The short- and long-run impacts of financial crises on youth unemployment in OECD countries

Giovanni S. F. Bruno[a]

[a]Bocconi University – Department of Economics, Via Roentgen 1, 20136, Milan, Italy. Phone number: ++ 39 02 5836 5411 (giovanni.bruno@unibocconi.it)

Misbah T. Choudhry[b]

[b]Lahore University of Management Sciences, Pakistan (misbah.tanveer@lums.edu.pk)

Enrico Marelli[c]

[c]Department of Economics and Management, University of Brescia, Italy (emarelli@eco.unibs.it)

Marcello Signorelli[d]

[d]Corresponding author: Department of Economics, University of Perugia, Italy (signorel@unipg.it)

Abstract

This paper estimates the impact of systemic financial crises on the youth unemployment rate (YUR), in comparison with the total unemployment rate (UR), for a panel of OECD countries over the period 1981-2009. Our estimation strategy is based on a battery of dynamic panel data estimators suitably designed to deal with the small cross-sectional dimension of the panel and the resulting finite-sample biases of dynamic panel data estimators of short- and long-run coefficients. We show that both YUR and UR are highly persistent, with estimated persistence coefficients of 0.81-0.89 in YUR and 0.85-0.90 in UR. The effect of financial crises on the YUR is large both in the short and the long run, also if compared to the short- and long-run effects on UR: YUR's short and long-run responses to financial crisis are, respectively, some 1.9 and 1.5-1.7 times higher. The key control variable is the lagged GDP growth. It is always highly negatively significant and, again, it has larger impacts on YUR than UR: YUR's short and long-run responses in this case are, respectively, some 1.8 and 1.3-1.6 times higher. The impacts of institutional variables are significant and with relatively higher size for YUR. Policy implications are deep, indicating that on the onset of a financial crisis episode policy interventions should be prompt and especially focussed on the youth labour market.

JEL: J08, J48, J68,

Keywords: youth unemployment, financial crises, dynamic panel data estimators, short- and long-run bias-corrected LSDV estimator.

1. Introduction

The youth unemployment rate (YUR) is, in most countries, at least twice as high as the total unemployment rate (UR). Higher than average YUR have been recently recorded not only in some Mediterranean countries (Spain, Italy, Greece) or certain new EU member states (Hungary and Slovakia in particular), but also in France, Belgium, Sweden and Finland.

The recent economic crisis abruptly ended the gradual decline in global YUR during the period 2002–07 (ILO, 2012a). Moreover, after the recent crisis, the increase in the YUR has been generally larger than the rise in the total rate: young workers, who have weaker work contracts, lower qualifications and less experience than older workers, have borne the brunt of the "Great Recession".[1] Persistent unemployment is likely to become structural, especially in countries affected by the new recession, and for young people it raises the risk of a "lost generation" (Scarpetta et al. 2010).

Many studies have been devoted to investigating why YUR is persistently higher than the adult unemployment rate (or also the total UR)[2]. None of the existing analyses using panel data of countries, though, have explicitly quantified the long-run effects of macroeconomic shocks and financial crisis on the youth unemployment rates. Indeed, from an econometric point of view this is a non-trivial issue in panels with a small number of cross-sectional units, such as most panels of countries, since besides the well-known inconsistency and finite-sample biases affecting conventional OLS and GMM panel data estimators (Nickell 1981, Kiviet 1995, Judson and Owen 1999, Bruno 2005b), there is also a non-linearity finite-sample bias in the long-run coefficient estimates that has to be considered (see Pesaran and Zaho (1999) and Bun (2003), among others).

This paper estimates the short- and long-run effects of financial crisis on YUR and total UR for a panel of at most 27 high income OECD countries over a period beginning in 1981 and ending

[1] Arpaia and Curci (2010) produced a broad analysis of labour market adjustments in the EU-27 after the 2008-2009 recession

[2] See, for example, Clark and Summers (1982) and Kolev and Saget (2005).

in 2009, the year following the worst recession, but when unemployment rates were still high or even rising. We use a battery of dynamic panel data estimators suitably designed to deal with the finite-sample biases in short- and long-run coefficients.

The paper is organized as follows. The next section reviews the existing literature on YUR. Section 3 describes the data, explains the econometric strategy and presents estimation results. Section 4 concludes with a discussion on the main policy implications.

2. Financial crises and other determinants of youth unemployment: Literature Review

As we stated in the Introduction, YUR is, in most countries, at least twice as high as the total UR; but in some countries the ratio is more than 3 (notice that most of empirical studies refer to individuals aged 15-24 years but other ages are sometimes considered). Moreover, the size of the group of "youth left behind" is generally larger than YUR indicates and can be proxied by the number of young people who are neither employed nor in education or training (NEET) (O'Higgins, 2012; Scarpetta et al., 2010).

The recent crisis started in 2007-08 as a financial crisis and led to the "Great Recession" (2008-09), the biggest recession since the Great Depression of the '30s. The real effects of financial crises (on production, income, expenditure, etc.) are always lagged, but the impact on the labour market is even more lagged. As a consequence of the Great Recession, unemployment rose sooner (in 2009-10) in the most flexible labour markets and later (after 2010) in countries where rigidities or internal flexibilities were prevailing.

Although in some countries the initial impact on youth unemployment has been moderate, its long run consequences – such as loss of work experience and human capital, lower employability and reduced earnings, poorer job quality and precarious employment – are now worrying. Of course, also participation rates have changed: discouraged by high YUR, many young people have

given up the job search altogether (or decided to postpone it and continue their stay in the education system) (ILO, 2012a). According to Quintini and Manfredi (2009), the crisis has pushed young people, even those who performed well in good times, into the group of "poorly-integrated new entrants" and possibly into the group of "youth left behind".

The situation is even more problematic in Europe. Not only has the impact on labour markets been large (although delayed in some countries), especially affecting the weaker segments of the market like young people, but the sovereign debt crisis (2011-12) led in 2012-13 to a new recession. In particular, many Eurozone countries have been hurt not only by the persisting credit crunch and lack of confidence, but also by the austerity measures that the most vulnerable countries (Greece, Ireland, Portugal, Spain, Italy) were forced to adopt.

There are some papers that tried to estimate the effects on unemployment of the last financial crisis and "Global Recession"; see, for example, Furceri and Mourougane (2009), World Bank (2010), ILO (2010 and 2012a), O'Higgins (2012), Marelli, Patuelli and Signorelli (2012)[3]; Lundberg and Wuermli (2012) analyse the youth impact of the recent crisis also from a sociological standpoint. In most empirical studies, the impact of financial crises on YUR is found to be larger than the impact on the overall UR.

There are also some papers that tried to obtain some inferences from studying the impact of past financial crises[4] on (youth) unemployment; this attempt is made despite the peculiarities of the last crisis – especially its global nature – compared to previous financial crises (concerning in most cases individual countries or specific groups of countries). For example, Verick (2009), in order to better investigate the impact of the recent crisis on the labour market (especially on young men and women), also analyses the effects on unemployment of the past "Big 5 Crises" (Spain 1977, Norway 1987, Finland 1991, Sweden 1991 and Japan 1992). His analysis confirms that young people are hit hardest; furthermore, the impact persists long after the economy starts growing again.

[3] While ILO and O'Higgins focus specifically on youth unemployment, Marelli et al. investigate the impact of the crisis on unemployment in general, but with a detailed analysis at the regional (NUTS-2) level for the EU countries.

[4] According to Reinhart and Rogoff (2009) there have been eight episodes of major international financial crises since 1870.

Choudhry et al. (2012), considering approximately 70 countries, found that the crises' impact on youth unemployment rate is significant and robust; youth unemployment increases until five years after a financial crisis, with the largest effects in the second and third years. The gender-specific effect of crises on young workers has also been investigated in this paper.

If we now leave aside for a moment the issue of the effects of financial crises, we could ask what are the broad causes of high UR in general and YUR in particular?

A first group of causes include macroeconomic cyclical conditions. The key explanatory variable of UR changes is, in this case, GDP growth.[5] Even at this level, it has also been found that YUR are more sensitive to the business cycle conditions than adult (or overall) UR. Besides GDP changes or the output gap, some other macroeconomic variables have been considered, e.g. productivity growth, trade openness, the terms of trade dynamics, the inflation rate and real (long-term) interest rates. In our empirical analysis, in addition to GDP changes and the real interest rate, we have included the inflation rate as well. So, we must spend a few words on explaining why a negative effect of inflation on unemployment is obtained in many studies: if the actual price level exceeds the expected price level (it might happen with high inflation rates), real wages are lower than expected during the wage bargaining process; then employment increases and unemployment decreases.[6]

A second group of variables that are significant in determining unemployment includes demographic and structural conditions. The demographic variables comprise the percentage of young (or old) people on the population (e.g. the percentage of young people will be used in our investigations) as well as the age structure, population density, migration flows. Structural economic conditions refer to the trade specialisation of countries, the links between the financial structure and real economic activities, the degree of competitiveness (e.g. considering an index of

[5] The link between the two variables is the well-known Okun's law; however, the Okun's coefficient varies across countries and over time. For example, IMF (2010) examined the role of institutions and policies in explaining such differences. Bartolucci et al. (2011) estimated a model that detects an additional impact of financial crises on unemployment beyond their effect through GDP changes.

[6] See Nickell (1998), Nickell et al. (2005), and Belot and van Ours (2001).

"economic freedom")[7]; in addition, of course, to the sectoral mix of production: the share of construction workers, for instance, has been found to be significant (Destefanis and Mastromatteo 2010).

Most of the literature on the causes of high YUR focuses on a third group of variables, i.e. the impact of policies and institutions. OECD (2006) found that almost two-thirds of non-cyclical unemployment changes over two decades can be explained by changes in policies and institutions.[8] As a matter of fact, it was the OECD's *Jobs Study* (1994) that initially proposed an institutional explanation of the weak employment performance in Europe, the so-called "eurosclerosis"; thus leading to specific policy suggestions. Brandt et al. (2005) use a synthetic index of the intensity of the "reform policies" and found that OECD-inspired reforms improve labour market performance with a five-year lag (see also Bassanini and Duval, 2006).

In the present paper, we will focus on the role played by active labour market policies (ALMP) – which is generally negative (i.e. it reduces unemployment) – and of unemployment benefits, in most cases positive (benefits amount, duration, and the replacement ratio are considered in empirical studies). Many other "institutional" variables have been examined in the literature: labour taxes, minimum wages, degree of unionisation, structure of collective bargaining, employment protection legislation (EPL), and incidence of temporary and/or part-time contracts.

According to empirical studies, while the impact of EPL is ambiguous and not always significant for overall UR (the only certain evidence is the lower volatility of employment growth in high EPL countries)[9], generous unemployment benefits are likely to maintain high levels of unemployment (OECD, 2006). The key role of ALMP, together with unemployment benefits, in the

[7] A synthetic "index of the economic freedom of the world" (EFW) has been sometimes used (Feldmann, 2010). Reforms strengthening "economic freedom" impact youth unemployment more than general unemployment rates.

[8] Moreover, changes in policies and institutions, together with changes in the output gap, are estimated to explain 74% of the cross-country variance in the observed unemployment changes for the period 1982-2003.

[9] EPL and lay-off regulations affect the distribution and duration of unemployment, by influencing worker turnover, more than the unemployment level (OECD, 2006); thus they might impinge more on the employability of young people.

explanations of changes in employment and unemployment rates is confirmed by the econometric analysis of Destefanis and Mastromatteo (2010).

With specific reference to young workers, the diffusion of temporary contracts has been especially investigated (e.g. Booth et al., 2002). Notice that institutional variables, like the types of labour contracts, may interact with macroeconomic conditions, worsening the youth unemployment problem. For example, the recessions cause a greater impact on the young because of the higher diffusion of temporary contracts among them (and the strict EPL protecting adult workers). In the EU, about half of young workers are in temporary employment, compared to about 15% for all employees, but the incidence is higher on new hires. Thus, young workers are among the first to lose their jobs, after economic crises, and, because of the reduction in labour demand, school-leavers compete with more jobseekers for fewer vacancies (Scarpetta et al., 2010).

A fourth group of variables is even more specific for the determination of YUR (rather than general UR). They refer, in particular, to human capital, skill mismatch[10], school-to-work transition processes.[11] For example, in developed economies there is a strong link between educational attainment and employment outcomes; the competitive advantage for highly educated people is also detected in terms of higher wage levels (ILO, 2012a). On the other hand, young people with low human capital and less skills are frequently exposed to long-term unemployment, unstable and low quality jobs, and social exclusion (OECD, 2005). However, young people, despite a generally higher education[12] than older workers, often lack two key components of human capital: generic and job-specific work experience. Thus it is the "youth experience gap" that reduces in many cases the employability of young people.

[10] A possible cause of high youth unemployment is the mismatch between the knowledge acquired through formal education and the skills required by the labour market; for a recent investigation of the characteristics of university-to-work transitions and skill mismatches, see Marelli, Sciulli and Signorelli (2012).

[11] These processes vary across countries and change over time (see Caroleo and Pastore, 2007; Quintini and Manfredi, 2009).

[12] Also the characteristics of the educational systems play a key role as well: e.g., countries operating a "dual apprenticeship system" are in better conditions to improve youth labour performance.

As O'Higgins (2012) warns, there is a problem for young people of being more vulnerable to a crisis' effects, than older adults; but a second more important problem is that these effects are more long-lasting for the young. Long periods of unemployment erode the skills of young workers, reduce their employability, cause a permanent loss of human capital and make unemployment persistent.

3. An empirical investigation on OECD countries

In this section we present the econometric analysis of our basic research question, i.e. the assessment of the impact of the financial crises on youth unemployment rate (YUR), compared with the total unemployment rate (UR), after controlling for macroeconomic conditions (GDP growth) and some institutional variables.

3.1. Data

In order to econometrically estimate the impact of various macroeconomic, structural and institutional variables on unemployment rate – especially on youth unemployment rate – we used the sample of high income OECD countries for the period of 1981-2009. The initial number of countries included in the regressions is equal to 27. Beyond an obvious concern of reducing as much as possible heterogeneity across countries, one reason to limit our sample to high income OECD countries is availability of reliable data on various indicators, specifically for labour market reforms and polices. The list of countries included in our analysis is in Table A1 in appendix.

To identify financial crisis episodes, we use the definition of "financial crisis" adopted in Honohan and Laeven (2005) that considers financial crisis as the occurrence of either a "systemic banking crisis" or a "non-systemic banking crisis". The authors also consider currency crises and debt crises. Our econometric analysis focuses on systemic financial crises.

As regards unemployment, according to the International Labor Organization (ILO), from which the YUR and UR data were extracted, the unemployed comprise all persons above a specified age who, during the reference period, were: (a) without work, (b) currently available for work, and (c) actively seeking work. So the unemployment rate is defined as the number of unemployed in an age group divided by the labour force for that group[13].

We have included various explanatory variables to capture their impact on YUR and UR. These control variables belong to different categories, i.e. financial crises, macroeconomic situation, demographic condition, governance and economic freedom, labour market condition, policies and reforms. The choice of control variables for econometric analysis was motivated in Section 2; in particular, we take guidance from previous literature (Booth et al., 2002; OECD, 2006; Destefanis and Mastromatteo, 2010; Feldmann 2010 & 2012). Our explanatory variables include: lagged GDP growth rate, financial crisis, inflation, real interest rate, education level, youth population (share), labour market reform index, economic freedom index, active labour market polices expenditure (ALMP/UNEMP) and unemployment benefits.

Data for GDP growth, inflation rate, real interest rate and population of 0-14 years are taken from World Bank Development Indicators (WDI) historical database. Data on labour market reforms (LMR) index and economic freedom index (EFI) are taken from Fraser institute[14]. Data on financial crisis measured as systemic banking crisis and its updated data is taken from Laeven and Valencia (2012).

Detailed explanation of definitions, calculation and sources of all data used in empirical analysis is presented in the Appendix (Table A2).

[13] In the case of our YUR, the labour force of that age group (15-24 years) is used as the denominator. Similarly, when we are using total unemployment rate as our dependent variable, it is calculated as total unemployed labour force divided by total labour force (in the age group 15-64).

[14] Data on LMR and EFI is usable for dynamic specification only from 2000, for this reason they are included only into two models specifications. LMR is a un-weighted composite index based on six measures of labour market institutions (minimum wage, hiring and firing regulations, centralized collective bargaining, mandated cost of hiring, mandated cost of worker dismissal and conscription). Similarly, economic freedom is summary for Economic Freedom of the World, scaled to take values between 0 (least free) and 10 (most free)

3.2. Model and econometric strategy

The baseline model for estimation is:

$$YUR_{i,t} = YUR_{i,t-1} ¥ + FC_{i,t} ª + \boldsymbol{X}\grave{a}_{i,t} \quad + \sim_i + \varepsilon_{i,t}, \qquad (1)$$

where $YUR_{i,t}$ indicates the youth unemployment rate in country $i=1,\ldots,N$ at time $t=1,\ldots,T_i$ and it is our dependent variable (alternatively, it is replaced by $UR_{i,t}$ when we use total unemployment rate as our dependent variable). $FC_{i,t}$ indicates the financial crisis dummy (takes a value of one if there is a crisis in a country and zero otherwise), $\boldsymbol{X}\grave{a}_{i,t}$ is a row vector comprising the macroeconomic conditions prevailing in country i at time t and, possibly, time dummies in order to capture global shocks. The presence of $YUR_{i,t-1}$ (alternatively, $UR_{i,t-1}$) in the right hand side of Equation (1) serves to specify the unemployment rate as a dynamic process, allowing non-instantaneous adjustments.[15] The composite disturbance $\sim_i+\varepsilon_{i,t}$ comprises a country specific latent component, $\sim_i$, possibly correlated with all the explanatory variables and a zero-mean idiosyncratic component, $\varepsilon_{i,t}$, independent of all explanatory variables other than $YUR_{i,t-1}$ ($UR_{i,t-1}$).

Equation (1) is, therefore, a dynamic panel data model with individual effects potentially related to the regressors. A well known estimation issue concerning this family of models is that the Least Squares Dummy Variables estimator (LSDV), the workhorse of panel data analysis with correlated individual effects, is here no longer consistent for $N \rightarrow +\infty$ and finite T (Nickell 1981).

N-consistent GMM estimators have been suggested as alternatives to LSDV over the last three decades, the two most popular being: the difference GMM estimator by Arellano and Bond (1991), based on the first-difference transformation of equation (1), and the system GMM estimator by Blundell and Bond (1998), based on the joint estimation of two equations: equation (1) untransformed and in first difference. Beyond their great versatility, both estimators have well

[15] In dynamic models, the lagged level of unemployment is often added to investigate persistence of effects. Some econometric analyses control also for possible endogeneity and reverse causality from unemployment to labour market institutions (e.g. Bernal-Verdugo et al., 2012).

known common and distinctive weaknesses. Indeed, Monte Carlo experiments agree in showing that the difference GMM has a severe *finite-sample bias* in panels with small *N*, which is aggravated by a *weak instruments* bias in the presence of highly persistent data. The system GMM, on the other hand, is suitably designed for highly persistent series and so in principle it is not affected by the weak instrument bias. Nonetheless, Monte Carlo experiments show that its finite sample bias, although smaller than difference GMM and LSDV, is still large in absolute terms. Both estimators are also severely affected by the *proliferation bias* documented in Roodman (2009a), which occurs when the number of instruments gets large compared to the number of cross-sectional units.

As mentioned before, the likely heterogeneity of responses to a crisis across a large pool of countries, along with data availability concerns, have led us to restrict our analysis to a panel of high income OECD countries. The price of this choice is a resulting *N* of at most 27 countries in our estimation samples, which discourages our using N-consistent GMM estimators as primary tools of inference for all the reasons spelled out in the foregoing paragraph. We adopt instead a different estimation strategy, relying on the bias-corrected LSDV estimator (LSDVC) introduced by Kiviet (1995). The idea at the origin of LSDVC is to derive an approximation of the LSDV bias that is as accurate as possible and then remove it from the LSDV estimator. Kiviet (1995) obtains LSDVC by purging LSDV of bias approximations containing terms of at most order $N^{-1}T^{-1}$. Kiviet (1999) provides a further refinement with approximations of at most order $N^{-1}T^{-2}$. Bun and Kiviet (2003) obtain formulas that are as accurate as Kiviet's (1999) but easier to implement.

Unfortunately, none of the foregoing formulas accommodate unbalanced panels, a serious limitation that makes them not directly usable for most real-world data sets. Bruno (2005a), extending Bun and Kiviet's (2003) formulas to unbalanced panels, fills that gap. The bias approximations in Bruno (2005a) are those adopted by the Stata command xtlsdvc, designed by G. S. F. Bruno to implement LSDVC. This makes the bias correction strategy suitable for unbalanced panels and so avoids the waste of information that would otherwise occur if the estimation sample

were balanced by the researcher. Since the public availability of xtlsdvc, LSDVC has become increasingly used as a suitable tool of inference in dynamic panel models with a small number of cross-sectional units. Bloom et al. (2007), Potrafke (2010), Celasun and Harms (2011), de Rassenfosse and van Pottelsberghe de la Potterie (2012) are notable examples of applications of LSDVC to panels with a small number of countries.

Bruno (2005b) offers a detailed description of the command. Here it suffices to remind that xtlsdvc permits three possible bias approximations with an increasing degree of accuracy: $B_1 = c_1(\bar{T}^{-1})$, $B_2 = B_1 + c_2(N^{-1}\bar{T}^{-1})$ and $B_3 = B_2 + c_3(N^{-1}\bar{T}^{-2})$, where *N* denotes the number of cross-sectional units (at most 27 countries in our case) and $\bar{T} = \left(\frac{1}{N}\right)\sum_{1}^{N} T_i$ denotes the average group size of the panel (an average number of years of at most 25.22 in our case). Since the bias approximations B_1, B_2 and B_3 depend upon unknown parameters, i.e. the regression variance, σ^2, and γ , bias corrections are implemented through the two-step procedure suggested by Kiviet (1995). The first step obtains estimates for σ^2 and γ from some N−consistent dynamic panel data estimator of choice. The second step performs bias correction by purging the LSDV estimator from an estimate of the bias, $\hat{B}_i$, *i=1,2* and *3*, computed by picking out the bias approximation formula B_i and evaluating it at the estimated σ^2 and γ.

Depending on the chosen bias approximation, three LSDVC estimators can be implemented: $LSDVC_i = LSDV - \hat{B}_i$, *i=1,2* and *3*. Each of the three bias corrected estimators is initialised through three N-consistent estimators for σ^2 and γ, either the Anderson and Hsiao (1982) IV estimator (AH) or the Arellano and Bond (1991) difference GMM estimator (AB), or else the Blundell and Bond (1998) system GMM estimator (BB). Standard errors are obtained through a parametric bootstrap procedure described in Bruno (2005b).

Monte Carlo analysis in Bruno (2005b) demonstrates that for sample sizes comparable to those of our samples LSDVC outperforms not only the conventional LSDV, but also the N-

consistent estimators AH, AB and BB, according to both root mean squared error and bias criteria, regardless of the initialising estimator and the accuracy of the bias approximation (similar evidence supporting LSDVC is provided by Kiviet 1995 and Judson and Owen 1999).

In our empirical analysis we choose the most accurate $LSDVC_3$, and tried all three initialisations. In addition, following the recommendations in Roodman (2009a) against the proliferation bias in GMM dynamic panel data estimators, we also implemented a new version of LSDVC, initialised through BB estimators with smaller sets of instruments[16]. Consistently with the Monte Carlo evidence in Bruno (2005b), we find no substantial differences in LSDVC coefficients and standard errors among all initializations tried. We report results for LSDVC initialised by AB in Tables 1-4, and those for LSDVC initialized by a "parsimonious" BB estimator in Tables A5-A8 in appendix. Bootstrapped standard errors are always computed through 500 replications.

3.3. Long-run coefficients

Within the dynamic framework of Equation (1), ª and must be thought of as short-run coefficients, measuring the immediate (within the year) response of unemployment to the onset of a temporary crisis (a unit change in $FC_{i,t}$) or temporary shocks in $\boldsymbol{X}'_{i,t}$, respectively. Long-run coefficients are identified as $\frac{\lambda}{1-\gamma}$ and $\frac{\boldsymbol{\beta}}{1-\gamma}$; they measure the total adjustment of the unemployment rate following a prolonged crisis or sustained shocks in $\boldsymbol{X}'_{i,t}$, respectively. The ¥ coefficient captures the persistence of the process: since $|\gamma|$ is the portion of the short-run adjustment that is translated to the next year, the closer $|\gamma|$ to 1 the higher the persistence in the dependent variable. To directly assess the speed of the long-run adjustments we also estimate the

[16]In the construction of the "parsimonious" BB estimator, the instrument count is reduced by replacing the "GMM-style" instruments with their principal components with eigenvalues at least 1 (Bai and Ng 2010; Mehrhoff 2009; Roodman 2009a). Alternatively, instruments are computed using only a limited number of lags of the dependent variable and then collapsed as described in Roodman (2009a). These initializations are implemented by an upgraded version of xtlsdvc, available on request, that incorporates the Stata command xtabond2 by David Roodman (see Roodman 2009b for a description of xtabond2).

median lag of the process $= -\frac{ln(2)}{ln(\gamma)}$, i.e. the number of years required for completing 50% of the long-run adjustment.

From the above it is clear that long-run coefficients are non-linear transformations of the short-run coefficients. This would bring about a further finite-sample bias in the "naive" [17] long-run estimates, $\frac{\widehat{\lambda}_{LSDVC}}{1-\widehat{\gamma}_{LSDVC}}$ and $\frac{\widehat{\boldsymbol{\beta}}_{LSDVC}}{1-\widehat{\gamma}_{LSDVC}}$, obtained by replacing the short-run coefficients with the LSDVC short-run estimates into $\frac{\boldsymbol{\lambda}}{1-\gamma}$ and $\frac{\boldsymbol{\beta}}{1-\gamma}$. We rectified this bias along the lines of Bun (2003), by removing the bias approximations derived by Pesaran and Zhao (1999) from the "naive" long-run estimates[18].

3.4.Results

Tables 1 and 2 report LSDVC short-run coefficient estimates, along with the median lag estimates, for YUR and UR respectively. The bias-corrected long-run coefficient estimates are shown in Tables 3 and 4. Models 1 to 4 are the ones with the largest estimation samples. Model 1 is the most parsimonious with *Lagged GDP growth*, *Inflation* and a *trend* variable as additional explanatory variables. Model 2 extends Model 1 by replacing the trend variable with a full set of time dummies. Model 3, in addition to the controls of Model 1, also considers the following regressors: *Population aged 0-14*, *Part-time employment* and *Real interest rate*. Model 4 offers the most general specification, extending Model 3 with a full set of time dummies (uncorrected LSDV short-run estimates for Models 3 and 4 are reported in Table A4 in appendix). Models 5 to 9 explore

[17] This is the way Pesaran and Zhao (1999) refer to long-run estimates of the kind $\frac{\widehat{\beta}}{1-\widehat{\gamma}}$, where $\widehat{\beta}$ and $\widehat{\gamma}$ are some consistent estimators of the short-run coefficients.

[18] The Pesaran-Zhao procedure is another feature supported by the upgraded xtlsdvc (see footnote 17).

the impact of additional controls (ALMP/UNEMP, unemployment benefits, EFI, LMR) at the expenses of smaller estimation samples[19].

Our main results can be summarised as follows.

1. As expected, the coefficient capturing dynamics, ¥, is large and always strongly significant in all models and for both YUR and UR (Tables 1 and 2). In the models with the largest estimation samples, Models 1-4, it is 0.81-0.89 for YUR and 0.85-0.90 for UR. Interestingly, the comparison of LSDVC and uncorrected LSDV (Table A4) confirms the well-known downward bias of the LSDV ¥ estimator (Kiviet 1995, Bruno 2005b).
2. Tables 1 and 2 also show that the short-run impact of *FC* is always positively significant in both YUR and UR equations. Also, it is higher for YUR than for total UR. Indeed, the short-run impact of *FC* on YUR is always far higher than 1 percentage point, while the impact on UR is always less than 1 percentage point. Model 5 is the only exception, presenting *FC* coefficients of reduced significance. One possible explanation is that this model includes the variable *ALMP/UNEMP*, which is not observed after 2004, so that the estimation sample in this case does not cover the last crisis. In Models 1-4, the short-run impact of a financial crisis episode on YUR is about 1.9 times higher than on UR.
3. The long-run impact of *FC* is always positively significant in both YUR and UR equations and always higher for YUR than for UR (Tables 3 and 4). More specifically, the long-run impact of a financial crisis episode on YUR is from 1.5 to 1.7 times higher than on UR in Models 1-4.
4. For most of the models YUR shows slightly less persistence than UR. For example, focussing on Model 4 we observe a median lag of 3.72 for YUR (Table 1) against a corresponding value of 4.95 for UR (Table 2). Nonetheless, the short-run impact of a crisis

[19] *ALMP/UNEMP* is not observed after 2004. *EFI* and *LMR* are usable in a dynamic analysis only from year 2000 onward. Before 2000, in fact, they are only observed with gaps of four years, in 1980, 1985, 1990 and 1995. The variable *Unemployment benefits*, also contains several missing values.

is so much higher for YUR than for UR that, even though smaller portions of it are translated to future YUR, the long-run impacts are eventually higher for the former. With long-run estimates of 9.3 for the YUR equation and 6.3 for the UR equation (Tables 3 and 4), Model 4 predicts that after less than 4 years of crisis YUR increases by 4.6 percentage points on average and that after 5 years of crisis UR increases by 3.1 percentage points on average. This is in line with the direct evidence of the data. For example, in the US YUR and UR have increased, respectively, by 7.1 and 4.7 percentage points over the period of the last crisis, 2007-2009. Similarly, for the UK we observe a 5 points increase in YUR against a 2.4 points increase in UR over the same period.

5. The time dummies capture transitory effects that are aggregate across all countries. Interestingly, the significance of the crisis variable is not attenuated when they are included in the specification, as in Models 2 and 4. On this regard, the dummy coefficient estimates (unreported) show that the dummy for year 2009 is always the one with the largest positive impact, indicating the global nature of the last crisis.
6. The short- and long-run impacts of *Lagged GDP growth*, always negatively significant, are more sizeable for YUR than UR. In Models 1-4 we observe short-run impacts on YUR that are 1.7-1.8 times higher than on UR and long-run impacts that are 1.3-1.6 times higher.
7. The sign of the coefficients on all the other regressors, when significant, are consistent with our theoretical priors. The real interest rate generally exhibits a positive coefficient (as expected), but it is not statistically significant in Model 6 (Tables 1 and 2); the inflation rate, when significant, points to the opposite direction (see discussion on page 5). A high share of part-time employment, as a proxy of flexible labour contracts, tends to significantly reduce unemployment (especially YUR), but it loses significance when additional institutional controls are used and the estimation sample shrinks (Models 5 and 6). Concerning the impacts of the additional institutional variables, they are significant, show the expected signs and relatively higher size for YUR than UR: active labour market policies (ALMP), labour

market reforms (LMR) and the more general “economic freedom” (EFI) tend to reduce unemployment and the opposite effect is caused by the Unemployment benefits. Our findings regarding above mentioned explanatory variables are in consonance with the existing literature on the topic (see Booth et al., 2002, Destefanis and Mastromatteo, 2010,Feldmann 2010 and Choudhry et al., 2012).

Even with all their finite-sample limitations, GMM estimators may be interesting to compare with LSDVC and may also shed some light on issues that cannot be accommodated within the LSDVC framework, such as exogeneity of regressors, required for LSDVC to be N-consistent. We focus on system GMM, rather than difference GMM, since our LSDVC estimates all agree in showing high persistence in the unemployment series. In order to attenuate the proliferation bias (Roodman 2009a) we implement two versions of the system GMM, both based on a reduced instrument count. The first version (sysGMM1) collapses "GMM-style" instruments from the unemployment variables and limits the lag depth to order 10. The second version (sysGMM2) replaces the "GMM-style" instruments with their principal components with eigenvalues at least 1 (Bai and Ng 2010; Mehrhoff 2009). Our data do not allow limiting instruments proliferation in the presence of a full set of time dummies, therefore we accomplish system GMM estimation only for Model 3. Results are reported in Table 5.

Although expectedly less significant, the coefficient estimates here largely confirm the findings from the LSDVC analysis. In addition, the two-step robust Hansen statistic and the AR2 test support instrument validity in all cases. While our attempts (unreported) of estimating difference and system GMM with full sets of instruments always showed the symptoms of an instruments proliferation bias (a singular two-step estimated covariance matrix of moments and p-values of Hansen statistics collapsing to unity), there is no clear evidence of such a problem in this case. It is also interesting to note that all the Difference-in-Hansen tests provide empirical support

to exogeneity of regressors [20]. Finally, the Difference-in-Hansen tests of the validity of the additional orthogonality restrictions brought in by the level equation do not permit to reject such hypothesis at any conventional level of significance.

Table 1: Youth Unemployment Rate – Bias corrected LSDV Short-run estimates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Youth u-rate(-1)	0.847***	0.886***	0.813***	0.830***	0.752***	0.794***	0.790***	0.775***	0.789***
	0.022	0.023	0.028	0.029	0.045	0.053	0.045	0.055	0.051
GDP Growth (-1)	-0.425***	-0.303***	-0.427***	-0.330***	-0.584***	-0.551***	-0.507***	-0.564***	-0.636***
	0.035	0.036	0.041	0.043	0.061	0.099	0.082	0.086	0.080
Financial crises	1.933***	1.516***	1.820***	1.686***	0.812	1.133*	1.309***	1.075**	1.204***
	0.259	0.298	0.349	0.359	0.645	0.583	0.423	0.440	0.400
Inflation	-0.024	-0.007	-0.034	-0.026	0.019	-0.220	-0.212*	-0.258***	-0.227***
	0.027	0.028	0.038	0.040	0.075	0.136	0.115	0.095	0.085
Pop aged 0-14			0.069	0.109	0.199	-0.303			
			0.081	0.076	0.131	0.419			
Real Interest Rate			0.089**	0.083**	0.090*	-0.002			
			0.035	0.034	0.050	0.064			
Part-time employment			-0.158***	-0.157***	0.060	-0.145			
			0.057	0.054	0.085	0.173			
ALMP/UNEMP					-0.038***				
					0.014				
Unemployment Benefits						1.422*	2.571***		
						0.858	0.544		
EFI								-1.628**	
								0.746	
LMR Index									-0.550**
									0.269
Trend	-0.016		0.025		0.022	-0.005	0.090*	0.081	0.162**
	0.013		0.022		0.031	0.106	0.049	0.061	0.075
Time dummies	NO	YES***	NO	YES***	NO	NO	NO	NO	NO
		124.13		105.12					
Median lag	4.16***	5.73***	3.35***	3.72***	2.43***	3.01***	2.95***	2.72***	2.92***
	0.66	1.24	0.56	0.69	0.51	0.86	0.71	0.76	0.80

[20] We have also tried sysGMM on specifications allowing endogenous regressors and, again, results (available on request) confirm the LSDVC findings.

Observations	646	646	483	483	270	187	260	234	233
No of Countries	26	26	26	26	19	25	25	26	26
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	24.85	24.85	18.58	18.58	14.21	7.48	10.40	9	8.96
Significance of Model	264.03***	128.41***	182.59***	119.05***	150.32***	68.94***	236.52***	137.95***	155.98***

Notes: Bootstrap standard errors based on 500 replications are reported under the coefficient value: * significant at 10 %, ** significant at 5 %, *** significant at 1 %. The chi-squared values for the Wald tests of joint significance of the time-dummy coefficients are reported, whenever time-dummies are included. The *median lag=-log(2)/log(¥)* denotes the number of years required for 50% of the long-run adjustment following a sustained unit change in any of the explanatory variables. The *significance of the model* refers to the chi-squared values for the Wald tests of joint significance of the explanatory variable coefficients, excluding the lagged dependent variable. The *average group size* refers to the average number of years over which a country is observed in the estimation sample. The initialization is based on AB, the Arellano and Bond (1991) difference GMM estimator.

Table 2: Total Unemployment Rate – Bias corrected LSDV Short-run estimates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Total u-rate(-1)	0.866***	0.902***	0.851***	0.869***	0.809***	0.816***	0.760***	0.788***	0.822***
	0.017	0.018	0.021	0.021	0.032	0.045	0.034	0.049	0.050
GDP Growth (-1)	-0.231***	-0.181***	-0.237***	-0.200***	-0.340***	-0.266***	-0.235***	-0.302***	-0.342***
	0.015	0.017	0.019	0.019	0.026	0.039	0.031	0.034	0.038
Financial crises	0.996***	0.828***	0.975***	0.884***	0.467*	0.432**	0.592***	0.425**	0.533***
	0.124	0.132	0.146	0.152	0.258	0.211	0.153	0.189	0.183
Inflation	-0.022*	-0.014	-0.013	-0.012	0.010	-0.071	-0.106**	-0.092**	-0.070*
	0.012	0.013	0.017	0.017	0.036	0.051	0.043	0.042	0.041
Pop aged 0-14			0.024	0.052	0.069	-0.133			
			0.037	0.034	0.058	0.152			
Real Interest Rate			0.044***	0.034**	0.041*	-0.016			
			0.015	0.015	0.023	0.023			
Part-time employment			-0.087***	-0.082***	-0.007	-0.006			
			0.025	0.024	0.039	0.061			
ALMP/UNEMP					-0.018***				
					0.007				
Unemployment Benefits						0.955***	1.584***		
						0.322	0.209		
EFI								-0.902***	
								0.321	
LMR Index									-0.244**
									0.113
Trend	-0.024***		-0.001		-0.011	-0.013	0.010	0.017	0.054*
	0.005		0.010		0.016	0.037	0.018	0.024	0.029
Time dummies	NO	YES***	NO	YES***	NO	NO	NO	NO	NO
		169.23		118.16					
Median lag	4.83***	6.69***	4.29***	4.95***	3.26***	3.42***	2.53***	2.91***	3.53***
	0.67	1.30	0.65	0.86	0.61	0.92	0.41	0.77	1.08
Observations	681	681	501	501	285	194	272	243	242
No of Countries	27	27	27	27	20	26	26	27	27
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	25.22	25.22	18.56	18.56	14.25	7.46	10.46	9	8.96
Significance of Model	368.30***	201.48***	297.31***	207.80***	305.87***	119.73***	326.36***	187.39***	167.09***

Notes: see the footnote of Table 1.

Table 3: Youth Unemployment Rate – Bias corrected LSDV Long-run estimates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP Growth (-1)	-2.610***	-2.367 ***	-2.154***	-1.812***	-2.164***	-2.291***	-2.168***	-2.209***	-2.600***
	0.394	0.470	0.342	0.342	0.424	0.567	0.526	0.498	0.511
Financial crises	11.889***	11.851***	9.240***	9.288***	2.931	5.007**	5.733***	4.255**	5.061***
	2.098	2.913	2.129	2.381	2.345	2.260	1.954	1.729	1.708
Inflation	-0.161	-0.073	-0.197	-0.166	0.017	-0.969*	-0.945*	-1.013***	-0.928***
	0.161	0.209	0.182	0.206	0.265	0.563	0.494	0.384	0.362
Pop aged 0-14			0.366	0.609	0.834*	-1.323			
			0.398	0.409	0.434	1.642			
Real Interest Rate			0.459***	0.464**	0.337*	-0.008			
			0.174	0.186	0.190	0.253			
Part-time employment			-0.828***	-0.904***	0.228	-0.638			
			0.272	0.282	0.310	0.698			
ALMP/UNEMP					-0.153***				
					0.047				
Unemployment Benefits						6.094*	11.186***		
						3.436	2.901		
EFI								-6.686**	
								2.769	
LMR Index									-2.304**
									1.065
Trend	-0.104		0.123		0.069	-0.077	0.376*	0.319	0.666**
	0.078		0.112		0.114	0.413	0.222	0.217	0.283
Time dummies	NO	YES	NO	YES	NO	NO	NO	NO	NO
		31.56		36.13					
Observations	646	646	483	483	270	187	260	234	233
No of Countries	26	26	26	26	19	25	25	26	26
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	24.85	24.85	18.58	18.58	14.21	7.48	10.40	9	8.96
Significance of Model	52.43***	30.02***	60.54***	49.05***	80.12***	24.96***	32.76***	36.12***	31.64***

Notes: The long-run coefficient on an *x* variable, $\beta/(1-\gamma)$, measures the total impact of a sustained unit change in *x* on the dependent variable. Bootstrap standard errors based on 500 replications are reported under the coefficient value: * significant at 10 %, ** significant at 5 %, *** significant at 1 %. The chi-squared values for the Wald tests of joint significance of the time-dummy long-run coefficients are reported whenever time-dummies are included. The *significance of the model* refers to the chi-squared values for the Wald tests of joint significance of the long-run coefficients. The initialization is based on AB, the Arellano and Bond (1991) difference GMM estimator.

Table 4: Total Unemployment Rate – Bias corrected LSDV Long-run estimates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP Growth (-1)	-1.644***	-1.652***	-1.502***	-1.423***	-1.652***	-1.267***	-0.967***	-1.240***	-1.596***
	0.217	0.293	0.221	0.241	0. 285	0.341	0.205	0.252	0.336
Financial crises	7.091***	7.593***	6.188***	6.282***	2.300*	2.179**	2.261***	1.770**	2.569***
	1.216	1.690	1.149	1.387	1.297	1.011	0.625	0.844	0.928
Inflation	-0.169**	0.136	-0.098	-0.100	0.015	-0.363	-0.391**	-0.381**	-0.328
	0.084	0.116	0.103	0.116	0.168	0.239	0.171	0.177	0.211
Pop aged 0-14			0.156	0.370	0.373	-0.608			
			0.230	0.248	0.262	0.748			
Real Interest Rate			0.281***	0.251**	0.201*	-0.075			
			0.098	0.105	0.115	0.113			
Part-time employment			-0.564***	-0.603***	-0.039	-0.042			
			0.155	0.167	0.192	0.290			
ALMP/UNEMP					-0.092***				
					0.027				
Unemployment Benefits						4.748***	6.019***		
						1.641	1.084		
EFI								-3.900***	
								1.270	
LMR Index									-1.162**
									0.535
Trend	-0174***		-0.014		-0.064	-0.084	0.068	0.056	0.236*
	0.038		0.063		0.073	0.174	0.073	0.098	0.132
Time dummies	NO	YES**	NO	YES*	NO	NO	NO	NO	NO
		44.78		38.69					
Observations	681	681	501	501	285	194	272	243	242
No of Countries	27	27	27	27	20	26	26	27	27
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	25.22	25.22	18.56	18.56	14.25	7.46	10.46	9	8.96
Significance of Model	68.87***	35.10***	78.07***	52.29***	98.21***	26.24***	56.60***	35.47***	26.49***

Notes: see the footnote of Table 3.

Table 5: One-step System GMM short-run estimates for YUR and UR - Model 3

	Youth u-rate		Total u-rate	
	sysGMM1	sysGMM2	sysGMM1	sysGMM2
Youth u-rate(-1)	0.682***	0.545**		
	0.063	0.232		
Total u-rate(-1)			0.720***	0.696***
			0.061	0.108
GDP Growth (-1)	-0.339***	-0.378***	-0.186***	-0.169***
	0.067	0.096	0.030	0.027
Financial crises	1.466**	1.342*	0.853***	0.872***
	0.546	0.730	0.239	0.237
Inflation	0.003	-0.011	-0.037	-0.041
	0.083	0.112	0.038	0.046
Pop aged 0-14	-0.015	-0.057	0.052	0.048
	0.133	0.205	0.064	0.071
Real Interest Rate	0.079**	0.105	0.028	0.032*
	0.041	0.066	0.018	0.019
Part-time employment	-0.176***	-0.249**	-0.071***	-0.075**
	0.054	0.117	0.026	0.029
Trend	-0.017	-0.036	-0.027	-0.031
	0.047	0.078	0.023	0.028
Constant	8.504**	12.847	3.048*	3.364
	3.648	8.329	1.586	2.113
Median lag	1.81***	1.14	1.91**	1.91**
	0.44	0.80	0.82	0.82
AR2 test p-value	0.817	0.562	0.824	0.763
Hansen statistics p-value	0.189	0.179	0.177	0.252
Diff-in-Hansen p-value (X exogenous)	0.130		0.199	
Diff-in-Hansen p-value (D.y(-1) valid)	0.569		0.438	
KMO		0.948		0.927
Observations	483	483	501	501
No of Countries	26	26	27	27
Number of instruments	17	12	18	12
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009
Average group size	18.6	18.6	18.6	18.6
Significance of Model	117.88***	55.21***	130.84***	118.25***

Notes: Cluster-robust standard errors are reported under the coefficient value: * significant at 10 %, ** significant at 5 %, *** significant at 1 %. sysGMM1 is the system GMM estimator with collapsed "GMM style" instruments from lag 4 to lag 10 for YUR and from lag 3 to lag 10 for UR. For this estimator two cluster-robust (two-step) Difference in Hansen statistics are computed: that testing exogeneity of regressors (X) and that testing the validity of the lagged first difference of the dependent variable (D.y(-1)) as an instrument for the level equation. sysGMM2 is the system GMM estimator with instrumental variables given by principal components of at least eigenvalue 1extracted from "GMM style" instruments. In this case the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) is computed (it must be > 0.5 for satisfactory factor analysis). For both estimators, AR2 test refers to the Arellano and Bond (1991) test of autocorrelation of order 2 in differenced disturbances (AR2 is zero under zero AR1 correlation in the disturbances in level, which is required for the validity of the instruments in levels). The cluster- robust (two-step) Hansen statistics directly tests the joint validity of all overidentifying restrictions in both estimators. The *significance of the model* refers to the chi-squared values for the Wald tests of joint significance of the explanatory variable coefficients, excluding the lagged dependent

variable. The *average group size* refers to the average number of years over which a country is observed in the estimation sample. The constant term is included only in the level equation, being differenced out in the difference equation.

4. Conclusions and policy implications

In this study we have analysed the effects of financial crises on youth unemployment rates (YUR) during the period 1981-2009 for a panel of high income OECD countries. The estimation strategy is primarily based on bias-corrected LSDV estimators for dynamic panel data models (LSDVC). We have also considered the differentiated impact on YUR compared to total UR. Special attention has been paid to the persistence of such effects, estimating both short-run and long-run effects.

The key result of our econometric investigations is that the financial crisis impact on YUR is large, statistically significant and robust, both in the short and long run. The impact is higher if compared with overall UR: some 1.9 times higher in the short run and from 1.5 to 1.7 times higher in the long run. The key control variable is the lagged GDP growth. It is always highly negatively significant in both equations and similarly to financial crisis it shows larger short-run and long-run impacts on YUR than UR: YUR's short and long-run responses to financial crisis are, respectively, some 1.8 and 1.3-1.6 times higher.

Dynamic feedbacks, as captured by lagged YUR and UR, are always highly significant and relatively larger in the UR equation, which indicates a slightly lower persistence in YUR than in UR. Despite of lower persistence, the short-run impact of a crisis is found so much higher for YUR than UR that eventually it triggers also a higher long-run impact.

The inclusion of many other control variables – inflation, real interest rate, part time employment and population age structure – does not change the sign and significance of the main explanatory variable. As to the institutional variables, despite the small number of observations, the impact of active labour market polices seems statistically significant. Also economic freedom and part time employment tend to reduce unemployment, especially for young people, while the

unemployment benefits increase the YUR and UR. Changing the estimation framework from LSDVC to GMM does not alter our main conclusions.

The first policy implication is obvious. The estimated heavy toll in terms of higher unemployment rates, especially among young people, urge to prevent the occurrence of financial crisis. This suggestion is not trivial, though, because in the last five years, despite the numerous proposals at different levels (G-20, EU, individual countries), little progress has been made in designing a reformed financial system and more effective regulations.

Secondly, given the substantial links of total UR and, especially, YUR with GDP growth, macroeconomic policy to sustain aggregate demand, in the short run, and uphold growth trends (also through structural reforms), in the long run, are extremely useful. This is especially relevant for Eurozone countries, where the extensive austerity measures adopted following the sovereign debt crisis should now be accompanied by an effective growth strategy (the "Europe 2020" plan of the EU is useless if depressive economic conditions are persisting over time).

Thirdly, given the estimated persistence of effects, policy interventions must be prompt in response to the onset of a financial crisis.

Finally, since on the occurrence of a crisis episode young people are the ones most seriously hit, specific labour policies are needed to attack the high and rising YUR. [21] Generous active labour policies[22], accompanied by adequate school-to-work institutions, are badly needed, especially in countries where a big proportion of young people (in some cases almost half or even exceeding this ceiling) are not able to find a job. Otherwise, the group of young people losing contact with the labour market, thus permanently hindering their employment prospects, will become a foremost social problem.

[21] A review of policies to reduce YUR, including an appraisal of measures taken in EU countries, can be found in O'Higgins (2012).

[22] ILO (2012a), that explicitly considers also macroeconomic and growth policies, distinguishes between: (i) active labour market measures, including development of public employment services, wage and training subsidies or tax cuts (that can motivate employers to hire young people); (ii) programmes to offset the mismatch of technical skills among youth, such as vocational training programmes, re-training of unemployed or discouraged youth, workplace training schemes, the creation or improvement of apprenticeship systems, entrepreneurship training programmes, soft and life skills training programmes for disadvantaged youth.

Acknowledgments

This research was supported by a Marie Curie International Research Staff Exchange Scheme Fellowship within the 7th European Community Framework Programme (under the project IRSES GA-2010-269134).

References

Anderson, T. W. and C. Hsiao. (1982). Formulation and estimation of dynamic models using panel data. *Journal of Econometrics* 18: 570-606.

Arellano, M. and S. Bond. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58: 277-297.

Arpaia A. and Curci N. (2010), "EU Labour Market Behaviour During the Great Recession", *European Economy*, Economic Papers, 405.

Bai J. and Ng S. (2010), "Instrumental Variable Estimation in a Data Rich Environment," *Econometric Theory*, 26, 1577-1606.

Bartolucci F., Choudhry M., Marelli E. and Signorelli M. (2011), "Financial Crises and Labour Market: Beyond the Okun's Law", presented at the 16th World Congress *International Economic Association*, Tsinghua University, Beijing, July 4-8, 2011.

Bassanini A. and Duval R. (2006), *Employment Patterns in OECD Countries: Reassessing the Role of Policies and Institutions.* OECD Economics Department working paper, 486.

Belot, M. and Van Ours J.C. (2001), "Unemployment and Labor Market Institutions: An Empirical Analysis", *Journal of Japanese and International Economics*, 15(4): 403-418.

Bernal-Verdugo E.L., Furceri D. and Guillaume D. (2012), "Labor Market Flexibility and Unemployment: New Empirical Evidence of Static and Dynamic Effects", *Comparative Economic Studies*, 3.

Bloom D. E., Canning D., Mansfield R.K. and Moore M. (2007) "Demographic change, social security systems, and savings," *Journal of Monetary Economics*, 54, 92-114.

Blundell R. and S. Bond (1998), "Initial conditions and moment restrictions in dynamic panel data models" *Journal of Econometrics*, 87, 115-143.

Booth A.L., Francesconi M. and Frank J. (2002), "Temporary Jobs: Stepping Stones or Dead Ends?", *Economic Journal*, 112(480), F189-F213.

Brandt N., Burniaux J.M. and Duval R. (2005), *Assessing the OECD Jobs Strategy: Past Developments and Reforms*, OECD Economics Department working paper, 429.

Bruno, G.S.F. (2005a). "Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models". *Economics Letters*, 87, 361-366.

Bruno, G.S.F. (2005b). "Estimation and inference in dynamic unbalanced panel data models with a small number of individuals". *The Stata Journal*, 5, 473-500.

Bun M.J. (2003). "Bias Correction in the Dynamic Panel Data Model with a Nonscalar Disturbance Covariance Matrix" *Econometric Reviews* Vol. 22, No. 1, pp. 29–58.

Bun, M.J.G. and J.F. Kiviet. (2003). On the diminishing returns of higher order terms in asymptotic expansions of bias. *Economics Letters* 79: 145-152.

Caroleo F.E. and Pastore F. (2007), "The Youth Experience Gap: Explaining Differences Across EU Countries", *Quaderni del Dipartimento di Economia, Finanza e Statistica*, Università di Perugia, 41.

Celasum, O. and Harms P. (2010) "Boon or Burden? The Effect of Private Sector Debt on the Risk of Sovereign Default in Developing Countries" *Economic Inquiry*, 49, 70-88.

Choudhry M., Marelli E. and Signorelli M. (2012), "Youth Unemployment Rate and Impact of Financial Crises", *International Journal of Manpower*, 33, 1, 76-95.

Clark K.B. and Summers L.H. (1982), "The Dynamics of Youth Unemployment", in R. B. Freeman and D. A. Wise (Eds.), *The Youth Labour Market Problem: its Nature, Causes and Consequences*. Chicago Press/NBER.

Destefanis S. and Mastromatteo G. (2010), "Labour-market Performance in the OECD: Some Recent Cross-country Evidence", *International Journal of Manpower*, 31, 7, 713-31.

Feldmann H. (2010), "Economic Freedom and Unemployment", chapter 5 in: *Economic Freedom of the World*, Annual Report.

Feldmann H. (2012), "Financial System Sophistication and Unemployment in Industrial Countries", *International Journal of Finance and Economics*. doi: 10.1002/ijfe.1466.

Furceri D. and Mourougane A. (2009), "The Effect of Financial Crises on Potential Output: New Empirical Evidence from OECD countries", *OECD Economics Department Working Paper*, 699, Paris.

Honohan P. and Laeven L.A. (2005), *Systemic Financial Distress: Containment and Resolution*, Cambridge University Press, Cambridge (UK).

ILO (2012a), *Global Employment Trends for Youth 2012*, Geneva.

ILO (2012b), *Key Indicators of the Labour Market* (KILM), Seventh Edition, Geneva.

IMF (2010), "Unemployment Dynamics During Recessions and Recoveries: Okun's Law and Beyond", Chapter 3 in *World Economic Outlook: Rebalancing Growth*, Washington.

Judson, R.A. and A.L. Owen. (1999). Estimating dynamic panel data models: a guide for macroeconomists. *Economics Letters* 65: 9-15.

Kiviet, J.F. (1995). On bias, inconsistency, and efficiency of various estimators in dynamic panel data models. *Journal of Econometrics* 68: 53-78.

Kiviet, J. F. (1999). Expectation of expansions for estimators in a dynamic panel data model; some results for weakly exogenous regressors. In *Analysis of Panels and Limited Dependent Variable Models*, ed. C. Hsiao, K. Lahiri, L.-F. Lee, and M. H. Pesaran,199-225. Cambridge: Cambridge University Press.

Kolev A. and Saget C. (2005), "Understanding Youth Labour Market Disadvantage: Evidence from South-East Europe", *International Labour Review*, 144(2), 161-187.

Laeven L and F.Valencia (2012), "Systemic Banking Crises Database: An Update", *IMF working paper* 12/163. International Monetary Fund.

Lee J. (2000), "The Robustness of Okun's law: Evidence from OECD Countries", *Journal of Macroeconomics*, 22(2): 331-56.

Lundberg M. and Wuermli A. (2012), *Overview Children and Youth in Crisis: Protecting and Promoting Human Development in Times of Economic Shocks*, The World Bank.

Marelli E., Patuelli R. and Signorelli M. (2012), "Regional Unemployment in the EU before and after the Global Crisis", *Post-Communist Economies*, 2.

Marelli E., Sciulli D. and Signorelli M. (2012), "Skill Mismatch of Graduates in a Local Labour Market: the Case of Perugia", presented at the International Workshop on *Partners in Innovation. The Role of Knowledge Institutions and Universities in Local Development*, Trento, December 10-11.

Mehrhoff J. (2009) "A Solution to the Problem of Too Many Instruments in Dynamic Panel Data GMM", *Deutsche Bundesbank* Discussion Paper 31/2009.

Nickell, S.J. (1981). "Biases in dynamic models with fixed effects." *Econometrica* 49: 1417-1426.

Nickell S.J. (1998), "Unemployment: Questions and Some Answers", *The Economic Journal*, 108(448): 802-816.

Nickell S.J., Nunziata L. and Wolfgang O. (2005), "Unemployment in the OECD since the 1960s. What do we know?", *Economic Journal*, 115, 500: 502-06.

OECD (1994), *OECD Jobs Study*, Paris.

OECD (2005), *Education at Glance*, Paris.

OECD (2006), *Employment Outlook*, Paris.

O'Higgins N. (2012), "This Time It's Different? Youth Labour Markets during 'The Great Recession' ", *Comparative Economic Studies*, 3.

Pesaran, M.H, and Zhao Z. (1999), "Bias reduction in estimating long-run relationships from dynamic heterogenous panels" in C. Hsiao, K. Lahiri, L-F Lee and Pesaran M.H. (Eds.),

Analysis of Panels and Limited Dependent Variables, Cambridge University Press, Cambridge.

Potrafke N. (2010) "Does government ideology influence deregulation of product markets? Empirical evidence from OECD countries", *Public Choice* 143, 135-155.

Quintini G. and Manfredi T. (2009), "Going Separate Ways? School-to-Work Transitions in the United States and Europe", *OECD Social, Employment and Migration Working Paper*, 90.

de Rassenfosse G. and van Pottelsberghe de la Potterie B. (2012) "On the Price Elasticity of Demand for Patents", *Oxford Bulletin of Economics and Statstics*, 74, 58-77.

Reinhart C.M. and Rogoff K.S. (2009), *Time is Different: Eight Centuries of Financial Folly*, Princeton University Press.

Roodman D. (2009a) "A note on the theme of too many instruments" *Oxford Bulletin of Economics and Statistics*, 71, 135-158.

Roodman D. (2009b) "How to do xtabond2: An introduction to difference and system GMM in Stata" *The Stata Journal*, 9, 86-136.

Scarpetta S., Sonnet A. and Manfredi T. (2010), "Rising Youth Unemployment During the Crisis: How to Prevent Negative Long-term Consequences on a Generation?", *OECD Social, Employment and Migration Working Papers*, 6.

Verick S. (2009), "Who is Hit Hardest During a Financial Crisis? The Vulnerability of Young Men and Women to Unemployment in an Economic Downturn", *IZA Discussion Papers*, 4359.

World Bank (2010), *Global Economic Prospects. 2010 Foresees Long Road to Economic Recovery*, Washington.

APPENDIX

Table A1: List of Countries

Australia	Greece	New Zealand
Austria	Hungary	Norway
Belgium	Iceland	Portugal
Canada	Ireland	Slovakia
Czech Republic	Italy	Spain
Denmark	Japan	Sweden
Finland	Korea, Republic of	Switzerland
France	Luxembourg	United Kingdom
Germany	Netherlands	United States

Table A2: Data description and Sources

Variable	Definition	Source
Dependent Variables		
Youth Unemployment Rate	Youth (15-24 years) unemployed labor force/youth labor force	Key Indicators of Labor market (KILM) 7th Edition
Total Unemployment Rate	Total unemployed labor force/Total labor force	Key Indicators of Labor market (KILM) 7th Edition
Key Explanatory Variable		
Labor Market Reforms Index	Labor Market Regulations (LMR) index as an explanatory variable. LMR is a composite index based on six measures of labor market institutions (minimum wage, hiring and firing regulations, centralized collective bargaining, mandated cost of hiring, mandated cost of worker dismissal and conscription). The LMR index is an un-weighted average of these six measures and its value varies from 1-10	Fraser Institute http://www.freetheworld.com/2011/2011/Dataset.xls
Control Variables		
GDP Growth	Annual GDP growth	World Development Indicator
Inflation	Annual change in the consumer price index	World Development Indicators
Real Interest Rate	The lending interest rate adjusted for inflation as measured by GDP deflator	World Development Indicators
Population aged 0-14	Share of population in age group 0 to 14 years	World Development Indicators
Economic Freedom Index	Summary index from Economic Freedom of the World, scaled to take values between 0 (least free) and 10 (most free). The index measures the degree of economic freedom in the following areas: (1) Size of government: expenditures, taxes and enterprises, (2) Legal structure and security of property rights, (3) Access to sound money (4) Freedom to trade internationally, (5) Regulation of credit, labor, and business. The summary ratings of the index are the arithmetic means of the five area ratings.	Fraser Institute http://www.freetheworld.com/2011/2011/Dataset.xls
Part time Employment	Part time employment as percentage of total employment	World Development Indicators
ALMP/UNEMP	Expenditure on Active Labour Market Policies per unemployed individual normalised on GDP per member of the labour force	The CEP – OECD Institutions Data Set (1960-2004) http://eprints.lse.ac.uk/19789/
Unemployment Benefits	Out of work income maintenance and support-Full unemployment benefits	OECD-Stats http://stats.OECD.org/index.aspx?

Table A3: Summary Statistics of Variables

Variable	Mean	Std. Dev.	Min	Max
Youth Unemployment Rate	14.460	7.463	3.200	43.800
Total Unemployment Rate	6.652	3.428	1.613	22.676
Labor Market Reforms	6.076	1.642	2.620	9.280
Population aged 0-14 year	17.989	2.679	13.322	29.675
Real Interest Rate	4.487	3.301	-10.600	12.873
Inflation	3.231	3.206	-9.629	28.303
GDP growth	2.412	2.731	-7.580	10.579
Part-time Employment	15.273	7.440	1.600	36.700
Economic Freedom Index	7.403	0.583	5.240	8.640
Unemployment Benefits	0.781	0.527	0.080	2.810
ALMP/UNEMP	16.468	15.082	1.570	103.560

Table A4: LSDV short-run estimates - Models 3-4

	Model 3		Model 4	
	Youth u-rate	Total u-rate	Youth u-rate	Total u-rate
Youth u-rate(-1)	0.755***		0.774***	
	0.024		0.026	
Total u-rate(-1)		0.811***		0.825***
		0.014		0.016
GDP Growth (-1)	-0.432***	-0.238***	-0.334***	-0.201***
	0.072	0.036	0.074	0.038
Financial crises	1.966***	0.983***	1.743***	0.893***
	0.466	0.188	0.514	0.197
Inflation	-0.069	-0.020	-0.044	-0.021
	0.055	0.024	0.068	0.030
Pop aged 0-14	0.044	0.038	0.120*	0.054
	0.064	0.032	0.067	0.035
Real Interest Rate	0.084***	0.051***	0.094**	0.039**
	0.028	0.014	0.032	0.016
Part-time employment	-0.183***	-0.099***	-0.194***	-0.096***
	0.051	0.023	0.044	0.023
Time dummies	NO	NO	YES***	YES***
Median lag	2.46***	3.31***	2.71***	3.60***
	0.28	0.28	0.35	0.36
R^2	0.78	0.87	0.83	0.90
Observations	483	501	483	501
No of Countries	26	27	26	27
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009
Average group size	18.6	18.6	18.6	18.6
Significance of Model	20.96***	35.50***	16.05***	26.94***

Notes: Cluster-robust standard errors are reported under the coefficient value: * significant at 10 %, ** significant at 5 %, *** significant at 1 %.

Table A5: Youth Unemployment Rate – Bias corrected LSDV Short-run estimates (initialized by sysGMM2)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Youth u-rate(-1)	0.848***	0.886***	0.819***	0.846***	0.773***	0.811***	0.828***	0.786***	0.814***
	0.026	0.026	0.032	0.030	0.046	0.052	0.047	0.051	0.048
GDP Growth (-1)	-0.420***	-0.300***	-0.423***	-0.335***	-0.593***	-0.543***	-0.495***	-0.547***	-0.618***
	0.039	0.038	0.046	0.045	0.063	0.104	0.094	0.097	0.087
Financial crises	1.911***	1.504***	1.805***	1.725***	0.871	1.010*	1.102**	1.030**	1.125***
	0.293	0.316	0.398	0.374	0.695	0.592	0.453	0.494	0.421
Inflation	-0.035	-0.019	-0.040	-0.026	0.025	-0.213	-0.198	-0.260**	-0.226**
	0.032	0.030	0.043	0.041	0.080	0.141	0.128	0.108	0.091
Pop aged 0-14			0.079	0.116	0.199	-0.316			
			0.101	0.085	0.150	0.450			
Real Interest Rate			0.091**	0.078**	0.094*	-0.006			
			0.040	0.036	0.053	0.067			
Part-time employment			-0.163***	-0.167***	0.094	-0.131			
			0.070	0.060	0.098	0.185			
ALMP/UNEMP					-0.037**				
					0.016				
Unemployment Benefits						1.429	2.737***		
						0.890	0.625		
EFI								-1.504*	
								0.779	
LMR Index									-0.523*
									0.280
Trend	-0.018		0.030		0.025	-0.007	0.110**	0.084	0.157*
	0.015		0.027		0.034	0.109	0.053	0.067	0.080
Time dummies	NO	YES***	NO	YES***	NO	NO	NO	NO	NO
		113.41		105.12					
Median lag	4.20***	5.72***	3.47***	4.13***	2.69***	3.30***	3.68***	2.87***	3.37***
	0.78	1.38	0.68	0.89	0.62	1.00	1.10	0.77	0.96
Observations	646	646	483	483	270	187	260	234	233
No of Countries	26	26	26	26	19	25	25	26	26
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	24.85	24.85	18.58	18.58	14.21	7.48	10.40	9	8.96
Significance of Model	201.61***	107.85***	138.04***	112.26***	139.65***	61.42***	188.90***	115.24***	131.84***

Notes: Bootstrap standard errors based on 500 replications are reported under the coefficient value: * significant at 10 %, ** significant at 5 %, *** significant at 1 %. The chi-squared values for the Wald tests of joint significance of the time-dummy coefficients are reported, whenever time-dummies are included. The *median lag=-log(2)/log(¥)* denotes the number of years required for 50% of the long-run adjustment following a sustained unit change in any of the explanatory variables. The *significance of the model* refers to the chi-squared values for the Wald tests of joint significance of the explanatory variable coefficients, excluding the lagged dependent variable. The *average group size* refers to the average number of years over which a country is observed in the estimation sample. The initialization is based on sysGMM2, the system GMM estimator with instrumental variables given by principal components of at least eigenvalue 1extracted from "GMM style" instruments (see Table 5).

Table A6: Total Unemployment Rate – Bias corrected LSDV Short-run estimates (initialized by sysGMM2)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Total u-rate(-1)	0.873***	0.911***	0.861***	0.886***	0.828***	0.848***	0.801***	0.813***	0.858***
	0.019	0.021	0.022	0.023	0.033	0.045	0.038	0.044	0.045
GDP Growth (-1)	-0.230***	-0.180***	-0.237***	-0.202***	-0.343***	-0.269***	-0.247***	-0.295***	-0.335***
	0.016	0.017	0.020	0.020	0.028	0.042	0.039	0.037	0.041
Financial crises	0.986***	0.831***	0.962***	0.906***	0.498*	0.339	0.477***	0.411**	0.492***
	0.131	0.137	0.156	0.161	0.273	0.220	0.169	0.200	0.192
Inflation	-0.025*	-0.016	-0.013	-0.011	0.013	-0.067	-0.090*	-0.091**	-0.070
	0.013	0.014	0.018	0.018	0.038	0.054	0.050	0.045	0.044
Pop aged 0-14			0.021	0.053	0.062	-0.138			
			0.042	0.038	0.065	0.170			
Real Interest Rate			0.044***	0.032**	0.041*	-0.018			
			0.016	0.015	0.025	0.025			
Part-time employment			-0.088***	-0.082***	0.000	0.006			
			0.028	0.026	0.044	0.067			
ALMP/UNEMP					-0.017**				
					0.007				
Unemployment Benefits						0.949***	1.546***		
						0.344	0.245		
EFI								-0.845***	
								0.314	
LMR Index									-0.226**
									0.114
Trend	-0.024***		-0.001		-0.009	-0.010	0.030	0.017	0.052*
	0.006		0.011		0.017	0.040	0.019	0.026	0.030
Time dummies	NO	YES***	NO	YES***	NO	NO	NO	NO	NO
		160.95		111.27					
Median lag	5.11***	7.43***	4.63***	5.75***	3.67***	4.22***	3.13***	3.36***	4.53***
	0.82	1.79	0.80	1.25	0.77	1.37	0.67	0.87	1.55
Observations	681	681	501	501	285	194	272	243	242
No of Countries	27	27	27	27	20	26	26	27	27
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	25.22	25.22	18.56	18.56	14.25	7.46	10.46	9	8.96
Significance of Model	327.74***	181.45***	259.61***	189.50***	282.29***	102.52***	243.66***	167.91***	143.35***

Notes: see the footnote of Table A5.

Table A7: Youth Unemployment Rate – Bias corrected LSDV Long-run estimates (initialized by sysGMM2)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP Growth (-1)	-2.598***	-2.345 ***	-2.182***	-1.938***	-2.299***	-2.354***	-2.337***	-2.213***	-2.697***
	0.471	0.526	0.391	0.420	0.510	0.663	0.728	0.594	0.658
Financial crises	11.852***	11.770***	9.364***	10.001***	3.402	4.836*	5.639**	4.227*	5.139**
	2.515	3.245	2.493	2.907	2.841	2.618	2.629	2.165	2.144
Inflation	-0.220	-0.141	-0.225	-0.183	0.029	-0.988	-1.002	-1.043**	-0.979**
	0.193	0.228	0.213	0.239	0.315	0.659	0.686	0.485	0.464
Pop aged 0-14			0.415	0.680	0.893	-1.419			
			0.503	0.505	0.555	1.996			
Real Interest Rate			0.475**	0.472**	0.365	-0.022			
			0.203	0.215	0.224	0.297			
Part-time employment			-0.867**	-1.007***	0.342	-0.621			
			0.341	0.351	0.395	0.830			
ALMP/UNEMP					-0.160***				
					0.058				
Unemployment Benefits						6.372	12.914***		
						3.991	4.345		
EFI								-6.497*	
								3.422	
LMR Index									-2.363*
									1.325
Trend	-0.117		0.145		0.079	-0.093	0.475	0.336	0.688**
	0.094		0.138		0.138	0.487	0.311	0.274	0.348
Time dummies	NO	YES	NO	YES	NO	NO	NO	NO	NO
		25.70		28.66					
Observations	646	646	483	483	270	187	260	234	233
No of Countries	26	26	26	26	19	25	25	26	26
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	24.85	24.85	18.58	18.58	14.21	7.48	10.40	9	8.96
Significance of Model	35.87***	23.15***	45.22***	34.89***	58.04***	19.21**	18.57***	26.47***	20.89***

Notes: The long-run coefficient on an *x* variable, $\beta/(1-\gamma)$, measures the total impact of a sustained unit change in *x* on the dependent variable. Bootstrap standard errors based on 500 replications are reported under the coefficient value: * significant at 10 %, ** significant at 5 %, *** significant at 1 %. The chi-squared values for the Wald tests of joint significance of the time-dummy long-run coefficients are reported whenever time-dummies are included. The *significance of the model* refers to the chi-squared values for the Wald tests of joint significance of the long-run coefficients. The initialization is based on sysGMM2, the system GMM estimator with instrumental variables given by principal components of at least eigenvalue 1extracted from "GMM style" instruments (see Table 5).

Table A8: Total Unemployment Rate – Bias corrected LSDV Long-run estimates (initialized by sysGMM2)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP Growth (-1)	-1.690***	-1.735***	-1.567***	-1.546***	-1.769***	-1.388***	-1.077***	-1.294***	-1.713***
	0.289	0.381	0.266	0.329	0. 353	0.461	0.322	0.321	0.463
Financial crises	7.273***	8.005***	6.364***	6.904***	2.573*	2.057	2.235**	1.835*	2.679**
	1.577	2.137	1.327	1.846	1.566	1.290	0.910	1.072	1.248
Inflation	-0.191*	-0.162	-0.105	-0.109	0.023	-0.384	-0.416	-0.402*	-0.358
	0.103	0.137	0.118	0.140	0.197	0.310	0.254	0.230	0.287
Pop aged 0-14			0.150	0.408	0.377	-0.678			
			0.280	0.318	0.329	0.995			
Real Interest Rate			0.294***	0.260**	0.215	-0.093			
			0.113	0.128	0.136	0.146			
Part-time employment			-0.596***	-0.661***	-0.015	-0.003			
			0.191	0.218	0.239	0.379			
ALMP/UNEMP					-0.096***				
					0.033				
Unemployment Benefits						5.204**	6.871***		
						2.195	1.760		
EFI								-3.987**	
								1.605	
LMR Index									-1.210*
									0.704
Trend	-0183***		-0.012		-0.063	-0.081	0.109	0.059	0.247
	0.047		0.076		0.088	0.228	0.106	0.125	0.172
Time dummies	NO	YES	NO	YES	NO	NO	NO	NO	NO
		31.32		27.15					
Observations	681	681	501	501	285	194	272	243	242
No of Countries	27	27	27	27	20	26	26	27	27
Estimation period	1981-2009	1981-2009	1981-2009	1981-2009	1985-2004	1998-2009	1998-2009	2000-2009	2000-2009
Average group size	25.22	25.22	18.56	18.56	14.25	7.46	10.46	9	8.96
Significance of Model	40.83***	22.20***	55.62***	31.30***	67.57***	15.67**	25.58***	23.31***	16.62***

Notes: see the footnote of Table A7.