XXV Convegno Nazionale di Economia del Lavoro
Università degli Studi G. D'Annunzio, Chieti-Pescara
September 9-10 2010

Youth Unemployment and the Impact of Financial Crises

Misbah Tanveer Choudhry[*], Enrico Marelli[**] and Marcello Signorelli[***]

Abstract

The impact of last financial crisis (2007-08) and subsequent global recession (2008-09) has been deeper on the weakest segments of the labour market. In this paper, we mainly focus on the extent and persistence of the impact of (past and last) financial crises on youth (15-24) unemployment rate.

After a review of the existing (theoretical and empirical) literature on the determinants of youth unemployment rate in general and at the occurrence of economic crises, we present empirical estimations on the impact of past financial crises on young workers. We empirically investigate the relationship between financial crises and youth unemployment rate by employing fixed effects panel estimation on a large panel of countries (about 70) around the world for the period 1980-2005. Gender specific effect of crises on young workers is also investigated. To analyse the severity of financial crises for economies at different levels of economic development, we re-estimate our model for sub-samples of high income OECD countries and other economies in the sample. For further robustness check and sensitivity analysis, alternative definitions of crises are considered. The "persistence" of the impact of financial crises for young workers is also investigated. Finally we also estimate the Arellano-Bond dynamic panel, confirming the significance of the results.

Young people are far more affected by the employment crises than the elder; long term unemployment for young workers can be harmful and may result in "discouraged workers" effects and social exclusion from labour market. Notwithstanding some peculiarities of the last crisis, our econometric investigations can be useful to better assess its impact on youth unemployment. At the end of the paper, before presenting some final considerations and policy implications, very recent data on youth labour market dynamics are analysed and discussed.

JEL Classification: G01, C23, J21, J29, J69

Key words: financial crises, labour impact of economic crises, youth unemployment, panel fixed effects

[*] University of Groningen, Faculty of Economics and Business, The Netherlands; P.O. Box 800, 9700 AV, Groningen, The Netherlands; e-mail: m.t.choudhry@rug.nl.

[**] University of Brescia, Full Professor of Economic Policy, Faculty of Economics, Italy; Department of Economics, via San Faustino 74/B, 25122 Brescia (Italy); e-mail: emarelli@eco.unibs.it

[***] University of Perugia, Associate Professor of Economic Policy, Faculty of Political Sciences, Italy; Department of Economics, Finance and Statistics, via A. Pascoli, 20, 06123 Perugia (Italy); e-mail: signorel@unipg.it

1. Introduction

The integration of young people into the labour market is an important objective all over the world and, in particular, it is a key policy issue of the European Employment Strategy. In fact, the European Employment Guidelines stress the need to build employment pathways for young people and to reduce youth unemployment. Notice that, in Europe, youth unemployment rates are generally more than twice as high as the adult rates, with significant differences across countries (Quintini et al. 2007) and regions (Perugini and Signorelli, 2010a e 2010b).

Youth unemployment dramatically rose again after the recent global economic crisis (ILO, 2010; Arpaia and Curci, 2010). The crisis, started in 2007-08 as financial crisis, led to the biggest recession (2008-09) since the Great Depression of the '30s, with widespread consequences on economic performance, labour productivity and employment in all countries around the world. Notice that the real effects of financial crisis (on production, income, expenditure, etc.) are always lagged[1]. Considering the labour market consequences of the crisis, the problem is that – despite a recovery that is going on (although weak and uncertain) since the Summer of 2009 – all negative effects have not yet fully displayed, because of even longer lags. The impact has been deeper on the weakest segments of the labour market, especially young people.

But can we learn something from past financial crises? The key contribution of this study is the assessment of the impact of past (1980-2005) financial crises on youth unemployment rate. Of course, we are aware of the peculiarities of the last crisis – especially its global nature – compared to previous financial crises, concerning in most cases individual countries or specific group of countries. Nevertheless, we think that some inferences can also be made with respect to the effects of the last crisis[2] and the more appropriate policies to be adopted. To analyse the severity of financial crises for economies at different levels of economic development, we re-estimate our model for sub-samples of high income OECD countries and other economies in the sample. For further robustness check and sensitivity analysis, alternative definitions of crises are considered. Gender specific effect of crises on young workers is also investigated. Finally the "persistence" of the impact of financial crises on youth unemployment is also investigated.

The structure of the paper is the following. In Section 2, after some definitions about financial crises and the concept of "youth", there is a brief review on the general determinants of youth unemployment and its sensitivity to economic crises. Section 3 presents our econometric investigations on the impact of past financial crises on youth unemployment rate. Section 4 contains some key evidence of the ongoing impact of last crisis on youth unemployment and, finally, crucial policy implications are briefly discussed in Section 5.

2. Review of the Literature

A first sub-section of this review is dedicated to a concise presentation of the definitions of "financial crises" and "young people" adopted in the literature (and then used in the empirical part of this paper). In the following two sub-sections, considering the aim of the paper, we review a selection of contributions from a large and recently growing literature on the specific determinants of youth unemployment rates (YUR). Then we focus on the few studies concerning the behaviour of YUR during and after "major crises".

2.1. On the Definitions of Financial Crises and Young People

First of all, it should be emphasized that national financial crises (without significant external effects) are obviously very different, in a *worldwide* perspective, from international financial crises. For example, according to Bordo (2006) and Reinhart and Rogoff (2008a, 2008b, 2009), there were eight episodes of major international financial crisis since 1870[3]. However, in order to econometrically estimate the *national* labour market impact – especially on young people – of past financial crises, in this study we use the definition of "financial crisis" adopted in Honohan and Laeven (2005), that consider at country level both "*systemic banking crises*" (when a country's corporate and financial sector experiences a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time)[4] and "*non-systemic banking crises*" (e.g. crises limited to a small number of banks). In addition, it would be also useful to consider (in a sensitivity analysis): (i) "systemic banking crises" alone (as above defined); (ii) "currency crises" defined as a nominal depreciation of the currency of at least 30 percent that is also at least 10 percent

[1] It should be noted a remarkable shift (at the beginning of 2010) - more pronounced in some countries than others - from a financial crisis in the private sector to a fiscal (sovereign debt) crisis, because of large increases in public deficits, mainly as a consequences of GDP and revenue declines/ accompanied by an increase in public expenditures.

[2] A partly similar approach has been followed by Verick (2009) that in order to better investigate the impact of the recent crisis on the labour market (especially on young men and women) analyses also the effects on unemployment of the past "Big 5 Crises".

[3] We briefly recall the dates and countries of origin of the eight "international financial crises": (i) in 1873 German and Austrian stock markets collapsed with effects on the rest of Europe and Americas; (ii) in 1890 a debt crisis involved Latin America (especially Argentina); (iii) in 1907 a fall in copper prices caused financial panic in the US with effects on Europe, Latin America and Asia; (iv) in 1929 with a stock market crash in US started the well known "Great Depression"; (v) in 1981-82 a Latin American debt crisis began producing a decade-long debt crisis across developing economies; (vi) in 1991-92 real estate and equity price bubbles burst in Scandinavia and Japan, while in Europe the ERM entered into crisis; (vii) in 1997-98 the Asian and Russian crises; (viii) finally, in 2007-08 the worst financial crisis (after 1929) started in US. For more details, see IMF (2009, p. 128).

[4] As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted.

increase in the rate of depreciation compared to the previous year (Laeven and Valencia, 2008); (iii) “sovereign debt crises" defined as when a sovereign default to private lending or debt is rescheduled (Laeven and Valencia, 2008).

As regards youth labour market analysis, we just stress that, although official statistics tend to focus on the group aged 15-24, there is a considerable debate about the pros and cons of various definitions of youth and their consequences in the study of labour market performance and dynamics (e.g., Lefresne 2003; O’Higgins 1997). However, because of the larger data availability in international statistics, we shall use in our empirical estimates the narrow definition (15-24 years) of young people[5].

2.2. On the Key Determinants of Youth Unemployment

As recalled in the Introduction, the youth unemployment rate is generally much higher than adult unemployment rate. The main reason of the generally worse youth labour market performance with respect to adults is related to the lower level (and/or different quality) of human capital (and productivity), which – ceteris paribus – makes employers prefer adult people to young.

It has been noticed that – among the multiple features characterizing the transition of young people from school to the labour market, the risk of unemployment they face, their performance at work, the quality and stability of their positions – human capital is a prominent element. In particular, young people with low human capital and low skills are more exposed to long duration unemployment, to unstable and low quality jobs, perhaps to social exclusion (Oecd, 2005). However, the educational level is only the most immediate variable measuring “human capital”; in fact, young people lack the other two important components of human capital, namely generic and job-specific work experience[6].

As for the European context, Caroleo and Pastore (2007), argued that the "*youth experience gap*” is the key factor explaining a youth unemployment rate so much higher with respect to adult unemployment rate. In addition, they classify the EU countries into five groups (the North-European, the Continental European, the Anglo-Saxon, the South-European and that of New member states) according to the institutional setting and the mix of policy instruments (including various degrees and types of labour market flexibility), of educational and training systems, passive income support schemes and fiscal incentives. To overcome the gap, young people "experiment" frequent labour market transitions (Clark and Summers 1982; Freeman and Wise 1982; Blanchflower and Freeman 2000; Rees 1986; Topel and Ward 1992) with significant country and segmentation differences (Scarpetta et al. 2010) according to the mix of school-to-work transition institutions (Ryan 2001; Caroleo and Pastore 2007, 2009).

The links between the “institutional framework” and policies to contrast youth unemployment are discussed in a wide and recent literature (e.g. Brunello et al. 2007; Checchi 2006; European Commission 2008 chapter 5; Perugini and Signorelli, 2010a and 2010b). Many other researches analyse the role of institutional and policy settings with specific reference to the youth segments, both focusing on specific aspects such as temporary jobs (e.g. Nunziata and Staffolani 2007) or minimum wage regulation (e.g. Neumark and Wascher, 1999 and 2004; Abowd at al. 1997), or providing a more comprehensive view of the many possible institutional and policy factors directly or indirectly related to labour market and their interaction (e.g. Kolev and Saget 2005; Bassanini and Duval 2006; OECD, 2006a).

Quintini et al. (2007) investigate changes in the school-to-work transition process in OECD countries, also highlighting the persisting differences between youth and adult unemployment rates (the former is generally more than twice as high as the latter). As above mentioned, Clark and Summers (1982) analyse the determinants of the higher flows in and out of unemployment for young compared with adult people, while O'Higgins (2005) examines trends in the youth labour market in developing and transition countries, highlighting the high difficulties of integrating young people into "decent work". Also the persistence of youth unemployment (e.g. Heckman and Borjas 1980; Ryan 2001) has been investigated.

Another possible cause of high youth unemployment and low quality employment – low entrance wages, bad-quality jobs, diffusion of non standard labour contracts – has been found in the mismatch between the knowledge acquired through formal education and the skills required by the labour market. In general, the difference between educational supply and labour demand is in stronger connection to the performance of local economies than is the level of educational stock itself (Rodriguez-Pose, 2005). Many other factors can contribute to the youth labour market performance. It is well-known that overall and youth unemployment depends significantly on macroeconomic cyclical conditions: though the permanent effects, e.g. on potential output, of cyclical downturns can be estimated (see, for instance in the case of the recent global recession, Furceri and Mourougane, 2009, and Wolrd Bank, 2010), the economic cycle cannot explain many of the “persistent” employment difficulties of young people compared to adult.

2.3. On the Sensitivity of Youth Unemployment to Economic Crises

As already noticed, the literature on the impact of "economic crises" on youth unemployment is still quite scarce.

[5] As for a more complete definition of "youth unemployment" and some measurement aspects, see also ILO (2009).

[6] From both a theoretical and an empirical viewpoint, Carmeci and Mauro (2003) have shown that educated youngsters need to acquire firm-specific knowledge by working activities for “schooling” human capital to become productive.

First of all, it should be recalled that, the overall and specific impact on labour market of a crisis is usually different across (and within) countries depending on many factors, such as: (i) the economic structure, (ii) the institutional framework (including STWT, i.e. the "school-to-work transition" institutions) and (iii) the policymakers response at different levels[7]. The previous factors affect, in the first place, the size and the degree of (in)stability of the relationship between economic growth (or output decline) and unemployment rate, i.e. the so-called "Okun's law"[8]. However, a decline in aggregate demand - as occurred in 2008-09 in many countries - negatively affects labour demand, with different immediate responses (also as a consequence of labour hoarding practices), various time lags (before the impact on employment indices becomes notable) and different degrees of the persistence of the effects; moreover, the adverse effects can be partly mitigated by policymaker responses (both general macroeconomic policies and specific measures for the labour market) and the existence of a better institutional framework (including unemployment benefits, social insurance systems, etc.).

Considering the young people, Scarpetta et al. (2010) highlight that the crises exacerbate a number of structural problems that affect the transition from school to work. In fact, during and after a (financial and/or economic) crisis, the decline in GDP turns - after some months - into a reduction of labour demand[9]: in this situation school-leavers are competing with more jobseekers for fewer vacancies[10], while the youth already in the labour market are generally among the first to lose their jobs, mainly due to the higher diffusion of temporary contracts[11], with a consequent high difficulty to get another one (OECD, 2009a). So, the high diffusion of temporary contracts is a key explanation of the higher business-cycle sensitivity for youth in the labour market. However, many authors (e.g. Cockx and Picchio, 2009; Scarpetta et al., 2010) notice also that - for many youth - temporary contracts (especially apprenticeship) are more often a stepping stone to a permanent contract than a "trap"[12].

The labour hoarding practices, especially in countries with the highest EPL on "permanent contracts", favour adult segments and can further increase the size and duration of the impact of the crisis on youth unemployment.

It should be noted that, generally, "education matters" and the consequences of a crisis are usually more dramatic for low-skilled youth, already in great difficulties in good times, since the crisis further increase their risk of long-term inactivity and exclusion. Many authors find that a "scarring" effect of unemployment on youth depends on overall labour market conditions, but it is significantly higher for disadvantaged youth (e.g. Bell and Blanchflower, 2009). In any case, adopting the definitions of Quintini and Manfredi (2009), the crisis is pushing more and more youth, even those who have performed well in good times, into the group of "poorly-integrated new entrants" and possibly in to the group of "youth left behind"[13]. In particular, Scarpetta et al. (2010) highlight the risk to have a "lost generation" and the need to adopt effective (active and passive) labour policies and STWT institutions for minimizing the increase in the number of youth losing effective contact with labour market and permanently damaging their employment prospects.

Verick (2009) considers the effects on unemployment of the past "Big 5 Crises" (Spain 1977, Norway 1987, Finland 1991, Sweden 1991, and Japan 1992) in order to better investigate the impact of the recent crisis on the labour market, especially on young men and women[14]. The author argues that data on the five previous financial crisis, as well as on the recent one, reveal that young people are hit hardest and the impact persist long after the economy is growing again[15]; the size and persistence of the impact on youth unemployment depend on: (i) the degree of economic contraction, (ii) the sectoral composition of employment prior to the crisis and (iii) the institutional structures. In particular, Verick (2009) further confirms that - during and after a severe recession - young people find increasingly difficult to both acquire a job as a new entrant in the labour market, especially as a consequence of hiring freezes, and to remain employed, since they are more likely to be laid off than workers with more seniority. So, the youth unemployment rates are more sensitive to the business cycle than witnessed for adult (OECD, 2008).

---

[7] In many countries policies are adopted - with different degrees of coordination and autonomy - in more than one level of government (see also Signorelli, 2008).

[8] See Okun, 1962. For a discussion on the stability (and main direction of causality) of the output-unemployment relationship, see Signorelli (2005).

[9] Labour demand (at both firm and aggregate level) can be also distinguished in "desired" and "actual", especially considering - together with other factors - the hiring and firing costs (also related to the labour hoarding strategies and to the evidence of co-existence of vacancies and unemployment). In addition, it should also be considered the partly different dynamics of labour demand if considered either in terms of "number of workers employed" or in terms of "overall number of hours worked".

[10] As mentioned in the previous section, the existence of a "youth experience gap" favors a higher employability of adult (with generic and sector specific skills) with respect to youngsters.

[11] The higher diffusion of temporary contracts between youngsters leads to the adoption of a sort of "last-in first out" rule.

[12] The trap effect of temporary contracts seem to be higher in countries with a large difference in the stringency of regulations for permanent contracts (i.e. strict "employment protection legislation", EPL) as compared to temporary (or other atypical) contracts.

[13] According to Scarpetta et al. (2010) the size of the group of "youth left behind" can be proxied by the number of young people who are neither in employment, nor in education or training (NEET). This group represented 11% (on average) of 15-25-years-old in the OECD in 2007.

[14] For an empirical investigation comparing the different impact on regional youth unemployment rates of two major Russian crises, see Demidova and Signorelli (2010).

[15] Differently from previous crises, in the last crisis the young men have been particular affected, mainly due to the high proportion of young men in heavily impacted sectors.

Arpaia and Curci (2010) produce a wide analysis of the labour market adjustments in EU-27 after the 2008-09 recession (in terms of employment, unemployment, hours worked and wages) and they also highlight that workers with weaker work contracts and a lower qualification and experience have borne the brunt of the "great recession", with a consequent huge increase in youth unemployment rates[16].

Considering the complex relationship between unemployment, employment and participation rates (see, for example, Perugini and Signorelli, 2004 and 2007), it should be noted that - especially during and after a crisis - the increase in (youth and total) unemployment rates can undervalue the negative impact if the possible decrease in the (youth and total) participation rates is not adequately considered. This is the well known "discouragement effect" (usually more relevant for women) that produce a reduction of the actual labour force and - especially in the case of young people - can partly consist in an increase in the duration of "education".[17]

3. Financial Crises and Youth Unemployment Rate: Some Econometric Investigations

In this section we used the cross country panel estimation approach to quantify the relationship between financial crises and youth unemployment rate in the labour markets.

3.1. Data and model

The empirical investigation of the relationship between youth unemployment rate and financial crisis is carried out for a sample of more than 70 countries for the period 1980-2000. The empirical estimation is done with unbalanced panel data, to fully utilize the available information for our variables of interest.

The baseline model for estimation is:

$$\boldsymbol{YUN_{it} = Crisis_{it}\,\beta + Z_{it}\,\mu + \varepsilon_{it}} \qquad \textbf{(1)}$$

where, YUN_{it} represents youth unemploymnet rate in country *i* at time *t* and it is our dependent variable. According to the International Labor Organization (ILO), the organization from which the data were extracted, 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. In the case of youth unemployment as a proportion of the young population, the population for that age group replaces the labour force as the denominator.[18]

$Crisis_{it}$ is representing our measure of financial crisis. Z_{it} is a vector of control variables and ε_{it} is the error term.

Data on our key explanatory variable (financial crisis) is taken from the Honohan and Laeven (2005). Detailed explanation of data on financial crises definitions (for different kind of crises) is presented in Table A1 in appendix. Financial crisis is a variable which takes a value of one if there is a crisis in a country and zero otherwise. Similarly, the currency crisis, bank crisis and debt crisis variables take a value of one if there is a crisis and zero otherwise.

For including *control variables*, we take guidance from previous literature (e.g. Jacobsen 1999, Iftikhar and Shehnaz, 2005). Our control variables include GDP growth, inflation rate, foreign direct investment and openness. Data for our explanatory variables are taken from World Bank Development Indicators (WDI) historical database. Adjusted inflation[19] rate is used as a proxy for the changes in the price level in the country.

The correlation matrix of our dependent and main explanatory variables is provided in Table A2. The low correlations of the explanatory and control variables suggest that multicollinearity is not a potential problem in our estimations.

3.2. Impact of financial crises on youth unemployment rate

[16] In addition to assess whether the increase in unemployment is due to an increase of job separations or to a decline in the job finding rate, they also provide evidence of an asymmetric response over the cycle, with recessions being characterised by more job destructions than by job creation in the following recoveries (especially due the interactions between wage dynamics and labour hoarding practices).

[17] We recall that, according to ILO definition (but similar definitions are used by other national and international institutions), unemployed are the persons that - during a reference period - are without work, but are currently available for work and, in addition, are actively seeking employment.

[18] KILM 9, Youth unemployment rate.

[19] To adjust for extreme movements, we modify the inflation rate (P) as $\frac{P/100}{1+(P/100)}$.

We estimate equation (1) using a fixed effects panel model over the period 1980-2005, for a panel of 72 countries. Fixed effects model has been selected on the basis of Hausman test[20]. Results of empirical estimation are presented below in Table 1. In first model, we simply evaluate the impact of financial crises on youth unemployment rate (YUN). We observe that the "crisis" coefficient is positive and statistically significant. Result implies that financial crisis leads to increase in youth unemployment rate. Then, we incorporate lagged value of GDP growth and growth in fixed capital formation as explanatory variables in model 2. As expected, the coefficient of these two variables is negative but statistically significant only for lagged GDP growth. It implies that, as expected, GDP growth in an economy helps to reduce unemployment among young workers. The impact of crisis remains positive and significant for youth unemployment rate.

We incorporate, in model 3 to model 5, the other control variables which may impact the unemployment rate of young workers. Coefficients for Inflation, FDI and Openness variables are negative, which reflect that increase in these variables will promote employment among young workers. Moreover, their inclusion does not change the sign and significance of the key explanatory variable. Finally, in model 6 we include all variables from model 1 to model 5 and find that results remain very consistent. Financial crisis is our main variable of interest and its impact remains negative and significant in all specifications, suggesting the robustness of our findings.

Table 1: Impact of financial crises on youth unemployment rate

Dependent Variable: Youth Unemployment Rate						
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Financial Crises	1.811***	1.331***	1.290***	1.426***	1.293**	1.347***
	0.513	0.475	0.47	0.487	0.5	0.481
GDP growth(-1)		-0.249***	-0.347***	-0.239***	-0.244***	-0.329***
		0.067	0.065	0.065	0.064	0.06
Gross capital formation growth		-0.028	-0.027	-0.025	-0.029	-0.027
		0.017	0.017	0.017	0.017	0.017
Inflation			-12.278***			-12.459***
			2.671			2.671
Foreign direct Investment				-0.075		-0.079
				0.065		0.056
openness					-0.013	-0.019
					0.028	0.029
Constant	15.458***	16.491***	18.131***	16.832***	17.353***	19.739***
	0.112	0.261	0.392	0.339	2.051	2.025
Observations	916	846	835	826	846	817
Countries	75	72	72	72	72	72
R-square	0.027	0.082	0.155	0.089	0.083	0.166
Significance of Model	12.477	10.319***	12.212***	8.228***	8.059***	8.781***

As a sensitivity analysis, we replicate the same exercise for a sample of high income OECD countries and other countries (excluding high income OECD countries). The results are presented in Tables A3 and A4 in appendix respectively. The crisis impact is still negative for youth unemployment rate, both in high income OECD as well as for other countries. However, it is statistically significant only in case of high income OECD countries. For the "other countries" sample, the crises coefficient is only significant in model 1, which is without any control variable. The value of coefficient is also higher in high income OECD sample countries as compared to other countries sample results in Table A4. This implies that financial crises impact for young workers in high income economies is more severe as compared to other countries in the sample. This may be due to the fact that youth in high income economies are working in formal sector and mostly employed in non-farm activities. However in low income and developing economies mostly young people are working in informal sector or in agriculture sector under the category of unpaid family helpers.

[20] Low p-value of Hausman test suggests using fixed effects model instead of random effects.

3.3 Youth unemployment and crises: a gender perspective

Gender specific impact of financial crises cannot be ignored. Men and women may be affected differently because of gender specific inequalities in labour markets and prevailing norms about role of men and women in economy and society (Sperl, 2009). To look at the gender perspective of youth unemployment rate, we estimate the impact of financial crisis on the female youth unemployment rate. The estimation results are presented in Table 2. We find that, as a consequence of financial crisis, there is an increase in unemployment rate among the young female workers. However, GDP growth and increase in investment promote employment among young females in labour markets, thus reducing unemployment. The value of financial crisis coefficient is slightly higher for female workers, which implies that financial crisis can widen the gender gap among young workers.

Table 2: Impact of financial crises on female youth unemployment rate

Dependent Variable: Female Youth Unemployment Rate						
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Financial Crises	1.659***	1.313***	1.348***	1.428***	1.284**	1.399***
	0.503	0.492	0.458	0.504	0.516	0.481
GDP growth(-1)		-0.225***	-0.326***	-0.215***	-0.221***	-0.313***
		0.067	0.064	0.067	0.065	0.063
Gross capital formation growth		-0.022	-0.021	-0.02	-0.023	-0.021
		0.018	0.018	0.018	0.018	0.018
Inflation			-12.788***			-12.996***
			3.011			3.033
Foreign direct Investment				-0.084		-0.096**
				0.053		0.043
Openness					-0.01	-0.01
					0.025	0.025
Constant	17.168***	17.968***	19.641***	18.358***	18.640***	20.755***
	0.111	0.285	0.453	0.332	1.793	1.782
Observations	914	844	833	824	844	815
Countries	74	71	71	71	71	71
R-square	0.02	0.059	0.129	0.067	0.059	0.139
Significance of Model	10.855	10.070***	14.138***	9.139***	7.631***	10.548***

The results of empirical analysis for sub-samples of high income OECD countries and other developing countries are presented in Table A5 in the appendix. Contrary to overall youth unemployment rate, we find that financial crisis impact is positive and statistically significant for young female workers, both in developing and high income economies.

The findings of impact of financial crisis on unemployment rate among female young workers are in accord with the literature evaluating financial crisis impact on female participation rate (Choudhry et al., 2010). It indicates that labour market indicators for youth are following the trends at aggregate level in the country.

3.4 Youth unemployment and crises: persistence of the effects

To check the persistence of adverse effect of crisis on youth unemployment rate, we take the lag value of crisis as an explanatory variable (see model 2 to model 7 in Table 3). An important thing to note is that intensity of adverse effects of crisis on unemployment rate is high in second and third year after financial crisis. The adverse effect of crisis on unemployment disappears after five years subsequent to crisis. This finding also confirm the fact that labour market indicator for young workers follow the overall trend in unemployment rate. Choudhry et al. (2010) find that adverse

impact of financial crisis on labour force participation and unemployment rate remain there until five years after crises.

Table 3 - Impact of Crisis on Youth Unemployment Rate

Dependent variable: Youth Unemployment Rate

Variables		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP(-1)	Coefficient	-0.329***	-0.324***	-0.325***	-0.394***	-0.383***	-0.383***	-0.382***
	Robust SE	0.048	0.045	0.044	0.044	0.045	0.045	0.046
Gross Fixed Capital Formation	Coefficient	-0.027**	-0.023*	-0.039***	-0.029**	-0.026*	-0.026**	-0.02
	Robust SE	0.014	0.013	0.013	0.013	0.013	0.013	0.013
Openness	Coefficient	-0.019	-0.016	-0.012	-0.007	-0.007	-0.011	-0.013
	Robust SE	0.014	0.013	0.012	0.011	0.011	0.011	0.012
Foreign direct Investment	Coefficient	-0.079**	-0.088***	-0.083**	-0.080**	-0.066**	-0.048	-0.047
	Robust SE	0.034	0.033	0.032	0.032	0.033	0.032	0.032
Inflation	Coefficient	-12.459***	-13.286***	-12.900***	-13.445***	-13.302***	-13.895***	-14.166***
	Robust SE	1.533	1.469	1.437	1.448	1.45	1.425	1.503
Financial Crises	Coefficient	1.347***						
	Robust SE	0.403						
Financial Crisis (-1)	Coefficient		2.446***					
	Robust SE		0.375					
Financial Crisis (-2)	Coefficient			2.372***				
	Robust SE			0.357				
Financial Crisis (-3)	Coefficient				2.061***			
	Robust SE				0.349			
Financial Crisis (-5)	Coefficient					0.958***		
	Robust SE					0.362		
Financial Crisis(-7)	Coefficient						-0.033	
	Robust SE						0.36	
Financial Crisis (-10)	Coefficient							-0.902**
	Robust SE							0.365
Constant	Coefficient	19.739***	19.466***	19.281***	19.358***	19.493***	19.990***	20.676***
	Robust SE	0.916	0.875	0.827	0.808	0.825	0.824	0.877
No of observations		817	872	904	922	879	830	742
Number of Groups		72	73	74	75	75	74	74
R-Square		0.166	0.204	0.194	0.188	0.166	0.175	0.188
Significance of Model		24.464***	33.811***	33.142***	32.401***	26.481***	26.443***	25.574***

Source: Authors Calculations

Note: Robust standard errors in parentheses. * Significant at 10%, ** significant at 5 %, *** significant at 1 %

3.5 Youth unemployment and financial crises: a dynamic model

To evaluate the short term effect of financial crises on youth unemployment rate we introduced the lagged dependent variable as an explanatory variable. Thus our model for estimation becomes:

$$\boldsymbol{YUN_{it} = YUN_{it(T-1)} + Crisis_{it}\,\beta + Z_{it}\,\mu + \varepsilon_{it}} \qquad \textbf{(2)}$$

where YUN_{it} represents youth unemployment rate in country *i* at time *t* and $\boldsymbol{YUN_{it(T-1)}}$ is the lagged value of dependent variable. $Crisis_{it}$ is representing our measure of financial crisis. Z_{it} is a vector of control variables and ε_{it} is the error term.

The main estimation results are presented in Table 4. The coefficient estimates with the lagged dependent variable (in column 1-6) reflect the short term effect of explanatory variables on youth unemployment rate. The coefficient of lagged unemployment rate equals (0.75 to 0.78) and is highly significant, indicating that unemployment rate is highly persistent. This finding is consistence with literature on unemployment determinants (see Elhorst and Zeilstra, 2007).

Table 4: Impact of financial crises on youth unemployment rate - Dynamic Model

Dependent Variable: Youth Unemployment Rate						
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
lagged Youth Unemployment Rate	0.783***	0.785***	0.766***	0.780***	0.784***	0.758***
	0.036	0.035	0.038	0.036	0.035	0.04
Financial Crises	1.354***	0.706**	0.691**	0.787***	0.681**	0.775***
	0.359	0.289	0.289	0.289	0.293	0.289
GDP growth(-1)		-0.105**	-0.126***	-0.095**	-0.101**	-0.111***
		0.043	0.039	0.043	0.043	0.039
Gross Fixed Capital formation growth		-0.090***	-0.087***	-0.088***	-0.090***	-0.087***
		0.013	0.013	0.013	0.013	0.013
Inflation			-4.797***			-5.196***
			1.147			1.16
Foreign direct Investment				-0.053***		-0.043***
				0.015		0.012
openness					-0.011	-0.021**
					0.012	0.009
Constant	3.221***	4.015***	4.806***	4.230***	4.813***	6.415***
	0.587	0.493	0.597	0.525	0.959	0.888
Observations	777	730	724	710	730	706
Countries	67	64	63	64	64	63
R-square	0.656	0.728	0.736	0.732	0.729	0.743
Significance of Model	235.659***	145.047***	126.280***	113.665***	112.255***	94.058***

The impact of financial crisis on youth unemployment rate is still positive and statistically significant, reflecting the robustness of our findings in the previous section, i.e. that financial crises causes further unemployment among young workers. Empirical results imply also that the relationship between unemployment rate and inflation rate is negative and significant. The possible explanation for the negative impact of inflation on unemployment is that if actual price level exceeds the expected price level, real wages are lower than expected during the wage bargaining process and consequently employment increases and unemployment decreases. (Nickell, 1998 and Belot and van Ours, 2001). All other explanatory variables have the expected sign and are statistically significant.

We have also estimated the empirical model (with lagged dependent variable) from a gender perspective. The empirical results are presented in the appendix in Table A6. The findings suggest that unemployment among young female workers is highly persistent and statistically significant. Crisis has still a positive influence on their unemployment rate. Economic growth, fixed capital formation, inflation and foreign direct investment reduce the female youth unemployment rate.

At this point we should consider that several econometric problems may arise if we estimate the basic model presented in (2) with a simple fixed effects panel estimation. The inclusion of the lagged dependent variable on right-hand side makes the empirical model dynamic and needs a special treatment. The presence of the lagged dependent variable gives rise to autocorrelation. There may be an endogeneity problem and measurement error in some of explanatory variables. To deal with these issues, we thus applied the Arellano-Bond (1991) dynamic panel estimation model, for analyzing the impact of financial crises and lagged dependent variable on youth unemployment rate.

Estimation results are presented in Table 6. In column 1 we show the dynamic panel estimation results[21] for young male workers, while in column 2, results are presented for female young workers. We find that both the lagged dependent variable and financial crises are still positive and statistically significant. Hansen test for over-identifying

[21] We use Roodman (2006) xtabond2 command to apply 2-step GMM system Dynamic Panel Estimation.

restriction appears insignificant, suggesting the validity and exogeneity of our instruments (see table 6). Similarly, the Arellano-Bond test for the first difference autoregressive process appears to be significant and the second difference appears to be insignificant.

Table 6 : Impact of financial crises on youth unemployment rate- Arellano-Bond Dynamic Panel Estimation

Dependent Variable	Youth Unemployment Rate Male	Youth Unemployment Rate Female
	Model 1	Model 2
lagged Youth Unemployment Rate	0.787***	0.763***
	0.041	0.041
Financial Crises	4.002***	3.891**
	1.384	1.743
GDP growth(-1)	-0.154**	-0.038
	0.078	0.104
Gross Fixed Capital formation growth	-0.090***	-0.066***
	0.019	0.023
Inflation	-8.952	-9.934
	4.708	6.406
Foreign direct Investment	-0.015	0.010
	0.011	0.015
Openness	-0.007	-0.010
	0.008	0.009
Constant	4.469***	4.576***
	1.085	1.229
Observations	706	704
Countries	63	63
Number of Instruments	25	23
Arellano-Bond Test for AR(1)	0.00	0.00
Arellano-Bond Test for AR(2)	0.12	0.75
Hansen Test over identifying restrictions-P value	0.33	0.12

4. The recent Great Recession and its impact on youth unemployment

One of the results of the previous section was that the adverse impact of the crisis on youth unemployment appears stronger in the second and third year after the financial crisis. The last crisis began as financial crisis at the end of 2007; its deepest impact on financial markets (with Lehman Brothers default) was in September 2008, when the real effects initially developed (but the deepest fall in production was reached in the first half of 2009) and led to increasing unemployment rates during 2009 (but in many countries they are still rising in 2010). In fact, the real effects (on product, income, etc.) of financial crises are always lagged and the labour market effects are even more lagged. As for the next years, in addition to a further rise in the unemployment rates, it is also likely, similarly to past crises, a certain degree of persistence of unemployment rate in the subsequent years, due to phenomena of "hysteresis" (upward shift in the "structural unemployment").

Total unemployment rate increased by about 1 percentage point (from 5.7% in 2008 to 6.6% in 2009) in the world as a whole, equivalent to an increase of almost 34 million people unemployed: the increase has been general, although the size of the increase has been different in the world regions. The highest increases of UR resulted in developed economies, the EU and the remaining countries of Europe, with a further increase in unemployment foreseen for 2010 (see e.g. ILO, 2010).

The impact of the crisis has been differentiated not only across countries, but also between the various segments of the labour market. Concerning *young workers*, it should be noted that a decrease in labour demand implies fewer job openings, so young people (new entrants with high "experience gap") are particularly affected. Moreover, job destructions are also likely to disproportionately affect young workers, because they tend to work more frequently under temporary contracts.

The specific impact of the crisis on youth UR can be discussed with reference to EU data. First of all, we can observe that, according to available data[22] huge and different increases in *total unemployment rates* are shown by EU-27 countries (Table 4). Total UR increased in EU-27 at 9.6% in March 2010 with respect to 7.1% in September 2008; the final level is almost identical to US' (9.7%). Among the bigger countries, the smallest increases were observed in Germany (from 7.1% to 7.3%), Belgium (from 7.3% to 8.1%) and Italy (from 6.8% to 8.8%), while the highest increases were recorded in Latvia (from 8.1% to 22.3%), Estonia (from 6.5% to 15.5%), Spain (from 12.4% to 19.1%) and Ireland (from 6.7% to 13.2%).

Table 4 - Unemployment rates (total, female and youth) September 2008 versus March 2010

	Total UR			*Female UR*			*Youth UR*	
	Sept. 2008	*March 2010*		*Sept. 2008*	*March 2010*		*Sept. 2008*	*March 2010*
Belgium	7.3	8.1		7.9	8.0		19.9	24.2
Germany	7.1	7.3		7.0	6.7		9.5	10.0
Ireland	6.7	13.2		5.2	8.9		14.2	27.9
Greece	7.5	10.2***		11.2	13.9*		22.0	27.5****
Spain	12.4	19.1		13.8	19.1		26.2	41.2
France	8.0	10.1		8.5	10.4		19.8	22.1
Italy	6.8	8.8		8.5	10.2		21.3	27.7
Cyprus	3.5	6.7		4.2	6.9		8.7	17.8
Luxembourg	5.1	5.6		5.9	6.5		18.3	18.0
Malta	5.8	6.9		6.2	7.2		11.2	14.8
Netherlands	2.7	4.1		2.8	4.0		5.2	7.4
Austria	3.9	4.9		4.1	4.4		7.9	10.1
Portugal	7.8	10.5		9.2	11.2		17.3	21.4
Slovenia	4.1	6.2		4.3	6.3		10.2	12.2
Slovakia	8.9	14.1		10.3	14.2		19.2	33.3
Finland	6.5	9.0		6.7	8.1		17.0	23.7
Euro area	7.7	10.0		8.4	10.1		15.7	19.9
Bulgaria	5.2	8.7		5.2	7.9		11.2	22.5
Czech Rep.	4.3	7.9		5.6	8.7		10.3	21.7
Denmark	3.4	7.6		3.7	6.5		8.3	14.2
Estonia	6.5	15.5***		5.6	11.2*		14.3	32.0****
Latvia	8.1	22.3		7.6	17.5		12.9	44.9
Lithuania	6.3	15.8***		5.9	11.8*		14.9	30.4****
Hungary	7.8	11.0		7.9	10.5		20.0	28.4
Poland	6.8	9.1		7.7	9.2		16.6	23.6
Romania	5.8	7.6***		4.7	6.8*		18.6	20.4****
Sweden	6.4	8.7		6.7	8.6		20.5	26.0
U.K.	6.0	7.8**		5.3	6.7**		15.8	19.7**
EU-27	7.1	9.6		7.5	9.4		15.8	20.6
US	6.2	9.7		5.5	8.6		13.4	18.8
Japan	4.0	4.8*		3.8	4.4*		-	-

Note: * February 2010; ** January 2010; *** December 2009; **** Q4 2009.
Source: Eurostat, December 1, 2009. Seasonally adjusted unemployment rates.

In the same period, *youth* UR (15-24) increased from 15.8% to 20.6% (with extremely high rates in Spain and Latvia, 41.2% and 44.9% respectively; the other Baltic states, Slovakia and Italy follow in this ranking.[23]

It would be interesting to distinguish now the differentiated impact of the *crisis* on youth unemployment in the EU countries from the *structural* problems that affect the relative position of young people, that is particularly shaky in some countries. To this end we need data for a longer period. Table 5 shows the unemployment rate of young people (15-24 years) in the EU-27 countries, for the 1998-2009 period. For the EU-27 aggregate, we can see that there was a steady situation till 2005, then an improvement in 2006-07 – prior to the global crisis – and finally a jump in 2009 to the highest level of all decade (19.6%).

Higher than average figures are shown by different groups of countries: (i) some Mediterrenean countries (Spain, Italy, Greece) plus France and Belgium; (ii) many Nordic countries (Sweden, Finland, the Baltic states); (iii) some NMS (Poland, Hungary, Slovakia); on the other hand, in Romania and Bulgaria the situation improved over

[22] Eurostat, April 30, 2010.
[23] As to *female* UR, it increased in EU-27 from 7.5% to 9.4%, but male UR increase was even higher, from 6.8% to 9.8%.

time[24] (and now the two countries are close to or below the EU average). The crisis has caused a deep worsening – from 2008 to 2009 – in the Baltic states, in Spain and Greece, in Hungary and Slovakia, but also in Sweden, Finland, France and Italy. And the pattern has been deteriorating also in 2010.[25]

Table 5 – Unemployment rate of young people (15-24 years)

	1998	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
Belgium	**22.1**	**21**	16.7	16.8	17.7	**21.8**	**21.2**	**21.5**	**20.5**	**18.8**	**18**	**21.9**
Bulgaria			**33.7**	**38.8**	**37**	**28.2**	**25.8**	**22.3**	**19.5**	15.1	12.7	16.2
Czech Republic	12.8	17.7	**17.8**	17.3	16.9	**18.6**	**21**	**19.2**	**17.5**	10.7	9.9	16.6
Denmark	7.3	9.1	6.2	8.3	7.4	9.2	8.2	8.6	7.7	7.9	7.6	11.2
Germany	9.1	8.1	7.5	7.7	9.1	9.8	11.9	14.2	12.8	11.1	9.9	10.4
Estonia			**24.4**	**23.2**	**17.6**	**20.6**	**21.7**	15.9	12	10	12	**27.5**
Ireland	11.3	8.5	6.7	7.2	8.4	8.7	8.7	8.6	8.6	8.9	13.3	**24.4**
Greece	**29.9**	**31.5**	**29.1**	**28**	**26.8**	**26.8**	**26.9**	**26**	**25.2**	**22.9**	**22.1**	**25.8**
Spain	**33.1**	**27.3**	**24.3**	**23.2**	**24.2**	**24.6**	**23.9**	**19.7**	**17.9**	**18.2**	**24.6**	**37.8**
France	**25.1**	**22.9**	**19.6**	**18.9**	**19.3**	**19.2**	**20.6**	**21.1**	**22.1**	**19.6**	**19.1**	**23.3**
Italy	**29.9**	**28.7**	**27**	**24.1**	**23.1**	**23.7**	**23.5**	**23.9**	**21.7**	**20.3**	**21.2**	**25.3**
Cyprus			10.1	8.1	8.1	8.9	10.5	13	10.5	10.1	8.8	13.8
Latria	**26.8**	**23.6**	**21.4**	**22.9**	**22**	18	18.1	13.6	12.2	10.7	13.1	**33.6**
Lithuania	**25.5**	**26.4**	**30.6**	**30.9**	**22.4**	**25.1**	**22.7**	15.7	9.8	8.2	13.4	**29.2**
Luxembourg	6.9	6.9	6.6	6.2	7	11.2	16.4	14.3	15.8	**15.6**	**17.3**	17.5
Hungary	15	12.6	12.4	11.3	12.7	13.4	15.5	**19.4**	**19.1**	**18**	**19.9**	**26.5**
Malta			13.7	**18.8**	17.1	17.2	16.8	16.2	16.5	13.8	11.9	14.3
Netherlands	7.6	6.8	5.7	4.5	5	6.3	8	8.2	6.6	5.9	5.3	6.6
Austria	6.4	5.4	5.3	5.8	6.7	8.1	9.7	10.3	9.1	8.7	8	10
Poland	**22.5**	**30.1**	**35.1**	**39.5**	**42.5**	**41.9**	**39.6**	**36.9**	**29.8**	**21.7**	**17.3**	**20.6**
Portugal	10.4	8.8	8.6	9.4	11.6	14.5	15.3	16.1	16.3	**16.6**	**16.4**	**20**
Romania		**20.4**	**20**	**18.6**	**23.2**	**19.6**	**21.9**	**20.2**	**21.4**	**20.1**	**18.6**	**20.8**
Slovenia	17.8	17.6	16.3	**17.8**	16.5	17.3	16.1	15.9	13.9	10.1	10.4	13.6
Slovakia	**25.1**	**33.8**	**36.9**	**39.2**	**37.7**	**33.4**	**33.1**	**30.1**	**26.6**	**20.3**	**19**	**27.3**
Finland	**23.5**	**21.4**	**21.4**	**19.8**	**21**	**21.8**	**20.7**	**20.1**	**18.7**	**16.5**	**16.5**	**21.5**
Sweden	16.1	12.3	10.5	14.9	16.3	17.3	**20.4**	**22.5**	**21.5**	**19.1**	**20**	**25**
United Kingdom	13.1	12.7	12.2	11.7	12	12.2	12.1	12.8	14	14.3	15	19.1
EU (27 countries)	*18.4*	*17.8*	*17.3*	*17.3*	*18*	*18.1*	*18.5*	*18.3*	*17.1*	*15.3*	*15.4*	*19.6*

Source: Eurostat on-line data base
*Note: *EU-25 for 1998 and 1999. In bold the values higher than the EU average.*

A possible question that now arises is whether the increased youth unemployment rates reflect the general bad economic situation – as shown by the total unemployment rates – or instead a peculiar negative movement concerning young people. Many studies (e.g. ILO, 2010) have argued that the most vulnerable segments of the labour market are young people, old workers, vulnerable employment in general and (at least in many world regions) women.

Table 6 shows for the EU-27 countries the ratios between the youth unemployment rates (15-24 years) and the total unemployment rates (all ages). A first observation is that – for EU as a whole – there was not in the last decade any improvement in the relative position of young people, despite the European Employment Strategy and Lisbon's Agenda goals. The ratio has been pretty close to 2 and it has been slightly deteriorating even before the crisis. In other words, young people face a double risk, compared to general population, of being unemployed. The real figure is probably higher, because the "discouraged worker effect" is more likely for the young, who can opt to continue the education or simply to live with their families (avoiding to implement robust search efforts if unable to find a job).

[24] Also in the Baltic states the situation had improved in the years preceding the crisis, but then worsened sharply; on the contrary youth unemployment in Sweden was getting worse since the mid decade.
[25] For example the figure for Italy was 25.3% for 2009 on average, but in June 2010 it reached 30%.

Table 6 – Ratios of youth unemployment rate vs. total unemployment rate

	1998	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
Belgium	**2.4**	**2.5**	**2.4**	**2.5**	**2.4**	**2.7**	**2.5**	**2.5**	**2.5**	**2.5**	**2.6**	**2.8**
Bulgaria			**2.1**	2.0	2.0	**2.1**	**2.1**	**2.2**	**2.2**	2.2	**2.3**	**2.4**
Czech Republic	2.0	**2.1**	2.0	**2.2**	**2.3**	**2.4**	**2.5**	**2.4**	**2.4**	2.0	**2.3**	**2.5**
Denmark	1.5	1.8	1.4	1.8	1.6	1.7	1.5	1.8	2.0	2.1	**2.3**	1.9
Germany	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.3	1.4	1.4
Estonia			1.8	1.8	1.7	**2.1**	**2.2**	2.0	2.0	2.1	2.2	2.0
Ireland	1.5	1.5	1.6	1.8	1.9	1.9	1.9	2.0	1.9	1.9	2.1	2.1
Greece	**2.8**	**2.6**	**2.6**	**2.6**	**2.6**	**2.8**	**2.6**	**2.6**	**2.8**	**2.8**	**2.9**	**2.7**
Spain	**2.2**	**2.2**	**2.2**	**2.3**	**2.2**	**2.2**	**2.3**	2.1	2.1	2.2	2.2	2.1
France	**2.3**	**2.2**	**2.2**	**2.3**	**2.2**	**2.1**	**2.2**	**2.3**	**2.4**	**2.3**	**2.4**	**2.5**
Italy	**2.6**	**2.6**	**2.7**	**2.6**	**2.7**	**2.8**	**2.9**	**3.1**	**3.2**	**3.3**	**3.2**	**3.2**
Cyprus			**2.1**	**2.1**	**2.3**	**2.2**	**2.2**	**2.5**	**2.3**	**2.5**	**2.4**	**2.6**
Latvia	1.9	1.7	1.6	1.8	1.8	1.7	1.7	1.5	1.8	1.8	1.7	2.0
Lithuania	1.9	1.9	1.9	1.9	1.7	2.0	2.0	1.9	1.8	1.9	**2.3**	2.1
Luxembourg	**2.6**	**2.9**	**3.0**	**3.3**	**2.7**	**2.9**	**3.3**	**3.1**	**3.4**	**3.7**	**3.5**	**3.2**
Hungary	1.8	1.8	1.9	2.0	**2.2**	**2.3**	**2.5**	**2.7**	**2.5**	**2.4**	**2.6**	**2.7**
Malta			2.0	**2.5**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**	2.2	2.0	2.1
Netherlands	2.0	**2.1**	2.0	2.0	1.8	1.7	1.7	1.7	1.7	1.8	1.9	1.9
Austria	1.4	1.4	1.5	1.6	1.6	1.9	2.0	2.0	1.9	2.0	2.1	2.1
Poland	**2.2**	**2.2**	**2.2**	**2.2**	**2.1**	**2.1**	**2.1**	2.1	2.1	**2.3**	**2.4**	**2.5**
Portugal	**2.1**	2.0	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	2.1	2.1	2.0	2.1	2.1
Romania		**2.9**	**2.7**	**2.7**	**2.7**	**2.8**	**2.7**	**2.8**	**2.9**	**3.1**	**3.2**	**3.0**
Slovenia	**2.4**	**2.4**	**2.4**	**2.9**	**2.6**	**2.6**	**2.6**	**2.4**	**2.3**	2.1	**2.4**	**2.3**
Slovakia	2.0	**2.1**	2.0	2.0	2.0	1.9	1.8	1.8	2.0	1.8	2.0	**2.3**
Finland	**2.1**	**2.1**	**2.2**	**2.2**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.6**	**2.6**
Sweden	2.0	1.8	1.9	**2.6**	**2.7**	**2.6**	**2.8**	**3.0**	**3.1**	**3.1**	**3.2**	**3.0**
United Kingdom	**2.1**	**2.2**	**2.3**	**2.3**	**2.4**	**2.4**	**2.6**	**2.7**	**2.6**	**2.7**	**2.7**	**2.5**
EU (27 countries)	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.1*	*2.1*	*2.2*	*2.2*	*2.2*

Source: Eurostat on-line data base
*Note: *EU-25 for 1998 and 1999. In bold the ratios higher than the EU average.*

If we examine the figures of individual countries, the striking observation is that higher-than-average ratios can be found for the same countries with higher-than-average unemployment rates (the bold cells in Table 6 roughly correspond to the bold cells in Table 5). The clearest exceptions are provided by Spain and by the Baltic states, where the ratios are close to the European average (which is around 2) and the huge unemployment rates – that we have emphasized before – are also a consequence of the awful labour market situation.

On the other hand, the labour market exhibits specific problems concerning young people – with youth/total ratios around or close to 3 – in Italy, Greece, some NMS, in the Belgium-Luxembourg-France zone and, rather surprisingly, also in Sweden as well as the UK.

The countries that have been the most able to cope with the labour market problems, in general, and to keep under control the rise of youth unemployment, in particular, are localised in central Europe: Germany, Austria, the Netherlands, and Denmark. Is this the revenge of the flexicurity model or, from a different point of view, the success of the attempt to make more flexible some labour market institutions but safeguarding the basic elements of the pre-existing "social model" (exemplified by the German experiments of the last years)?

5. Conclusions and Policy Implications

The empirical part of this study investigated the effect of financial crises on youth unemployment rates during the period 1980-2000 for a large number of countries (about 70). The estimation technique consists in a random effects panel model. The empirical study focused also on the differentiated impact by gender and by group of countries, according to their income level. A special emphasis was given to the problem of persistence of such effects.

The main results of our econometric investigations are the following. *Financial crisis impact on youth unemployment rate is significant*, reflecting the general result obtained for people of all ages (see Chooudhry et al., 2010). Our results imply that financial crises lead to increase in youth unemployment rate; the results are statistically significant and robust. The inclusion of many control variables does not change the sign and significance of the key explanatory variable.

Labour markets in economies belonging to diverse income groups respond differently to financial crises; in particular, empirical analysis shows that financial crisis impact on youth unemployment rate is negative and significant only in case of high income economies; also the estimated coefficient is lower in developing economies. A possible explanation is that mostly young people in developing countries are working in informal sectors or in agriculture sector (under the category of unpaid family helpers) and they are not recorded in official labour market statistics.

Gender specific analysis shows that severity of the impact for female unemployment rate is higher in comparison to overall (youth) unemployment rate. We also find that financial crisis impact is positive and statistically significant for young female workers, both in developing and high income economies (differently from the general result mentioned above). Our results also show the persistence of adverse effects for labour markets and suggest that financial crises affect youth unemployment rate till five years after onset of crises. However the most adverse effects are found in second and third year after financial crisis. Moreover, considering the Arellano-Bond dynamic panel estimation model, we found that both the lagged dependent variable and the financial crisis variable have a significant impact on youth unemployment rate, both for male and for females.

Though we are fully aware of the peculiarities of the last crisis, its global nature in the first place, we think that our econometric results allow us to have an indirect idea about the impact of the 2007-08 financial crisis on the labour market, in general, and on the youth, in particular.

The impact of the crisis on labour markets has been delayed, but unfortunately will persist in the next years. The deepest impact was brought on the weakest sections of the labour market: young people (because of the less stable jobs and, especially for the new entrants, as a consequence of "labour hoarding" phenomena regarding adult workers in a situation of low labour demand), women, old workers (who are often unable to find alternative jobs), with a widespread increase in vulnerable employment as well.

Public policies have generally followed two key approaches: (i) providing huge *fiscal stimuli* to sustain, through government expenditures, consumption, aggregate demand and production; (ii) following *"passive" labour market policies*, to sustain the income of the unemployed (or workers risking to be fired).

As to the first point, the timing of the exit strategies will be crucial (see also World Bank, 2010), although a rapid reduction in public deficits is required by the fiscal stance of many EU countries (that has caused in Spring 2010 increased risks concerning sovereign debts).

On the second point, effective improvements in active labour market policies should accompany the passive measures, in order to help the weakest segments of the labour market – particularly young people – that, as we have seen, are the most affected by the crisis. Even the system of passive policies in not always adequate: many young workers are not generally entitled to (full) unemployment insurance (because of their precarious and temporary jobs) and unemployment benefits are - in many countries - totally lacking for new entrants in the labour market.

Appropriate "active" policies are even more required, especially in countries where youth performance was awful even before the crisis. As we have seen (Section 4), the unemployment rate of young people is in many countries three times as high as the general one (and it probably underestimates the real figures because of "discouraged worker" and other effects). Thus, better STWT institutions, more efficient placement services, more adequate training activities, etc. are absolutely required. As for the "educational system" a progressive shift of the "sequential and rigid" systems towards the "dual and flexible" systems seems appropriate. Otherwise the NEET generation will continue to expand, with dreadful economic and social consequences.

References

Abowd J, Kramarz F, Lemieux T, Margolis D (1997), "Minimum wages and youth employment in France and the United States". *NBER Work Pap* 6111

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(2), 277-97.

Arpaia A. and Curci N. (2010), "The EU Labour Market Behaviour During the Great Recession", January, mimeo.

Bassanini A. and Duval R. (2006), "The Determinants of Unemployment across OECD Countries: Reassessing the Role of Policies and Institutions", *OECD Economic Studies*, 42, 7–86.

Bell D.N.F. and Blanchflower D.G. (2009), "What Should Be Done about Rising Unemployment in the UK", *IZA Discussion Paper*, n. 4040, Bonn.

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

Blanchflower D.G., Freeman R. (2000), "*Youth Employment and Joblessness*", University of Chicago Press, Chicago.

Bordo M. (2006), "Sudden Stops, Financial Crises, and Original Sin in Emerging Countries: Déjà Vu?", *NBER Working Paper*, 12393.

Brunello G., Garibaldi P., Wasmer (2007), "*Education and training in Europe*", Oxford University Press, New York.
Carmeci L., L. Mauro (2003), "Long run growth and investment in education: does unemployment matter?", *Journal of Macroeconomics, 25: 123-137.*
Caroleo F.E., F. Pastore (2007)," The youth experience gap: explaining differences across EU countries", Università di Perugia, Quaderni del Dipartimento di Economia, Finanza e Statistica 41.
Caroleo F.E., F. Pastore (2009), "Le cause del(l'in)successo lavorativo dei giovani", *Economia & Lavoro*, vol. 3, 107-31.
Checchi D. (2006), "*The Economics of Education*", Cambridge University Press, Cambridge.
Choudhry M.T., Marelli E. and Signorelli M. (2010), "Financial Crises and Labour Market Performance", International Atlantic Economic Conference, Prague, 24-27 March 2010.
Clark K.B., L.H. Summers (1982), "The dynamics of youth unemployment", in Freeman R.B. and D.A. Wise (eds.), cit.
Cockx B. and Picchio M. (2009), "Are Short-Lived Jobs Stepping Stones to Long-Lasting Jobs?", *IZA* Discussion Paper, n. 4004, Bonn.
Demidova O., Signorelli M., (2010), "The Impact of Crises on Youth Unemployment of Russian Regions: An Empirical Analyses", paper accepted for EACES Conference "Comparing Responses to Global Instability", University of Tartu, Estonia, 26-28 August 2010.
Elhorst, J.P., and A.S. Zeilstra (2007) "Labor force participation rates at regional and national levels of the European Union: An integrated analysis". Papers in Regional Science 86: 525-549.
European Commission (2008), "Employment in Europe 2008".
R. Freeman e D. Wise (eds.), *The Youth Labour Market Problem: Its Nature, Causes and Consequences*, University of Chicago Press: Chicago.
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.
Heckman JJ, Borjas GJ (1980), "Does unemployment cause future unemployment? Definitions, questions and answers from a continuous time model of heterogeneity and state dependence". *Econ* 47(187): 247-283
Honohan P. and Laeven, L.A. (2005), *Systemic Financial Distress: Containment and Resolution*, Cambridge University Press, Cambridge (UK).
ILO (2009), "*KILM9 - Youth unemployment*" in Key Indicators of the Labour Market (KILM), Sixth Edition, Geneva, September.
ILO (2010), *Global Employment Trends*, International Labour Organization, Geneva, January.
IMF (2009), *World Economic Outlook. Sustaining the Recovery*, Washington, October.
Jacobsen J.P. (1999), "*Labor force participation"***,** *The Quarterly Review of Economics and Finance*, Elsevier, 39, 5, 597-610.
Kolev A, Saget C (2005) "Understanding youth labour market disadvantage: Evidence from south-east Europe", *Int Labour Rev* 144(2): 161-187
Laeven L.A. and Valencia F. (2008), "Systemic Banking Crises: A New Database", *IMF Working Paper*, 224, Washington, DC.
Lefresne F (2003) 'Les jeunes et l'emploi.' *Collect Repères* La Découverte, Paris
E. Marelli and M. Signorelli (eds.) (2010), *Economic Growth and Structural Features of Transition*, Palgrave Macmillan, London and New York.
Neumark D., W. Wascher (1999), "A cross national analysis of the effects of minimum wages on youth employment", *NBER* w.p. 7299.
Neumark D., W. Wascher (2004), "Minimum wages, labour market institutions, and youth employment: a cross-national analysis", *Industrial and Labour Relations Review* 57(2): 223-247.
Nickell,S (1998) "Unemployment: Questions and some answers" The Economic Journal, 108: 802-816.
Nunziata L, Staffolani S (2007) "Short-term contracts regulations and dynamic labour demand: theory and evidence". *Scott J Poltic Econ* 54(1): 72-104
OECD (2005), *Education at Glance*, Paris.
OECD (2006a) *Employment Outlook* OECD, Paris
OECD (2008), *OECD Employment Outlook 2008*, Paris.
O'Higgins N. (2005), "Trends in the youth labour market in developing and transition countries", *Labor and Demography* WP 0507002.
O'Higgins N (1997) The challenge of youth unemployment. *Employ Train Pap* 7 ILO, Geneva
Okun A. M. (1962), "Potential GNP: Its Measurement and Significance," in *Proceedings of the Business and Economic Statistics Section*, American Statistical Association, Washington, D.C., pp. 98-103.
Perugini C., M. Signorelli (2007), "Labour market performance differentials and dynamics in EU-15 countries and regions", *European Journal of Comparative Economics*, n. 2.
Perugini C., M. Signorelli (2010a), "Youth Labour Market Performance in European Regions", *Economic Change and Restructuring*, n. 2.
Perugini C., M. Signorelli (2010b), "Youth Unemployment in Transition Countries and Regions" in E. Marelli and M. Signorelli (eds.), op. cit.
Quintini G., J.P Martin, S. Marti (2007), "The changing nature of the school-to-work transition process in OECD countries", *IZA* discussion paper 2582.
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*, n. 90, Paris.
Rees A. (1986), "An Essay on Youth Joblessness", *Journal of Economic Literature*, 24(2): 613-628.
OCSE (1994), "*The OECD Jobs Study*", Paris.
Reinhart C. and Rogoff K. (2008a), "This Time Is Different: A Panoramic View of Eight Centuries of Financial Crises", *NBER Working Paper*, 13882.
Reinhart C. and Rogoff K. (2008b), "Banking Crises: An Equal Opportunity Menace", *NBER Working Paper*, 14587.
Reinhart C. and Rogoff K. (2009), "The Aftermath of Financial Crises", *NBER Working Paper*, n. 14656.

Rodrìguez-Pose A. (2003), "Human capital and regional disparities in the EU", Joint Conference of the EC and the EIB on: Human capital, employment, productivity and growth.
Roodman, D. (2006) “How to do xtabond2:an introduction to “Difference ” and “System” GMM in Stata”. Centre for Global Development Working Paper Number 103.
Ryan P. (2001), “The school-to-work transition: a cross-national perspective”, *Journal of Economic Literature* 39(1): 34-92.
S. Scarpetta, A. Sonnet and T. Manfredi (2010), "Rising Youth Unemployment During the Crisis: How to Prevent negative Long-Term Consequences on a Generation?", *OECD Social, Employment and Migration Working Papers*, n. 6, Paris, April.
Signorelli M. (2005), "Growth and Employment: Comparative Performance, Convergences and Co-movements", *Economic Department Working Paper*, n.8, University of Perugia.
Signorelli M. (2008), "Employment and Unemployment in a Multilevel Regional Perspective", in M. Petricioli (ed.), *Mediterranean Europe*, P.I.E. Peter Lang, Bruxelles.
Sperl L. (2009), "The Crisis and its Consequences for Women", Development and Transition, 13, United Nation Programme and London School of Economics and Political Science.
Topel R.H., Ward M.P. (1992), “Job Mobility and the Careers of Young Men”, *Quarterly Journal of Economics*, 107(2): 439-479.
S. Verick (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*, n. 4359, August.
World Bank (2010), *Global Economic Prospects. 2010 Foresees Long Road to Economic Recovery*, Washington.

Appendix

Table A1: Data description and Sources

Variable	Definition	Source
Dependent Variables (alternative)		
Youth Unemployment Rate	Youth unemployed Labour force/youth labour force	Key Indicators of Labour market (KILM)
Key Explanatory Variable		
Financial Crises	It is calculated as a sum of systemic banking crises (when a country’s corporate and financial sector experiences a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted) and non-systemic banking crises (is defined as crises limited to a small number of banks).	Honohan and Laeven (2005)
Control Variables		
GDP Growth (CSW)	Annual GDP growth	World Development Indicator
Gross Fixed Capital Formation	Annual growth in fixed capital formation	World Development Indicator
Foreign direct Investment (FDI)	Net inflow of foreign direct investment as percentage of GDP	World Development Indicators
Openness(Open)	Trade of goods and services as percentage of GDP	World Development Indicators
Inflation (Inf)	Consumer Price Index (P) was adjusted for extreme fluctuations as P/100)/[1+(p/100)]	World Development Indicators

Table A2:Correlation Matrix

Variable	YUN	CRS	LGDP	GFCF	INF	FDI	OPEN
Youth Unemployment Rate (YUN)	1						
Financial crises (CRS)	0.00	1.00					
lagged GDP Growth (LGDP)	-0.18	-0.16	1.00				
Gross Fixed Capital Formation Growth (GFCF)	-0.07	-0.19	0.34	1.00			
Inflation (INF)	0.01	0.07	-0.07	0.01	1.00		
Foreign direct Investment(FDI)	-0.04	-0.06	0.09	0.06	-0.09	1.00	
Openness (OPEN)	-0.09	-0.08	0.10	0.04	-0.22	0.40	1.00

Table A3: Impact of financial crises on youth unemployment rate – High Income OECD Countries

Dependent Variable: Youth Unemployment Rate					
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Financial Crises	1.607***	1.506***	1.603***	1.501***	1.316**
	0.547	0.526	0.545	0.55	0.525
GDP growth(-1)	-0.691***	-0.737***	-0.667***	-0.644***	-0.646***
	0.091	0.088	0.091	0.095	0.091
Gross capital formation growth	0.058*	0.016	0.056*	0.057*	0.006
	0.031	0.031	0.031	0.031	0.031
Inflation		-34.410***			-38.889***
		5.594			5.747
Foreign direct Investment			-0.071**		-0.056
			0.033		0.034
Openness				-0.03	-0.049**
				0.018	0.02
Constant	16.867***	18.772***	16.975***	18.747***	22.156***
	0.328	0.437	0.331	1.197	1.365
Observations	471	469	469	471	467
Countries	24	24	24	24	24
R-square	0.164	0.231	0.174	0.169	0.255
Significance of Model	29.005***	33.094***	23.298***	22.502***	24.942***

Table A4: Impact of financial crises on youth unemployment rate – Non OECD Countries

Dependent Variable: Youth Unemployment Rate					
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Financial Crises	0.808	0.74	0.983	0.821	0.861
	0.586	0.576	0.622	0.586	0.619
GDP growth(-1)	-0.121**	-0.215***	-0.116**	-0.121**	-0.211***
	0.055	0.055	0.057	0.055	0.057
Gross capital formation growth	-0.042***	-0.041***	-0.041**	-0.040**	-0.038**
	0.016	0.015	0.016	0.016	0.016
Inflation		-9.635***			-9.522***
		1.619			1.696
Foreign direct Investment			0.082		-0.067
			0.112		0.114
Openness				0.015	0.008
				0.015	0.02
Constant	16.897***	19.108***	17.171***	15.771***	19.236***
	0.376	0.48	0.471	1.186	1.359
Observations	375	366	357	375	350
Countries	48	48	48	48	48
R-square	0.061	0.158	0.063	0.064	0.155
Significance of Model	7.060***	14.726***	5.093***	5.546***	9.070***

Table A5: Impact of financial crises on female youth unemployment rate

Dependent Variable: Female Youth Unemployment Rate		
Variables	High Income OECD Countries	Other Countries
Financial Crises	1.204**	1.428*
	0.556	0.73
GDP growth(-1)	-0.508***	-0.243***
	0.096	0.067
Gross capital formation growth	0.041	-0.037**
	0.033	0.019
Inflation	-29.214***	-10.950***
	6.09	1.998
Foreign direct Investment	-0.085**	-0.013
	0.036	0.134
Openness	-0.037*	0.005
	0.021	0.024
Constant	21.621***	21.753***
	1.446	1.603
Observations	467	348
Countries	24	47
R-square	0.166	0.152
Significance of Model	14.503***	8.832***

Table A6: Impact of financial crises on female youth unemployment rate - Dynamic Model

Dependent Variable: Female Youth Unemployment Rate						
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
lagged Youth Unemployment Rate	0.738***	0.744***	0.722***	0.740***	0.743***	0.717***
	0.047	0.049	0.052	0.05	0.049	0.054
Financial Crises	1.335***	0.748***	0.722***	0.817***	0.726**	0.788***
	0.323	0.272	0.262	0.275	0.28	0.267
GDP growth(-1)		-0.099**	-0.126***	-0.091**	-0.096**	-0.111***
		0.043	0.037	0.044	0.043	0.037
Gross Fixed Capital formation growth		-0.080***	-0.077***	-0.079***	-0.081***	-0.077***
		0.015	0.015	0.015	0.015	0.015
Inflation			-6.121***			-6.515***
			1.24			1.266
Foreign direct Investment				-0.051***		-0.046***
				0.017		0.015
Openness					-0.01	-0.017
					0.012	0.011
Constant	4.320***	4.953***	5.943***	5.177***	5.633***	7.353***
	0.843	0.794	0.927	0.843	1.147	1.271
Observations	775	728	722	708	728	704
Countries	67	64	63	64	64	63
R-square	0.592	0.647	0.663	0.653	0.648	0.667
Significance of Model	122.284***	59.583***	96.354***	53.790***	46.761***	80.475***