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Adjustment Mechanisms in a Currency Area

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Abstract

Both the euro-area and the United States suffered an initially quite similar housing and financial shock in 2007/8, with several states in both regions being particularly badly affected. Yet there was never any question that the worst hit US states would need a special bail-out or leave the dollar area, whereas such concerns have worsened in the euro-area. We focus on three badly affected states, Arizona, Spain and Latvia, to examine the working of relative adjustment mechanisms within the currency region. We concentrate on four such mechanisms, relative wage adjustment, migration, net fiscal flows and bank flows. Only in Latvia was there any relative wage adjustment. Intra-EU migration has increased, but is more costly for those involved in the EU (than in the USA). Net federal financing helped Arizona and Latvia in the crisis, but not Spain. The locally focussed structure of banking amplified the crisis in Spain, whereas the role of out-of-state banks eased adjustment in Arizona and Latvia. The latter reinforces the case for an EU banking union.

A. Introduction

The current financial crisis was caused by a real estate boom and bust, with an accompanying cycle of bank credit expansion. Some states both in Europe and in the United States were particularly severely affected by this cycle. Yet there was never any question that the US states thus affected would have to have special bail-out support, or be considered at risk of leaving the dollar area, whereas such concerns became rife in the euro-currency zone.

So in this study we explore the adjustment mechanisms in three states, one in the USA and two in Europe, which were particularly badly hit by the recent cycle. Our chosen American state was Arizona. In Europe we examined two countries. The first is Spain, which is currently having problems in achieving a satisfactory adjustment. The second is Latvia, which does seem to have (partially) adjusted via internal devaluation, but at some considerable cost. Initially, when the financial shock first hit, 2007 Q2 until 2008 Q4, the extent of increasing divergence between states in the USA and in Europe, (both EU and Eurozone), was roughly similar, as measured by the standard deviation of unemployment, both with states equally weighted and weighted by population. But from 2009 onwards the SD in Europe continued to widen continuously, whereas it fell after a time in the USA, as documented in Table 1, in Appendix 2, and Chart 1. We also show in Chart 2 and 3 the best and worst two states, as well as the average.

Moreover, the initial housing market shock measured by the housing price index (HPI), and the response to that, were not all that different in the USA and in Europe, (EU and Eurozone). Again we measure this by the standard deviation of states, (equally weighted), around the average, Table A, Appendix 2. We show this graphically, for the worst and best states, in Charts 5 and 6.

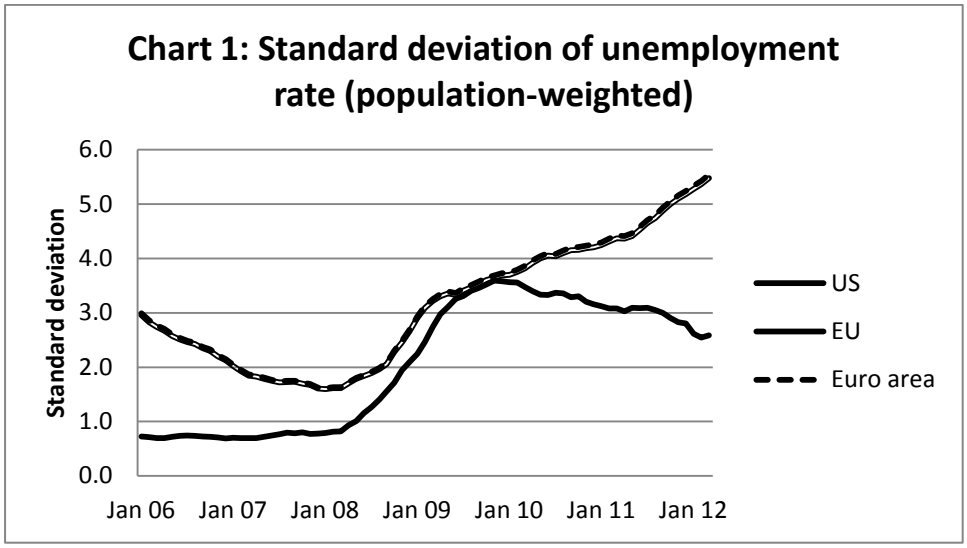


Chart 1: Standard deviation of unemployment rate (population-weighted)
Standard deviation
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan 06
Jan 07
Jan 08
Jan 09
Jan 10
Jan 11
Jan 12
US
EU
Euro area

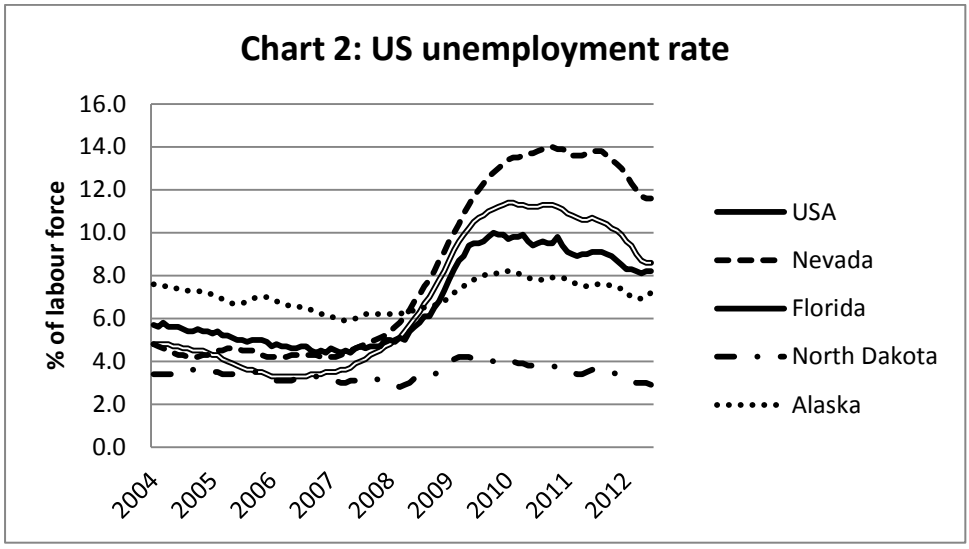


Chart 2: US unemployment rate
% of labour force
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2004
2005
2006
2007
2008
2009
2010
2011
2012
USA
Nevada
Florida
North Dakota
Alaska

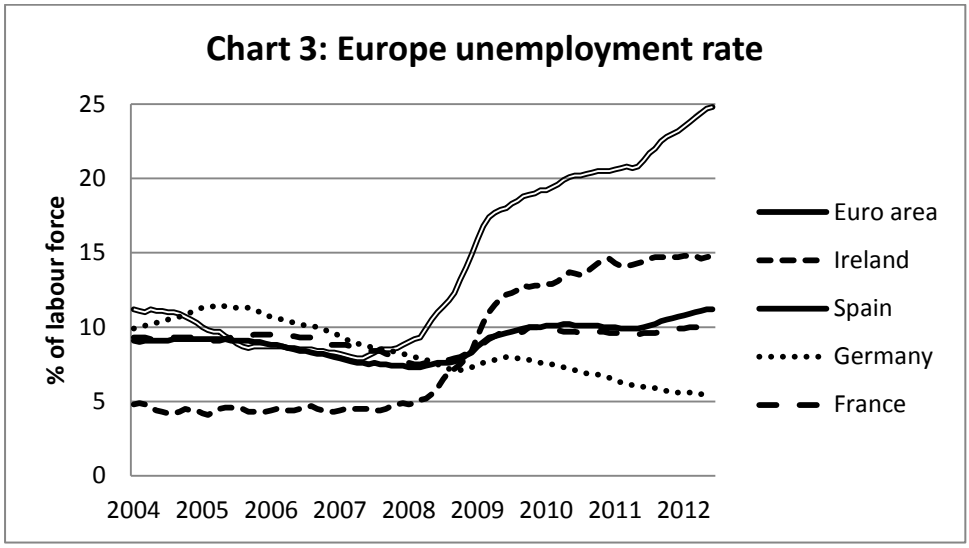


Chart 3: Europe unemployment rate
% of labour force
25
20
15
10
5
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
Euro area
Ireland
Spain
Germany
France

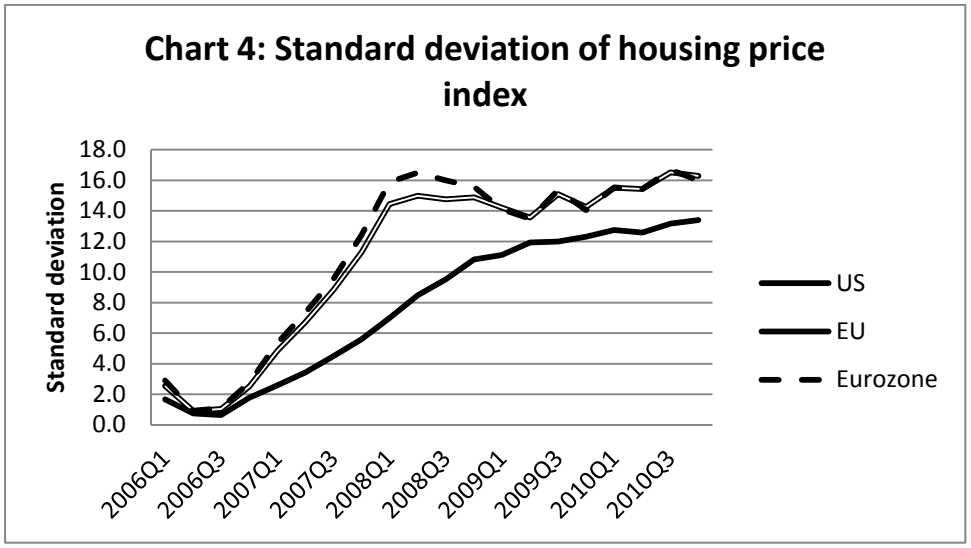


Chart 4: Standard deviation of housing price index
Standard deviation
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2006Q1
2006Q3
2007Q1
2007Q3
2008Q1
2008Q3
2009Q1
2009Q3
2010Q1
2010Q3
US
EU
Eurozone

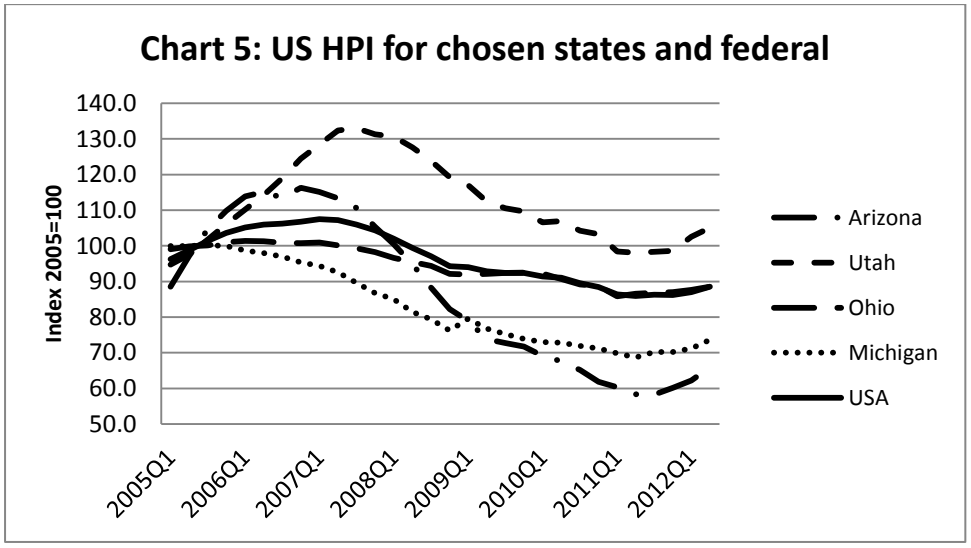


Chart 5: US HPI for chosen states and federal
Index 2005=100
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
2005Q1
2006Q1
2007Q1
2008Q1
2009Q1
2010Q1
2011Q1
2012Q1
Arizona
Utah
Ohio
Michigan
USA

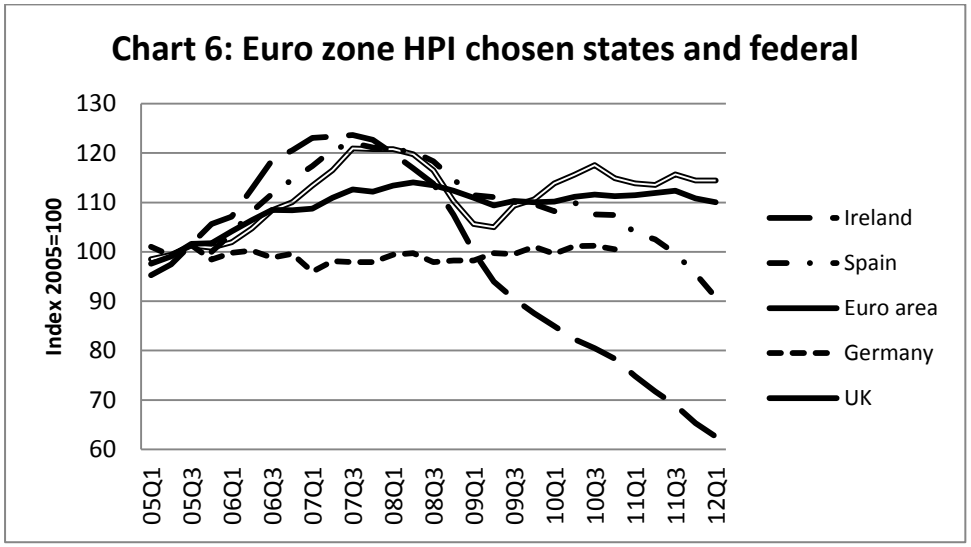


Chart 6: Euro zone HPI chosen states and federal
Index 2005=100
130
120
110
100
90
80
70
60
05Q1
05Q3
06Q1
06Q3
07Q1
07Q3
08Q1
08Q3
09Q1
09Q3
10Q1
10Q3
11Q1
11Q3
12Q1
Ireland
Spain
Euro area
Germany
UK

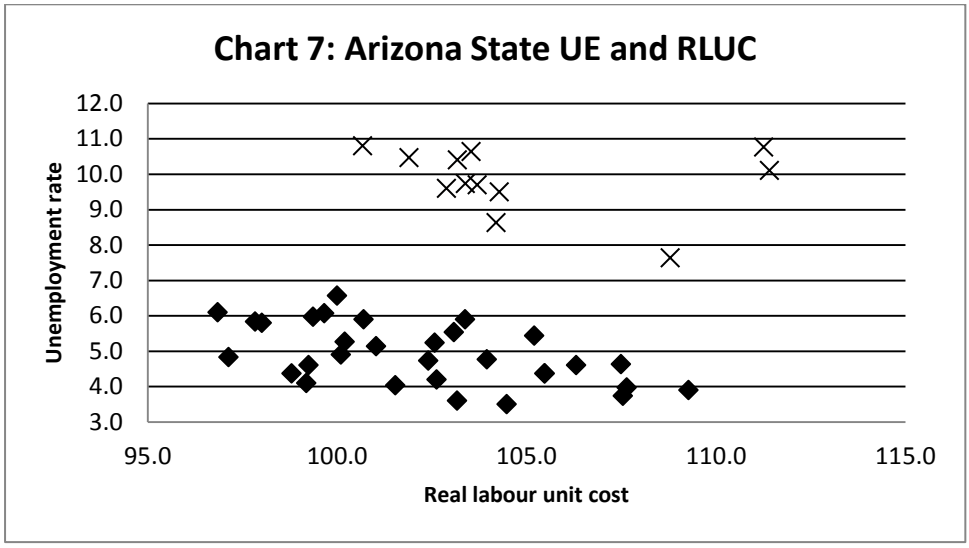
What then appears is that, after a common initial shock, the states in the USA converged, but increasingly diverged in Europe. As a result of history the USA has become much more united, more of an optimal currency area than divergent Europe. So there is far more need to improve adjustment mechanisms, in response to idiosyncratic shocks, in the EU. We turn now to a study of how such mechanisms appear to have worked in our three chosen states.

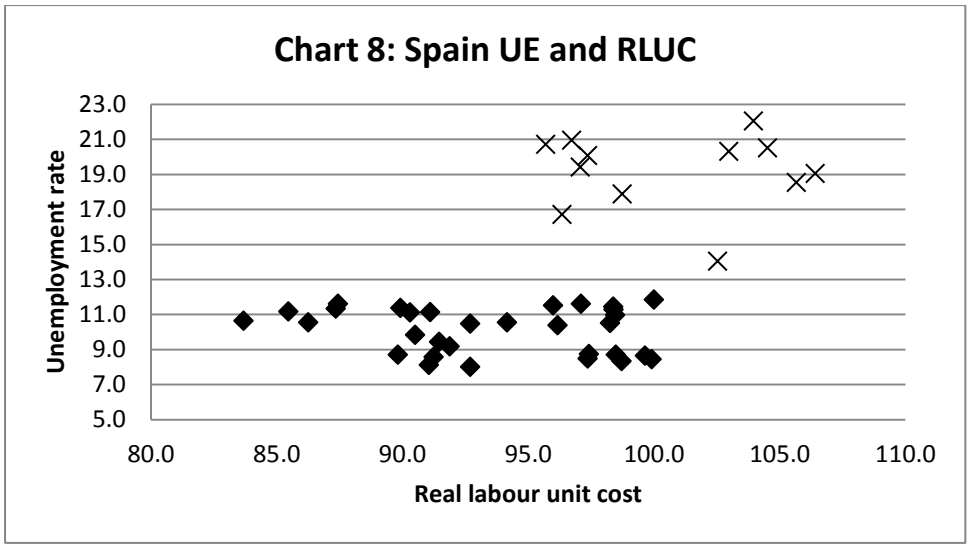
We review how four different adjustment mechanisms may have worked in each of our three states. The first two relate to labour markets. If wage rates were perfectly flexible in response to idiosyncratic shocks, then it would not be a problem for any country/region to abide in a larger single currency region. So we look first at the relationship between unemployment in each state, (relative to the average for the currency region as a whole), compared with real unit labour costs in that state, relative to the currency region as a whole (n.b. Latvia is not yet a formal member of the euro-currency area, but maintained a fixed peg to the euro throughout: Despite some suggestions, at one stage, supposedly from the IMF, that Latvia should devalue, its foremost policy was to maintain its peg to the euro).

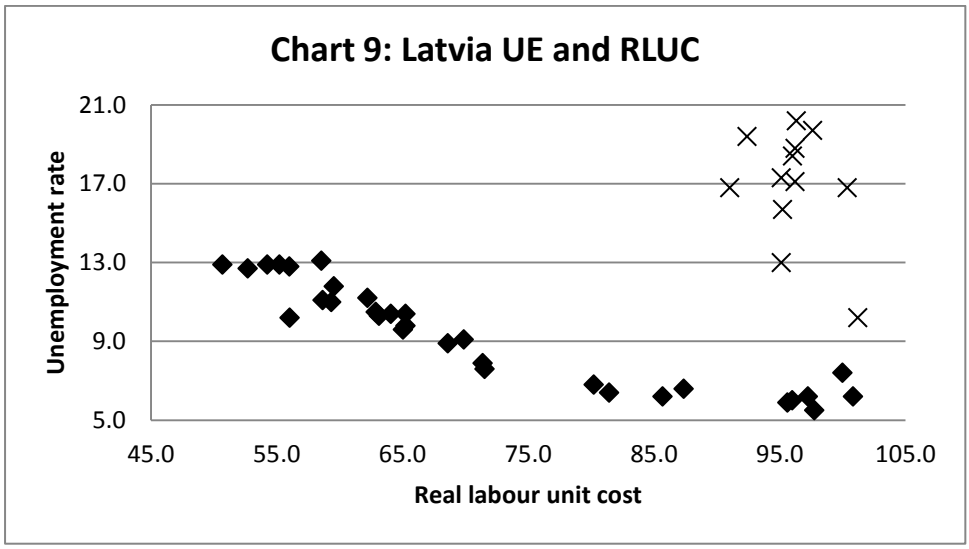
B. Labour Markets: Wage Adjustment

So we start by examining how flexible labour markets have been in our three states. In the charts below we show the relationship between the real unit labour costs (RULC) and unemployment (UE) in three different formats. (1) We use the absolute level of both RULC and UE in all three states. Then, we attempt to eliminate the trends in each state in two ways. (2) We represent both RULC and UE in terms of a ratio with the US average, for Arizona, and the Eurozone average for Spain and Latvia. However, in Latvia the RULC has had a much steeper upward trend than in the Eurozone as a whole, which results in an evident trend in the ratio itself. We removed this trend in the Latvian RULC by using a Hodrick-Prescott filter with data up to 2Q08. (3) We also plot the relationship between the percentage change in real unit labour costs and the relative unemployment for each of our three countries. Note that, in all three cases, diamonds represent periods up until 3Q08 and Xs the subsequent quarters through 3Q11, while x-axis is RULC and y-axis is UE.

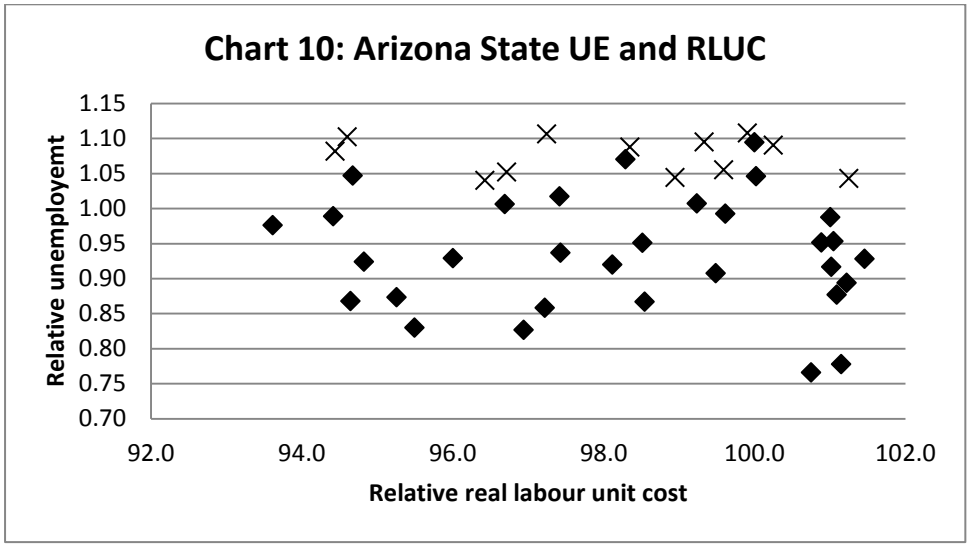
(1) RULC and UE in absolute terms

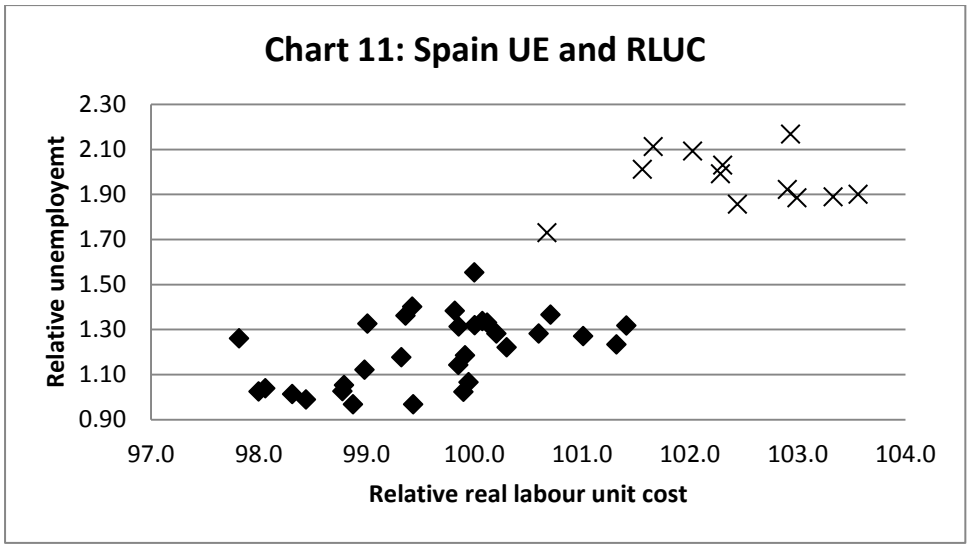


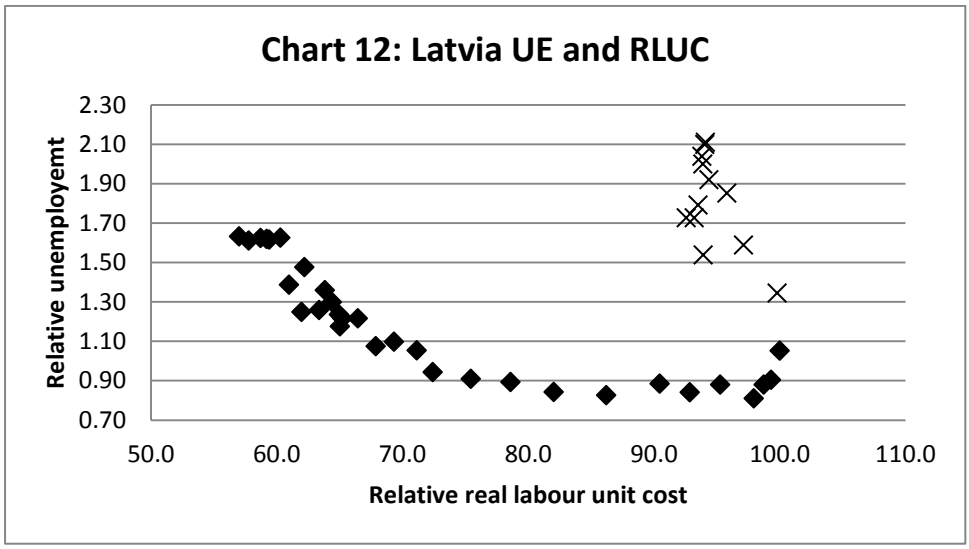


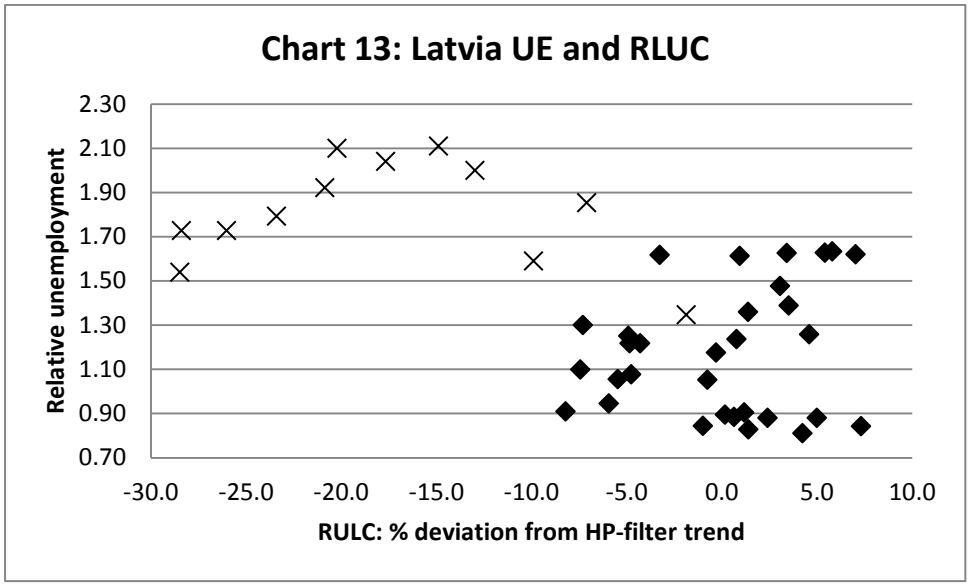


(2) RULC and UE in relative terms

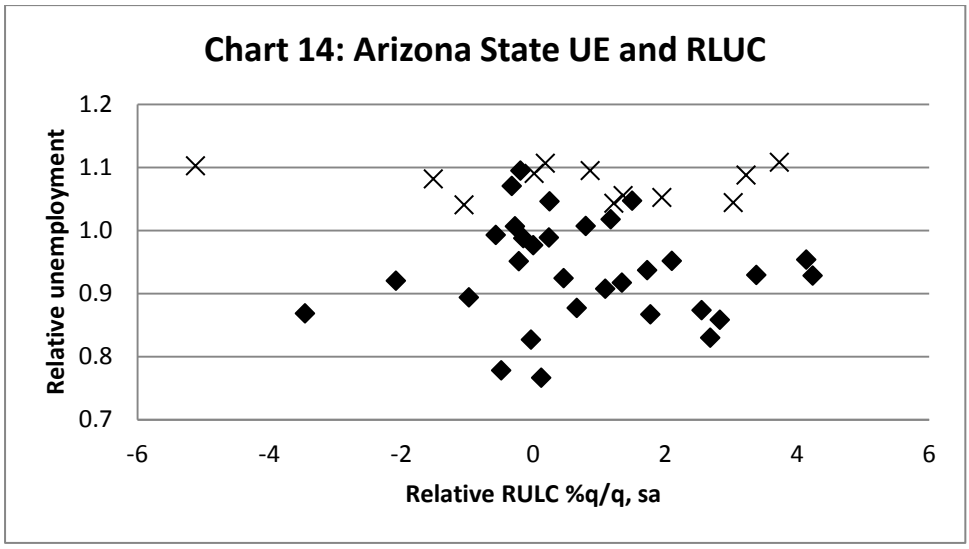


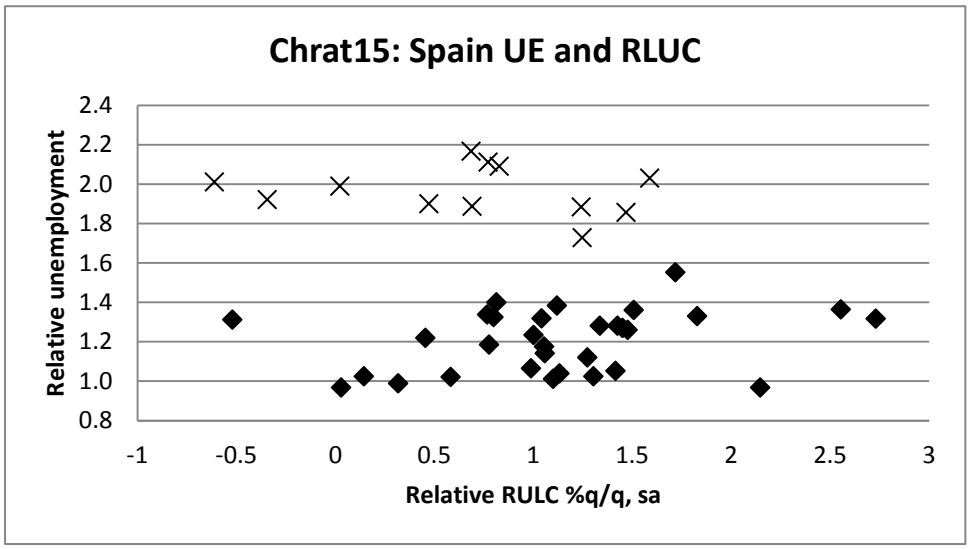


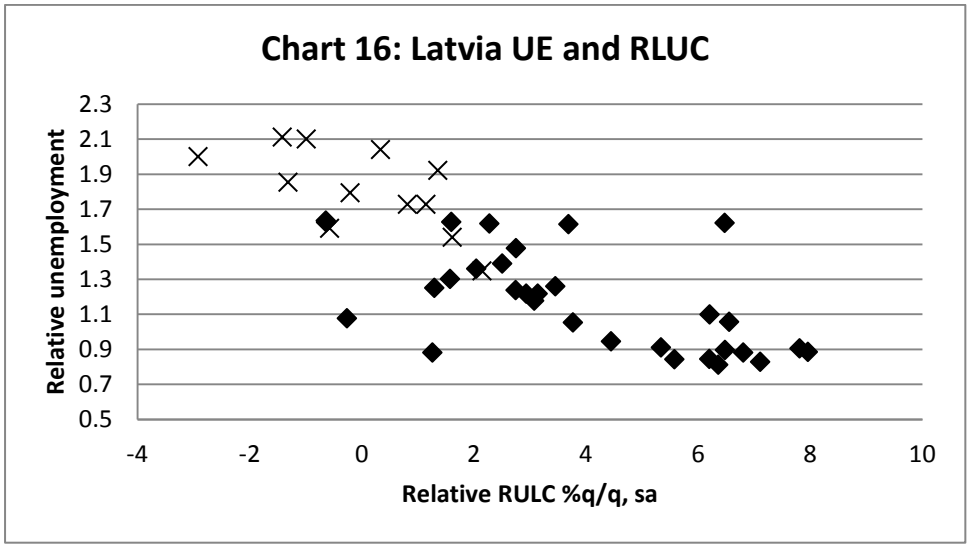




(3) RULC in %q/q, sa and UE in relative terms







When trends are eliminated, Latvia shows a notable negative correlation between RULC and UE, implying relatively flexible wages. In both Arizona and Spain, in all three examples, it is hard to observe <u>any</u> relationship between RULC and UE.

Next, we analyse the same data using regressions. We show the relationship for each country between the percentage change in RULC and the change in the relative unemployment, with the latter lagged four quarters; the lag length chosen by the highest adjusted R-squared. This also makes sense from a practical point of view as wage negotiations typically take place once a year. Finally we provide a multiple regression for each country,

$$\Delta \text{ RULC} = a + b_1 \text{ UE} + b_2 \Delta \text{ UE}$$

The results of the regression repeat the analysis from charts. The actual equation results are set out in full in Appendix 1. The only country within our sample that displays any significant wage adjustment is Latvia, while the correlations between RULC and UE are insignificant in both Arizona and Spain.

In Arizona, the individual coefficients are not significant, and the adjusted R-squared is minimal. In line with the charts, there does not seem to be much, if any, correlation between RULC and relative unemployment.

In Spain, however, the whole regression and both coefficients are significant at a 5% significance level, although the fit of the regression is poor, with an adjusted R-squared of only 0.16. Here, the role of current relative unemployment is plausible, with b1 recording -0.21, (but b2 has the wrong sign and a larger coefficient).

If we omit the change in relative unemployment and run the regression again, the explanatory power of the equation decreases significantly, with adjusted R-squared falling to 0.004, while the relative unemployment also turning insignificant with a p-value of 0.28.

As expected from the scatter plot, Latvia RULC and UE show a significant negative correlation, with b1 and b2 at -2.28 and -1.16, respectively. Unlike the other two countries, where the change in relative unemployment had an insignificant impact, current relative unemployment has a larger impact in Latvia. With the data being quarterly, this might reflect that a somewhat quicker and flexible wage adjustment process in Latvia (than elsewhere). Meanwhile, the regression has a relatively good fit, with an adjusted R-squared at 0.41.

For all three of our sample states, we estimated what might happen, according to these equations, if we assumed a 10% increase in the relative unemployment rate taking place at a steady pace in the next two years (i.e. 1¼% more per quarter). The country that is estimated to show the largest deviation from trends previous would be Latvia, with our model expecting only 1.5% annual growth in RULC relative to EU, significantly lower than 5.2% rise averaged from 2003 to 2007, i.e. an improvement of 3.7% per annum. In contrast, Arizona's relative real wages to the USA are estimated to edge down by 0.3% per year, only a marginal shift in pace from averaging no change before the crisis, while Spain would be down about 0.5% annually, compared to an average relative increase of 0.4% during the 5 years through 2007.

C. Labour Markets: Migration

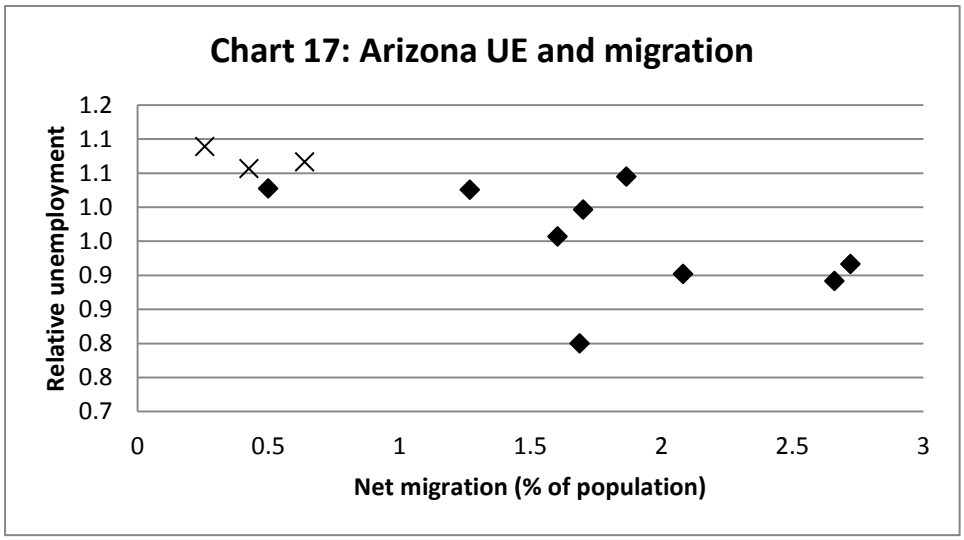
Ever since Blanchard and Katz (1992) appeared, however, it has been known that the apparent greater adjustment facility in the USA did not arise from greater wage flexibility. As we have shown above, that remains. Our US state has slightly less wage flexibility than Spain, and much less than Latvia. Instead it seemed to derive from a greater mobility of workers and their families. Thus when work dried up in, say, Massachusetts or Arizona, workers (and their families) moved to where work

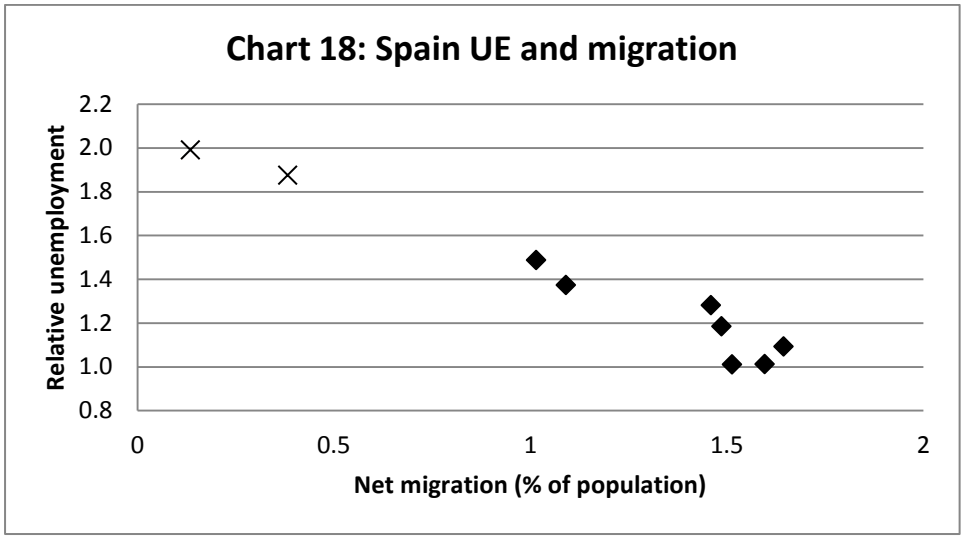
could more easily be found. This was contrasted with greater inertia in Europe, where it was argued, see Decressin and Fatás (1995), that a lesser availability of work in badly affected states/regions simply led, after a temporary period of high unemployment, to lower participation rates.

Did this comparison, of flexible migration in the USA, specifically in Arizona, and low migration in Europe, specifically in Latvia and Spain, still hold true?

First, however, one should note that the basic data in all three cases are suspect. Both Arizona and Spain had large inward migration through most recent years, see the data in the data Appendix, Appendix 2. But there will also have been some sizeable unrecorded illegal migration in both cases, in Arizona from Mexico and in Spain mostly from Africa. But so long as the ratio of recorded to unrecorded migration remains constant, the maintained assumption here, estimates of relative speeds of adjustment remain usable.

Eye-balling the raw data, the extent of change in migration in recent years in Spain and in Arizona looks roughly similar. In both cases after the crisis struck net inwards migration fell from about 1½% of population to about ½% per annum. However the regression results tell a slightly different story. Migration in Spain has been primarily due to the macro-economic factor driving such flows, more so than in Arizona; in the equation $Mig_t = a + b_1$ Relative UE_t, the adjusted R^2 is 0.96 in Spain and 0.47 in Arizona. But the coefficient on relative unemployment, at -1.4 in Spain is notably less than that in Arizona, at -6.9.





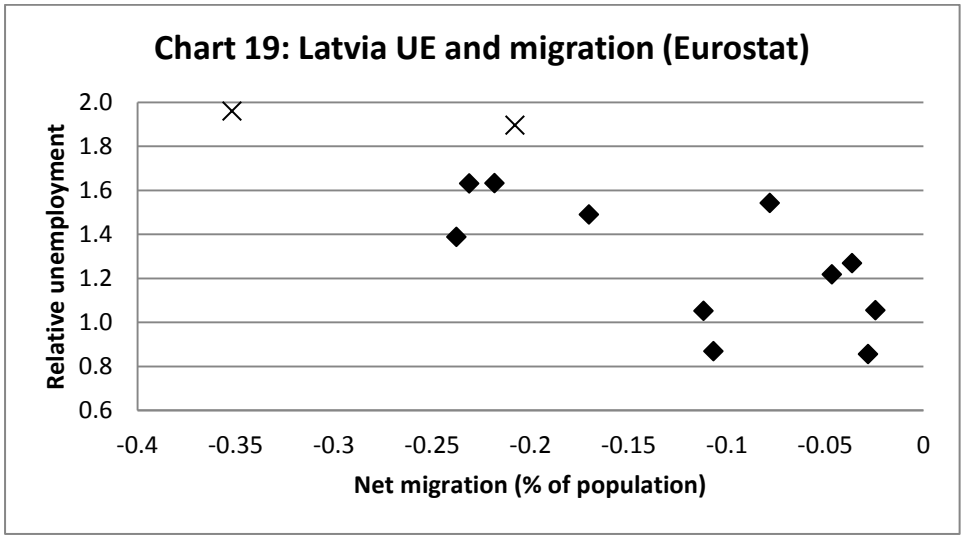
Assuming that unemployment, in Spain and Arizona, rose to a level 10% above the average (EU and USA), the implication is that their overall populations would decline, due to migration, by 1.4% and 6.9%, respectively.

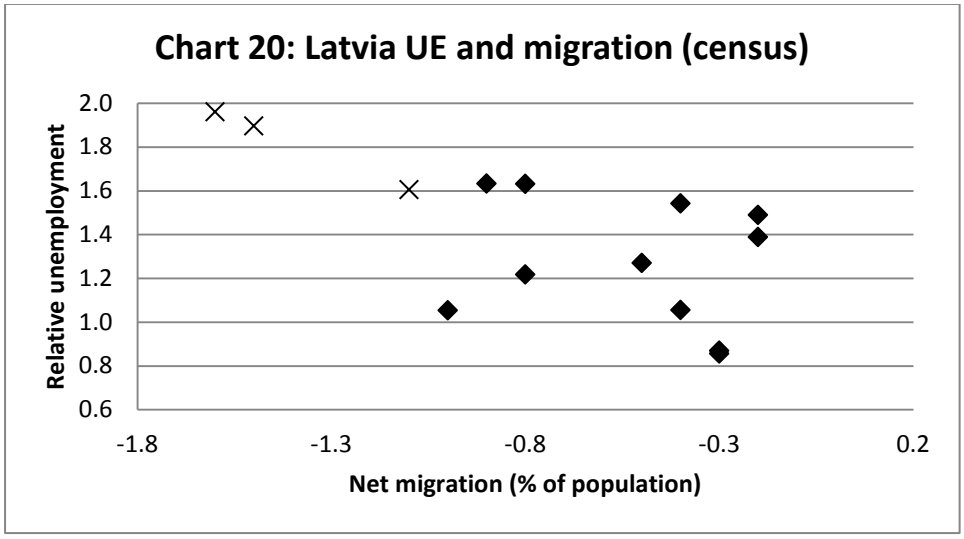
The Latvian case is more complicated. The actual recorded figures for net outward emigration from Latvia, in the Eurostat statistics, show relatively tiny figures. The problem is that the decennial census figures, which are presumably accurate, do not tie up with the recorded figures, over the intervening ten years, for births, deaths and recorded net migration, see Appendix 2.

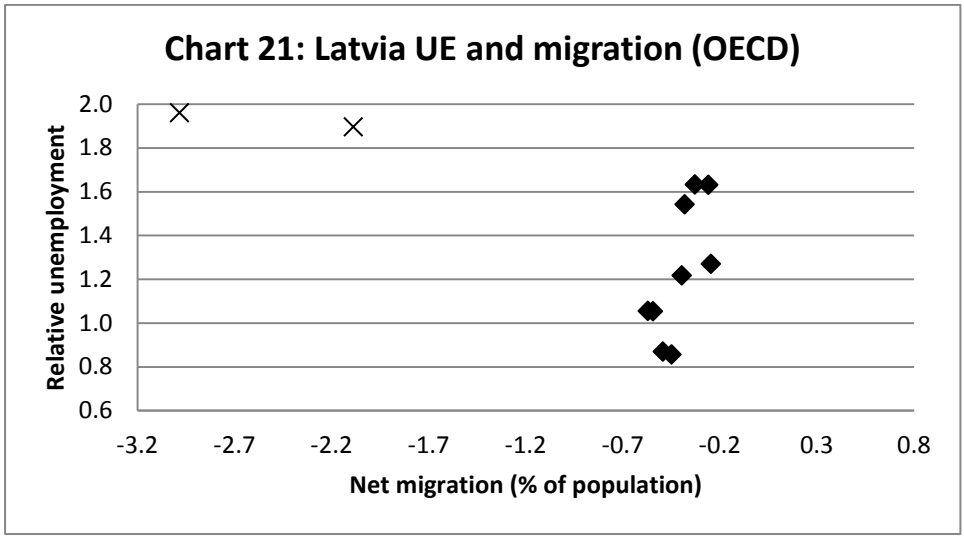
Recently, the Central Statistical Bureau of Latvia has released its own set of estimates on net migration in the ten years up to 2011. Although the numbers now are consistent with the census results, the migration patterns seems to have been smoothed out, especially when comparing the Latvian data with reported inflows from Latvia in the four OECD countries that apparently received the largest migration flows from Latvia, with early-2000 numbers now having been marked up significantly from previous estimates. However, the OECD data does not provide a full set of countries. So, we attempt to estimate the intervening ten years' worth of data using the temporal patterns from the countries reporting to the OECD and the aggregate change in net migration from the Latvian census.

Using the actual recorded (tiny) figures for net emigration from Latvia, this also appears to have been primarily driven by relative UE, the adjusted R^2 being 0.57, but the resulting coefficient, at -0.2, was much smaller than in the case of Spain and Arizona. If we gross up, to fit the census data, and assuming that unrecorded emigration has an identical annual pattern as in the OECD data to that

recorded, the coefficient, of course, jumps to -1.45. In this latter case a level of UE some 10% above the EU average would cause a drop in the Latvian population of 14.5%, i.e. ten times as in Spain and over twice as much as in Arizona.







We may assume, perhaps, that the discrepancy between the actual, and implied Census, figures for net migration out of Latvia relates to unrecorded emigration. But some, possibly large, part of that implied net emigration over these ten years may have been due mainly to socio-political factors, i.e. to the changing and lowered status of the Russian (ethnic and speaking) segment of the population, rather than to primarily macro-economic factors. So if we gross up the annual recorded net migration figures to match the implicit decennial data from the census, we may be getting an exaggerated upper bound to estimates of Latvian migration in response to relative unemployment.

In addition, if we take these considerations into account by changing the model to Migt = a + b1 UEt + b2Migt-1, to include some trend auto-correlation, partly due to other factors, then we get a much better fit for the OECD-trend interpolated data. The adjusted R-squared increase from 0.34 to 0.81, while the coefficient for relative unemployment moves down from -1.45 to -0.89.

With such a small sample of states, and with such severe data problems, especially in the Latvian case, it is difficult to come to any conclusions. Whereas the coefficient of the effect of UE in migration was larger in Arizona, than in Spain or than (in most regressions) for Latvia, relative UE explained more of such migration as occurred in the two European states. Perhaps all that can be said is that in some European states migration has become quite flexible in response to macro-economic factors, so that the prior difference in this respect between the US and the Eurozone is no longer quite so marked.

What remains puzzling is the differential attitude of commentators towards such migration in the USA and Europe. Thus in Blanchard and Katz, and in much other American commentary, such

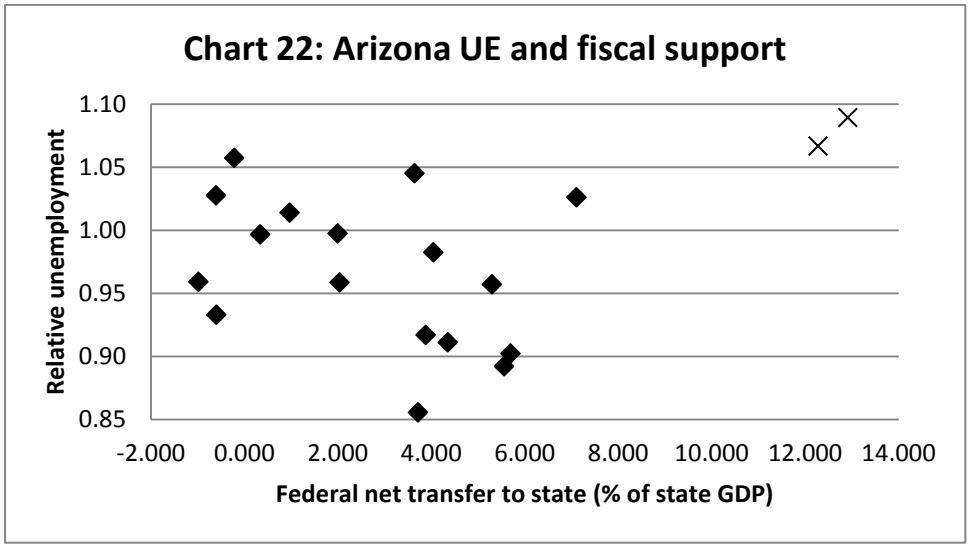
internal labour (within US) mobility is generally regarded as 'good', bringing flexibility and adjustment. Whereas in Europe such labour mobility is more often seen as a severe cost to those involved. Thus the massive, (census implied), Latvian emigration is perceived as a huge cost for a policy of internal devaluation, Leitner (2008). Of course, it is possible that migration within Europe is far more costly to those migrating than in the USA, with the latter having a common language, a common culture and a common system. Even so we know of little empirical work on the relative costs and benefits of internal migration in the USA, as compared with Europe.

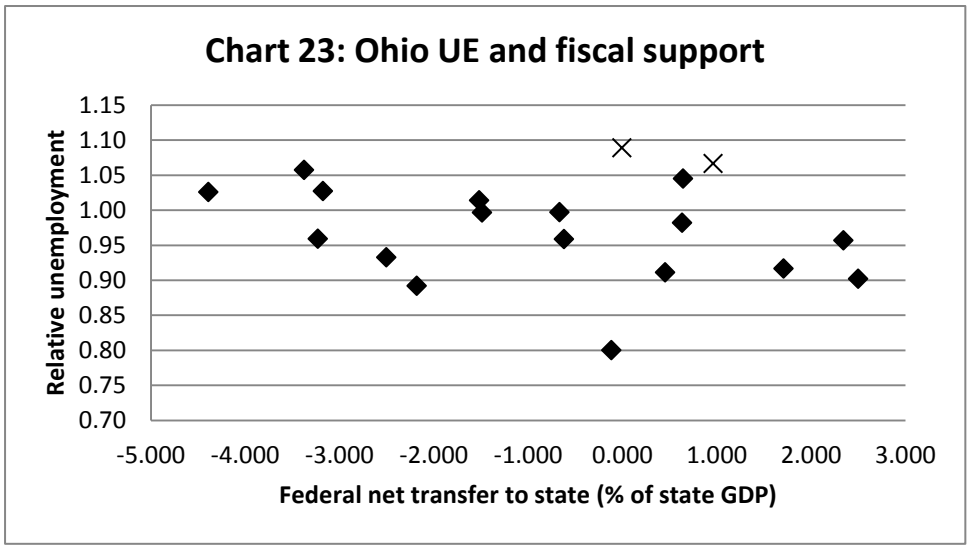
Nevertheless our provisional conclusion is that differential mobility in response to relative UE is not the over-riding factor allowing more flexible adjustment in the United States than in Europe, though this may result from our choice of the three specific states studied here. So if the differential factor is not mobility, what is it?

D. Fiscal Differences

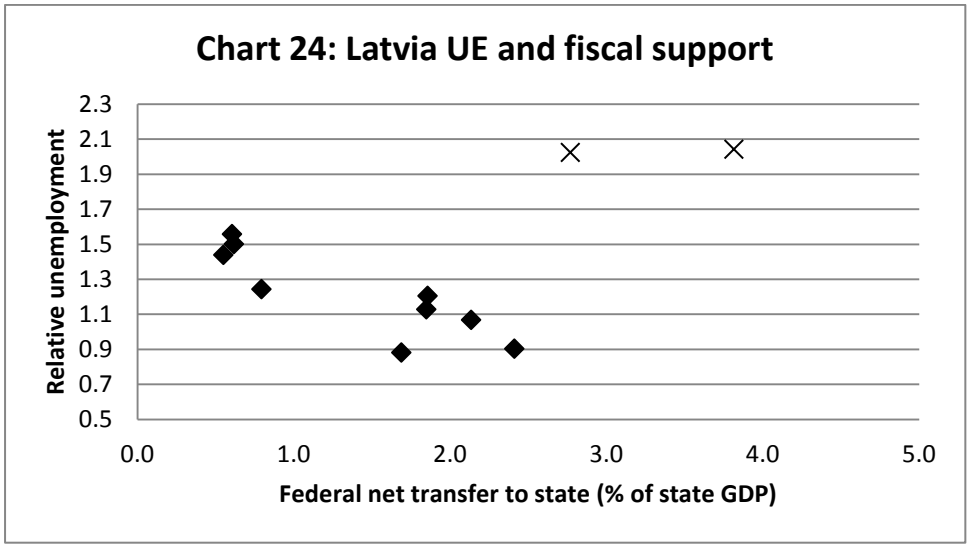
There is a developing consensus, to which one of us has contributed, e.g. Goodhart (1998), that a common monetary union needs some supporting fiscal unification to survive. One aspect of this idea is that an idiosyncratic adverse shock would be, quasi-automatically, buffered by counter-cyclical fiscal transfers, (higher unemployment benefits and lower tax payments). So we looked in each case to see how far such fiscal transfers did act as a counter-cyclical buffer.

We started with Arizona. The data on net fiscal transfers are set out in Appendix 2. We regressed such net transfers, as a percentage of state GDP, against relative unemployment in Arizona, i.e. ratio of Arizona UE to US UE. The results are shown in Chart 22 below. Between 1991 and 2008, marked by diamonds in the Chart there was no discernible relationship. Then in our final two years, 2009 and 2010, there was a large increase in net fiscal transfers to Arizona. We checked to see whether this was just part of a generalised increase in transfers from the federal centre to all states, or was focussed on Arizona (and the other more seriously affected State) by comparing it with Ohio State that had performed relatively well during the recent crisis. Looking at the charts below, federal transfer to Ohio State in 2009 and 2010, marked by X in Chart 23, do not show any comparable significant increase, as in Arizona's case. This at a minimum shows that not all states saw a substantial increase in federal net transfers during recent years.

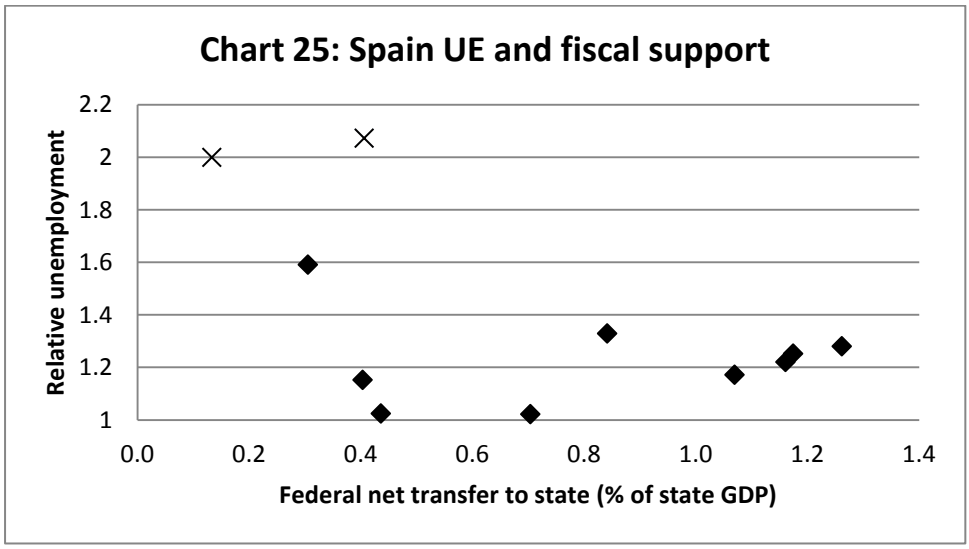




Similarly for Latvia, we regressed net official transfers from abroad, as a percentage of GDP, against the ratio of Latvian UE to European UE. The results are shown in Chart 24. Prior to 2009, once again there was no discernible relationship, with such official flows being more structural rather than cyclical. In fact, according to the European Commission (EC) data, Latvia only started contributing to the federal budget since 2004. Then in 2009, Latvia faced a severe crisis, (with the ratio of Latvian unemployment to EU UE jumping up from 1.1 times in 2008 to 2.0, twice, in 2009), and applied to the EC and to the IMF for financial assistance. Such assistance was forthcoming and on a considerable scale, relative to Latvian GDP. In the subsequent years, marked by Xs in the Charts, such net inflows jumped to 2.8% and 3.8% of GDP respectively.



In the case of Spain, however, there was no response of net official fiscal transfers to relative Spanish UE throughout our data period, see Chart 25. There was no central European fiscal support for Spain when it encountered a particularly severe shock.



What the Arizona results suggest is that the normal quasi-automatic fiscal buffering implied by the US federal fiscal system may be quite small by now, but that would need further testing on a complete study of all US states. But what both the Arizona and Latvian results indicate is that in a big crisis, when the political will to do so is there, enough fiscal resources can be mobilised to make a significant difference. A problem in Spain has been that the political will to help, from the other major European countries, has not (yet?) been in evidence.

E. Banking Differences

One of the factors causing the crisis to deepen in Europe has been in the interaction between the weakening of the State and of its national banks, with causation going in both directions; thus in Greece the sovereign dragged down the banks, whereas in Iceland, Ireland and (to a lesser degree) Spain, the reverse happened. This interaction between individual states and the banks therein was also vastly less in the USA, partly because individual state debt plays such a much more minor role in overall US public sector debt, and because the main US banks are now all cross-border federal entities, like Citi, Bank of America, etc.

Again there is a similar interaction between the local state economy and local banks. When local bank loans are focussed on local lending (especially to real estate), a collapse of the local real estate market will severely damage the health of the local banking system.[1] This will make such banks unwilling and unable to extend new loans in the adversely hit state, thereby further amplifying the cycle.

In Arizona there are a large number of (tiny) local state banks, but the bulk of loans and deposits were at large nation-wide US banks, see Appendix 2. So, when the Arizona economy deteriorated, the nation-wide banks could continue to apply their nation-wide lending criteria. By contrast, in Spain almost all banking is done by locally headquartered banks, though some of the large banks, e.g. BBVA and Santander were protected in part by their international diversification, e.g. in Latin America. We were not able to find data on foreign bank participation in loans/deposits in Spain but we are confident that this is small.

Latvia is, in this respect, half-way between Arizona and Spain. In 2011, the year for which we have data, 56% of the deposits in Latvia were with locally head-quartered banks. Almost all the rest were with Swedish banks, particularly Swedbank 14% and SEB Bank 9%. In that same year, which was, of course, a crisis year, no less than 73% of loans were made by the foreign (mostly Swedish) banks and only 27% by the Latvian banks. This underlines the point that, when an asymmetric shock hits a region within a wider currency area and without a Central Bank of its own, that region will lose out badly if its own banks are primarily local.

[1] Such geographical concentration, although systemically dangerous, is encouraged by politicians, and even by some economists. Instruments that allow banks to diversify such risks, such as Credit Default Swaps (CDS), are criticised as dangerous and opaque.

The implication of this is that a 'banking union' may be as important to the continuing success of the euro, as a fiscal union could be, though the two are linked by the need to pre-arrange euro-zone measures for bank resolution.

There is, however, a caveat. The nation-wide nature of the US banking system is quite recent. Before the liberalisation of recent decades, local political patriotism and concern with the 'money-power' of New York (from Andrew Jackson onwards) had made banking in the USA even more localised there than in Europe, e.g. via the McFadden Act (1927). This has two implications. The first is that the heterogeneity of state economic outcomes should have been decreasing over time in the USA in line with the greater nation-wide unification of banking, a testable hypothesis in principle. The second is that a 'banking union' while desirable for a currency union is not essential. What matters most of all is public political support.

F. Conclusion

This is a preliminary and partial exercise which could with benefit be extended to encompass all US and EU States. Nevertheless it did bring some suggestive results which we had not previously anticipated. What was expected was that neither in Arizona nor in Spain was there any sign of wage flexibility allowing beneficial shifts in relative unit labour costs in response to relative UE. Latvia, however, did show some flexibility in this respect.

Although the underlying data left quite a lot to be desired, our partial results suggested that the conventional wisdom that the US adjusted to asymmetric shocks via labour mobility, whereas Europe did not, may need reconsideration. Our results indicate that labour mobility was almost as great in Spain as in Arizona, and probably considerably greater (than in Arizona) in Latvia. What does, however, impress us is the difference in attitude to such mobility within the USA [but not between the USA and other countries] where within US mobility is broadly seen as bringing greater flexibility and a sign of a vibrant, entrepreneurial economy, and within Europe where it is seen as a cost (to both emitting and recipient countries) with damaging social implications.

We also found less evidence of quasi-automatic counter-cyclical fiscal flows from the federal centre in Arizona than we had expected. But when the crisis really hit, both Arizona and Latvia were

supported. Perhaps the more important requirement is the political will to give fiscal help to a neighbouring state in difficulties rather than quasi-automatic fiscal institutions.

Finally, and perhaps most important, both our work and general evidence from this latest crisis suggests that having the local banking system focussed primarily on the local state debt and the local state economy is likely to exaggerate and to amplify idiosyncratic shocks, especially when the state is part of a wider monetary union without its own Central Bank, exchange rate and monetary policy. Perhaps the euro-currency region needs a banking union even more urgently than it needs a fiscal union.

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Appendix 1: Models and regression results

A. Labour Markets: Wage Adjustment

A.1 Δ Relative $RULC_t$ = a + b_1 Relative UE_t + b_2 Δ Relative UE_t

Δ Relative $RULC_t$: Change in relative real unit labour cost (RULC). Percentage change in the ratio of state RULC to federal RULC (USA for Arizona and EU for Spain and Latvia) at time t.

Relative UE_t : Relative unemployment. Ratio of state unemployment rate to federal unemployment rate (USA for Arizona and Euro area for Spain and Latvia) at time t.

Δ Relative UE_t : Change in relative unemployment over four quarters at time t.
[Example] Let's look at Latvia's Δ Relative $UE_{t=2Q09}$
Δ Relative $UE_{t=2Q09}$ = Relative $UE_{t=2Q09}$ - Relative $UE_{t=2Q08}$ = 1.85 – 0.88 = 0.97

A.1.a Arizona

Dependent Variable: RULC_AZ_PC
Sample (adjusted): 2001Q4 2011Q3
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE_AZ	-0.587491	1.583490	-0.371011	0.7127
UE_AZ_4	0.631488	1.538440	0.410473	0.6838
C	0.553782	1.542008	0.359131	0.7215
R-squared	0.005356			
Adjusted R-squared	-0.048409			

A.1.b Spain

Dependent Variable: RULC_ES_PC
Sample (adjusted): 2001Q4 2011Q3
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE_ES	-0.209835	0.367222	-0.571412	0.5712
UE_ES_4	1.959192	0.717786	2.729492	0.0097
C	0.189918	0.504838	0.376197	0.7089
R-squared	0.198689			
Adjusted R-squared	0.155375			

A.1.c Latvia

Dependent Variable: RULC_LV_PC
Sample (adjusted): 2001Q4 2011Q3
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE_LV	-2.782770	0.701567	-3.966505	0.0003
UE_LV_4	-1.155908	0.813785	-1.420410	0.1639
C	4.904885	0.966668	5.074012	0.0000

R-squared	0.437225
Adjusted R-squared	0.406805

B. Labour Markets: Migration

B.1 $Mig_t = a + b_1$ Relative UE_t

Mig_t : Net migration. Net migration as percentage of state population at time t.

Relative UE_t : Relative unemployment rate. Ratio of state unemployment rate to federal unemployment rate (USA for Arizona and Euro area for Spain and Latvia) at time t.

B.1.a Arizona

Dependent Variable: MIG_AZ
Sample (adjusted): 2000 2011
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_UE_AZ	-6.878790	2.090633	-3.290291	0.0081
C	8.209843	2.061695	3.982084	0.0026

R-squared	0.519831
Adjusted R-squared	0.471814

B.1.b Spain

Dependent Variable: MIG_ES
Sample (adjusted): 2002 2010
Included observations: 9 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_UE_ES	-1.505587	0.112083	-13.43274	0.0000
C	3.205591	0.157877	20.30441	0.0000

R-squared	0.962654
Adjusted R-squared	0.957319

B.1.c Latvia (census)

Dependent Variable: MIG_LV_CEN
Method: Least Squares
Date: 10/09/12 Time: 16:58
Sample: 1998 2011
Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_UE_LV	-0.789801	0.302457	-2.611280	0.0227
C	0.428841	0.432768	0.990927	0.3413

R-squared	0.362339
Adjusted R-squared	0.309201

B.1.d Latvia (OECD-based)

Dependent Variable: MIG_LV_OECD
Sample (adjusted): 2000 2010
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_UE_LV	-1.450009	0.580998	-2.495722	0.0341
C	1.180388	0.820604	1.438438	0.1842

R-squared	0.409008
Adjusted R-squared	0.343342

B.2 $Mig_t = a + b_1$ Relative $UE_t + b_2\ Mig_{t-1}$

B.2.a Latvia (census)

Dependent Variable: MIG_LV_CEN

Sample (adjusted): 1999 2011
Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_UE_LV	-0.676919	0.226290	-2.991378	0.0135
MIG_LV_CEN(-1)	0.699093	0.211795	3.300799	0.0080
C	0.668269	0.330433	2.022401	0.0707
R-squared	0.700140			
Adjusted R-squared	0.640168			

B.2.b Latvia (OECD-based)

Dependent Variable: MIG_LV_OECD
Sample (adjusted): 2001 2010
Included observations: 10 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_UE_LV	-0.892004	0.376736	-2.367718	0.0498
MIG_LV_OECD(-1)	1.131123	0.279578	4.045821	0.0049
C	0.993964	0.464170	2.141380	0.0695
R-squared	0.854781			
Adjusted R-squared	0.813290			

C. Fiscal differences

C.1 $Tran_t = a + b_1\ UE_t + b_2\ UE_{t-1}$

Trant : Federal net transfer. Federal net transfer as % of state GDP at time t.

Relative UE_t : Relative unemployment rate. Ratio of state unemployment rate to federal unemployment rate (USA for Arizona and Euro area for Spain and Latvia) at time t.

C.3.a Arizona

Dependent Variable: TRAN_AZ
Sample (adjusted): 1992 2010
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

UE_AZ	10.52150	14.21886	0.739968	0.4700
UE_AZ(-1)	-1.186225	14.33070	-0.082775	0.9351
C	-5.302360	16.02802	-0.330818	0.7451

R-squared	0.034813
Adjusted R-squared	-0.085835

C.3.b Spain

Dependent Variable: TRAN_ES
Sample (adjusted): 2001 2010
Included observations: 10 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE_ES	-1.409257	0.582521	-2.419241	0.0461
UE_ES(-1)	1.269782	0.756681	1.678094	0.1372
C	1.003890	0.532544	1.885086	0.1014

R-squared	0.476483
Adjusted R-squared	0.326906

C.3.c Latvia

Dependent Variable: TRAN_LV
Sample (adjusted): 2001 2010
Included observations: 10 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE_LV	1.220392	1.107322	1.102111	0.3069
UE_LV(-1)	-0.736916	1.325207	-0.556076	0.5955
C	1.154554	1.384201	0.834094	0.4318

R-squared	0.152870
Adjusted R-squared	-0.089167

Appendix 2: Data tables

[Table A.1] Unemployment rate

% of labour force, seasonally adjusted

	United States		Euro area			Relative unemployment*		
	Federal	Arizona	Federal	Spain	Latvia	Arizona	Spain	Latvia
Jan 2007	4.6	3.8	7.9	8.2	6.9	0.83	1.04	0.87
Feb 2007	4.5	3.7	7.8	8.1	6.9	0.82	1.04	0.88
Mar 2007	4.4	3.7	7.7	8.0	6.9	0.84	1.04	0.90
Apr 2007	4.5	3.5	7.6	7.9	6.4	0.78	1.04	0.84
May 2007	4.4	3.5	7.6	7.9	6.4	0.80	1.04	0.84
Jun 2007	4.6	3.5	7.5	8.1	6.4	0.76	1.08	0.85
Jul 2007	4.7	3.5	7.6	8.3	6.6	0.74	1.09	0.87
Aug 2007	4.6	3.6	7.5	8.4	6.6	0.78	1.12	0.88
Sep 2007	4.7	3.7	7.5	8.5	6.6	0.79	1.13	0.88
Oct 2007	4.7	3.8	7.4	8.5	6.0	0.81	1.15	0.81
Nov 2007	4.7	4.0	7.4	8.6	6.0	0.85	1.16	0.81
Dec 2007	5.0	4.1	7.4	8.8	6.0	0.82	1.19	0.81
Jan 2008	5.0	4.2	7.3	9.0	6.6	0.84	1.23	0.90
Feb 2008	4.9	4.4	7.3	9.2	6.6	0.90	1.26	0.90
Mar 2008	5.1	4.5	7.3	9.3	6.6	0.88	1.27	0.90
Apr 2008	5.0	4.8	7.4	9.9	6.6	0.96	1.34	0.89
May 2008	5.4	5.2	7.5	10.5	6.6	0.96	1.40	0.88
Jun 2008	5.6	5.7	7.6	11.0	6.6	1.02	1.45	0.87
Jul 2008	5.8	6.1	7.6	11.4	8.0	1.05	1.50	1.05
Aug 2008	6.1	6.6	7.6	11.8	8.0	1.08	1.55	1.05
Sep 2008	6.1	7.0	7.7	12.3	8.0	1.15	1.60	1.04
Oct 2008	6.5	7.3	7.8	13.2	10.9	1.12	1.69	1.40
Nov 2008	6.8	7.6	8.1	14.0	10.9	1.12	1.73	1.35
Dec 2008	7.3	8.0	8.3	14.9	10.9	1.10	1.80	1.31
Jan 2009	7.8	8.3	8.7	15.9	14.3	1.06	1.83	1.64
Feb 2009	8.3	8.6	9.0	16.8	14.3	1.04	1.87	1.59
Mar 2009	8.7	9.0	9.3	17.4	14.3	1.03	1.87	1.54
Apr 2009	8.9	9.4	9.4	17.7	17.6	1.06	1.88	1.87
May 2009	9.4	9.7	9.5	17.9	17.6	1.03	1.88	1.85
Jun 2009	9.5	10.0	9.6	18.0	17.6	1.05	1.88	1.83
Jul 2009	9.5	10.3	9.7	18.3	19.6	1.08	1.89	2.02
Aug 2009	9.6	10.5	9.8	18.5	19.6	1.09	1.89	2.00
Sep 2009	9.8	10.6	9.9	18.8	19.6	1.08	1.90	1.98
Oct 2009	10.0	10.7	10.0	18.9	21.1	1.07	1.89	2.11
Nov 2009	9.9	10.8	10.0	19.0	21.1	1.09	1.90	2.11
Dec 2009	9.9	10.8	10.0	19.2	21.1	1.09	1.92	2.11

Source: US BLS and Eurostat

* Ratio of state unemployment rate to federal unemployment rate (USA for Arizona and Euro area for Spain and Latvia)

[Table A.1] Unemployment rate (continued)

% of labour force, seasonally adjusted

	United States		Euro area			Relative unemployment*		
	Federal	Arizona	Federal	Spain	Latvia	Arizona	Spain	Latvia
Jan 2010	9.7	10.8	10.1	19.2	21.2	1.11	1.90	2.10
Feb 2010	9.8	10.8	10.1	19.4	21.2	1.10	1.92	2.10
Mar 2010	9.8	10.8	10.1	19.6	21.2	1.10	1.94	2.10
Apr 2010	9.9	10.7	10.2	19.9	20.6	1.08	1.95	2.02
May 2010	9.6	10.6	10.2	20.1	20.6	1.10	1.97	2.02
Jun 2010	9.4	10.6	10.1	20.2	20.6	1.13	2.00	2.04
Jul 2010	9.5	10.5	10.1	20.2	19.4	1.11	2.00	1.92
Aug 2010	9.6	10.4	10.1	20.3	19.4	1.08	2.01	1.92
Sep 2010	9.5	10.3	10.1	20.4	19.4	1.08	2.02	1.92
Oct 2010	9.5	10.2	10.1	20.5	18.1	1.07	2.03	1.79
Nov 2010	9.8	10.1	10.1	20.5	18.1	1.03	2.03	1.79
Dec 2010	9.4	10.0	10.0	20.5	18.1	1.06	2.05	1.81
Jan 2011	9.1	9.9	10.0	20.6	17.1	1.09	2.06	1.71
Feb 2011	9.0	9.7	9.9	20.7	17.1	1.08	2.09	1.73
Mar 2011	8.9	9.6	9.9	20.8	17.1	1.08	2.10	1.73
Apr 2011	9.0	9.6	9.9	20.7	17.0	1.07	2.09	1.72
May 2011	9.0	9.6	9.9	20.8	17.0	1.07	2.10	1.72
Jun 2011	9.1	9.6	10.0	21.2	17.0	1.05	2.12	1.70
Jul 2011	9.1	9.6	10.1	21.7	15.7	1.05	2.15	1.55
Aug 2011	9.1	9.5	10.2	22.0	15.7	1.04	2.16	1.54
Sep 2011	9.0	9.4	10.3	22.5	15.7	1.04	2.18	1.52
Oct 2011	8.9	9.2	10.5	22.8	15.4	1.03	2.17	1.47
Nov 2011	8.7	9.1	10.6	23.0	15.4	1.05	2.17	1.45
Dec 2011	8.5	9.0	10.7	23.2	15.4	1.06	2.17	1.44
Jan 2012	8.3	8.7	10.8	23.5	15.4	1.05	2.18	1.43
Feb 2012	8.3	8.7	10.9	23.8	15.4	1.05	2.18	1.41
Mar 2012	8.2	8.6	11.0	24.1	15.4	1.05	2.19	1.40
Apr 2012	8.1	8.2	11.2	24.4	15.9	1.01	2.18	1.42
May 2012	8.2	8.2	11.3	24.7	15.9	1.00	2.19	1.41
Jun 2012	8.2	8.2	11.4	24.8	15.9	1.00	2.18	1.39

Source: US BLS and Eurostat

* Ratio of state unemployment rate to federal unemployment rate (USA for Arizona and Euro area for Spain and Latvia)

[Table A.2] Standard deviation of unemployment rate

Using population of 2010

	US				EU (27 countries)				Euro area (17 countries)			
	EW		PW		EW		PW		EW		PW	
	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD
Change 1Q06 -1Q12	**3.0**	**0.8**	**3.6**	**1.9**	**2.6**	**2.1**	**1.6**	**2.5**	**2.9**	**3.1**	**2.2**	**2.6**
Jan 06	4.6	1.1	4.8	0.7	7.8	2.8	8.7	3.0	7.7	2.7	8.8	3.0
Feb 06	4.5	1.0	4.7	0.7	7.7	2.7	8.7	2.8	7.6	2.6	8.8	2.9
Mar 06	4.4	1.0	4.7	0.7	7.6	2.6	8.6	2.7	7.5	2.6	8.7	2.8
Apr 06	4.4	1.0	4.6	0.7	7.5	2.6	8.5	2.7	7.4	2.6	8.6	2.7
May 06	4.5	1.0	4.7	0.7	7.4	2.6	8.4	2.6	7.3	2.5	8.6	2.6
Jun 06	4.5	1.0	4.7	0.7	7.3	2.5	8.3	2.5	7.2	2.5	8.4	2.5
Jul 06	4.5	1.0	4.7	0.7	7.2	2.5	8.2	2.5	7.1	2.5	8.3	2.5
Aug 06	4.5	1.0	4.7	0.7	7.2	2.5	8.2	2.4	7.1	2.5	8.3	2.5
Sep 06	4.4	1.0	4.6	0.7	7.1	2.4	8.1	2.3	7.0	2.4	8.2	2.4
Oct 06	4.4	1.0	4.6	0.7	7.0	2.4	8.0	2.3	7.0	2.4	8.2	2.3
Nov 06	4.3	1.0	4.5	0.7	6.9	2.3	7.9	2.2	7.0	2.4	8.1	2.2
Dec 06	4.3	1.0	4.5	0.7	6.9	2.2	7.8	2.1	6.9	2.3	8.0	2.1
Jan 07	4.2	1.0	4.5	0.7	6.8	2.1	7.7	2.0	6.9	2.3	7.9	2.0
Feb 07	4.2	1.0	4.4	0.7	6.7	2.1	7.6	1.9	6.8	2.2	7.8	2.0
Mar 07	4.2	1.0	4.4	0.7	6.6	2.1	7.4	1.8	6.7	2.2	7.7	1.9
Apr 07	4.2	1.0	4.5	0.7	6.5	2.0	7.3	1.8	6.6	2.2	7.6	1.8
May 07	4.3	1.0	4.5	0.7	6.4	2.0	7.3	1.8	6.6	2.2	7.6	1.8
Jun 07	4.3	1.0	4.6	0.7	6.4	2.0	7.2	1.7	6.5	2.3	7.6	1.8
Jul 07	4.4	1.0	4.6	0.8	6.4	2.0	7.2	1.7	6.5	2.2	7.6	1.7
Aug 07	4.4	1.0	4.7	0.8	6.4	2.0	7.2	1.7	6.5	2.2	7.6	1.7
Sep 07	4.4	1.0	4.7	0.8	6.3	2.0	7.1	1.7	6.4	2.3	7.5	1.8
Oct 07	4.4	1.0	4.8	0.8	6.2	2.0	7.1	1.7	6.3	2.2	7.5	1.7
Nov 07	4.5	1.0	4.8	0.8	6.1	1.9	7.0	1.7	6.3	2.1	7.4	1.7
Dec 07	4.5	1.0	4.8	0.8	6.1	1.9	7.0	1.6	6.3	2.1	7.4	1.6
Jan 08	4.5	1.0	4.9	0.8	6.1	1.9	6.9	1.6	6.3	2.1	7.4	1.6
Feb 08	4.5	1.1	4.9	0.8	6.0	1.9	6.8	1.6	6.2	2.1	7.3	1.6
Mar 08	4.6	1.1	5.0	0.8	5.9	1.9	6.8	1.6	6.2	2.1	7.3	1.6
Apr 08	4.7	1.1	5.1	0.9	6.0	1.9	6.9	1.7	6.2	2.2	7.4	1.7
May 08	4.9	1.2	5.4	1.0	6.0	2.0	7.0	1.8	6.3	2.3	7.5	1.8
Jun 08	5.1	1.2	5.6	1.2	6.1	2.0	7.0	1.8	6.3	2.3	7.6	1.9
Jul 08	5.3	1.3	5.8	1.3	6.3	1.9	7.1	1.9	6.5	2.2	7.6	1.9
Aug 08	5.5	1.3	6.0	1.4	6.4	2.0	7.1	2.0	6.6	2.2	7.6	2.0
Sep 08	5.7	1.4	6.3	1.6	6.4	2.0	7.2	2.1	6.6	2.3	7.7	2.1
Oct 08	6.0	1.5	6.5	1.7	6.7	2.3	7.3	2.3	6.8	2.4	7.9	2.3
Nov 08	6.3	1.6	6.9	1.9	6.8	2.4	7.5	2.5	6.9	2.6	8.1	2.5
Dec 08	6.7	1.6	7.4	2.1	7.0	2.5	7.7	2.7	7.1	2.7	8.3	2.7
Jan 09	7.2	1.7	7.9	2.2	7.6	2.9	8.1	2.9	7.6	3.1	8.7	2.9
Feb 09	7.6	1.8	8.3	2.5	7.9	3.1	8.4	3.1	7.9	3.3	8.9	3.1
Mar 09	8.0	1.8	8.7	2.7	8.2	3.1	8.6	3.2	8.2	3.4	9.2	3.3
Apr 09	8.3	1.9	9.0	3.0	8.6	3.5	8.8	3.3	8.5	3.6	9.4	3.3
May 09	8.5	2.0	9.3	3.1	8.8	3.6	8.9	3.4	8.6	3.6	9.5	3.4
Jun 09	8.6	2.0	9.5	3.3	8.9	3.6	9.1	3.3	8.8	3.6	9.6	3.4
Jul 09	8.7	2.0	9.6	3.3	9.2	3.9	9.2	3.4	9.0	3.9	9.7	3.5
Aug 09	8.8	2.1	9.7	3.4	9.4	4.0	9.3	3.5	9.1	3.9	9.8	3.5
Sep 09	8.9	2.1	9.7	3.5	9.5	4.0	9.4	3.5	9.3	4.0	9.9	3.6
Oct 09	8.9	2.1	9.8	3.5	9.6	4.2	9.4	3.6	9.3	4.0	10.0	3.6
Nov 09	8.9	2.1	9.8	3.6	9.7	4.3	9.5	3.6	9.4	4.1	10.0	3.7
Dec 09	9.0	2.1	9.9	3.6	9.8	4.3	9.5	3.7	9.5	4.1	10.0	3.7

[Table A.2] Standard deviation of unemployment rate (continued)

Using population of 2010

	US				EU (27 countries)				Euro area (17 countries)			
	EW		PW		EW		PW		EW		PW	
	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD
Change 1Q06 -1Q12	**3.0**	**0.8**	**3.6**	**1.9**	**2.6**	**2.1**	**1.6**	**2.5**	**2.9**	**3.1**	**2.2**	**2.6**
Jan 10	9.0	2.1	9.9	3.6	10.1	4.5	9.7	3.7	9.7	4.5	10.1	3.7
Feb 10	9.0	2.1	9.9	3.6	10.1	4.6	9.7	3.8	9.8	4.6	10.1	3.8
Mar 10	8.9	2.1	9.9	3.5	10.2	4.6	9.7	3.8	9.8	4.6	10.1	3.9
Apr 10	8.9	2.1	9.8	3.4	10.2	4.6	9.7	3.9	9.8	4.6	10.2	4.0
May 10	8.8	2.0	9.7	3.3	10.2	4.6	9.7	4.0	9.9	4.7	10.2	4.0
Jun 10	8.7	2.0	9.6	3.3	10.2	4.7	9.7	4.1	9.9	4.7	10.1	4.1
Jul 10	8.7	2.0	9.6	3.4	10.1	4.4	9.6	4.0	9.7	4.5	10.1	4.1
Aug 10	8.7	2.0	9.6	3.4	10.1	4.5	9.6	4.1	9.7	4.5	10.1	4.1
Sep 10	8.7	2.0	9.5	3.3	10.1	4.5	9.6	4.2	9.7	4.6	10.1	4.2
Oct 10	8.6	2.0	9.5	3.3	10.0	4.3	9.7	4.2	9.6	4.5	10.1	4.2
Nov 10	8.6	2.0	9.5	3.2	9.9	4.3	9.6	4.2	9.6	4.5	10.0	4.2
Dec 10	8.5	2.0	9.4	3.2	9.9	4.3	9.6	4.2	9.6	4.6	10.0	4.3
Jan 11	8.4	2.0	9.2	3.1	9.9	4.3	9.5	4.2	9.6	4.6	9.9	4.3
Feb 11	8.3	2.0	9.1	3.1	9.8	4.3	9.5	4.3	9.6	4.6	9.9	4.4
Mar 11	8.2	2.0	9.0	3.1	9.8	4.3	9.4	4.4	9.6	4.7	9.9	4.4
Apr 11	8.2	2.0	9.0	3.0	9.8	4.3	9.5	4.4	9.6	4.7	9.9	4.4
May 11	8.2	2.0	9.1	3.1	9.9	4.3	9.5	4.4	9.7	4.7	9.9	4.5
Jun 11	8.3	2.0	9.1	3.1	9.9	4.4	9.6	4.5	9.8	4.8	10.0	4.6
Jul 11	8.3	2.0	9.1	3.1	9.8	4.3	9.7	4.7	9.7	4.9	10.1	4.7
Aug 11	8.3	2.0	9.1	3.0	9.9	4.4	9.7	4.7	9.8	5.0	10.2	4.8
Sep 11	8.2	2.0	9.0	3.0	10.0	4.4	9.9	4.9	10.0	5.1	10.4	4.9
Oct 11	8.0	2.0	8.8	2.9	10.1	4.5	9.9	5.0	10.2	5.3	10.5	5.1
Nov 11	7.9	1.9	8.7	2.8	10.2	4.6	10.1	5.1	10.4	5.4	10.6	5.2
Dec 11	7.8	1.9	8.6	2.8	10.3	4.7	10.1	5.2	10.4	5.5	10.7	5.2
Jan 12	7.6	1.9	8.4	2.6	10.2	4.8	10.2	5.3	10.4	5.6	10.8	5.3
Feb 12	7.5	1.8	8.3	2.5	10.3	4.8	10.2	5.4	10.5	5.7	10.9	5.4
Mar 12	7.4	1.8	8.2	2.6	10.3	4.9	10.3	5.5	10.6	5.8	11.1	5.5

[Table A.3] Unemployment cycle in US states

Seasonally adjusted

	Relative unemployment			Absolute unemployment		
	Peak*	Rank by deviation**	2007 avg	Peak*	Rank by deviation**	2007 avg
Nevada	1.5	1	1.0	14.0	1	4.6
Utah	0.9	2	0.6	8.3	16	2.6
Alabama	1.1	3	0.7	10.6	3	3.4
Florida	1.2	4	0.9	11.4	2	3.9
Arizona	1.1	5	0.8	10.8	4	3.7
Idaho	1.0	6	0.6	8.9	14	2.9
Rhode Island	1.4	7	1.1	11.9	7	5.2
New Jersey	1.2	8	0.9	9.7	19	4.3
Hawaii	0.8	9	0.6	7.1	31	2.6
North Carolina	1.2	10	1.0	11.4	8	4.7
Indiana	1.2	11	1.0	10.8	13	4.6
California	1.3	12	1.2	12.4	6	5.3
Colorado	1.0	13	0.8	9.0	20	3.8
Tennessee	1.2	14	1.0	11.0	12	4.7
Wyoming	0.8	15	0.6	7.5	26	2.8
Oregon	1.3	16	1.1	11.6	9	5.2
Delaware	0.9	17	0.8	8.5	23	3.5
New Mexico	0.9	18	0.8	8.0	30	3.5
Georgia	1.1	19	1.0	10.5	15	4.6
Virginia	0.8	20	0.7	7.3	36	3.0
New York	1.1	21	1.0	8.9	34	4.5
Maryland	0.8	22	0.8	8.0	29	3.4
Illinois	1.2	23	1.1	11.4	11	5.0
Louisiana	0.9	24	0.8	7.9	38	3.8
Washington	1.1	25	1.0	10.2	18	4.5
South Carolina	1.3	26	1.2	12.0	10	5.6
Montana	0.8	27	0.7	7.0	42	3.4
Connecticut	1.0	28	1.0	9.4	25	4.5
Missouri	1.1	29	1.1	9.7	26	5.0
District of Columbia	1.2	30	1.2	10.5	22	5.5
West Virginia	0.9	31	0.9	8.5	35	4.2
South Dakota	0.6	32	0.6	5.3	49	2.9
Pennsylvania	0.9	33	0.9	8.7	33	4.3
Iowa	0.8	34	0.8	6.3	48	3.7
Massachusetts	1.0	35	1.0	8.7	37	4.5
Vermont	0.8	36	0.9	7.2	44	3.9
Texas	0.9	37	0.9	8.2	39	4.3
Wisconsin	1.0	38	1.0	9.2	32	4.8
Michigan	1.5	39	1.5	14.2	5	7.1
Minnesota	1.0	40	1.0	8.3	41	4.6
Nebraska	0.6	41	0.6	4.9	51	3.0
Kentucky	1.2	42	1.2	10.7	21	5.6
Ohio	1.1	43	1.2	10.6	24	5.6
Maine	0.9	44	1.0	8.4	40	4.7
New Hampshire	0.7	45	0.8	6.7	45	3.6
Kansas	0.8	46	0.9	7.6	43	4.1
North Dakota	0.5	47	0.7	4.2	52	3.1
Oklahoma	0.7	48	0.9	7.2	46	4.1
Mississippi	1.2	49	1.4	10.9	28	6.3
Alaska	1.1	50	1.3	8.2	50	6.1
Arkansas	0.9	51	1.2	8.2	47	5.3
Puerto Rico	2.0	52	2.4	16.6	17	10.9

Source: US BLS

* Highest reading from January 2008 to June 2012. For example, Arizona's peak is 1.13 on June 2010 in relative unemployment terms and 10.8 from November 2009 to March 2010 in terms of absolute unemployment rate..

** Ranked by the largest point deviation from 2007 average. For instance, Arizona's largest deviation from 2007 average is 0.3 points in relative unemployment terms and 7.1%-points in terms of absolute unemployment rate.

[Table A.4] Unemployment cycle in European states

Seasonally adjusted

	Relative unemployment			Absolute unemployment		
	Peak*	Rank in deviation**	2007 average	Peak*	Rank in deviation**	2007 average
Latvia	2.2	1	0.9	21.2	3	6.5
Estonia	2.0	2	0.6	18.9	4	4.7
Lithuania	1.9	3	0.6	18.3	5	4.3
Spain	2.4	4	1.1	24.8	1	8.3
Greece	2.2	5	1.1	23.1	2	8.3
Ireland	1.5	6	0.6	14.8	6	4.6
Cyprus	1.0	7	0.6	10.6	8	4.0
Iceland	0.8	8	0.4	7.4	11	2.6
Croatia	1.5	9	1.2	16.0	7	8.9
Denmark	0.8	10	0.5	8.0	13	3.8
Portugal	1.5	11	1.2	15.4	9	8.9
Bulgaria	1.2	12	1.0	12.4	10	6.9
Slovenia	0.9	13	0.7	8.7	15	4.9
Italy	1.0	14	0.9	10.8	12	6.1
Hungary	1.2	15	1.0	11.3	14	7.4
Sweden	1.0	16	0.8	9.1	18	6.1
Luxembourg	0.7	17	0.6	5.4	24	4.2
United Kingdom	0.9	18	0.7	8.3	17	5.3
Czech Republic	0.8	19	0.7	7.8	19	5.3
Norway	0.4	20	0.4	3.7	25	2.5
Malta	0.9	21	0.9	7.5	27	6.5
Netherlands	0.5	22	0.5	5.2	22	3.6
Belgium	1.0	23	1.0	8.5	26	7.5
Romania	0.9	24	0.9	7.7	23	6.4
Austria	0.6	25	0.6	5.2	28	4.4
Slovakia	1.5	26	1.6	14.8	16	11.2
Finland	0.9	27	1.0	8.7	20	6.9
Germany	1.2	28	1.2	8.1	30	8.7
France	1.1	29	1.2	10.1	21	8.4
Poland	1.1	30	1.3	10.0	29	9.7

Source: Eurostat

* Highest reading from January 2008 to June 2012. For example, Spain's peak is 2.4 on June 2012 in relative unemployment terms and 24.8 on June 2012 in terms of absolute unemployment rate.

** Ranked by the largest point deviation from 2007 average. For instance, Spain's largest deviation from 2007 average is 1.2 points in relative unemployment terms and 16.5%-points in terms of absolute unemployment rate.

[Table A.5] Standard deviation of housing price index

Index 2006=100

	US		EU*		Euro area**	
	Avg	SD	Avg	SD	Avg	SD
Change 1Q06 - 4Q10	-9.7	11.7	11.1	13.7	10.6	13.1
2006Q1	98.7	1.7	95.6	2.6	95.5	2.9
2006Q2	99.7	0.7	99.3	0.9	99.2	0.9
2006Q3	100.3	0.7	101.6	1.0	101.5	1.1
2006Q4	101.3	1.8	103.5	2.5	103.8	2.8
2007Q1	102.1	2.6	106.1	4.8	106.3	5.4
2007Q2	102.3	3.4	108.8	6.7	108.8	7.3
2007Q3	101.7	4.5	111.4	8.8	111.4	9.5
2007Q4	100.7	5.6	111.7	11.3	112.2	12.4
2008Q1	99.6	7.0	113.5	14.5	114.6	15.9
2008Q2	97.9	8.5	113.9	15.0	115.0	16.5
2008Q3	96.2	9.5	113.3	14.8	114.8	16.0
2008Q4	94.4	10.8	109.6	14.9	111.8	15.6
2009Q1	94.3	11.1	107.0	14.2	109.3	14.1
2009Q2	93.2	11.9	105.8	13.6	107.4	13.5
2009Q3	92.5	12.0	107.0	15.1	108.2	15.4
2009Q4	92.4	12.3	106.2	14.3	106.8	14.1
2010Q1	91.6	12.8	106.6	15.5	106.8	15.5
2010Q2	91.0	12.6	107.2	15.4	107.0	15.4
2010Q3	90.1	13.2	107.8	16.5	107.5	16.7
2010Q4	89.0	13.4	106.7	16.3	106.2	16.0

* Using countries with sufficient history. Belgium, Germany, Ireland, Greece, Spain, France, Cyprus, Malta, Netherlands, Slovakia, Finland, Denmark, Sweden, and UK

** Using countries with sufficient history. Belgium, Germany, Ireland, Greece, Spain, France, Cyprus, Malta, Netherlands, Slovakia, and Finland

[Table B.1] Real labour unit cost (RULC)

Index 3Q08=100 unless noted otherwise

	Not seasonally adjusted			Seasonally adjusted			Relative to federal			HP filter trend*
	Arizona	Spain	Latvia	Arizona	Spain	Latvia	Arizona	Spain	Latvia	Latvia
2001Q1	79.7	64.9	30.7	98.8	99.0	57.8	98.8	99.0	57.8	0.5
2001Q2	79.9	68.1	33.3	99.0	100.1	57.0	99.0	100.1	57.0	3.0
2001Q3	78.8	75.8	34.4	100.0	101.4	59.2	100.0	101.4	59.2	3.7
2001Q4	83.6	75.0	34.1	99.2	99.9	58.7	99.2	99.9	58.7	1.8
2002Q1	80.8	68.4	32.9	99.9	99.8	59.4	99.9	99.8	59.4	-1.8
2002Q2	81.7	71.4	36.7	99.4	99.4	60.3	99.4	99.4	60.3	3.0
2002Q3	79.8	79.2	36.4	99.0	100.7	61.0	99.0	100.7	61.0	2.0
2002Q4	85.7	79.5	37.4	100.0	100.1	62.2	100.0	100.1	62.2	1.8
2003Q1	82.0	72.6	35.7	99.6	100.0	62.0	99.6	100.0	62.0	-2.9
2003Q2	84.2	75.7	40.5	100.3	100.2	63.4	100.3	100.2	63.4	2.8
2003Q3	82.6	82.7	39.9	99.3	100.6	63.8	99.3	100.6	63.8	0.8
2003Q4	89.0	83.8	41.0	99.9	101.0	64.9	99.9	101.0	64.9	0.5
2004Q1	85.5	76.6	39.4	100.1	101.3	64.4	100.1	101.3	64.4	-4.7
2004Q2	86.8	79.1	44.5	100.3	100.3	65.0	100.3	100.3	65.0	-0.2
2004Q3	86.6	85.5	44.2	100.2	99.9	65.2	100.2	99.9	65.2	-2.9
2004Q4	94.0	86.5	45.5	99.7	99.9	66.5	99.7	99.9	66.5	-3.3
2005Q1	87.2	79.3	46.2	100.1	99.9	69.3	100.1	99.9	69.3	-5.2
2005Q2	90.6	82.0	49.9	100.8	99.9	67.9	100.8	99.9	67.9	-3.4
2005Q3	93.4	87.5	51.4	101.6	98.9	71.1	101.6	98.9	71.1	-4.0
2005Q4	96.4	89.8	53.5	100.5	99.4	72.4	100.5	99.4	72.4	-4.5
2006Q1	96.1	81.9	54.3	101.8	98.4	75.4	101.8	98.4	75.4	-6.4
2006Q2	94.4	85.1	62.1	100.6	98.3	78.6	100.6	98.3	78.6	0.1
2006Q3	94.2	90.6	63.8	101.3	98.0	82.0	101.3	98.0	82.0	-0.8
2006Q4	101.0	92.4	68.1	101.2	98.8	86.2	101.2	98.8	86.2	1.2
2007Q1	100.4	85.1	71.4	101.1	98.1	90.4	101.1	98.1	90.5	0.6
2007Q2	98.6	88.6	80.4	100.6	98.8	92.8	100.6	98.8	92.8	6.5
2007Q3	98.0	95.2	83.0	100.8	99.0	95.3	100.8	99.0	95.3	4.6
2007Q4	103.5	97.0	88.4	99.8	99.3	98.0	99.8	99.3	98.0	4.0
2008Q1	102.5	89.7	92.4	100.6	97.8	99.3	100.6	97.8	99.3	1.1
2008Q2	101.0	92.7	99.6	100.6	99.4	98.7	100.6	99.4	98.7	2.4
2008Q3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-0.8
2008Q4	106.3	102.3	102.4	100.5	100.7	99.8	100.5	100.7	99.8	-1.9
2009Q1	101.1	94.5	98.5	101.3	102.4	97.1	101.3	102.4	97.1	-10.4
2009Q2	101.1	98.1	103.6	100.9	103.0	95.8	100.9	103.0	95.8	-7.7
2009Q3	100.3	104.6	97.4	100.4	103.3	93.9	100.4	103.3	93.9	-14.3
2009Q4	110.3	106.4	96.2	101.7	103.6	94.1	101.7	103.6	94.1	-16.9
2010Q1	100.0	96.4	92.0	99.2	102.9	94.1	99.2	102.9	94.1	-23.4
2010Q2	102.8	98.9	98.4	99.5	102.3	93.8	99.5	102.3	93.8	-20.9
2010Q3	102.8	104.0	96.9	99.6	101.6	94.4	99.6	101.6	94.4	-25.3
2010Q4	111.8	107.2	96.5	100.1	102.3	93.5	100.1	102.3	93.5	-29.1
2011Q1	104.9	98.2	94.1	98.9	102.0	93.2	98.9	102.0	93.2	-36.1
2011Q2	105.5	101.5	101.5	99.2	101.7	92.6	99.2	101.7	92.6	-33.9
2011Q3	107.8	108.1	100.4	99.3	102.9	93.9	99.3	102.9	93.9	-37.9

Source: LSE FMG estimates (deflated using CPI) based on data from US BLS and Eurostat

* Percentage deviation from trend computed with Hodrick-Prescott filter

[Table C.1] Net migration flows

% of total population

	Arizona	Spain	Latvia (Eurostat)	Latvia (census)	Latvia (OECD-based)*
1998			-0.2	-0.2	
1999			-0.2	-0.2	
2000	0.5		-0.2	-0.8	-0.3
2001	1.7		-0.2	-0.9	-0.3
2002	1.9	1.1	-0.1	-0.4	-0.4
2003	1.6	1.5	0.0	-0.5	-0.2
2004	2.1	1.5	0.0	-0.8	-0.4
2005	2.7	1.5	0.0	-0.4	-0.6
2006	2.7	1.6	-0.1	-0.3	-0.5
2007	1.7	1.6	0.0	-0.3	-0.4
2008	1.3	1.0	-0.1	-1.0	-0.5
2009	0.6	0.4	-0.2	-1.5	-2.1
2010	0.3	0.1	-0.4	-1.6	-3.0
2011	0.4			-1.1	

Source: Arizona from United States Census Bureau, Eurostat, and Latvia (census) from Central Statistical Bureau of Latvia

* LSE FMG estimated to Latvia net migration using the patterns from four OECD countries that had the largest net migration from Latvia (Germany, Netherlands, Finland, and Sweden) and aggregate change for the ten year using in non-natural population change (excluding fertility and mortality) from the Latvia census.

[Table D.1] Federal net transfer to state

% of state GDP

	Federal net transfer		
	Arizona	Spain	Latvia
1991	3.7		
1992	4.0		
1993	4.4		
1994	2.0		
1995	2.0		
1996	1.0		
1997	-0.6		
1998	-1.0		
1999	-0.2		
2000	-0.6	0.8	0.6
2001	0.3	1.2	0.6
2002	3.6	1.3	0.6
2003	5.3	1.2	0.8
2004	5.7	1.1	1.9
2005	3.9	0.7	2.1
2006	5.6	0.4	1.7
2007	4.8	0.4	2.4
2008	7.1	0.3	1.8
2009	12.3	0.1	2.8
2010	12.9	0.4	3.8

Source: Europe data from Eurostat and European Commission, US data from Census Bureau and Arizona state

[Table E.1] Size of domestic banking sector in deposit market

% of deposits

	Arizona	Spain	Latvia
Banks with domestic HQ	9%	#N/A	56%
Banks with foreign HQ	91%	#N/A	44%

Source: LSE FMG estimates for Arizona and Association of Latvian Commercial Banks for Latvia

[Table E.2] Size of domestic banking sector in lending market

% of loans

	Arizona	Spain	Latvia
Banks with domestic HQ	#N/A	#N/A	27%
Banks with foreign HQ	#N/A	#N/A	73%

Source: Latvian Commercial Banks for Latvia