

## II. Labour mobility as an adjustment mechanism<sup>(13)</sup>



*The movement of workers from one EU country to another has become an increasingly important adjustment mechanism for the European economy, particularly since the introduction of the euro. This section assesses the economic adjustment role played by labour mobility (i.e. intra-EU labour migration). It first looks at stylised facts on mobility in the EU before going on to analyse the reasons why workers move between countries. The analysis shows that labour mobility increases significantly when a country joins the EU. While euro area membership seems not to be associated with an overall rise in the magnitude of mobility flows, workers do appear more ready to move from countries where unemployment is high, to those where it is lower. The final part of the section shows that workers have become more likely to move to another EU country in response to economic shocks affecting only some countries. Movements in response to shocks have increased significantly since the introduction of the euro. The analysis demonstrates that real wages also became more responsive to asymmetric shocks during the same period.*

### Introduction

This section assesses the role of labour mobility in macroeconomic adjustment in the euro area and in the EU.<sup>(14)</sup> The subject of labour mobility was examined in the early stages of the debate on economic and monetary union (EMU). At that time, it was stressed that because monetary union allowed less room for absorbing asymmetric shocks via macroeconomic policy tools, a sufficient degree of labour mobility was needed as an alternative adjustment channel. Empirical analysis showed that the degree of mobility in EU countries participating in EMU was not comparable with that in other monetary unions, particularly the US, and that mobility played a minor role in the adjustment process. Several years have passed since the start of

the financial crisis, and more and more attention is being given to how labour mobility could counteract the divergence in growth and unemployment among EU countries, particularly within the euro area.

This section will start by presenting a series of stylised facts and trends regarding mobility in EU countries. It will then present two analytical approaches to assessing the role of mobility in macroeconomic adjustment in the EU and the euro area. In the first approach, the determinants of mobility flows are analysed by means of ‘gravity equations’, which link gross mobility flows to the characteristics and economic situations of the origin and destination countries. The second approach consists of assessing the dynamic response of labour mobility to asymmetric labour demand shocks, i.e. shocks that affect some EU countries but not others.

### Labour mobility in the euro area: stylised facts

Mobility across the EU has been increasing over the past two decades. This is demonstrated by the data on the proportion of the EU population born in a different EU country (Graph II.1). This increase is particularly evident when looking at data for the post-enlargement EU (available for recent years only). However, growing mobility is not only from east to west. Mobility among countries that were Member States before the 2004 enlargement also shows a moderately positive trend over the past two decades.

Despite this rising trend, mobility across EU Member States remains low compared with other world regions, most notably the US.<sup>(15)</sup> In 2013, about 4 % of working-age EU citizens lived in an EU country other than that in which they were born. In the US, by comparison, nearly 30 % of the working-age population lives in a state other than their state of birth.

EU labour mobility appears somewhat higher cross-border workers are taken into account: about 1.1 million EU citizens work in another EU country but do not reside there. In addition, there are about 1.2 million posted workers, working for

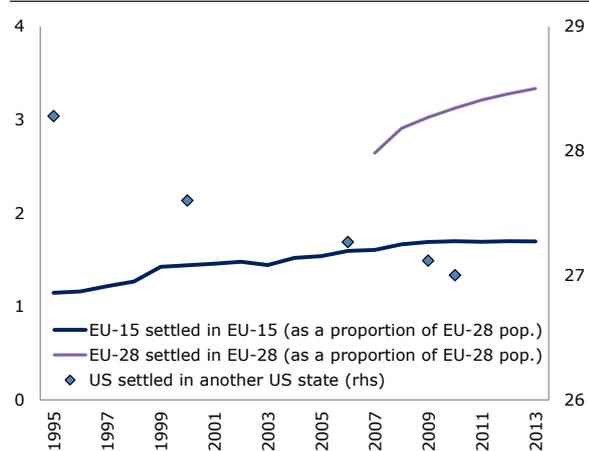
<sup>(13)</sup> Section prepared by Alfonso Arpaia, Aron Kiss, Balazs Palvolgyi and Alessandro Turrini.

<sup>(14)</sup> The results presented in this section are based on Arpaia A., A. Kiss, B. Palvolgyi and A. Turrini (2014), ‘Labour mobility and labour market adjustment in the EU’, *European Economy, Economic Papers*, No 539. See this paper for further references and details on the methodologies applied. For a previous discussion of the topic, see European Commission (2011), ‘Adjustment via migration’, *Quarterly Report on the Euro Area*, Vol. 10, No 3, Section II.2, pp. 32-33.

<sup>(15)</sup> OECD (2012), OECD Economic Surveys: European Union 2012, OECD Publishing.

their home companies for a limited period of time in another Member State.

**Graph II.1: Proportion of EU working-age population born in other EU countries, and proportion of US population born in a different US state (1)**  
(1999-2013, %)



(1) Data for the EU excludes Germany, since no breakdown over time was available for foreigners living in Germany by origin country.

**Source:** Eurostat population statistics and Eurostat special extraction from the Eurostat Labour Force Survey; US Census Bureau, Census and American Community Survey.

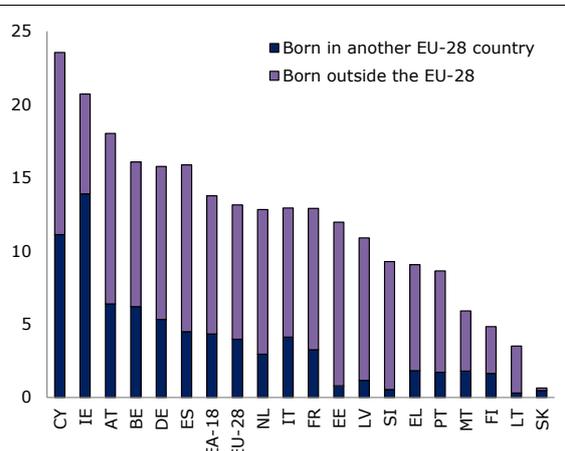
There are considerable differences in the size and composition of the foreign-born population across EU Member States (Graph II.2). The proportion of the foreign-born population is in general lower in the new Member States. Also, in most countries, the proportion of those born outside the EU is higher than the proportion of those born in other EU countries. Overall in the EU, the proportion of intra-EU migrants in the working-age population (4%) is less than half of the proportion of migrants born outside the EU (9.2 %).

Recent changes in the foreign-born proportion of the population also show substantial differences across countries (Graph II.3). It appears that in general the proportion of intra-EU mobility is higher in recent migration flows than before the crisis and the same is true for migration stocks (compare Graph II.3 with Graph II.2).

Inward migration flows are generally stronger in old Member States but some changes have taken place as a result of the crisis. The countries where the proportion of migrants grew most before the crisis included those on the euro area periphery, such as Ireland and Spain. In the wake of the crisis,

inflows into those countries fell sharply, while the size of the foreign-born population in the Baltic countries fell substantially.

**Graph II.2: Proportion of working-age population born in other countries, euro area (1)**  
(2013, %)



(1) Luxembourg was omitted in order to make the graph clearer. In Luxembourg, 38 % of the population was born in another EU country and 9 % was born outside the EU.

**Source:** Eurostat for DE, EU-28 and EA-18; for other countries, the calculations are based on a Eurostat special extraction from the European Labour Force Survey.

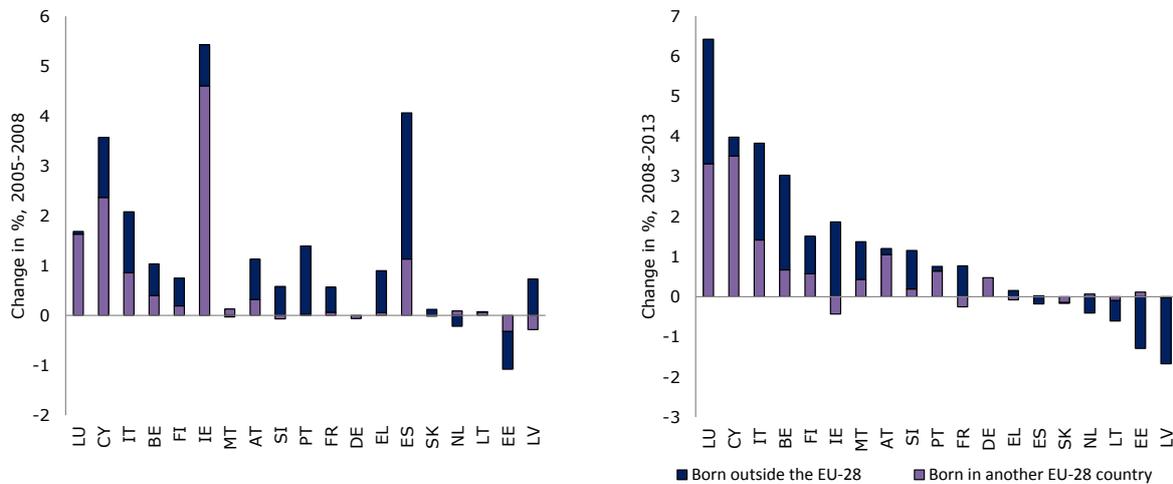
Recent overall changes in migration patterns suggest that mobility may be playing a role in the post-crisis adjustment of the euro area. The rest of this section presents two analytical approaches that look more systematically at the role of mobility as an adjustment channel in the EU and the euro area.

### Explaining mobility flows

This section investigates determinants of bilateral migration flows between countries. Besides estimating the main drivers of migration flows globally, the section also seeks to answer the following questions: Do migration flows between countries increase when they are members of the EU or the euro area? How do cyclical economic conditions affect bilateral migration? Does economic and monetary union affect migration patterns in Europe?

Determinants of bilateral gross migration flows are estimated globally in what is known as the 'gravity model' of migration flows from 163 origin countries to 38 destination countries, including most EU Member States. The details of the

Graph II.3: **Change in the proportion of working-age population born abroad, before and during the crisis, euro area**



(1) For DE and IE, 2006 instead of 2005. For DE, the value is for all foreigners (no breakdown available). Countries are ordered according to the change that occurred in 2008-13.

**Source:** DG ECFIN calculations based on a Eurostat special extraction from LFS.

methodology, data and regression results are presented in Box II.1.

A number of conclusions can be drawn from the regression analysis in Box II.1 on global mobility flows. Migration flows are larger between more populous countries and towards higher-income countries (see column 1 in the table). The estimates suggest that if either the origin or destination country's population increases by 1 %, gross bilateral migration increases by about 0.5 %. In a similar vein, if per-capita GDP in the destination country increases by 10 % relative to the origin country, this increases the gross bilateral migration flow by about 0.6 %. Origin and destination country effects, which are included in columns 2 and 3 of the table, take up the explanatory power of population and relative GDP, probably because per-capita GDP and the population of countries change relatively slowly over time. Other traditional control variables (distance, common language, past colonial relationship, past migration) have very significant effects on bilateral migration, in the expected direction. These effects are robust to the inclusion of country effects.

The relative unemployment rate is estimated to affect migration significantly. If the unemployment rate of the destination country increases by 1 % relative to that in the origin country, the bilateral migration flow to this country is estimated to decrease by about 0.14 % in the specifications

which include country effects (see columns 2 and 3 in the table).

EU membership on both sides is estimated to increase bilateral migration flows by about 25 % in the specification with country effects, everything else being equal (columns 2 and 3 in the table). Euro area membership on both sides does not appear to affect migration by itself, but the estimated interaction terms indicate that it does influence migration flows (column 3 in the table). Euro area membership on both sides intensifies migration toward countries with a relatively low unemployment rate, as suggested by the negative and significant estimated coefficient of the interaction term between the EMU dummy variable and the relative unemployment rate. This effect appears to have strengthened further during the crisis, although the corresponding coefficient does not reach statistical significance. This supports the view that migration flows serve the adjustment to asymmetric shocks in the euro area more than between other countries.

### Cross-country labour mobility and adjustment: a general framework

In a monetary union, asymmetric economic shocks, i.e. shocks that affect economic activity in some regions but not in others, are expected initially to

### Box II.1: Explaining mobility flows with gravity equations

Determinants of mobility flows between pairs of countries are estimated in ‘gravity equations’. The dependent variable is the gross annual migration flow from a given origin country to a given destination country.

Explanatory variables include the geographical distance between the countries and the product of their populations. Some variables, such as the ratio of per-capita incomes and unemployment rates of both countries, control for factors affecting the gain from migration. Other variables, such as the existence of a common language, historical links and past migration between the countries, control for the costs of migration.

In addition, a series of variables aims to capture the interplay between the process of European integration and the economic context. First, dummy variables control for both countries’ membership of the EU and the euro area. Secondly, appropriate interaction terms make it possible to test whether the importance of relative unemployment rates increased since the inception of the EMU or during the crisis.

The equations presented in the following table are estimated in a logarithmic form, which means that estimated coefficients can be interpreted as elasticities. Origin and destination country dummy variables are included in order to control for time-invariant factors that affect the propensity of the population of some countries to choose emigration and the relative attractiveness of destination countries. Year dummy variables control for global trends and cycles.

Table: **Determinants of gross bilateral migration flows: gravity equations**

Dependent variable: Log gross migration flow	(1) No country effects	(2) Country effects	(3) Full specification
Log product of populations	0.491*** (0.005)	0.274* (0.164)	0.244 (0.163)
Log weighted distance	-0.514*** (0.010)	-0.669*** (0.014)	-0.668*** (0.014)
Log relative GDP per capita in the destination country	0.061*** (0.006)	-0.002 (0.068)	-0.003 (0.069)
Log relative unemployment rate in the destination country (lag)	-0.099*** (0.011)	-0.137*** (0.022)	-0.138*** (0.022)
Log bilateral migrant stock in the destination country, 1990	0.358*** (0.004)	0.301*** (0.005)	0.302*** (0.005)
Common language	0.779*** (0.024)	1.028*** (0.026)	1.027*** (0.026)
Past colonial relationship	0.556*** (0.041)	0.615*** (0.041)	0.613*** (0.041)
Both countries are EU members in given year	0.179*** (0.035)	0.248*** (0.034)	0.249*** (0.034)
Both countries are EA members in given year	0.160*** (0.041)	0.020 (0.039)	-0.024 (0.040)
Interaction term: Relative Unemp. * Post-2008 crisis			0.040* (0.024)
Interaction term: EA * Post-2008 crisis			0.081 (0.061)
Interaction term: EA * Relative Unemp.			-0.179*** (0.039)
Double interaction: EA * Relative Unemp. * Crisis			-0.115 (0.080)
Constant	-15.950*** (0.173)	-9.472** (4.492)	-8.673* (4.480)
Source country effects	no	yes	yes
Destination country effects	no	yes	yes
Year effects	yes	yes	yes
Observations	27 924	27 924	27 924
R-squared	0.721	0.823	0.823

(1) All equations estimated with ordinary least squares (OLS).

(2) The sample period is 1992-2011. The sample includes 163 origin countries and 38 destination countries.

(3) Asterisks indicate estimated coefficients that are statistically significant at the 1% (\*\*\*) , 5% (\*\*) or 10% (\*) level.

**Source:** DG ECFIN calculations.

(Continued on the next page)

*Box (continued)*

Data on migration flows are taken from the OECD's International Migration Database for 1992-2011. Control variables were collected from the World Bank's World Development Indicators and from bilateral databases of the *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPII) and the World Bank.

The table shows estimation results, proceeding from a 'bare-bones' specification in column (1), through one including origin and destination country effects in column (2), to the full specification in column (3).

cause differences in the unemployment and activity rates. These are absorbed over time by the adjustment of real wages and by geographical mobility. In a country affected by a positive, transitory, labour demand shock, caused perhaps by products in that region becoming more sought after on world markets, workers are initially drawn from the unemployment pool and more inactive workers start entering the labour force. As time goes by, real wages grow compared with other regions. If the shock persists, the labour force starts growing also as a result of the inflow of workers from other locations. Similar dynamics play out in the opposite direction in the case of a negative shock.

With limited data on labour mobility, it has become standard in the literature on the subject to follow the approach applied by Blanchard and Katz (1992) to studying the labour market adjustment in the US.<sup>(16)</sup> Blanchard and Katz (1992) observed that shocks to relative employment levels across US states tended to persist over time, while relative unemployment and activity rates tended to return to their initial levels after deviations. If asymmetric shocks have a permanent effect on employment but not on the unemployment and activity rates, the change in employment levels must be absorbed by changes in the working-age population. Assuming that labour demand shocks do not influence demographic trends, the response of relative population must reflect the response of labour mobility. Following Blanchard and Katz, a panel vector auto regression (a PVAR with two lags) has been estimated for the EU-15 countries and the following variables: the change in the logarithm of national employment, the logarithm of the activity rate and the logarithm of the employment rate (defined here as 1 minus the unemployment rate). The contribution of mobility is calculated as a residual, i.e. the change in employment not explained by changes in the

activity and unemployment rates. This implies that, unlike 'gravity equations', which focus on bilateral mobility flows, this approach includes migration to and from third countries in its definition of adjustment through mobility.

Over the whole period studied (1970-2013), the average size of labour demand shocks is estimated to be about 1.1 % of employment. Shocks to the level of employment are persistent and reach maximum effect after about four years, before converging to a level permanently higher than the initial one. Within one year, the unemployment rate falls and the activity rate rises by about 0.5 and 0.3 percentage points respectively. The effect of the shock on the unemployment and activity rates is also persistent and lasts for longer than five years.

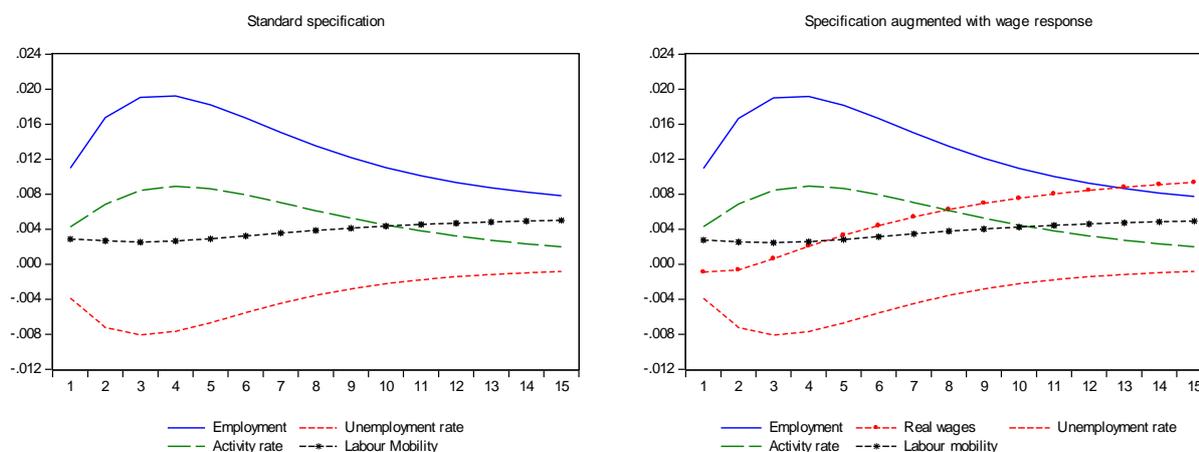
Labour mobility, meanwhile, increases by 0.3 % in the first year and peaks after about 10 years. Thus, in the first year, the unemployment rate, the activity rate and labour mobility absorb 43 %, 32 % and 25 % respectively of the initial labour demand shock. Results are robust to the exclusion from the sample of countries that are not members of the euro area. The results do not change much if the analysis includes real wages. Relative real wages gradually increase in response to labour demand shocks and stabilise after about 10 years, broadly in line with the stabilisation of the unemployment rate.

The responses to an asymmetric labour demand shock have also been estimated separately before and after economic and monetary union. Graph II.4 shows the responses of employment and the unemployment and activity rates to a one-standard-deviation positive labour demand shock for the period before and after the EMU creation. The results are shown separately in a model specification with no real wages (left panels) and one including a wage equation (right panels).

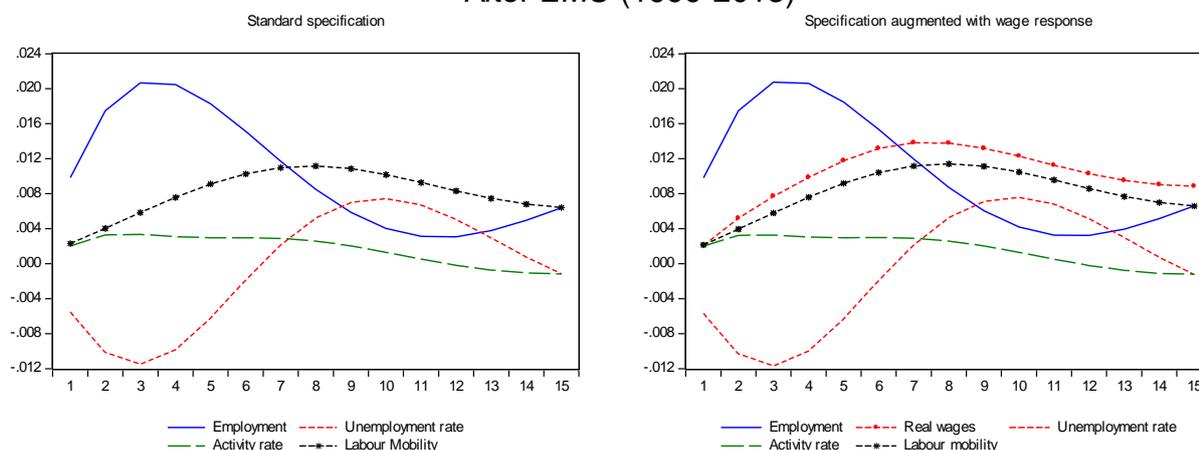
<sup>(16)</sup> Blanchard, O. and L.F. Katz (1992), 'Regional evolutions', *Brookings Papers on Economic Activity* No 1, pp. 1-75.

Graph II.4: Responses to a country-specific positive labour demand shock

Before EMU (1970-1998)



After EMU (1999-2013)



(1) The horizontal axis represents years after a labour demand shock affecting a Member State. All variables are in logs; mobility is defined as the change in employment not explained by changes in the employment rate (defined as 1 minus unemployment rate) or the activity rate.

**Source:** DG ECFIN calculations.

The graph shows that labour market adjustment has become more responsive in a number of respects after the EMU inception.

- First, despite the fact that the average labour demand shocks are roughly equal in the two periods (1.1 % before the EMU and 0.98 % since EMU introduction), the response of unemployment is quicker and less persistent after the start of the EMU.
- Secondly, the activity rate exhibits a more muted and short-lived reaction to the shock.
- Thirdly, labour mobility appears to respond more quickly and strongly after the EMU was set up, absorbing a bigger fraction of the shock than the activity rate at any lag.

- Finally, since the start of the EMU, real wages seem to have become more reactive to country-specific labour demand shocks. Before EMU, the response of real wages to the shock is initially muted, becoming statistically significant only after five years. Since the EMU inception, wages have become significantly different from the pre-shock level already after the second year.

**Conclusions**

Cross-country mobility flows in the EU are still much lower than those recorded in other highly integrated areas, particularly the US. The stock of migrants from within the EU is also generally much lower than from outside the EU. Nevertheless, an upward trend is visible, which is

not only the result of the enlargement of the EU to Eastern European countries characterised by high outward migration, but also of movements among old member states.

The findings of the two analytical approaches presented in this section show that monetary unification was followed by increased responsiveness of labour mobility to unemployment differences and to asymmetric demand shocks. The response of real wages to demand shocks also appears to have strengthened.

Further analysis should investigate the reasons underlying this increased responsiveness of

mobility flows in the euro area, particularly the relative roles of the EU integration of Eastern European countries and the loss of the exchange rate and monetary policy as shock absorbers for members of the euro area.

The analysis also suggests that, in the coming years, the persistence of the large differences in unemployment from country to country observed after the crisis could generate significant cross-border labour mobility flows, which, in some cases, could require supportive policy frameworks to ensure the successful integration of mobile workers.