on claims for unemployment insurance (UI). In the year to January 2009, the number of people claiming UI jumped roughly 80 percent to nearly 328,000 claimants. Table 2 shows how the overall rise in UI claimants breaks down between Irish nationals and non-Irish nationals, as well as the breakdown of non-Irish nationals by nationality. In January 2009 there were 263,527 Irish nationals and 64,334 non-Irish nationals claiming UI. Compared with the same month a year earlier, the number of Irish national claimants had risen 71 percent, while the corresponding annual increase for non-Irish nationals was 143 percent. Among non-Irish nationals the largest number of claimants were nationals from the EU accession states (35,826) while the smallest number were from the EU15 states outside Ireland and the UK (3,651).

Table 2: Ireland – Nationality of persons claiming unemployment insurance

	(1)	(2)	(3)	(4)	(5)= (1)+(2)+(3)+(4)	(6)	(7)=(5)+(6)
	UK	EU 15 excl. Irl. and UK	NMS10	Other nationals	Non-Irish nationals	Irish nationals	Total
January 2007	7,545	1,517	4,198	5,882	19,142	139,610	158,752
February	7,569	1,527	4,696	5,890	19,682	139,717	159,399
March	7,483	1,447	5,242	5,678	19,850	136,019	155,869
April	7,401	1,458	5,386	5,593	19,838	134,481	154,319
May	7,367	1,462	5,506	5,743	20,078	133,932	154,010
June	7,841	1,567	5,860	6,453	21,721	144,642	166,363
July	8,137	1,614	6,139	6,601	22,491	152,103	174,594
August	8,246	1,640	6,544	6,627	23,057	151,149	174,206
September	7,732	1,497	6,326	5,902	21,457	138,994	160,451
October	7,612	1,473	6,542	5,408	21,035	136,414	157,449
November	7,851	1,516	7,433	5,439	22,239	139,483	161,722
December	8,150	1,610	7,934	5,540	23,234	147,142	170,376
January 2008	8,756	1,759	10,064	5,909	26,488	154,961	181,449
February	9,073	1,858	12,545	6,247	29,723	159,762	189,485
March	9,349	1,959	13,403	6,408	31,119	166,873	197,992
April	9,401	1,921	14,166	6,483	31,971	163,627	195,598
May	9,600	1,945	14,738	6,996	33,279	168,477	201,756
June	10,268	2,146	15,623	7,831	35,868	184,943	220,811
July	10,969	2,327	16,953	8,215	38,464	199,776	238,240
August	11,426	2,446	18,581	8,648	41,101	206,283	247,384
September	11,186	2,419	19,381	8,228	41,214	199,003	240,217
October	11,584	2,654	22,285	8,077	44,600	207,351	251,951
November	12,372	2,902	26,089	8,513	49,876	218,710	268,586
December	13,279	3,211	28,950	9,015	54,455	236,908	291,363
January 2009	14,807	3,651	35,826	10,050	64,334	263,527	327,861

Note: NMS 10 refers to the 10 countries that joined the EU in 2004.

Source: Central Statistics Office, Live Register for January 2009.

The share of non-Irish nationals among all persons claiming UL rose to nearly 20 percent in January 2009 from 12 percent in the same month two years earlier. Non-Irish nationals are overrepresented as UI claimants compared to their share of the labour force. Estimates from the Quarterly National Household Survey for June to August 2008 show that non-Irish nationals represented an estimated 16 percent of all persons in the labour force aged between 17 and 65 years (the relevant age range for claiming UI). In other words, the probability of non-Irish nationals losing their jobs and becoming an UI claimant would appear to be markedly higher than for Irish nationals.

While these Irish data may to some extent be influenced by the rapidly contracting Irish construction section, the Irish experience suggests two ways in which migrants are acting as

a buffer to reduce the impact of the economic shock on the native workforce. First, the fact that foreign workers are more likely to lose their job than Irish workers implies that Irish workers have to bear a less-than-proportional part of the labour market adjustment in the crisis. Second, as reflected in the ESRI forecast of net negative migration in 2009, the rapidly deteriorating job prospects for foreign workers is inducing many of them to return home despite the fact that Irish wages continue to be much higher than those in the source country.

3. The cyclical nature of migration: a panel regression model

The Irish case study presented in the previous section allowed us to draw some tentative conclusions about the cyclical nature of migration in a particular country. In this section we aim to estimate formal econometric models for a wide panel of countries to explore how traditional determinants of migration and the economic cycle interact in influencing migration flows. Using this framework, we will in later sections of our paper present scenarios of future migration flows and simulate the effects of the current crisis on migration from the new member states to the EU15.

3.1. The model: theoretical background and the long-run migration function

Following the literature on macroeconomic migration functions, we apply a parsimonious specification of the migration model for our empirical analysis. The theoretical approach follows the temporary migration framework with heterogeneous agents originally developed by Brücker and Schröder (2006). Individuals have the choice to stay at home or to move for a certain period of their life time (or their entire life) to another country. They choose the length of the stay in the foreign country such that they maximise utility over their life time. The utility of individuals depends on their earnings in the respective locations, but also on non-monetary factors such as social relations, cultural links, etc. At a given difference in the net present value of earnings, the time spent abroad depends on the weight individuals assign to monetary earnings and to the non-pecuniary factors relevant for their utility in the respective locations (for similar models see Djajic and Milbourne, 1986, and Dustmann and Kirchkamp, 2002). Under the assumption that these preferences are not uniform across individuals, an equilibrium relationship between migration stocks and the difference in income levels between the host and the home country emerges. At this equilibrium, the gross emigration rate and the gross return migration rate are equal, such that net migration ceases (Brücker and Schröder, 2006).

The long-run macro migration function is specified in the following form:

$$m_{i,EU15,t}^* = b_1 y_{EU15,t} + b_2 y_{i,t} + b_3 e_{EU15,t} + b_4 e_{i,t} + \boldsymbol{\eta}' \mathbf{x}_{EU15,i,t} + \varepsilon_{i,EU15,t} \quad (1)$$

where $m_{i,EU15,t}^*$ denotes the long-run or equilibrium share of migrants residing in the EU15 population from sending country i (we will shortly discuss the rationale behind modelling the migration stock in the EU15 and not in individual receiving countries), $y_{EU15,t}$ and $y_{i,t}$ the natural log of the wage rate in the destination and the sending country, $e_{EU15,t}$ and $e_{i,t}$ the natural log of the employment rate in the EU15 and the sending countries, $\mathbf{x}_{i,EU15,t}$ a vector of institutional variables, which capture migration conditions between sending country i and the EU15, $\boldsymbol{\eta}$ the corresponding vector of coefficients, and $\varepsilon_{i,EU15,t}$ is the error term. Finally, the subscript $EU15$ denotes the EU15, i the index of sending countries and t the time index. The wage rate is approximated by the GDP per capita expressed in euros (and ECUs before 1999) at current exchange rates but in 2000 prices, and the employment rate is defined as $e_{j,t} = \ln(1 - u_{j,t})$, ie as the natural logarithm of one minus the unemployment rate in country j . As institutional variables we consider dummy variables for the 2004 EU enlargement, a guest worker dummy which captures bilateral migration agreements between Spain and Italy on the one hand and Bulgaria and Romania on the other hand, for migration restrictions vis-à-vis non-EU countries, for the emigration restrictions during the regimes of the Iron Curtain for the countries of the former communist bloc, and for the civil war in former Yugoslavia.

The variables of the model are derived from the standard human capital model, ie the utility is determined by expectations about income levels, which are in turn conditioned by employment opportunities. Utility is concave in (expected) earnings, which implicitly accounts for the fact that other, non-monetary arguments enter the utility function. Individuals are risk averse, but uncertainty focuses on employment opportunities. Hence, it is expected that the coefficient for the employment rate in the receiving country is larger than the coefficient for the employment rate in the home country (Hatton, 1995).

Choosing the migration *stock* instead of the migration *flow* as the dependent variable on the left-hand side of equation (1) has important implications for migration forecasts. While standard models based on the assumption of a representative agent predict that migration flows continue until the income difference meets a certain threshold level where the difference in net earnings equals migration costs, models with heterogeneous agents predict that net migration ceases when migration stocks have achieved their equilibrium levels, even if income differences are high and persistent. The latter way to model the macro migration function helps to understand why the EU's southern enlargement did not trigger any migration flows although income differences were considerable: the migration stocks which had been accumulated before enlargement were already at, or even above, their equilibrium levels. In contrast, in the case of the EU's eastern enlargement, larger migration flows were to be expected since the Iron Curtain and immigration restrictions applied in the receiving countries prevented migration stocks being close to their equilibrium levels before enlargement.

3.2. Modelling the adjustment to the business cycle

Equation (1) captures the long-run equilibrium of migration stocks as determined by the long-run values of the explanatory variables. The short-term dynamics of the model depends on the formation of expectations and adjustment costs. A flexible way to model the short-term dynamics is an error-correction mechanism (ECM), which is compatible with different theories on the formation of expectations and adjustment under uncertainty about the future (see eg Hatton, 1995, for a formal derivation of an ECM from a rational-expectations model in the migration context). This enables us to model both the adjustment of the migration stock to fluctuations of the income and employment variables in the course of the business cycle as well as the long-run equilibrium level in one equation.

The error-correction model which forms the basis of our estimates has the form

$$\begin{aligned} \Delta m_{i,EU15,t} = & \beta_1 m_{i,EU15,t-1} + \beta_2 \Delta m_{i,EU15,t-1} + \beta_3 y_{EU5,t-1} + \beta_4 \Delta y_{EU5,t-1} + \beta_5 y_{i,t-1} + \beta_6 \Delta y_{i,t} + \\ & + \beta_7 e_{EU5,t-1} + \beta_8 \Delta e_{EU5,t-1} + \beta_9 e_{i,t-1} + \beta_{10} \Delta e_{i,t} + \eta' x_{i,EU15,t-1} + \delta' \Delta x_{i,EU15,t} + v_{i,EU15,t} \end{aligned} \quad (2)$$

where Δ denotes the first-difference operator and $v_{i,EU-15,t}$ the error term. The error term is specified here as a one-way error component model with country-specific fixed effects. Note that standard fixed-effects estimators have proved to provide smaller forecasting errors in the migration context than pooled estimators and more sophisticated GMM and heterogeneous estimation techniques (Brücker/Siliverstovs, 2006a, 2006b). Moreover, we allowed for residual autocorrelation and adopted a heteroscedasticity robust covariance matrix.

While the long-run equilibrium stock of migrants is determined by income levels and employment rate levels in the EU15 and the sending countries, the short-run dynamics of the migration flows depend on changes in these variables. Business-cycle effects and economic shocks are thus captured by the change in incomes and the change in the employment rate. Note that inclusion of the variables of destination and of sending countries separately enables us to identify the different impact of the fluctuation of economic variables in receiving and sending countries.

3.3. Dealing with third-country effects and migration diversion

Almost all migration models tempt to explain bilateral migration movements between receiving and sending countries by a set of bilateral variables. Explicitly or implicitly these models ignore migration conditions in third countries. Technically this is called the 'irrelevance of independent alternatives' (IIA) assumption, ie that the choice of one destination does not depend on other destinations. This assumption is particularly problematic in the eastern enlargement context. The fact that key destination countries such as Germany and Austria have maintained their immigration restrictions while the UK and

Ireland have opened their labour markets has certainly triggered additional immigration flows to the latter destinations. Similarly, changing economic or social conditions in one destination may also affect the scale of migration to other destinations. However, if the ‘irrelevance of independent alternatives’ assumption is violated, we obtain biased results.

Considering all potential alternatives is, however, hardly possible in a migration model. We have thus chosen a simplified approach. Instead of estimating the model in equation (2) for bilateral country pairs, we estimate migration from a number of destinations into the entire EU15, assuming that the choice to move to the EU15 is independent from other possible destinations. Since the overwhelming share of the migrants from the NMS (new member states) and the other countries included in the sample moves to the EU15, ignoring other destinations does not seem to be too restrictive. By treating the EU15 as a single destination country we circumvent the IIA problem and should obtain consistent estimates of the parameters, as long as other alternative destinations outside the EU do not affect the scale of migration into the EU15, and as long the EU15 countries are relatively homogeneous in their characteristics such that a change in the regional structure of migration within the EU does not significantly affect overall migration into the EU15.

3.4. Data

Our sample consists of 28 sending countries during the period 1983 to 2006: the ‘old’ EU member states with the exception of Luxembourg (14), the then new member states from central and eastern Europe, former Yugoslavia, Morocco, Tunisia, and Turkey. This sample thus covers - with the exception of the Commonwealth of Independent States (CIS) countries - the entire European continent and some main sending countries at the European periphery. The EU15 is the main destination for migrants from these countries such that the assumption of the irrelevance of independent alternatives is not too onerous. For this reason we have excluded the CIS countries from the sample, since ethnic disentangling plays an important role there. Other destinations such as Russia are important alternatives to the EU15 in case of the CIS. Altogether, our sample covers more than 80 per cent of the immigrants residing in the EU15. Due to data limitations, the panel is not balanced. We can include only those sending countries for which (almost) the entire EU15 report migration stocks and hence we could not cover the entire time period for all sending countries. In particular, data for the new member states starts in the mid 1990s only.

The data on migration stocks are derived from the statistics of the EU15 destination countries. Whenever possible, we have used the national population statistics, and the Eurostat Labour Force Survey in the remaining cases. However, in order to avoid structural breaks we rely only on one data source for a given destination. These data have then been aggregated to calculate the number of migrants in the EU15. Since national data sources and nationality concepts differ across the EU, some measurement error is unavoidable.

As an approximation of average earnings we have used GDP per capita. We employed in our regressions GDP per capita both at purchasing power parities and at current exchange rates (both were included at constant 2000 prices and the available US dollar figures were converted to euros). Since the estimation results of the income variable at current exchange rates has turned out to be better than those for income measured at purchasing power parities, we decided to use GDP per capita at current exchange rates in the regressions presented here. Note that GDP at current exchange rates affects migration decisions particularly in the case of temporary migration, since a part of the income is consumed in home countries. Moreover, measurement error for GDP per capita at current exchange rates is likely to be smaller compared to purchasing power parity estimates. GDP per capita at current exchange rates was taken from the World Development Indicators (World Bank, 2008), while GDP per capita at purchasing power parity was derived from the series provided by Angus Maddison and the University of Groningen, which was extrapolated from the World Bank series. This data is available in US dollars, but in order to exclude the euro/dollar exchange rate swings from the GDP per capita at current exchange rate series, we converted them to euro using Eurostat euro and ECU exchange rates against the dollar.

For the calculation of employment rates we used the standardised unemployment rates (ILO norm) provided by Eurostat, plus national statistical sources in some cases. The population figures have been taken from Eurostat.

The institutional variables are defined as follows: $NMS8_{it}$ is a dummy variable which has a value of 1 starting in 2004 for the 8 eastern European countries that joined the EU in that year and of zero otherwise; $GUEST_{it}$ is a dummy variable which has a value of 1 if migration from Bulgaria and Romania is facilitated by bilateral guestworker agreements and of zero otherwise;³ $RESTRICT_{it}$ is a dummy variable which has a value of 1 if the country does not participate in the free movement of the EU and the EEA and if immigration is not facilitated either by transitional arrangements for the free movement or by guestworker agreements; $IRON_{it}$ is a dummy variable which has a value of 1 if emigration is effectively hindered by the Iron Curtain regimes and of zero otherwise.

Several aspects are important to note in this context. The institutional variables considered here are of course only rough approximations of the institutional conditions in the EU15. For example, we are not able to capture changes in the application of the transitional arrangements during 2004-2007 in individual EU member states, ie countries which decided to open their labour markets during the course of the sample period. This would require including a dummy variable and the respective interaction dummy variables for each year since 2004, which would in turn make any identification impossible. A similar argument applies for changes of immigration policies of the EU15 vis-à-vis Bulgaria and Romania during the phase which we characterise here as influenced by bilateral migration agreements.

³ This holds for Bulgaria and Romania in the years from 1998 until the end of the sample period. The traditional source countries of guestworker recruitment in the EU such as Spain, Portugal and Turkey were not subject to such agreements during the sample period.

However, in our view these changes in immigration policies during the 2004-2007 period did not affect migration flows from the NMS8 and the NMS2 much, such that our identification strategy captures the main changes in the immigration regimes of the EU15 during the sample period. A more detailed consideration of the institutional regimes would require estimating the model as a panel of destination and sending countries, which would in turn run into the difficulty of employing the irrelevance of independent alternatives assumption. This would yield extremely biased results if migration in one EU15 country is affected in one way or another by the immigration policies of other EU15 countries, which in our view is certainly the case in the context of the EU's eastern enlargement.

3.5. Estimation Results

The estimation results are shown in Table 3.

Table 3: Estimation results for the panel error correction model

	unconstrained model	constrained model
$m_{i,EU15,t-1}$	-0.1389 (0.0836)	-0.1434 (0.0843)
$\Delta m_{i,EU15,t-1}$	-0.3684 (0.1421)	-0.3731 (0.1398)
$y_{EU15,t-1}$	0.0034 (0.0015)	0.0023 (0.0012)
$y_{i,t-1}$	-0.0024 (0.0013)	-0.0017 (0.0011)
$\Delta y_{EU15,t}$	0.0156 (0.0097)	0.0124 (0.0073)
$\Delta y_{i,t}$	-0.0023 (0.0015)	0
$e_{EU15,t-1}$	0.0189 (0.0129)	0.0232 (0.0124)
$e_{i,t-1}$	-0.0089 (0.0049)	-0.0084 (0.0045)
$\Delta e_{EU15,t-1}$	-0.0027 (0.0242)	0
$\Delta e_{i,t-1}$	-0.0010 (0.0074)	0
R2	0.40	0.39
No. obs.	472	475
χ^2 -fixed effects	44.45	42.79
P	(0.019)	(0.027)

Note: The estimated model is described in equation (2) and also includes the lagged values and current period changes of dummies for various migration regimes as described in the main text and fixed effects. Residual autocorrelation is allowed and a heteroskedasticity robust covariance matrix was adopted. ' χ^2 -fixed effects' is a likelihood ratio test for redundant fixed effects.

With the exception of the highly insignificant parameter of $\Delta e_{EU15,t-1}$, all other parameters had the sign one would expect from first principles. Furthermore, most of the parameters were significant with the exception of $\Delta e_{EU15,t-1}$, $\Delta e_{i,t-1}$ and $\Delta y_{i,t}$. These three variables were hence dropped altogether from the final specification and the model was re-estimated, which is shown in the second column of Table 3.

The results show that EU15 variables have larger parameters in absolute terms than variables of the sending countries (even though the sum of the two coefficients is typically not significantly different from zero), indicating that the economic situation in the EU15 plays a crucial role in migration decisions. Among the short-run effects, the change in EU15 income is itself a significant determinant, but not the change in income in the sending countries, nor the change in employment. However, through the error-correction mechanism, the deviation from the long-run equilibrium matters in the short run and hence employment conditions are also determinants of short-run changes in migration.

4. The effect of the 2004 EU enlargement on migration

It is a widely held view that the 2004 EU enlargement led to a massive rise in migration from the new member states to the EU15 and especially to the UK and Ireland. Both opened up their labour markets at that time. However, even before the 2004 enlargement there was already a large and growing stock of migrants from these countries in the EU and it is reasonable to assume that without enlargement migration would have increased further.

We can use the estimated model of the previous section to assess the effect of enlargement on migration. This obviously relates to the eight countries that joined in 2004 (NMS8). For Bulgaria and Romania (NMS2) the related question is the effect of the guest worker agreement.

To this end we run two simulations. First, we dynamically simulate the model for 2004-2006 using the (unaltered) explanatory variables to have a benchmark prediction for migration, conditional on the model and the explanatory variables. Next, we run a counterfactual dynamic simulation in which we have set the EU enlargement (for NMS8) and guest worker agreement (for the NMS2) dummies to zero for 2004-2006. The difference between the two simulations indicates the effect of EU enlargement (for the NMS8) and the guest worker agreement (for the NMS2) on migration from these countries to the EU15.

Table 4 below shows our simulation results, and we also included the actual change in the migrant stock in the EU15. The table confirms that the 2004 EU enlargement indeed substantially boosted migration according to our model estimations. The guest worker agreement for Bulgaria and Romania also had a sizeable effect on migration. Migration in excess of the model's enlargement effect can be attributed basically to two broad factors:

(1) the weaknesses of the model (eg possible misspecification, estimation errors, data problems, etc.), (2) the effect of included variables (ie income differences, employment opportunities) that would have attracted migrants from the new member states even without enlargement.

Table 4: The effect of the 2004 EU enlargement and guest workers agreement on migration

	NMS8		NMS2	
	Model: the cumulative effect of the 2004 EU enlargement on migration stock in the EU15	Actual cumulative change in the stock of migrants in the EU15 compared to 2003	Model: the cumulative effect of the guest worker agreement on migration stock in the EU15 since 2003	Actual cumulative change in the stock of migrants in the EU15 compared to 2003
2004	197,442	144,542	198,542	266,703
2005	424,700	427,119	389,676	458,340
2006	607,983	807,764	554,570	647,427

Source: Authors' calculation.

According to the findings presented in Table 4, the 2004 EU enlargement can explain roughly three quarters of the historically observed increase in immigrant stock in the EU15. In other words, we estimate that, without enlargement, the migration flows would have been 75 percent lower during the period under consideration, namely 2004-2006. The impact of the guest worker agreements for Bulgaria and, more importantly, Romania is estimated to be even more significant, explaining about 80 percent of the observed migration flows since 2003. These results strongly underline the positive effects of EU enlargement on migration.

5. Growth and employment scenarios

In order to be able to use the estimated model of Section 3 for assessing the impact of the present economic crisis on migration, we need to establish scenarios for future growth and labour market developments in the EU which is the purpose of this section.

We would like to emphasize that our aim is *not* to provide forecasts for economic growth and employment. Our goal is to set up hypothetical medium term scenarios that can be used to assess the prospects for medium term migration flows. Due to the large degree of uncertainty of possible medium term economic developments, we present clearly our assumptions and derive alternative scenarios.

5.1. The effect of the crisis on catching-up prospects

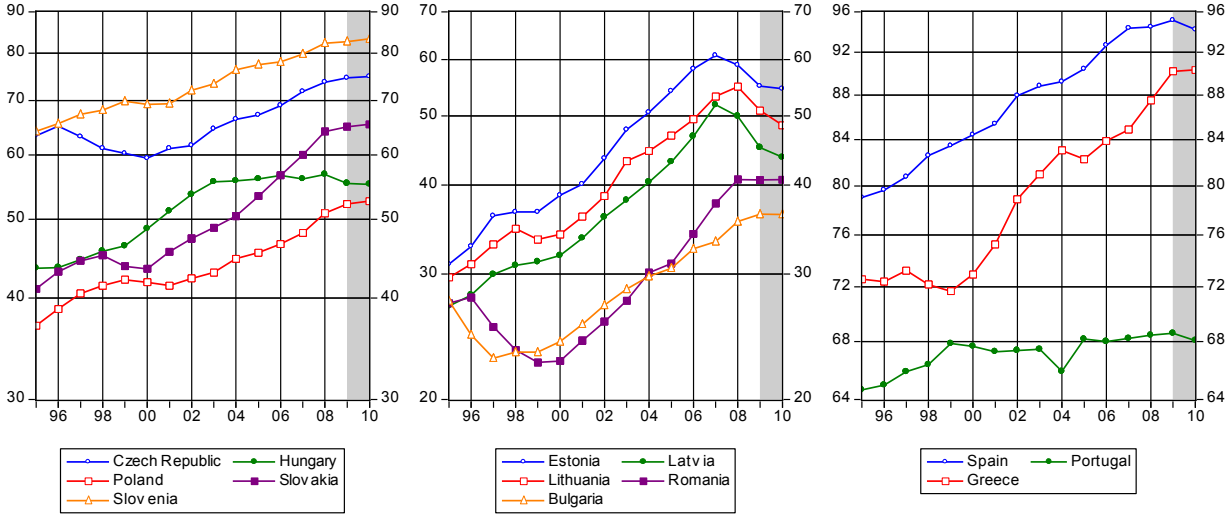
Before the crisis, ie up to 2007, the catching-up process of the new member states seemed to be fast and reasonably smooth. Some countries had built up various vulnerabilities, such as huge credit and housing booms (eg the Baltic countries, Bulgaria and Romania) and

consequently high current account deficits and external debt, and it was widely expected that these vulnerabilities must be corrected at some point in time. However, the actual magnitude of the corrections, as also reflected by the fall in GDP, were amplified by the global financial and economic crisis. Figure 4 indicates that the real GDP catch-up compared to EU15 reversed in the Baltic countries and in Hungary and slowed down in all other countries. Bulgaria and Romania are particularly at risk because of their huge current-account deficits and external debts and their bursting housing bubbles.⁴

Consequently, the new member states can be divided into two main groups:

- Group 1 - Less affected/vulnerable countries: Czech Republic, Poland, Slovakia and Slovenia.
- Group2 – More affected/vulnerable countries: Bulgaria, Estonia, Hungary⁵, Latvia, Lithuania and Romania.

Figure 4: GDP per capita in purchasing power standards (EU15 = 100), 1995-2010



Note: Values for 2009-2010 were calculated by using the April 2009 GDP growth forecasts of the European Commission’s DG ECFIN. Source: Eurostat, DG ECFIN, Bruegel.

⁴ See Darvas and Szapáry (2008) for a detailed analysis of macroeconomic developments and vulnerabilities in the new EU member states.

⁵ Hungary did not have a double-digit current account deficit and the housing boom was also much less marked than in the other five highly vulnerable countries. However, Hungary had the highest general government debt to GDP ratio and a long history of irresponsible fiscal policy as well as severe structural weaknesses (high tax rates and government expenditures, inefficient and wasteful social systems, etc). For these reasons growth slowed down in Hungary well before the crisis and the country was the first in Europe one to ask for IMF help. For these reasons we put Hungary in the group of more vulnerable countries.

Table 5 indicates that there were substantial downward revisions in economic growth forecasts from October 2007 to April 2009 in all countries including the EU15. Our regression results in Section 3 indicated that economic conditions in the EU15 probably had a bigger effect on migration than economic conditions in the new member states. Consequently, even in the case of a parallel slowdown of similar magnitude, migration would probably still have decreased.

Table 5: GDP growth forecasts made in October 2007 and April 2009 by DG ECFIN

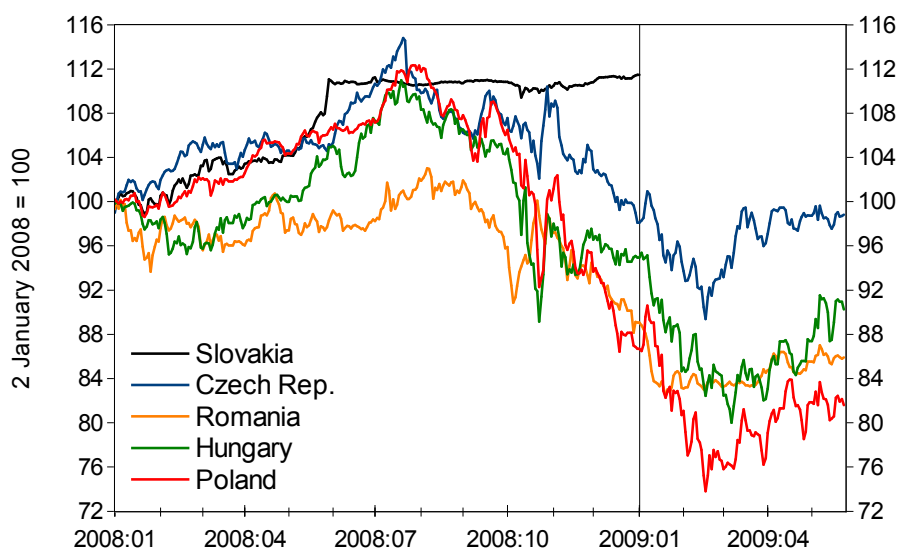
	2003	2004	2005	2006	October 2007 forecasts			Actual		April 2009 forecasts	
					2007	2008	2009	2007	2008	2009	2010
Bulgaria	5	6.6	6.2	6.1	6.3	6.0	6.2	6.2	6.0	-1.6	0.1
Czech Rep.	3.6	4.5	6.4	6.4	5.8	5.0	4.9	6.0	4.4	-2.7	0.3
Estonia	7.2	8.3	10.2	11.2	7.8	6.4	6.2	6.3	-3.6	-10.3	-0.8
Hungary	4.2	4.8	4.1	3.9	2.0	2.6	3.4	1.1	0.5	-6.3	-0.3
Latvia	7.2	8.7	10.6	11.9	10.5	7.2	6.2	10.0	-4.6	-13.1	-3.2
Lithuania	10.3	7.3	7.9	7.7	8.5	7.5	6.3	8.9	3.1	-11.0	-4.7
Poland	3.9	5.3	3.6	6.1	6.5	5.6	5.2	6.6	4.8	-1.4	0.8
Romania	5.2	8.5	4.1	7.7	6.0	5.9	5.8	6.2	7.1	-4.0	0.0
Slovenia	2.8	4.4	4.1	5.7	6.0	4.6	4.0	6.8	3.5	-2.6	0.7
Slovakia	4.2	5.4	6	8.3	8.7	7.0	6.2	10.4	6.4	-3.4	0.7
EU15	1.2	2.3	1.6	2.9	2.7	2.2	2.2	2.6	0.8	-3.9	0.0

Note: Forecast for the EU15 is a weighted average of forecasts for the euro area, UK, Denmark and Sweden.

Source: October 2007 and April 2009 forecasts are from the DG ECFIN of the European Commission; actual data is from the Eurostat.

On the other hand, countries with floating exchange rates experienced depreciations, even countries such as Poland which did not have obvious major vulnerabilities. The Czech Republic, the least vulnerable non-euro area CEE country (very low share of foreign currency loans and low government debt) also experienced exchange-rate depreciation, especially after the disastrous industrial production figures for late 2008 were revealed (see Figure 6). It is difficult to assess whether exchange-rate depreciations reflect natural corrections of previous strong appreciation trends or go beyond that. However, the co-ordinated statements of the Czech, Hungarian, Polish and Romanian central banks of 23 February 2009 suggest that the macroeconomic situation of these countries does not justify such a major weakening of their exchange rates.

Figure 5: Nominal exchange rates against the euro, 2 January 2008 – 25 May 2009



Source: ECB.

Any fall in GDP per capita at PPS relative to the EU15 increases the real income gap that can drive migration. But the observed currency depreciations also increase the incentive to migrate. The reason is that migrants consume part of their income in their home country, so nominal income differences also matter for the migration decision.

Hence, the crisis rewrites effective income differences between the EU15 and most of those new member states that are not yet members of the euro area. As discussed earlier, migration can generally be expected to slow down when growth in the host country slows down in the cyclical down-turn. However, the prospect of damage to the catching-up mechanism in most of the new member states stands to increase the medium-term prospects for migration.

In order to quantify the possible change in migration potential due to the crisis, we proceed in two steps. First, we quantify the likely change in the catching-up prospects due to the crisis, and second, we relate the change in catching-up prospects to migration.

5.2. Overview of the scenarios

The scenarios we present are illustrative. Although there is a widespread consensus that economic catching-up of the new member states will probably continue (see eg European Commission, 2009), there are a lot of uncertainties regarding the speed with which this is likely to occur. The same applies to old member states of the EU, as the right-hand panel of Figure 4 indicated. The previously successful catching-up process of Portugal halted after euro-area entry and that of Spain reversed after the recent bursting of the real-estate

bubble. Endogenous growth theories suggest that each country has a specific anchor which secures its convergence path, which is determined by various social, economic and institutional factors. This anchor is not necessarily equal to the average of advanced economies. We do not aim to determine the long-run anchor, partly because it depends on future policies as well, but aim to set up scenarios that we regard as broadly plausible.

We first set up a 'pre-crisis' scenario using information available in 2007 that will form the basis of a comparison with 'crisis' scenarios, for which we create two ones.

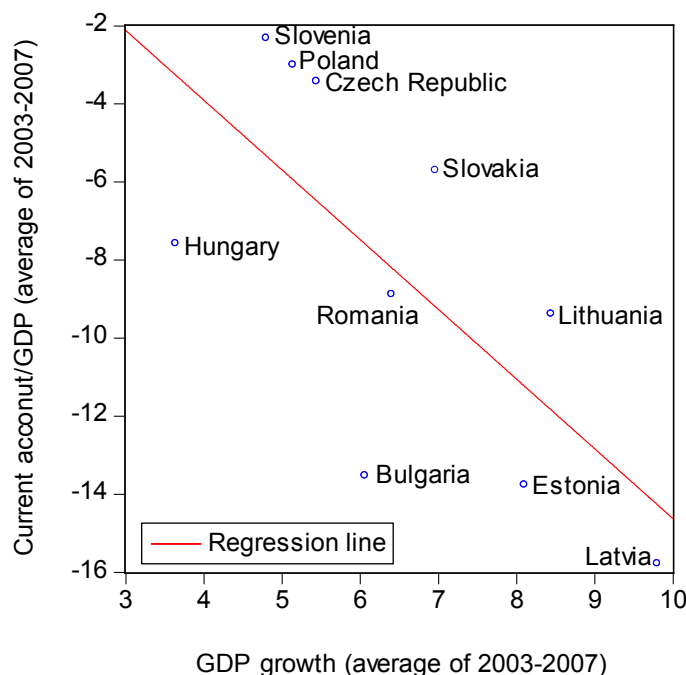
The *'pre-crisis' scenario* is based on actual data up to 2006 and the October 2007 forecast of DG ECFIN which includes forecasted values for 2007-2009. Hence, our scenarios are relate to 2010 and beyond.

The *'crisis' scenarios* are based on the available forecasts in April 2009, which include forecasts up to 2010. Hence our scenarios relate to 2011 and beyond. For the 'crisis' scenarios we simulate a 'benchmark scenario' and a 'hard hit scenario'.

The *benchmark scenario* is based on available forecasts for all countries up to 2010. In our scenarios for 2011 onwards, we assume that GDP growth between 2001 and 2010 is equal to potential growth in 2011 for those five countries that did not accumulate excessive current-account imbalances (the Czech Republic, Hungary, Poland, Slovakia and Slovenia). For the other five countries (Bulgaria, Estonia, Latvia, Lithuania and Romania), however, we assume a change in the growth model, since it seems highly unlikely that these countries will able to run double-digit current-account deficits in the future. As Chart 6 indicates, there was a strong relationship between GDP growth and current-account imbalances among the new member states in the past. Consequently, the average growth of the past decade may well overestimate their potential growth rates. We have assumed that the potential growth rate for 2011 of those countries with large current-account imbalances is equal to the average potential growth rate of the other five countries, which is 4.2 percent per year.

The *hard hit scenario* assumes a deeper recession both in the EU15 and in the new member states in the near future and a durable effect on the new member states in the medium term. The IMF and the OECD in their March 2009 forecasts emphasised strong downside risks. Any worsening of the outlook for the EU15 will probably have a more than proportional effect on the new member states through trade links. Furthermore, there is a risk that subsidiaries of western European banks in new member states may curtail credit to a larger extent than what would have been justified by the economic conditions in these countries, while domestically owned banks have anyway largely been deprived of foreign funding. Credit contraction in the new member states is likely to aggravate the economic crisis (Darvas and Pisani-Ferry, 2008). For these reasons, the speed of future catching-up (ie excess growth over EU15 growth) is assumed to be one half of historical averages and the long-run structural unemployment rate is also assumed to be higher in the new member states. The *hard hit scenario* also assumes that there will be an additional ten percent exchange-rate depreciation for countries operating flexible exchange-rate systems.

Figure 6: GDP growth and the current account, 2003-2007



Source: Authors' calculation based on data from Eurostat.

5.3. General assumptions for the scenarios

We derive our scenarios using the same principles and will alter the parameters of the model in the different scenarios.

In all scenarios we assume that catching-up, that is, excess growth of real GDP compared to EU15, is fast when a country has a much lower per capita GDP than the EU15, but the speed decreases as progress is made in catching up. This assumption is in line with the empirical findings of the growth literature. Such behaviour can be conveniently modelled with a logistic function:

$$\frac{\left(\frac{Y^{(PPS)}}{POP}\right)_{i,t}}{\left(\frac{Y^{(PPS)}}{POP}\right)_{EU15,t}} = \frac{1}{\alpha + \beta \exp(-\gamma \cdot t)} \quad (3)$$

where $\left(\frac{Y^{(PPS)}}{POP}\right)_{i,t}$ indicates GDP per capita at PPS in country i at time t and α , β and γ are parameters. One can calibrate these three parameters so that equation (1) matches (a) per capita GDP at PPS relative to EU15 in the starting year, (b) per capita GDP at PPS relative to

EU15 in the long run, and (c) the initial speed of catching-up, that is, the excess growth of per capita GDP of country i over per capita GDP growth of EU15.

The scenarios for GDP per capita at current exchange rates⁶ relative to EU15 are derived on the basis of these PPS scenarios and assumptions regarding the relationship between PPS and actual nominal exchange rates that we refer as 'real exchange rate' for simplicity. For all scenarios we assume that the real exchange rate continues to appreciate in parallel with the convergence in GDP per capita at PPS. The speed of convergence of real exchange rates and GDP per capita at PPS is assumed to be proportional. The long-run level of the real exchange rate is assumed to be equal to our assumption on the long-run ratio of GDP per capita at PPS compared to the EU15. Another way to phrase this assumption is that the price level relative to EU15 will be the same as GDP per capita at PPS relative to EU15.

The employment ratio, which is defined for simplicity as one minus the unemployment rate, also appears in our model. We have assumed that the unemployment rate reverts to its long-run structural equilibrium in three years' time and that the convergence path to this equilibrium is a linear process.

5.4. Detailed assumptions about the scenarios

The pre-crisis scenario (October 2007 scenario)

- (a) *Initial level of per capita GDP at PPS:* We calculate the forecasted value of GDP per capita at PPS for 2009 based on the 2006 actual data and the October 2007 forecast of DG ECFIN for 2007-2009. Consequently, all scenarios are made for 2010 onwards.
- (b) *Long-run level of per capita GDP at PPS:* We assume that the long-run anchor of the growth process is 90 percent of EU15. As can be seen from Chart 1, this is roughly the average of current Spanish and Greek values.
- (c) *Initial speed of catching-up:* the excess growth of per capita GDP at PPS is set equal to actual excess real GDP growth from 2000 to 2009 which, as indicated above, includes actual data up to 2006 and the 2007 forecasts for 2007-2009. It would have been reasonable to assume that the average growth during this nine-year period could well proxy the potential growth rate.⁷

⁶ Since we are studying migration from the new member states to the EU15, the individual country exchange rates are also defined against the EU15, ie a weighted average of euro, pound sterling, Swedish krona and Danish krone.

⁷ To be more precise, we divide the GDP level in 2009 with the GDP level in 2000 and calculate the average annualised (compounded) growth rate in this period. Note that our sample for calculating the initial speed does not include the period of the Russian crisis, which seriously affected some of these countries.

- (d) *Real exchange rate*: No real exchange-rate shock is assumed, ie the gap between PPS and actual nominal exchange rate-based GDP per capita evolves according to our general assumptions discussed above.
- (e) *Unemployment rate*: Similarly to (a) above, we calculate the forecasted value of the unemployment rate for 2009 based on the 2006 actual data and the October 2007 forecast of DG ECFIN for 2007-2009. The long-run anchor of the unemployment rate is set equal to the structural unemployment rate of 2007 as included in the AMECO database. This rate is reached (according to our general assumptions) in two years from the final date of the forecast (2009), ie it is reached by 2011.

The 1st crisis scenario – baseline scenario (April 2009 baseline scenario)

- (a) *Initial level of per capita GDP at PPS*: We calculate the forecasted value of GDP per capita at PPS for 2010 based on the 2008 preliminary data and the April 2009 forecasts for 2009 and 2010. Consequently, all scenarios are made for 2011 onwards.
- (b) *Long-run level of per capita GDP at PPS*: The same as in the pre-crisis scenario, ie 90 percent of EU15.
- (c) *Initial speed of catching-up*: For five countries (the Czech Republic, Hungary, Poland, Slovakia, Slovenia) the excess growth of per capita GDP at PPS is set equal to actual excess real GDP growth in 2000-2010, which includes actual data up to 2008 and the 2009 forecasts for 2009 and 2010. For the other five countries that had large current account imbalances (Bulgaria, Estonia, Latvia, Lithuania, Romania) the initial GDP growth is set equal to the average of the other five countries in 2011, which is 4.2 percent per year.⁸
- (d) *Real exchange rate*: For the four countries operating floating exchange-rate systems we assume that the average nominal exchange rate of January-May 2009 will prevail for the rest of the year.⁹ This implies exchange-rate depreciation compared to 2008. The real exchange-rate depreciations are assumed not to alter the future price convergence prospects (ie we do not take into account possibly higher inflation due to the exchange-rate depreciations), but the real exchange-rate appreciation process is assumed to be governed by our general assumptions discussed above from the

⁸ Note that we have projected GDP per capita at PPS compared to the EU15. We assumed that the change in GDP per capita at PPS compared to EU15 is fully the result of excess real GDP growth. In order to be able to derive an absolute GDP growth number for the new member states, we need an assumption for GDP growth for the EU15. For the later, we again used April 2009 forecasts for 2009 and 2010 and assumed that it will be 2 percent per year starting in 2011.

⁹ The average exchange rates from 2 January to 25 May 2009 against the euro are 27.27 (Czech koruna), 292.05 (Hungarian forint), 4.46 (Polish zloty) and 4.23 (Romanian leu). Note that we used a weighted average of the exchange rate of the EU15, that is, the average of euro, pound sterling, Danish krone and Swedish krona exchange rates.

depreciated level in 2009. The real exchange rates of other countries (ie the two euro- area countries and the four countries that operate fixed exchange-rate systems) are not affected.

- (e) *Unemployment rate*: We use the same principles as in the pre-crisis scenario, the only difference being that we use April 2009 DG ECFIN forecasts until 2010 and assume that the same long-run structural unemployment rate is reached by 2012.

The 2nd crisis scenario – deeper crisis scenario (April 2009 hard hit scenario)

- (a) *Initial level of per capita GDP at PPS*: We subtract two percent from 2009 and one percent from 2010 annual GDP growth forecasts of the new member states and one percent and 0.5 percent from the growth forecast of the EU15 in these two years. We use these values to forecast the 2010 GDP per capita level at PPS compared to the EU15.
- (b) *Long-run level of per capita GDP at PPS*: The same as in the other two scenarios, ie 90 percent of EU15.
- (c) *Initial speed of catching-up*: We assume that the crisis has a longer-term effect on growth as well and that the average GDP growth rate over a historical period overestimates the potential growth rate. Consequently, we calculate the average excess growth over EU15 growth for all countries for the period 2000-2010 (including the downgraded 2009-2010 forecasts as indicated in point (a) above) and assume that the initial speed of catching-up will be one half of these historical values for the five countries that did not have large current- account imbalances (the Czech Republic, Hungary, Poland, Slovakia, Slovenia). For the other five countries (Bulgaria, Estonia, Latvia, Lithuania, Romania), again the initial GDP growth is set equal to the average of the other five countries in 2011, which is 3.0 percent per year.
- (d) *Real exchange rate*: We assume that there is an additional ten percent nominal exchange-rate depreciation for those four countries that operate floating exchange-rate systems (the Czech Republic, Hungary, Poland, Romania).
- (e) *Unemployment rate*: The unemployment rate in the new member states is assumed to be two and one percent higher in 2009 and 2010, respectively, than the April 2009 DG ECFIN forecasts, while in the EU15 the additional rise in the unemployment rate is assumed to be one and 0.5 percent in these two years. Furthermore, the long-run structural unemployment rate is one percent higher in the new member states than in the previous two scenarios.

Table 6 presents the numerical values for GDP growth scenarios between 2005 and 2013 and highlights the various sources.

Table 6: Real GDP growth scenarios (percent)

	scenario	2005	2006	2007	2008	2009	2010	2011	2012	2013
Bulgaria	2007	6.2	6.3	6.3	6.0	6.2	5.7	5.6	5.5	5.4
	2009BM	6.2	6.3	6.2	6.0	-1.6	-0.1	4.2	4.2	4.2
	2009HH	6.2	6.3	6.2	6.0	-3.6	-1.1	3.0	3.0	3.0
Czech Rep.	2007	6.3	6.8	5.8	5.0	4.9	4.5	4.2	3.9	3.7
	2009BM	6.3	6.8	6.0	3.2	-2.7	0.3	4.2	3.9	3.7
	2009HH	6.3	6.8	6.0	3.2	-4.7	-0.7	3.0	3.0	2.9
Estonia	2007	9.2	10.4	7.8	6.4	6.2	7.8	6.8	6.0	5.3
	2009BM	9.2	10.4	6.3	-3.6	-10.3	-0.8	4.2	4.1	4.1
	2009HH	9.2	10.4	6.3	-3.6	-12.3	-1.8	3.0	3.0	3.0
Hungary	2007	4.1	3.9	2.0	2.6	3.4	3.7	3.6	3.6	3.5
	2009BM	4.1	3.9	1.1	0.5	-6.3	-0.3	2.9	2.9	2.9
	2009HH	4.1	3.9	1.1	0.5	-8.3	-1.3	2.4	2.4	2.4
Latvia	2007	10.6	12.2	10.5	7.2	6.2	8.5	7.8	7.2	6.6
	2009BM	10.6	12.2	10.0	-4.6	-13.1	-3.2	4.2	4.2	4.1
	2009HH	10.6	12.2	10.0	-4.6	-15.1	-4.2	3.0	3.0	3.0
Lithuania	2007	7.9	7.9	8.5	7.5	6.3	7.7	7.1	6.6	6.0
	2009BM	7.9	7.9	8.9	3.0	-11.0	-4.7	4.2	4.2	4.1
	2009HH	7.9	7.9	8.9	3.0	-13.0	-5.7	3.0	3.0	3.0
Poland	2007	3.6	6.2	6.5	5.6	5.2	4.3	4.2	4.2	4.1
	2009BM	3.6	6.2	6.7	4.8	-1.4	0.8	4.2	4.1	4.1
	2009HH	3.6	6.2	6.7	4.8	-3.4	-0.2	3.0	2.9	2.8
Romania	2007	4.2	7.9	6.0	5.9	5.8	6.0	5.9	5.8	5.6
	2009BM	4.2	7.9	6.2	7.1	-4.0	0.0	4.2	4.2	4.1
	2009HH	4.2	7.9	6.2	7.1	-6.0	-1.0	3.0	3.0	3.0
Slovenia	2007	4.1	5.7	6.0	4.6	4.0	4.2	3.5	3.1	2.7
	2009BM	4.1	5.7	6.8	3.5	-3.4	0.7	4.1	3.5	3.1
	2009HH	4.3	5.9	6.8	3.5	-5.4	-0.3	3.0	2.9	2.8
Slovakia	2007	6.6	8.5	8.7	7.0	6.2	6.1	5.6	5.2	4.9
	2009BM	6.6	8.5	10.4	6.4	-2.6	0.7	5.7	5.4	5.0
	2009HH	6.6	8.5	10.4	6.4	-4.6	-0.3	3.8	3.7	3.6
EU-15	2007	1.8	2.9	2.7	2.2	2.2	2.0	2.0	2.0	2.0
	2009BM	1.8	2.9	2.7	0.7	-3.9	0.0	2.0	2.0	2.0
	2009HH	1.8	2.9	2.7	0.7	-4.9	-0.5	2.0	2.0	2.0

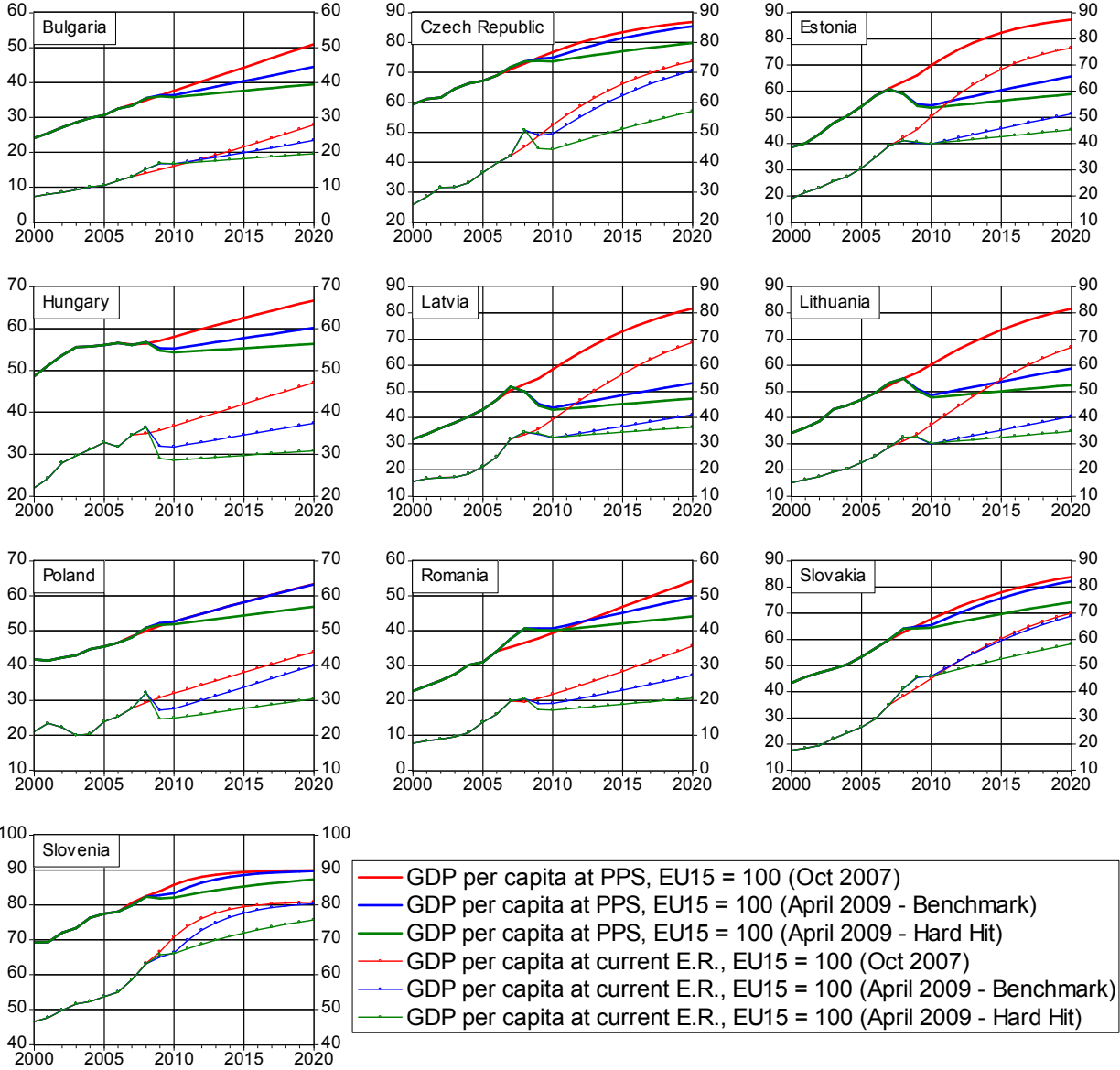
Note: Yellow colour=actual data; blue colour=forecasts by DG ECFIN; orange colour=our assumptions; no colour=our scenarios. Note that our scenarios are not forecasts, but hypothetical medium term scenarios that are derived on the basis of our various assumptions discussed in the main text for the purpose of assessing the prospects for medium term migration flows. Sources: DG ECFIN, EIU, IMF, Danske Bank, Eurostat, Bruegel.

5.5. Results

Figure 7 compares the outlook for GDP per capita at PPS and at current exchange rates relative to EU15 for our three scenarios. The *benchmark scenario* indicates that the outlook (relative to EU15) has seriously deteriorated for the three Baltic countries and also to some extent for Hungary, Bulgaria and Romania. For four countries (Czech Republic, Slovakia, Slovenia, Poland) the outlook relative to EU15 does not change much. The *hard hit scenario*,

however, indicates a considerable deterioration in all new member states especially at current exchange rates.

Figure 7: Scenarios of GDP per capita at PPS and at current exchange rates (EU15 = 100), 2000-2020

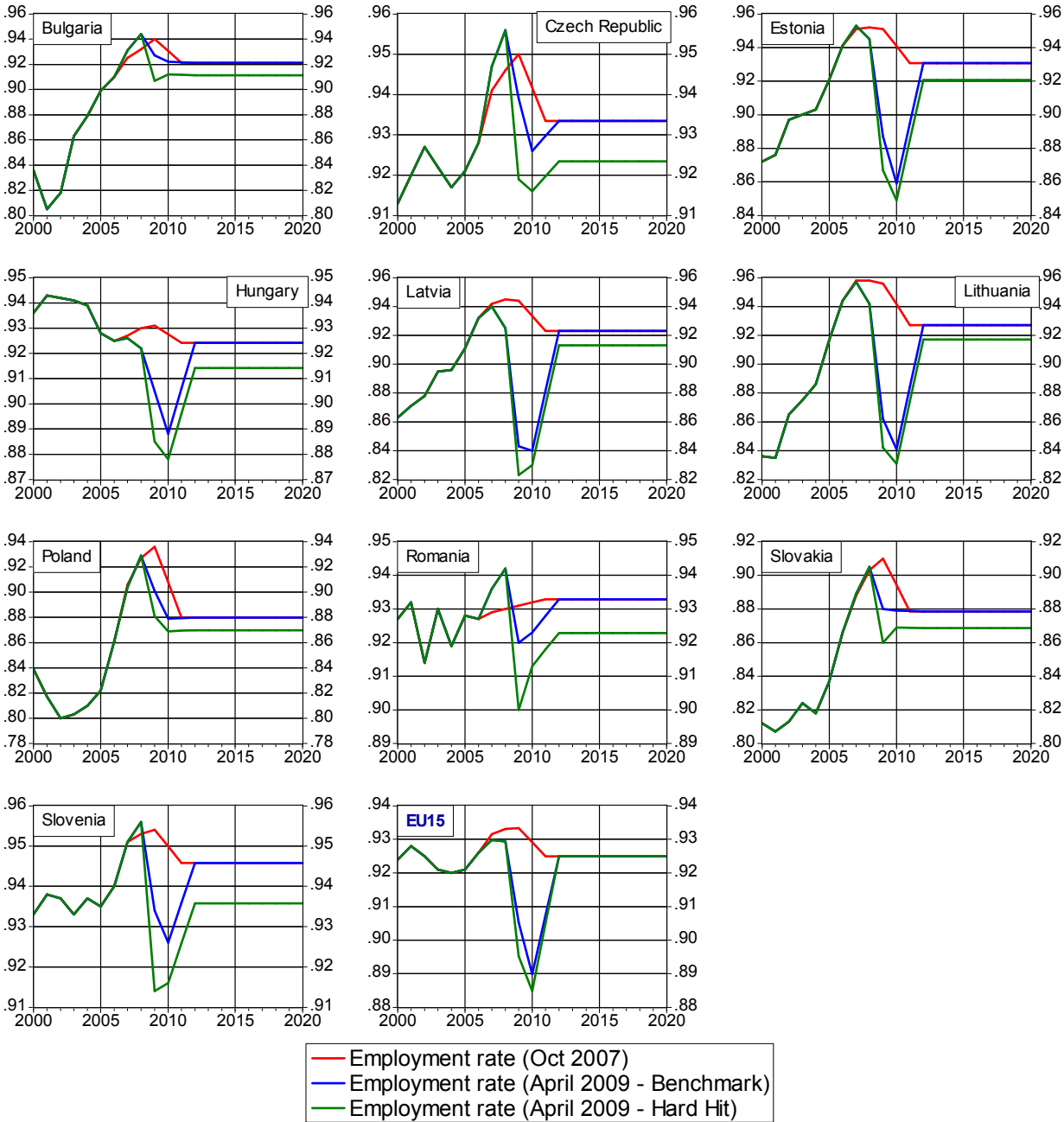


Note. The 'Oct 2007' scenario uses actual data up to 2006, the October 2007 forecast for 2007-2009 and our scenario for 2010-2020. The 'April 2009' scenarios use actual data up to 2008, the April 2009 forecasts for 2009-2010 (downscaled in the *hard hit scenario*) and our scenarios for 2011-2020. Actual data is from Eurostat; sources of forecasts are detailed in the note to Table 5. See further details in the main text.

In Figure 8 we compare the evolution of employment rates according to the previously specified assumptions. Perhaps the most important outcome here is the rapid but short-term decline in the employment rate in the EU15. This results in a substantial increase in the labour market search costs for migrants in the short run, thereby reducing the incentive to

migrants (or increasing the incentive to return from abroad). Similar drops in the employment rate can be observed in the countries of origin, especially in the three Baltic countries, while in the four less vulnerable countries the drop is less marked. Also, it is likely that the impact of local and foreign employment rates on migration decisions will not be symmetric, simply because many of the more successful migrants are employed at home when they leave, so their migration decision is not much influenced by their local employment rates.

Figure 8: Employment rate scenarios, 2000-2020



Note: The employment rate is defined as one minus the unemployment rate in our paper. The 'Oct 2007' scenario uses actual data up to 2006, the October 2007 forecast for 2007-2009 and our scenario for 2010-2020.

The 'April 2009' scenarios use actual data up to 2008, the April 2009 forecasts for 2009-2010 (downscaled in the *hard hit scenario*) and our scenarios for 2011-2020. Source: Actual data is from Eurostat; forecasts are from the DG ECFIN. See further details in the main text.

Having constructed these scenarios and gaining some qualitative understanding of what their migration impact might look like, we are naturally led to the next question, which is how to best attempt to quantify the likely migration effects. This issue is dealt with in the next section.

6. Migration in the wake of the crisis

The empirical results of the panel error correction model for the level of the migrant stock in the EU15 and our macroeconomic scenarios allow us to simulate the future developments in the migrant stock. We should emphasise that even though we have attempted to make our simulations as reliable as we can, there is a large degree of uncertainty and a non-negligible margin of error in the set-up of the exercise and in the assumptions.

The three simulations of the level of migration under our three scenarios indicate that the crisis does affect net migration flows, but the effects are relatively small compared to the total stock of migrants. In other words, we do not expect any massive change in aggregate migration behaviour between old and new member states in the coming year. What we would expect are some significant changes at the margins.

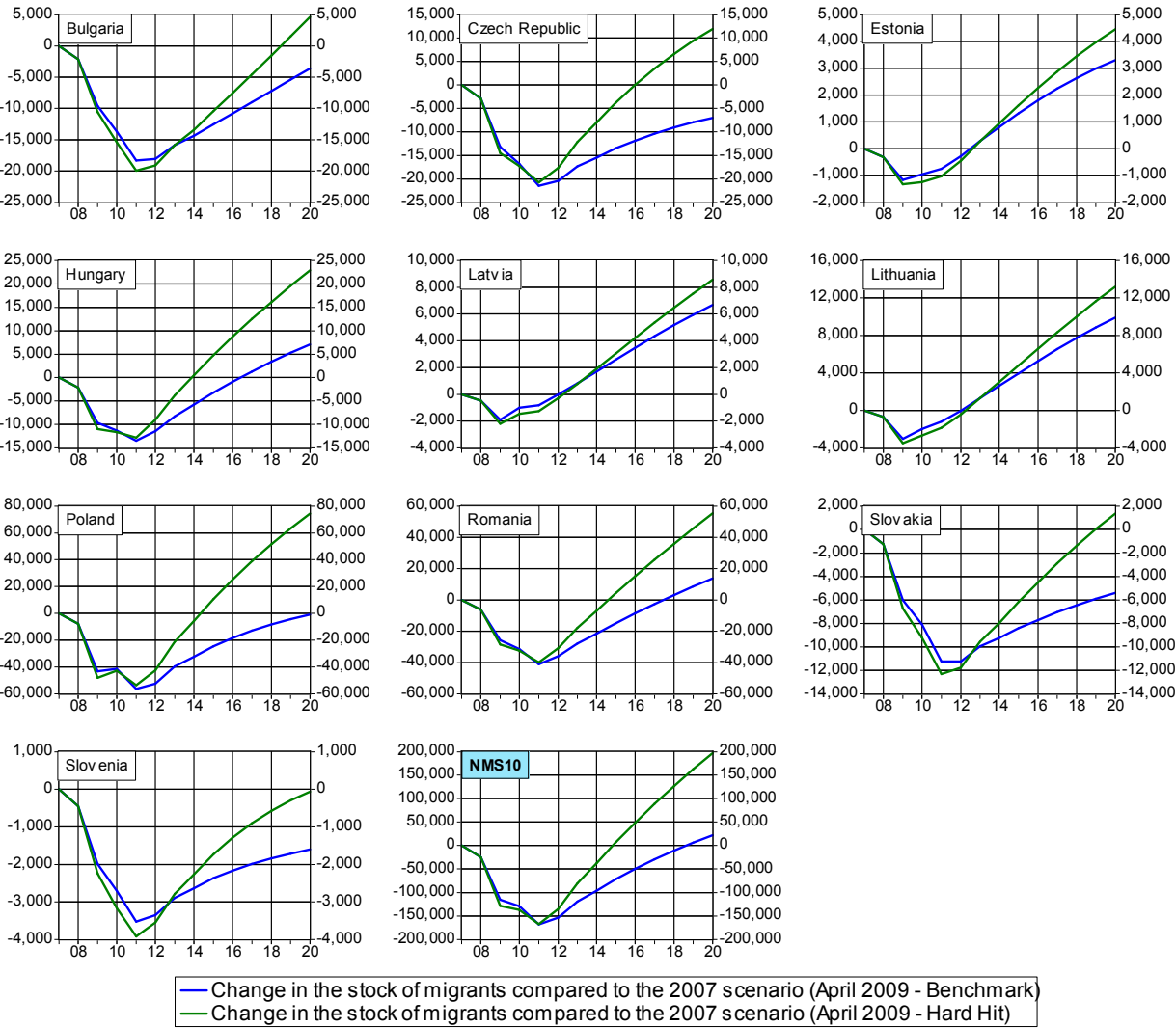
In order to see those significant effects at the margin more clearly, we plot the expected deviations of the migration stock from the 2007 scenario due to the crisis in Figure 9.¹⁰ This confirms the original intuition that migration is likely to dip in the short run as a result of the crisis and return to the pre-crisis scenario level by around 2019 in the *baseline scenario* on the average of the NMS10. In the *hard hit scenario*, however, the NMS10 migration stock may end up at a higher level in the longer run. At the beginning of 2007 there were approximately 3.8 million migrants from the ten new member states in the EU15. Our simulations suggests that there will be about 170 thousand less migrants by 2011 due to the crisis and about 200 thousand more by 2020 according to our hard hit scenario, which are around five percent of the current stock.

There are, however, important country-specific differences. The four less affected countries (Czech Republic, Poland, Slovakia and Slovenia) are mostly projected to experience less migration outflows than without the crisis; it is even true under the *hard hit scenario* for Slovakia and Slovenia, thanks to their less affected catching-up process. By contrast, hard-hit

¹⁰ For a detailed analysis of long-run migration trends see Brücker et al (2009), with which our results are broadly consistent.

countries like Latvia are expected to experience only a small drop in emigration as a result of the crisis and rapidly move towards more emigration on account of its overall worsened position relative to the EU15.

Figure 9: Change in the stock of migrants in the EU15 compared to the 2007 scenario (number of people), 2007-2020



Source: Authors' calculation.

7. Summary

With the Irish experience we illustrated how labour mobility has acted as a buffer both in the upswing and in the downturn. We then proceeded to attempt a quantification of the cyclical elements of migration in a regression model. We found that cyclical variables such as unemployment and growth rates have substantial explanatory power when it comes to migration flow, well beyond what can be explained by income differences alone. Also, our regression offers some evidence that the impact on migration of changes in the unemployment rate in the receiving country may be bigger than that of change in the unemployment rate in the country of origin. This suggests that the search cost in the labour market in the receiving country may indeed be a key cyclical determinant of migration.

We then constructed scenarios for the future of the EU economies until 2020, placing particular emphasis on the possibility that the growth model of some of the new member states that was based on extremely high current-account deficits may have suffered long term damage as the result of the crisis. Using these economic scenarios and the regression parameters previously obtained, we find that migration flows from East to West are likely to be depressed by the crisis in the short run but will rebound in the medium term.

Our findings have numerous implications. From the perspective of the receiving countries, migrants help with the short-run response to the economic cycle in two important ways. First, there is evidence, not least from Ireland, that migrants bear a disproportionate risk of losing their job during the downturn. Conversely, of course, job creation for migrants will tend to be disproportionately faster than for natives. Hence, the migrant workforce acts as a labour market buffer that can, to some extent, shield the native workforce from fluctuations of the business cycle including the present economic shock. Second, rising unemployment rates in the host country will, in the short term, reduce the net inflow of migrants on account of greatly increased search costs for new arrivals to find a job. As a result of this reduced net inflow, unemployment in the receiving country is set to increase by less than it would otherwise have done.

From the perspective of the sending country, the impact of these developments will generally be less benign for a number of reasons. First, as employment abroad decreases rapidly (more rapidly than that among natives in the receiving country), so will remittance flows that support the local economy in the sending country. Second, the rise in unemployment in response to the crisis is likely to be exacerbated by the reduced net outflow of migrants. This effect might, in the short run, even be sufficiently strong to lead to a reversal in net migration flows. Hence, the sending countries are likely to be relatively hard hit in the short run. The sending countries do not have the option of temporarily debarring migrants from returning to their country of origin on account of the economic crisis for obvious legal and ethical reasons.

However, sending countries stand to benefit in the medium term. In our empirical estimates we find that the reduction in migration outflows in response to the crisis will only be

temporary and likely be followed by a subsequent increase in East-West migration due to a less favourable medium-term outlook in some of the sending countries in eastern Europe in the aftermath of the crisis. In other words, the short-run pressures on labour markets in sending countries may be alleviated through the migration channel in the medium term. Or, if viewed probabilistically, it can be said that labour mobility offers eastern Europe an insurance against a speed limit in terms of catching up with the EU15 in the aftermath of the crisis.

The corollary of this is that receiving countries will experience the buffer effect of migration only in the short run. In the longer run, worsened economic prospects in some of the sending countries would lead to a rebound of immigration to the EU15. To the extent that immigrants create wealth for the native population in the host country, this might be a welcome prospect. But to the extent that increased migration flows continue to be regarded as problematic in some host countries, this could even induce EU15 countries to consider some kind of support to labour markets in distressed sending countries.

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