

Factor Mobility and Regional Disparities: East, West, Home's Best?*

PRELIMINARY

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by

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1. Introduction

The desire to establish the four freedoms belonging to the formation of a common market—free movement of goods, services, persons and capital – was already written down in the Rome Treaty. The integration project formed relatively successfully a single goods and capital market. Currently, the EC undertakes serious efforts to tackle the problems preventing an effective single services market. The free movement of persons is *de facto* the black sheep in the integration process as (cross-border) migration is still very low.

The 15 members of the European Union together constitute of a large set of diverse regions. The regions differ in labour market outcomes such as unemployment rates and wages but also in industry structure (Midelfart-Knarvik *et al.*, 2000). This makes Europe relatively vulnerable to asymmetric shocks (Bayoumi and Eichengreen (1993)). Something which might be amplified by a better functioning of the single market (Krugman, 1993).¹ Therefore, labour mobility has potentially a useful role to play.

Labour mobility can indeed play a role in the adjustment to shocks. In a single currency area the adjustment to asymmetric shocks can take place via price or quantity adjustment or via fiscal transfers. In particular, real wages ought to be flexible, fiscal redistribution of sufficient size or capital, labour and income flows should be sufficiently responsive to disturbances.² In the European Union, fiscal redistribution is relatively unimportant compared to the US, while wage flexibility is known to be notoriously low. However, it is not clear that the role for labour mobility is or can be important in absorbing short term shocks. Hence, one should focus on long term or permanent shocks.

Labour mobility can also play a role in resolving regional disparities. Unemployment rates as well as incomes per capita differ vastly across regions. Midelfart-Knarvik *et al.* (2000) show that the industry structure is also very diverse across the EU and is becoming even more so. Barro and Sala-i - Martin (1995) show that per capita incomes

¹This is disputed, however, by Fatas (1997) or Frankel and Rose (1997).

²It is not a priori clear that the disappearance of the exchange rate instrument is an unambiguous loss. A lot of countries abstain from using the exchange rate as an instrument for shock adjustment for already a long time.

do tend to converge but that complete convergence is still out of sight. Taking these pieces together, the point that there is a *potential* role for labour mobility in resolving regional disparities is easily made. Indeed, it is low mobility in the presence of large region disparities what is worrying. Hence what is crucial is the responsiveness of labour to regional disparities. Thus, explaining the responsiveness is important. This is what this paper is about.

Closely related to our approach are Decressin and Fatás (1995) and Puhani (1999). Decressin and Fatás (1995) use the methodology of the seminal study of Blanchard and Katz (1992) to show that the responsiveness of European regional labour mobility is slow and low relative to the US. They find that in the short run almost nothing of an idiosyncratic shock is absorbed by migration. The major adjustment mechanism is the change in labour participation rates. Changes in unemployment rates account only for a small portion of the change in regional employment. Puhani (1999), using a different methodology, explains net migration rates by regional disparities (instead of region-specific shocks). He finds that only unemployment rates significantly explain migration. This methodology is closely related to ours.

This paper focuses on the questions *why* labour mobility is low in the EU and how it is (apparently) possible that it remains low. We explore the issue of labour participation, thrown up by Decressin and Fatás (1995) as the most important alternative adjustment mechanism. In particular, our analysis contains five contributions to the literature. First, using a different framework, we address the question on labour participation as an alternative adjustment mechanism in the EU. Second, we examine whether labour participation of the young is important or labour participation is important in general.³ Third, we use a more finely disaggregated data-set as Decressin and Fatás and Puhani and include more regions. Fourth, we treat the EU regions as single panel whereas Decressin and Fatás and Puhani treat different countries separately. Finally, we introduce several new variables in the migration model. That is, we distinguish between long-term unemployment and unemployment in general; and we examine whether part time work is

³In the empirical specification we use female labour participation as this shows more variation. Men more often work full-time.

an adjustment mechanism that is comparable to labour force participation.

The paper is organized in six sections. Section 2 presents a theory of net migration. Section 3 contains data description and discusses their limitations. Section 4 shows the econometric estimation based on balanced and unbalanced panel structures of the data. Furthermore it draws some inferences from the static econometric model applied to as many as 191 regions of EU. Section 5 formulates a partial adjustment model and applies it to the net migration rate. A dynamic model is estimated using OLS and generalized Least Squares. The estimated adjustment coefficients permit us to study both short run and long-run responses of net migration rates to unemployment, income and other labour market variables.

2. A theory of net migration

The role that labour mobility plays in resolving aggregate regional disparities is captured by net migration flows⁴. The section sets up a model that is sufficiently flexible to discuss a number of different labour market variables. We derive net migration flows by constructing the gross flows based on individual (or household) migration decisions. The net migration rate is the difference between a region's immigration and emigration (expressed as the proportion of the region's population).

2.1 The model

To derive the flows of migrants we consider first the decision to emigrate. An individual calculates the expected value of supplying labour on the home market (V_{ii}) and compares that to the expected value of participating in the alternative labour markets (V_{ij}). Thereby, the individual (q) takes into account the cost of leaving the region of residence. This cost of leaving is a function of several observable and unobservable characteristics. The unobservables include the preference for the region of residence or the number of children.

⁴ Gross flows of workers that are not identical with respect to skill, might be resolving disequilibria on specific labour markets. We ignore this aspect here due to a lack of suitable data.

We assume that these are randomly distributed among all potential migrants within each region. Among the observables we focus on economic state variables. Having a partner that is currently employed might raise the cost of emigration. Female labour participation rates can serve as a proxy for this. Denote these costs of leaving for individual q as $C_{i,q}$. Thus an individual migrates if:

$$V_{ii} \leq V_{ij} - C_{i,q} \quad (1)$$

The average of $C_{i,q}$ over individuals in a region, is denoted C_i and should be read as a function of labour market variables. C_i is the willingness of the average individual to leave region i . The expected value of supplying labour on the (home or any other) labour market depends on the wage and the probability of being matched successfully. Thus, we propose:

$$V_{ij} = M(U_j, S_j) W_j \quad M_1, M_2 < 0 \quad (2)$$

where M is function that indicates the chance of having or obtaining a job in market j . The subscripts to M denote partial derivatives.⁵ U_j is the unemployment rate in labour market j and S_j is a vector of other shock-absorbing factors on the labour market. Examples of the latter are: the share of part-time work, wage flexibility and the participation rate. It is here that the most important adjustment mechanism that Decressin and Fatás find, should come into play; changing participation rates that effectively act as shock absorbers make a region less attractive for a potential migrant. An individual thus emigrates from region i if:

$$M(U_i, S_i) W_i + C_i < \underset{j \in N}{MAX} [M(U_j, S_j) W_j] \quad (3)$$

where N is the set of regions. This learns that a region is more likely to face emigration if the cost of leaving is low and if the wage is low. Unemployment encourages emigration at two levels: the unemployed are more likely to go as their cost of leaving (C) is lower and higher unemployment lowers the probability of obtaining a job in the home region.

Analogously, an individual from region j chooses to be in region i if:

⁵ Note that – by omitting a subscript i to the wage – we do consider discrimination of migrants on the labour market. Ortega (2000) shows that discrimination is a likely outcome in theory.

$$M(U_i, S_i) W_i > \underset{h \in N}{MAX} [M(U_h, S_h) W_h] + C_j \quad (4)$$

Immigration is thus increasing in the probability of obtaining a job (low unemployment and ineffective alternative labour market adjustment mechanisms)⁶ and increasing in the wage. In deciding which region to go, C_j , the labour market status of the potential immigrant, does not play a role as it is identical for all intended regions.

Using equation (4) and (5) it follows that net migration (NM_i) is explained by:

$$NM_i = M(U_i, S_i) W_i + C_i \quad (5)$$

For some labour market variables the push (unemployed are more likely to leave) and pull (high level of unemployment discourages immigration) factors both work in the same direction. For other variables it is not a priori clear. Take, for example, labour participation of females. On the one hand it increases the cost of leaving a region (C_i increases). On the other hand female labour participation in the labour market act as an alternative adjustment mechanism and smoothens the adjustment to regional disparities. Here empirical testing is to shed light on the dominating effect.⁷

2.2 Other theoretical considerations

The discussion above deals with individuals though the relevant decision unit is the household. We capture this in the model by taking the cost of leaving into consideration, which approximates for having a partner that has a job etc. Of course, whether or not a family has school-going children does matter for the household decision. We assume that

⁶ We believe that the alternative adjustment mechanisms are especially important for immigration, as immigrants from other EU countries are allowed to search abroad for three months only.

⁷ We expect that younger people are, on average, much more flexible than older individuals. In the empirical analysis we use the age group 25-35. For this group the cost of leaving is low as they commonly do not have school-going children (for the highly educated Mauro and Spilimbergo, 1999, find that the higher educated are more mobile). This effect of age does not necessarily dominate the negative matching effect because changes in young age female participation in the labour market act as an alternative adjustment mechanism that smoothens unfavourable regional conditions.

these factors are randomly distributed and hence do not bias our estimates. Bauer (1995) suggests that migration may become a self-perpetuating process, because the costs and risks of migration are lowered by social and information networks. The network approach indicates that the cost of moving may be substantially reduced for the relatives and friends of migrants and this could increase the probability of migration. The network effect of migration hence implies that migration induces more migration. We will touch upon this issue by considering a dynamic specification of our econometric model.

Countrywide unemployment levels likely tend discourage migration (see, Gordon, 1995). That aggregate unemployment affects gross flows negatively does, however, not deliver a clear prediction for net flows, hence we do not pursue this line here (Pissarides and McMaster, 1990, elaborate on this).

3. Data: description and limitations

We use regional data from Eurostat (2000). From the available regions we selected the regions which provided the necessary data to construct net migration rates. This provides us with an unbalanced panel of 191 regions with time series up to 13 years (1983-1995). This panel is unbalanced. That is, we do not have complete time-series for all 191 regions. Said differently, 191 regions is the maximum number of observations for a single year.

From the unbalanced panel we constructed a balanced panel with the time-series dimension unaltered and the number of regions reduced to 82 (for details on the regions included in both panels see Appendix A).

The fact that we use population migration where labour migration is relevant for the labour market impact, requires some discussion. First, the data do not allow us to distinguish between labour migration and population migration. Second, there is evidence that qualitatively comparable results are obtained using either labour or population-migration data (see Parikh and Van Leuvesteijn, 2000). Finally, systematic biases (think of a region with a large university) will end up in fixed effects. The unsystematic bias is white noise.

Table 1 Summary Statistics (Balanced Panel)^a

	Mean	Std Dev	Minimum	Maximum
<i>GDP</i> ^b	14311.30	4533.86	5053.10	33734.69
<i>U</i>	8.40	3.88	1.50	25.40
<i>ACTfy</i>	67.56	10.03	32.20	88.70
<i>ACTf</i>	40.77	6.71	22.00	62.40
<i>POP</i> ^c	2260.29	1798.60	222.80	11004.29
<i>NM</i> ^d	3	6.5	- 44	27

^a The summary statistics are taken from the untransformed variables.

^b GDP per inhabitant at PPPs.

^c In thousands.

^d Multiplied by thousand.

The explanatory variables for which the information is available are summarised in Table 1 (Appendix A provides detailed definition for the different variables). As a proxy for the wage rate, we use GDP per inhabitant at purchasing power parity (GDP). The spread in GDP per inhabitant is large; Thessalia in Greece in 1983 has the lowest income in the panel; Schleswig-Holstein in Germany 1995 has the highest. We use two figures for unemployment: those recorded as unemployed, *U*, and those who are in unemployment for more than twelve month, long-term unemployment (*Ult*). In the balanced panel, however, we restrict ourselves to 'general' unemployment. It is Campania in Italy where a quarter of the labour force is unemployed. Other explanatory variables are: the activity rate of females (*ACTf*) and the activity rate of young females (*ACTfy*). The population data are provided to illustrate the size of the regions. The mean size of a region is 2.2 million people. The mean rate of migration is 3, hence the regions in the sample are, as an unweighted average, immigration regions. Hence a region with 2,200,000 inhabitants received net 6,600 migrants a year.⁸ The mean rate of migration, 0.0003, might be low, it is not the same as saying that migration is unimportant, as will be discussed later.

Figure 1 depicts the average of the absolute value of the net migration rate in the

⁸That is: 2,200,000 *3/1000.

sample.

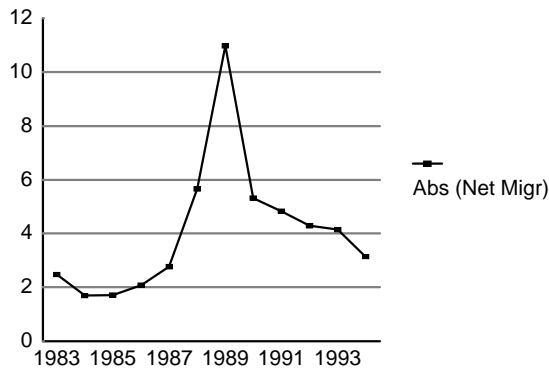


Figure 1 Net Migration over time

The spike around 1989, 1990 is to a considerable extent caused by the German unification. What deserves attention is that the migration rate is -- despite further steps in the European integration process -- back to its low rate of the early eighties. Two issues are important to judge the time-series behaviour of the net migration rate, first what is the magnitude of migration compared to population change and second how big is the incentive to migrate.

First, that the migration rate is low is something different than saying that migration is unimportant. Figure 2 makes this point. It shows the share that migration contributes to population change. Figure 2 depicts the median observation.⁹ This median share is roughly 50% to 80% and has not returned to the share in the early eighties.

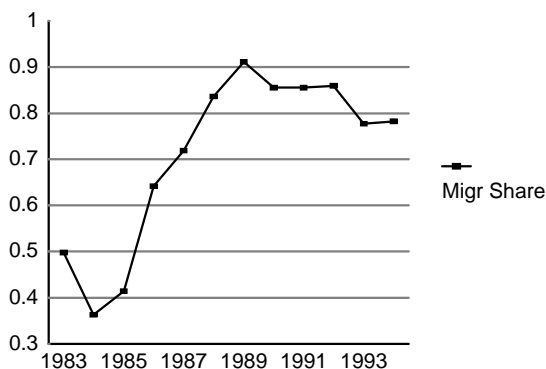


Figure 2 Contribution of migration to population change

⁹We show the median of Migration/ Δ population instead of the mean, as the mean is not informative as the denominator tends to zero for several observations.

Second, the return to the relatively low rates of migration in the eighties is not worrying as such, what matters is whether the rate of migration is low despite seemingly high incentives to migrate. Figure 3 present some indicators of the incentives to migrate. The lower line in the figure depicts the variance of the log of per capita GDP. The constancy (or, slight increase) indicates that the regions in our sample have not converged considerable in the period under consideration (see, for a similar finding, Barro and Sala-i-Martin, 1995).

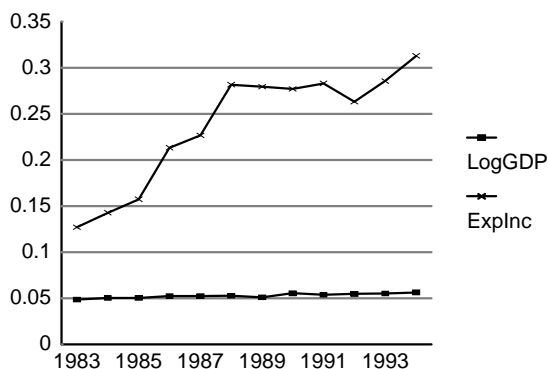


Figure 3 Variance of expected income and income

In Section 2 we argued that the relevant decision variable for migration is the chance of obtaining a job multiplied by the wage, that $(1-U)W$. The upper line shows whether $(1-U)*\log\text{GDP}$ showed convergence; the opposite is true.¹⁰ Hence, the low rate of migration remains puzzling. Putting some pieces of the puzzle together is the issue to which we turn now.

4. Econometric estimation and results

The estimating equation -- related to equation (5) -- is specified as follows

$$NM_i = b_0 + b_1 \ln W_i + b_2 \ln U_i + \epsilon_i \quad (6)$$

The interpretation of the estimated coefficients is as follows: a one percent increase in the

¹⁰The latter finding is robust to the method of computing the variation in expected income; the coefficient of variation produces also an upward trend as does this statistic with the level of income (without taking logs).

wage rate increases the net migration rate b_1 percentage points. For the unemployment rate it is slightly more complicated: a one percentage-point increase in the unemployment rate increases the net migration rate with b_2/U percentage points (where U is the relevant average unemployment rate).

The estimation procedure we follow is related to the type of data we have. Panel data are a special type of pooled cross-section/time-series data in which the same individual units are sampled over time. In our analysis both cross-sectional variation and intertemporal variation can provide useful information. Hence, it may be useful to classify variables into one of three types: region time-invariant, time region-invariant and region-time varying variables. The region time-invariant variables are constant over time but specific for the cross-sectional units: think of a pleasant climate in a certain region. The time region-invariant variables are the same for the cross-sectional units at a given point of time but they vary through time. Examples of these would be year-effects including the changes in attitudes towards migration from one year to another. The region-time varying variables are variables that vary across cross-sectional units at a point in time and also exhibit variations through time. Most of the variables are region-time-varying variables in our study.¹¹

Given this type of data we use on both the unbalanced and balanced panel four different estimation techniques. The first is the *total*, which is plain OLS on the full panel. The second is the *within* estimation that takes into account the regional fixed effects. The focus is then on the time-series dimension in the data. The third, *between* estimation, explores the cross-sectional dimension by using only the regional means over time. In most cases we will restrict ourselves to the within estimations only. In all cases we restrict the estimated coefficients to be identical across regions.

The fourth approach in the random effects *estimation*. This can in general be specified as follows:

¹¹The advantage of panel data comes in a variety of ways: a. it increases the number of observations; b. it adds more variability and more information; c. it permits the data to be treated in two dimensions separately provided there are enough time periods for which data are available; and d. it makes econometric specification rich such that we can use a fixed effect and a random effects model.

$$y_{it} = X_{it}\beta + \epsilon_{it} \quad \text{where} \quad \epsilon_{it} = \alpha_i + \eta_{it} \quad (7)$$

The random effects estimator is preferred over the within (or fixed-effect) estimation if the time-invariant region specific variables, α_i , are uncorrelated with X_{it} . When the true model is the random effects model, OLS will yield consistent estimates of β but the standard errors will be underestimated. Hence, we will use the Generalized Least Squares procedure.¹² The Hausman test, tests the null hypothesis of a true Random Effects model. In the presented results in the next section, the Hausman test generally rejects the random effects model given the diversity of regions. The empirical evidence strongly favours fixed effects models in a majority of regression specifications.

4.1 Unbalanced panel estimation

Table 2 reports the results for the basic equations, where we introduce only the unemployment rate and the wage proxy. Both variables have the expected signs and are significant. The wage proxy is insignificant in *between* estimation. Thus, the time-average level of GDP does not explain time-averaged migration. Only in a time series perspective GDP explains net migration; thus an increasing GDP relative to the (common) European benchmark, increases the net migration rate.

On annual data one might suggest that GDP and unemployment of the previous period will have a significant influence on the net migration rate. Migrants might wait one period and thus react to the observed GDP and unemployment rates of last period before taking a decision to move to a more prosperous region. This is tested using the lagged unemployment rate and GDP variables. Columns (III) to (IV) show that the results are very similar to the results in column (I).

¹²When there is no uncorrelated region-specific component of variance, the random effects estimator reduces to the pooled OLS estimator. The pooled estimator weights all observations equally. The OLS estimator on the pooled data does not use the information about heteroscedasticity that can result from repeated observations. The random effects estimator is a combination of the between and within estimator with GLS weights.

Table 2 Unbalanced panel. Basic estimations. Dependent variable is net migration rate (NM).[†]

<i>Variable</i>	(I) <i>Within</i>	(II) <i>Between</i>	(III) <i>Within</i>	(IV) <i>Between</i>
<i>GDP</i>	4.22*** [6.73]	0.14 [0.11]	– –	– –
<i>UN</i>	-3.55*** [6.07]	-3.32*** [4.65]	– –	– –
<i>GDP(-1)</i>	– –	– –	3.19*** [4.55]	-0.92 [0.64]
<i>UN(-1)</i>	– –	– –	-3.14*** [5.01]	-3.76*** [4.90]
<i>R</i> ²	0.44	0.12	0.46	0.13
<i>N</i>	1966	1966	1775	1775
<i>Hauseman test</i> $\chi(2,2)$	9.85	–	6.00	–

[†] Sample period is 1983-1995, 191 regions. Absolute t-statistics are given in brackets under the estimates. *, **, and *** denote statistical significance at the 10% level, the 5% level, and the 1% level, respectively.

As a next step we introduce the following alternative push and pull factors sequentially in the model:

$$NM_i = b_0 + b_1 \ln W_i + b_2 \ln U_i + b_3 \ln Ult_i + b_4 \ln PARTf_i + \epsilon_i \quad (8)$$

To reiterate, based on the discussion in Section 2 we expect both short-term (or 'regular') as well as long-term unemployment to have a negative sign. The expected sign for the alternative adjustment mechanisms, that part-time work is, is not a priori clear. Table 3 shows the results for the random effects estimation.¹³ First, we introduce the long-term unemployment rate instead of the 'regular' unemployment rate. Long-term unemployment turns up highly significant. The significance of the GDP factor is drastically reduced. This suggests that changes in the rate of long-term unemployment provide a more powerful

¹³The choice to present the random effects model depends on the fact that the null-hypothesis of a random-effects model is not rejected. In the remainder, both when we report the random effects model as well as when we report the fixed effects model we will show the Hauseman test for the random effects model.

explanatory factor for net migration than the regular unemployment rate. To test for this we include the share of long-term unemployment in total unemployment along with the total unemployment rate, this term is however insignificant.

When we turn our attention again at column (I) in Table 3 and compare that to column (I) in the previous table we can infer something about the different reactions to a percentage point increase in the long-term unemployment rate and the 'regular' unemployment rate. The estimated coefficients differ considerably but the responsiveness of net migration to both types of unemployment turns out not to differ.¹⁴

The final column in Table 3 reports a regression including the share of females that work part-time. Part-time work is not significant and hence does not seem to act as a cost to emigration nor or a substitute for adjustment. It might be the case that both play a role and that the effects therefore cancel.

¹⁴A one percent increase in the 'regular' unemployment rate causes a change in the net migration rate of 0.00044 (that is $-4.22/1000$ divided by the sample mean of 9.49). For long-term unemployment we find 0.00041 (that is $-1.91/1000$ divided by the sample mean of 4.56).

Table 3 Unbalanced panel.Dependent variable is net migration rate (NM).[†]

<i>Variable</i>	(I) <i>Random</i>	(II) <i>Random</i>	(III) <i>Random</i>
<i>GDP</i>	1.59* [1.79]	2.16*** [2.44]	3.65*** [4.91]
<i>UN</i>		-3.48*** [6.73]	-4.29*** [8.22]
<i>UNIt</i>	-1.91*** [5.32]		
<i>UNItshare</i>		0.65 [0.90]	
<i>PARTf</i>			0.2 [0.38]
<i>R</i> ²	0.11	0.13	0.13
<i>N</i>	1435	1435	1504
<i>Hauseman test</i> $\chi(2,3,3)$	2.78	7.58	8.64

[†] Sample period is 1983-1995, 191 regions. Absolute t-statistics are given in parentheses under the estimates. *, **, and *** denote statistical significance at the 10% level, the 5% level, and the 1% level, respectively.

The next section will refine the inferences with the balanced panel.

4.2 Female labour participation in the balanced panel

Table 4 reports the *within* results for the balanced panel. These basic results are analogous to those obtained with the unbalanced panel. Again GDP and unemployment explain net migration rates in the expected way. Almost 44% of the time series variation is explained by these two variables. How sensitive is migration to unemployment and GDP? A one percent increase in GDP increases the migration rate by 0.005 percentage points. A one percentage point increase in the unemployment rate increases the migration rate by -

0.00095 percentage points (-8.02/1000 divided by the sample mean of 8.4). Hence in a region with 2.2 million inhabitants, 2100 people leave when the unemployment rate increases with one percentage point (the latter is an increase in unemployment by 22000 people).

Next, we introduce in columns (2) and (3) the alternative adjustment factors introduced by Decressin and Fatás.¹⁵

Table 4 Balanced panel. Dependent variable is net migration rate (NM).[†]

<i>Variable</i>	(I) <i>Within</i>	(II) <i>Within</i>	(III) <i>Within</i>
<i>GDP</i>	5.08*** [6.86]	7.15*** [7.89]	6.38*** [7.00]
<i>UN</i>	-8.02*** [10.08]	-8.03*** [10.17]	-8.13*** [10.22]
<i>ACTfy</i>		-11.91*** [3.90]	
<i>ACTf</i>			-8.27** [2.43]
<i>R</i> ²	0.45	0.45	0.45
<i>N</i>	1066	1066	1066
<i>Hauseman</i>			
<i>test</i>	17.98	23.24	22.04
$\chi^2(2,3,3)$			

[†] Sample period is 1983-1995, 82 regions. Absolute t-statistics are given in parentheses under the estimates. *, **, and *** denote statistical significance at the 10% level, the 5% level, and the 1% level, respectively.

The estimation shows that female labour participation serves as an alternative adjustment mechanism (see column (2)). Hence, changes in regional prosperity induce changes in labour participation of young females that discourage immigration. Overall female labour participation is also significant. Both effects are of similar magnitude and hence there is no evidence for the second effect of female labour participation we discern, discouragement

¹⁵ Recall that we are unable to use long-term unemployment and part-time participation data as that would considerably reduce the sample size.

of emigration.¹⁶ When we introduce both female labour participation variables ($ACTf$ and $ACTfy$) in the regression we find that the $ACTfy$ is significant only. With the static estimation this is the only evidence present for the discouragement of emigration-effect by female labour participation.¹⁷ Summarising: we find that (young) female labour participation acts as an alternative adjustment mechanism. In the next section we check for the robustness of these results in a dynamic-panel estimation.

5. A dynamic panel approach: allowing for ‘network effects’

Network effects can be important, as we suggested in Section 2. To account for these mechanisms we employ a dynamic panel approach in this section. The advantage of the dynamic panel approach is that it allows the net migration rate to adjust over time to the desired rate. Hence, for some time there might be a discrepancy between the desired and actual net migration rate.

To facilitate the interpretation of the results, note that fixed proportional adjustment is achieved in one period (revealed by the estimated coefficient) and the remainder is spread over time. The smaller the adjustment coefficient -- that is $1 -$ the coefficient of the lagged dependent variable -- the longer it takes to reach equilibrium or desired level of net migration.

Table 5 reports the results for the dynamic panel analysis. The inclusion of a lagged dependent variable does not affect the qualitative conclusions; unemployment affects net migration rate negatively and GDP does so positively (see column (1)). The second column presents a fixed effect estimate with the female participation rate variables. The dynamic analysis seems to leave the results unchanged.

¹⁶A one percent increase in the 'young' females participation rate causes a change in the net migration rate of 0.00018 (that is $-11.91/1000$ divided by the sample mean of 67.57). For the participation rate of all females we find 0.00020 (that is $-8.27/1000$ divided by the sample mean of 40.77).

¹⁷We do not report this estimate to save space. It is available on request.

Table 5 Dynamic panel (balanced data). Dependent variable is net migration rate (NM).[†]

<i>Variable</i>	(I) <i>Within</i>	(II) <i>Within</i>
<i>NM(-1)</i>	0.26*** [8.27]	0.26*** [8.09]
<i>GDP</i>	2.66*** [3.08]	5.14*** [4.92]
<i>UN</i>	-5.67*** [6.54]	-5.71*** [6.64]
<i>ACTf</i>		-3.25 [0.89]
<i>ACTfy</i>		-10.85** [2.55]
<i>R</i> ²	0.41	0.50
<i>N</i>	984	984
<i>Hauseman test</i> $\chi(5)$		97.9

[†] Sample period is 1984-1995, 82 regions. Absolute t-statistics are given in parentheses under the estimates. *, **, and *** denote statistical significance at the 10% level, the 5% level, and the 1% level, respectively.

The coefficient for the lagged-dependent variable is stable across specifications. Unemployment is always negative. The estimate for the short run is, in both estimations, close to -6 whereas the total long-run impact is -8.1. Hence, the adjustment coefficient on labour mobility is not extremely low.

6. Conclusions

In this study, two simple models are used to study the European population migration. Data on net migration rates based on population data are used in the absence of data on gross labour flows from place to place in EU economies. Due to increases in economic activity or declines in unemployment the regional population tends to increase due to migration. This aspect is captured both in the panel study of 82 regions as in the unbalanced panel

study of 191 regions. The important aspect of this study is the sustenance of low labour mobility for a long period of time despite regional disparities. We show that this can partly be explained through the adjustment in labour market variables that interact with unemployment rates in different regions. In this respect, female participation and participation of young females mitigates the adverse effects of low labour mobility. Hence, with a different approach we confirm the Decressin and Fatás (1995) finding. Part time employment does not play an analogous role. The other contribution of this study is to use a large panel with a partial adjustment model and to show that the adjustment coefficient on labour mobility is not extremely low once all other adjustments into labour market are explicitly considered in the regression model. We find that the adjustment coefficient is about 0.74 suggesting that net migration at a regional level adjusts to the desired level of net migration on an average within 1.3 years.

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Appendix A. Data

Regions is the panel

We use regional data at the Nuts 2 level from Eurostat (2000). Nuts 2 (nomenclature of territorial units for statistics) subdivides the territory of the European Community into 211 regions. Two regions at the Nuts 2 level are identical to countries: Luxembourg and Denmark. We use data on population changes and economic variables, like GDP, and labour market data, as unemployment and participation rates.

From the available regions we selected the regions which provided the necessary data to construct net migration rates¹⁸. This provides us with an unbalanced panel of 191 regions with time series up to 13 years (1983-1995).

From the unbalanced panel we constructed a balanced panel with the time-series dimension unaltered and the number of regions reduced to 82. The following regions are in the unbalanced panel. The balanced panel contains the regions with a (B).

Région Bruxelles-capitale/Brussels hoofdstad gewest (B), Antwerpen (B), Limburg (B) (B), Oost-Vlaanderen (B), Vlaams Brabant, West-Vlaanderen (B), Brabant Wallon, Hainaut (B), Liège (B), Luxembourg (B) (B), Namur (B), Denmark (B), Stuttgart (B), Karlsruhe (B), Freiburg (B), Tübingen (B), Oberbayern (B), Niederbayern (B), Oberpfalz (B), Oberfranken (B), Mittelfranken (B), Unterfranken (B), Schwaben (B), Berlin, Brandenburg, Bremen (B), Hamburg (B), Darmstadt (B), Gießen (B), Kassel (B), Mecklenburg-Vorpommern, Braunschweig (B), Hannover (B), Lüneburg (B), Weser-Ems (B), Düsseldorf (B), Köln (B), Münster (B), Detmold (B), Arnsberg (B), Koblenz (B), Trier (B), Rheinhessen-Pfalz (B), Saarland (B), Schleswig-Holstein (B), Thüringen, Anatoliki Makedonia, Thraki, Kentriki Makedonia, Dytiki Makedonia, Thessalia (B), Ipeiros, Ionia Nisia, Dytiki Ellada, Sterea Ellada, Peloponnisos, Attiki, Voreio Aigaio, Notio Aigaio, Kriti (B), Galicia, Principado de Asturias, Cantabria, Pais Vasco, Comunidad Foral de Navarra, La Rioja, Aragón, Comunidad de Madrid, Castilla y León, Castilla-la Mancha, Extremadura, Cataluña, Comunidad Valenciana, Baleares, Andalucía, Murcia, Ceuta y Melilla (ES), Canarias (ES), Île de France (B), Champagne-Ardenne (B), Picardie (B), Haute-Normandie (B), Centre (B), Basse-Normandie (B), Bourgogne (B), Nord - Pas-de-Calais (B), Lorraine (B), Alsace (B), Franche-Comté (B), Pays de la Loire (B), Bretagne (B), Poitou-Charentes (B), Aquitaine (B), Midi-Pyrénées (B), Limousin (B), Rhône-Alpes (B), Auvergne (B), Languedoc-Roussillon (B), Provence-Alpes-Côte d'Azur, Corse, Piemonte (B), Valle d'Aosta (B), Liguria, Lombardia (B), Trentino-Alto Adige (B), Veneto (B), Friuli-Venezia Giulia (B), Emilia-Romagna (B), Toscana (B), Umbria (B), Marche (B), Lazio (B), Abruzzo (B), Molise (B), Campania (B), Puglia (B), Basilicata (B), Calabria (B), Sicilia (B), Sardegna (B), Luxembourg (B), Groningen, Friesland, Drenthe, Overijssel, Gelderland, Flevoland, Utrecht, Noord-Holland, Zuid-Holland, Zeeland, Noord-Brabant, Limburg (NL), Burgenland, Niederösterreich, Wien, Kärnten, Steiermark, Oberösterreich, Salzburg, Tirol, Vorarlberg, Norte, Centro (P), Lisboa e Vale do Tejo, Alentejo, Algarve, Açores (PT), Madeira (PT), Stockholm, Östra Mellansverige, Sydsverige, Norra Mellansverige, Mellersta Norrland, Övre Norrland, Tees Valley and Durham, Northumberland, Tyne and Wear, Cumbria, Cheshire, Greater Manchester, Lancashire, Merseyside, East Riding and North Lincolnshire, North Yorkshire, South Yorkshire, West Yorkshire, Derbyshire and

¹⁸ For obvious reasons we left out the four French overseas departments a priori.

Nottinghamshire, Leicestershire, Rutland and Northants, Lincolnshire, Herefordshire, Worcestershire and Warks, Shropshire and Staffordshire, West Midlands, East Anglia, Bedfordshire, Hertfordshire, Essex, Inner London, Outer London, Berkshire, Bucks and Oxfordshire, Surrey, East and West Sussex, Hampshire and Isle of Wight, Kent, Gloucestershire, Wiltshire and North Somerset, Dorset and Somerset, Cornwall and Isles of Scilly, Devon, West Wales and The Valleys, East Wales, North Eastern Scotland, Eastern Scotland, South Western Scotland, Highlands and Islands, Northern Ireland

Definitions of the variables:

GDP Log of Gross domestic product per inhabitant at Purchasing Power Parities at NUTS level 2.

The following data are the results of the survey. The survey refers exclusively to private households. The labour force (or active population or working population) was defined as comprising persons in employment and the unemployed. All those persons who are not classified as employed or unemployed are defined as inactive. Activity rates these represent the labour force as a percentage of the population of working age (15 years or more for the post-1991 series, 14 years or more for the series between 1983 and 1991).

ACTf Log of activity rates of females (19/11/1998)

ACTfy Log of activity rates of female by aged between 25 and 35 years related to the corresponding total population (19/11/1998)

PARTf Log of the share of working females that has a part-time job

Unemployed persons are those who, during the reference period of the interview, were aged 15 years or over, without work, available for work within the next two weeks and had used an active method of seeking work at some time during the previous four weeks.

U Log of Unemployment rates at NUTS level 3 (11/10/1999)¹⁹

Ult Log of Long-term unemployment; those who are in unemployment for more than 12 consecutive months.(26/07/1999).

The following data are not used directly in the estimation but to construct net migration rates.

Pop Population at 1st January

Births Live births

Deaths Deaths

The data on migration rates are derived from population changes that are not explained by births and deaths, thus:

¹⁹Latest update by Eurostat.

$$NM_t = 1000 * \frac{POP_{t+1} - POP_t - (BIRTHS_t - DEATHS_t)}{POP_t}$$

The figures thus constructed report the difference between immigration and emigration. The immigrant either resided in a different region within the same country, a region in some other EC country or some non-EC country. The net change in population due to migration to offset region-specific shocks is relevant. The source of the migrants is (economically) not very relevant. The information of gross flows between regions would facilitate the analysis of different push and pull factors within an economy. Such information is, however, not available between regions of the EU economies.