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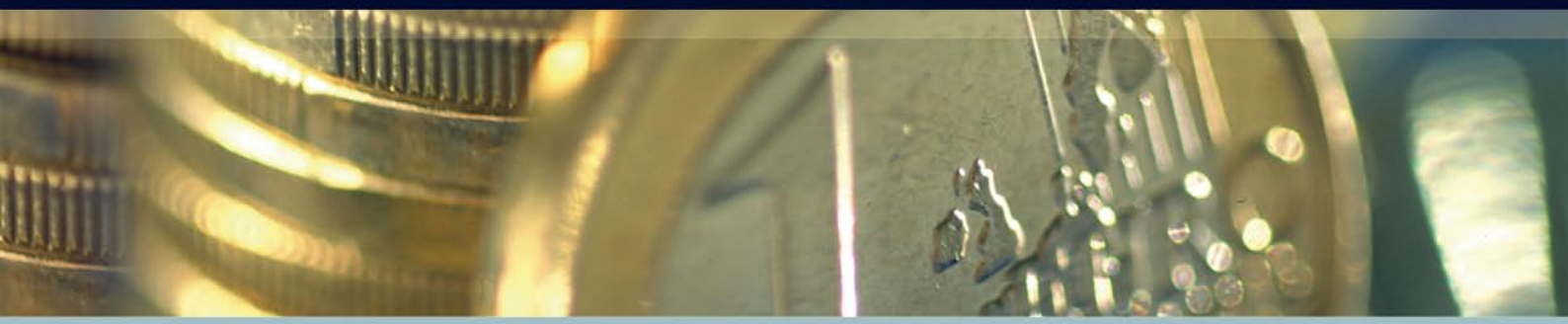

Mobility in Europe – Why it is low, the bottlenecks and the policy solutions

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In May 2008, it was ten years since the final decision to move to the third and final stage of Economic and Monetary Union (EMU), and the decision on which countries would be the first to introduce the euro. To mark this anniversary, the Commission is undertaking a strategic review of EMU. This paper constitutes part of the research that was either conducted or financed by the Commission as source material for the review.

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Mobility in Europe
Why it is low, the bottlenecks,
and the policy solutions

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June 30, 2008

Abstract: Adjustments in the European labour markets are a major source of economic resilience and integration. As such, they warrant in-depth understanding and close monitoring in the specific context of Eurozone and national fiscal policies. This report begins with an executive summary (part A), then goes on to review recent literature on adjustment to asymmetric shocks within a monetary union (part B) and to highlight the role of real adjustment (notably labour adjustment). In part C, we study the extent to which there has been an increase or a decrease in the convergence and speed of adjustment of regional and national labour markets of Member States after the EMU. We find no evidence of a decline in either of those dimensions. In part D, we explore areas requiring policy intervention. For that we build an original methodology: we study how the dynamics of labour markets depend on various institutions. The methodology is adapted to national labour markets and regional labour markets where in addition one can capture the effects on regional population and inter-regional mobility. We find a surprisingly strong role for the institutions in the housing market, somewhat stronger than other institutions, and check the robustness of this result. We then argue in part E that removing obstacles to geographical mobility and simultaneously undertaking pro-competition reforms in the goods market could be a beneficial mix, as these measures each reinforce the other's positive effect. Wage flexibility, notably regional wage flexibility, would also ease the convergence of labour markets. But, in a realistic short run, this cannot be the only dimension of reform: it requires social consensus on redefining fundamental elements of the European Welfare States, which is a long-run target. We focus on other reforms that can be implemented in a shorter time horizon.

(*) The first part of this report (PART B) is based on a survey presented at the "EMU @ 10: Achievements and Challenges" EU-DG ECFIN workshop in Brussels on 26-27 November 2007.We are grateful to the European Commission for financial support. We thank Alfonso Arpaia, Giuseppe Carone, Nuria Díez Guardia, Karl Pichelmann and Gilles Saint-Paul for very helpful comments.

PART A: EXECUTIVE SUMMARY

If capital flows have been liberalised and the supply of capital is arguably close to being perfectly elastic within the Eurozone, the same cannot yet be said about the mobility of labour factors. This remains a serious issue, given that labour mobility is a crucial adjustment mechanism for macroeconomic shocks – demographic, demand-driven, or even technological – affecting European economies in different ways and at different times (so-called "asymmetric shocks"). Indeed, the textbook theory of optimal monetary areas states that factors of production such as capital and labour should adjust freely within the common currency area and, in particular, should be mobile enough to meet demand and avoid excess capacity locally.

Generally speaking, in the aftermath of an adverse economic shock, there are **three main types of adjustment mechanisms available to a region or a country** (see European Commission, 2007a and 2007b, for a review of these adjustment mechanisms applied to the European policy context).

First, there is what we may term **a nominal channel**, or external adjustment mechanism, such as devaluation or accommodating monetary policies. A country adversely affected by a macroeconomic shock will see some of its capital flowing out and, in turn, face a depreciation of its currency. This will reduce its labour costs compared to other countries and restore its economy's competitiveness. Unfortunately, this adjustment mechanism entails **two drawbacks**. The traditional drawback is that devaluation raises the prices of imports, notably energy, and so leads to inflation. The second one is that devaluation is a non-cooperative, zero-sum game. For these two reasons, the creation of a common monetary area in Europe, limiting the first adjustment channel for asymmetric shocks, has, arguably, generated large gains in avoiding inflation and non-cooperative devaluations.

Secondly, there are **real adjustment mechanisms**. The first one is mobility of labour. A region specialised in a particular industry could be negatively affected by a trade shock. This will result in higher unemployment if workers are not mobile and cannot relocate. In this region, labour will thus be required to take on part of the adjustment burden, and:

a) move out of the labour force
b) move geographically
c) retrain and move to other sectors
d) work at a lower wage (wage flexibility)
e) decrease the number of hours worked

f) remain unemployed

or any combination of these six possibilities.

A second **real channel** operates through capital adjustment, studied, for instance, in an influential paper by Blanchard and Katz (1992) applied to the adjustment of US states. By capital adjustment we mean that a region hit by an adverse shock might see capital flow back in again after a while. This is due to the local availability of unoccupied labour and to the possible cut in wages a few months or years after the initial shock, which in turn increases the returns to capital. Capital should thus eventually flow in and restore, in part, the production of the economy. Blanchard and Katz addressed the question of whether Massachusetts would recover from a major crisis due to restructuring of the car industry. Once the economy of the region is depressed, as Blanchard and Katz argue, wages indeed go down in part. This implies that capital would be more productive to the extent that capital and labour are price-substitutes (Hamermesh, 1996, Hamermesh and Pfann, 1996).

Depending on the relative speed of the adjustment of capital or the geographical mobility of the labour force, an economy hit by an asymmetric shock would either recover fully or remain permanently below its growth trend. In the US, Blanchard and Katz showed that about one-third to one-half of the initial decline in employment would be offset by inflows of capital into the region in the three to four years following the shock.

In Europe, Decressin and Fatás (1995), and Bentolila and Jimeno (1998), have shown that real adjustment mechanisms (labour and capital) were mostly ineffective, and that there was an adjustment through higher unemployment and a lower participation rate. Martinez and Wasmer (1995) showed that population in the depressed region declined slowly after a negative shock in Europe and that employment remained permanently below its initial trend.

Bertola and Ichino (1995) suggested that the explanation for the persistence of unemployment in Europe in the 1980s and 1990s was a lack of labour mobility. Their viewpoint is that income compression in Europe prevents wages from being sufficiently attractive to workers in the dynamic regions and unemployment benefits from providing sufficient incentive to work in the depressed regions. *A contrario*, the same argument can be used for the low attractiveness of depressed regions to employers and capital, if wage compression limits the magnitude of wage cuts.

When the above mechanisms do not operate, we are left with a third adjustment mechanism, **the fiscal channel**, involving *net* fiscal transfers (i.e. lower tax contributions or higher gross transfers). A vast body of literature (initiated by Sala-i-Martin and Sachs, 1992 and Von Hagen, 1992, and extended

with Asrubdali et al., 1996, Sorensen and Yosha, 1998, Ostergaard et al., 2002, Kalemli-Oczan et al., 2003) has studied such transfers and the way they operate. The transfers range from automatic net transfer schemes such as social policies (unemployment benefits or lower tax bases or progressive tax rates), to transfers operating through political decision-making processes and targeting regions or industries in decline, either at the national level or at the EU or federal level (Structural and Cohesion Funds in Europe, Canadian transfers across provinces).

Throughout this report, we shall discuss those adjustment mechanisms at two separate levels: country and regional (defining regions as NUTS2 or NUTS3 when data are available). There is no conceptual difference between the two levels of discussion: most adjustment mechanisms can be found at both levels and, qualitatively speaking, act in a similar way. The only difference is a quantitative one: first, one can expect much less mobility from factors of production between countries, as compared to mobility between regions within a country. This is the case, in particular, of unskilled labour and, especially, of older workers. We also expect less mobility of skilled labour and capital, even though these factors have become increasingly more mobile over the past decades. The magnitude of fiscal transfers across regions of a same country, in contrast, is larger than across countries, given the limited scope of European programmes. A few decades ago, the existence of episodes of adjustment from currency depreciation would have provided a major difference between country-level and regional-level analysis. This adjustment mechanism no longer exists. So, and to a large extent, this undermines the whole point of a distinction between regional-level and country-level analyses of labour market adjustments. Different labour market institutions – which are mostly country-specific and therefore do not vary much between different regions within the same country – provide one last distinction for regional and country-level analysis. But, again, this will not generate drastically different results in the dynamics of regional-level adjustment compared to country-level adjustment.

New issues since the EMU

If the literature discussed above focused on the level and persistence of high unemployment in Europe until the mid 1990s, as well as the ability or inability of countries to cope with the euro, the terms of the debate have shifted since then and new issues have appeared.

First and importantly, the EMU does not, by definition, allow for adjustments through devaluations. This implies that the dynamics of adjustments of labour markets are now constrained to real channels: labour mobility as well as other channels such as capital flows. The focus has also shifted to a new real channel of adjustment, which would operate through the goods market: product market regulations

may prevent new firms from being created and from growing, thus preventing the development of new sectors. This is the view taken for instance in Blanchard and Giavazzi (2003). More generally, the labour literature has put great emphasis on the role of employment protection legislation in reducing both labour hires and layoffs, as well as political complementarities arising from the insider-outsider political process. See Saint-Paul (2000).

Another issue has emerged: alongside the process of enlargement and the successive rounds of negotiations on trade policies, current debates are now shaped by **anti-globalisation sentiment**, as the negative vote on the referendum in France and the Netherlands have shown. Many citizens in Europe perceive the process of European integration as a threat and would prefer to maintain trade barriers even at the cost of slower growth, rather than continue with the process of integration. Such feelings are, for instance, well captured by opinion polls on further trade integration conducted by the German Marshall Fund (2006). See the next chart.

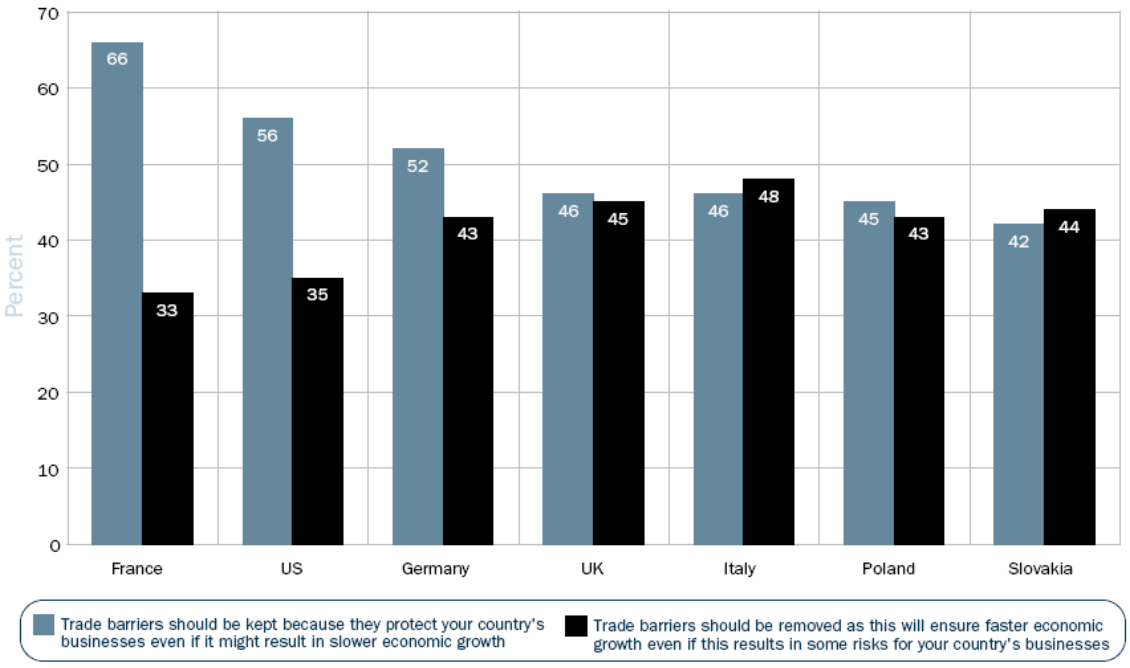


Fig. A-1: Sentiment on trade. Source: German Marshall Fund.

This chart, from the German Marshall Fund (2006 edition), illustrates the reluctance to accept trade integration of workers in Germany and France, and, to some extent the US (as compared, for instance, to the UK). In a nutshell, the debate now boils down to how to deal with the fear of globalisation and what kind of tools Europe can develop to accommodate workers and citizens who fear losing jobs due to reallocation shocks and external trade adjustment.

We believe that such anti-globalisation feelings illustrate a new issue, in line, precisely, with the lack of mobility discussed in this report: European workers are relatively specialised and fear globalisation, that is, they perceive it as threatening some of their industries, and institutions are not mobility-friendly, which tends to deprive them to some extent of the possibility of finding a new job elsewhere.

A recent initiative, the European Globalisation Fund, is precisely an attempt to deal with globalisation in the context of mass restructuring, on a relatively limited scale so far (€500 million per year for the whole EU27). The objectives of the Fund state that support to displaced workers will be provided when displacement occurred due to changes in world trade patterns and in the context of mass layoffs[1]. See Wasmer and von Weizsäcker (2007) for an analysis and proposals of the European Globalisation Fund.

Summing up, post-EMU factors of adjustment are still considered to be the same as in the pre-EMU period, but with a greater focus on skill depreciation and on imperfections in other markets (in particular product market regulations).

Policy perspectives

The European Commission (2007a, 2007b) has produced a number of policy recommendations aimed at improving the efficiency of labour market adjustment in a context of asymmetric shocks. The lack of mobility in particular has been emphasised forcefully in the first of these two reports, which argues that "***Geographic labour mobility can play an important role as an adjustment mechanism in EMU, especially in the event of permanent shocks*** *requiring a reallocation of production factors such as a decline in the working-age population due to ageing sectoral and structural changes related to globalisation or technological change, or regional differences in structural unemployment.*" The report also rightly argues that margins of actions to increase mobility across countries will necessarily be limited and may not even necessarily be desirable. We agree with the statement of limited margins of actions here, and in turn expect more from intra-country mobility.

Three categories of reforms are emphasised in the reports. First, European legislation should relax constraints in terms of working time organisation by allowing for more flexible labour contracts. Absent the possibility of reducing the number of hours worked, a typical firm may decide to lay off and

[1] E.g. if there are at least 1 000 redundancies over a period of 4 months in an enterprise in a Member State, including workers made redundant in its suppliers or downstream producers, or at least 1 000 redundancies, over a period of 9 months, particularly in small or medium-sized enterprises, in a sector in one region or two contiguous regions.

so adjust through employment. Secondly, institutions should allow for better wage flexibility. Downward wage rigidities may lead to labour market adjustment though decreased participation and increased unemployment. A better bargaining structure would allow for better wage flexibility. Thirdly, labour market institutions tend to deter labour mobility. In particular, stringent employment protection legislation, high tax wedges, high unemployment benefits, and weak active labour market policies are an impediment to labour mobility and tend to depress employment rates. In addition, other institutions may limit within- and between-country labour mobility. Inefficient housing markets and limited portability of pensions, for instance, also strongly reduce the incentives to migrate to another EU country.

We share the view that real channels such as labour mobility do not operate fully due to immobility-friendly institutions hampering cross-country mobility (such as non-portability of pensions and other rights) and hindering any type of mobility (such as unemployment benefits, imperfections in the housing markets, local social policies such as welfare and, lastly, the existence of accumulated specific skills at the sector level and local social capital accumulated through expectations of low future mobility). As we argue in Part B, Section 3-6, those factors tend to compound into a number of self-reinforcing mechanisms and vicious circles leading to low mobility – which, by definition, is hard to remedy through soft (that is, marginal) policies. This is the idea of **multiple equilibria**. In the presence of multiple equilibria, it is hard to switch from the socially less desirable equilibrium to the more desirable equilibrium with gradual reforms. Such reforms (e.g. cutting back benefits, reducing employment protection) will reduce worker welfare but might not be sufficient to reach the new equilibrium. This does not mean that these reforms should be discarded: it simply means that their likely outcome in the short run will be limited in a world of multiple equilibria.

The alternative real adjustment mechanisms cannot operate much better: capital inflows into depressed areas cannot benefit from lower wages due to a lack of downward mobility and, typically, would also have to cope with an ageing, specialised workforce, with generally low education levels and obsolescent skills.

Lastly, fiscal adjustment (that is, net transfers to depressed regions), leads to moral hazard problems highlighted, for instance, in Persson and Tabellini (1996). In particular, we think that transfers to industries in decline and aid to regions, when not channelled towards investment in new technologies and in public infrastructure, are strong disincentives to immobility and mostly serve to postpone more radical decisions about industry structure. Subsidies for fishery are a good example of a transfer leading to moral hazard: France's fishing industry, for example, instead of financing training and

redeployment opportunities for a number of its workers, was recently awarded tax breaks to contain the consequences of the increase in oil prices.

For all these reasons, we believe that solutions outside the labour markets should also be explored – perhaps, indeed, first of all. A wide deregulation and pro-competition policy in services, taxis, telecoms, legal jobs, accounting and finance would first generate a surge in hiring. At the same time, bottlenecks arising from the lack of geographical mobility (housing market regulations, passive unemployment benefits, dependence on local councils for housing or transfers) should be removed.

In support of those claims, our analysis in Part D shows the importance of product market regulations (PMR) and housing market regulations (HMR) on diverging dynamics of labour markets. High PMR countries and high HMR countries face very persistent labour markets. We also find that fluctuations in unemployment are more moderate in high tax countries, i.e. that the fiscal channel works effectively. This, however, comes at a cost: the high tax environment generates more persistence in labour markets.

Lastly, the development of super-active schemes, such as subsidies for mobility and wage insurance in the case of layoffs in restructuring sectors, would complement the first two avenues. For a discussion of the way the European Globalisation Fund should be interpreted and possibly extended, see Wasmer and von Weizsäcker (2007). Those should be combined with productivity-enhancing policies such as detailed in Blanchard (2006b) and discussed in part B of this report.

PART B. A SURVEY

In what follows, we develop a discussion of the various adjustment factors studied in the most recent literature. We start with the comparative exercises measuring and characterising adjustment patterns in the labour markets in Europe and the US, either at the country level or at the regional level. We then study the role of institutions, geographical labour mobility and occupational mobility and specific skills, the existence and strength of fiscal adjustments in both European regions and across US states, and, lastly, other issues such as social capital and imperfections in goods markets and in housing markets. In a second part, we attempt to summarise the post-EMU literature. It is noted that very few articles on labour adjustment have been published in the post-EMU period, which suggests the pressing need for additional works – and, in particular, to measure the impact of institutional mechanisms on labour market dynamics.

1. Pre-EMU: labour mobility, regional dynamics

Labour mobility is the first channel of labour market adjustment. In an influential paper, Blanchard and Katz (1992) developed an interestingly simple methodology to measure local labour market imbalance and the dynamics of adjustment. Indeed, in an economy where certain regions are declining and others are booming, we expect higher wage growth in the latter. Perfect labour mobility implies movements of workers from the regions where working conditions are less appealing. On the other hand, we could expect declining wages in the depressed regions to promote local job creation. This, however, might not occur in the short run if there are real wage rigidities (see the related section in this survey).

The study for the US by Blanchard and Katz (1992) indeed shows that, after a state is hit by a negative shock, firms leave and the adjustment takes place through an increase in migration of workers to other states. And, as a matter of fact, downward wage rigidity does not allow job creation to recover immediately.

This ideal situation (relatively high mobility of labour across regions) is not necessarily applicable in Europe for several reasons detailed in the survey. In particular, direct obstacles to mobility and various forms of friction may hinder worker movements to other regions. Decressin and Fatás (1995) study European economies over the period 1975-1987. They base their methodology on Blanchard and Katz (1992). Quantitatively, they show that, while the adjustment takes place through higher migration in the US, a large part of this adjustment in Europe operates through a decrease in labour market

participation instead. This study concludes that barriers to mobility can imply that the economy adjusts by increasing non-participation rather than by increasing mobility.

The figure below illustrates the different adjustment paths for Europe and the US as measured by these two studies. The upper graph (Europe) clearly shows that a positive labour demand shock is accompanied by a higher increase in participation than in the US (lower graph), where most of the adjustment operates through labour mobility.

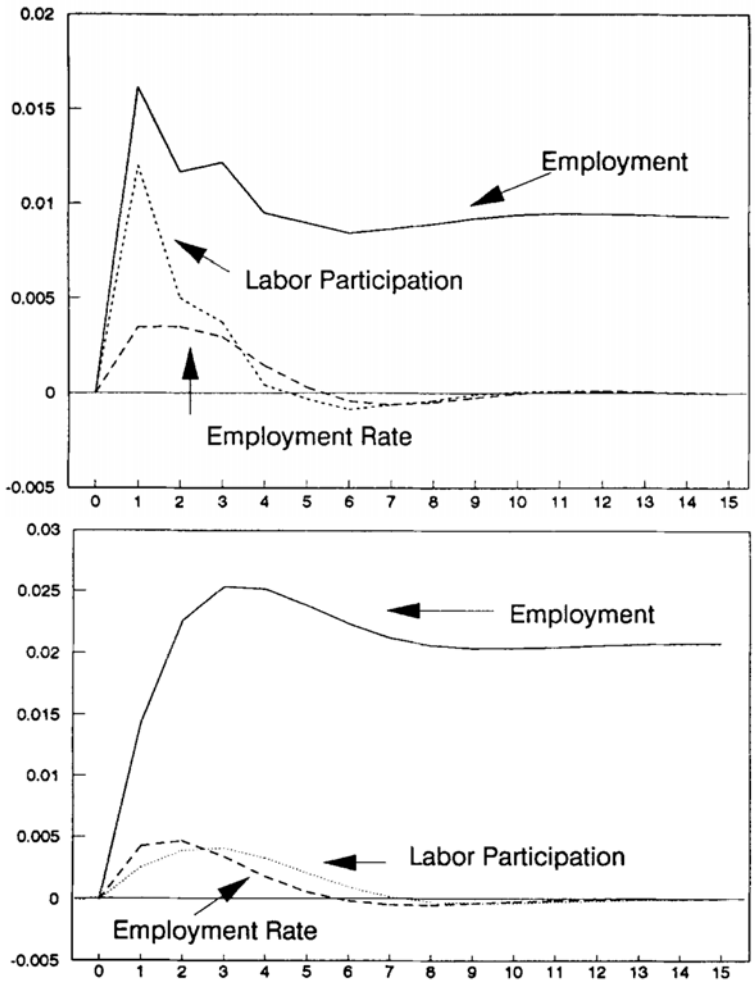


Fig. B-1: Response of employment, employment rate and participation to a labour demand shock in both Europe (upper graph) and the US (lower graph). Source: Decressin and Fatás (1995).

Obstfeld and Peri (1998) reach a similar conclusion. They consider three adjustment margins: geographical labour mobility, price adjustment and fiscal transfers. Given that labour mobility is much weaker in Europe than in the US, and that prices are quite sticky, they contend that Europe prefers to rely on fiscal transfer as an insurance against adverse regional shocks. In his comment on the paper by

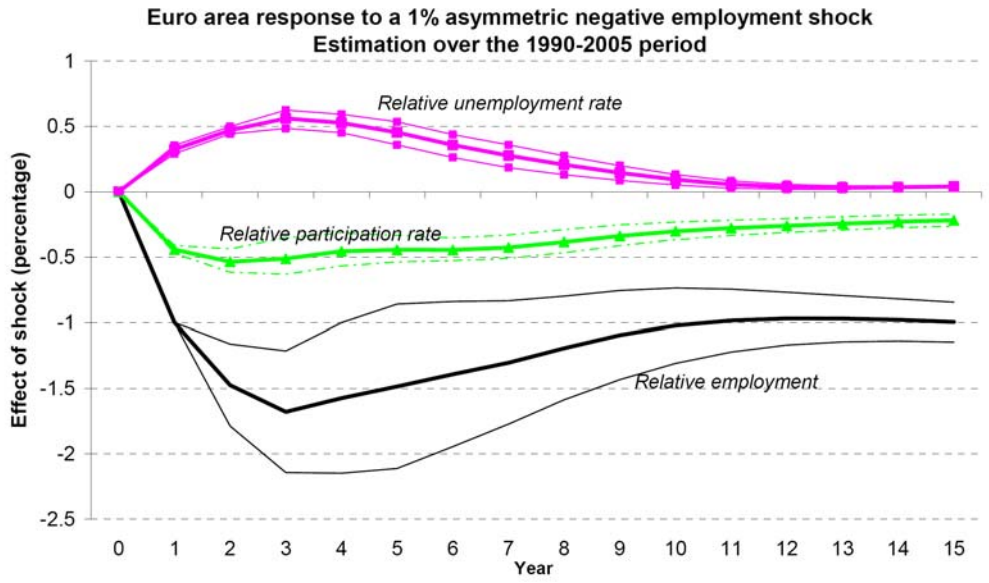
Obstfeld and Peri (1998), Blanchard insists that fiscal adjustment should not be regarded as the solution to the problem of low mobility in Europe since, he argues, it merely delays that solution. Patterson and Amati (1998) also highlight the importance of fiscal federalism. Policies are already in place at the European level (the Structural Funds and the Cohesion Fund are two examples).

However, more work is needed to disentangle the role that the various institutions play in this difference in labour market dynamics. The simple specifications used in those papers can be extended, at relatively low cost, to measure the role of each institution, which is done in Section D (see e.g. Fig. D-6).

2. Pre-EMU: labour mobility, country dynamics

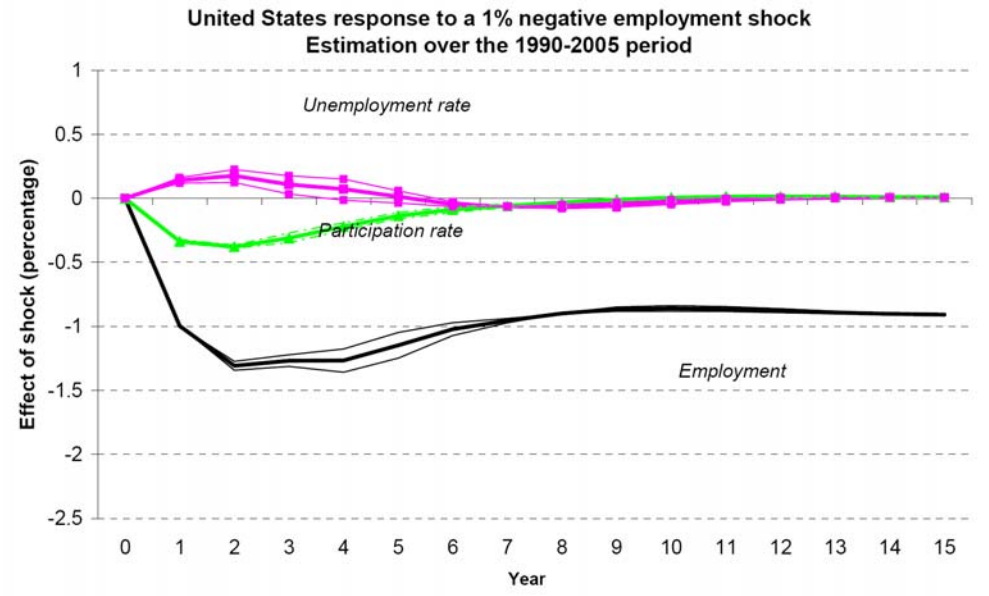
Beyond regional differences in labour markets, various authors have attempted to investigate country dynamics in the labour market. The conclusions derived with regional data about differences between Europe and the US remain valid so far with data at the country level. We now present a few applications of Blanchard and Katz's methodology such as Bruno and Fuss (1999) and, more recently, DGTPE (2007) and L'Angevin (2007). They all rely on national rather than regional data. Bruno and Fuss (1999) focus on EU12 (minus Luxembourg) over the period 1966-1993. They conclude that there is no common European adjustment mechanism and that asymmetric shocks are large.

On the other hand, DGTPE (2007) and L'Angevin (2007), who study a rather more recent period (until 2005), find that labour-market response to asymmetric shocks is tending towards that observed in the US. The following figures are taken from L'Angevin (2007) and corroborate this claim.



Bands of one standard error are represented by dotted lines.

Fig. B-2: Response of employment, employment rate and participation to a labour demand shock in Europe. Source: L'Angevin (2007).



Bands of one standard error are represented by dotted lines.

Fig. B-3: Response of employment, employment rate and participation to a labour demand shock in the US. Source: L'Angevin (2007).

3. Possible causes for diverging labour market dynamics

In this part, we will study the possible determinants behind the different adjustment patterns in the EU and US. We first consider country-level institutions and country unemployment dynamics. Then we look at geographical mobility, occupational mobility and working hours as dimensions of adjustment. We conclude that the first two dimensions are absent from the dynamics of adjustment in Europe.

3. 1. Labour market institutions

Steve Nickell (2003) proves helpful to analyse the role of institutions at the country level. In a recent paper, he (ibid) noted that "*Average unemployment in Europe today is relatively high compared with OECD countries outside Europe. The majority of countries in Europe today have lower unemployment than any OECD country outside Europe, including the US. These two facts are consistent because the four largest countries in Continental Western Europe, namely France, Germany, Italy, Spain, (the Big Four), have very high unemployment and most of the rest have comparatively low unemployment.*" As a matter of fact, since the 1990s, a number of (smaller) countries have managed to reform their labour markets and the general level of unemployment in Europe has declined significantly. Table B-1 illustrates the pattern of reform in the pre-EMU period.

From the Early 1980s to the Late 1990s

'Policy' Changes

	Replacement Rate	Benefit Duration	Benefit Strictness	ALMP	Union Coverage	Union Density	Co-ordination
Europe							
Austria	X	-	-	-	-	v	X
Belgium	v	-	-	-	-	-	X
Denmark	-	X	v	vv	-	-	X
Finland	X	-	-	-	-	X	v
France	-	X	-	v	X	-	X
Germany	-	X	-	v	-	-	-
Ireland	v	X	-	-	?	v	v
Italy	X	-	-	-	-	-	v
Netherlands	-	-	v	v	-	-	v
Norway	X	X	v	v	-	-	X
Portugal	X	X	-	v	-	vv	-
Spain	v	-	-	-	X	-	-
Sweden	X	-	-	-	-	-	X
Switzerland	XX	X	-	v	-	-	X
UK	v	X	v	X	vv	v	-
Non-Europe							
Australia	-	-	v	v	-	v	X
Canada	v	X	-	-	-	-	-
Japan	X	-	-	-	-	-	-
New Zealand	-	-	-	X	vv	v	XX
US	-	-	v	-	-	-	-

Notes:

(i) v implies 'good' shift, X implies 'bad' shift.

(ii) See Table 8. Replacement rate change (1980-87 to 1999) greater than 0.04 implies X, less than –0.04 implies v. Double X or v for changes in excess of 0.25. The latter does not apply to Italy because the figure in the 1999 column refers to so few people.

(iv) See Table 9. Duration index change (1980-87 to 1999) greater than 0.1 implies X, less than -0.1 implies v. Double X or v for changes in excess of 0.5.

(v) See Table 10 and the discussion in OECD (2000), Chapter 4. Author's judgment based on this information.

(vi) See Table 11. Change (1985/9 to 1993/8) greater than 0.2 implies v, less than –0.2 implies X. Double v or X for changes in excess of 0.5. Bracketed amount must move in the same direction by 0.05.

(vii) See Table 12. Coverage change (1980 to 1994) greater than 0.1 implies X, less than –0.1 implies v. Double X or v for changes in excess of 0.3.

(viii) See Table 13. Density change (1980-87 to 1996-8) greater than 10 implies X, less than –10 implies v. Double X or v for changes in excess of 30.

(ix) See Table 14. Co-ordination (Type 2) change (1980-87 to 1995-99) greater than 0.5 implies v, less than –0.5 implies X. Double X or v for changes in excess of 1.0.

(x) See Table 15. Employment protection change (1980-87 to 1998) greater than 0.2 implies v, less than –0.1 implies X. See Table 16. Taxes and change (1980-87 or 1988-95 to 1996-2000) greater than 0.07 implies X, less than –0.07 implies v.

Table B-1: Institutions in the labour market and unemployment variations. Source: Nickell (2003).

	Employment Protection	Labour Taxes	Total v	Total X	Unemployment 1980-87	Unemployment 2000-01	Unemploymen Change
Europe							
Austria	-	X	1	3	3.1	3.7	0.6
Belgium	v	-	2	1	11.2	6.8	-4.4
Denmark	v	-	4	2	7.0	4.4	-2.6
Finland	v	-	2	2	5.1	9.4	4.3
France	X	-	1	4	8.9	9.0	0.1
Germany	v	-	2	1	6.1	6.4	0.3
Ireland	-	v	4	1	13.8	4.0	-9.8
Italy	v	X	2	2	6.7	8.4	1.7
Netherlands	v	v	5	0	10.0	2.6	-7.4
Norway	v	-	3	3	2.4	3.6	1.2
Portugal	v	-	4	2	7.8	4.1	-3.7
Spain	v	-	2	1	17.6	13.5	-4.1
Sweden	v	-	1	2	2.3	5.5	3.2
Switzerland	-	-	1	4	1.8	2.6	0.8
UK	-	v	6	2	10.5	5.2	-5.3
Non-Europe							
Australia	-	?	3	1	7.7	6.5	-1.2
Canada	-	X	1	2	9.7	7.0	-2.7
Japan	-	-	0	1	2.5	4.9	2.4
New Zealand	-	?	3	3	4.7	5.7	1.0
US	-	-	1	0	7.6	4.4	-3.2

Table B-1 (continued): Institutions in the labour market and unemployment variations. Source: Nickell (2003).

Nickell counted the number of "ticks" (Vs in the table) as good reforms, and "crosses" (Xs in the Table) as bad reforms, and provides the following regression:

Unemployment change (80/87 to 00/01, in %) = 0.25 – 1.25 ticks +1.21 crosses

with an R-square of 0.51 and 20 countries. The respective t-statistics on the ticks and crosses coefficients are 3.1 and 2.2, thus quite significant. The regression suggests that the difference between the "Big Four" and smaller countries lies in their ability to undertake "good" reforms and to resist "bad" ones, despite their short-term popularity. At the sub-country level, when analysing the role of institutions and notably their impact on adjustment, we will have to impose country effects for the typical response of a region.

3.2. Wage flexibility

Markets typically adjust to changes in demand through prices. Are prices flexible enough to cope with temporary or permanent imbalances between demand and supply? It depends on the specific markets considered. In the particular case of labour markets, the price is workers' wages and it can be relatively slow to adjust. We review here two recent papers on nominal and real wage rigidities. In

Dickens et al. (2007), the authors have exploited a common methodology to compare the evolution of wages of individual workers in 16 countries. They typically find that the distribution of nominal wage changes is non-normal and asymmetric, with a peak in zero. They argue that dividing the number of workers facing no wage change by the total number of workers facing either a negative change or no change in nominal wages, is a measure of the number of *potential negative changes* in wages that have been prevented by wage institutions. It is thus a good measure of nominal rigidity. As regards real wage rigidity, they also observe a peak in the distribution of real wage changes, this time around the "expected" rate of inflation. It therefore seems straightforward to adapt the previous methodology to obtain a measure of real wage rigidity: by dividing the number of workers with a wage increase equal to the expected inflation rate by the total number of workers facing a wage increase less than or equal to expected inflation. The outcome is represented in Fig. B-4. The US is a country with relatively high nominal wage rigidity but little real wage rigidity, thanks to the "grease" of inflation. In other countries such as Sweden and Finland, but also Belgium and Austria, the amount of real wage rigidity is quite high, reflecting instead the "sand view" of inflation: with automatic indexation, real wages do not fall. In addition, inflation distorts price signals: wage changes have little informational content when inflation is higher, distorting economic decisions.

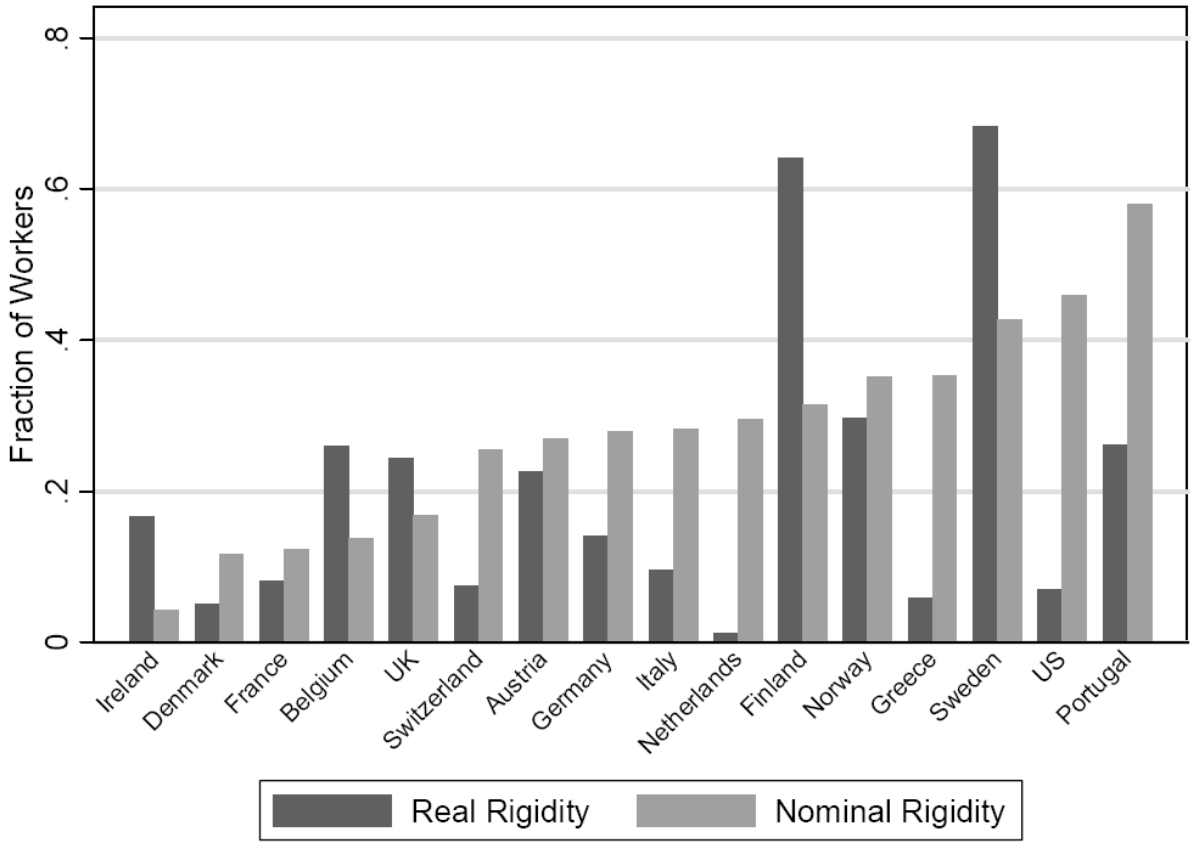
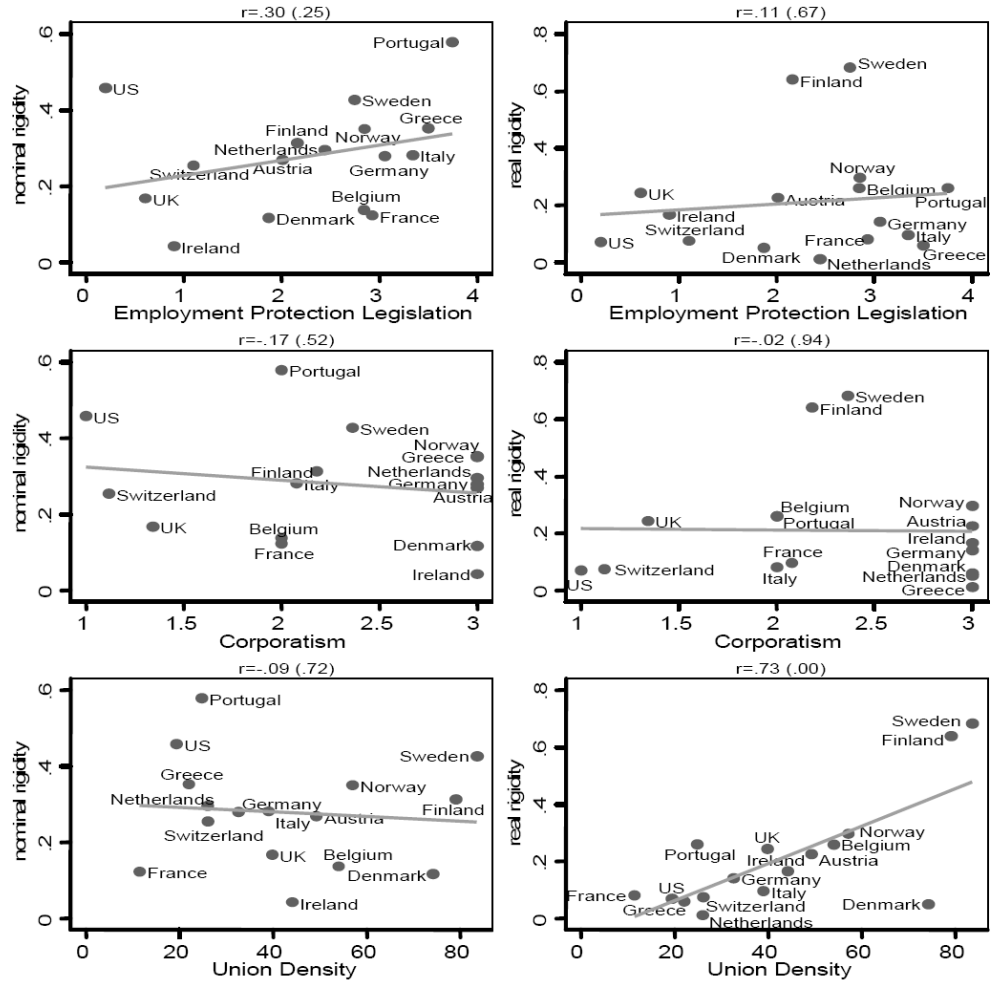


Fig. B-4: Real and nominal rigidity by country, fraction of workers potentially affected

Source: Dickens et al. (2007).

They also argue that real wage rigidity is due to union density, as reported in Fig. B-5, while nominal wage rigidity is positively, although weakly, due to the stringency of employment protection legislation. These are correlations and, of course, the interpretation in terms of causal effects is difficult: it is actually impossible to infer the consequence of a change in EPL, say, on the changes in wage flexibility that may be expected from such a reform. These are only suggestive evidence.



r= correlations with significance levels in parenthesis

Correlations of Institutional Variables with Rigidity Measures

Sources and definitions:

Aggregate EPL: OECD (2004), Index of the strictness of employment protection legislation, Categorical variable coded 0 to 6, where 6 is most restrictive

Corporatism: Elmeskov, Martin and Scarpetta (1998), Wage-bargaining corporatism index, summary measure of collective bargaining structures of centralization and coordination, Categorical variable coded 1= low to 3 =high

Union Density: Elmeskov, Martin and Scarpetta (1998), The proportion of workers who are members of a trade union, in percent.

Fig. B-5: Nominal and real wage rigidity and labour market institutions. Source: Dickens et al. (2007).

Part II (Special Focus) of a recent report by the European Commission (DG Economic and Financial Affairs, 2006) surveys recent changes in labour costs and nominal rigidity of wages in Europe. Notably, the report compares pre-EMU and post-EMU wage flexibility (page 108, graph 66), and the distribution of wage cuts and wage increases (page 109, Table 23). The data used are from the EU KLEMS database, which covers all EU25 countries plus the US and Japan over a fairly long period of time (1970 to 2004 in the case of Western Member States and 1995 to 2004 in the case of new Member States).

Overall, it appears that the post-EMU period is not associated with less nominal rigidity. In contrast, the report states that "*Compared to the high inflation years of the 1980s, more frequent relative wage cuts are observed in some countries during the 1990-1998 period (Austria, Belgium, Finland and Italy). However, since 1999, relative wage cuts appear less frequent*." The report links the low and stable inflation of the post 1999 period to the difficulty of adjusting wages downwards, as expectations of inflation are relatively clear and workers negotiating wage changes therefore have no room to make a "mistake".

The weak influence of EMU on wage flexibility is a result that also meets the conclusions by Arpaia and Pichelmann (2007). These authors estimate a wage equation for a panel of twelve European countries from the Eurozone over the period 1980-2005, including variables affecting the shape of the Phillips curve such as unemployment, productivity, lagged inflation and the labour share. Their specification allows them to disentangle between nominal and real wage rigidity depending on the variable considered. The former is represented by the elasticity of wage growth with respect to past inflation, while the latter considers the response of wages to shocks affecting the labour share. Their time-varying estimation suggests that real wages were increasingly more rigid as time goes over the period 1997-2005. The time-varying estimation suggests that real wages became increasingly more rigid with time over the period 1997-2005.

Lastly, the report by the European Commission also defines a measure of downward wage rigidity by comparing the fraction of total wage changes to the fraction of productivity changes in order to derive a measure of "prevented wage cuts". A positive difference indicates that negative wage changes are less frequent than negative productivity changes, pointing to a higher degree of nominal wage rigidity. This number is highest in Finland, Greece, Ireland, the Netherlands (to a lesser extent) and Portugal over 1999-2004.

Summing up, the issue of relative wage rigidity is important but it is difficult to measure. It may be interesting, in the future, to develop alternative measurement strategies based on the regional dimension. For instance, it may be interesting to measure to what extent a NUTS2 or NUTS3 region affected by a negative asymmetric shock faces an average decline in wages. Regional wages are available in the US from the CPS and have been used by Blanchard and Katz (1992). They indeed decrease, contributing to local adjustment and in turn generating capital inflows for the region. In Europe, conventional wisdom is that regional wages do not decrease enough to attract capital. As we will see later, this is partly due to other mechanisms of adjustment, in particular fiscal adjustment.

3.3. Geographical mobility

We show here that, on average, geographical mobility is lower in Europe – but that this is not true of all countries in Europe (the Nordic countries being an exception). We then investigate whether low mobility stems from skills and education. Rupert and Wasmer (2007) undertook a comparative study of mobility in Europe and the US based on the Census in the US and the European Community Household Panel in Europe. We can see from Table B-2 that mobility is, on average, a third of that in the US. In other words, 15.5% of American residents move yearly for one reason or another (Census 2000). About two-thirds of these moves are within a county; the remainder to a different county. In other words, the inter-county mobility rate is approximately 5% a year, or around 14% over three years. The ECHP does not give more details on what is considered as a geographical area and whether this is fully comparable to counties in the US, so comparability of the second and third line of the table is subject to caution.

Fig. B-6 and Fig. B-7 from other sources present similar differences between Europe and the US. In Fig. B-6, notably, we can observe that the difference between Europe and the US is sharper in the case of Southern European countries and much more modest in the case of Scandinavian countries. This interesting finding should be included in the analysis of the role of institutions on mobility. Another interesting difference, in Fig. B-7, is that geographical mobility of individuals peaks in the US between 20 and 24 years, while it monotonically declines in Europe from age 16 (Fig. B-7).

	US	EU15
Mobility rate	15.5%	4.95%
Share within county / area	0.67	0.83
Share between county / area	0.33	0.17

Table B-2: Mobility in the US and EU.

Source: Rupert and Wasmer (2007), data source: US Census 2000, ECHP years 1999-2000-2001.

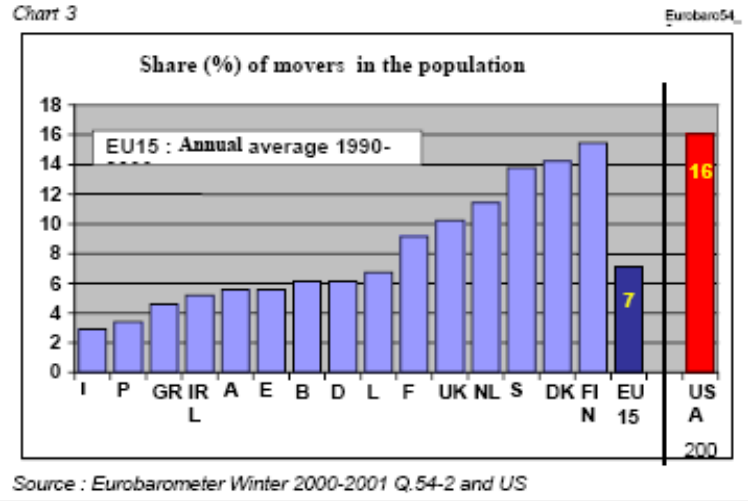


Fig. B-6: Share of movers in the population. Source: US Department of Labor, Bureau of International Affairs & European Commission, Directorate General Employment and Social Affairs.

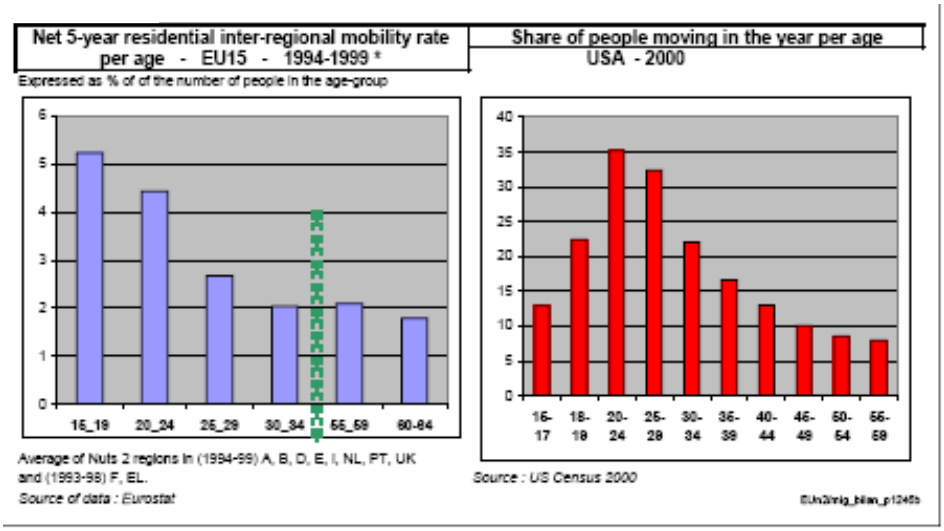


Fig. B-7: Regional mobility in Europe and the US. Sources: US Department of Labor, Bureau of International Affairs & European Commission, Directorate General Employment and Social Affairs.

3.3.1. The causes of low mobility

Low mobility in Europe could be due to differences in the individual underlying shocks driving mobility. This question can be broached by comparing the causes of residential mobility in the two databases. We provide here a calculation of residential mobility outside the current "area" as defined in the European Community Household Panel (Table B-3), and distinguish "Any reason" and "Job-related reasons". Interestingly, the causes break down into roughly similar proportions in Europe and in the US – in the case of intra- or inter-area mobility alike.

	US		
All pop. (1+)	intra-county	inter-county	all
Work related	5.6%	31.1%	16.2
Family related	25.9%	26.9%	26.3
House related	65.4%	31.9%	51.6
Others	3.0%	10.1%	6.0
All reasons	100%	100%	100
	EU15		
	intra-area	inter-area	all
Job related	7.61%	40.0%	14.3%
Personal Reason	31.6%	29.8%	31.3%
House Related	59.1%	28.1%	52.7%
Not Available	1.7%	2.11%	1.8%
All reasons	100%	100%	100%

Table B-3: Reasons for moving, US and EU 15

Source: Rupert and Wasmer (2007), data source: US Census 2000, ECHP years 1999-2000-2001.

Combined with Table B-2 providing mobility rates regardless of the reason for moving, one noteworthy implication of Table B-3 is that, despite the fact that mobility is three times lower in Europe than in the US (Table B-2), the proportion of family-related, house-related and work-related mobility rates within each area is roughly the same: e.g. 5.6% of all moves within a county are due to work-related reason in the US, while the corresponding number is 7.61% in Europe. Most numbers in the table are indeed relatively similar. This is a finding which, in our view, can be interpreted as follows: European households face the same type of shocks as households in the US, but are three times less likely to move geographically in response to said shocks. It follows that there are presumably large obstacles to mobility in the housing markets, beyond the "immobility-friendly" institutions on the labour markets.

Finally, it is worth noting that job-related mobility in the US seems to be high enough to lead to adjustment, despite the fact that it represents a minority of all residential moves.

Other statistical sources emphasise the low mobility rates in Europe. Vandebrande et al. (2007) calculated the fraction of individuals having never moved after they left the family home: this fraction is around 17% in Europe, and reaches one-third in countries where unemployment has been traditionally high, such as Spain, for instance. See Fig. B-8.

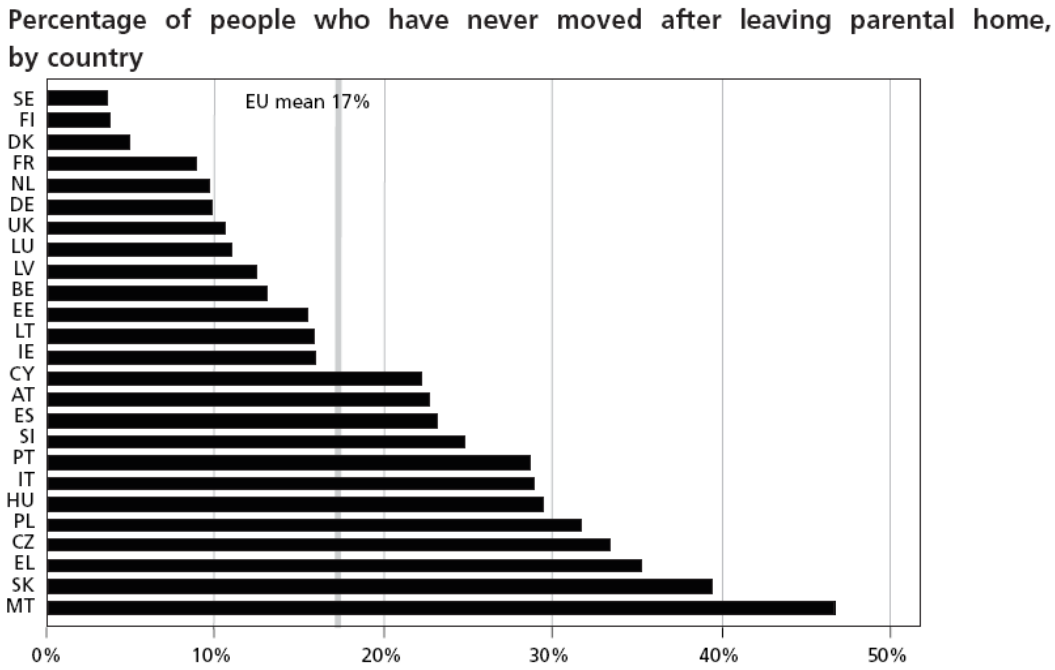


Fig B-8: Mobility in Europe.

Source: Vandenbrande et al. (2007).

In the next chart from the US Census Bureau (2000), we can observe reasons for moving among those who moved. Most intra-county mobility is housing-related, while work-related mobility is approximately one third of inter-county moves. Family-related mobility is a constant proportion of all moves.

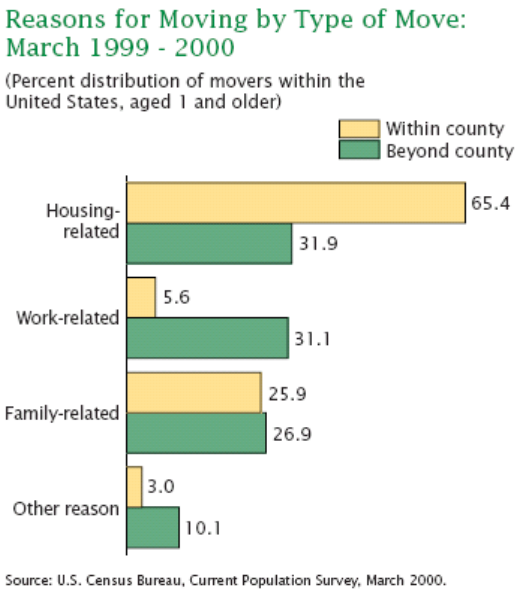


Fig. B-9: Reasons for moving in the US.

Source: US Census Bureau.

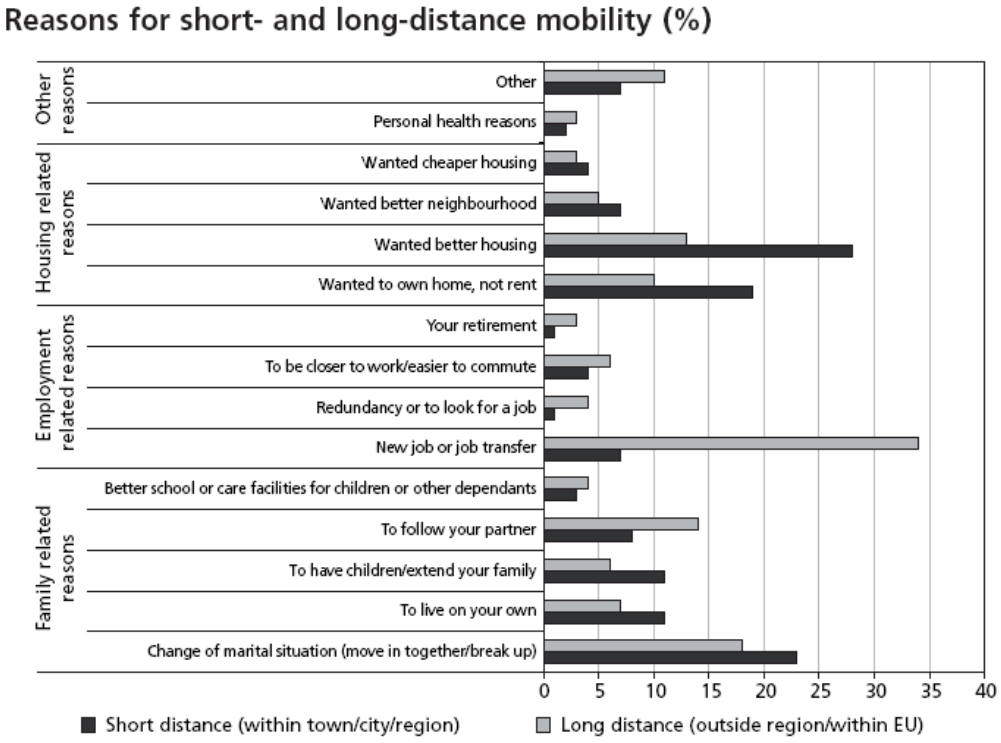


Fig B-10: Reasons for moving in Europe.

Source: Vandenbrande et al. (2007).

The literature on this topic has also highlighted the fact that other factors can influence inter-regional migrations and that inverse causality between mobility and unemployment is possible. For instance, Bentolila (1997), in the case of Spain, and Pissarides and Wadsworth (1989), for the UK, have shown that, on the one hand, regional differences in unemployment are an incentive for inter-regional mobility but that, on the other hand, a high national level of unemployment tends to reduce incentives to move. The idea here is that unemployed workers do not necessarily want to pay the cost of migrating to the more dynamic regions if it is very likely that they will remain unemployed there.

Fidrmuc (2002) confirms this finding in the case of transition economies. He argues that the increase in unemployment over the past years in those countries has resulted in lower geographical mobility because it has reduced incentives to move.

3.3.2. Mobility by skill level and education

Other works by McCormick (1997) and Wasmer et al. (2005) suggest that migration costs are higher for the unskilled. As shown in Fig. B-11 and Table B-4, the less mobile in Europe are the less skilled. In contrast, Fig. B-12 reports that there is no systematic association between education and mobility in the US, or perhaps even the opposite in the case of 30-34 years old workers: those with less than 12 years of education appear to be the most likely to migrate in the US. In other words, the negative effect of insufficient mobility in Europe seems to primarily affect the least skilled. In most European countries, according to the next figure and the next table from Wasmer et al. (2005), education and geographical mobility are positively related. More educated workers are more mobile – for reasons that still have to be understood. Is it because the economic opportunities of moving are higher for the most skilled workers? Or because the Welfare State in Europe encourages low mobility in the case of the less skilled, often also unemployed, workers? Is it because there are many costs associated with mobility, such as important security deposits that unskilled workers may not be able to pay? Or, lastly, is it because there are important psychological mobility costs in Europe that prevent mobility among the less skilled, who do not have the social capital for mobility? All these factors are potentially important. This is an important research agenda that we could not explore in this report, in part due to the lack of long time-series labour market data by skill category. More precise answers to those questions would require ambitious data collection and more specific work based on microeconomic data and individual surveys, beyond the scope of this report.

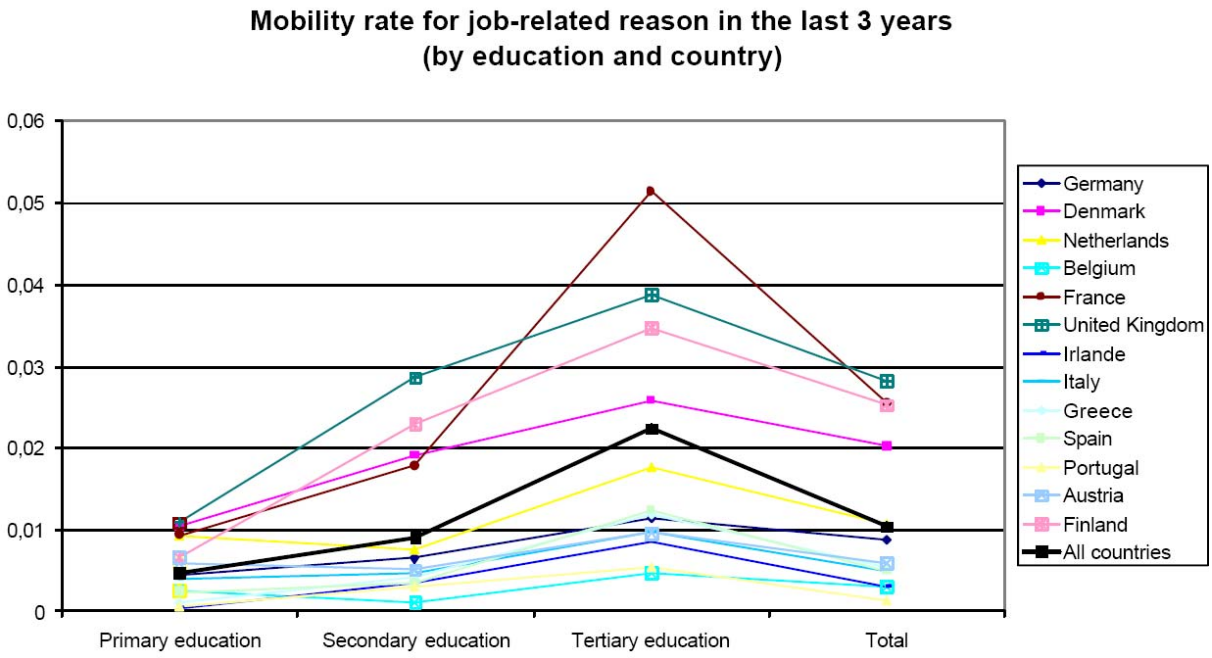


Fig. B-11: Mobility rate in the last three years, job-related reason & outside the area/city, by education (EU15 less Luxembourg and Sweden, 1995-2001)

Source: Wasmer et al. (2005).

	Mobility rate, Any Reason	# obs.
All	0.145	750168
Primary	0.113	730422
Secondary	0.154	730422
Tertiary	0.205	730422
	Mobility rate, Job-related Reason	# obs.
All	0.083	58337
Primary	0.055	57093
Secondary	0.080	57093
Tertiary	0.110	57093

Notes: Samples. Any reason: all EU15 population 15-65, 1995-2001; job-related reason: active population, 15-65 of head of households, EU15 less Luxembourg and Sweden, 1995-2001. Survey weights.

Table B-4: Mobility experience in the last three years, by education.

Source: Wasmer et al. (2005).

This means that it is even more important to understand the "mobility gradient" with respect to the education variable, which is more apparent in Europe than in the US, where mobility and education are unrelated. If anything, less skilled workers in the US (those below high-school level and even lower) appear to have slightly higher mobility rates than more skilled workers.

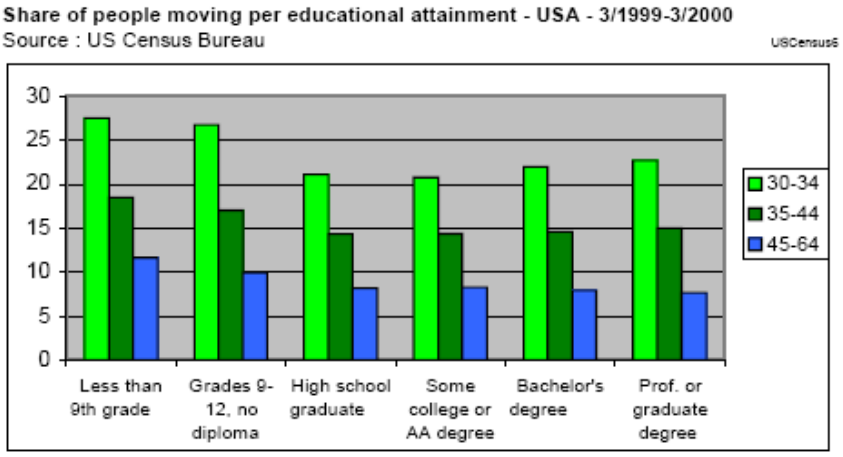


Fig. B-12: Education and mobility in the US.

Source: US Department of Labor, Bureau of International Affairs & European Commission, Directorate General Employment and Social Affairs.

3.3.3. East-West mobility

Another dimension of labour mobility in Europe is that of workers migrating from Eastern to Western countries. This has been a hot political issue for several reasons. First, in the West, workers may worry about it because they do not want to compete with Eastern workers and face either wage cuts or unemployment. This is especially true in a context of rigid labour markets where workers in the West are immobile and cannot move across sectors as stressed in Saint-Paul (2007). To assess the importance of this argument, Boeri and Brücker (2001) study the impact of enlargement through three channels: (i) trade, (ii) foreign direct investment and (iii) migration. Their main conclusion is that the third channel is the most important, while the first two are insignificant. Second, Western workers may worry about the fact that Eastern workers have access to welfare benefits in the West, which decreases their income through redistribution. For this reason, in another paper (Boeri and Brücker, 2005), the authors claim that Western countries should adopt a coordinated migration policy and exclude Eastern workers from welfare access.

However, despite the relevance of these issues, the literature on labour mobility in Eastern Europe has tended to focus on internal geographic mobility between regions in Eastern countries instead of migration from the East to the West. We therefore provide a brief review of this literature.

After the fall of the communist regimes, Eastern European economies experienced an important structural change for two reasons. First, while the allocation of factors of production had been state-

centralized, it then suddenly became determined by market rules. Hence, the transition to a market economy implied large reallocation of workers across regions and industries (Burda, 1993), which was accompanied by a large decrease in output and employment during the subsequent restructuring period. For instance, Burda and Hunt (2001) report a 30% decrease in output in Eastern Germany for the period 1989-1992, while employment decreased by 35% and the unemployment rate rose from barely 0% to a share of the active population between 15% and 33% depending on the measure of unemployment one looks at. It seems that the level of unemployment is still high as compared to the West. Secondly, at the same time, Eastern Europe started trading goods with the West, raising the weight of exporting industries and also enhancing labour reallocation (Lamo et al., 2006).

An interesting case for the analysis of labour mobility in Eastern Europe is the experience of German reunification. This is somehow an intermediate situation, between within-country labour mobility in Eastern Europe and East-West migration. Burda and Hunt (2001) analyse the evolution of productivity and unemployment in East vs. West Germany. They emphasize the remarkably slow transition in East Germany. In particular, they show that convergence in terms of Total Factor Productivity was not achieved at the time they wrote their study and conjecture that differences in terms of infrastructure can explain differences in terms of TFP, given that these differences appear for all skill levels.

A reason for the lack of convergence is a lack of geographic mobility, due to real wage rigidity, that is, too high wages in the East (Hunt, 2001). They were an impediment to interregional labour reallocation and maintained workers in the East. Specifically, high wages deterred employment of women (Hunt, 2002) and the elderly (Hunt, 2006). Second, fiscal transfers from West to East Germany have been important, which may be another reason why mobility has not reached the desired level.

In a non-German context, Boeri and Terrell (2002) analyse the situation in other Central and Eastern European economies. They also stress the lack of wage flexibility as an explanation of the low rate of geographic mobility. According to their study, non-employment benefits, such as unemployment benefits and other income provided by the state, could explain why the pace of reallocation is so low and so keep workers in inactivity.

3.4. Occupational and sector mobility

3.4.1. Facts

Many studies have suggested that a large share of human capital is specific to the sector (See Neal, 1995, and Parent, 2001) or occupations of workers (see Kambourov and Manovskii, 2008b). Other studies have also shown that it is sometimes specific to a particular job (see Topel, 1991).

Kambourov and Manovskii (2008a) and Hagedorn et al. (2004) have studied the evolution of occupational and industry mobility in the US and Germany respectively. They conclude that mobility rose in the US over 1968-1997. Occupational mobility increased from 10% to 15% at the one-digit level, from 12% to 17% at the two-digit level, and from 16% to 20% at the three-digit level. The corresponding increases in industry mobility are 7% to 12%, 8% to 13%, and 10% to 13%, respectively. The next figure illustrates this evolution:

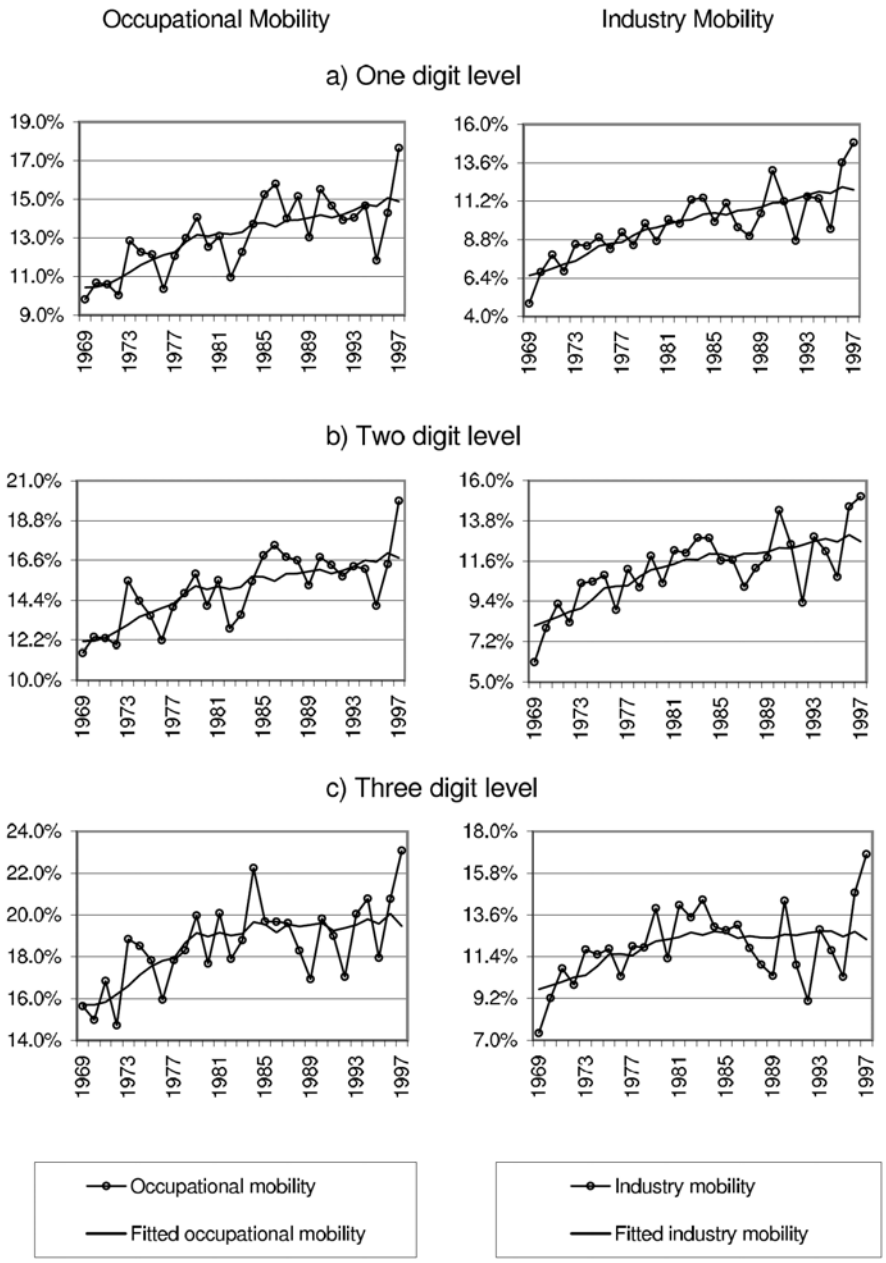


Fig. B-13: Occupational and industry mobility in the US.

Source: Kambourov and Manovskii (2008a).

These figures are relatively high – and have indeed been on an upward trend over the past decades – suggesting that labour adjustment has been effective in the US. There is thus far relatively scant available evidence in Europe, with one exception, Germany. Hagedorn et al. (2004) applied the same methodology to study occupational and industry mobility in that country. They used a large panel of male workers in West Germany over 1975-1995 and found annual occupational mobility rates of 12% at the three-digit level and industry mobility rates of 10% at the two-digit level, contrasting with the 17% corresponding rate in the US. They also found that the increase in mobility has not been as strong as in the US. We review the possible causes behind these differences below.

3.4.2. Causes: institutions and education

There are theoretical reasons for the link between specific skills accumulation and labour market institutions. Wasmer (2006) studied the relation between employment protection and the type of skills chosen by individuals. When employees, protected by layoff costs, anticipate longer careers, this raises the relative return to specific skills with respect to general skills, as workers obtain a reward to their skills over a longer time horizon. Therefore, they tend to accumulate more specific skills. This mix of highly specific skills and long-term jobs has several implications: it reduces turnover in the labour market (as workers with specific skills have no incentive to quit and lose their skills) and displacement is more costly for workers and for society (as workers who have over-invested in specific skills and under-invested in general skills require retraining).

Lamo et al. (2006) compare a country with a rigid labour market – Poland – and one with a more flexible labour market – Estonia – *to* explore these mechanisms of adjustment in New Member States' economies. These two countries are particularly interesting since they had similar rates of unemployment in 1998, at the time of the announcement of enlargement, and diverged afterwards. The authors argue that employment protection in Poland encourages the accumulation of specific skills, but is also an upshot of the existence of specific skills in Poland, where 2/3 of workers have vocational education against 1/3 in Estonia, leading to a different reactivity of the labour force in the aftermath of the announcement of the enlargement.

Vandenbrande et al. (2007) studies one last dimension of mobility, that between employers. Generally speaking, a large fraction of employees have never changed employer (20% on average in the EU). But there are large differences: this fraction is low in both Denmark (the flexicurity model) and the UK (a more flexible type of labour market) and highest in more regulated labour markets (40% in Greece, Portugal and Malta).

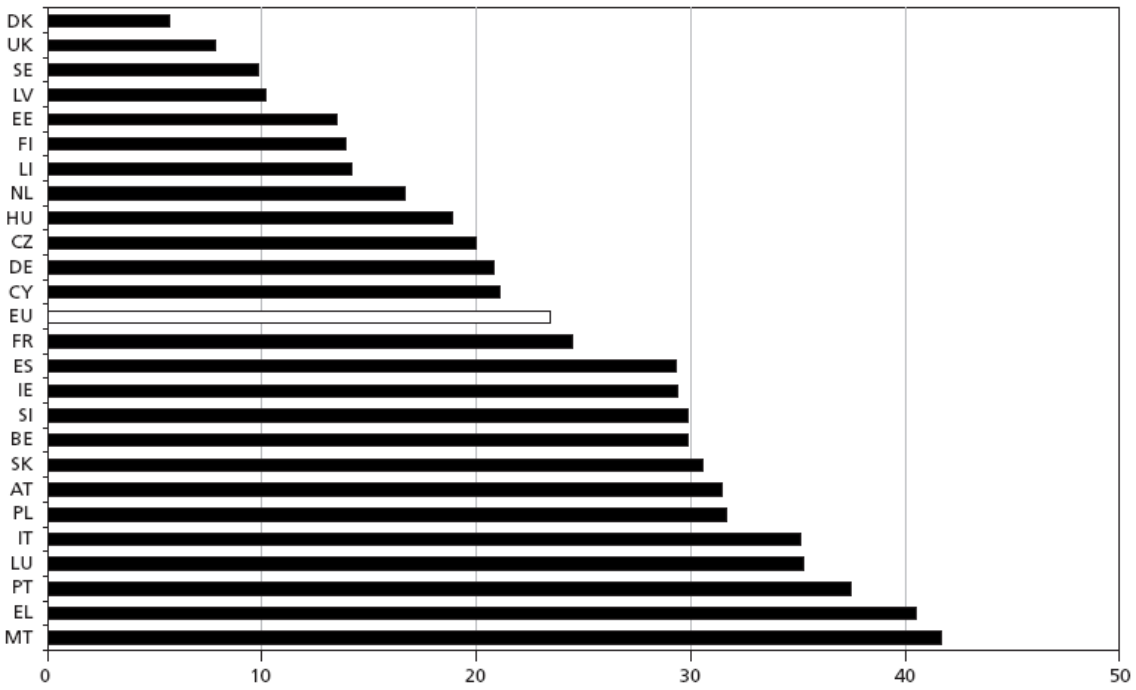


Fig. B-14: Percentage of people who have never changed employer, by country.

Source: Vandenbrande et al. (2007).

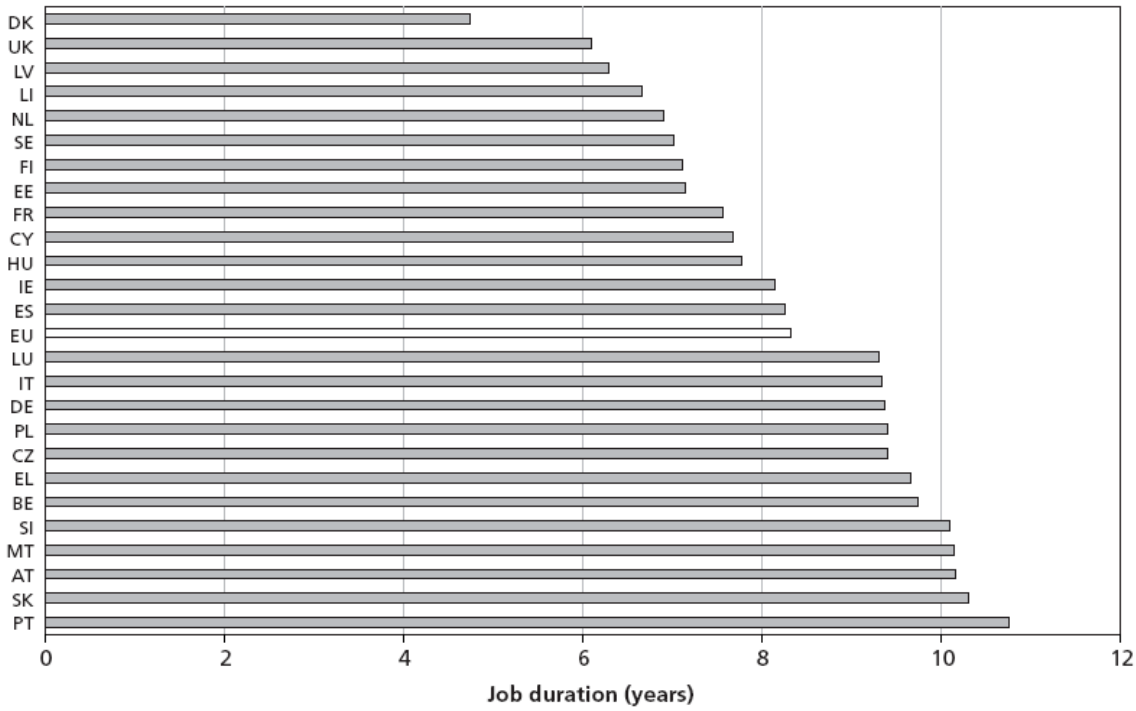


Fig. B-15: Average job duration by country in Europe.

Source: Vandenbrande et al. (2007).

3.5. Hours adjustment vs. employment adjustment

The European Commission (2007b) has argued that "***Flexible working time arrangements*** *for both employers and employees (such as working-time accounts, part-time, opening clauses allowing to deviate from working time schedules agreed in collective agreements)*" are one of the important adjustment mechanisms. They claim that, "*While it is too early to evaluate their overall impact, it is important to underline that the more frequent use of opening clause allowed to stabilise employment by increasing the adjustment of hours worked without changing the hourly wage in order to compensate for the variation in the monthly labour income.*"

We share this view to a large extent: this is an important way to cope with temporary changes in demand. We also believe that the initiative to cut hours in response to a negative demand shock should not be imposed at the country level: it is ideally a joint, bargained decision by workers and the firm, or a decision at sector level. It is also a better solution in the case of temporary shocks, as it preserves specific skills as discussed above. It cannot be an effective way of dealing with permanent shocks, as it may be in the best interest of workers to retrain (see Section E) instead of working less. Of course, on a temporary basis, reducing working time may be a good opportunity to use free time to undertake publicly funded training.

Academic literature, in contrast, is more circumspect and critical of *non-flexible* policies of involving a reduction of working time imposed at the national level. The French experience, in particular, is an example of a national policy imposed from an electoral platform that has thus far had no measurable effect on employment. As regards the decision to cut back weekly working hours from 40 to 39 in 1982, Crépon and Kramarz find that the firms where workers worked 40h fired more after 1982 than firms where workers worked 35-38 hours, and that the overall effect was a decrease, not an increase, in employment. They estimate that shortening the working week by one hour entailed a dent in the neighbourhood of 2% to 4% in employment. Workers on minimum wages were the ones most affected by the changes. The more recent (and more considerable) amendment in France (cutting working weeks back from 39 to 35 hours) was studied by Chemin and Wasmer (2007), who found evidence of a positive impact on real wages and no visible effect on employment. A broader – and sceptical – discussion on Europe can be found in Cahuc et al. (2006). In the introduction by Tito Boeri, it is argued that "*The main finding of this part of the report is that work sharing is rarely good for employment as hourly wages tend to increase (as in Germany and the Netherlands) after workweek reductions, in order to preserve monthly wages. Even when wage subsidies and other incentives to working-time reductions were offered (as in the very complicated 35-hour regimes introduced by Martine Aubry in France), the increase in hourly wages always prevented any potential (short-term) positive effect of*

hours reduction on employment headcounts." However, the country case studies indicate that working-time reductions have "*less unintended consequences when they follow a negotiated, evaluated, and consensual route at the decentralised level*."

3.6. Other labour issues

So far, we have discussed conventional economic indicators (labour market participation, geographical mobility, real wage adjustment and, lastly, human capital specificity). We nevertheless find that there are several issues associated with labour market adjustment – mobility, especially – that are sidelined by a purely economic rationale. In particular there are two dimensions which, based on the literature, raise relevant additional considerations. The first one is family factors. The second one, not totally unrelated, is social capital in general and local social capital in particular.

3.6.1. Family

In an early study, Mincer (1978) showed that female labour market attachment also plays an important role (see also Pingle, 2006). The idea is that mobility and female labour market participation are positively correlated because family ties tend to reduce the employment and earnings of migrating wives and to increase the employment and earnings of their husbands. Mincer (1978) also claims that increased female labour market attachment fosters mobility, which contributes to marital instability. Conversely, increased marital instability stimulates migration and reinforces the upward trends in female labour force participation. Fig. B-16 confirms the importance of family ties in geographical mobility decisions: support from friends or family and direct contact with them are the first two causes for not moving.

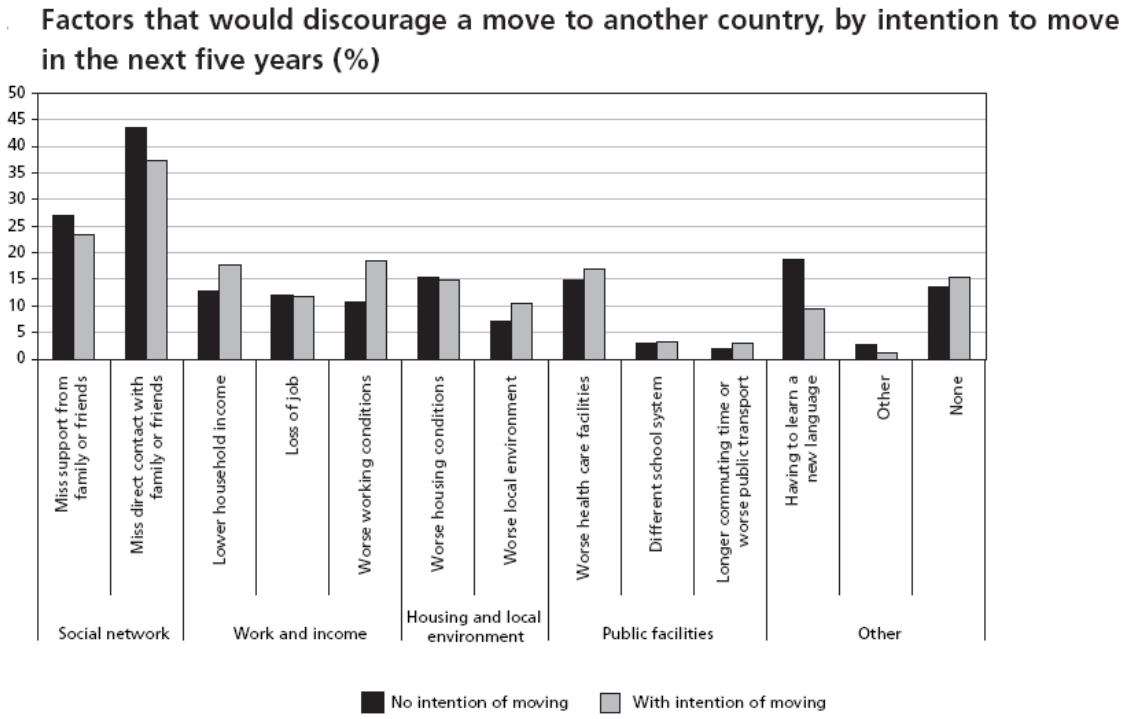


Fig. B-16: Barriers to mobility.

Source Vandenbrande et al. (2007).

3.6.2. Local Social Capital

Fig. B-16 offers a fairly good transition to the studies based on the concept of local social capital introduced in the European context by David et al. (2007). Indeed, beyond migration decisions of couples, local social capital seems to be an important determinant of both mobility and unemployment. In David et al. (2007), the authors try to understand the link between geographical mobility, local social ties and unemployment from both a theoretical and an empirical perspective. They show that the frequency of local social contacts with, for instance, family, friends or neighbours matters for individual mobility and unemployment. Cross-country differences in European attitudes toward local social relationships can explain differences in terms of aggregate mobility and unemployment; individuals are immobile because they do not want to lose their social environment.

It seems that Southern Europe is characterised by important local ties, low geographical mobility and high unemployment, while Northern Europe presents opposite patterns. Reasons behind these differences may be cultural, but also institutional: if labour market institutions (e.g. employment protection, unemployment insurance) result in low geographic mobility, then they also provide

incentives to further develop local ties as individuals anticipate they will not move to another region, meaning that both these factors interact with each other.

A result of this analysis is that multiple equilibria emerge quite naturally: low mobility reinforces the investment in local ties, and reciprocally. Selection of the equilibrium is the product of history, that is, it is past-dependent: once an equilibrium has been reached, it remains stable and any deviation becomes difficult. It follows that there are many complementarities between mobility and social capital, which makes it hard to break the low mobility equilibrium. Attempts to shift to a "higher mobility world", at least in the short run, require much effort. An implication of this analysis could be that, instead of diluting policy action on immobile workers, it would make more sense to channel mobility allowances towards more mobile workers.

4. Outside the labour markets

4.1. Product market regulation

Blanchard and Giavazzi (2003) study the interaction between labour and goods market deregulation. The authors think of deregulation as a redistributive mechanism of rents. By deregulating the goods market, they say, the labour share should increase because firms are in a weaker position on the goods market, implying that they can extract less income from consumers (who are also workers); their real wage, it follows, goes up. On the other hand, it should decrease when the labour market is deregulated, because doing so puts workers in a weaker bargaining position. The theoretical analysis by Blanchard and Giavazzi (2003) is in line with the evolution of mark-ups and labour share over the past 30 years. Labour market deregulation, which began in the mid 1980s, led to the observed decrease in labour share. The authors conclude by suggesting that labour market deregulation in Europe will involve focusing on goods market deregulation first. The reason is that, by decreasing rents in the goods market, less would be bargained between firms and workers, reducing incentives for workers to prevent labour market deregulation.

The benefits of labour reallocation have been largely shown in the context of trade liberalisation. Evidence based on firm-level data (see Bernard et al., 2007, for a review and Ottaviano and Mayer, 2007, for a policy study applied to the European context) have illustrated that trade liberalisation in the manufacturing sector generates worker reallocation from the less to the more productive firms within the same sector. The reason behind this movement of labour is that the most productive firms are better equipped to afford the cost of entering international markets; the less productive are involved in purely domestic activities. As a consequence, the most productive firms expand and the

less productive shrink or die. This in turn has an overall positive effect on aggregate productivity since production is largely concentrated in the most productive units.

For instance, Pavcnik (2002) has shown that after the massive trade liberalisation in Chile average productivity in the import-competing sector has increased by 3-10% more than in non-traded sectors. This increase is mostly due to a reshuffling of resources between firms characterised by different productivity levels. Similar conclusions have been derived from trade liberalisation in other countries such as the US (see Bernard et al., 2006), Canada (see Trefler, 2004) and Taiwan (see Aw et al., 2001).

Janiak (2007) has shown that in the absence of a well-established competitive structure, this reallocation process may lead to more job destruction (in the less productive firms) than job creation (in the more productive firms), even though aggregate productivity may increase. This implies that the economy adjusts to trade openness by lowering the employment level in the sector. Empirical evidence seems to support this view.

Bergoeing et al. (2004) study macroeconomic adjustment after an economy experiences a recession. In particular, they investigate how institutional barriers to job reallocation can explain slow recoveries, which they illustrate with the Fig. B-17. Their interpretation of the figure is that institutions are an impediment to labour reallocation from the least to the most productive firms. As a consequence, recessions have a more persistent impact and aggregate productivity growth only recovers after a few years. They give the example of the German recessions, which lasted about 10 years.

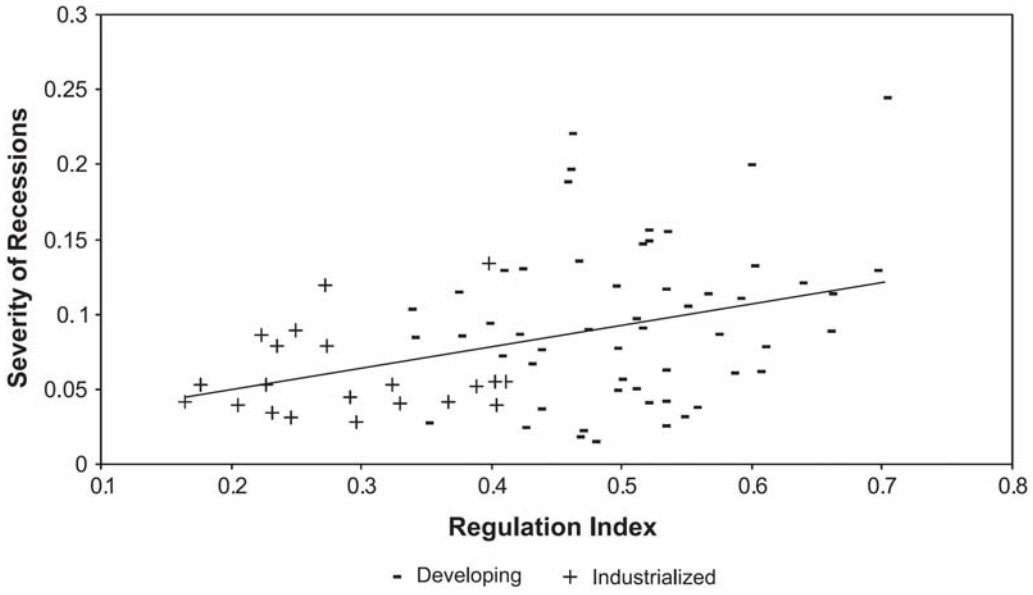


Fig. B-17: Severity of recessions and regulatory burden.

Source: Bergoeing et al. (2004). The regulatory index compiles information on financial restrictions, trade barriers, firm entry costs, inefficient bankruptcy procedures, bureaucratic red tape, tax burden and labour regulations for 76 countries. The severity-of-recessions index captures the extent of downward output deviations from trend for each country during the period 1960–2000.

Institutions can affect mobility in a number of areas. First, market rigidities influence the pace of job creation. For instance, if employment protection is too strong, firms that wish to expand after a negative shock may not hire sufficiently because they anticipate they may have to pay a firing cost in the future. Barriers to entry may also have a similar impact through firm entry. Firms either choose not to enter the market or decide to smooth the administrative burden over a longer period. Second, for the adjustment process to be fast, one needs to force inefficient firms out of the industry, since part of the resources available in the economy belongs to those firms, implying that reallocation to firms with improved technology is slower. Bergoeing et al. (2004) interpret institutional rigidities as a subsidy to incumbent firms. Lowering the importance of institutions would increase elimination of unsuccessful firms and so improve the speed of labour reallocation to the most productive firms.

Similarly, Restuccia and Rogerson (2007) explain cross-country differences in income per capita with institutional rigidities. They illustrate that policies that increase price dispersion can reduce TFP and income per capita by 30-50%. Such policies also have an impact on capital accumulation and growth. Bartelmans et al. (2006) achieve similar results. In particular, goods and labour market regulations

seem to be stringent in the transition economies of Eastern Europe and significantly affect efficiency-improving reallocation.

4.2. Housing market regulations

For obvious reasons, more efficient housing markets are beneficial to worker mobility. But it is not always easy to obtain comparable data across OECD countries. Earlier comparative work by Djankov et al. (2003) on the complexity of housing regulations can cast light. Table B-5 charts tenant-eviction complexity, which we view as a suitable proxy for the many other regulations affecting the rental housing market (eviction being the tip of the iceberg). More details on this measurement are provided in Box 2 (Part D of this report) and in Djankov et al. (2003).

Legal Origin	Country	Formalism Index
English	Canada	2.32 (-)
	Cyprus	3.50
	Ireland	3.20
	United Kingdom	2.22 (-)
	United States	2.97 (-)
Socialist	Bulgaria	4.51 (+)
	Croatia	3.43
	Czech Republic	3.54
	Estonia	4.74 (+)
	Hungary	3.46
	Latvia	3.86
	Lithuania	4.21
	Poland	4.08
	Romania	4.47 (+)
	Slovenia	4.26
French	Belgium	3.17
	France	3.60
	Greece	4.31
	Italy	4.24
	Luxembourg	3.66
	Malta	3.42
	Netherlands	3.00
	Portugal	4.54 (+)
	Spain	4.81 (+)
German	Austria	3.62
	Germany	3.76
Scandinavian	Denmark	3.60
	Finland	2.53 (-)
	Sweden	3.31
All countries of the table	Average (s.d.)	3.67 (0.68)

Table B-5: tenant-eviction complexity index.

Source: Djankov et al. (2003) and authors' calculations, Table 6A. (+) means one s.d. above the mean or more, (-) means one s.d. below the mean or less.

It appears that a few countries indeed display a relatively high degree of formalism compared to the table average (Bulgaria, Estonia, Romania, Portugal and Spain in particular). Reported geographical mobility in those countries is also generally very low compared to other Member States. At this stage, we do not contend that there are obvious causal effects here, even though theory would suggest that this is clearly a possibility.

We now investigate the other margin, the size of the rental housing market, following a strategy contrived by Casas-Arce and Saiz (2006). They use the same data (regulation indices) in a worldwide cross-section, and correlate the size of the private housing market in the main cities and those formalism indices. Their typical finding is reflected on Fig. B-18 and shows that there is a negative and fairly significant link: the more regulated the rental housing market, the lower its share in total housing.

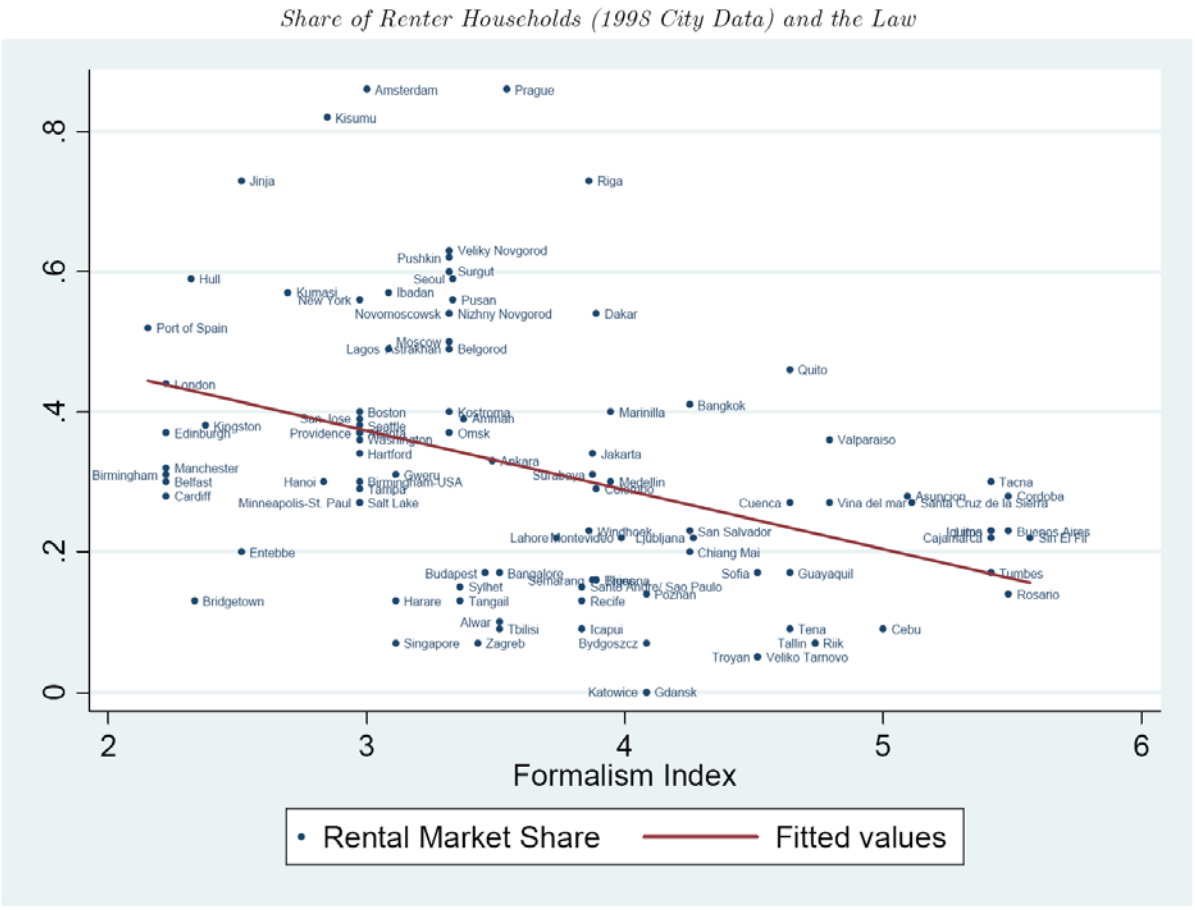


Fig. B-18: Source: Casas-Arce and Saiz (2006).

This suggests that improving the efficiency of rental housing laws may expand the size of the rental housing market, which is presumably a good starting point for improving the low mobility patterns encountered in several European countries.

5. Fiscal transfers

Given the lack of mobility and the impossibility for European economies to recover from a negative shock through devaluation, fiscal transfers remain an important adjustment margin, part of it being due to automatic stabilisers. The importance of this margin has been largely illustrated by the empirical literature on consumption smoothing. Asdrubali et al. (1996) and Sorensen and Yosha (1998) propose a methodology to quantify the amount of risk sharing in a group of countries (or regions). They decompose the cross-sectional variance of gross domestic product into several components. Each element of the decomposition refers to a particular mechanism used to achieve consumption smoothing over time and states of nature.

Interestingly, Kalemli-Ozcan et al. (2003) try to link risk sharing with regional specialisation. They rely on a methodology to decompose the variance of gross domestic product.[2] Their results suggest that risk sharing and specialisation are positively correlated. This is interesting because, while specialisation is important to achieve efficiency, it also generates risks to workers when sectoral and occupational demand shifts are important. This may lead workers to be reluctant to specialize, unless they can insure against the risk of specialization. In particular, if workers cannot move between sectors/regions/occupations after a specific shock, then they will perceive specialization as a risky decision. In this case, fiscal transfers are an alternative to a lack of labour mobility. This illustrates the trade-off that may exist between labour mobility and fiscal transfers.

The next question is to know the extent to which European workers can insure against specific shocks. Comparing the European context to the US is informative. Overall, Asdrubali et al. (1996) find that in the US, 39 percent of shocks are smoothed through capital markets, 13 percent by the federal government, 23 percent by credit markets and 25 percent are not smoothed. Sorensen and Yosha (1998) study the European context over the period 1963-1990. They follow a rather similar methodology: they decompose the variance of gross state product with factor income flows, depreciation, international transfers and saving. Their results indicate that only 40 percent of shocks are smoothed, which imply that Europe was not an optimal currency area at that time, as compared to the US. National government budget deficit contributes to half the smoothing, while corporate saving achieves the other half.

[2] More precisely, they construct income insurance and consumption insurance measures (which are roughly the fractions described above) for several risk-sharing groups of regions (or countries) such as Italy, the US, Canada, the UK, Japan, Spain, the EC countries and non-EC countries. In a second step, they regress an index of specialisation on those measures and other covariates such as GDP, population, distance, mining GDP share, agriculture GDP share, GDP volatility, human capital stock, manufacturing GDP share.

Obsfeldt and Peri (1998) summarise the debates. Their methodology is close to that developed in Asdrubali et al. (1996), Sorensen and Yosha (1998) and Kalemli-Ozcan et al. (2003). They propose a VAR methodology with two variables, which are per-capita personal income and *available* per-capita personal income (after adjusting for tax transfer). The results indicate that in response to a -1% deviation in output, Canadian regions receive in the first year an additional transfer of +0.13%, while US states receive a +0.10% increase in transfers. Italian regions, according to their estimates, would receive only a 3% increase in transfers.

The message that comes from those studies is the following: before implementing the euro, Europe had not really increased consumption smoothing following region-specific shock as compared to the US and most of the smoothing was due to fiscal adjustment. If governments want to improve on this margin, two directions may be followed. A first possibility suggested by Sorensen and Yosha (1998) requires a softening of the constraints on budget deficit so that government can achieve better smoothing by running temporary short-run deficits. The obvious caveat, in a common currency area, is the risk of free riding, that is countries running a deficit but not internalising the costs imposed on the credibility of the common currency. The alternative, viewed here as the superior one, is to set ambitious policies aimed at enhancing labour mobility. We believe policies improving on labour mobility to be more promising because they avoid a set of issues, which we document next. First, several papers have emphasised the various difficulties associated with regional fiscal transfers in response to asymmetric shocks. For instance, Fatás (1998) discusses the possibility of having a more ambitious fiscal federation within the EMU. He first argues that estimates of the US federal transfer system tend to overestimate the magnitude of the insurance value of transfers by a large factor, which he estimates to be around 3. The argument is as follows: transfers towards an economically depressed state have two aspects. The first one is a stabilisation aspect which is a transfer across states or regions, that is, a co-insurance scheme between individual regions. The second one is an inter-temporal transfer across periods: subsidizing a depressed state reduces taxes accruing to the federal budget and this has to be repaid at some point in the future. Therefore, and given the correlation in shocks across states, any negative shock in a region is likely to impose a large burden to most regions in the future, reducing the extent to which stabilisation operates intertemporally, that is, on a present-value basis.

Second, another difficulty associated with fiscal transfers is the trade-off between risk sharing and moral hazard, exemplified by Persson and Tabellini (1996). Starting from the claim by Sala-i-Martin and Sachs (1992) that EMU needs a federal tax-transfer scheme to accommodate asymmetric shocks, Persson and Tabellini rightly argue that such a scheme could (and in practice, would) reduce efforts to implement policies that reduce risks or reform markets such as to be able to cope with those shocks

(the real adjustments mechanisms discussed in introduction). Adapting the principal-agent literature, they attempt to classify different governance models with regard to the moral hazard issues. In the US-type system, transfers operate between individuals directly, while in Europe, transfers operate on an intergovernmental basis. Accountability and elections are also more direct in the US than in Europe; finally Europe has fewer instruments than the US, since more is delegated to national governments. The general result of their analysis is that the European context of dilution of power and accountability raise the moral hazard problem. An implication of the analysis seems to be that a more centralised governance of Europe with more tools would mitigate the moral hazard problems. Interestingly, the emergence of the European Globalisation Fund seems to be in line with this analysis, in the sense that this is a new transfer scheme allowing the European Commission to deal with local, asymmetric shocks on a direct basis, even though the way it operates gives a large role to national governments in the way they put together the applications to obtain eligibility to the Fund.

6. An update in the post-EMU period

There are as yet only scant academic articles on the evolution of labour markets in the post-EMU era, despite the quality of available data. Specifically, we lack comprehensive evidence pointing to labour market adjustments and the factors driving adjustment over this period (even though macroeconomic evidence is more abundant). Here, we will first describe available evidence and then review more recent macroeconomic trends.

6.1. Labour adjustment

In DGTPE (2007), already reviewed in Section 2, Clotilde L'Angevin provided a brief discussion of the possible evolution of the convergence pattern over this more recent period. She compared two periods (1976-2005 and 1990-2005) to check whether there has been an increase in the strength of real adjustment in the last period. In the short run, she does not observe any significant difference in labour adjustment across periods, but notices that Europe has seen an increase in net emigration following a negative labour demand shock over the latter, although this does not seem to be so in the US. Part of this result might however be due to estimation uncertainty owing to the smaller sample. Unfortunately, this is the only evidence in the article. There is no discontinuity in the parameter estimates, which would have been necessary to detect a post-EMU structural break. We investigate in Section C whether there have been structural breaks in the post-EMU period.

6.2. The consequences of the lack of real wage rigidity

The European Commission (2006) report detailed above also discussed at length the evolution of wage rigidity in the period 1999-2004. As stated in this report (page 130), "*Industry data suggest that the deterioration in cost competitiveness derives most of the time from growth of domestic wages in excess of foreign wages. However, in some countries, namely Italy, Spain and Portugal, the unfavourable productivity developments were not accompanied by a downward adjustment in the growth of relative wages."*

In an economy where productivity growth is low and lower than wage growth, as is the case in Portugal, Italy and Spain, according to this report and to Blanchard (2006a), one can expect several problems such as current-account deficits, low competitiveness and, possibly, a cause for a housing bubble. In a companion paper, Olivier Blanchard (2006b) analyses in greater detail the evolution of the Portuguese economy over the past 10 years. This economy is facing difficulties and other economies with similar characteristics, such as Spain and Italy, may soon face the same issues. Prior to the introduction of the euro into the economy, the decrease in interest rates and the prospect of entry into the euro generated an increase in output and consumption and a decrease in savings, leading to current account deficit (see also Blanchard and Giavazzi, 2002). However, the economic boom has been followed by an economic slump, amplifying the deficit in the current account. Tax cuts were insufficient to stabilise economic activity. The current account is still in deficit. As a consequence, the economy is now characterised by what economists call a 'twin deficit'. The figure below illustrates this evolution.

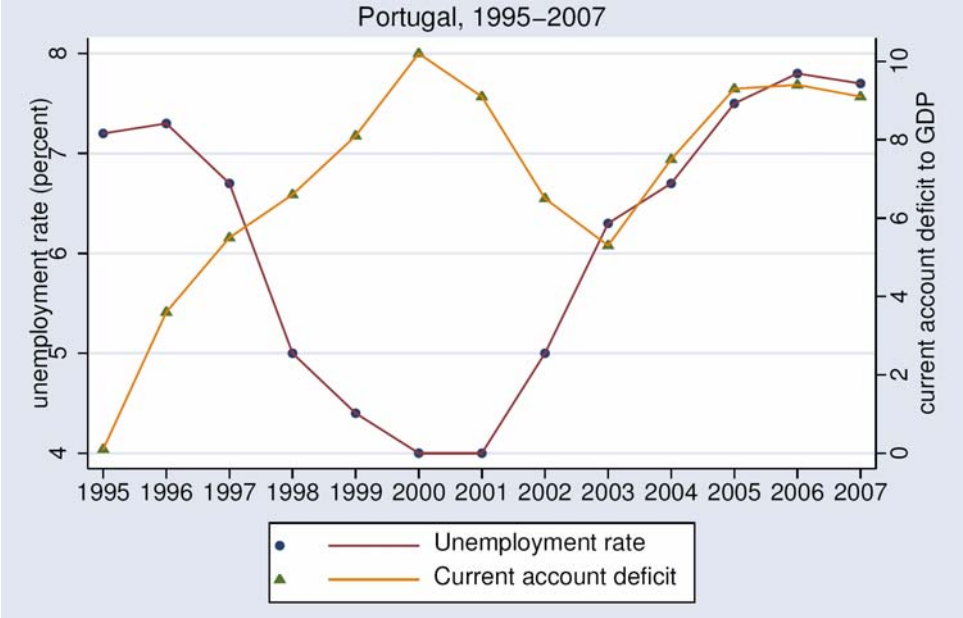


Fig. B-19: Portuguese unemployment rate and current account deficit.

Source: Blanchard (2006b).

The difficulty for Portugal is that it does not have any control over its exchange-rate policy due to the adoption of the euro. In the past, a currency devaluation would have occurred, but that option is no longer available. Olivier Blanchard fears Portugal will enter into 'competitive disinflation', meaning that, in order to restore its competitiveness on international markets, wages have to grow more slowly than productivity. Since productivity does not seem to be catching up and wage growth is quite persistent over time, the economy may adjust by significantly increasing its unemployment rate, which may last for a long time. The economy would only recover once wages or productivity have adjusted.

Fig. B-20 below illustrates this evolution.

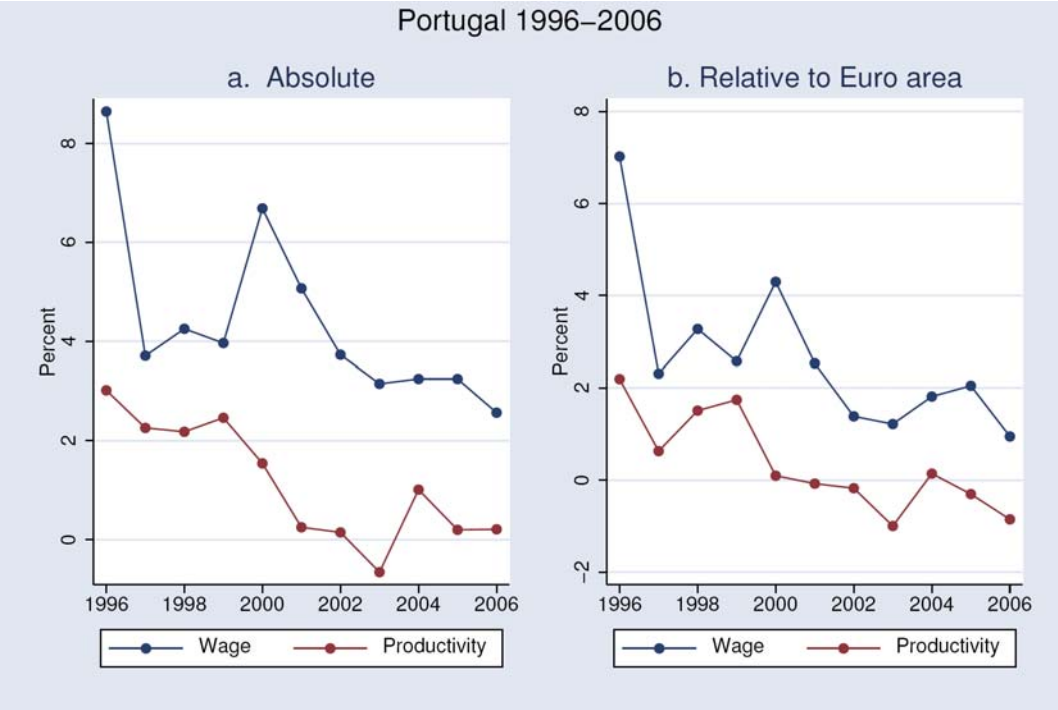


Fig. B-20: Portuguese wage and labour productivity growth.

Source: Blanchard (2006b).

Blanchard (2006b) also notes that Germany went through a similar situation and has recovered only recently. The case is displayed in Fig. B-21.

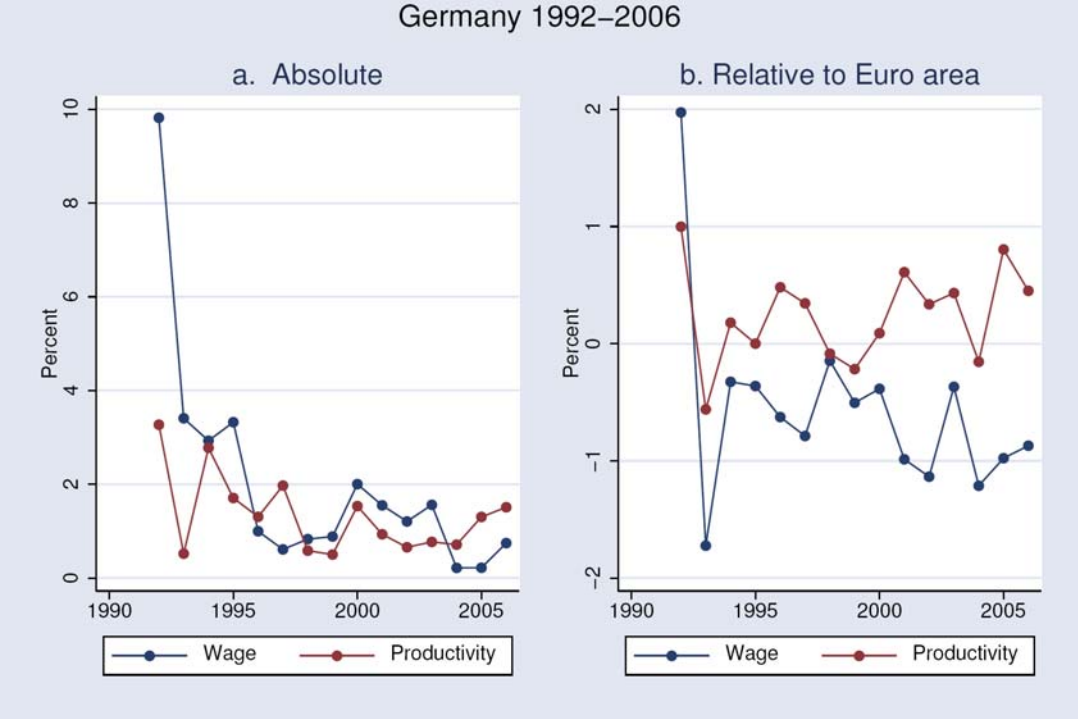


Fig B-21: German wage and labour productivity growth.

Source: Blanchard (2006b).

Olivier Blanchard proposes as solutions either fostering productivity by applying particular reforms in the tourism industry, for instance, or decreasing (or freezing) wages through a modification of Portuguese law (or an agreement with unions).

In a related paper by Fagan and Gaspar (2007), the authors study the impact of the convergence in both short-term and long-term interest rates in Southern European countries and Ireland. They argue that this integration led to better access to international financial markets, in turn associated with higher household expenditure and household debt. It followed a deterioration of current accounts. Inflation differentials also arose, leading to a loss of competitiveness.

Interestingly, both Fagan and Gaspar (2007) and Blanchard (2006a) focus on countries with higher wage rigidity and more regulated labour markets: Blanchard (2006a) predicts that Spain and Italy will follow Portugal to macroeconomic imbalances.

Those macroeconomic trends reinforce the need to have efficient real adjustment mechanisms in the goods and labour markets along the lines discussed in Part A and in Part B. These mechanisms may, however, not be fully available. This is what we will explore in part C of the report.

PART C. Convergence in Europe: a descriptive study

In this part, we will set the scene for the analysis of dynamic adjustment (the role played by institutions will be undertaken in part D). We will evaluate how European labour markets have adjusted in the recent pre-EMU and post-EMU periods. In particular, divergence in regional unemployment rates is an indication that the adjustment mechanisms discussed in Parts A and B are not effective, while a relatively fast convergence implies in contrast that these mechanisms operate quite well. We will therefore build a few indicators of convergence of regional labour markets, which will be introduced in Section 1. This discussion suggests that mobility indeed affects the speed of convergence of labour market variables. We do not discuss in this part whether institutions also influence the level of employment and other labour market variables although, in the Appendix to the report, we notice that labour market participation, especially the female rate, and regional mobility are positively correlated in the cross-section of European countries.

1. Assessing regional convergence

1.1. Convergence indicators

In what follows, we derive alternative measures of the convergence in unemployment across countries and regions in Europe. A discussion of the indicators can be found in the box below.

Box 1: Convergence indicators.

There are traditionally two ways to capture the idea of convergence, adapted from an earlier literature on GDP growth. The first and most intuitive way is to compute, for each period and for a given country, dispersion indicators of the time-series of interest (here, the rates of unemployment denoted by u_t, or the rate of employment, that is employment divided by working age population denoted by e_t). A good dispersion indicator would be the coefficient of variation (CV_t), i.e. the standard deviation divided by the sample mean. When the variable CV_t increases, it means that regional dispersion increases and we observe a divergence of labour markets. When it decreases, it is an indication of convergence. This concept of convergence is called **σ-convergence**, since the Greek letter σ is often the symbol of the standard deviation.

Another concept of convergence, which better captures the dynamic properties of regional series, is named the β-convergence. It captures the regression to the mean of a variable and has been widely

discussed in Mankiw et al. (1992) for the study of GDP-per-capita convergence. The idea is simply that the growth rate (or the rate of change) of a variable should be higher when this variable is below its long-run level or trend. One can summarise the speed of convergence of the variable to its mean by the parameter β estimated from a simple regression:

$$\Delta \log(u_{it}) = C_i - \beta \log(u_{i0}) + \varepsilon_{it} \quad \text{(C-1)}$$

where ε denotes a random noise in region i at time t, and u_{i0} is the initial level of unemployment in region i. The parameter C_i is a regional fixed effect. A low value of β implies a slow convergence, a high value a fast convergence. In particular, a value of $\beta = 0.10$ would be interpreted as the fact that each year (if the time units are in year), 10% of the gap between the variable and its long-run average is recovered. In this case, half of the long-run gap would be recovered in 5-6 years. Applied to GDP growth, conventional estimates find a coefficient between 2 and 3% a year, meaning that 20 to 30 years are needed to converge.

What is the connection between the two concepts of convergence, β and σ? The concept of σ-convergence is stronger and implies that all series converge to a unique value, while β-convergence only implies a regression to the mean. In a famous paper, Quah (1993) argued that Mankiw et al. (1992) was subject to the Galton's fallacy criticism and that β-convergence did not imply full convergence. An interpretation of the difference in the two concepts in terms of equation (C-1) above is that, for β-convergence to be equivalent to σ-convergence, we need both a positive σ and the fixed effect C_i to be identical across regions.

1.2. Co-evolution of national unemployment rates

Before analysing convergence of labour markets at the regional level, an analysis at the national level is informative. Fig. C-1 displays the evolution of national unemployment rates in the EU15 over the period 1983-2006. It shows that, in almost all countries, the level of unemployment is characterised by a downward-sloping trend over this period with large cyclical variations. In particular, some peaks indicate the adverse effect of recessions in the mid-1980s, at the beginning of the 1990s and at the beginning of the 2000s, which has been more pronounced for economies with stringent labour market institutions. See for instance Blanchard and Wolfers (2000).

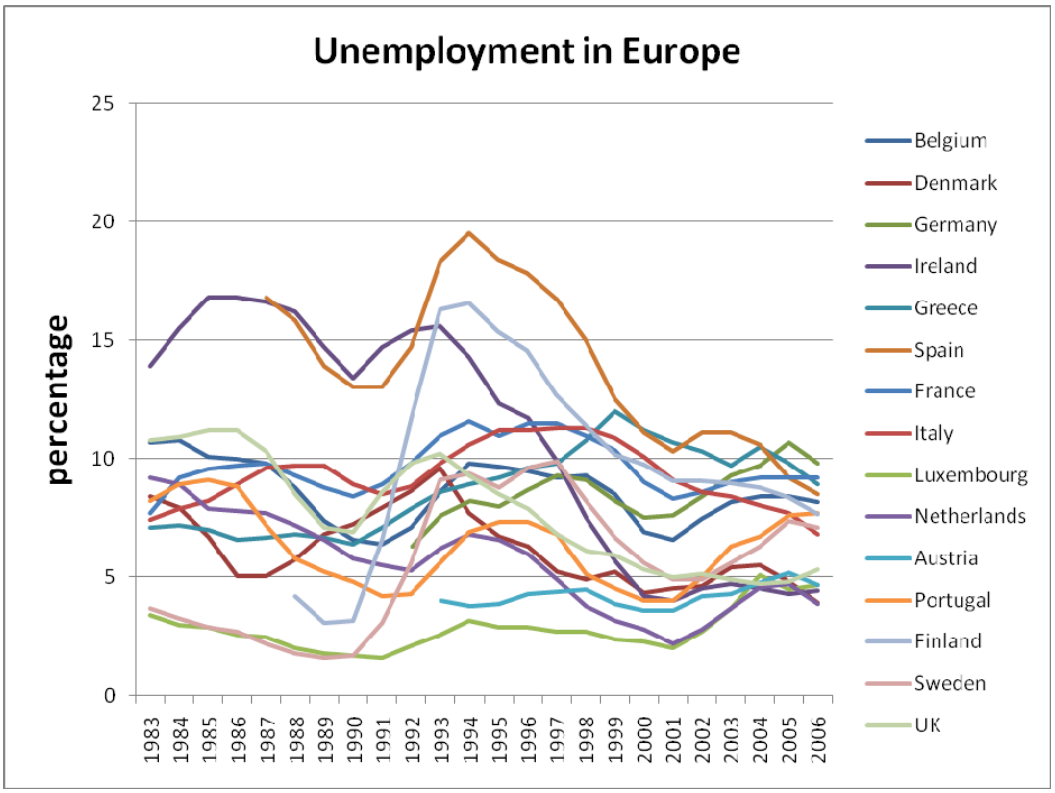


Fig. C-1: EU15 unemployment rates. Source: Eurostat.

At the same time, dispersion has declined over the period. Fig. C-2 presents a first application of the concept of σ–convergence at the national level. It confirms the overall decrease in dispersion over the period. The graph also shows that dispersion increases during recessions. One may think that this suggests the lack of cross-country labour mobility in Europe. This cyclicality result may however be in part an artefact of the data. If changes in unemployment in a recession are more substantial in regions already facing high unemployment because changes in unemployment in the cycle are proportional and not additive, then a natural implication is that dispersion in unemployment will increase – at least as measured with the coefficient of variation. Alternative measures based on relative unemployment rates did not match exactly the cyclicality pattern of Fig. C-2, so we do not draw firm conclusions here.

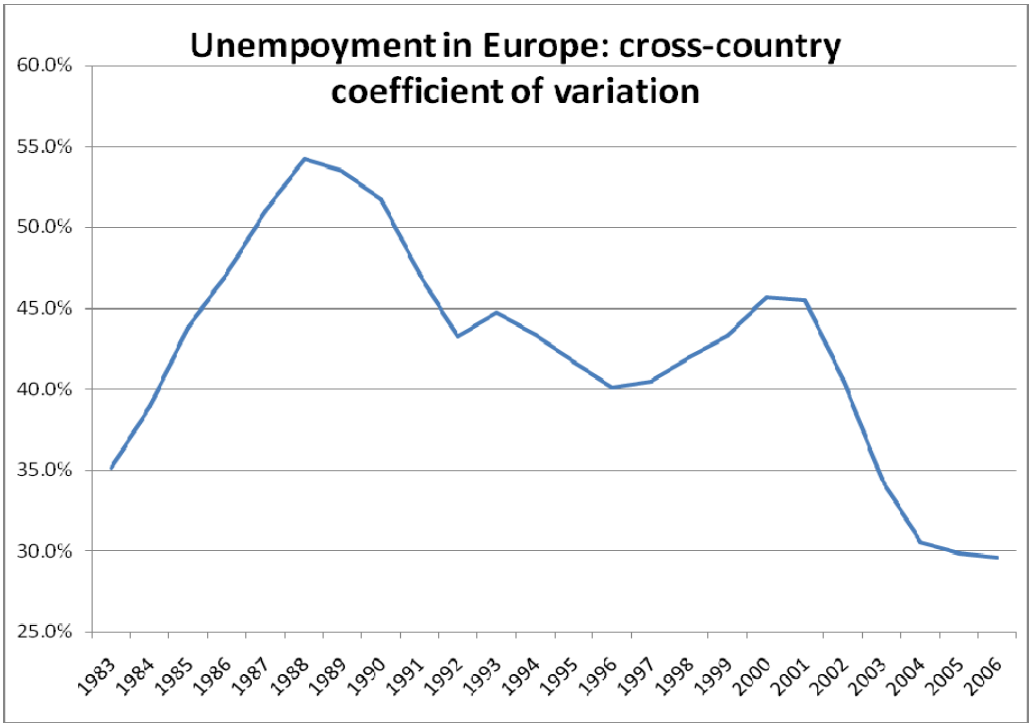


Fig. C-2: Source: Eurostat and authors' calculations.

1.3. Regional convergence

The regional unemployment data (NUTS2) is unfortunately characterised by a methodological break in the late 90's, with some overlap in the series. For this reason, we consider two measures of dispersion for regional unemployment: coefficients of variation and standard deviations. The motivation behind this choice is that, if the break affects variables in a multiplicative manner, then the coefficient of variation would not change. On the other hand, if the methodological break influences our series in an additive way, then the standard deviation would be unchanged. The choice of one measure or the other does qualitatively affect the evolution of dispersion of unemployment. However, as Fig. C-3 and Fig. C-4 show, the ranking in terms of dispersion is roughly the same.

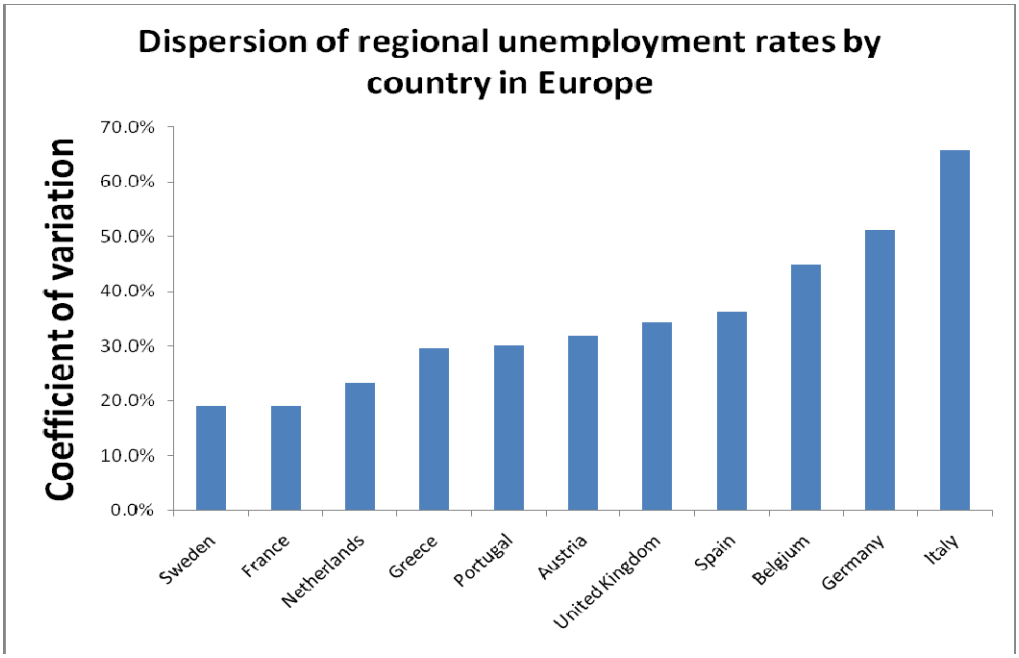


Fig. C-3: coefficient of variation of regional unemployment rates by country in Europe.

Source: Eurostat and author's calculations; regional classification: NUTS2.

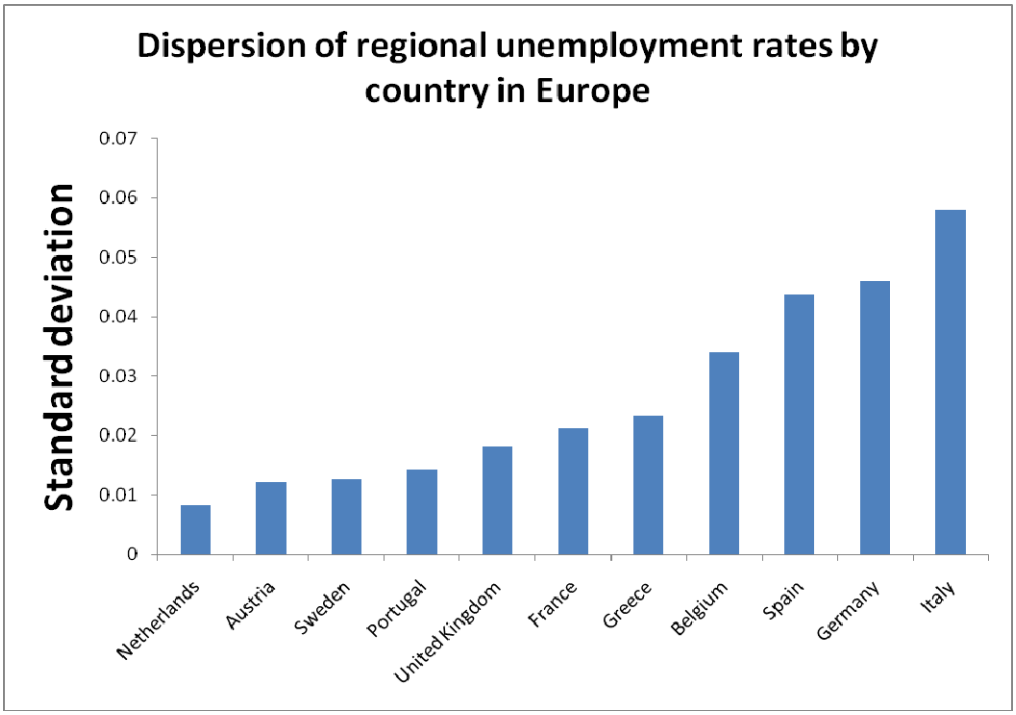


Fig. C-4: standard deviation of regional unemployment rates by country in Europe.

Source: Eurostat and author's calculations; regional classification: NUTS2.

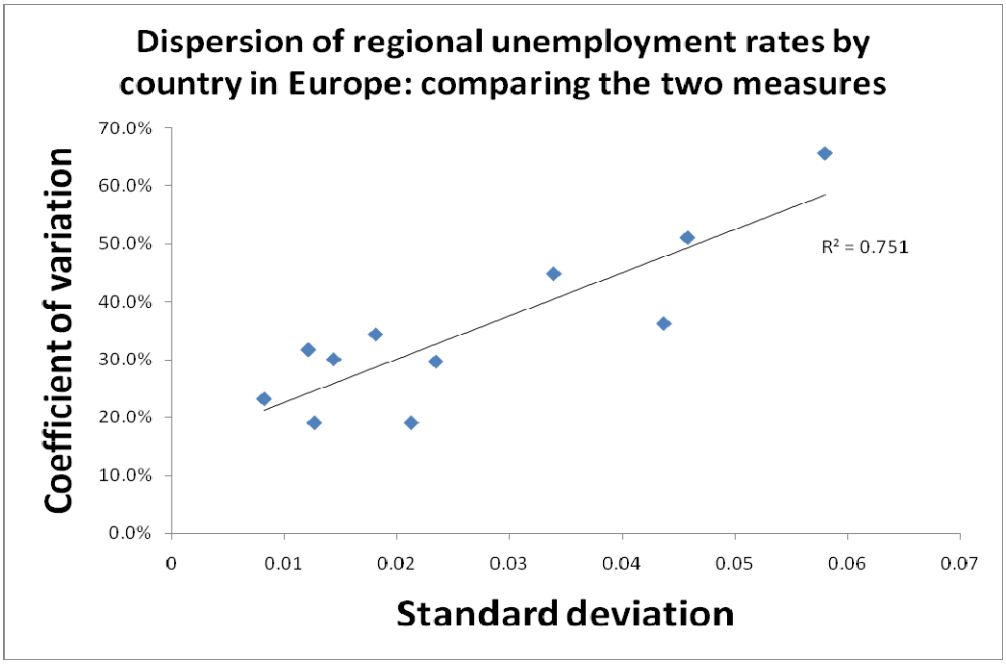


Fig. C-5: Source: Eurostat and author's calculations; regional classification: NUTS2.

In Appendix, we placed several graphs representing time-series of dispersion of regional unemployment by country. They consider both the evolution of the coefficient of variation and the standard deviation. Despite the reservation due to the existence of a break in the data stated above, these graphs clearly show that the steady increase in unemployment that most countries from continental Europe experienced until the end of the 1990s (see Fig. C-1) seems to be accompanied by higher dispersion of unemployment rates, while the decrease in unemployment that appears at the beginning of the century seems to go together with a reduction in dispersion.

In the rankings of regional dispersion (Fig. C-3 and Fig. C-4), we can note that countries with rigid labour markets tend to be characterised by higher dispersion of their regional unemployment rates. For instance, regional differences are more pronounced in Italy, Spain, Germany and Belgium, while countries with more flexible institutions such as Sweden or the Netherlands present lower dispersion.

This claim is confirmed by Fig. C-5, which presents the correlation between our measure of σ–convergence (CV) and the importance of cross-regional movers in each country. Specifically, countries characterised by a large share of cross-regional movers also display lower dispersion of their regional unemployment rates.

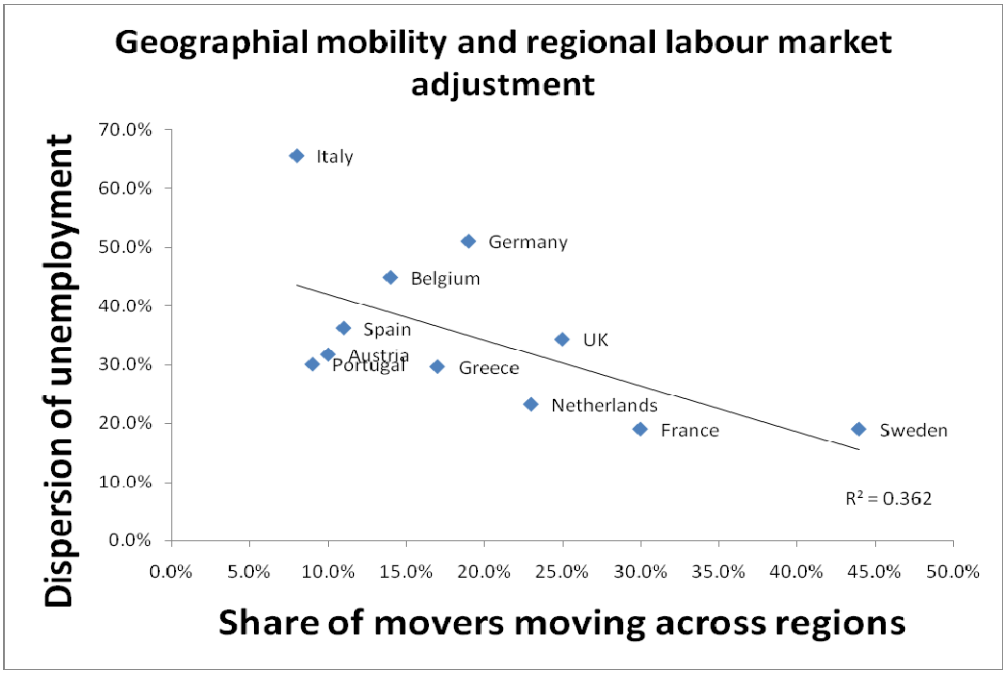


Fig. C-6: unemployment dispersion and geographical mobility.

Source: Eurostat, Vandenbrande et al. (2007) and authors' calculations. The measure of dispersion (1995-2005) is the coefficient of variation.

We turn now to our other measure of dispersion called the β–convergence. Since labour markets in Europe have seen both large variations as well as a uniform decrease in their unemployment level, we shall analyse convergence in a dynamic manner. This will allow us to indicate whether countries with rigid labour markets and high unemployment have shown higher flexibility in recent years.

Fig. C-7 presents our measure of β–convergence when we consider two different years – 1995 and 2002 – as initial periods of reference in our regressions. We can observe that countries such as France, Germany, Italy and Spain have seen an increase in the speed of their regional adjustment after the introduction of the euro. This suggests that the efforts made in those economies in order to reform labour market institutions have been quite effective. See Box 1 for a discussion on the interpretation of the coefficient β.

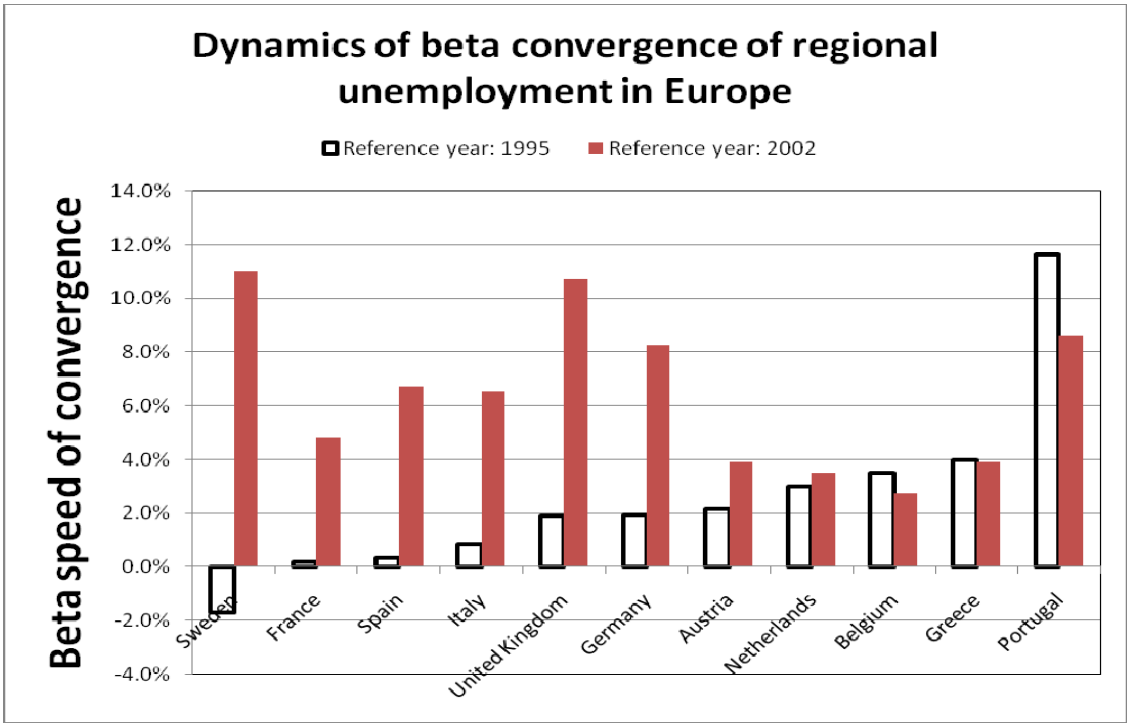


Fig. C-7: Source: Eurostat and author's calculations; regional classification: NUTS2.

Indeed, this recent evolution is not in line with former dynamics, where the ranking of countries in terms of β–convergence was quite stable. Fig. C-8 indicates that in the past, the ranking of countries in terms of speed of adjustment was approximately the same, at least when 1988 and 1995 are considered as reference years in our regressions. The picture also shows that unemployment rates at the end of the 1990s exploded (negative β coefficients) in Continental Europe. This indicates that recessions had a more pronounced impact before, suggesting that labour market reforms have also helped to increase the overall speed of adjustment in Europe.

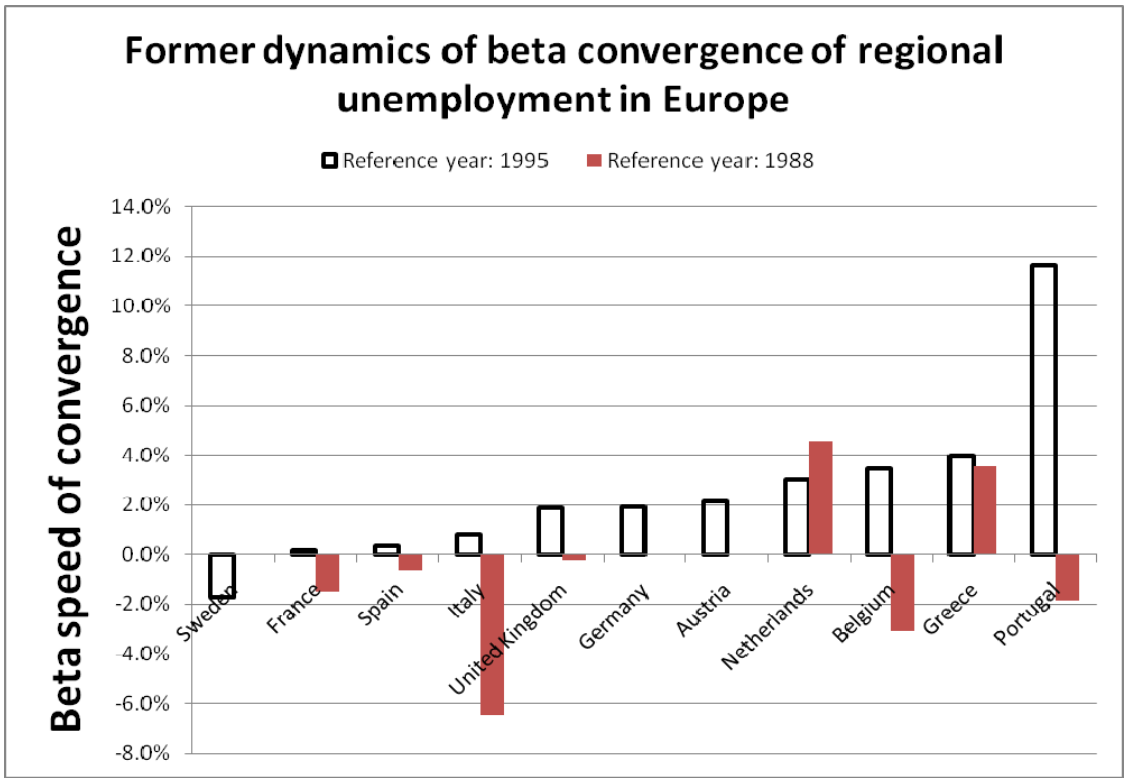


Fig. C-8: Source: Eurostat and author's calculations; regional classification: NUTS2.

2. Conclusions

Overall, this section leads to the following conclusions:

1. Regional unemployment rates became increasingly more dispersed in continental Europe until the end of the 1990s.

2. This increase in dispersion was associated with a simultaneous increase in country-level unemployment.

3. Dispersion of regional unemployment rates is negatively correlated to inter-regional mobility.

4. In the post-EMU era, large countries with rigid labour markets seemed to adjust **more effectively and faster** than in the pre-EMU period. Examples are France, Germany, Italy and Spain.

5. In non-Euro area countries such as the United Kingdom and Sweden, regional disparities also declined.

6. The speed of adjustment of labour markets in small economies (Austria, Belgium, Netherlands, Greece and Portugal) has not evolved significantly before and after the EMU.

Part D: Areas requiring policy intervention

In this part, we analyse the impact of various institutions on the dynamics of labour markets in the Eurozone in a methodological framework which is in spirit similar to the study by Blanchard and Katz (1992). In particular, we assess how rigidities such as the stringency of employment protection legislation (EPL), stringent regulation on both product and housing markets (respectively denoted by PMR and HMR), centralised wage bargaining and high tax rate, affect the response of labour market variables such as unemployment, participation, employment growth and labour mobility to asymmetric shocks. We will show that rigidities reduce the speed of convergence of those variables, as well as their volatility, and lowers migration.

1. Labour mobility and institutions

1.1. Data

The labour market data we use in this study comes from the Eurostat website. We extracted yearly data on labour participation rates, employment levels, unemployment rates, and the population aged between 15 and 64 years old at the country level, in countries belonging to the Eurozone (i.e. Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain), but Slovenia, for the period 1992-2007.

We also used data at the NUTS2 level for the above countries. This allows us to compare results at both national and regional levels, and thus to illustrate the sensitivity of the response of labour mobility to asymmetric shocks that occur at different levels. The disaggregated data is available for the same time period but is characterised by a structural break at the end of the 1990s. For this reason, we consider two different data sets for the regional analysis. The first one covers the period 1992-2001, while the second refers to the period 1999-2005[3].

Finally, as we are interested in the interaction between institutions and the ability of labour markets to recover promptly after a shock, we use data on EPL, unemployment benefits, centralisation of wage bargaining, regulation of both product and housing markets and taxes on labour, the sources of which are described in Box 2.

[3] We include both sets of data in the estimations, but add a dummy variable among the regressors (1 when the data corresponds to the database covering the second period, 0 otherwise). This allows us to rescale the level of the labour market variables from the second dataset and therefore enable comparisons with the first one.

Box 2: Data description.

Institutional data comes from several sources (at the national level). We took the first version of the EPL index of the OECD. The reason why we focused on this version rather than on the second is that the first provides greater variability over time and allows us to date back to the late 1980s (the second version only begins in the late 1990s). See Chapter 2 of OECD (1999) for more details on the database.

This measure of EPL is only available for three time periods, and we do not know exactly when the changes took place as they are identified as EPL in the late 1980s, late 1990s and 2003 respectively. We therefore arbitrarily considered that the first period spans 1985-1995, the second period the years up to 2002 and the last one from 2003 on.

The data on unemployment benefits is from the OECD website and corresponds to a summary measure, which is defined as the average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and three durations of unemployment. For further details, see OECD (1994) Chapter 8 and Martin (1996).

Similarly, the OECD measure of benefit entitlement is available at two-year intervals from 1961 to 2003. If the data is available for a given year and unavailable for subsequent years, we use available data to fill in the gaps. For instance, if data is only available for 1999, 2001 and 2003, we use 1999 figures for 1999 and 2000, 2001 figures for 2001 and 2002, and 2003 figures for 2003, 2004, 2005, 2006 and 2007.

The OECD website also provides data on product market regulation for two periods (1998 and 2003). We consider that the first range of values covers the period 1992-2002 and the second one 2003 and on. The OECD indicators of Product Market Regulation are a comprehensive and internationally comparable set of indicators that measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable. They measure the economy-wide regulatory and market environments in OECD countries in (or around) 1998 and 2003, and are consistent across time. The indicators cover formal regulations in the following areas: state control of business enterprises, legal and administrative barriers to entrepreneurship and barriers to international trade and investment. A detailed description can be found in Nicoletti et al. (2000) and Conway et al. (2005).

Our measures on housing market regulation are taken from Djankov et al. (2003), who describe indices of tenant-eviction procedure complexity. The measure is the sum of seven indices, namely (i) “professionals vs. laymen”, which covers the required degree of professionalism of the main actors in

the judicial process, (ii) “written vs. oral elements” for each stage of the procedure, (iii) the need of “legal justification” in the complaint/judgement, (iv) “statutory regulation of evidence”, which refers to the efficiency of the rules of evidence (v) “control of superior review”, (vi) “engagement formalities” that have to be observed being going to courts, (vii) “independent procedural actions”, which is defined as “every step in the procedure, mandated by the law or by court regulation, which demands interaction between the parties or between them and the judge or court officer, such as filing a motion or attending a hearing”. The index ranges from zero to seven where seven means a higher level of control or intervention in the judicial process. This data was introduced in part B of this report (Section B-4-2).

The centralisation measure comes from the OECD Employment Outlook (2004) Chapter 3 on "wage-setting institutions and outcomes", Table 3.5: wage-setting institutions in OECD countries1970-2000. Its takes a value between 1 and 5 according to the following criteria: 1 is "company and plant level predominant", 2 is "combination of industry and company/plant level, with an important share of employees covered by company bargaining", 3 is "industry-level predominant", 4 is "predominantly industrial bargaining, but also recurrent central-level agreements", 5 is "central-level agreements of overriding importance". For the period we are interested in, the data is available for two sub-periods, i.e. 1990-1994 and 1995-2000. For years beyond 2000, we considered the variable takes the same value as for 1995-2000.

Finally, we use taxes on labour from Table 16 in Nickell (2003), which adds up payroll tax rate, income tax rate and consumption tax rate. This measure is provided by the Centre for Economic Performance (London, UK) and aims to give an idea of the wedge between real product wage and real consumption wage after tax pay normalised on the consumer price index.

Note that several measures do not cover the case of Luxembourg (EPL, unemployment benefits, product market regulation and taxes), meaning that this country will be excluded from several regressions in the analysis that will follow.

Table D-1 provides an overview of the institutional panorama in Europe, where correlation coefficients between different institutional indicators are displayed. In particular, we report in bold font a correlation higher than 0.5: such is the case for the correlation between EPL and its sub-components (EPL for regular employment and EPL for temporary employment), for the correlation between EPL and product market regulation, and between EPL and housing market regulations.

Other correlations are weaker and insignificant. This correlation structure will require some adjustment of our estimation strategy, described in following sections.

	EPL	EPL (regular empl.)	EPL (temporary empl.)	Unemployment Benefits	Product market regulation	Housing market regulation	Taxes on Labour	Centralisation
EPL	1							
EPL (regular employ.)	**0,68**	1						
EPL (temporary employ.)	**0,80**	0,25	1					
Unemployment Benefits	-0,003	0,11	-0,22	1				
Product market regulation	**0,56**	0,15	**0,70**	-0,25	1			
Housing market regulation	**0,64**	**0,58**	**0,57**	-0,27	0,35	1		
Taxes on Labour	0,10	-0,19	0,39	-0,29	0,39	-0,16	1	
Centralisation	-0,30	-0,24	-0,43	0,064	-0,39	-0,44	-0,14	1

Table D-1: Correlation matrix of the institutional indicators. Eurozone (but Slovenia and Luxembourg), 1992-2007. Sources: OECD, Djankov et al. (2003), Nickell (2003) and authors' calculations.

1.2. Benchmark Methodology

We estimate the following vector autoregression (VAR):

$$\begin{aligned}
\Delta e_{i,t} &= D_{i,1} + \alpha_{i,1,1}(L)\Delta e_{i,t-1} + \alpha_{i,1,2}(L)u_{i,t-1} + \alpha_{i,1,3}(L)p_{i,t-1} + \alpha_{i,1,4}(L)\Delta m_{i,t-1} + \varepsilon_{i,e,t} \\
u_{i,t} &= D_{i,2} + \alpha_{i,2,1}(L)\Delta e_{i,t} + \alpha_{i,2,2}(L)u_{i,t-1} + \alpha_{i,2,3}(L)p_{i,t-1} + \alpha_{i,2,4}(L)\Delta m_{i,t-1} + \varepsilon_{i,u,t} \\
p_{i,t} &= D_{i,3} + \alpha_{i,3,1}(L)\Delta e_{i,t} + \alpha_{i,3,2}(L)u_{i,t-1} + \alpha_{i,3,3}(L)p_{i,t-1} + \alpha_{i,3,4}(L)\Delta m_{i,t-1} + \varepsilon_{i,p,t} \\
\Delta m_{i,t} &= D_{i,4} + \alpha_{i,4,1}(L)\Delta e_{i,t} + \alpha_{i,4,2}(L)u_{i,t-1} + \alpha_{i,4,3}(L)p_{i,t-1} + \alpha_{i,4,4}(L)\Delta m_{i,t-1} + \varepsilon_{i,m,t}
\end{aligned}$$

where $e_{i,t}$, $u_{i,t}$, $p_{i,t}$ and $m_{i,t}$ are respectively the logs of the difference with respect to the European (or country) average of the employment level, the unemployment rate, the labour market participation rate and the population aged between 15 and 64 years old in country (or region) *i* at time *t*. The $D_{i,\bullet}$ are country (or region) dummies, the $\alpha_{\bullet,\bullet}(L)$ are lag polynomials and the $\varepsilon_{i,\bullet,t}$ are semi-structural shocks affecting our labour market variables[4].

Specifically, we will illustrate the response of the labour market variables to a negative labour demand shock, which will be interpreted as a realisation of $\varepsilon_{i,e,t}$ equal to -1. Our benchmark regression will consist of one lag, but we will also allow for two in order to show the consistency of the results[5]. We will report results for the full system of equations, but also when only employment, unemployment and participation are modelled jointly, which corresponds to the original VAR estimated by Blanchard and Katz (1992).

As we are primarily interested in the influence of institutions on the response of the labour market variables, we will allow the lag polynomial to depend on the institutional measures according to the following manner:

$$\alpha_{i,\bullet,\bullet} = a_{\bullet,\bullet} + \sum_{j=1}^{5} b_{j,\bullet,\bullet} X_{j,i,t}$$

where the *Xs* are our institutional variables (namely EPL, unemployment benefits, centralisation of wage bargaining, product and housing market regulations and labour tax rate).

[4] As in Blanchard and Katz (1992), we control for region/country effects by introducing a set of dummy variables and also assume homoskedasticity of the error term. One could use a more robust estimation technique like GMM (see Arellano and Bond, 1991). But this strategy typically leads to standard errors that are much higher. For this reason, we decided to follow the standard literature. See Janiak (2006) for a discussion when this technique is applied to US job flows.

[5] Figure D-23 in the Appendix compares the responses in baseline model with two alternatives: (1) when we allow for two lags and (2) when the population between 15 and 64 years old is added to the regressors.

An issue when estimating vector autoregressions is to attempt to limit the dimensionality (i.e. the number of parameters to be estimated) since the precision of the estimates mechanically worsens. For this reason, we will present results of four alternative specifications: (i) no institutional interaction, (ii) when only one institutional variable is included, (iii) when an institution is included together with another institutional variable, (iv) when interactions only on the "diagonal" of the VAR are included, that is such that

$$\begin{cases} b_{j,r,s} = 0 \text{ if } r \neq s \\ b_{j,r,s} \neq 0 \text{ if } r = s \end{cases}$$

1.3. Benchmark results

Fig. D-1 displays the results of our benchmark regressions, where labour market variables at the country level are considered and no institutional effect is assumed. We present both the results of the impulse responses in terms of percentage changes in rates (left part of the figure, where the reported series are logs of the various rates, and where we further divide the log of the rate of unemployment by 10 to provide a comparable scale with the employment rate and the participation rate) and in terms of gross numbers (right part of the figures, see Box 3 for a description of the calculation). In the Appendix, the results are presented in tables.

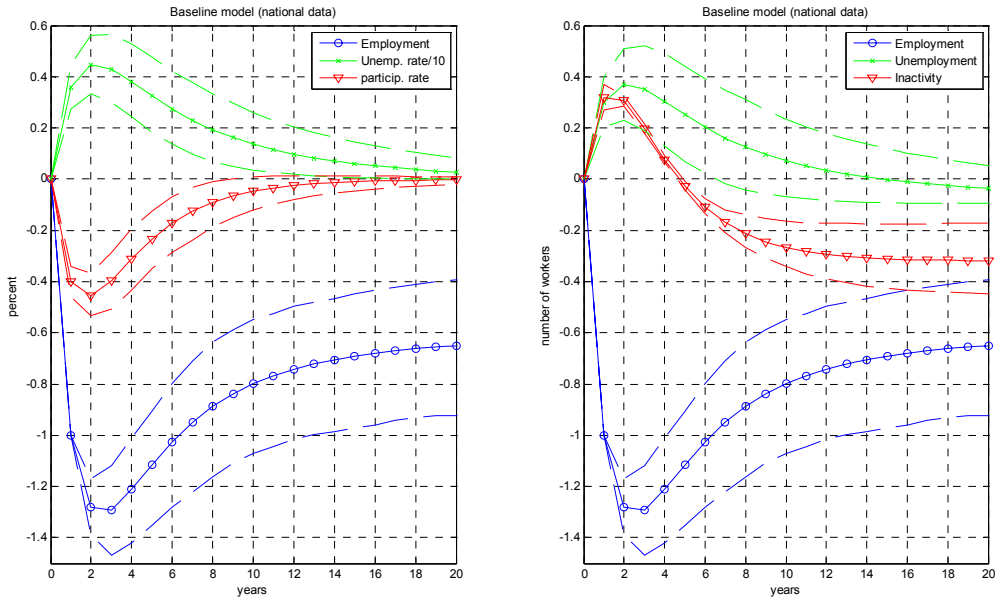


Fig. D-1: Baseline model, which is a VAR with one lag and three variables. The picture shows the responses when they are expressed in percent deviation from steady state (left panel) and directly in terms of the number of workers (right panel). No institutional interaction, country level. Dashed lines define a 95% confidence interval, calculated using standard parametric bootstrap and assuming normal distribution of the error term.

The left part of the graph shows that an asymmetric labour demand shock which depreciates employment by 1% brings about an increase in the unemployment rate by 4% in the short run (after one year) and reduces the participation rate by about 0.5%. Over time, variables then converge progressively to their steady-state level. The right part represents the joint dynamic evolution of employment, inactivity and unemployment expressed in numbers of workers (see Box 3 for a description of the calculation). In the short run, half of the negative employment shock is transmitted into higher unemployment, the remainder being a surge in inactivity. Half of the employment shock is persistent in the long run. Unemployment progressively goes back to its long-run value, while inactivity tends to decline slightly below the pre-shock value. This may be due to various measurement errors, but an alternative specification is that, on average, the long-run decline of employment requires that more family members work. To explain the co-evolution of employment and inactivity, basic accounting implies that the difference is explained by a moderate fraction of the population outmigrating. Hereafter, we will mostly report graphs of the evolution of employment changes, unemployment rates and participation and report the graphs in “numbers” in the Appendix, only commenting on them when this is relevant for the discussion.

Box 3: Detail of the calculation of the effect of employment on numbers of unemployed and inactive workers (right part of Fig. D-1).

Denoting the working-age population, which we denote by L, in a region (or countries), is the sum of three elements: the employed E, the unemployed U and the inactive I. We denote by P the labour force, which is the sum of those employed and unemployed. Hence, the unemployment rate *u* is the ratio of U to P and the participation rate p is the ratio of P to L.

A simulated response in a VAR framework estimated *à la* Blanchard-Katz would directly give the subsequent evolution of $\hat{E}$, $\hat{u}$ and $\hat{p}$, which we define as the percent deviation from steady state[6]:

$$\hat{E} = \frac{\Delta E}{E^*}; \hat{u} = \frac{\Delta u}{u^*}; \hat{p} = \frac{\Delta p}{p^*}$$

In the equation above, X^* denotes a variable evaluated at the steady state and $\Delta X = X - X^*$ is the difference between the level of X and the steady state.

Because we want to illustrate the response of variables in levels, which in our mathematical notation corresponds to E, U and I, we calculate the following expressions for the responses displayed in the graphs:

$$\Delta E = \hat{E}.(P^* - U^*)$$

$$\Delta U = \left(\frac{\hat{u}}{1 - U^*/P^*} + \hat{E}\right) U^*$$

$$\Delta I = \left[\hat{E} + \frac{U^*/P^*}{1 - U^*/P^*}\hat{u}\right](L^* - P^*) - \hat{p}L^*$$

The way we derive the first equation is almost straightforward: the second term in the equation corresponds to steady-state employment. Regarding the second equation, we first note that

$$\hat{u} = \hat{U} - \hat{P}$$

$$\hat{u} = \hat{U} - (1 - u^*)\hat{E} - u^*\hat{U}$$

$$\hat{u} = (1 - u^*)(\hat{U} - \hat{E}),$$

[6] As explained in Section 1.2, the figures actually report impulse responses as log deviations from steady state. This approximates percent deviations.

which can be rewritten as

$$\hat{U} = \frac{\hat{u}}{1 - u^*} + \hat{E}$$

and implies the formulation in the second equation. To write the equation for the inactives, we followed the next steps:

$$\Delta I = \hat{L}L^* - \hat{P}P^*$$

$$\Delta I = \left(\hat{P} - \hat{p}\right)L^* - \hat{P}P^*$$

$$\Delta I = \hat{P}(L^* - P^*) - \hat{p}L^*$$

$$\Delta I = \left[(1 - u^*)\hat{E} + u^*\hat{U}\right](L^* - P^*) - \hat{p}L^*$$

$$\Delta I = \left[(1 - u^*)\hat{E} + \frac{u^*}{1-u^*}\hat{u} + u^*\hat{E}\right](L^* - P^*) - \hat{p}L^*,$$

leading to the result. Concretely, we estimate L^*, P^* and U^* by merely calculating the average in our sample of countries (or regions) of the population aged between 15 and 64, the active population and the number of unemployed respectively. Then impulse response functions are normalized so that the short-run impact after one year on employment is -1.

It is also worth pointing to a few differences for European countries adjustment reported in Fig. D-1 with respect to the results for the US displayed in Blanchard and Katz (1992). First, the effect of the shock on unemployment and participation is much more important, especially for unemployment. In their study, they report a short-run impact of 0.32% on unemployment (i.e. about ten times lower), and an impact of 0.17% on participation (about three times lower). The reason could be that the alternative adjustment channel is not active in Europe: net labour mobility is barely zero after the shock and is not affected in the long run either. A second difference worth commenting on is that the effect of the shock on unemployment is much more persistent. While it takes five years for unemployment to return to its long-run value, our results suggest that it takes more than twelve years in Europe. Thirdly, employment adjusts rather quickly in Europe as compared to the US. Moreover, while it overshoots in the US – that is, it depreciates in the short run by more than in the long run – it reaches a plateau immediately in Europe.

2. Impact of institutions

After this description of the baseline model, we can now illustrate the institutional influence in greater detail. For this, we first interact institutional variables one by one, in a one lag polynomial specification. For each institution, two graphics are presented: one with a low value of the relevant institutional ingredient (eg., EPL, product market regulation, etc…) and one with a high index of the regulation, namely described as “low” and “high”. When the importance of an institution is “low”, it means that the respective value of the institutional variable corresponds to the first (bottom) quartile of the cross-country distribution, while “high” refers to the last (top) quartile.

Fig. D-2 illustrates the difference in the dynamics of labour markets according to the degree of employment protection, where we choose to replicate the specification of the VAR with three variables in percentage, and to represent the dynamics translated in terms of numbers of workers. The top charts (low EPL countries) shows a more rapid convergence than the bottom charts (high EPL countries): in the top left part (log of rates) as well as in the top right part (number of workers), employment returns above -1 after 5 years, while it takes 15 years in the right part. The dynamics of unemployment and inactivity are not drastically different, however. Changes in population drive the difference: anticipating slow convergence of employment, more individuals may move out of the region in order to find better job opportunities. Note however that this is a slow and marginal process, given low aggregate geographical mobility rates as discussed in previous parts of the report.

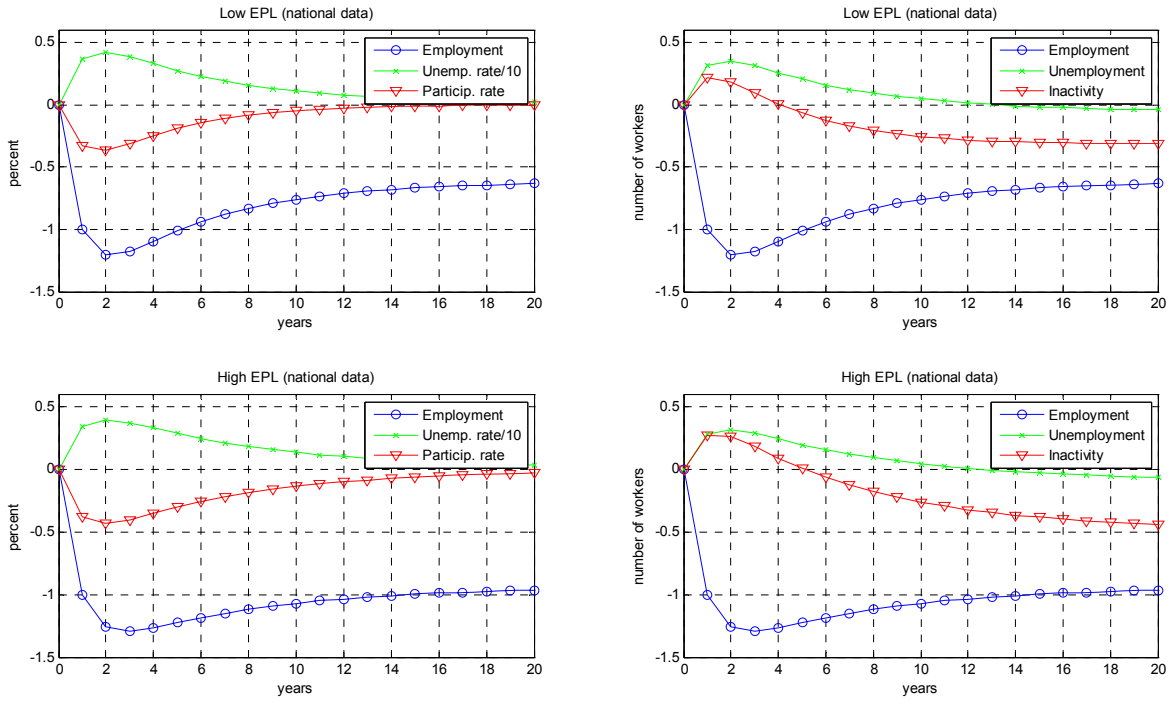


Fig. D-2: Response to an asymmetric labour demand shock according to the stringency of EPL (country level).

Regulation in the goods market has a similar influence on employment dynamics as EPL. Fig. D-3 shows also a small influence of product market regulation on unemployment dynamics: the value at the peak for unemployment goes from about +0.3 to +0.4, and converges more slowly to its final value. While it takes 6 to 8 years for the variable to reach its long-run equilibrium in "unregulated" economies, the adjustment can take about 16 years in highly regulated economies. Finally, in less regulated economies (top part of the panel), employment reaches the plateau around -0.6 after 8 to 10 years, while after 20 years, the value -0.6 is not yet reached in economies with more regulated product markets (bottom part of the panel). Despite these differences, the effects of product market regulation are not as strong as what one could have expected. An explanation for this low impact of product market regulation is the existence of conflicting effects: on the one hand, fewer job creations due to regulations of the goods market reduce the opportunities to move, but on the other hand, it raises the incentives to move. The net effect is ambiguous. However the methodology and the results reported in Fig. D2 do not allow us to decompose these two effects.

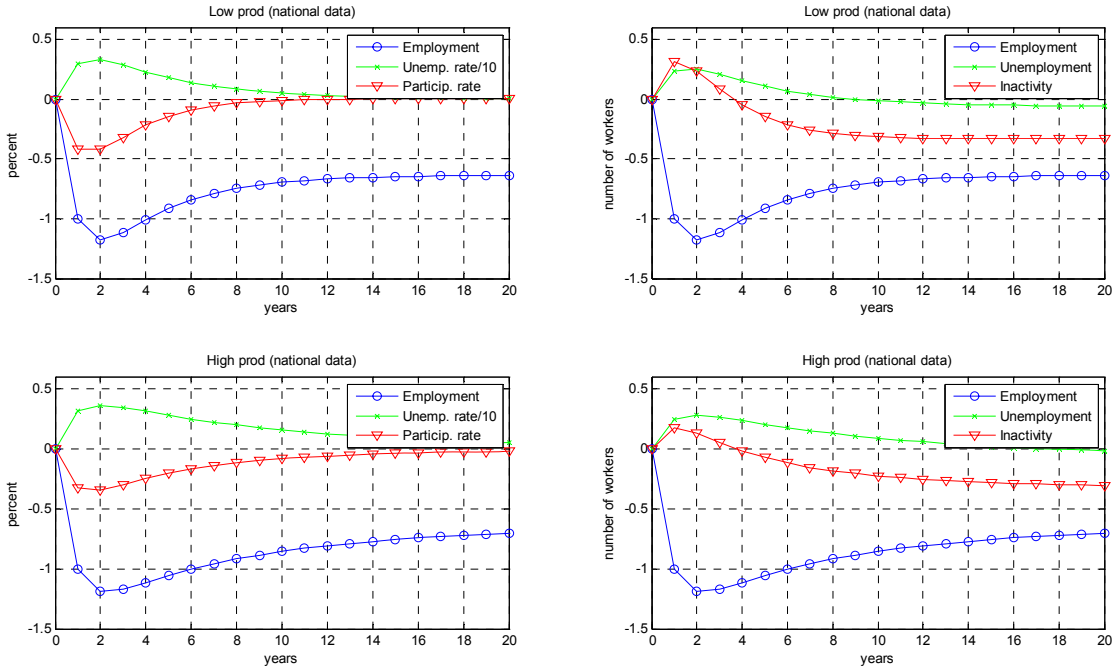


Fig. D-3: Response to an asymmetric labour demand shock according to the type of product market regulation (country level).

Interestingly, looking now at Fig. D-4, the impact of housing market regulations is the largest of all previous institutional features in terms of the dynamics. One can indeed see an even larger difference in employment dynamics. With low housing regulations, the dynamics of employment is much faster: half of the employment shock is absorbed in less than 10 years, while in high-housing-market-regulation countries, the employment shock is mostly permanent. There are also some differences in unemployment dynamics. The half-convergence period is 6 years in the low housing market regulation economies and approximately 10 years in high housing market regulation economies (left-part) and about 8 years in the right-panel (log of rates).

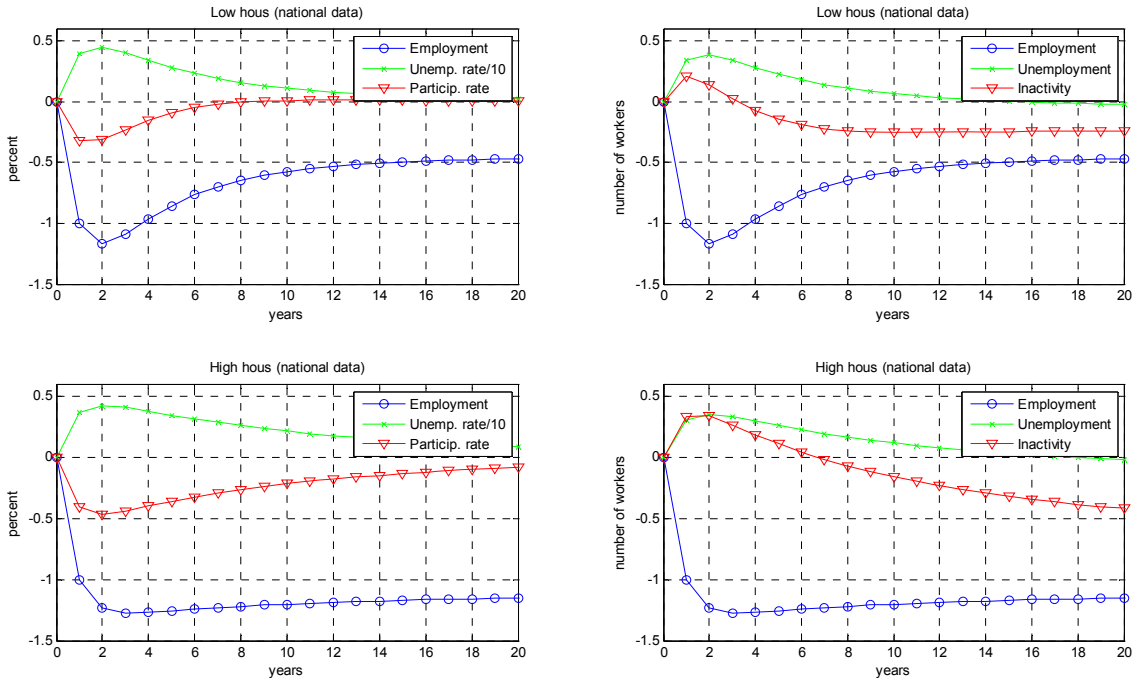


Fig. D-4: Response to an asymmetric labour demand shock according to the type of housing market regulation (country level).

Fig. D-5 runs a VAR where we interact the coefficients with the degree of centralisation of wage-setting institutions (whether this is country specific, industry or region specific or decentralised at the firm level). The difference here is quite striking and somewhat unexpected. Imposing an initial negative shock of -1% on employment, we observe a very strong amplification of the dynamics of employment in decentralised economies, whereas in centralised economies, the shock is actually absorbed relatively faster. An interpretation is that centralised economies (e.g. Scandinavian countries) have high tax rates and therefore strong economic stabilisers, mainly affecting the volatility of the labour market variables. We will explore this issue immediately in the next sub-section.

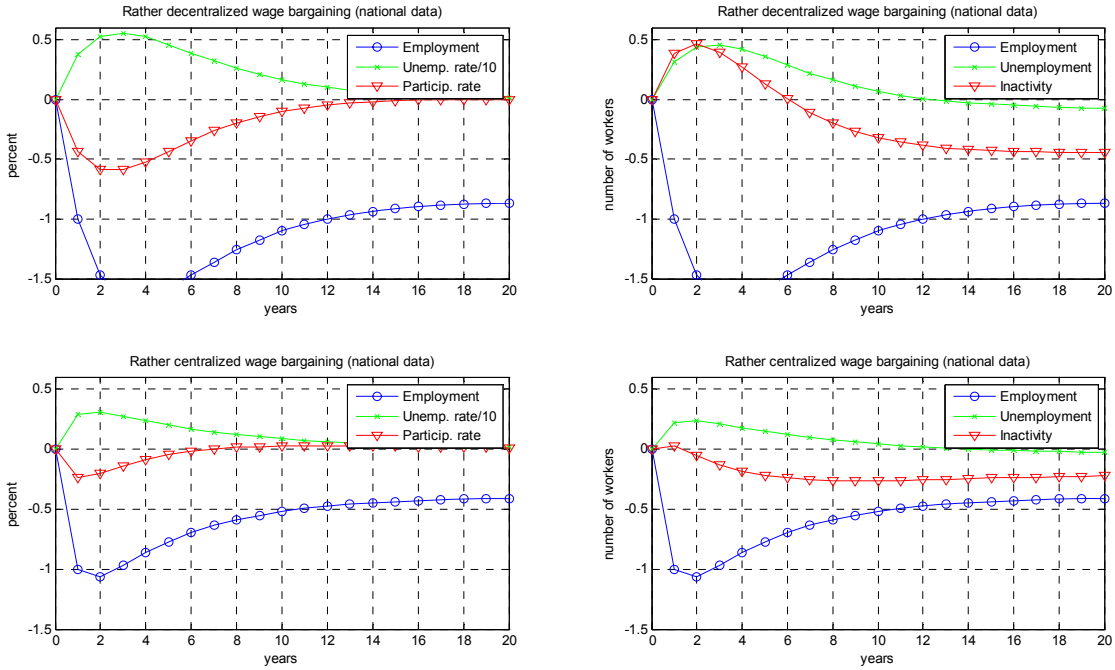


Fig. D-5: Response to an asymmetric labour demand shock according to the level of the degree of centralisation of wage bargaining (country level).

2. 3. Robustness

The advantage of the previous exercises is that we capture the impact of labour market institutions in all dynamic links between the three series. For instance, the effect of EPL could be to raise (or reduce) the lagged impact of an employment shock on inactivity, an effect which is captured in our specification. However, we need to estimate many coefficients and therefore cannot increase much the number of institutions in the regression since the number of coefficients would become too large. An alternative specification is to introduce the institutions two by two, in order to capture correlations between institutions[7].

The next chart is precisely an attempt to disentangle between the effect of centralization of wage bargaining, on the one hand, and the effect of higher payroll taxes, on the other hand. Fig. D-6 indicates that higher payroll taxes were indeed correlated with centralisation: the initial decline in employment in decentralised economies is now attenuated and remains around -1.5 (-2 when centralisation was introduced alone in Fig. D-5). The employment trough is also around -1.5 in low tax countries whereas in high tax countries, the minimum is higher, at -1.1. So, in short, half of the

[7] See section 1.2 for a formalisation. Here, we allow for non-zero off-the-diagonal coefficients.

effect of centralisation observed in Fig. D-5 was actually due to the correlation between payroll taxes and centralisation. However, the dynamics of employment in the right part of the figure remains similar to Fig. D-5, indicating that the other half of the effect is still there: countries with highly centralised wage- setting institutions seem to perform better than in countries with decentralised institutions, in that the magnitude of shocks is higher in decentralised countries.

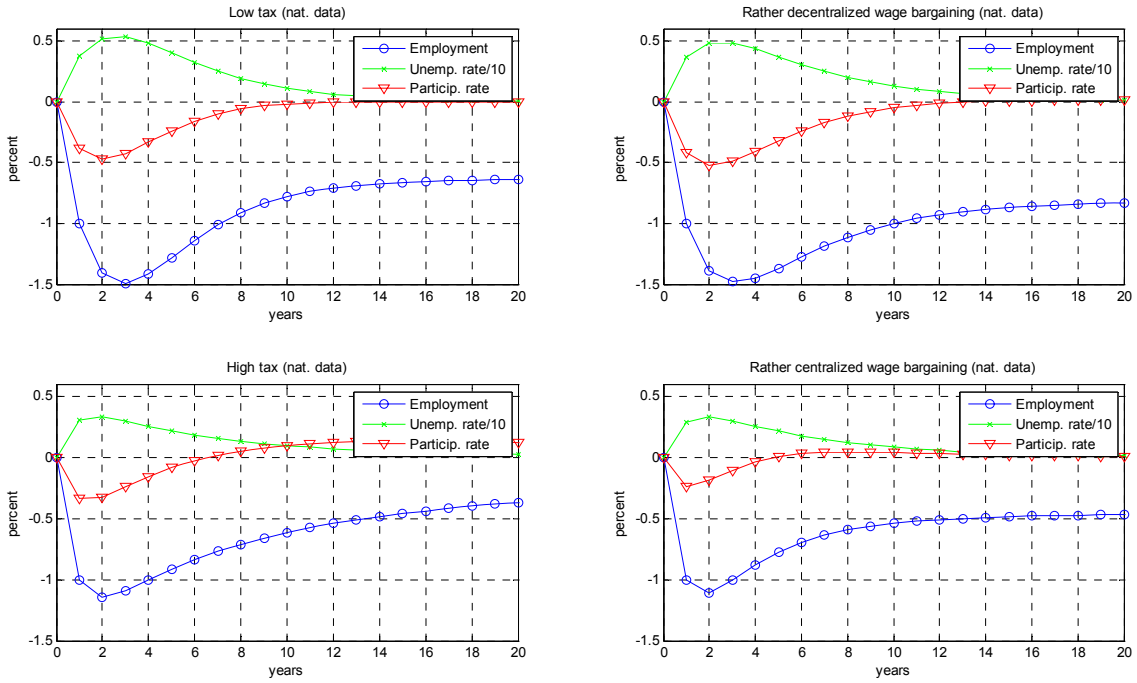


Fig. D-6: Baseline model when interacted with both the tax rate and the degree of centralisation of wage bargaining. Specification with rates only (see Appendix for the specification in levels).

Another check is to interact the coefficients of the VAR with EPL and the centralisation variable, such as in Fig. D-7. In that case the impact of EPL is not as large as previously but we still observe that high EPL slows down the convergence of employment dynamics. The amplification of the employment shock, in the right part of the graphs, is still quite different between high and low centralisation countries, and still similar to Fig. D-5 where centralisation was the only variable interacting with the coefficients of the VAR.

Of course, this is only a comparison of dynamics and amplification of the shocks: remember that we normalise the shocks in the two types of economies to be -1 in the short run (year 1). It could well be that the typical initial shock is itself different across different economies. In particular, more specialised economies (e.g. smaller countries) are presumably hit by larger relative asymmetric shocks.

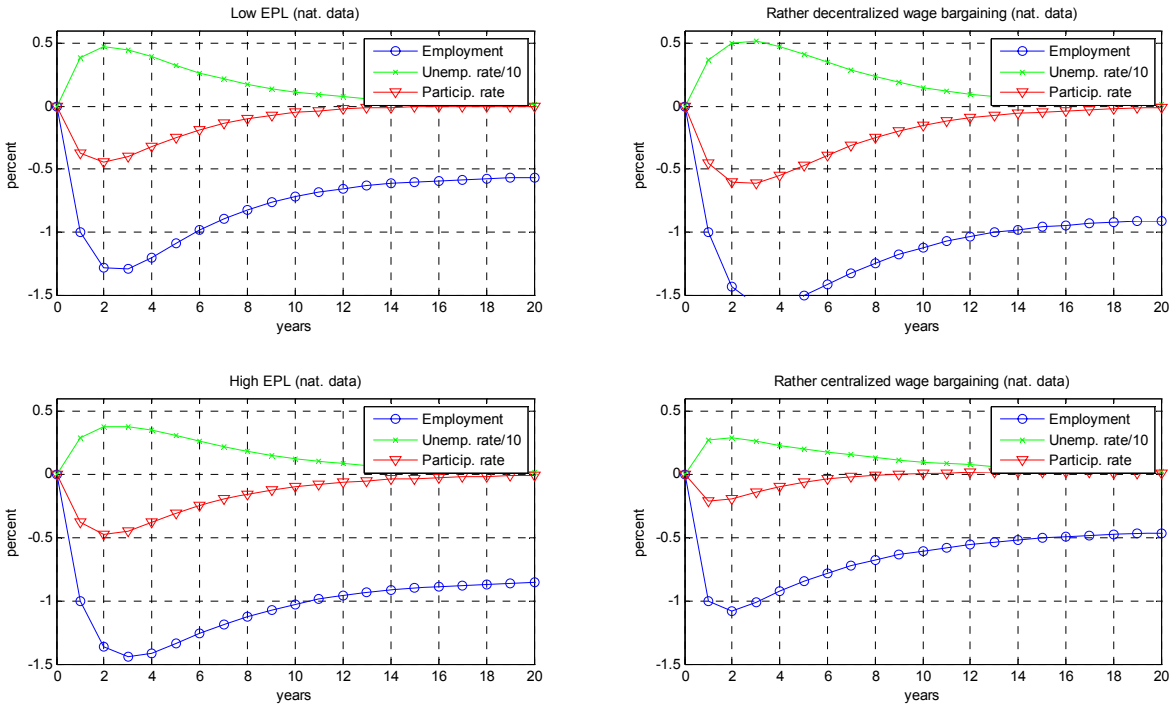


Fig. D-7: Baseline model when interacted with both EPL and the degree of centralisation of wage bargaining. Specification with rates only (see Appendix for the specification in levels).

Fig. D-8 presents the outcome of interacting both EPL and product market regulations with the coefficients of the VAR. Again, the results are similar to those obtained with Fig. D-2 and Fig. D-3: low EPL and low product market regulations lead to faster dynamics of employment, while high EPL and high product market regulations are associated with slower dynamics. Note however that the difference in the dynamics of convergence for the employment rate is very large in the right part of the figure: the impact of the degree of product market regulation does not appear to be as large as the impact of EPL and, as we see now, of housing market regulation.

Finally, Fig. D-9 shows what happens when we include both EPL and housing market regulations. In this case, the results are similar to those obtained with Fig. D-2 and Fig. D-4: low EPL and low housing market regulations are both associated with relatively faster dynamics of employment, while high EPL and high housing market regulations are associated with slower dynamics. It is quite striking to see that the effect of housing remains very large on employment dynamics, and more than product market regulations. We believe that this is a fairly robust conclusion: housing market regulations penalise employment dynamics in a way which was not suspected in the literature.

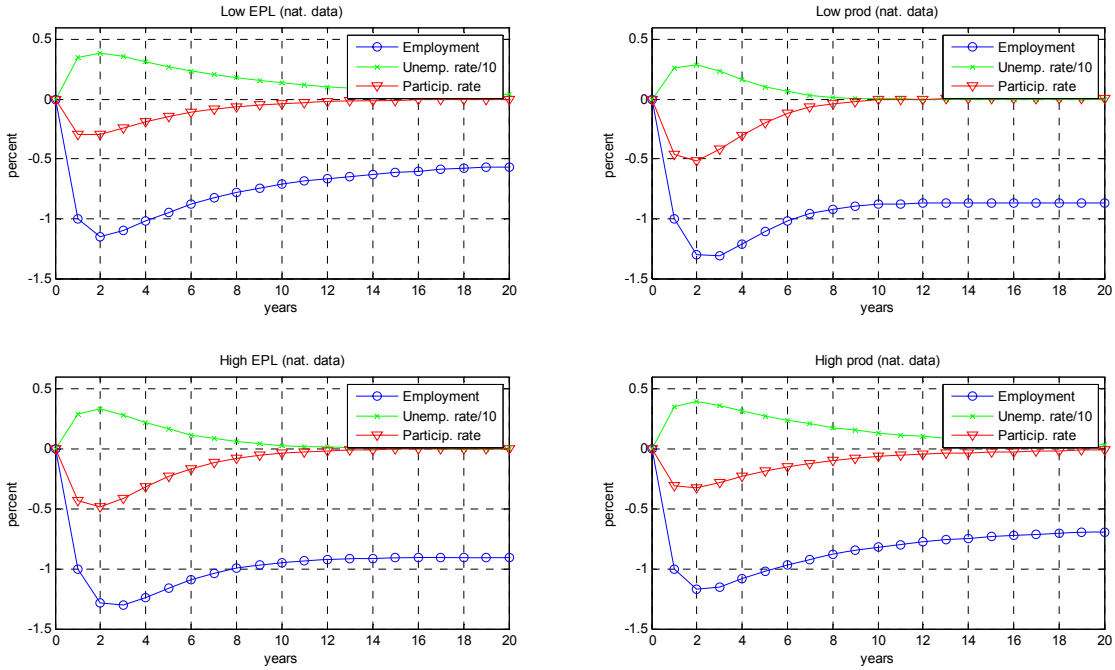


Fig. D-8: Baseline model when interacted with both EPL and product market regulation. Specification in rates only. See Appendix for the specification in numbers.

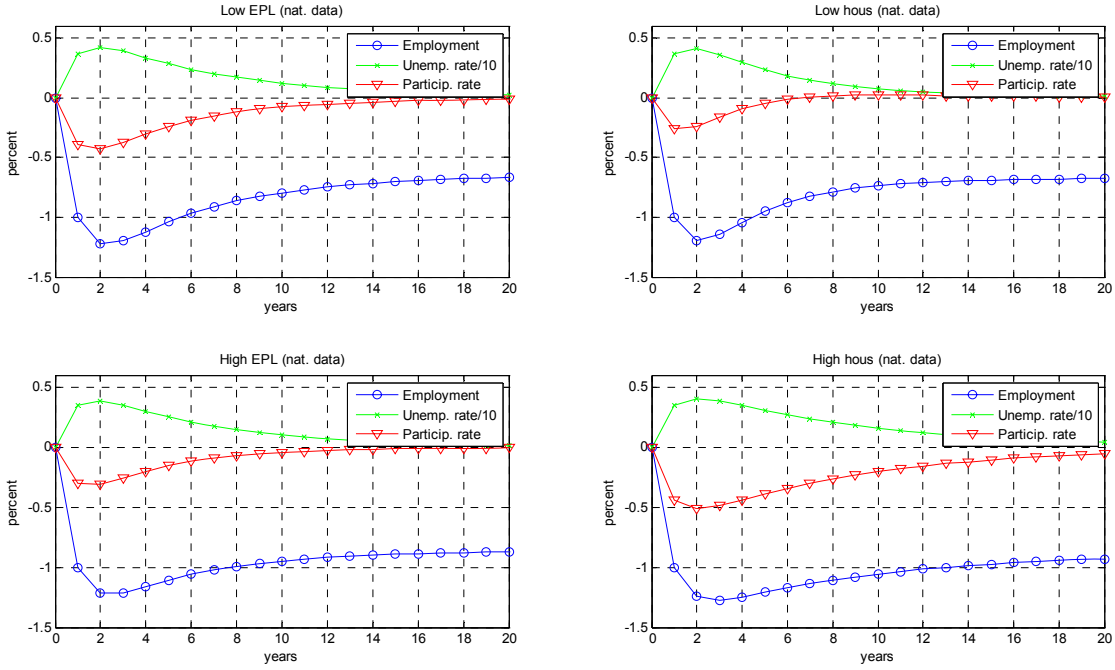


Fig. D-9: Baseline model when interacted with both EPL and housing market regulation. Specification in rates only. See Appendix for the specification in numbers.

2.4. Further issues

We now document the response of labour markets in the Eurozone by considering different worker categories, in particular young/old workers and men vs. women. The literature has shown that the supply of labour of women and young workers is typically more elastic. See, for instance, the reviews of the literature by Pencavel (1986), Killingsworth and Heckman (1986), Blundell and Macurdy (1999) and Altonji and Blank (1999) and the references therein. Our results in this Section will confirm the conventional view that the participation of young/old workers and women is more responsive to shocks than that of middle-age workers and men. We also address the issue of whether temporary vs. regular employment protection stringency have different effects.

2.4.1. The gender dimension

An issue is whether women are more responsive than men to shocks and to institutions. Fig. D-10 explores this question by running separately the benchmark VAR analysis for men and women. In terms of numbers (right charts), we can see that the dynamics of employment is quite similar for men and women, but that participation dynamics differs much more: female workers withdraw from the labour force twice as frequently. The peak in inactivity is indeed around +0.5 for women and around +0.25 for men. As a consequence, the evolution of unemployment is different: male worker unemployment (and unemployment rates in the left part of the figure) are twice as volatile, consistent with the fact that female workers' participation is more elastic to employment shocks: non-participation acts as a buffer for female workers.

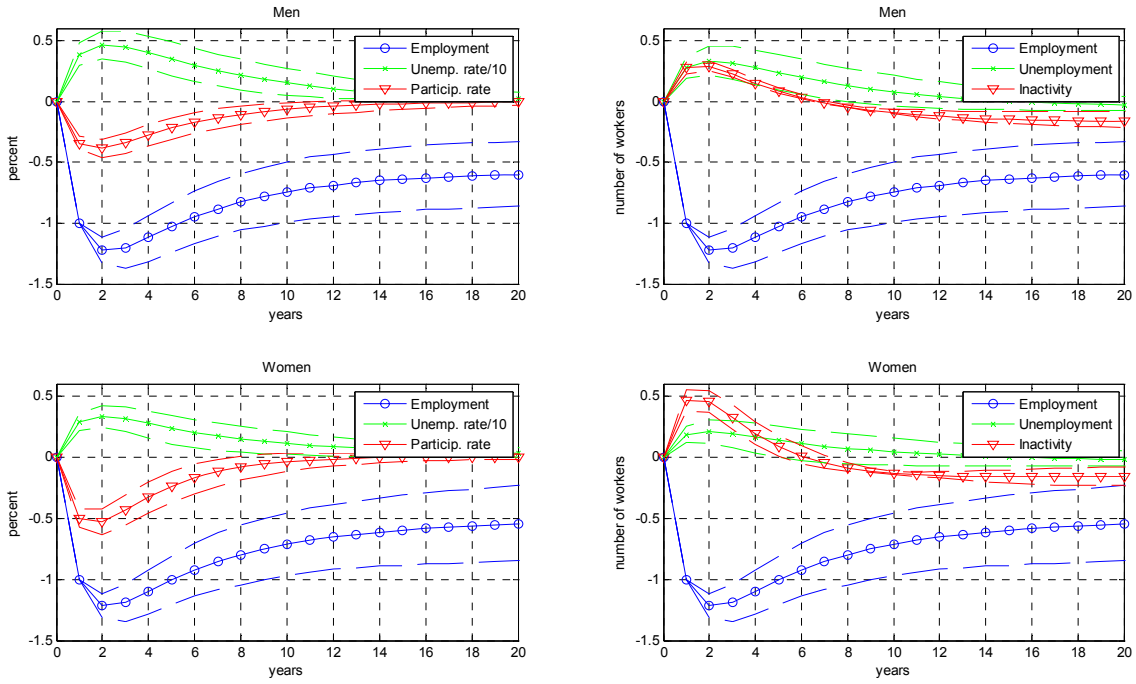


Fig D-10: Baseline model where the VAR is estimated for men and women separately.

We ran another exercise: interacting the coefficients of the VAR with institutions of the labour market, separately for men and women. We found a few differences but not as large as expected[8]. Both product market regulation and EPL penalise the recovery of employment dynamics for men and women, but more for women than for men, as one can see from the observation of the bottom part of Fig. D-11 (high EPL) and the bottom part of Fig. D-12 (high product market regulation). However, since in the top of the two figures, male and female employment dynamics were also different, it is not obvious that the slower convergence of female employment relative to men is due entirely to those two institutions.

However, the impacts of both EPL and product market regulations seem to be disproportionately higher for female participation rates, as they converge quite slowly in highly regulated economies.

[8] See for instance Di Tella and MacCulloch (2005).

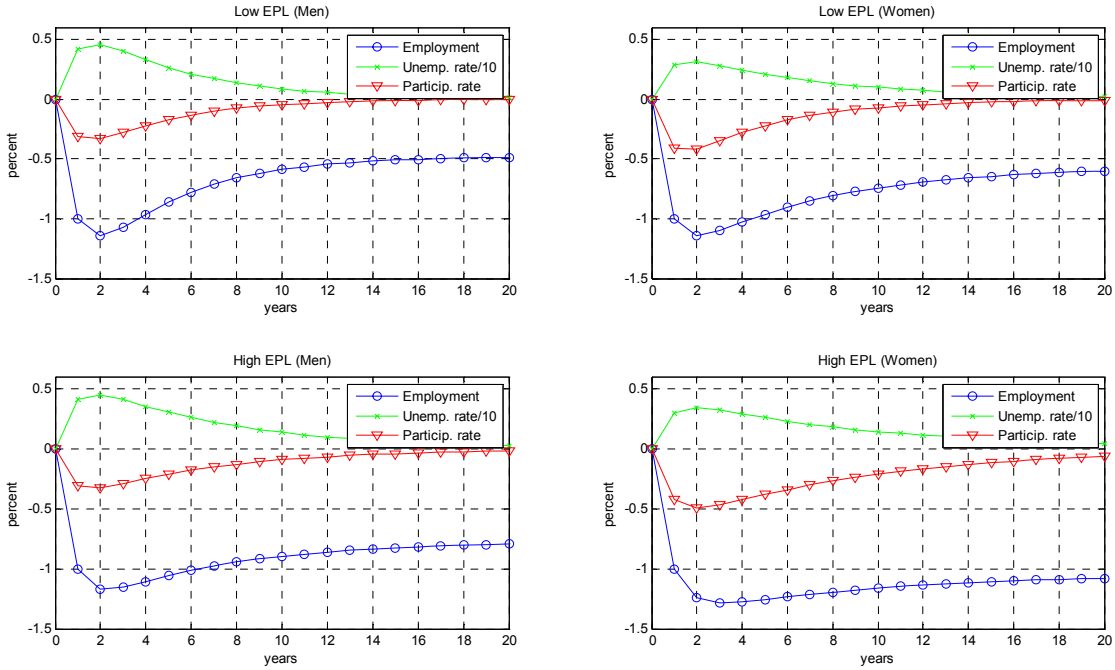


Fig D-11: Impact of EPL when the VAR is estimated for men and women separately. Specification in rates only. See Appendix for the specification in numbers.

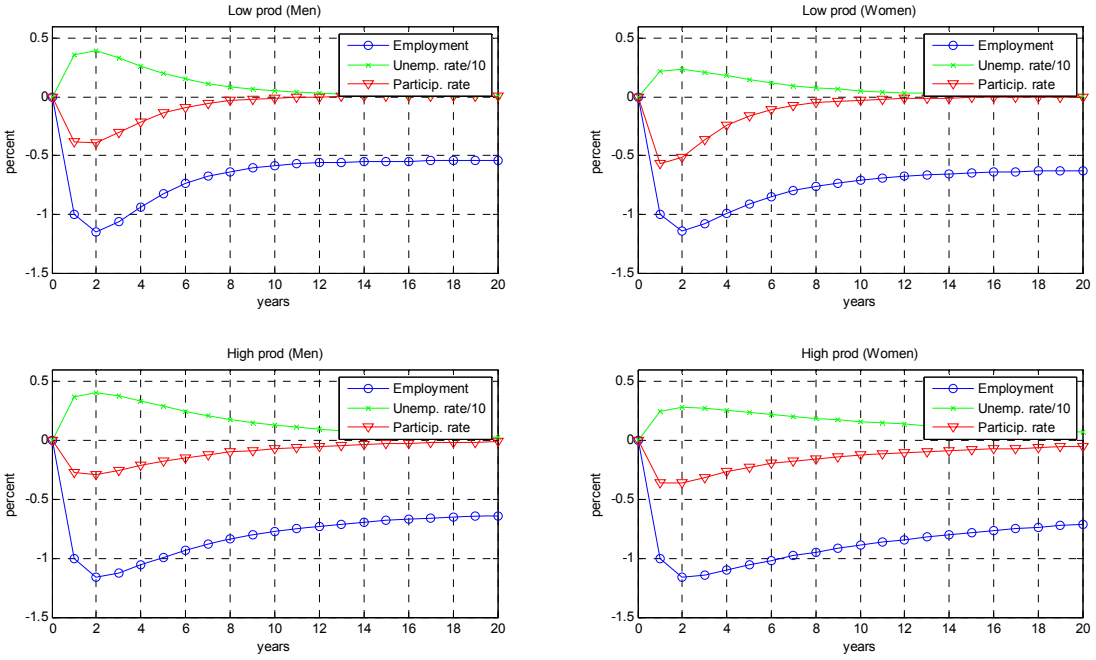


Fig D-12: Impact of product market regulation when the VAR is estimated for men and women separately. Specification in rates only. See Appendix for the specification in numbers.

2.4.2. The age dimension

We also investigated the extent to which age is a relevant dimension regarding the dynamics of adjustment of the labour market. Consistently with microevidence of labour supply curves[9], we find, in Fig. D-13, that the adjustment of younger (left panel) and older (right panel) workers is mostly operating through a decline in participation, whereas this margin of adjustment is not really effective for workers aged between 25 and 50 (centre panel). As a consequence, unemployment is not really sensitive to the shocks for younger and older workers. Finally, the employment dynamics of those workers is much less persistent, a reflection of the fact that this is a more cyclical and volatile variable than employment of older workers.

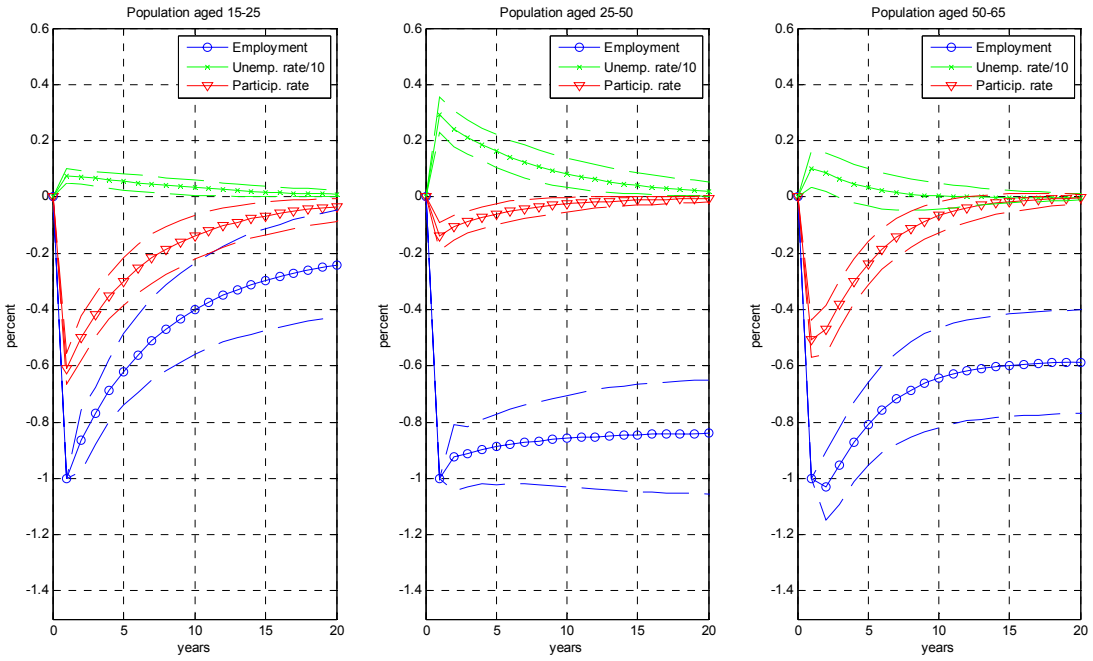


Fig D-13: Baseline model where the VAR is estimated for three age categories separately. Specification in rates only. See Appendix for the specification in numbers.

2.4.3. Temporary vs. permanent jobs

Another issue is whether EPL has an impact on the dynamics through protection of permanent jobs or through temporary jobs. Fig. D-14 suggests that both dimensions matter: high regular EPL and high EPL for temporary jobs both slow down the convergence of employment after the shocks, although the impact seems to be larger for regular EPL: in the left panel, we reach -1 after 4 years in

[9] See Pencavel (1986), Killingworth and Heckman (1986), Blundell and Macurdy (1999) and the references therein.

low regular EPL and after 10 years for high regular EPL countries, while in the right panel, we reach -1 after 7 years in low temporary EPL and after 8 years in high regular EPL countries. However, in the long run, the dynamics of employment is similar across types of employment protection: employment is still slightly above -1 (no convergence) after 20 years in both the bottom left and bottom right of the figure: both types of employment protection prevent the recovery of employment.

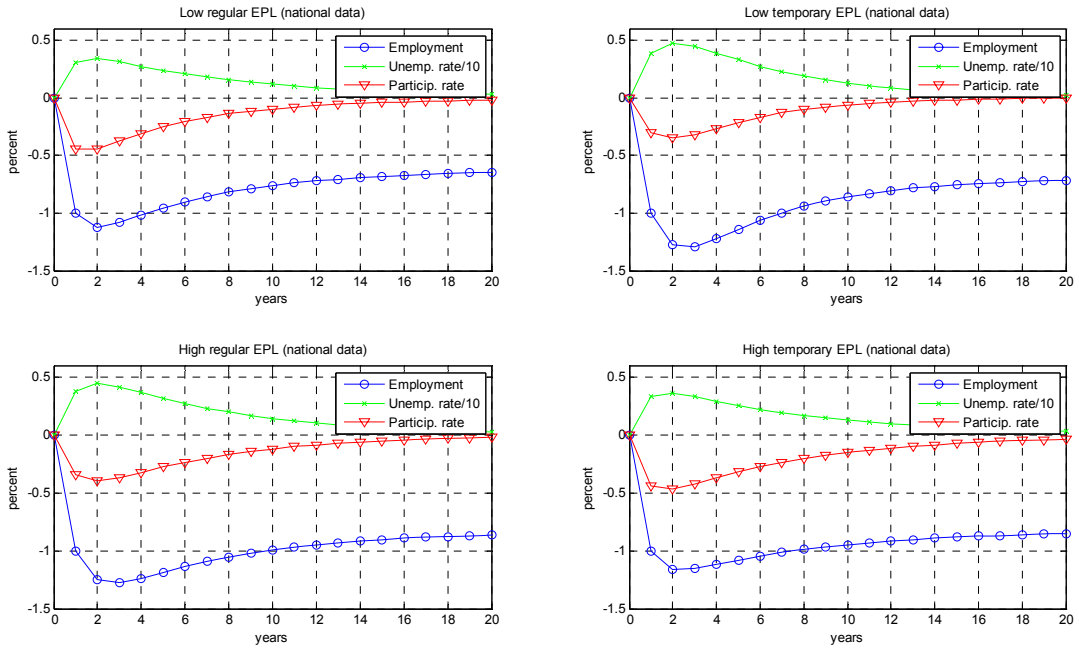


Fig D-14: Baseline model when interacted with two measures of EPL (for temporary and regular jobs). Specification in rates only. See Appendix for the specification in levels.

To conclude this sub-section, in the long run, both types of employment protection reduce the long-term value of employment in the same way: employment shocks are much more persistent in high EPL countries regardless of the type of EPL.

2.5. Regional mobility

We now develop two alternative strategies to discuss the issue of mobility. The first one is based on the country-analysis presented above extended to account for intra-country mobility. The second one is to undertake a regional analysis. The advantage is to include regional population data and therefore to have richer predictions, the cost being to have fewer observations in longitudinal dimension and therefore to capture the dynamic in time less precisely.

2.5.1. Country analysis with "inter-regional turbulence indices"

The first strategy is indeed to use the long time series dimension of country-level data and add to the benchmark VAR analysis an additional variable, intra-country mobility, which is calculated after some approximation from regional population data. To build this variable, we proceed as in Lilien's (1982) analysis of inter-industry mobility. He computed "turbulence indices" based on the evolution of industry employment. Here, we follow the same logic and build up series of "inter-regional population reallocation indices" which attempts to account for demographic growth. Details are provided in Box 4.

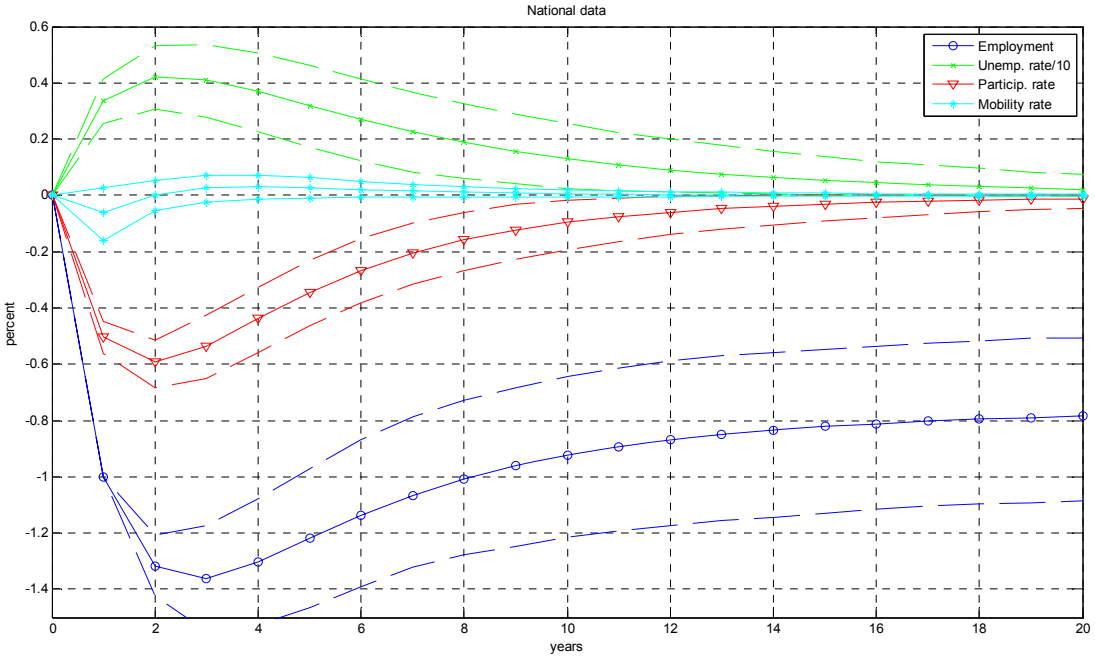


Fig D-15: Baseline model augmented with a measure of internal mobility.

We observe first that the inclusion of this new variable does not fundamentally change the results of other variables: the dynamics of employment, unemployment and participation remain similar to the benchmark case studied in Fig. D-1. Second, we find that immediately after the shock, our proxy for internal mobility drops. This is a fact that has been known in the literature (e.g. Pissarides and Wadsworth 1989): recessions are episodes of low job creations and therefore, migrations for job-related reasons decline. Now, in the year following the recovery, we find instead that mobility increases by a small and significant amount, although the significance is marginal. Our interpretation is consistent with all conclusions reached below: that geographical mobility is a margin of adjustment, but it is not responsive enough in Europe. An alternative interpretation is that our proxy is a noisy measure of internal mobility and that our study must be completed with other variables

reflecting, in time series, the geographical mobility of European workers. We also explored various specifications such as interacting the coefficients of this 4-variables VAR with various institutions of the labour market, but due to the large number of coefficients to be estimated, we did not reach any conclusive results. More variance and more observations are needed to improve the results, which is the goal of the next part of this section using the regional dimension of the data more extensively.

Box 4. Calculation of a Lilien intra-country mobility index.

Let A_t be the population of a given country and A_{it} the regional population for region i. Finally, let g_t and g_{it} be the growth rate of population, defined as $g_t = A_t/A_{t-1} - 1$.

If demographic growth of the country was zero, internal mobility between regions would easily be defined as:

$$M_t = \sum_i |\Delta A_{it}|,$$

where Δ is the time-difference operator. Mobility rate would then be:

$$m_t = \frac{\sum_i |\Delta A_{it}|}{A_t}.$$

Now, in the case of positive demographic growth at rate g_t for all regions, the reference point cannot be zero since we would over or under estimate true mobility. A better approximation for the number of mobile workers would be instead for a region with a net number of immigrant:

$$\begin{aligned} immigrants_{it} &= A_{it} - A_{it-1} - g_t A_{it-1} > 0 \\ &= A_{it} - (1+g_t)A_{it-1}, \end{aligned}$$

while, for a region net loser of workers emigrating to other regions:

$$\begin{aligned} emigrants_{it} &= -(A_{it} - A_{it-1} - g_t A_{it-1}) > 0 \\ &= -A_{it} + (1+g_t)A_{it-1} > 0. \end{aligned}$$

In other words, the mobility rate adapted from Lilien's turbulence index is simply:

$$m_t = \frac{\sum_i |A_{it} - (1+g_t)A_{it-1}|}{A_t}.$$

2.5.2. Regional analysis with the log of population change

The second strategy is to replicate this analysis at the regional level, in order to check robustness and investigate new issues such as the impact of regulations on internal migrations.[10] The purpose of this section is indeed to give more emphasis to geographic labour mobility. Here, geographical mobility will be captured by regional population data, which is added to the benchmark VAR specification run so far as in Fig. D-16.

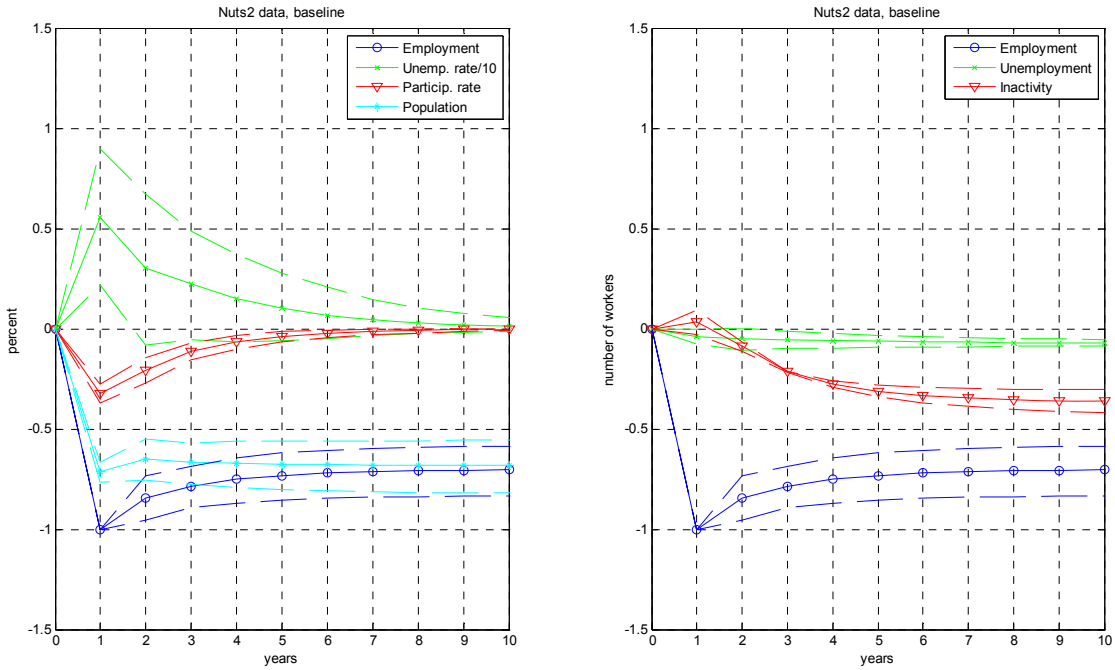


Fig. D-16: Regional model, benchmark with 1 lag and the three variables augmented by regional population. The picture shows the responses when they are expressed in percent deviation from steady state (left panel) and directly in terms of the number of workers (right panel). No institutional interaction, country fixed effects (series are in deviation with respect to country averages). Dashed lines define a 95% confidence interval, calculated using standard parametric bootstrap and assuming normal distribution of the error term.

This regional analysis is quantitatively fully consistent with the national analysis: following a regional negative shock of -1% on employment, regional employment slowly recovers and reaches a value around -0.7% in deviation to the national trend, plus or minus 0.15%. The rate of unemployment increases immediately by 5 points (NB: this is a percentage change in the rate of unemployment, and not percentage points increases in the unemployment). Unemployment returns slowly to its long-run

[10] In this part, we will estimate the VAR with variables in deviations from the country average and not, as previously, from European average.

value, with a speed of convergence that is relatively higher than at the national level: in Fig. D-1, the peak was slightly above +4%, but returning to half of this value +2% took about 8 years whereas here, the return to +2.5% occurs within 3 to 4 years.[11] Finally, participation declines and also converges relatively fast to its long-run trend. Again comparing to national series in Fig. D-1, we can note that the speed of convergence of participation is twice as fast at the regional level.

The new insight here is that there are movements of regional population which determine part of the dynamics: people move out from regions hit by a shock and this drives the persistence in employment series, despite the convergence of unemployment: most declining regions in Europe see indeed the working age population outmigrating. Interpreting Fig. D-16 symmetrically, one can state that regions hit by a positive shock attract immigrants, a process that sustains the positive employment shock, which becomes more persistent.

In what follows, we will now interact the coefficients of this augmented VAR with the various labour market institutions. Since the dynamics of employment, unemployment and participation are similar to the national level analysis, we will be briefer on each chart, and will also focus on the interaction between labour market institutions and regional population dynamics.

In Fig. D-17, we can see that again, a higher degree of employment protection is associated with greater persistence of employment shocks, but not to a large extent, the difference in the long run being at most 0.1 percentage points of the initial -1%: the low EPL countries converge to -0.6 while the higher EPL countries converge to -0.7, although arguably the convergence to these long-run values is somewhat slower in more regulated labour markets. Population dynamics are more different and the rates of population differ by approximately 0.2 percentage points: population declines faster in a region hit by a negative shock when the labour market is more sclerotic: this makes sense given that unemployed workers face fewer job opportunities locally and the institutions are more in favour of insiders.

[11] We did not formally calculate a half-period of convergence, but only inferred the time needed to converge to half of the initial shock from the graph.

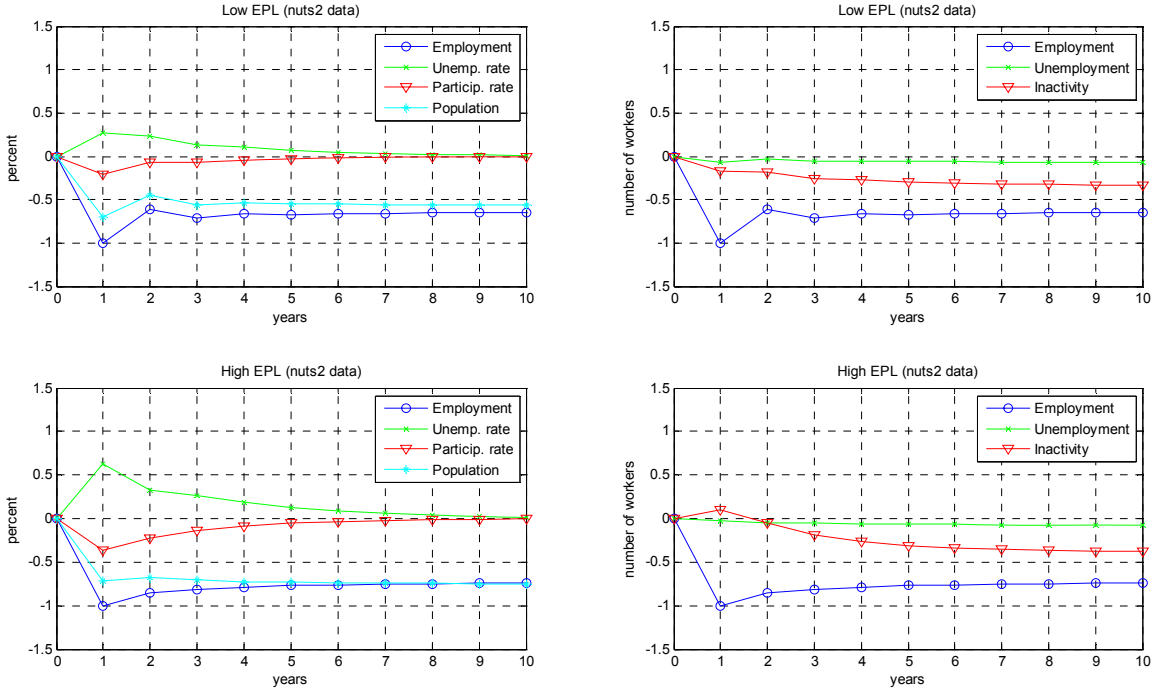


Fig. D-17: Response to an asymmetric labour demand shock according to the stringency of EPL (regional level analysis).

Fig. D-18 now investigates the impact of product market regulations on regional dynamics. Interestingly, we cannot detect any strong impact of product market regulations on the dynamics of labour market variables, nor on regional population dynamics. The top and the bottom of Fig. D-18 are indeed very close to each other.

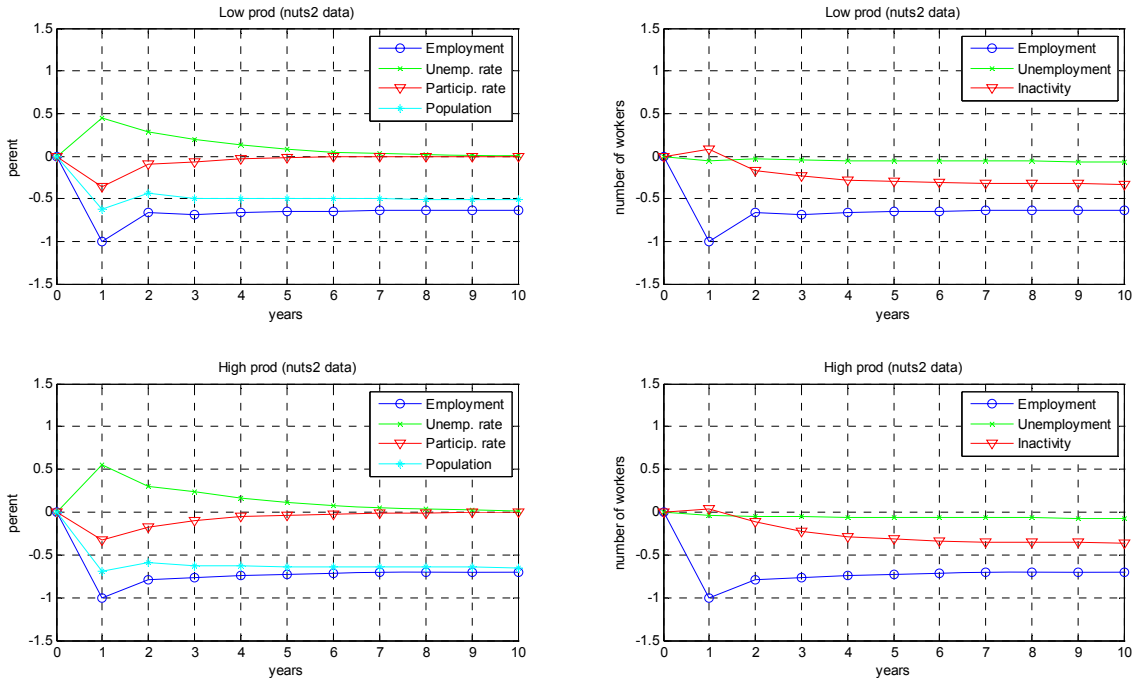


Fig. D-18: Response to an asymmetric labour demand shock according to the stringency of product market regulation (regional level analysis).

Fig. D-19 replaces the product market variable by the indicator for housing market regulation. As in the previous analysis, we can see that the influence of the housing market is more important than expected. There is almost no increase in unemployment in countries where the housing market is not strongly regulated, while the peak reaches 10% of the unemployment rate (that is, twice as much as on average) in countries with regulated housing markets. Similarly, the dynamics of employment are much slower and, to confirm the story, regional population declines less in countries with more regulated housing markets. The long-run value of population is -0.5 in those countries, whereas it is -0.8 in countries with low regulation of the housing markets. In other words, the degree of regional mobility after a negative shock is approximately log(0.8/0.5)=47% higher in countries with fluid housing markets.

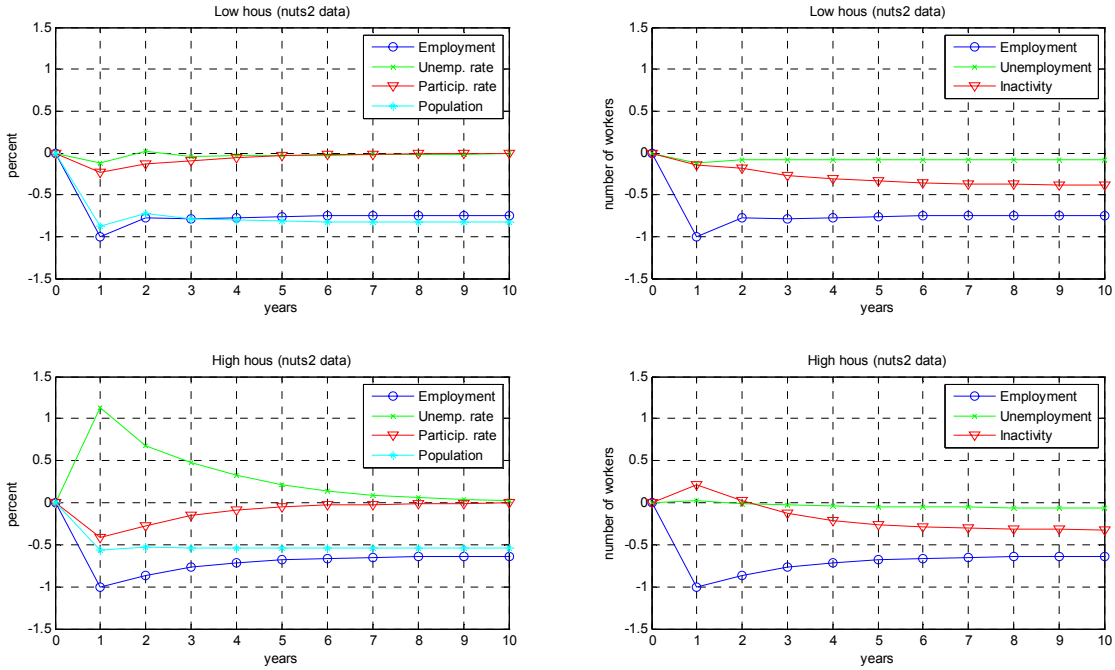


Fig. D-19: Response to an asymmetric labour demand shock according to the stringency of housing market regulation (regional level analysis).

The remainder of this section is to investigate whether this conclusion is robust to alternative specifications: we now introduce those institutions two by two and compare the results with the figures presented right above. Introducing both EPL and product market regulations leaves the conclusions unchanged, as can be seen from Fig. D-20.

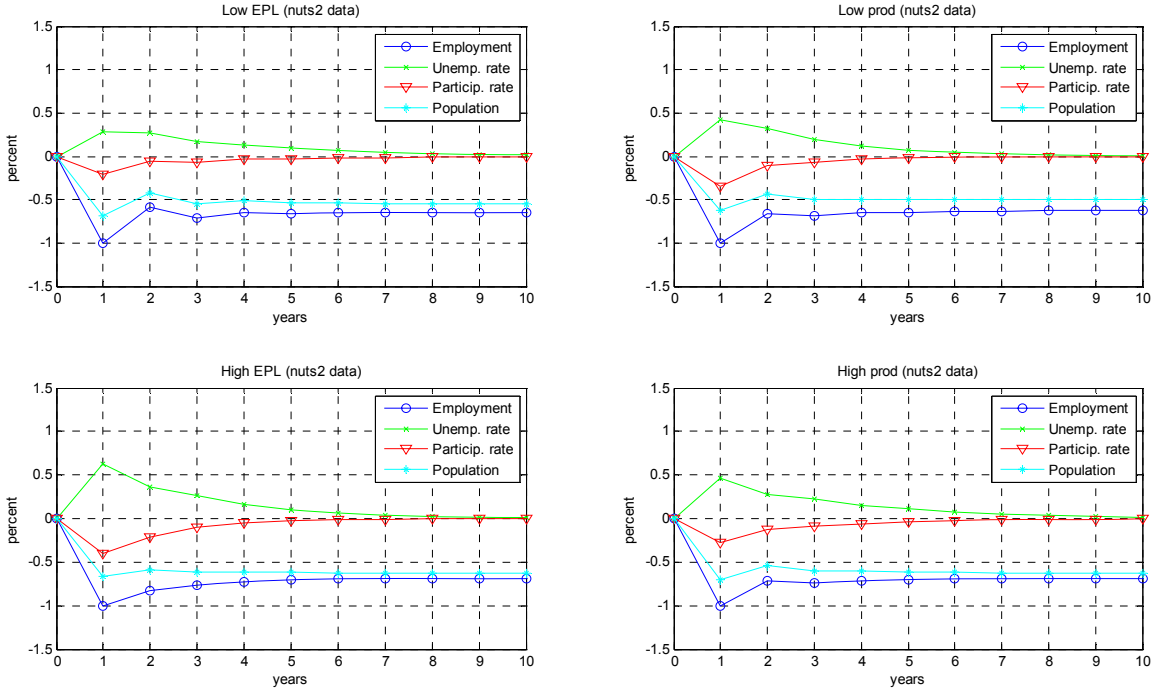


Fig. D-20: Regional level analysis, baseline model augmented with regional population and interacted with both EPL and the degree of product market regulation. Specification with rates only (see Appendix for the specification in levels).

When introducing both EPL and housing market regulation as reported in Fig. D-21, one can note that the gap in the long-run value of regional population in the right part of the chart is even larger than in Fig. D-19: previously, low housing regulation countries had a long-run value of -0.8, which is still the case. High housing regulation countries had a long-run value of -0.5: it is now -0.4. Therefore, the impact of housing market regulations (going from the first quartile of the cross-country distribution to the top quartile of that distribution) is to slow down regional mobility by log(0.8/0.4)=69%.

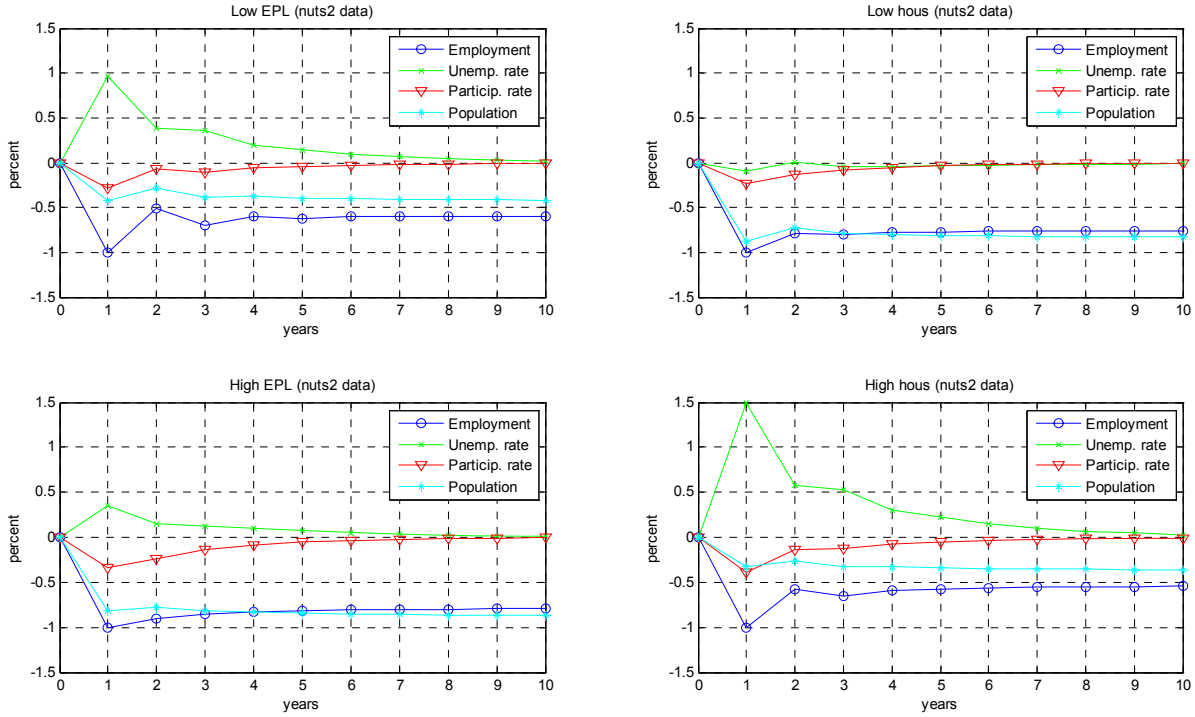


Fig. D-21: Regional level analysis, baseline model augmented with regional population and interacted with both EPL and housing market regulation. Specification in rates only. See Appendix for the specification in numbers.

2.6. Technical appendix: other robustness checks of the effect of institutions

Another robustness check is to derive the impact of only one labour market institution when all other institutions are added up in the VAR specification. For instance, we turn now to a framework where all institutions are included in the interaction terms of the VAR[12]. However, in order to reduce the curse of dimensionality, we choose to place those terms only on the "diagonal" of the VAR as we explained above. Note however that much of the interaction with institutions seems to take place off the diagonal, which is why the previous sub-section considered all the interactions and necessarily very few institutions.

Table D-2 presents the results, where both the interaction terms of institutions are reported as well as the coefficients of the VAR in the case of a zero institutional influence. T-statistics are reported in parentheses:

[12] See Section 1.2 for details on the methodology.

	Interaction terms with lag value				
	EPL	Unemployment Benefits	Product market regulation	Housing market regulation	Taxes on Labour
Employment	0.400 (2.48)	-0.006 (0.62)	-0.322 (1.61)	-0.213 (1.33)	-.024 (3.25)
Unemployment	-0.084 (1.42)	-0.008 (2.04)	0.297 (3.85)	-0.082 (0.90)	-0.003 (0.59)
Participation	-0.042 (2.08)	.000 (0.32)	.013 (0.53)	.017 (0.54)	-.002 (0.68)
Population	0.075 (0.49)	-.003 (0.28)	.053 (0.24)	.156 (0.79)	-.009 (1.41)
	Lag coefficients				
Dep. Var.\regressor	Employment	Unemployment	Participation	Population	
Employment	2.301 (2.61)	.017 (3.27)	-0.056 (1.01)	-0.436 (2.07)	
Unemployment	-3.186 (4.73)	1.242 (3.03)	-.970 (2.24)	3.344 (2.42)	
Participation	0.582 (12.83)	-.006 (1.92)	1.019 (4.86)	0.082 (0.85)	
Population	0.137 (4.00)	-0.005 (2.10)	0.010 (0.42)	-0.183 (0.19)	

Table D-2: Vector autoregression results (estimated coefficients) in the case of one lag, four variables and institutional interactions only on the "diagonal" of the VAR (country level). t-statistics are in parentheses; country dummies are not reported for presentation convenience.

It appears that employment protection tends to increase the persistence of employment, while it is reduced by taxes on labour. Other institutional measures do not present any significant impact. The persistence of the unemployment rate is mainly affected by regulation of the product market and by the unemployment insurance scheme though to a lower extent given the size of the coefficient. Persistence of the response of participation to a shock is reduced when employment protection is high. Lastly, population is not affected by the institutional context: all coefficients in line 4 of the table are not significant.

2.7. Technical appendix: a simulation exercise at the country level

We finalize this description of the interaction between institutions and labour market adjustment with a simulation exercise. We consider the results that were reported in Table D-2 and simulate the response of labour markets in some particular countries. Table D-3 introduces the values used in this exercise, which corresponds to the 2007 values in our database (remember they may contain some extrapolation)[13].

	EPL	Unemployment Benefits	Product market regulation	Housing market regulation	Taxes on Labour
Austria	1.9	32	1.38	3.62	66
Belgium	2.2	42	2.05	3.17	51
Germany	2.2	29	1.37	3.76	50
Spain	3.1	36	1.61	4.81	45
Finland	2	36	1.32	2.53	62
France	3	39	1.70	3.6	68
Ireland	1.1	38	1.12	3.2	33
Italy	1.9	34	1.87	4.24	64
Netherlands	2.1	53	1.37	3	43
Portugal	3.5	41	1.56	4.54	39

Table D-3: Institutions in the Eurozone – parameters for the simulation exercise.

Fig. D-22 presents the simulations. Responses to shocks clearly differ from one country to another. A country such as Ireland, for instance, adjusts rather quickly because of low EPL and regulation but displays an extremely volatile unemployment rate due to a weak automatic stabiliser. On the other hand, a country such as Italy is characterised by much less volatile but much more persistent unemployment because of opposite characteristics. Finally, Portugal exerts both volatility and persistence because of low labour taxes but high regulation. Note however that these simulations are based on preliminary results that need to be checked for robustness.

[13] Greece and Luxembourg are excluded from the sample because of data availability for these two countries.

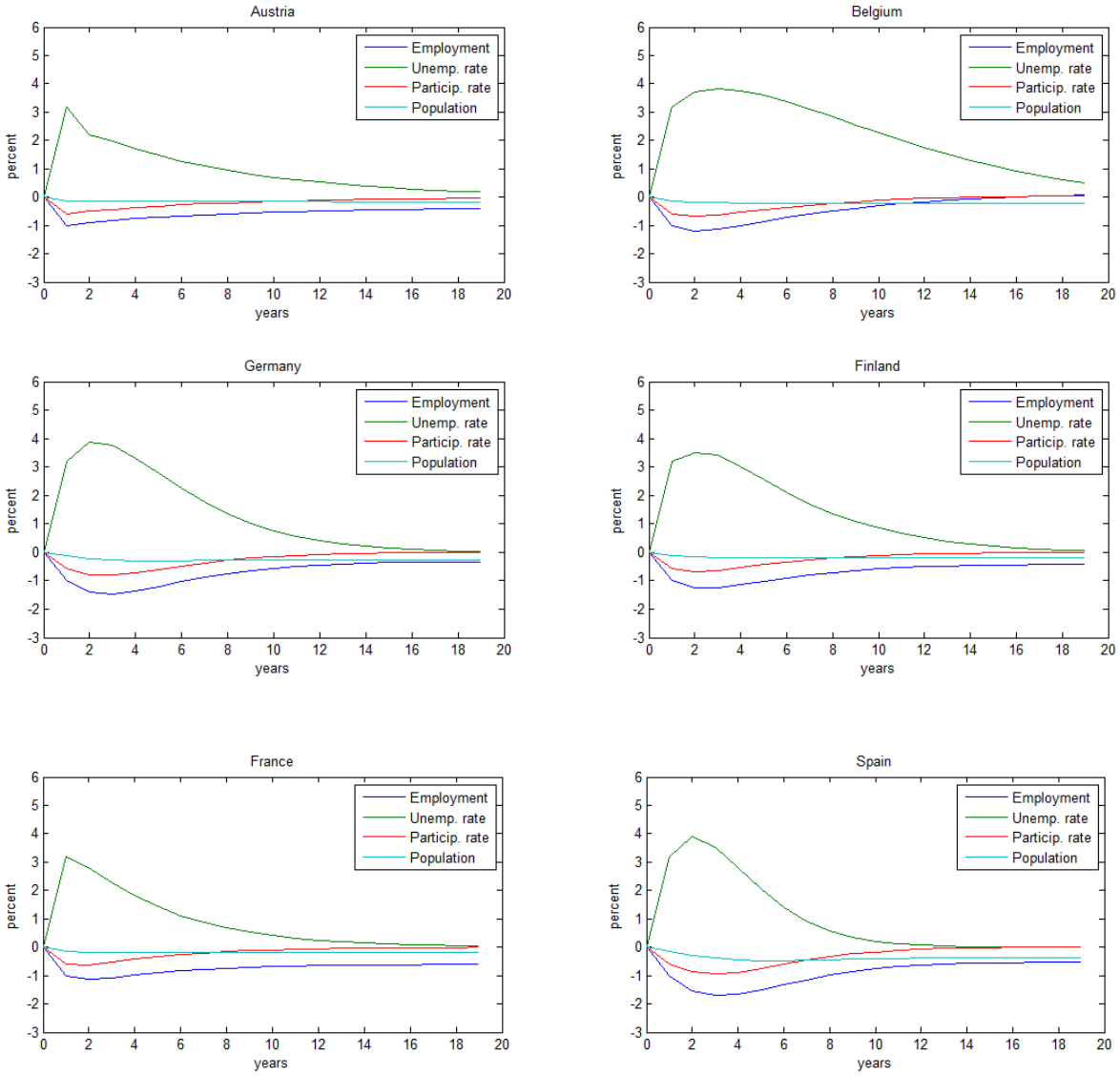


Fig. D-22: Country simulation of labour market response to an asymmetric labour demand shock (country-level specification of the VAR).

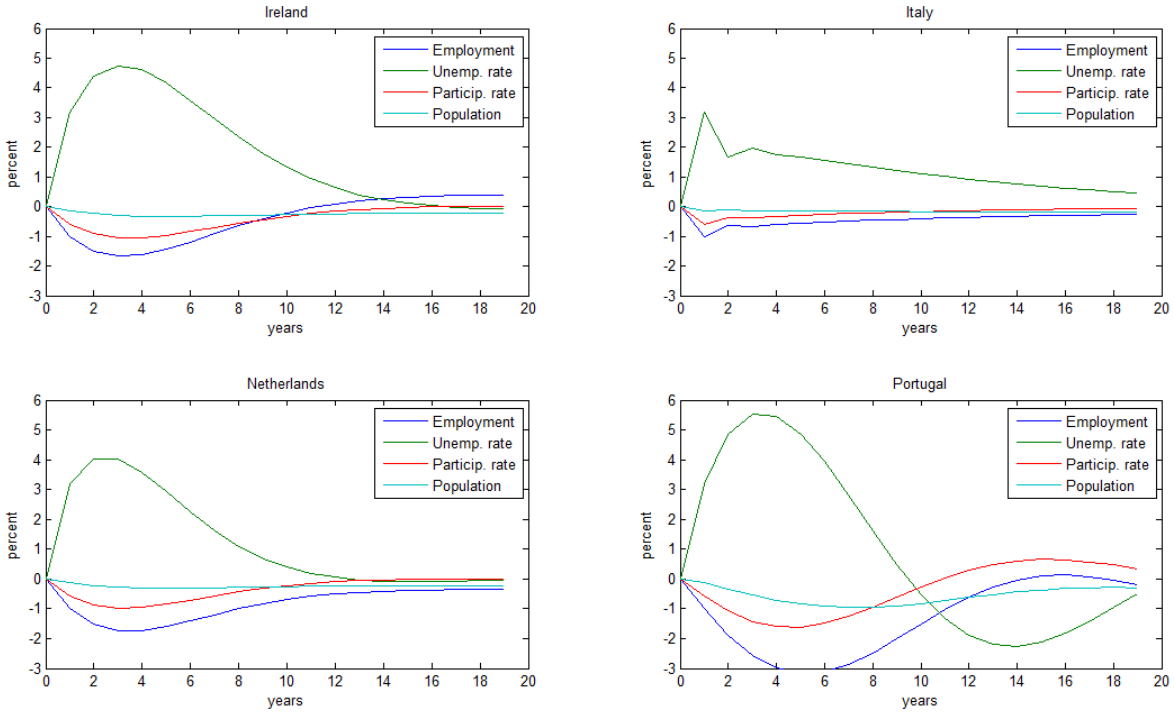


Fig. D-22 (continued): Country simulation of labour market response to an asymmetric labour demand shock (country-level specification of the VAR).

3. Conclusions

Overall, this section leads to the following conclusions:

1. The institutional context influences the ability of labour market variables, especially unemployment, to quickly adjust to asymmetric shocks, as well as their volatility. In particular, housing market regulations appear to be important factors preventing fast adjustment. Employment protection and product market regulations play a similar role (but to a lesser extent). In particular, the net effect of product market regulation appears to be limited: fewer job creations due to regulations of the goods market reduce the opportunities of moving, but regulations in the goods market should induce more mobility if local economic perspectives remain poor.

2. Quantitatively, the impact of the housing market appears to be large. Countries with low indices of housing market regulation face more moderate fluctuations in unemployment and regional population dynamics are more important than in countries with a higher index. When the indicator is in the highest quartile, regional mobility is lowered, depending on the specifications, by 45 to 70%. These estimates are consistent with differences in residential

mobility underlined in previous sections and simply confirm the neglected role of housing markets in easing the adjustment of labour markets.

3. Taxes on labour are associated with a reduction in the volatility of unemployment, employment growth and participation. This comes at the cost of higher persistence of these variables.

4. A strong degree of centralisation of wage bargaining seems to reduce the size of employment shocks, an effect that is partly but not entirely due to fiscal stabilisers in those countries with high centralisation. More work is needed to explore this issue and notably whether intermediate countries - in terms of centralisation - perform less well than decentralised countries.

5. After a negative employment shock, female employment dynamics do not significantly differ from male employment dynamics, but male unemployment rates are more volatile, while female participation appears to be more elastic than that of men.

6. Young and old worker dynamics are faster than for middle-aged workers and their participation is more elastic: their unemployment rate does not fluctuate much.

7. Employment protection for regular jobs has a strong impact on employment dynamics and more precisely slows down adjustment by 5 to 8 years, while restrictions on temporary jobs only have a marginal effect in the data in the short run. However, in the long run, both types of employment protection reduce the long-term value of employment in the same way: employment shocks are much more persistent in high EPL countries regardless of the type of EPL.

8. We did not find a very convincing econometric way to deal with the issue of distinguishing between permanent and transitory shock with our methodology. More work is needed on this question, since the policy recommendations vary greatly according to the persistence of shocks: temporary shocks need to be dealt with through wage flexibility and hours adjustment, while permanent shocks require training policies (see Section E for a critical account of such policies) and higher geographic mobility.

9. Regional and national dynamics differ to some extent. Adjustment via labour mobility within countries can be quite effective, at least for those countries having housing markets with low regulation. We cannot observe large labour mobility adjustment cross-country: language differences, lack of portability of pensions and other social security-specific factors. In the absence of cross-country mobility, adjustment through other real channels (deregulation of

the goods market associated with real wage flexibility and flexicurity) may be strengthened, especially for countries with regulated housing markets, according to our findings (conclusion 2 above).

PART E: Conclusions of the report

In this part, we first summarise the lessons from the above analysis (Parts B to D) and then propose new investigations in order to improve our understanding of labour market adjustment. In particular, we need to improve the measurement of occupational mobility and mobility between economic sectors. We argue that the accumulation of skills specific to a sector or an occupation is a potentially good explanation of slow labour market dynamics but a rigorous investigation of these mechanisms requires more data and more work.

1. Diagnoses

The diagnoses established so far can be briefly summarised as follows.

1. Mobility of labour is low, about a third of that in the US, and is limited by some social policies, wage compression and other goods and labour market regulations. Some social policies may indeed be unfriendly to mobility (such as employment protection) while it may be enhanced by others (such as active labour market policies, efficiently designed re-training programs, mobility allowances).

2. Wage flexibility appears to be insufficient to provide incentives for capital to flow into economically depressed regions and to provide incentives for workers to move to economically booming regions.

3. Mobility is also limited by the existence of large stocks of specific human capital and local social capital, themselves partly due to the institutions mentioned above.

4. Fiscal transfers act as a cushion but provide, at least in theory, the wrong incentives.

5. The lack of fluidity of the housing market may be an additional obstacle to labour adjustment.

6. Higher geographical mobility is not an ideal situation: it is associated with social capital losses and psychological costs, in particular for less educated individuals. Different channels of adjustment to regional asymmetric shocks are required.

7. There are policy trade-offs regarding the adjustment of labour markets. For instance, given the contrast between real wage rigidity in Nordic countries and the higher degree of

geographical mobility, basic economic intuition suggests that indeed lower wage flexibility involves a higher need for geographic mobility or a higher need of fiscal adjustment.

2. Possible areas for policy intervention

2.1. Summary

The statements above, combined with the outcome of the VAR analysis in part D, suggest the following needs for area intervention. First, in the short-run horizon, identify the obstacles to labour mobility across European regions and across Member States. Those obstacles may be country-specific (regulation of the housing markets, notably transaction costs or excessive rigidity of leases and rents) or require a higher degree of coordination between Member States, such as the transferability and portability of pensions across States.

Mobility between industrial sectors and between industry and services may also be limited in several Member States by the ineffectiveness of re-training policies. Appropriate training policies should provide a mix of general skills and skills specific to expanding sectors. Therefore, it is unlikely that sectorisation of training policies (that is, training programs developed and monitored by union members and employers' organisations at the industry level) is the appropriate level.

Finally, re-training and geographical mobility are required, and public provisions to improve those dimensions are also required, mostly inasmuch as wages do not adjust in the aftermath of asymmetric shocks. So, in principle, a first policy recommendation should be focusing on the conditions of an easing of wage adjustments.

2.2. Wage flexibility

Improvements in regional wage flexibility are likely to produce social benefits, first by easing the ability of capital to invest in depressed regions, second by reducing the welfare costs of mobility if dismissed individuals can get another job in the same area, and, lastly, by lowering the cost of living in depressed areas (when local labour costs are lowered, local prices, which are set on local costs plus a mark-up, are themselves reduced). A favourable wage-price spiral such as the one emphasised in Blanchard (1986) is even possible, leading the depressed region to recover attractiveness. Nevertheless, we believe that, in many Member States, national policies such as national minimum wages are deeply anchored and one should not expect too much from such reforms.

However, such ambitious reforms may not arise in a realistic short run: as a matter of fact, collective agreements are typically set, not at the government level, but in a decentralised way between employers and employees unions. It follows that these agreements are the product of a long social history and margins of actions of Member States are necessarily limited in the short run, unless drastic reforms such as those in the United Kingdom in the late 70's early 80's, or as in New Zealand and Australia more recently. The ability of Continental European countries to undertake such drastic reforms is limited.

2.3. Working on more efficient housing market regulations

Consistently with the insights of part D, geographical mobility appears to be low in many countries. As we have argued throughout the report, this comes both from Welfare State policies reducing the net gains of migrating and from obstacles to mobility in the housing market. This was confirmed through the VAR analysis, showing that the index for housing market regulation had a large impact in reducing the dynamic of adjustment of labour markets. We now expound on how various housing market legislations may affect mobility on the rental housing market and, beyond, on the real estate market.

To interpret these findings, we first discuss the theoretical ingredients at work here, which adds to the theoretical discussion on real adjustment mechanisms, and then discuss the policy implications.

2.3.1. Two margins in the housing sector

Let us dissociate the intensive margin and the extensive margin in the rental housing market, defined here as follows. The *intensive margin* is the number of transactions in the rental housing market, which depends on the availability of landlords to offer dwellings in the market and their ability to offer leases to particular individuals. When landlords require guarantees and security deposits, and have incentives to screen applicants thoroughly, this slows down the allocation of demand and supply, resulting in mismatch at the intensive margin.

The *extensive margin* is the size of the private rental housing market, as compared to real estate and public housing. It depends on the ability and willingness of investors to build new dwellings in the market, and the willingness of households to rent instead of buying their dwelling.

The intensive margin depends primarily on the extent to which litigation between landlords and tenants is processed fast and efficiently. This depends on the complexity and degree of formalism of associated pieces of legislation. The extensive margin depends primarily on cultural aspects, availability of credit and mortgage and finally on the fiscal environment and notably the implicit tax

rate on income from renting, as well as transaction costs on real estate (notary fees, taxation of the transaction, etc…).

2.3.2. Policy implications

We presented a few indicators of housing market regulations in the survey part B-4-2. They suggest that more can be done as regards, notably, transaction costs in real estate and the protection of buyers as regards the quality of the housing, even though in the latter case, we expect little variance with most of the EU. For instance, Table E-1 reported from European Commission (2007a) and OECD (2005) provides a good overview of differences across countries in transaction costs. The table points our important questions on the role of transaction costs, and more work is required notably to assess the impact of recent reforms. For instance, France's transaction costs recently decreased to less than 7%.

Housing tenure and transaction costs, in percentages, early 2000s

	Owner-occupied	Private rented	Social rented	Other	Transaction costs
BE	68	23	7	2	18
DK	51	26	19	4	5
DE	41	44	6	5	10
IE	79	7	9	6	9
GR	74	20	0	6	15
ES	81	11	0	8	12
FR	56	21	17	6	15
IT	77	12	5	7	19
LU	75	25	:	:	14
NL	54	11	35	0	9
AT	:	:	:	:	9
PT	76	15	7	2	16
FI	64	15	17	4	11
SE	46	21	18	15	8
UK	69	10	21	0	4

Table. E-1: Source: EU (2007a), from OECD and Belot and Ederveen (2007) for the data on transaction costs: costs as a percentage of the purchase value of the house.

To sum up, the variability of the various dimensions of housing market imperfections illustrated here suggest that there are significant margins of action in the housing market. One may imagine, in particular, simplifying the law on leases in order to protect landlords and ex-post, tenants, and further reducing transaction costs.

2.4. Occupational and sectoral mobility: a good substitute for geographical mobility?

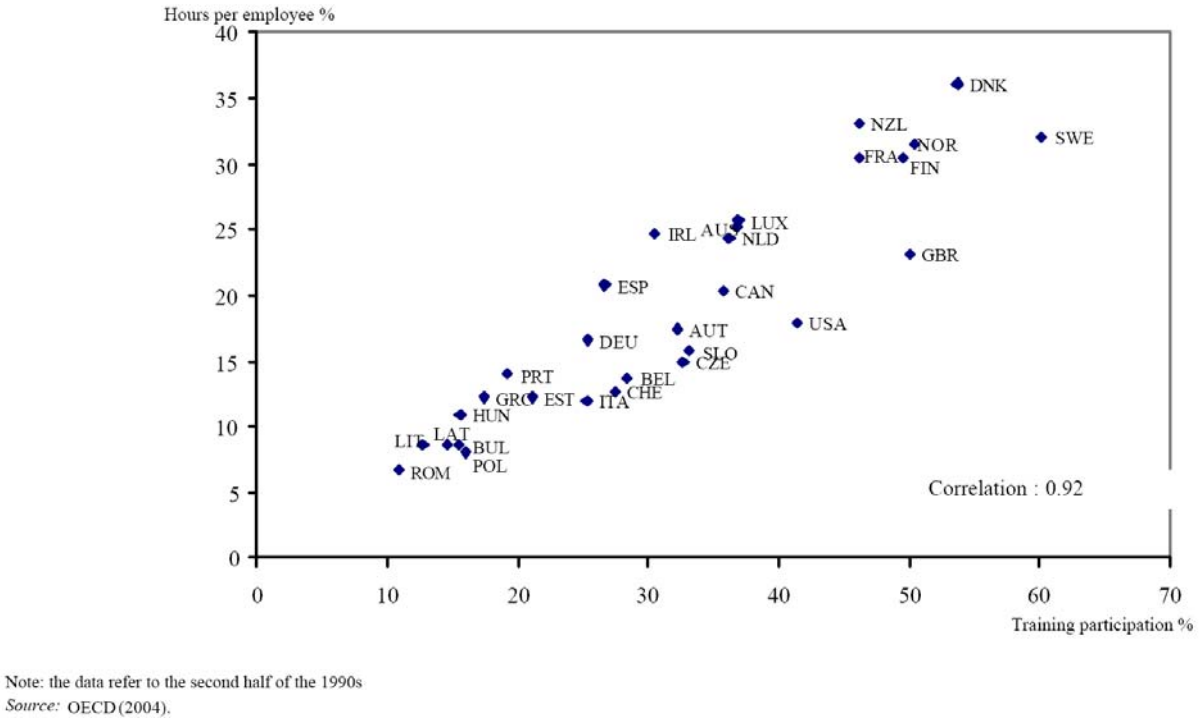
Geographical mobility is not the only way of adjusting. The simple Ricardian theory of trade suggests that workers and factors should reallocate where they are more productive, *within a given geographical area*. This suggests that a good substitute to geographical mobility is mobility of workers between occupations or sectors.

However, insights from theory suggests that factors leading to low geographical mobility such as employment protection, unemployment benefits and, more generally, search frictions, are also factors raising the specificity of human capital investments (Estevez et al. 2001, Wasmer 2006).

If it is difficult to raise the geographical mobility of workers for reasons highlighted in this report (such as the existence of local social capital, or a culture of low mobility), one alternative policy for improving the adjustment of the labour markets could in theory be to cope with workers with specific skills. This suggests that training and education policies should be studied more thoroughly in conjunction with studies of labour market dynamics. Extending the methodology of Part D in this direction may be a promising research agenda.

2.4.1. Can training be effective for labour market adjustment?

One of the reasons for low mobility is the existence of specific skills, as detailed in part B of this report. Mass layoffs, for instance, may cause skills to depreciate and workers may have difficulties finding new skilled jobs. For this reason and in the context of globalisation, training policies - and in particular re-training - have become one of the best potential options for addressing skill obsolescence. There are, however, several issues. First, training, in a decentralized equilibrium, may be under-optimally supplied due to multiple hold-up problems: employers may not pay for general training if they expect their employee to quit and re-employ their skills in other firms, while workers may not pay for specific skills if they expect their employer to exploit monopsony power over them. Secondly, countries and regions differ in the incidence of training. The next charts show heterogeneity in access to training in various Member States. Fig. E-1 shows that training incidence and hours vary greatly between Nordic countries (the highest) and Southern and Eastern European countries (the lowest).



Note: the data refer to the second half of the 1990s
Source: OECD (2004).

Fig. E-1: Training participation and training intensity across countries, % of employees (aged 25-64 years) taking some training in one year and average annual hours per employee. Source: Bassanini et al. (2005).

There is also a great deal of regional variability across regions of a single country, as revealed in Fig. E-2 to Fig. E-5.

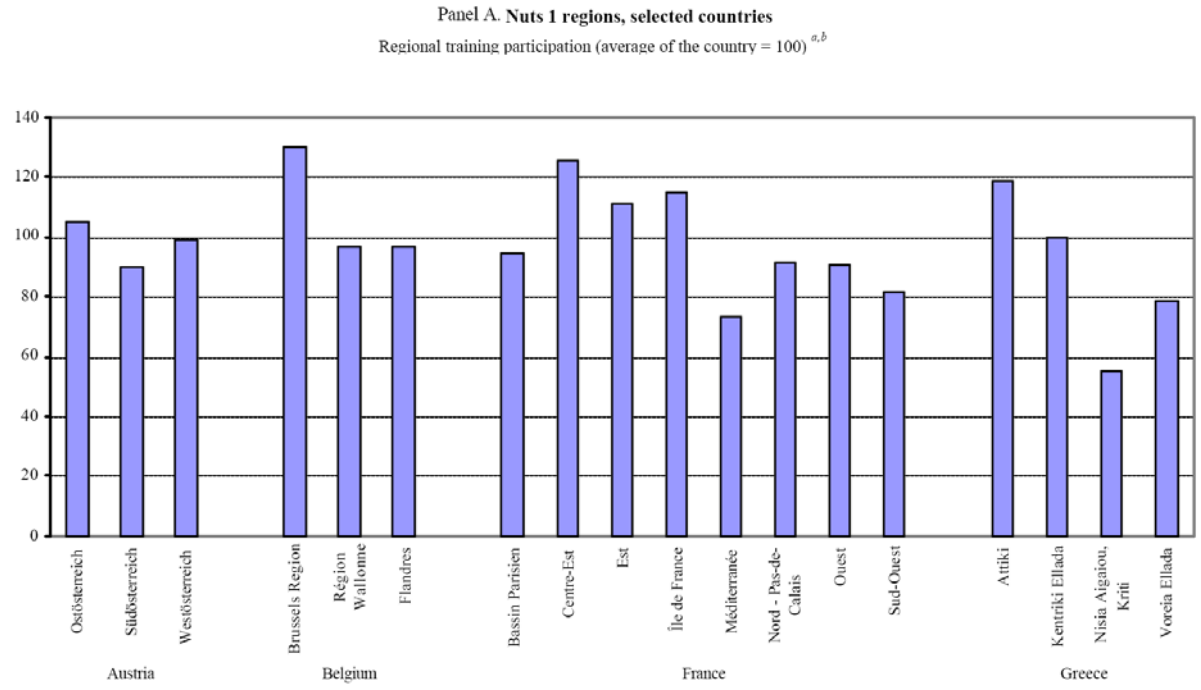


Fig. E-2: Dispersion of training participation rates in EU countries, by region.

Source: ECHP and Bassanini et al. (2005).

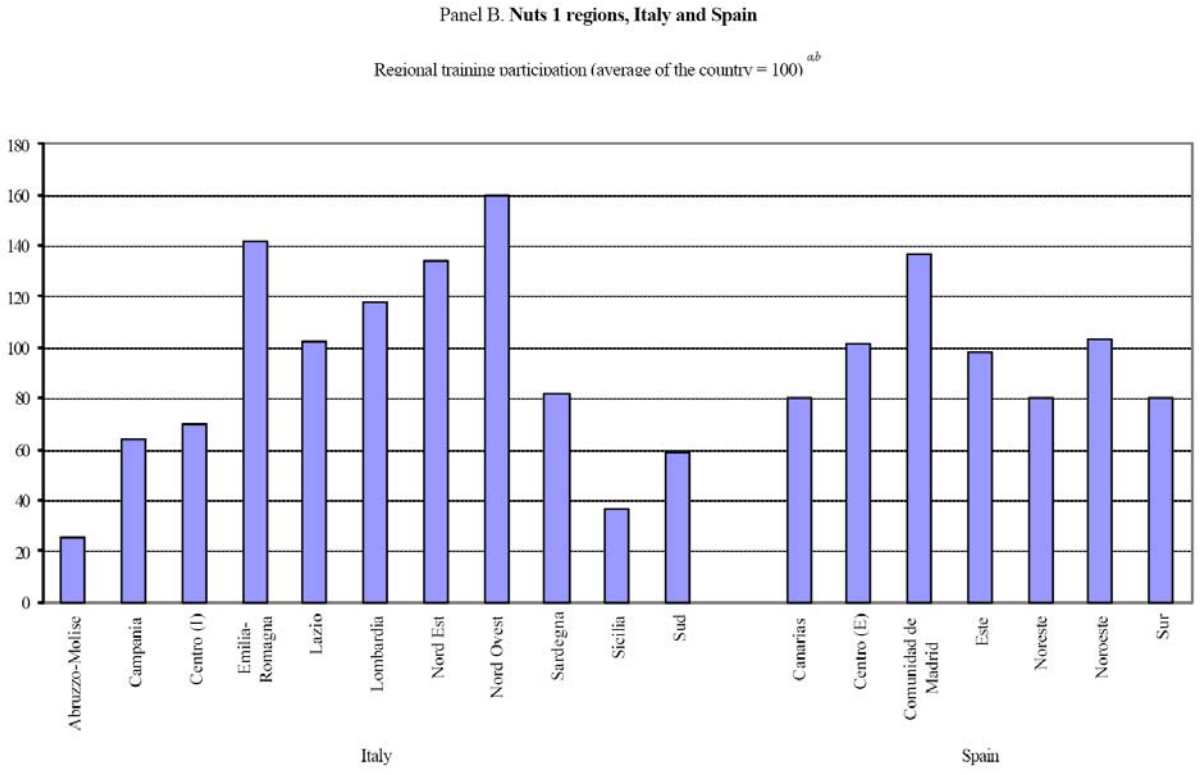


Fig. E-3: Dispersion of training participation rates in EU countries, by region.

Source: ECHP and Bassanini et al. (2005).

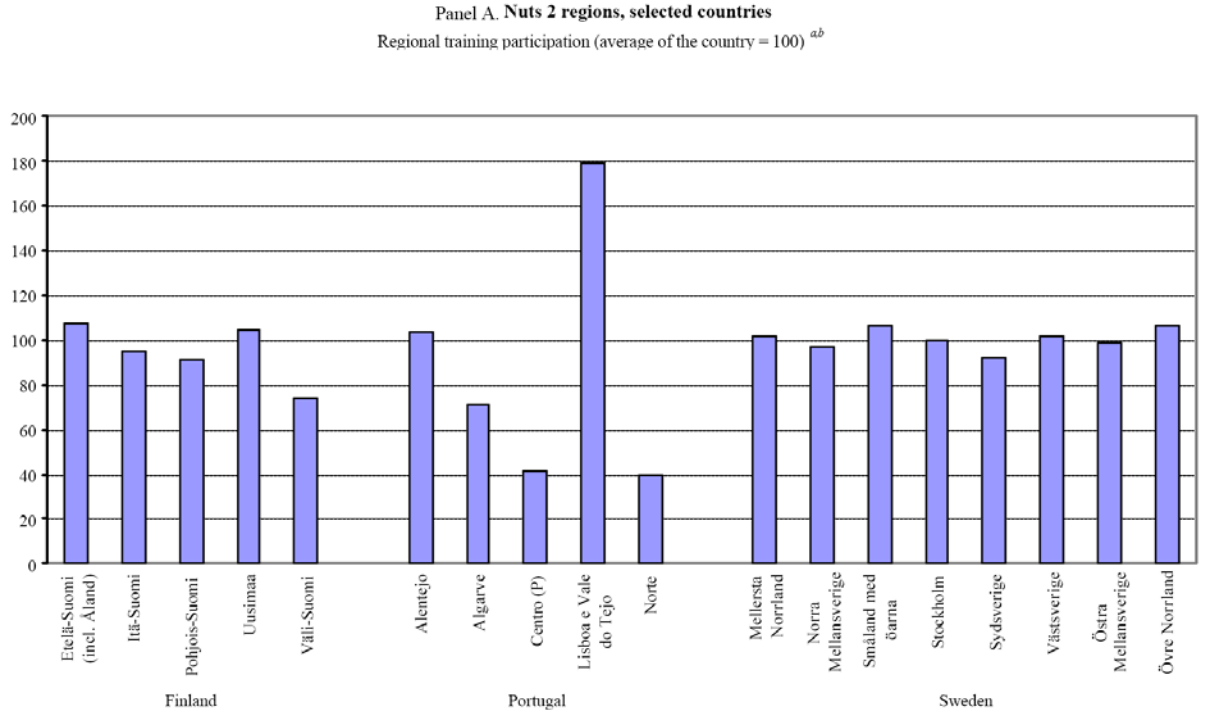
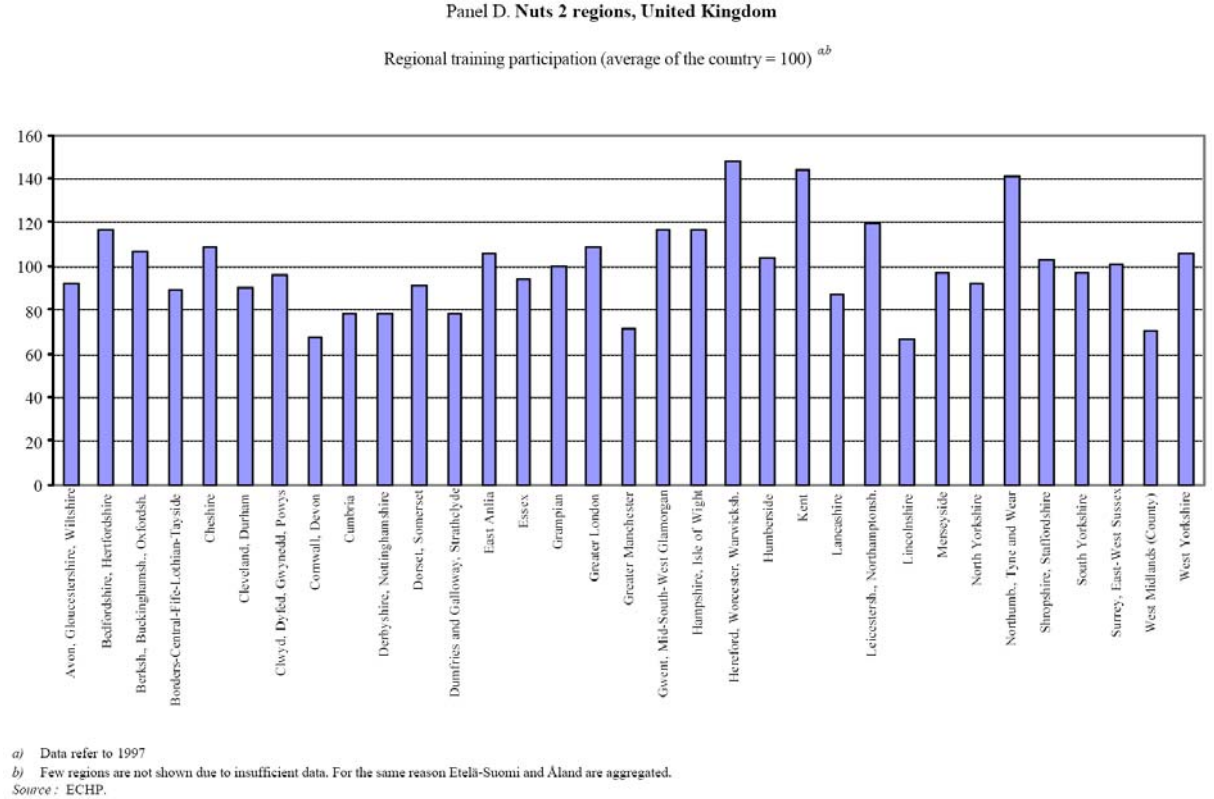


Fig. E-4: Dispersion of training participation rates in EU countries, by region.

Source: ECHP and Bassanini et al. (2005).



a) Data refer to 1997
b) Few regions are not shown due to insufficient data. For the same reason Etelä-Suomi and Åland are aggregated.
Source : ECHP.

Fig. E-5: Dispersion of training participation rates in EU countries, by region.

Source: ECHP and Bassanini et al. (2005).

The main message in these charts is that Nordic countries together with France and the UK have a relatively high incidence of training, while Southern European countries have both low incidence of training and a relatively high heterogeneity of training across regions.

It is also the case that training expenditure is something of an automatic stabiliser: as the next table indicates, it is higher when output is lower and when unemployment is higher.

Variation of training over the business cycle 1995-2001.

Panel A: Total training

	(1)	(2)	(3)	(4)	(5)	(6)
Output gap	-0.028**	-0.029	-0.061**			
	(0.013)	(0.019)	(0.028)			
Unemployment rate				0.046***	0.030*	0.035**
				(0.010)	(0.015)	(0.017)
Country dummies	*yes*	*yes*	*yes*	*Yes*	*yes*	*yes*
Country-specific trends	*no*	*yes*	*yes*	*No*	*yes*	*yes*
Time dummies	*no*	*no*	*yes*	*No*	*no*	*yes*
Number of observations	88	88	88	88	88	88
R-squared	0.96	0.98	0.98	0.97	0.98	0.98

Panel B: Employer-sponsored training

	(7)	(8)	(9)	(10)	(11)	(12)
Output gap	-0.045***	-0.053**	-0.077**			
	(0.016)	(0.023)	(0.031)			
Unemployment rate				0.062***	0.058***	0.058***
				(0.012)	(0.018)	(0.021)
Country dummies	*yes*	*Yes*	*yes*	*Yes*	*yes*	*yes*
Country-specific trends	*no*	*Yes*	*yes*	*No*	*yes*	*yes*
Time dummies	*no*	*No*	*yes*	*No*	*no*	*yes*
Number of observations	83	83	83	83	83	83
R-squared	0.93	0.97	0.98	0.94	0.97	0.98

Note: OLS with log-linear specifications. Robust standard errors in parentheses. ***, **, *: significant at the 1%, 5% and 10% level of confidence, respectively.

Table. E-2: Source: Bassanini et al. (2005).

Finally, returns to training are heterogeneous across workers and between countries. The next table indicates the wage increase associated with training. The OLS column merely indicates the correlation between wages and training without any causal implication: it may happen that employers pay for training for their (already) best employees. The FE column attempts to control for individual characteristics and provide a better account of the causal impact of training. As can be seen, training is

more efficient in countries where it is scarce (Italy, Portugal) but it is also relatively high in Nordic countries, where lessons can be drawn about the way it is organised.

Private returns to training. ECHP 1995-97-99-01.

	OLS	*FE*
Denmark	.042*** (.005)	.020*** (.007)
Netherlands	.037** (.019)	-.030 (.031)
Belgium	.055*** (.011)	.026* (.016)
France	.072*** (.007)	.000 (.013)
UK	.079*** (.005)	.019* (.010)
Ireland	.081*** (.010)	.005 (.022)
Italy	.097*** (.013)	.038*** (.014)
Greece	.216*** (.027)	.060* (.032)
Spain	.072*** (.007)	.017 (.012)
Portugal	.180*** (.013)	.105*** (.025)
Austria	.103*** (.006)	.004 (.012)
Finland	.055*** (.008)	.038** (.018)

Note : each regression include age, age squared, country, year, education, gender, marital status and industry dummies.

Table. E-3: Source: Bassanini et al. (2005).

The policy conclusion here is that training is a very useful component of labour market policies. Its supply is probably sub-optimal in several countries. It may also be the case that the training sector is not efficiently organised, in the absence of competition between suppliers.

2.5. Subsidies to mobility and other adjustment schemes.

A scheme such as the European Globalisation Fund, adequately targeted and extended (see e.g. Wasmer and Weiszäcker 2007), could be a starting point for a general reform of European policies.

Specifically, we support two active labour market policies: wage insurance and mobility allowance. Wage insurance would help those displaced workers who had to accept a pay cut in order to find a new job by paying them a wage top-up. And a mobility allowance would partially compensate workers for the private discomfort and expense of moving to find a new job. Both schemes directly signal the public interest in workers accepting a new job, rather than remaining unemployed, by providing a positive financial incentive.

Box 5: a labour policy mix for displaced workers.

(Source: Wasmer and von Weizsäcker 2007).

Wage Insurance

Wage insurance would be provided to every eligible displaced worker who was forced to accept a pay cut in order to find a new job. We propose that the wage insurance programme would pay a top-up of between half and two thirds of the pay difference between the net salary of the old and the new job, for up to two years. This proposal is similar to the Alternative Trade Adjustment Assistance, one component of the US TAA. Several programmes providing sizeable wage complements such as the Self-Sufficiency Program in Canada (SSP) have been shown to be effective labour market policies.[14]

Of course, even with a conceptually very simple programme like this, a number of complex technical questions would need to be addressed, taking the specificities of EU27 into account. For example, a workable and abuse-proof definition of the old and new net salary and rules for the portability of wage insurance across EU member states would have to be agreed. A sound relationship would need to be organised between the proposed wage insurance and similar schemes that already exist in some member states.[15] *Despite these difficult details, we are optimistic that not least the conceptual simplicity of the scheme would assure high visibility and reasonable take-up rates.*

Mobility Allowance

Since immobility is in effect subsidised by unemployment insurance and other parts of the welfare state, a subsidy for intra-regional mobility within the EU might be desirable in order to redress this distortion. In fact, without an additional subsidy for mobility, the proposed wage subsidy might even make this immobility distortion worse by inciting people to take on a lower paid (but subsidised) job in their home region instead of taking on a higher-paid (but unsubsidised) job in a different region or country.

Therefore, we propose to introduce a mobility allowance amounting to two months' previous gross pay for job-related moves of more than 50 km. For cross-border moves, two extra months would be added to the allowance to encourage intra-EU mobility. Alternatively, a reimbursement of some fraction of the actual costs of moving might have been considered, but this would necessarily be much more bureaucratic without being much more precise. The reason is that the monetary costs of moving are

[14] See Michalopoulos et al. (2002).

[15] eg France: "Allocation temporaires dégressives" for firms with at least 50 employees and for which 10 employees or more are laid off; Germany: "Entgeltsicherung für ältere Arbeitnehmer" for older workers.

often dwarfed by emotional and social costs, such as the lost support from social networks and the difficulties of dependents in adjusting.

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Appendix:

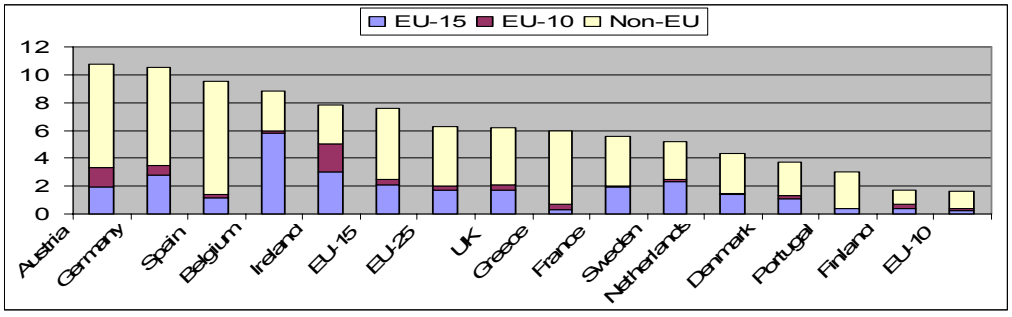
Internal mobility

	Gross and net migration rates (before 1999)							Gross migration rates (up to 2005)					
	Time period	Gross migration		Net migration		Share of churning flows		NUTS1			NUTS2		
	available	First year	Last year	First year	Last year	First year	Last year	1995	2000	2005	1995	2000	2005
BE	1983-1995	0.92	0.99	0.02	0.06	:	:	0.5	:	1.1	0.9	:	2
DE	1983-1990	1.32	1.06	0.07	0.17	5.53	16.46	0.7	1.3	1.1	1.1	1.7	1.5
IE	:	:	:	:	:	:	:	:	:	:	:	:	:
GR	:	:	:	:	:	:	:	0.3	0.2	0.1	0.4	0.2	0.1
ES	1983-1999	0.45	0.60	0.08	0.07	17.13	7.38	0.2	0.1	0.4	0.2	0.2	0.5
FR	:	:	:	:	:	:	:	1.5	2	1.7	1.7	2.3	:
IT	1983-1999	0.77	0.50	0.09	0.08	12.59	17.61	0.3	0.3	0.1	0.4	0.3	0.4
LU	:	:	:	:	:	:	:	:	:	:	:	:	:
NL	1983-1999	1.67	1.67	0.07	0.07	2.87	3.15	1.3	1.5	0.5	1.8	2.1	:
AT	1995-1999	0.89	0.93	0.05	0.05	:	:	:	:	0.2	:	:	0.4
PT	1985-1992	0.19	0.32	0.04	0.07	20.00	46.67	:	1.6	2.1	1.1	1.9	2.2
FI	1983-1999	1.23	0.76	0.10	0.08	17.53	5.53	:	:	:	:	1	1
DK	*1990-1999*	*3.48*	*3.41*	*0.08*	*0.09*	:	:	:	:	:	:	:	:
UK	*1985-1996*	*1.58*	*1.72*	*0.13*	*0.10*	*7.96*	*5.80*	*1.3*	*1.8*	*1.5*	*1.3*	*2.5*	*2.1*
SE	*1983-1999*	*1.5*	*1.58*	*0.06*	*0.15*	:	:	:	:	:	:	*1.7*	:

Source: European Commission (2007a).

Note: The net migration rate is the sum across all regions of the absolute values of the difference between in and out migration in a region. NUTS is the common classification system to produce regional statistics; in the EU, there are 89 regions at NUTS level 1 and 254 regions at NUTS level 2.

Share of foreign nationals in resident working-age population, 2005



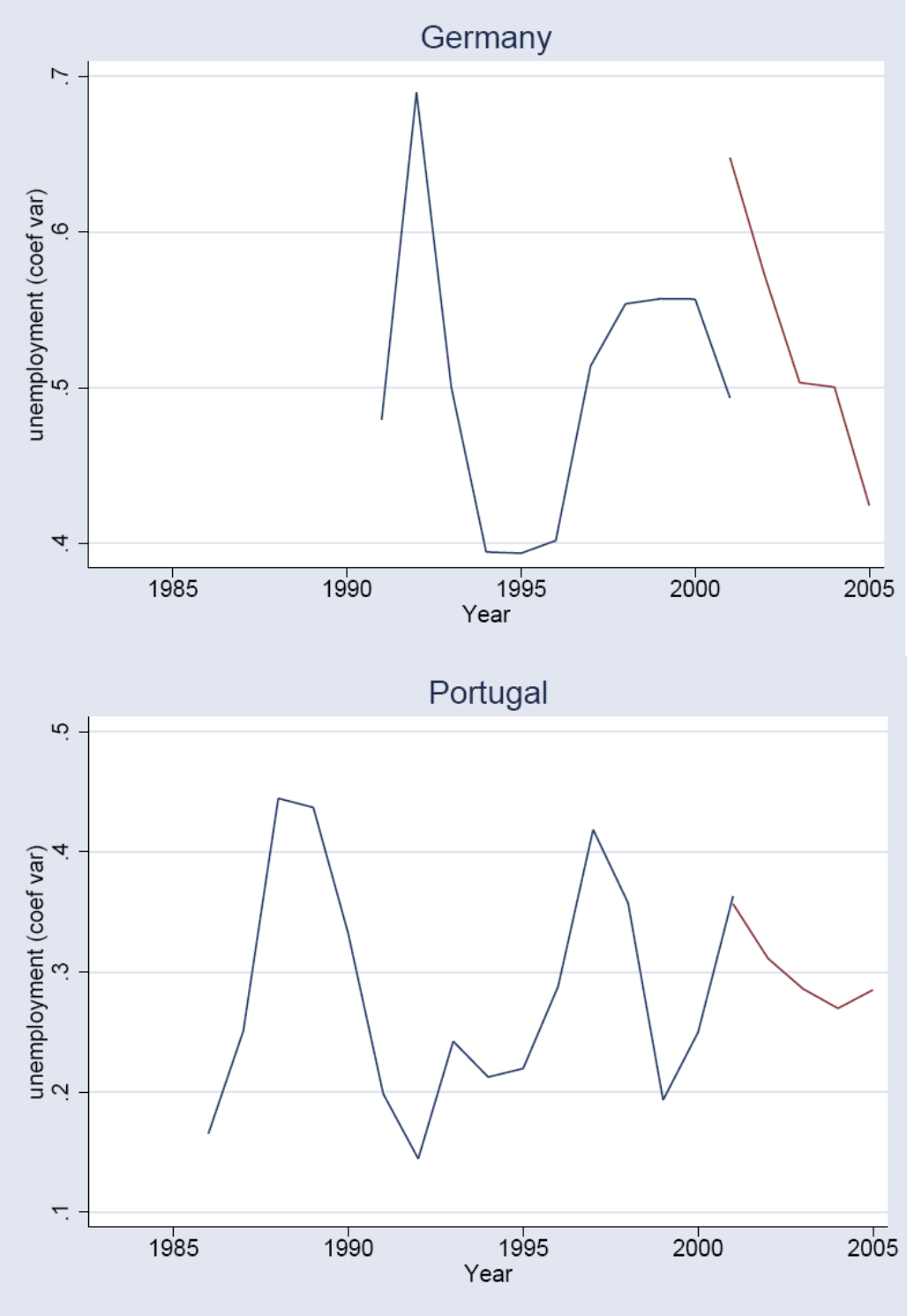
Source: European Commission (2007a).

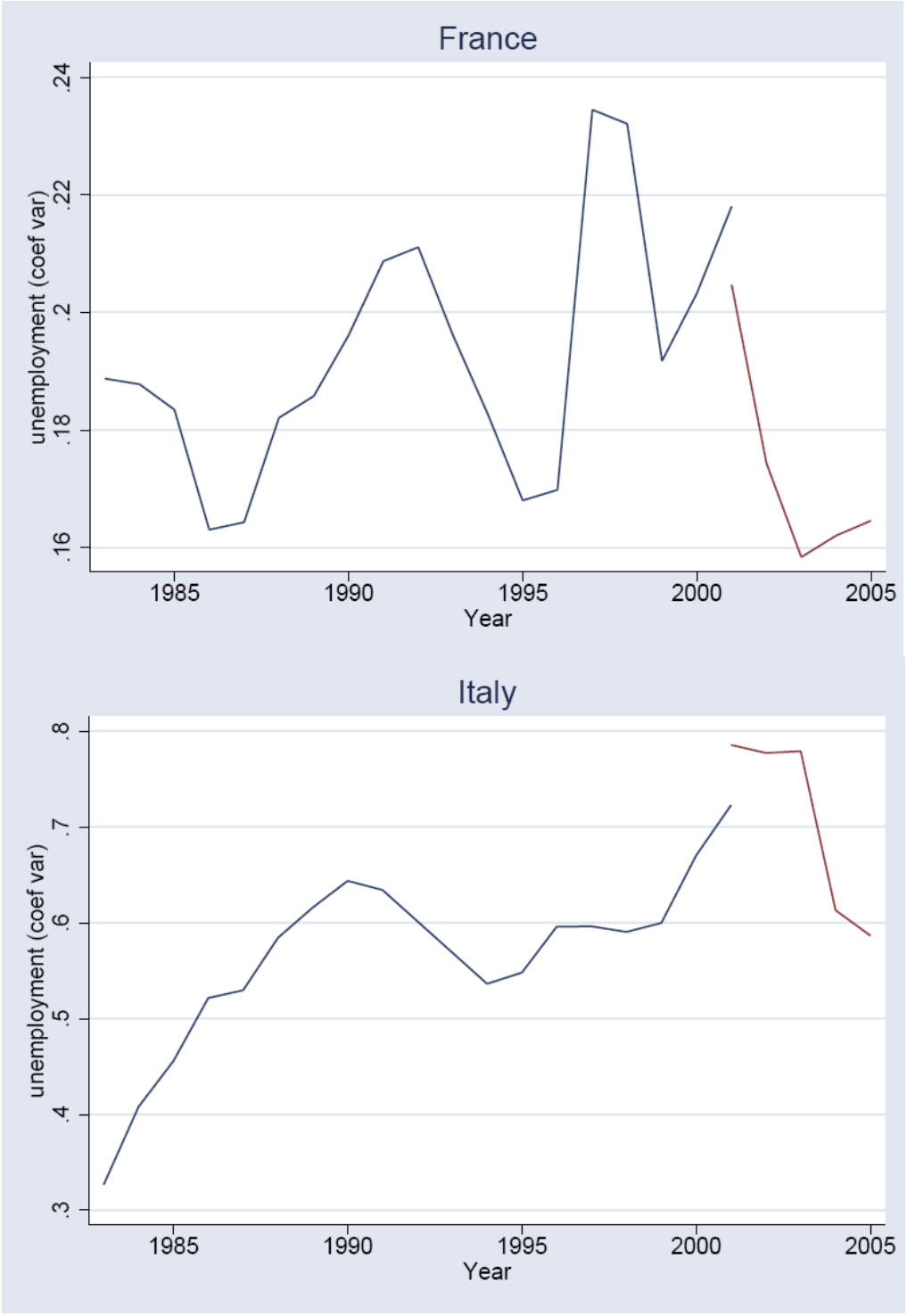
Luxembourg: share of foreign nationals in resident working-age population in 2005: 46%: 39.7% from EU-15; 0,8% from EU-10; 4,7% from non-EU.

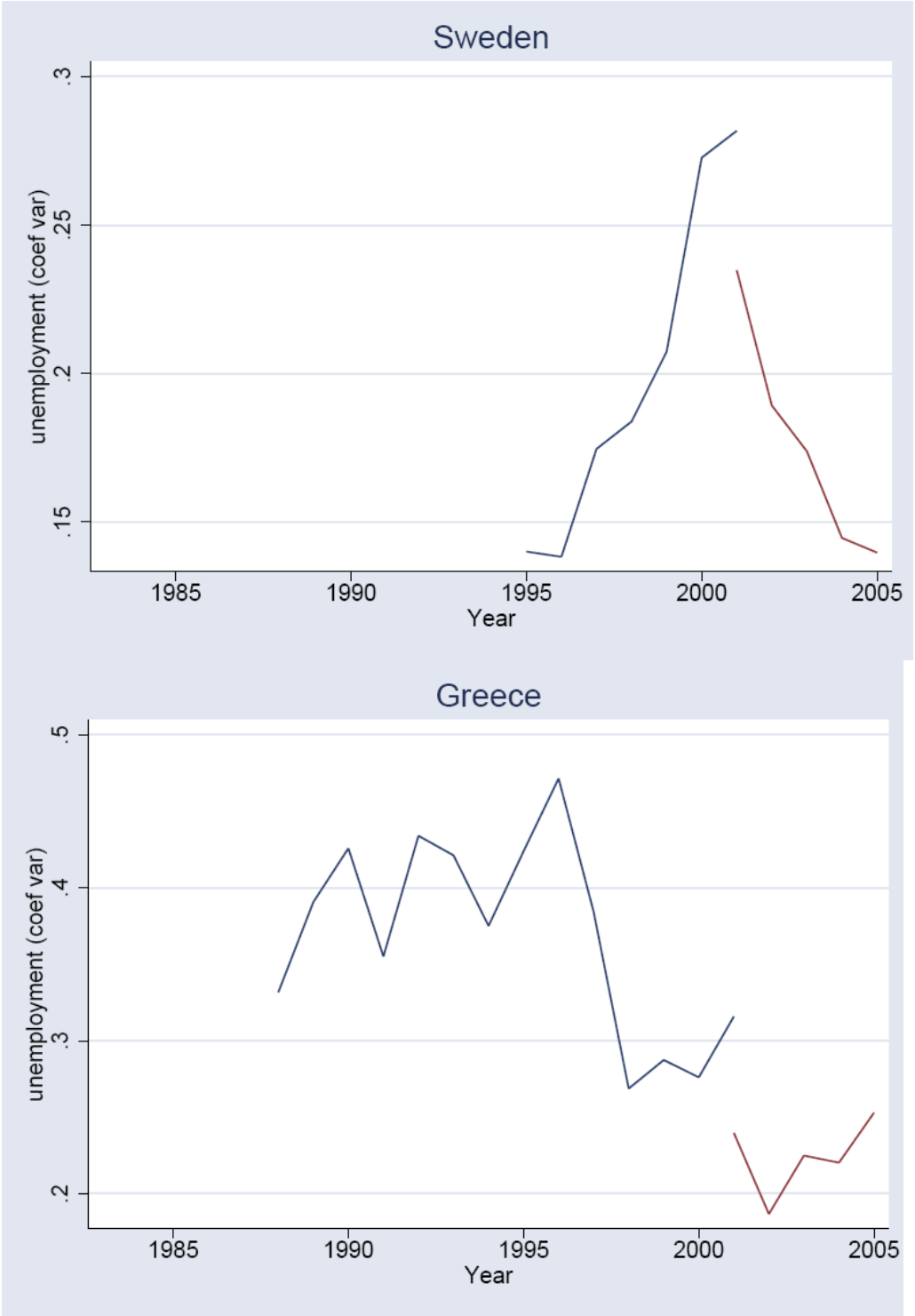
Dispersion of regional unemployment by country in Europe (NUTS2 classification) – coefficient of variation

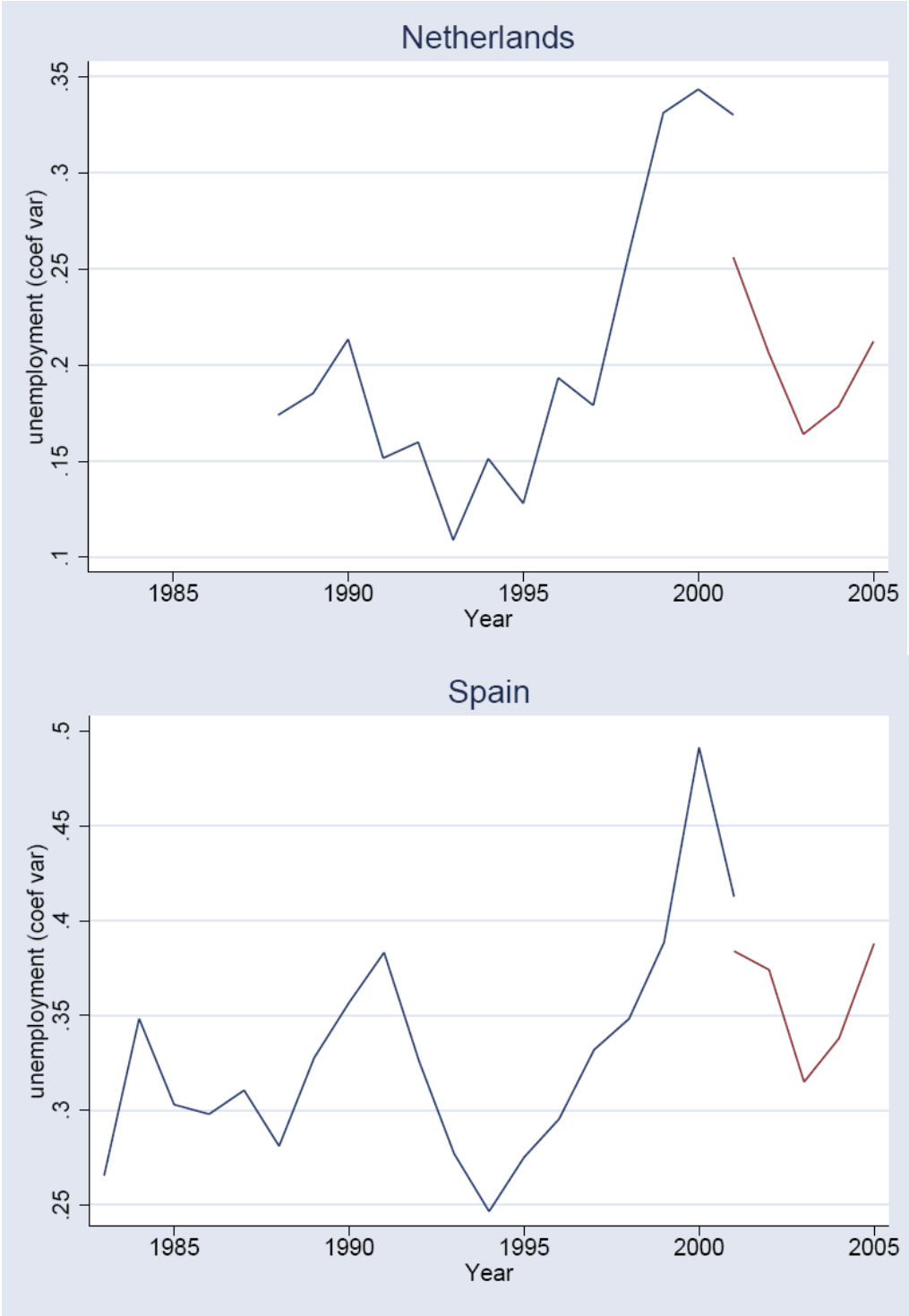
Source: Eurostat and authors' calculations

Notes: the data is characterised by a methodological break at the end of the 1990s. For this reason, two curves appear on the graphs below. The blue one corresponds to the methodology applied before the break and the red one to the methodology applied after.

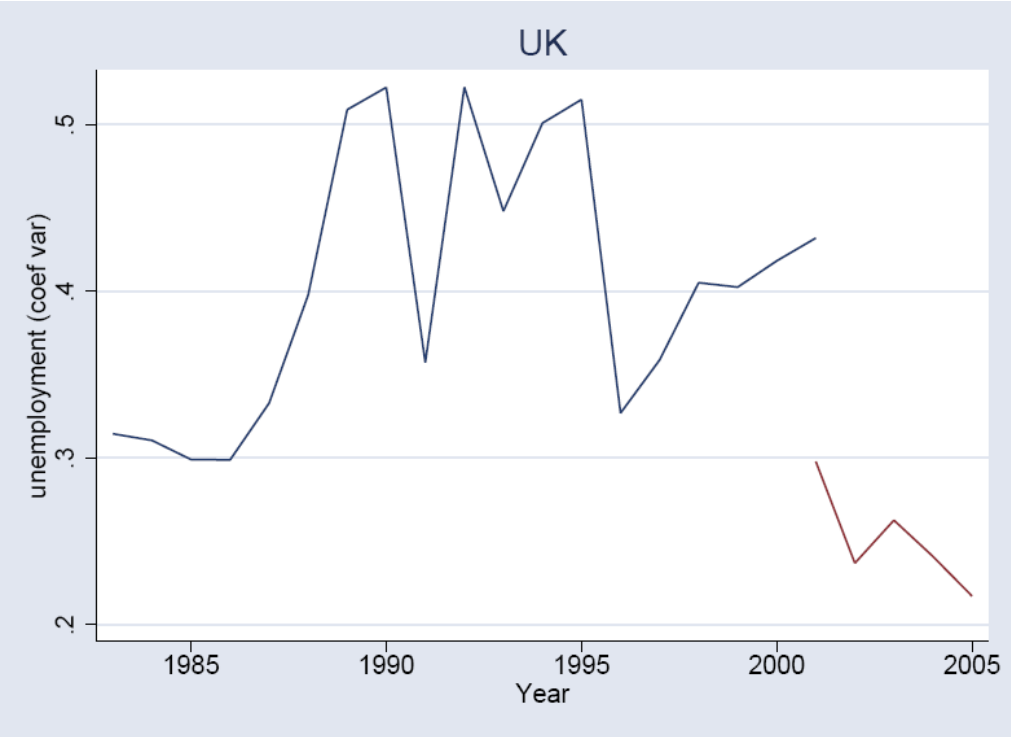



France
unemployment (coef var)
.16
.18
.2
.22
.24
1985
1990
1995
2000
2005
Year
Italy
unemployment (coef var)
.3
.4
.5
.6
.7
.8
1985
1990
1995
2000
2005
Year


Sweden
unemployment (coef var)
.15
.2
.25
.3
1985
1990
1995
2000
2005
Year
Greece
unemployment (coef var)
.2
.3
.4
.5
1985
1990
1995
2000
2005
Year


Netherlands
unemployment (coef var)
.1
.15
.2
.25
.3
.35
1985
1990
1995
2000
2005
Year
Spain
unemployment (coef var)
.25
.3
.35
.4
.45
.5
1985
1990
1995
2000
2005
Year

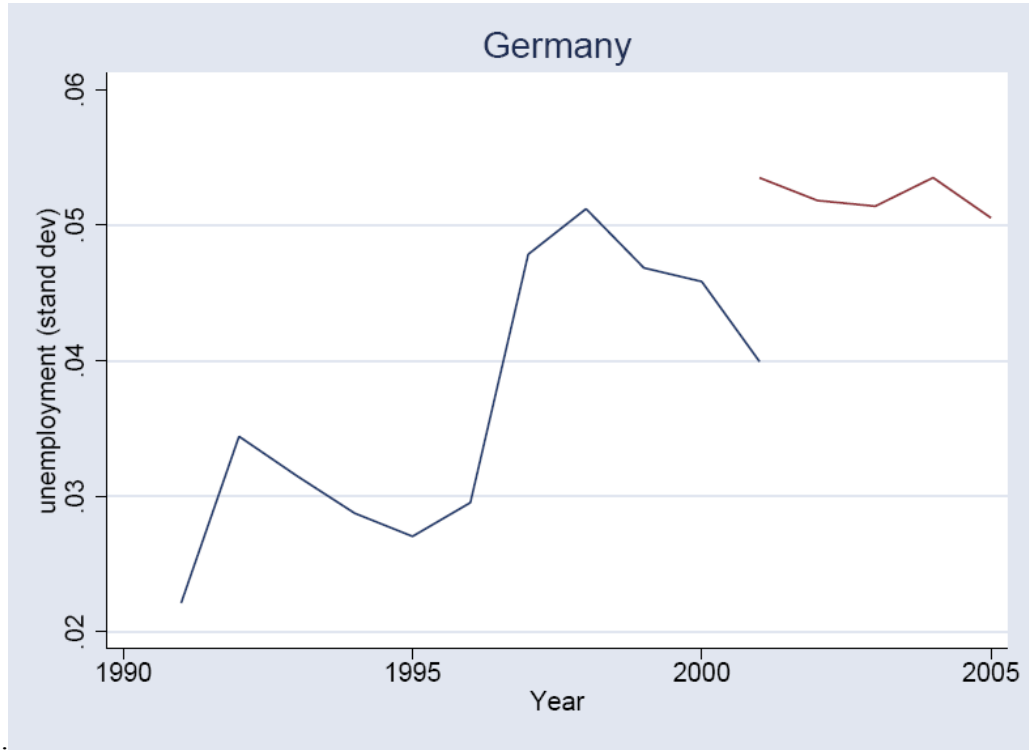

Belgium
unemployment (coef var)
.2
.3
.4
.5
.6
1985
1990
1995
2000
2005
Year
Austria
unemployment (coef var)
.25
.3
.35
.4
.45
1985
1990
1995
2000
2005
Year

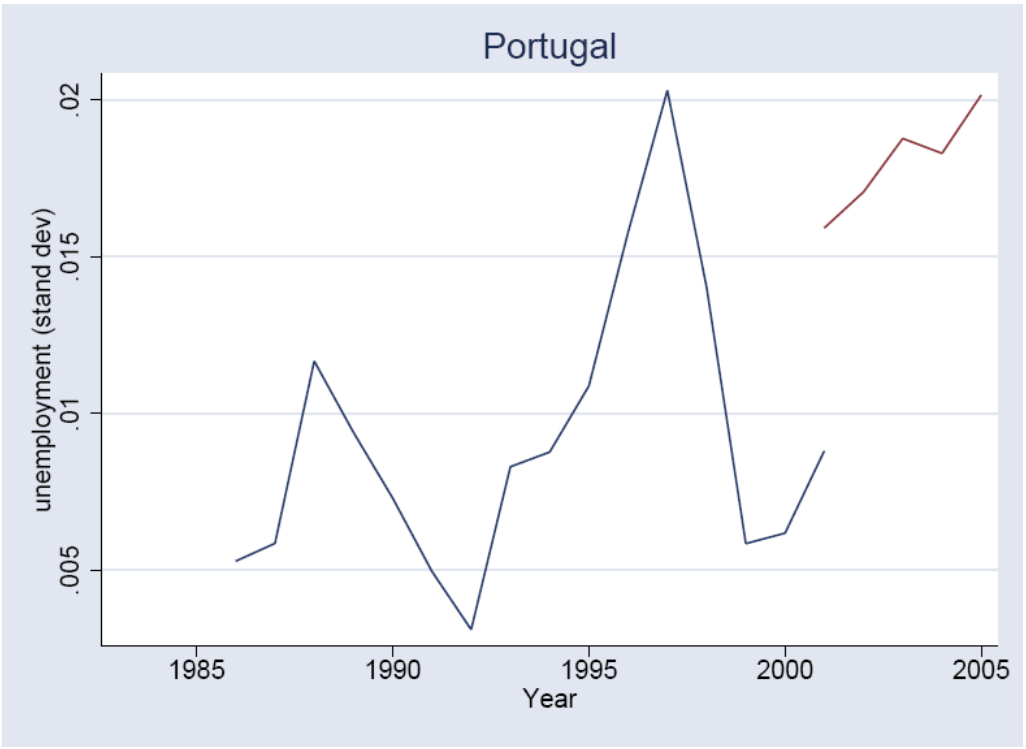

UK
unemployment (coef var)
.2
.3
.4
.5
1985
1990
1995
2000
2005
Year

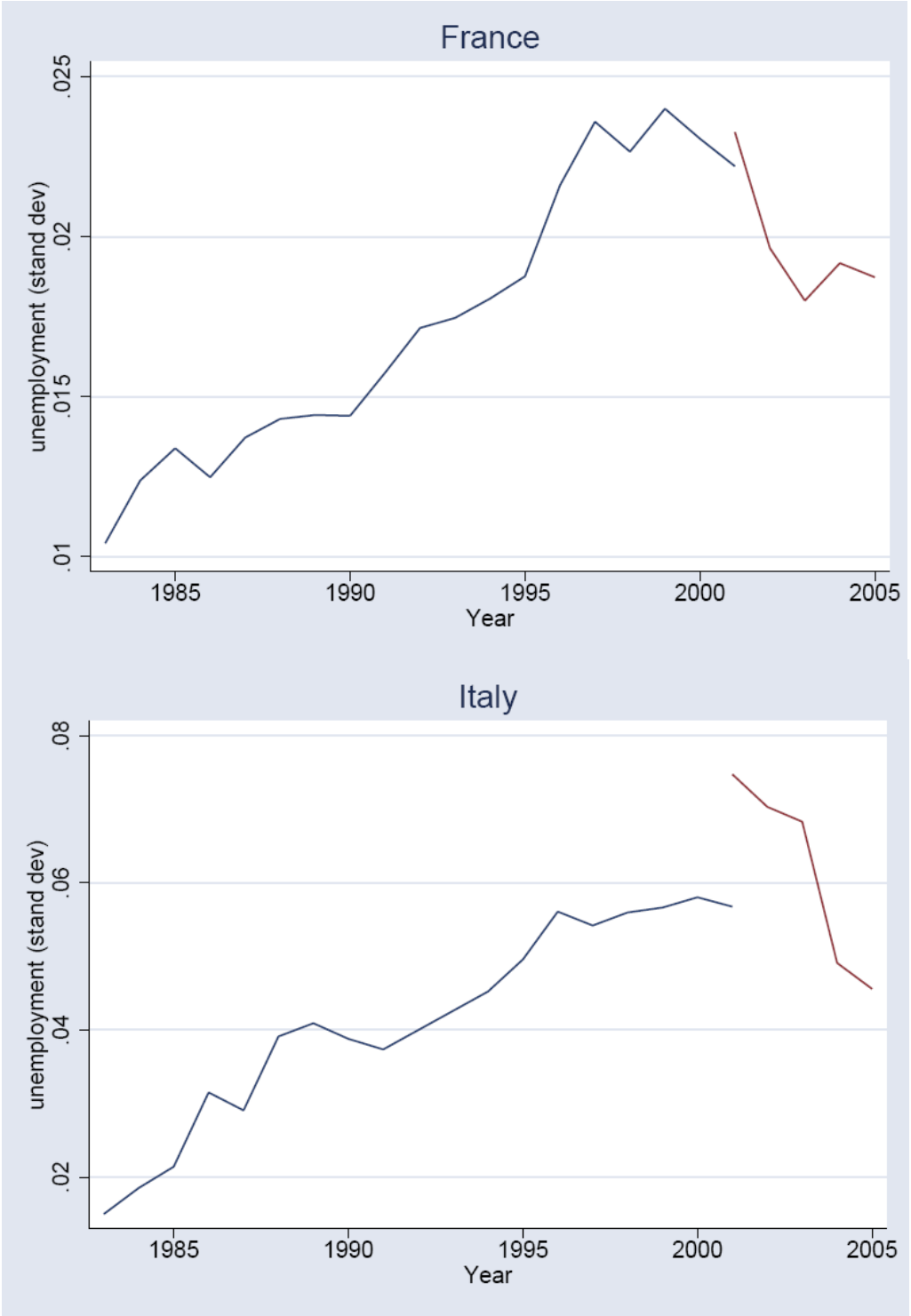
Dispersion of regional unemployment by country in Europe (NUTS2 classification) – standard deviation

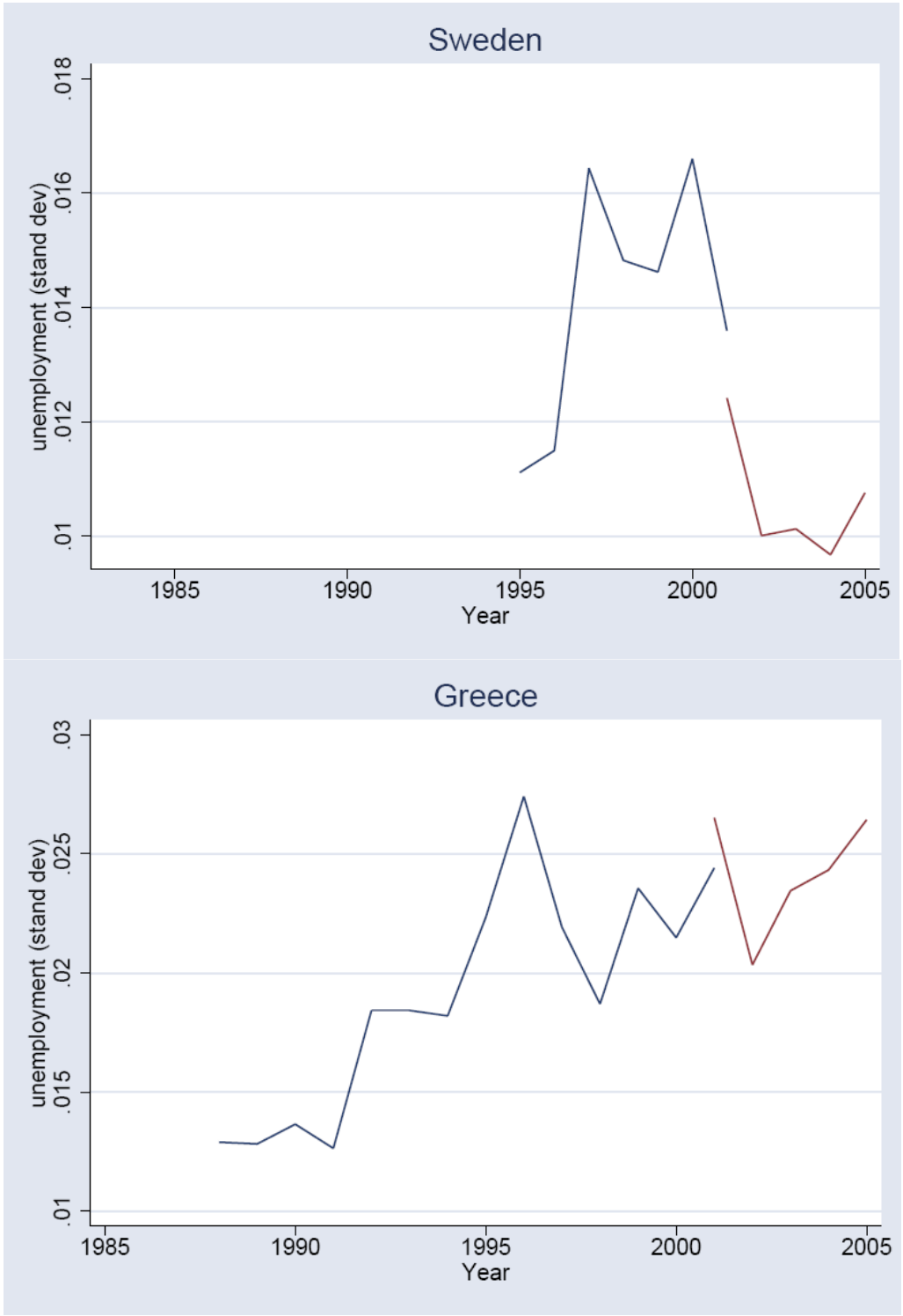
Source: Eurostat and authors' calculations

Notes: the data is characterised by a methodological break at the end of the 1990s. For this reason, two curves appear on the graphs below. The blue one corresponds to the methodology applied before the break and the red one to the methodology applied after

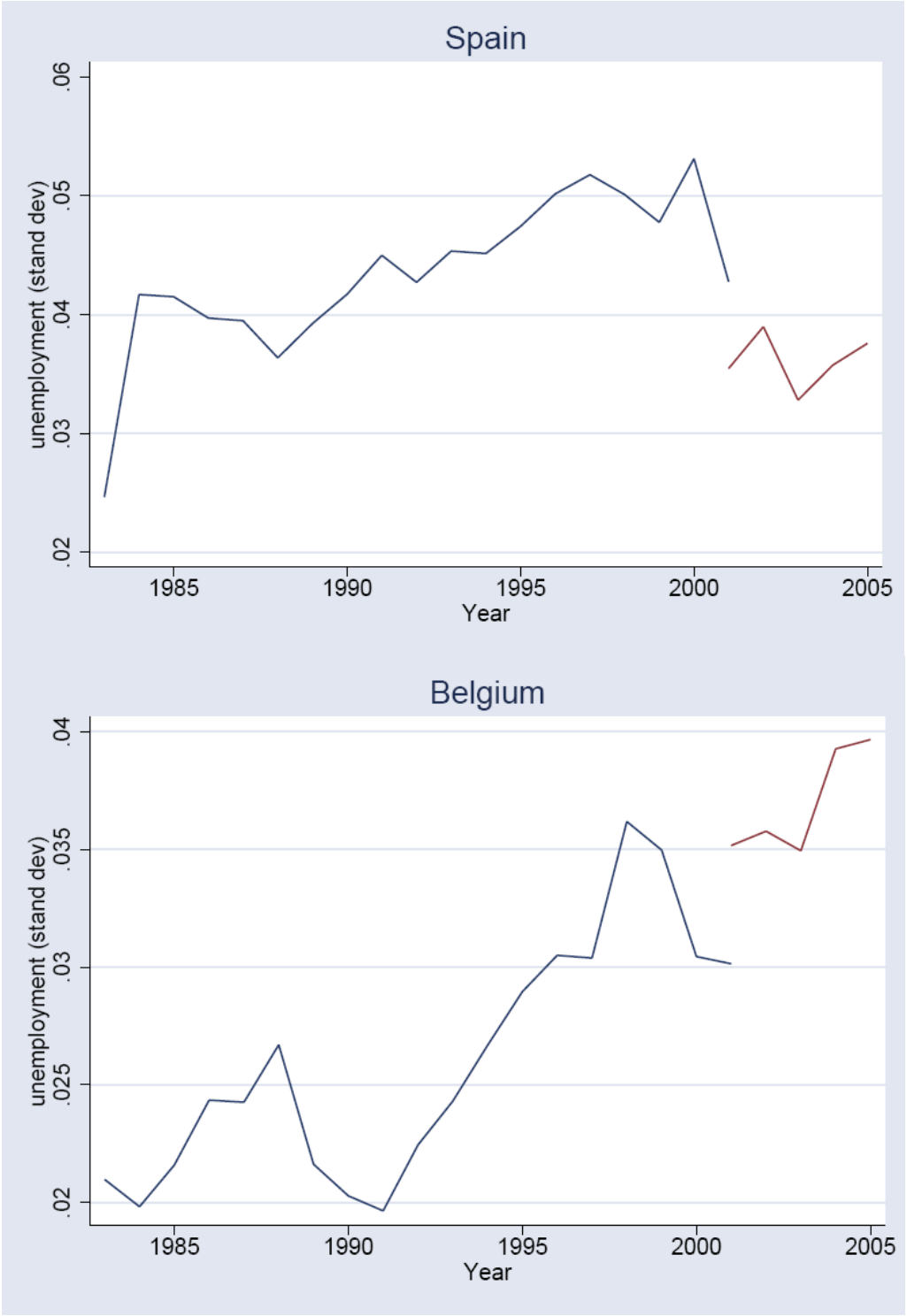


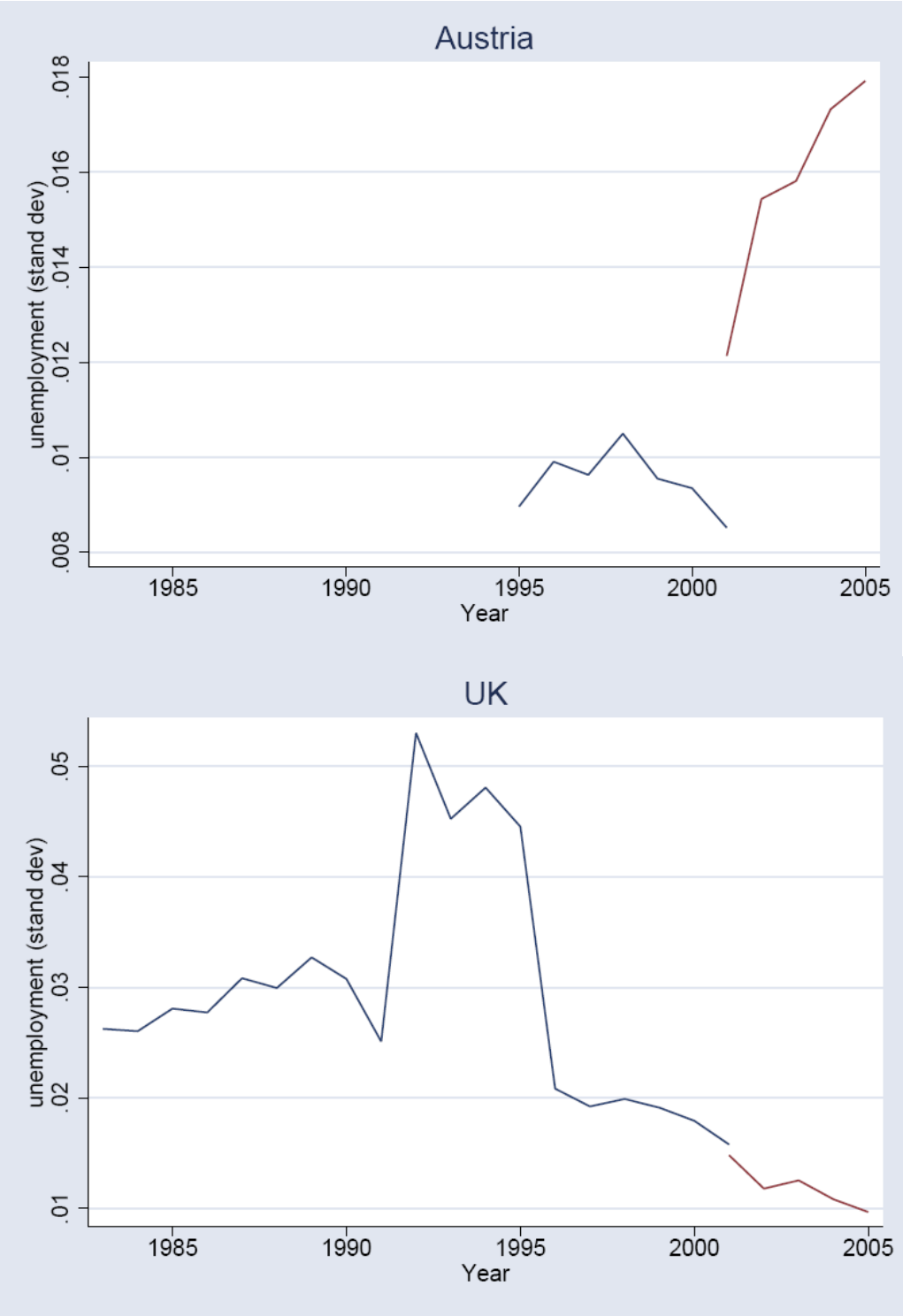



France
unemployment (stand dev)
.01
.015
.02
.025
1985
1990
1995
2000
2005
Year
Italy
unemployment (stand dev)
.02
.04
.06
.08
1985
1990
1995
2000
2005
Year


Sweden
unemployment (stand dev)
.01
.012
.014
.016
.018
1985
1990
1995
2000
2005
Year
Greece
unemployment (stand dev)
.01
.015
.02
.025
.03
1985
1990
1995
2000
2005
Year


Netherlands
unemployment (stand dev)
.006
.008
.01
.012
.014
1985
1990
1995
2000
2005
Year


Spain
unemployment (stand dev)
.02
.03
.04
.05
.06
1985
1990
1995
2000
2005
Year
Belgium
unemployment (stand dev)
.02
.025
.03
.035
.04
1985
1990
1995
2000
2005
Year


Austria
unemployment (stand dev)
.008
.01
.012
.014
.016
.018
1985
1990
1995
2000
2005
Year
UK
unemployment (stand dev)
.01
.02
.03
.04
.05
1985
1990
1995
2000
2005
Year

Appendix on Mobility: additional results

One of the targets of the Lisbon strategy is to foster labour market participation in Europe and so increase aggregate output and welfare. In this Section, we question whether the ability of the labour force to adjust to regional shocks through labour mobility can help fulfil this objective. The idea is that improving labour market flexibility along this dimension makes participating in the labour market more attractive because workers are better equipped (especially women).

The figure below shows the correlation between participation and mobility in EU12. The left graph is a scatter plot of the female rate of labour participation over the period 1995-2001 against the share of individuals who changed area of residence (NUTS 3 definition of the European Commission) in the last three years of the same period. The right graph is similar to the previous one but, instead of considering female labour force participation per se, it plots the difference with respect to male participation. The reason for introducing this second graph is that, when economic conditions are bad, both participation and mobility are low. By taking the difference one can somehow control for those factors. Thus the figure suggests that participation and mobility are positively correlated.

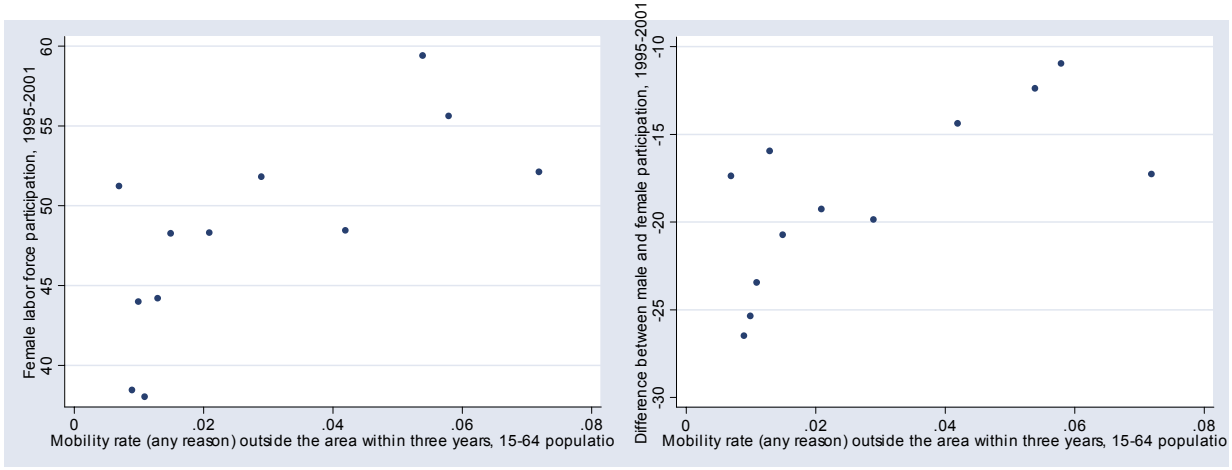


Fig. Appendix. Regional mobility and female participation. Sources: Wasmer et al. (2005), OECD and authors' calculations.

Mincer (1978) also claims that increased female labour market attachment fosters mobility, which contributes to marital instability. Conversely, increased marital instability stimulates migration and reinforces the upward trends in female labour force participation. The figure below shows this correlation. It displays EU12 divorce rates against the difference between male and female participation (left graph) and mobility (right graph). The divorce rate seems to be positively correlated with both variables.

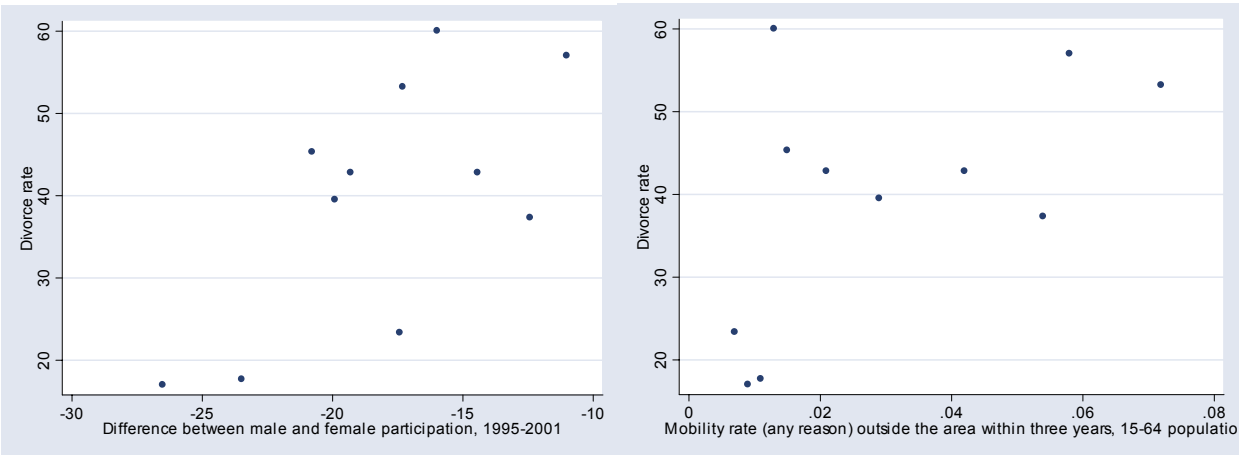


Fig. Appendix: Female participation, regional mobility and divorce rates. Sources: Wasmer et al. (2005), United Nations, OECD and authors' calculations.

APPENDIX to Section D.

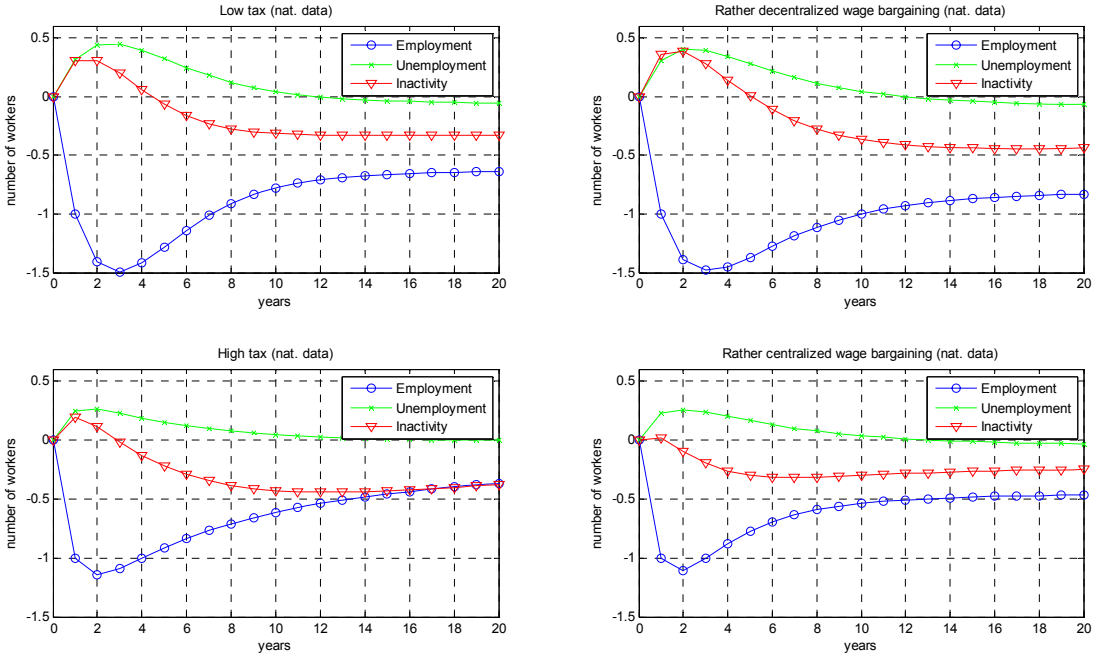


Fig. Appendix D-6: Complement to Fig. D-6. Baseline model when interacted with both the tax rate and the degree of centralisation of wage bargaining. Specification with numbers of workers only.

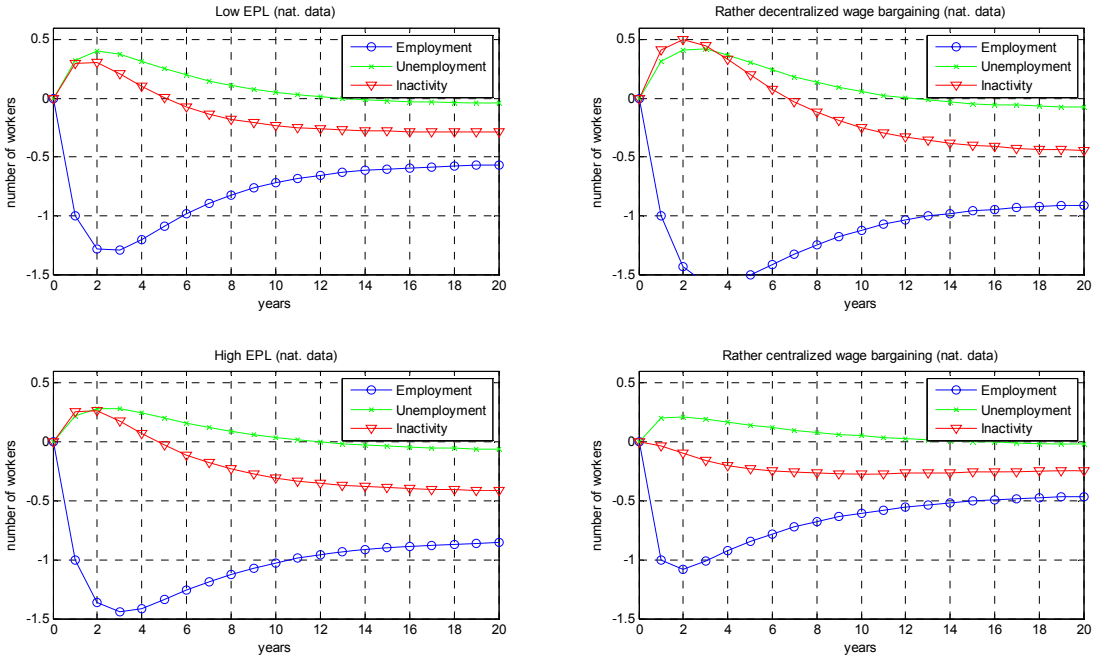


Fig. Appendix D-7: Complement to Fig. D-7. Baseline model when interacted with both EPL and the degree of centralization of wage bargaining. Specification with numbers of workers only.

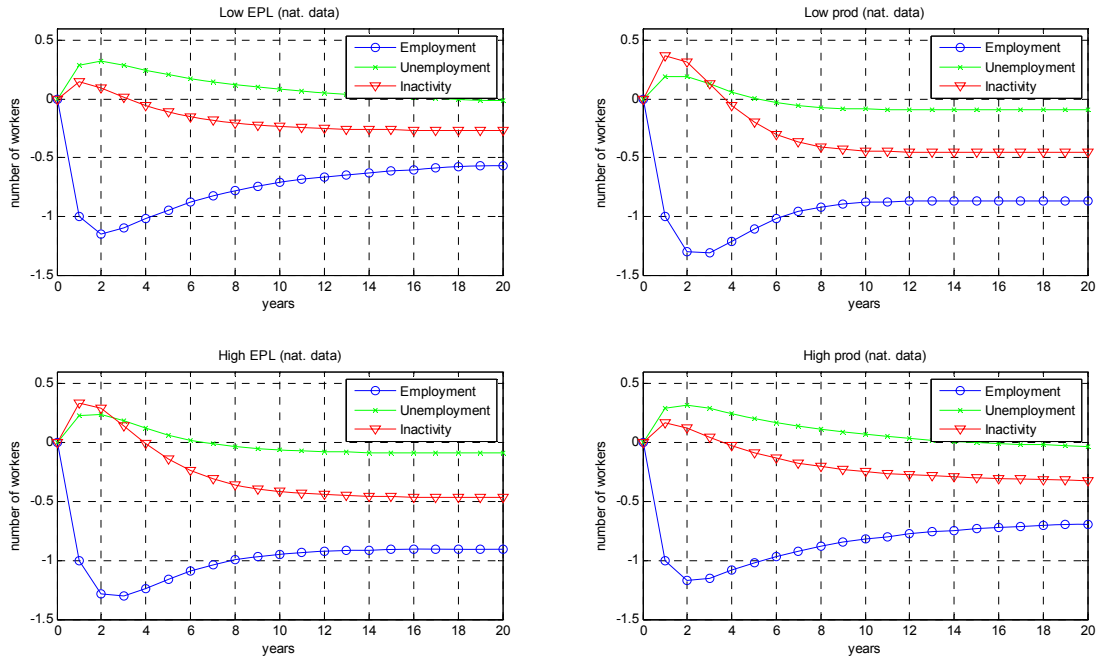


Fig. Appendix D-8: Complement to Fig. D-8. Baseline model when interacted with both EPL and product market regulation. Specification in numbers.

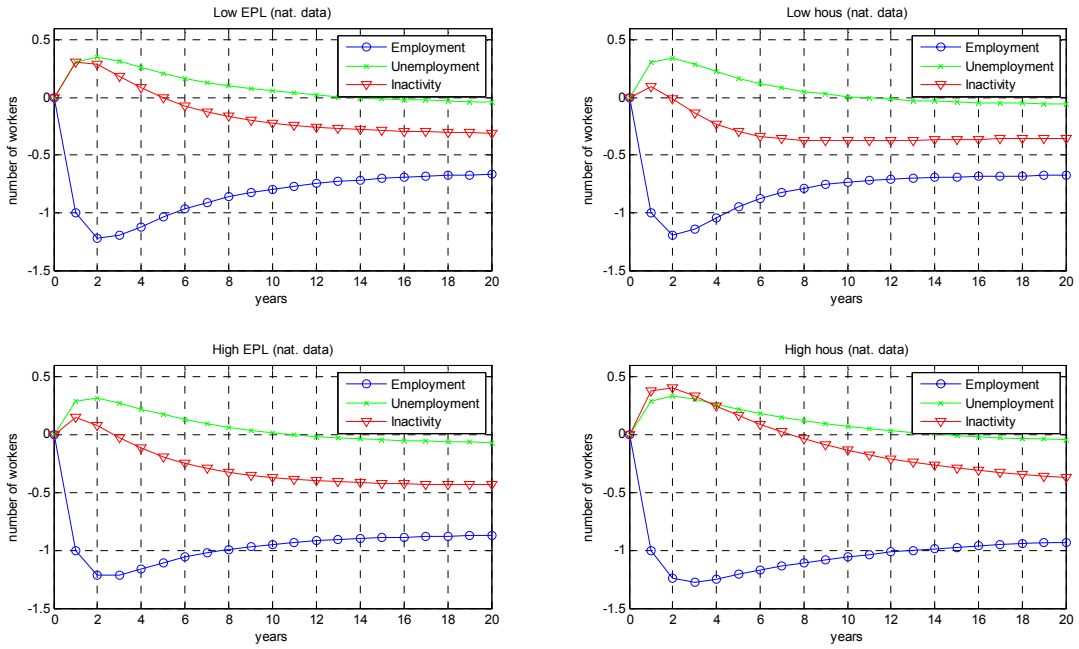


Fig. Appendix D-9: Complement to Fig. D-9. Baseline model when interacted with both EPL and housing market regulation. Specification in numbers.

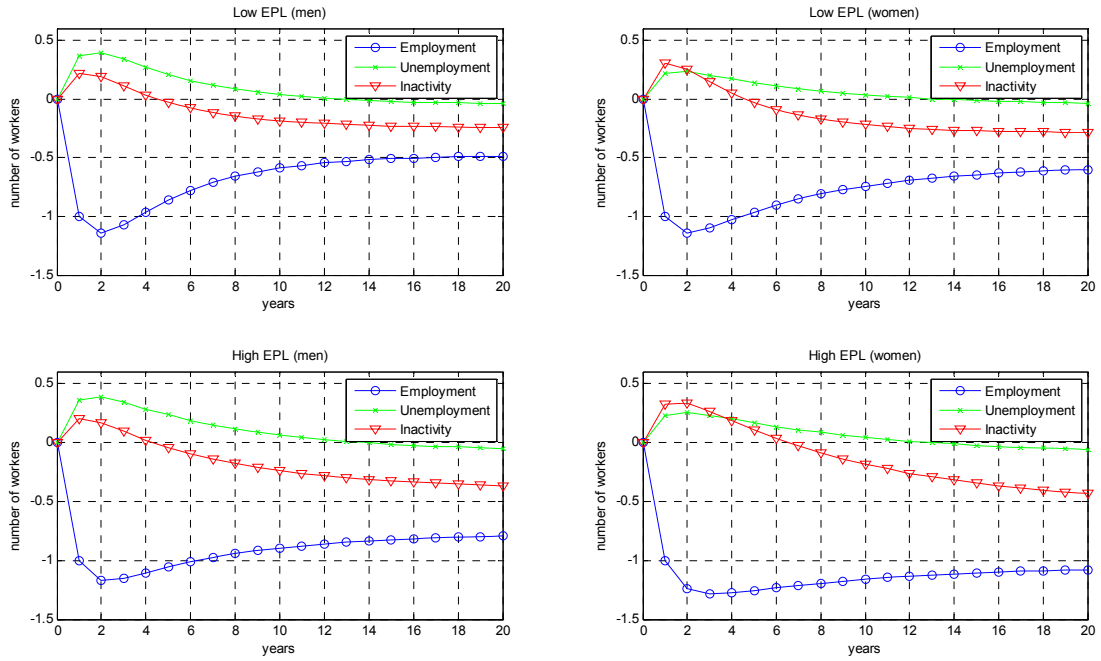


Fig Appendix D-11: Complement to Fig. D-11. Impact of EPL when the VAR is estimated for men and women separately. Specification in number of workers.

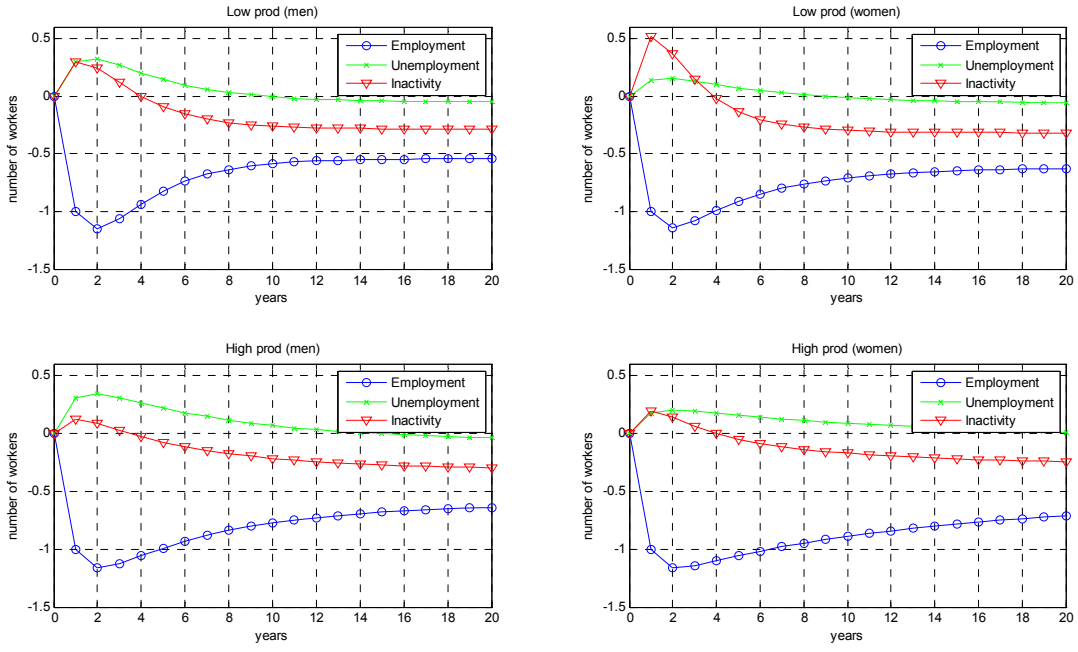


Fig Appendix D-12: Complement to Fig. D-12. Impact of product market regulations when the VAR is estimated for men and women separately. Specification in number of workers.

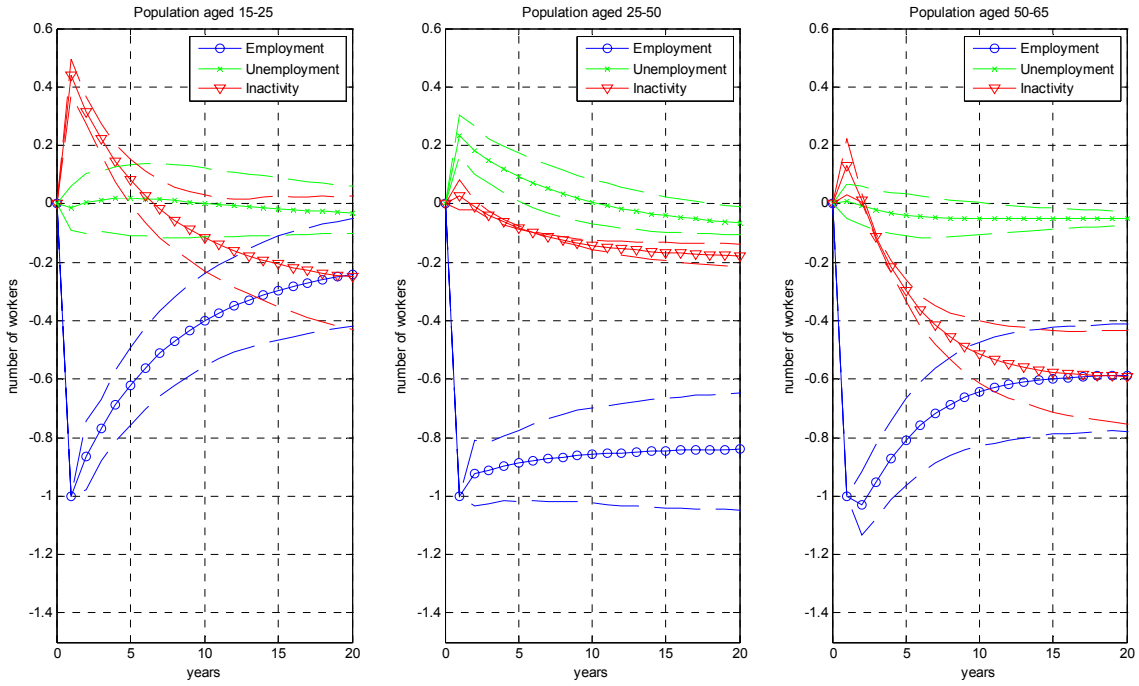


Fig Appendix D-13: Complement to Fig. D-13. Baseline model where the VAR is estimated for three age categories separately. Specification in number of workers.

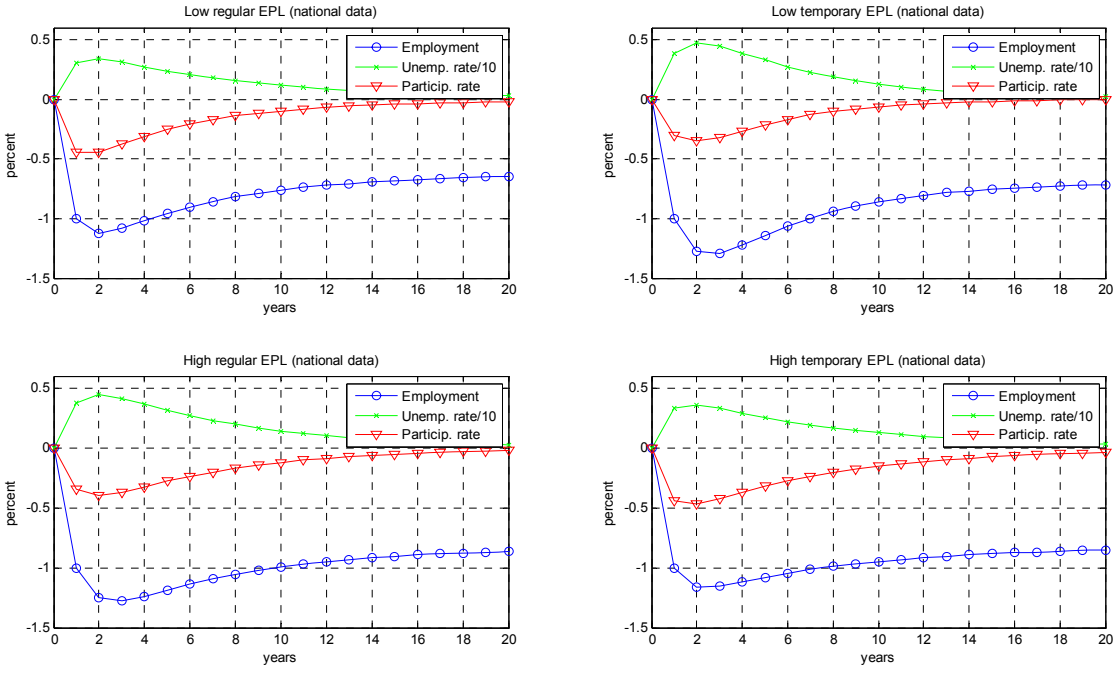


Fig Appendix D-14: Complement to Fig. D-14. Baseline model when interacted with two measures of EPL (for temporary and regular jobs). Specification in number of workers.

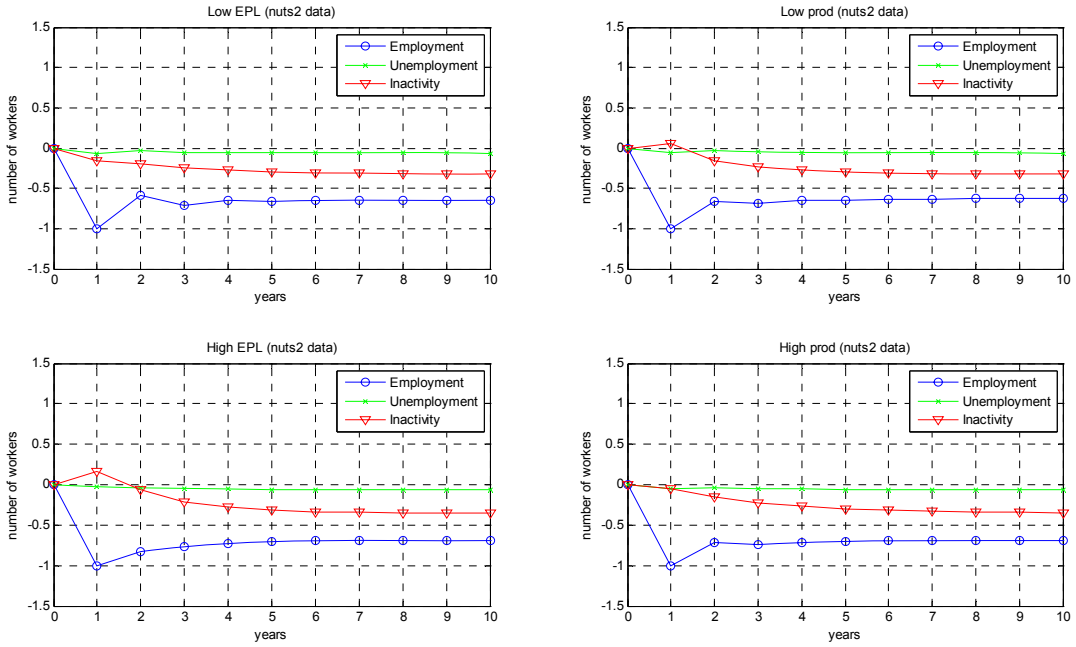


Fig. Appendix D-20: Complement to Fig. D-20. Regional level analysis, baseline model augmented with regional population and interacted with both EPL and product market regulation. Specification in numbers of workers.

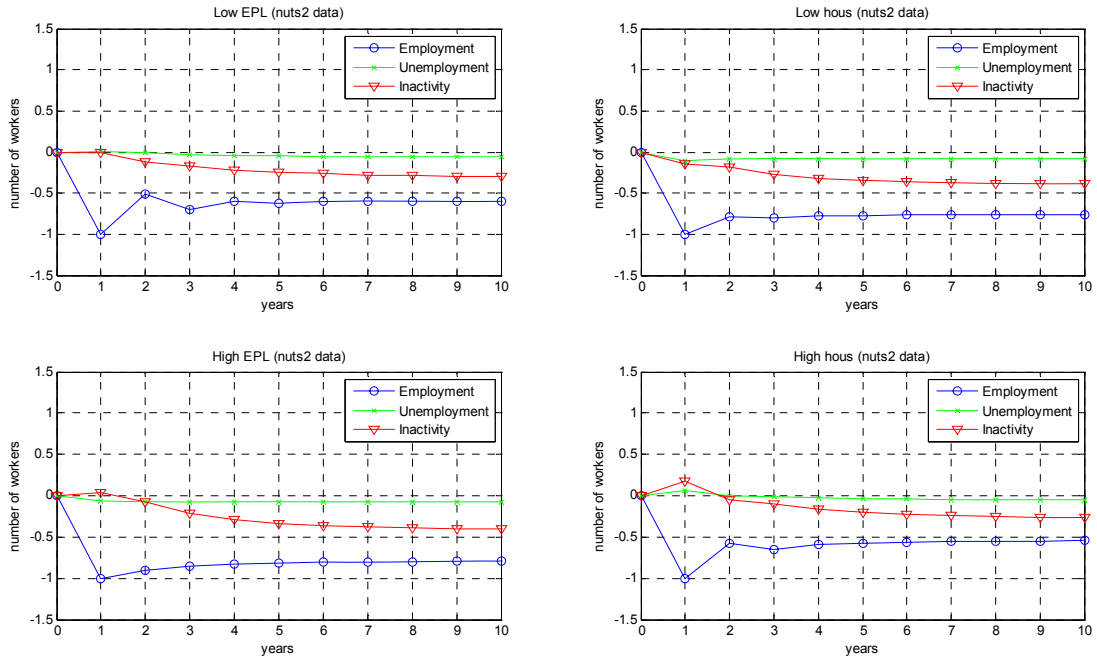


Fig. Appendix D-21: Complement to Fig. D-21. Regional level analysis, baseline model augmented with regional population and interacted with both EPL and housing market regulation. Specification in numbers of workers.

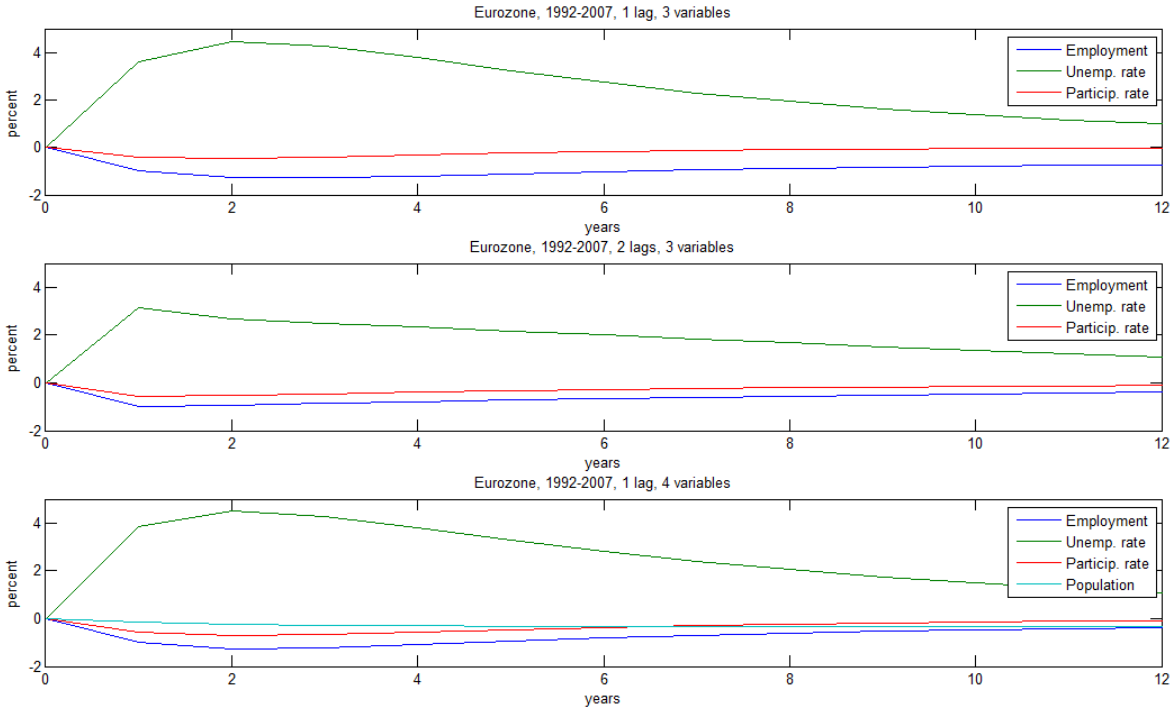


Fig. Appendix D-23: Variations of the baseline model. The top panel is a VAR with one lag and three variables, the middle panel is a VAR with two lags and three variables, the bottom panel augments the baseline VAR with population at the national level. No institutional interaction, country level. Specification with rates only.

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2903	-1.1146	-0.9493	-0.8386	-0.7678	-0.7218	-0.6912	-0.6703
Unemp. rate	3.5948	4.289	3.2459	2.3008	1.6261	1.1597	0.8347	0.6052	0.441
Particip. rate	-0.4	-0.395	-0.2344	-0.1254	-0.0656	-0.0345	-0.0186	-0.0103	-0.0059

Table Appendix D-1: Baseline model, which is a VAR with one lag and three variables. The table shows the responses when they are expressed in percent deviation from steady state. No institutional interaction, country level.

Low EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1796	-1.0147	-0.8808	-0.7915	-0.7331	-0.6945	-0.6688	-0.6515
Unemp. rate	3.6924	3.8279	2.7309	1.8812	1.2994	0.9042	0.6339	0.4472	0.3173
Particip. rate	-0.3348	-0.3117	-0.1935	-0.1137	-0.0661	-0.0382	-0.022	-0.0126	-0.0072

High EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2899	-1.2234	-1.1492	-1.0927	-1.0513	-1.0209	-0.9987	-0.9823
Unemp. rate	3.3796	3.7085	2.8541	2.1186	1.5651	1.1552	0.8524	0.6289	0.4639
Particip. rate	-0.3757	-0.4029	-0.3033	-0.2211	-0.161	-0.1176	-0.0861	-0.0631	-0.0463

Table Appendix D-2: Response to an asymmetric labour demand shock according to the stringency of EPL (country level). Specification in rates only.

Low product market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1205	-0.917	-0.7857	-0.7165	-0.6804	-0.661	-0.65	-0.6436
Unemp. rate	2.9801	2.8475	1.7791	1.0646	0.6443	0.3969	0.2481	0.1567	0.0996
Particip. rate	-0.4179	-0.3177	-0.1436	-0.0565	-0.02	-0.0059	-0.0009	0.0006	0.0009

High product market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1717	-1.0572	-0.9589	-0.8855	-0.8304	-0.7884	-0.7561	-0.7309
Unemp. rate	3.1112	3.4159	2.7785	2.208	1.749	1.384	1.0944	0.865	0.6835
Particip. rate	-0.3254	-0.2975	-0.2024	-0.139	-0.0985	-0.0718	-0.0536	-0.0406	-0.0312

Table Appendix D-3: Response to an asymmetric labour demand shock according to the type of product market regulation (country level). Specification in rates only.

Low housing market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0913	-0.856	-0.6976	-0.6065	-0.5529	-0.5195	-0.4976	-0.4826
Unemp. rate	3.9314	4.0378	2.7951	1.8902	1.3052	0.92	0.6577	0.4744	0.3441
Particip. rate	-0.3197	-0.232	-0.0929	-0.0252	0.001	0.0091	0.0103	0.009	0.0072

High housing market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2757	-1.2578	-1.231	-1.21	-1.1938	-1.1809	-1.1705	-1.1621
Unemp. rate	3.6488	4.0848	3.4384	2.8459	2.3556	1.9515	1.6177	1.3414	1.1126
Particip. rate	-0.4073	-0.4398	-0.3598	-0.2922	-0.239	-0.1966	-0.1622	-0.1342	-0.1111

Table Appendix D-4: Response to an asymmetric labour demand shock according to the type of housing market regulation (country level). Specification in rates only.

Rather decentralised wage bargaining (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.6379	-1.5719	-1.3605	-1.1737	-1.0441	-0.963	-0.9151	-0.8878
Unemp. rate	3.7252	5.548	4.5864	3.1904	2.0474	1.2583	0.7555	0.4486	0.2656
Particip. rate	-0.4345	-0.5887	-0.4351	-0.2644	-0.1438	-0.0719	-0.0332	-0.0139	-0.005

Rather centralised wage bargaining (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.9689	-0.7724	-0.6385	-0.5521	-0.4967	-0.4612	-0.4386	-0.4242
Unemp. rate	2.8579	2.7037	1.9812	1.4136	0.9953	0.6934	0.4787	0.3279	0.2231
Particip. rate	-0.2413	-0.1423	-0.0475	-0.0008	0.0187	0.0243	0.0235	0.0201	0.0161

Table Appendix D-5: Response to an asymmetric labour demand shock according to the level of the degree of centralization of wage bargaining (country level). Specification in rates only.

Low tax rate (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.4931	-1.2819	-1.0129	-0.8342	-0.7371	-0.6884	-0.6639	-0.6508
Unemp. rate	3.706	5.2944	4.0116	2.5007	1.4388	0.8104	0.4622	0.2707	0.1624
Particip. rate	-0.3852	-0.427	-0.2394	-0.1016	-0.0353	-0.0104	-0.003	-0.0013	-0.001

High tax rate (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0954	-0.9166	-0.7699	-0.6597	-0.576	-0.511	-0.4595	-0.4177
Unemp. rate	3.0791	2.9998	2.1657	1.5482	1.1233	0.8306	0.6271	0.4841	0.382
Particip. rate	-0.3399	-0.2419	-0.085	0.0177	0.0788	0.1126	0.129	0.1344	0.133

Rather decentralised wage bargaining (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.4823	-1.3686	-1.1893	-1.0512	-0.9601	-0.9033	-0.8687	-0.848
Unemp. rate	3.6555	4.8077	3.7032	2.5108	1.6266	1.0348	0.6535	0.4115	0.2589
Particip. rate	-0.4199	-0.491	-0.3215	-0.1741	-0.0818	-0.0311	-0.0059	0.0052	0.009

Rather centralised wage bargaining (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0059	-0.7736	-0.6368	-0.564	-0.5237	-0.5002	-0.4858	-0.4767
Unemp. rate	2.9015	3.0001	2.1358	1.46	0.9934	0.6758	0.4599	0.3131	0.2131
Particip. rate	-0.2379	-0.103	0.0076	0.0419	0.044	0.0362	0.0272	0.0196	0.0137

Table Appendix D-6: Baseline model when interacted with both the tax rate and the degree of centralization of wage bargaining. Specification in rates only.

Low EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2935	-1.091	-0.8965	-0.7658	-0.6845	-0.6346	-0.604	-0.585
Unemp. rate	3.814	4.4846	3.2362	2.1311	1.3753	0.8866	0.574	0.3736	0.2444
Particip. rate	-0.3784	-0.3981	-0.2481	-0.1363	-0.0708	-0.0354	-0.0169	-0.0075	-0.0029

High EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.4449	-1.3409	-1.1879	-1.0705	-0.9901	-0.9366	-0.9012	-0.8776
Unemp. rate	2.8692	3.7897	3.0231	2.1671	1.502	1.0284	0.7006	0.4762	0.3232
Particip. rate	-0.3834	-0.4463	-0.313	-0.1994	-0.125	-0.0791	-0.0507	-0.033	-0.0217

Rather decentralised wage bargaining (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.5744	-1.5059	-1.3296	-1.1791	-1.0737	-1.005	-0.9616	-0.9344
Unemp. rate	3.6755	5.1281	4.1061	2.8489	1.8681	1.1949	0.7559	0.4761	0.2994
Particip. rate	-0.4535	-0.6115	-0.4721	-0.3155	-0.1995	-0.1233	-0.0756	-0.0463	-0.0284

Rather centralised wage bargaining (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.014	-0.8469	-0.7242	-0.6383	-0.5781	-0.5358	-0.5059	-0.4847
Unemp. rate	2.6796	2.6194	2.017	1.5243	1.1434	0.8528	0.6332	0.4684	0.3454
Particip. rate	-0.2113	-0.1416	-0.0645	-0.0219	-0.0004	0.0093	0.0127	0.0129	0.0117

Table Appendix D-7: Baseline model when interacted with both EPL and the degree of centralization of wage bargaining. Specification with rates only.

Low EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1009	-0.9451	-0.8265	-0.7441	-0.686	-0.6443	-0.6136	-0.5908
Unemp. rate	3.4934	3.5512	2.7116	2.0522	1.5661	1.2044	0.9316	0.7238	0.5642
Particip. rate	-0.2942	-0.2435	-0.1448	-0.0839	-0.0488	-0.0286	-0.017	-0.0102	-0.0063

High EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.3066	-1.1606	-1.0357	-0.9667	-0.9325	-0.9162	-0.9085	-0.9049
Unemp. rate	2.9077	2.8346	1.6219	0.8196	0.3974	0.1901	0.0907	0.0434	0.0208
Particip. rate	-0.4287	-0.4122	-0.232	-0.115	-0.0546	-0.0256	-0.0119	-0.0056	-0.0026

Low product market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.308	-1.1088	-0.9594	-0.8947	-0.8736	-0.8686	-0.868	-0.8683
Unemp. rate	2.6267	2.3542	1.0525	0.3386	0.0734	0.0013	-0.0094	-0.0067	-0.0034
Particip. rate	-0.4611	-0.4231	-0.1967	-0.0684	-0.0184	-0.0032	0.0001	0.0004	0.0002

High product market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1495	-1.0223	-0.9202	-0.8481	-0.7971	-0.7605	-0.7338	-0.7142
Unemp. rate	3.4872	3.5908	2.7353	2.0461	1.5334	1.1523	0.8678	0.6546	0.4944
Particip. rate	-0.3099	-0.2793	-0.1846	-0.1215	-0.0817	-0.0562	-0.0394	-0.0281	-0.0203

Table Appendix D-8: Baseline model when interacted with both EPL and product market regulation.

Specification in rates only.

Low EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1995	-1.0409	-0.9114	-0.8256	-0.7688	-0.7304	-0.7037	-0.6849
Unemp. rate	3.6567	3.8858	2.8262	1.9934	1.4173	1.0185	0.7379	0.5378	0.3935
Particip. rate	-0.3907	-0.3719	-0.2391	-0.1502	-0.097	-0.0646	-0.0442	-0.0309	-0.022

High EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2133	-1.1075	-1.022	-0.9669	-0.9314	-0.9081	-0.8927	-0.8822
Unemp. rate	3.4566	3.5247	2.5174	1.7402	1.2018	0.8317	0.5767	0.4004	0.2782
Particip. rate	-0.3001	-0.259	-0.1549	-0.0914	-0.0555	-0.0348	-0.0224	-0.0147	-0.0099

Low housing market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1432	-0.9522	-0.8257	-0.758	-0.7218	-0.7017	-0.6899	-0.6827
Unemp. rate	3.6375	3.5836	2.3288	1.4599	0.9297	0.6039	0.3982	0.2653	0.1779
Particip. rate	-0.2604	-0.1662	-0.046	0.005	0.0196	0.0202	0.0166	0.0125	0.009

High housing market regulation (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.272	-1.2087	-1.1368	-1.0793	-1.0346	-1.0001	-0.9735	-0.9531
Unemp. rate	3.4884	3.8466	3.0557	2.3584	1.8139	1.3942	1.0713	0.8231	0.6322
Particip. rate	-0.4395	-0.4879	-0.3897	-0.302	-0.233	-0.1794	-0.1381	-0.1062	-0.0816

Table Appendix D-9: Baseline model when interacted with both EPL and housing market regulation.

Specification in rates only.

Men (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2015	-1.0305	-0.8833	-0.7818	-0.714	-0.6688	-0.6387	-0.6186
Unemp. rate	3.8779	4.4809	3.4691	2.5199	1.7909	1.2569	0.8743	0.604	0.4151
Particip. rate	-0.3456	-0.3374	-0.2196	-0.1363	-0.0845	-0.0528	-0.0332	-0.0211	-0.0135

Women (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1871	-1.005	-0.8543	-0.7516	-0.6817	-0.6327	-0.5974	-0.5715
Unemp. rate	2.8569	3.1447	2.3718	1.7393	1.2893	0.9683	0.7345	0.5612	0.4309
Particip. rate	-0.4988	-0.4336	-0.238	-0.1189	-0.0565	-0.0251	-0.0097	-0.0025	0.0007

Table Appendix D-10: Baseline model where the VAR is estimated for men and women separately. Specification in rates only.

Low EPL, men (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0737	-0.8618	-0.7126	-0.6209	-0.5653	-0.5315	-0.5109	-0.4983
Unemp. rate	4.1634	3.9818	2.6427	1.6875	1.0725	0.6816	0.4333	0.2755	0.1753
Particip. rate	-0.3166	-0.2822	-0.1728	-0.1017	-0.0598	-0.0353	-0.021	-0.0125	-0.0075

High EPL, men (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1534	-1.0565	-0.9763	-0.9183	-0.8765	-0.8463	-0.8245	-0.8088
Unemp. rate	4.1351	4.068	3.0222	2.2003	1.597	1.1577	0.8387	0.6073	0.4397
Particip. rate	-0.3065	-0.2936	-0.2138	-0.1537	-0.1107	-0.0799	-0.0577	-0.0417	-0.0302

Low EPL, women (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1023	-0.9626	-0.8524	-0.7733	-0.7165	-0.6755	-0.6457	-0.6241
Unemp. rate	2.8486	2.8032	2.0942	1.5398	1.1319	0.8327	0.6129	0.4514	0.3325
Particip. rate	-0.4136	-0.3491	-0.2206	-0.1384	-0.0881	-0.057	-0.0375	-0.0251	-0.017

High EPL, women (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2851	-1.2542	-1.2112	-1.1759	-1.1479	-1.1259	-1.1085	-1.0949
Unemp. rate	2.9331	3.2183	2.5951	2.044	1.6064	1.2623	0.9919	0.7794	0.6124
Particip. rate	-0.4257	-0.4709	-0.3824	-0.3027	-0.2388	-0.1881	-0.1481	-0.1165	-0.0916

Table Appendix D-11: Impact of EPL when the VAR is estimated for men and women separately. Specification in rates only.

Low product market regulation, men (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0637	-0.8242	-0.6783	-0.6061	-0.5722	-0.5565	-0.5494	-0.5461
Unemp. rate	3.576	3.3423	2.0092	1.1328	0.6342	0.3567	0.202	0.115	0.0659
Particip. rate	-0.3882	-0.3028	-0.1405	-0.0556	-0.0188	-0.0043	0.0007	0.0019	0.0018

High product market regulation, men (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1272	-0.9921	-0.8833	-0.8052	-0.7494	-0.7095	-0.6809	-0.6604
Unemp. rate	3.6344	3.7475	2.8381	2.0793	1.5092	1.0905	0.7859	0.5656	0.4067
Particip. rate	-0.2775	-0.2548	-0.177	-0.1228	-0.0864	-0.0613	-0.0437	-0.0312	-0.0224

Low product market regulation, women (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0802	-0.9109	-0.7999	-0.7332	-0.6919	-0.6655	-0.6484	-0.6372
Unemp. rate	2.1571	2.1109	1.4541	0.9677	0.6414	0.425	0.2816	0.1866	0.1236
Particip. rate	-0.569	-0.3671	-0.1621	-0.0733	-0.0364	-0.0199	-0.0118	-0.0073	-0.0047

High product market regulation, women (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1465	-1.0579	-0.9798	-0.9165	-0.8643	-0.8205	-0.7835	-0.7522
Unemp. rate	2.467	2.7195	2.3502	2.0052	1.7087	1.4555	1.2396	1.0556	0.8989
Particip. rate	-0.3599	-0.3166	-0.2293	-0.1753	-0.1403	-0.1155	-0.0966	-0.0814	-0.069

Table Appendix D-12: Impact of product market regulation when the VAR is estimated for men and women separately. Specification in rates only.

Population aged 15-25 (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7689	-0.6201	-0.512	-0.4324	-0.3733	-0.3289	-0.2954	-0.2701
Unemp. rate	0.7585	0.6638	0.5616	0.4601	0.3693	0.2924	0.2294	0.1788	0.1387
Particip. rate	-0.6117	-0.4183	-0.2989	-0.2171	-0.1597	-0.1188	-0.089	-0.0671	-0.0508

Population aged 25-50 (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.9106	-0.8883	-0.8731	-0.8625	-0.8549	-0.8495	-0.8456	-0.8428
Unemp. rate	2.9351	2.1259	1.6303	1.2442	0.9459	0.7171	0.5426	0.4098	0.3092
Particip. rate	-0.1398	-0.088	-0.0604	-0.0422	-0.0298	-0.0214	-0.0154	-0.0113	-0.0083

Population aged 50-65 (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.9511	-0.8092	-0.7189	-0.6633	-0.6298	-0.6098	-0.5981	-0.5915
Unemp. rate	0.997	0.6503	0.3325	0.1559	0.0627	0.0164	-0.0046	-0.0123	-0.0137
Particip. rate	-0.5058	-0.3809	-0.2364	-0.1439	-0.0862	-0.0507	-0.0293	-0.0165	-0.009

Table Appendix D-13: Impact of EPL when the VAR is estimated for three age categories separately. Specification in rates only.

Low regular EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.0841	-0.9532	-0.856	-0.7884	-0.7408	-0.7067	-0.6821	-0.6641
Unemp. rate	3.0845	3.0947	2.3818	1.7963	1.3477	1.0081	0.7526	0.5611	0.418
Particip. rate	-0.4436	-0.3785	-0.2514	-0.1691	-0.1167	-0.0821	-0.0588	-0.0425	-0.031

High regular EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2772	-1.1858	-1.0908	-1.0196	-0.968	-0.9308	-0.904	-0.8846
Unemp. rate	3.7819	4.1499	3.152	2.3001	1.6693	1.2104	0.8775	0.6361	0.4611
Particip. rate	-0.3452	-0.3726	-0.2783	-0.2	-0.1432	-0.1027	-0.0737	-0.053	-0.0382

Low temporary EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.2909	-1.1442	-0.9993	-0.8973	-0.8295	-0.7849	-0.7555	-0.7362
Unemp. rate	3.8802	4.4269	3.2652	2.2516	1.531	1.0376	0.7025	0.4754	0.3217
Particip. rate	-0.3039	-0.319	-0.2128	-0.1316	-0.08	-0.0485	-0.0293	-0.0178	-0.0108

High temporary EPL (national data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.1563	-1.0805	-1.0158	-0.9673	-0.931	-0.9037	-0.8832	-0.8677
Unemp. rate	3.3107	3.2774	2.5239	1.9178	1.4556	1.1044	0.8378	0.6354	0.4819
Particip. rate	-0.4384	-0.4223	-0.3174	-0.2368	-0.1772	-0.1331	-0.1002	-0.0756	-0.0571

Table Appendix D-14: Baseline model when interacted with two measures of EPL (for temporary and regular jobs). Specification in rates only.

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-1.3603	-1.2186	-1.0656	-0.9604	-0.893	-0.8497	-0.8215	-0.8027
Unemp. rate	3.3573	4.1098	3.1862	2.266	1.578	1.0941	0.7586	0.5264	0.3656
Particip. rate	-0.5038	-0.5353	-0.3451	-0.2052	-0.1227	-0.0756	-0.0482	-0.0315	-0.0211
Mobility rate	-0.0617	0.0272	0.027	0.0157	0.0082	0.0042	0.0022	0.0012	0.0007

Table Appendix D-15: Baseline model augmented with a measure of internal mobility.

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7869	-0.7319	-0.7131	-0.7063	-0.7037	-0.7027	-0.7023	-0.7022
Unemp. rate	0.5575	0.2238	0.1014	0.0436	0.0182	0.0075	0.0031	0.0012	0.0005
Particip. rate	-0.3249	-0.1128	-0.0378	-0.0133	-0.0049	-0.0019	-0.0007	-0.0003	-0.0001
Population	-0.7141	-0.6684	-0.6767	-0.6802	-0.6816	-0.6821	-0.6823	-0.6824	-0.6824

Table Appendix D-16: Regional model, benchmark with one lag and the three variables augmented by regional population. The picture shows the responses when they are expressed in percent deviation from steady state. No institutional interaction, country fixed effects (series are in deviation with respect to country averages).

Low EPL (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7162	-0.6693	-0.6577	-0.6535	-0.6518	-0.651	-0.6506	-0.6504
Unemp. rate	0.2757	0.1366	0.0672	0.0317	0.0148	0.0068	0.0032	0.0015	0.0007
Particip. rate	-0.2052	-0.0688	-0.0283	-0.0124	-0.0056	-0.0026	-0.0012	-0.0005	-0.0002
Population	-0.7016	-0.5581	-0.5516	-0.5558	-0.5586	-0.56	-0.5606	-0.5609	-0.5611

High EPL (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.8126	-0.7699	-0.7532	-0.7465	-0.7438	-0.7426	-0.7421	-0.7419
Unemp. rate	0.6336	0.2593	0.1283	0.0595	0.0267	0.0118	0.0051	0.0022	0.001
Particip. rate	-0.3607	-0.133	-0.0504	-0.0198	-0.0081	-0.0033	-0.0014	-0.0006	-0.0003
Population	-0.7185	-0.7061	-0.7324	-0.7431	-0.7475	-0.7493	-0.7501	-0.7505	-0.7506

Table Appendix D-17: Response to an asymmetric labour demand shock according to the stringency of EPL (regional level analysis). Specification with rates only.

Low product market regulation (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.686	-0.6493	-0.6402	-0.6371	-0.636	-0.6356	-0.6355	-0.6354
Unemp. rate	0.4521	0.1976	0.0792	0.03	0.0111	0.0041	0.0015	0.0006	0.0002
Particip. rate	-0.3559	-0.0671	-0.02	-0.0069	-0.0025	-0.0009	-0.0003	-0.0001	0
Population	-0.619	-0.4993	-0.5002	-0.5036	-0.5049	-0.5054	-0.5056	-0.5057	-0.5057

High product market regulation (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7619	-0.722	-0.7079	-0.7025	-0.7004	-0.6995	-0.6992	-0.6991
Unemp. rate	0.5464	0.2391	0.1112	0.0487	0.0207	0.0086	0.0036	0.0015	0.0006
Particip. rate	-0.3238	-0.0956	-0.0335	-0.0125	-0.0049	-0.0019	-0.0008	-0.0003	-0.0001
Population	-0.6953	-0.6246	-0.6381	-0.644	-0.6463	-0.6473	-0.6477	-0.6478	-0.6479

Table Appendix D-18: Response to an asymmetric labour demand shock according to the stringency of product market regulation (regional level analysis). Specification with rates only.

Low housing market regulation (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.789	-0.7621	-0.7521	-0.748	-0.7462	-0.7455	-0.7453	-0.7452
Unemp. rate	-0.1224	-0.0405	-0.0346	-0.0231	-0.0134	-0.0071	-0.0036	-0.0017	-0.0008
Particip. rate	-0.2368	-0.0906	-0.0377	-0.0153	-0.006	-0.0023	-0.0008	-0.0003	-0.0001
Population	-0.8749	-0.7921	-0.8156	-0.8265	-0.8306	-0.832	-0.8325	-0.8326	-0.8326

High housing market regulation (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7669	-0.6824	-0.6517	-0.6399	-0.6352	-0.6334	-0.6326	-0.6323
Unemp. rate	1.1348	0.4795	0.2147	0.0914	0.0381	0.0157	0.0064	0.0026	0.0011
Particip. rate	-0.4115	-0.1494	-0.0516	-0.0191	-0.0074	-0.003	-0.0012	-0.0005	-0.0002
Population	-0.562	-0.5351	-0.5383	-0.5398	-0.5405	-0.5408	-0.5409	-0.541	-0.541

Table Appendix D-19: Response to an asymmetric labour demand shock according to the stringency of housing market regulation (regional level analysis). Specification with rates only.

Low EPL (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7137	-0.6623	-0.6495	-0.6449	-0.6428	-0.6418	-0.6414	-0.6411
Unemp. rate	0.2866	0.1669	0.0921	0.0479	0.0244	0.0123	0.0062	0.0031	0.0016
Particip. rate	-0.2127	-0.0712	-0.03	-0.014	-0.0068	-0.0034	-0.0017	-0.0008	-0.0004
Population	-0.6929	-0.5478	-0.5386	-0.5432	-0.5467	-0.5487	-0.5497	-0.5502	-0.5504

High EPL (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7612	-0.7056	-0.6901	-0.6853	-0.6838	-0.6833	-0.6831	-0.6831
Unemp. rate	0.6337	0.2588	0.0985	0.0348	0.0119	0.004	0.0013	0.0004	0.0002
Particip. rate	-0.3968	-0.1038	-0.0285	-0.0086	-0.0027	-0.0009	-0.0003	-0.0001	0
Population	-0.6607	-0.6127	-0.6196	-0.6224	-0.6234	-0.6237	-0.6238	-0.6239	-0.6239

Table Appendix D20: Regional level analysis, baseline model augmented with regional population and interacted with both EPL and the degree of product market regulation. Specification with rates only.

Low product market regulation (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.6895	-0.6432	-0.6315	-0.6278	-0.6266	-0.6261	-0.626	-0.6259
Unemp. rate	0.4214	0.1933	0.0756	0.0275	0.0098	0.0035	0.0012	0.0004	0.0002
Particip. rate	-0.3445	-0.0736	-0.0216	-0.0071	-0.0024	-0.0009	-0.0003	-0.0001	0
Population	-0.6201	-0.5027	-0.5003	-0.5026	-0.5036	-0.504	-0.5041	-0.5041	-0.5042

High product market regulation (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7389	-0.7032	-0.6911	-0.6858	-0.6834	-0.6823	-0.6818	-0.6816
Unemp. rate	0.4591	0.2199	0.1116	0.0547	0.0262	0.0124	0.0058	0.0027	0.0013
Particip. rate	-0.2773	-0.0902	-0.0376	-0.0166	-0.0075	-0.0034	-0.0016	-0.0007	-0.0003
Population	-0.7038	-0.6013	-0.6145	-0.6234	-0.6276	-0.6296	-0.6305	-0.6309	-0.6311

Table Appendix D-20 (continued): Regional level analysis, baseline model augmented with regional population and interacted with both EPL and the degree of product market regulation. Specification with rates only.

Low EPL (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.6958	-0.6231	-0.6026	-0.5956	-0.5928	-0.5916	-0.5911	-0.5909
Unemp. rate	0.9667	0.3597	0.1502	0.0655	0.0292	0.0131	0.0059	0.0027	0.0012
Particip. rate	-0.2856	-0.1077	-0.0454	-0.0201	-0.0091	-0.0042	-0.0019	-0.0009	-0.0004
Population	-0.4221	-0.3869	-0.3982	-0.4091	-0.4151	-0.4181	-0.4195	-0.4202	-0.4205

High EPL (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.8538	-0.8165	-0.8019	-0.7962	-0.794	-0.7931	-0.7927	-0.7925
Unemp. rate	0.3555	0.1299	0.0705	0.0354	0.017	0.0079	0.0036	0.0017	0.0007
Particip. rate	-0.335	-0.1366	-0.0527	-0.0207	-0.0083	-0.0034	-0.0014	-0.0006	-0.0003
Population	-0.8192	-0.815	-0.8452	-0.8573	-0.8622	-0.8642	-0.8651	-0.8655	-0.8656

Table Appendix D-21: Regional level analysis, baseline model augmented with regional population and interacted with both EPL and housing market regulation. Specification in rates only.

Low housing market regulation (NUTS data)

horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.7943	-0.7704	-0.7614	-0.7577	-0.7561	-0.7555	-0.7552	-0.7551
Unemp. rate	-0.1004	-0.0439	-0.036	-0.0234	-0.0132	-0.0069	-0.0034	-0.0016	-0.0008
Particip. rate	-0.2358	-0.0873	-0.0356	-0.0141	-0.0054	-0.002	-0.0007	-0.0002	-0.0001
Population	-0.8727	-0.7853	-0.8101	-0.821	-0.825	-0.8263	-0.8267	-0.8268	-0.8268

High housing market regulation (NUTS data)

Horizon	1 year	3 years	5 years	7 years	9 years	11 years	13 years	15 years	17 years
Employment	-1	-0.6541	-0.5805	-0.5565	-0.5467	-0.5423	-0.5403	-0.5395	-0.5391
Unemp. rate	1.4888	0.5247	0.2223	0.0991	0.0447	0.0203	0.0092	0.0042	0.0019
Particip. rate	-0.3832	-0.1315	-0.055	-0.0244	-0.011	-0.005	-0.0023	-0.001	-0.0005
Population	-0.3323	-0.3218	-0.3412	-0.3529	-0.3586	-0.3612	-0.3624	-0.3629	-0.3631

Table Appendix D-21: Regional level analysis, baseline model augmented with regional population and interacted with both EPL and housing market regulation. Specification in rates only.