



**THE IMPACT OF CRISES ON YOUTH
UNEMPLOYMENT OF RUSSIAN REGIONS:
AN EMPIRICAL ANALYSIS**

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The Impact of Crises on Youth Unemployment of Russian Regions: An Empirical Analysis

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Abstract[°]

The main purpose of this paper is to estimate the influence of the 1998 and 2008 crises on the youth unemployment rates (age class 20-29) in Russian regions. The investigation is founded on the panel data for 78 Russian regions during 1997–2008 provided by ROSSTAT (the main Russian State statistical organization). We compare the level and dynamics of the youth unemployment in various Russian regions and try to solve three main questions:

Are there any special features of the youth unemployment in comparison with overall unemployment? How the 1998 crisis did change - and how the 2008 crisis is going to change - the youth unemployment dynamics? What can we learn from the impact of 1998 crisis and what is the main difference with the impact of the 2008 crisis?

With the help of the obtained results we define some preliminary policy suggestion.

JEL Classification: G01, R23, E24

Key words: financial crises, regional youth unemployment, Russian labour market

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1. Introduction

In many countries, youth unemployment dramatically rose after the recent global economic crisis (ILO, 2010; Arpaia and Curci, 2010; Choudhry et al., 2010)¹. The last 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 in all countries around the world. The real effects of financial crisis (on production, income, expenditure, etc.) are always lagged². Considering the labour market consequences of the crisis, even longer lags exist.

It should be noted that, also in "good times" the integration of young people into the labour market is an important objective all over the world, due to the generally high and persisting youth unemployment rates. For example, 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 and 2010b).

The aim of this paper is to provide new econometric results on the youth labour market performance and dynamics of Russian regions, especially focusing on the impact of 1998 and 2008 crises.

The structure of the paper is the following. In section 2 the relevant literature review is distinguished into five sub-topics. The empirical evidence and results are presented in Section 3, before a brief Section of final remarks and policy implications.

2. Review of the Literature

Considering the topic of the paper and the characteristic of the existing literature, we distinguish this part into five sub-sections. In fact, in the huge literature on labour markets, the topics regarding (i) the youth segment, (ii) the regional levels and (iii) the labour market impact of crises are generally considered separately. So, after a brief presentation of the definitions of "young people" adopted in the literature and a note on the better indicator between employment and unemployment rates, the second sub-section is dedicated to the "structural" determinants of youth unemployment rates (YURs) and the third one is devoted to key explanations of regional labour market performance, differences and dynamics. Then, after a review of the literature on the relationship between crisis and youth unemployment, in the final sub-section some key differences between 1998 and 2008 Russian crises are presented.

2.1. On the Definitions of "Young People" and the Better Youth Labour Market Performance Indicator

Although official statistics tend to focus on the group aged 15-24³, 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 the case of Russia, we shall use in our empirical estimates the 20-29 age class.

In general, employment rate indicators are better than unemployment rates, but this does not hold for "young people" considering the difficulties to take in to account of the differences and changes in the "schooling

1 The impact has been deeper on the weakest segments of the labour market, especially young people.

2 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 consequence of GDP and revenue declines/ accompanied by an increase in public expenditures.

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

participation"⁴. Obviously, in interpreting empirical evidence, it should be borne in mind that YURs are affected by all the problems related to general unemployment rates (in particular, the definition of unemployment and the role of discouragement effects)⁵. In addition, in the case of youth unemployment, some specific problems, such as underemployment and informal sector employment, may be particularly relevant (O'Higgins 2005).

2.2. On the Structural Determinants of Youth Unemployment

As already highlighted in the Introduction, the youth unemployment rate is generally higher than adult unemployment rate. According to the existing literature, many factors (including also the macroeconomic conditions and the set of labour market institutions) contribute to the youth labour market performance. It is well-known that unemployment, in general, depends significantly on macroeconomic cyclical conditions: however, macroeconomic performance and cyclical behaviour cannot explain many "persistent" employment difficulties of young people. 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. The educational level is the most immediate variable measuring "human capital", but young people lack the other two components of human capital, namely generic and job-specific work experience. 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.

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). The impact of the institutional settings has been previously stressed by many authors (e.g. Neumark and Wascher, 2004; Kolev and Saget, 2005; Bassanini and Duval, 2006); in particular, many authors have analysed the effects of temporary jobs (e.g. Booth et al., 2002; Quintini and Martin, 2006) or of minimum wage regulations (e.g., Abowd et al., 1997, Neumark and Wascher, 1999). A part of the literature point on the role of temporary contracts in favouring the transition of young people to labour market (e.g. Ichino et al., 2005; Barbieri and Sestito, 2008; Picchio, 2008).

The school-to-work transition (STWT) processes and their changes over time has been widely investigated in the literature. Clark and Summers (1982) analyse the determinants of the higher flows in and out of unemployment for young compared with adult people. The persistence of youth unemployment, initially considered by Heckman and Borjas (1980), is also the focus of Ryan (2001). Even macroeconomic variables - e.g. the labour demand level and relative wages (see O'Higgins, 2005) – may affect the school-to-work transition. As to the education systems in Europe, that can be classified according to their flexibility vs. rigidity and to their "dual" vs. "sequential" approach to training (Caroleo and Pastore, 2003 and 2007), they determine, on one hand, the "quality" of education and the performance of students and interact, on the other hand, with the STWT institution in influencing the youth labour market performance⁶.

4 In other terms, a lower or/and decreasing youth employment rate is significantly related to high(er) "schooling participation".

5 On this point, see Perugini and Signorelli 2004 and 2007.

6 Caroleo and Pastore (2007), arguing that the "youth experience gap" is a key factor in explaining youth unemployment, 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.

Many other researches consider the human capital a prominent element in the explanation of the determinants of youth labour market performance (by considering 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). 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). The microeconomic literature considers the educational choices as the optimal outcome of comparing the investment costs in education and the expected returns (probability to get a job, future incomes, better occupations and careers, social esteem, etc.). However, the decision of extending the study period and the choice of the type and level of school, as well as the final outcomes, depend also on the family (socio-economic and cultural) background. In fact, the participation to (different levels of) education is positively correlated, in all countries, with household background in terms of education and/or employment, with obvious effects in terms of social mobility; remarkable differences between countries exist and persist over time (Hertz et al. 2007); the objective of equal (or similar) educational and employment opportunities is far to be reached (e.g. Checchi 2003; Brunello-Checchi 2005).

An important 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 local/regional 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, 2003): a good level of formal education can have a limited impact on economic growth and performance if it is not suitable to the market needs. This is why the problem of an efficient - in terms of demand/supply match - investment in (higher) human capital and the measurement of (both private and social) returns on investment, e.g. in terms of increased labour productivity, is permanently in the agenda of the policymakers.

In the European context, in addition to Eurostat surveys (2003), Andrews et al. (2001) investigate the role of qualitative mismatch between demand and supply, while Hannan et al. (1999) realised a comparison of the STWTs by considering the differences in the educational institutions and in the labour markets. Iannelli e Soro-Bonmati (2003) showed the "youth transition" differences between South (Italy and Spain) and North Europe, focusing also on the role of the family. Some authors used ECHP data in empirical researches in European countries (e.g. Betti et al., 2005; Righi and Sciulli, 2009), in particular Bernardi et al. (2000) compared Italy and Great Britain especially focusing on the role of institutional and individual aspects. Other researches investigated single countries: Nguyen and Taylor (2003) investigated - for British young - the relationships between (i) job opportunities and school programmes and (ii) lenght of the transition and the probability of finding a job; Blazquez-Cuesta and Garcia-Perez (2007) highlighted (i) the negative role of the decentralisation of the Spanish educational systems on the process of STWT, (ii) the positive role of public expenditure for education in increasing job opportunities and (iii) the existence of an U-inverted dynamic of the probability of finding a job with respect to the time/lenght of transition. As for the Italian case, some authors used a compared approach with respect to many other countries (Boschetto et al., 2006), while other researches used national or regional data (e.g. Mariani et al., 2001).

On the supply side of education, the quality of the educational system (capital endowment of schools, teachers' experience and "quality"), together with teaching and grading practices, has a considerable impact on human capital accumulation. The empirical research makes use of the Oecd's PISA (Programme for International Student Assessment) and ALL (Adult Literacy and Lifeskills), providing data about adults' skills and their occupational status and wage (see e.g. Porro-Iacus 2007 and Checchi et al. 2007). A last relevant strand of the literature examines the links between education systems, investments in training and active labour policy instruments. It seems to emerge the possibility of either a "training trap" (Caroleo and Pastore, 2003 and 2005; Dietrich, 2003) or a "locking-in effect" due to lower intensity in searching a permanent job (van Ours, 2004).

The phenomena of overeducation represent a challenge for the human capital theory. It shows itself when the human capital of a worker is much greater than that required by his tasks representing a case of waste of resource for the individual and the state (Freeman and Wise, 1976). A promising, but still under-developed strand of the literature, focuses on the impact of local labour markets in determining the individual risk of overeducation. In this context, the spatial distribution of jobs and workers, as well as the possibility of workers to move or commute seem to have an important role in determining the probability of overeducation of different individuals.

O'Higgins (2005) examines trends in the youth labour market in developing and transition countries, and highlights the main difficulties of integrating young people into "decent work". He also stresses the importance of considering (i) the "quality" of youth employment in terms of wages, weight of the informal sector, and underemployment, and (ii) the existence of "state dependence" concerning the complex role of "child labour" (e.g., ILO 2002) and the persistence of youth unemployment (e.g., Heckman and Borjas 1980; Ryan 2001). Other approaches explicitly focus on supply side aspects connected to the effects of demographic composition and changes: for example, Flaim (1990) shows the negative effect of the "baby boom" on unemployment rates; Shimer (1999) finds that a larger youth population share reduces the total unemployment rate and raises labour force participation by young people. Korenman and Neumark (1997) analyse the influence of the youth share of the population on youth unemployment, concluding that its role is overwhelmed by the effects of aggregate economic conditions.

2.3. On the Determinants of Regional Labour Market Performance and Differences

As to our knowledge, there are only few studies (Green et al., 2001; Perugini and Signorelli, 2010a and 2010b) investigating youth labour market performance at regional level (in the European context). The latter research highlighted also the following results: (i) the "unemployment problem" in the EU is especially and increasingly due to youth unemployment, (ii) the strong persistence over time of youth labour market performance, and (ii) its clearcut spatial dependence. The second point should increase awareness that, if potential labour market weaknesses are left free to unfold, the price to be paid will be high for a long period of time; the other side of the coin is that policy efforts aimed at increasing labour market performance, if successful, may be able to produce durable outcomes, and this time pattern of benefits should be carefully considered when assessing the present costs of policy interventions. The third point (spatial autocorrelation),

indicates that supra-regional aspects do matter in shaping labour market performance and that policy design should carefully consider the true spatial extent and interactions which take place at regional level.

Differently, a large literature exists on regional labour market, not specific for youth segment.

As regards the determinants of differences and dynamics in EU regional labour markets, the literature generally distinguishes the two blocks of transition and old EU-15 countries. Considering the empirical literature on transition countries⁷, part of the literature focuses on sigma and beta regional convergence. Boeri and Scarpetta (1996) show the large increase in regional labour market disparities, and others (e.g., Smith 1998; Gorzelak 1996; Petrakos 1996; Römisch 2003) present evidence of the sigma divergence of unemployment, wages, and GDP per capita in Central and Eastern European countries. Marelli (2004 and 2007) considers both sigma and beta convergence in old-EU and new-EU (transition) countries. As regards the literature which also contains theoretical perspectives, Ferragina and Pastore (2006 and 2008) present interesting surveys and results explaining the high and persistent disparities in regional unemployment rates in relation to the optimal speed of transition theory (Aghion and Blanchard 1994; Boeri 2000). Huber (2007) surveys the empirical literature on regional labour market development in transition, focusing on the evidence of increasing regional disparities and polarisation of capital cities and regions closer to EU borders. An additional survey on the “mystery” of regional labour market performance differentials can be found in Elhorst (2003).

Some authors have highlighted the importance of regional differences in initial conditions: Scarpetta (1995) showed that transition negatively affected especially those regions in which planned economy concentrated most economic activities (particularly in the manufacturing sector); Gorzelak (1996) stressed the importance of geographic distance from the core of Europe. Other authors focus on the role of the degree of restructuring, affected by the depth and speed of reform processes: Newell and Pastore (2000) showed that, when unemployment is positively related to workers’ reallocation across regions, spatial unemployment differentials increase, the main reason being the different pace of industrial change. In order to explain regional unemployment, Boeri (2000) focused on the geographical immobility of workers, mainly caused by lack of housing in potential destination areas, and on the existence of wage rigidities. Similarly, Fidrmuc (2004) noted the scanty role of migration in reducing regional disparities in the CEECs. Many other authors have attempted to identify the complex mechanisms of regional labour market adjustment in transition (e.g., Bornhorst and Commander 2006; Huber, 2004; Gacs and Huber, 2005).

As regards old EU member countries, literature on regional labour markets is very extensive (see, e.g., Fischer and Nijkamp 1987) and its review is normally the object of a paper (e.g., Elhorst, 2003). We recall here only a few recent studies. Marelli (2006) used national and regional data to compare the speed and synchrony of employment changes at various territorial levels across Europe. In a previous study (Marelli 2000), in a long-term perspective, this author focused on sigma and beta convergence in the employment levels of regions in some EU-12 countries during various sub-periods. A very famous paper which used employment data to investigate regional differences in Europe is that of Decressin and Fatàs (1995). Similarly, using unemployment rates, Overman and Puga (2002) showed polarisation of the EU NUTS-2 regions towards the highest and lowest

⁷ As shown by Kornai (1980, 1992), the situation before transition was characterised by a chronic labour shortage (over-employment with low productivity), especially in the most developed and industrialised CEECs. The same author (Kornai 2006) also highlights the fact that unemployment emerging in the early stage of transition was largely unexpected in its main features (two-digit levels and wide regional differences). In addition, the initial (and optimistic) theoretical models of transition (e.g. Aghion and Blanchard 1994) presumed – wrongly – that it would have only lasted a short time.

levels during the period 1986-1996. An interesting example of research connecting sectoral and institutional aspects with regional unemployment in Europe is that of Longhi et al. (2005). Perugini and Signorelli (2007) propose evidence of regional differences and dynamics according to both employment and unemployment indicators; Montuenga et al. (2006) adopt a regional perspective to investigate the wage curve and to measure wage flexibility; and Südekum (2006) uses some stylised facts of EU-15 regions to present a theoretical model which combines a wage curve with increasing returns technology. Bollino and Signorelli (2003) consider the existence of institutions as a particular and complex factor of production affecting regional production structures and employment performances; Monastiriotis (2006) presents a set of labour market flexibility indicators at sub-national level. Lastly, Caroleo and Coppola (2005) confirm the importance of institutional variables also to explain EU regional unemployment disparities.

Finally, it should be noted, especially considering regions with quite different level of economic development (like Russian regions), the latter affects both total and youth unemployment rates.

As already noted - with few exceptions - in the existing literature the two subjects of youth and regional labour markets have generally been considered as separate topics.

2.4. On the Relationship between Crisis and Youth Unemployment

The literature on the impact of "economic crises" on youth unemployment is still quite scarce.

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 levels⁸. 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"⁹. 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 and different degrees of the persistence of the effects.

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 demand¹⁰: in this situation school-leavers are competing with more jobseekers for fewer vacancies¹¹, 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 contracts¹², with a consequent high difficulty to get another one (OECD, 2009).¹³ The labour

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

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

10 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".

11 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.

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

13 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". The trap effect of

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"¹⁴. 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 women¹⁵. 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 again¹⁶; 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).

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 rates¹⁷.

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

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.

14 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.

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

16 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.

17 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).

"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".¹⁸

Finally, Choudhry et al. (2010) investigated the effect of financial crises on youth unemployment rates during the period 1980-2000 for a large number of countries (about 70) and obtained that crisis impact on youth unemployment rate is significant and robust.

2.5. On Some Key Differences of the 1998 and 2008 Russian Crises

One of the main experts on the Russian labor market, Kapeliushnikov (2009) believes that the reaction of the Russian labour market to the negative shocks can be considered settled. There is not much reduction in employment but a reduction of working time due to the wide use of various forms of underemployment. This model is observed in the previous and the current crisis. If the previous crisis was structural and institutional (individual sectors such as trade and finance have grown and participants of labour market could switch to these sectors from e.g. building construction), the current crisis is cyclical, and it struck simultaneously in all major sectors. The main difference of the present crisis from the previous one is that this crisis takes place in conditions of relatively low inflation. The main mechanism used by employers in the 1990's - impairment of earnings due to inflation at this time was completely blocked. In addition, since the last crisis has occurred formalization of labour relations and workers become harder to dismiss. All this enable the author to conclude that a sharp rise on unemployment in the Russian market is not expected.

More recently Kapeliushnikov (2010a) highlighted that the total number of unemployed in 2009 increased from 4.9 to 6.9 million compared with 2008 (the change occurred at 2 million). The crisis of 2008-2010 has little impact on the economically active population: the reduction of employment entirely offset by a rise in unemployment. In the 1990's situation was different: a joint increase in unemployment rate and inactivity rate (the latter is also explained by the "discouragement effect") occurred.

In addition, Kapeliushnikov (2010b) highlighted that the rise in unemployment during the recent crisis in Russia was less pronounced than in the U.S. and in Europe. In the Russian economy, the unemployment rate after the initial sharp increase began to decline rapidly and now exceeds pre-crisis level on only 2%. According to many analysts, the main reason lies in the specific labor market policy, which holds the Russian state from the beginning of the crisis, in particular the active subsidy for underemployed.

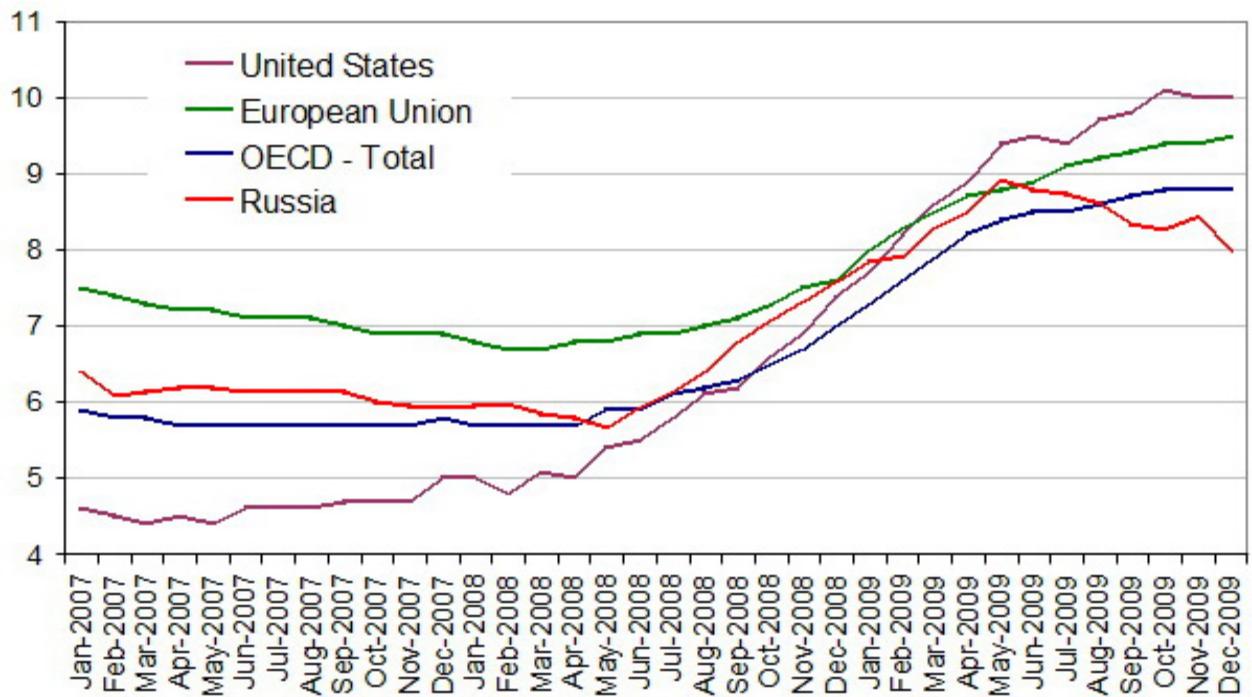
The Russian government has been implementing the anti-crisis program on the labour market. This program included the following main elements: new trainings, creation of temporary jobs, assist employees in moving to a new job, support for the small business and self employment. However, as noted Kapeliushnikov, to quantify the effect of the program is difficult. Many enterprises were not covered by state program. But these enterprises usually didn't fire workers, but reduced working time (and wage).

The similar conclusion makes another expert of the Russian labor market Anna Lukyanova. She stressed that if we compare the rate of unemployment in Russia and OECD countries (see Fig. 1), Russia in 2007 - the beginning of 2008 was on average OECD level, but significantly lower than the EU as a whole. In summer 2008, the unemployment began rising in Russia and the EU. In the second half of 2009, the situation in

¹⁸ 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.

Russia started to improve (opposite the situation in the OECD, EU and US). One of the interesting observations of the author consists in the fact that during a recession was no increase in the relative unemployment of graduates. However, increased unemployment can be seen for a wider group - young people from 20 to 29 years.

Figure 1. Unemployment rate: Russia, EU, US, OECD (with seasonal correction)



Source: Anna Lukyanova, The crisis and the Russian labor market, 28 April 2010 (<http://opec.ru/1245528.html>)

Lindz (2004 and 2008) also observes the importance of age structure for the Russian labor market. Using Russian Longitudinal Monitoring Survey (RLMS) Phase II (rounds VI–XIII) she demonstrated that “workers become more concerned about the possibility of losing their jobs as they age, and only after age 42 do they begin to regain some confidence”.

For the analysis of unemployment in so great country as Russia, of course is important to take into account regional specificities. As noted, for example, by Shilov (2009) “*beyond this general development, however, one can observe substantial variation across regions. In 2005 the Moscow region evidently experienced an unemployment rate of only 1%, whereas the Dagestan region in the Northern Caucasus had unemployment as high as 22.6%. In 2005 the national median wage was roughly 230 USD per month, but regional monthly wages were 583 USD in the capital and 122 USD in Dagestan. Another important feature of the Russian labor market is low interregional mobility. About a third of Russian regions are actually locked in “poverty traps”, and even in other regions the effect creates significant obstacles. Russian regions may therefore be more plausibly considered isolated labor markets than U.S. regions.*”

However, as noted by Deputy Director of Institute of World Economy and International Relations Gontmakher (2009): “*The regional statistics should be treated carefully. Sometimes we can't compare Russia's*

regions; it's like comparing Russia with Portugal. Anyone who has seen the market in Nazran, understands that there is no problem with employment here. The typical family, for example, in Ingushetia, this is not the husband, wife, two children, but a clan, multigenerational family in which there are a large number of relatives. And, as a rule, the total budget. Five people work in Moscow and fed 100 people at home in Ingushetia, Chechnya, Dagestan, etc. And people living there are often not even imposing the demand for jobs, especially women and people approaching retirement age. This labor market is not standardized and transparent in terms of statistics. This is a different economy, not bad, but it is different. And using the International Labour Organization methodology in Dagestan and Chechnya is meaningless because it is a tool designed to measure the labor markets in the industrial and postindustrial society”.

3. Data, Descriptive Evidences and Econometric Results

In this section we present the characteristic of the data, some descriptive evidences and new econometric results.

3.1. Data and model

We based our analysis on the panel of 78 Russian regions (see list of regions in Table A1) during the period 1997 – 2008. The source of the data is ROSSTAT site (www.gks.ru) and ROSSTAT publications.

Our basic empirical models are

$$Y_{it} = \mu + \beta_1 GDPPP_{it} + \beta_2 GDPGROWTH_{it}^2 + \beta_3 LessMIN_{it} + \beta_4 d1998 + \beta_5 d1999 + \beta_6 d2008 + \alpha_i + \varepsilon_{it}$$

where i and t are the number of a region and time, respectively, $i = 1, \dots, 78$, $t = 1997, \dots, 2008$, $\varepsilon_{it} \sim IID(0, \sigma_\varepsilon^2)$, α_i are constants for the fixed effects model and $\alpha_i \sim IID(0, \sigma_\alpha^2)$ for random effects model (we add dummy variables for corresponding Russian Federal Districts in random effects models).

We have used two sets of three dependent variables:

- 1) First set - YUNEMPLit, UNEMPLit – official youth (in 20-29 age group) and common total unemployment rate (according to the International Labor Organization methodology) in region i at time t, and there difference UNDIFit. Unfortunately, these data are available only ones in two years, $t = 1998, 2000, 2002, 2004, 2006, 2008$
- 2) Second set – YOUNEMPLOYMENTit, TOTALUNEMPLit – the share of unemployment in 20-29 age group and in whole population region in region i at time t, and there difference UNEMDIFit. These data are available annually, $t = 1997, 1998, \dots, 2007, 2008$.

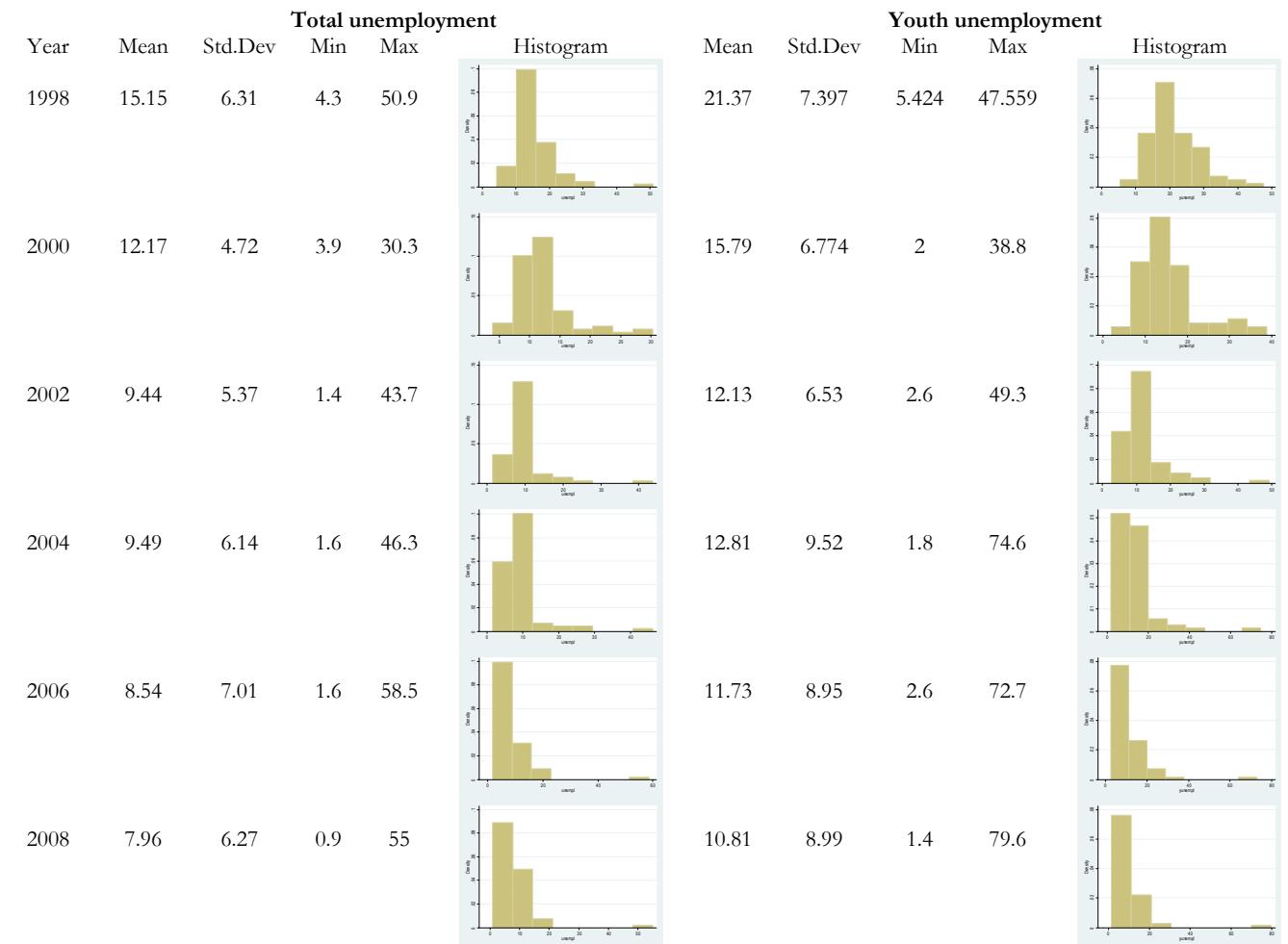
Our control variables include GDPPP - purchasing parity per capita GDP, LESSMIN - the percentage of total population in the region with incomes below the subsistence level, GDPGROWTH2 for the first set and GDPGROWTH for the second set – biannual or annual growth. All these variables are a measure of regional economic development.

As we can see in table A3, all Spearman’s coefficients of dependent and control variables are significantly different from zero, this shows a monotonic dependence.

Table 1 contains descriptive statistics and histograms for dependent variables YUNEMPL and UNEMPL for each year. As we can see, the unemployment rate in the Russian regions varies substantially. That is why we also include a set of regional dummy variables in random effect models.

We tried to capture the impact of the crises on total and youth unemployment by introducing a set of dummy variables for the crises years.

Table 1. Distribution of total and youth unemployment



3.2. Econometric results

Table 2 contains the results of estimation of our basic fixed effects and random effects models for the first set of dependent variables. The results of estimation of models for the second set of dependent variables are shown in Table 3.

According the Hausman test in all cases fixed effects models are preferable. However, the signs of estimated coefficients and their significance are the same in fixed and random models, but models with random effects allow you to obtain estimates for the coefficients of unchanging factors, such as dummy variables for regions. Estimation of the random effects models with a set of regional dummies allowed us not only to catch the regional differences, but also test our models for stability. Inclusion of the new variables did not change signs and significance of the coefficients of other variables.

In all models the signs of the coefficients of variables GDPPP, GDPGROWTH, GDPGROWTH2 are negative (insignificance of the GPGROWTH2 coefficient may be result of multicollinearity) and the sign of LESSMIN coefficient is positive, i.e. in more economically developed regions the youth and total unemployment rate (and share) are lower.

In all models the coefficients of d2008 are insignificant, but the coefficients of d1998 and d1999 are significant and positive. Hence the 1998-1999 crisis had negative impact on youth and total unemployment, but the beginning of 2008 crisis had no impact on 2008 youth and total unemployment¹⁹. At the same time positive and significant coefficients of variables d1998 and d1999 in models 3.1-3.3, 6.1-6.3 indicate that the impact of the first crisis on youth unemployment was more serious than in general case.

As noted above we included a set of regional dummy variables in random effects models and test the hypothesis about the possibility of removing the group of insignificant regional dummy variables. Positive and significant coefficients of the variables "SOUTH" and "SIBERIA" in models 1.3, 2.3, 4.3, 5.3 allow us to conclude that in South and Siberian districts youth and total unemployment are higher than in others. And in the South District during the 1998-1999 crisis the situation with youth unemployment was more serious than in other districts (as evidenced by a positive and significant coefficient for the variable "SOUTH" in models 3.3 and 6.3)

Table 2 - Econometric Results (first set of models)

| Dependent variable | YUNEMPL | | | | UNEMPL | | | | UNDIF |
|---|-----------------|-----------------|---|-----------------|-----------------|---|-----------------|-----------------|-----------|
| | Model 1.1 FE | Model 1.2 RE | Model 1.3 RE with Regional dummies | Model 2.1 FE | Model 2.2 RE | Model 2.3 RE with Regional dummies | Model 3.1 FE | Model 3.2 RE | |
| Control variables | | | | | | | | | |
| GDPPP | -7.71e-06* | -7.65e-06* | -6.1e-06 | -7.64e-06*** | -7.4e-06*** | -6.55e-06*** | -6.27e-08 | -9.66e-07 | -7.19e-08 |
| GDPGROWTH2 | -0.0197 | -0.0175 | -0.026 | -0.009 | -0.0087 | -0.013 | -0.01 | -0.002 | -0.01 |
| LESSMIN | 0.082*** | 0.138*** | 0.134*** | 0.069*** | 0.098*** | 0.096*** | 0.013 | 0.057*** | 0.048*** |
| d1998 | 7.366*** | 7.349*** | 7.25*** | 4.55*** | 4.54*** | 4.51*** | 2.81*** | 2.85*** | 2.74*** |
| d2008 | -0.309 | 0.432 | 0.228 | -0.146 | 0.213 | 0.103 | -0.162 | 0.533 | 0.32 |
| SOUTH | | | 10.79*** | | | 8.14*** | | | 2.54*** |
| SIBERIA | | | 3.62** | | | 2.93*** | | | 0.32 |
| Const | 11.414*** | 9.692*** | 1.07*** | 8.46*** | 7.56*** | 5.94*** | 2.94*** | 1.54*** | 1.39*** |
| Observation | 465 | | 465 | 465 | 465 | 465 | 465 | 465 | |
| Model significance statistic | 70.01 | 345.84 | 433.39 | 85.58 | 414.16 | 499.45 | 17.14 | 105.81 | 150.09 |
| p-v | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| F-test that all FE = 0 | | | | | | | | | |
| p-v | 12.38 | | | 19.49 | | | 2.14 | | |
| | 0.000 | | | 0.000 | | | 0.000 | | |
| Breusch and Pagan Lagrangian multiplier test chi2 | | | | | | | | | |
| p-v | | | | | | | | | |
| | 320.74 | | 238.9 | | 431.8 | | 366.16 | | 16.33 |
| | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.0356 |
| Hausman test chi2 | 2365.53 | | | 96.21 | | | | 28.51 | |
| p-v | 0.000 | | | 0.000 | | | | 0.000 | |

* - significant at 10%, ** - significant at 5%, *** - significant at 1%.

19 As for more complete results, we are waiting for the availability of the 2009 regional data.

Table 3 - Models for shares of general and youth unemployment in whole population and in 20-29 age group

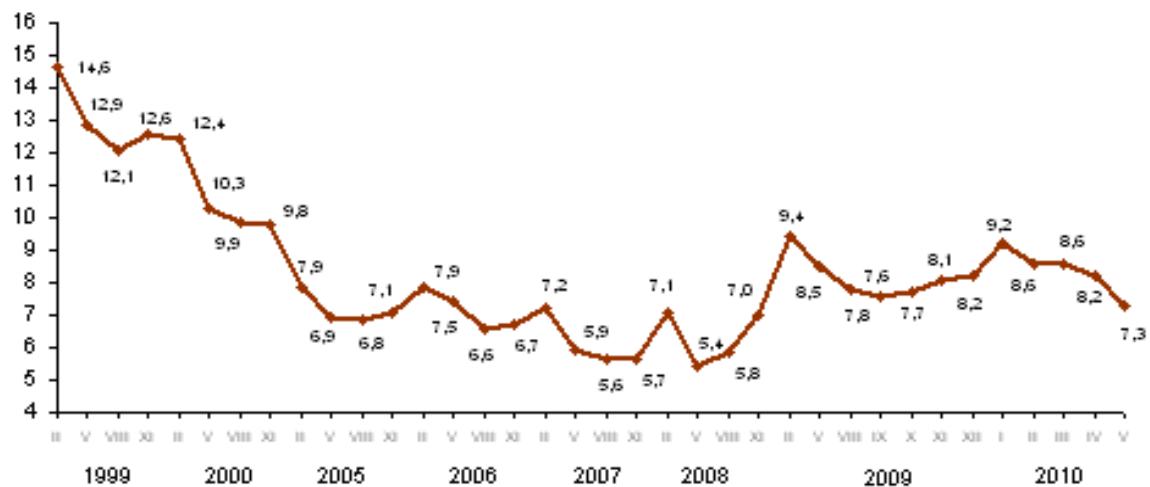
| Dependent variable Number of model | YOUNEMPLOYMENT | | | TOTALUNEMPL | | | UNEMDIF | | |
|---|----------------|--------------|--------------------------------|-------------|-----------|--------------------------------|-----------|-----------|--------------------------------|
| | Model 4.1 | Model 4.2 | Model 4.3 | Model 5.1 | Model 5.2 | Model 5.3 | Model 6.1 | Model 6.2 | Model 6.3 |
| Type of model | FE | RE | RE with Regional Dummies | FE | RE | RE with Regional dummies | FE | RE | RE with Regional Dummies |
| | | | Control variables | | | | | | |
| GDPPP | - | - | - | -9.65e- | -9.24e- | -8.92e- | -4.91e- | -4.43e- | -4.19e- |
| | 0.0000146*** | 0.0000136*** | 0.000013*** | 06*** | 06*** | 06*** | 06*** | 06*** | 06*** |
| GDPGROWTH | -0.0469*** | -0.0487*** | -0.0525*** | - | - | - | -0.017* | -0.017* | -0.02** |
| LESSMIN | 0.0472*** | 0.0762*** | 0.073*** | 0.023*** | 0.035*** | 0.0344*** | 0.023*** | 0.043*** | 0.038*** |
| d1998 | 3.264*** | 3.213*** | 3.21*** | 1.83*** | 1.808*** | 1.808*** | 1.432*** | 1.412*** | 1.41*** |
| d1999 | 4.011*** | 3.734*** | 3.79*** | 2.42*** | 2.312*** | 2.335*** | 1.583*** | 1.399*** | 1.46*** |
| d2008 | 0.088 | 0.321 | 0.207 | 0.177 | 0.27 | 0.224 | -0.089 | 0.081 | -0.002 |
| SOUTH | | | 5.44*** | | | 4.26*** | | | 1.17*** |
| SIBERIA | | | 2.08*** | | | 1.73*** | | | 0.345 |
| Const | 9.61*** | 8.742*** | 7.67*** | 6.52*** | 6.16*** | 5.27*** | 3.091*** | 2.512*** | 2.41*** |
| Observation | 927 | 927 | 927 | 928 | 928 | 928 | 927 | 927 | 927 |
| Model significance statistic | 100.15 | 614.5 | 697.07 | 0.000 | 678.23 | 757.08 | 41.53 | 304.39 | 332.46 |
| p-v | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| F-test that all FE = 0 | 13.89 | | | 26.94 | | | 3.2 | | |
| p-v | 0.000 | | | 0.000 | | | 0.000 | | |
| Breusch and Pagan Lagrangian multiplier test chi2 | | 943.5 | 655.03 | | 1670.6 | 1344.44 | | 92.15 | 62.34 |
| p-v | | 0.000 | 0.000 | | 0.000 | 0.000 | | 0.000 | 0.000 |
| Hausman test chi2 | 101.99 | | | | 1445.71 | | | 22.32 | |
| p-v | 0.000 | | | | 0.000 | | | 0.000 | |

* - significant at 10%, ** - significant at 5%, *** - significant at 1%.

As we noted above, we didn't find out - with 2008 data - the impact of the beginning of the second crisis on youth and total unemployment. Unfortunately, we have no all necessary data for 2009 year. But according to the Federal State Statistics (Figure 2, Table 4) of the Russian Federation as a whole we note that the second crisis has negatively affected the total and youth unemployment, and the impact on the youth unemployment was more serious.

Figure 2 - Unemployment rate in Russia (without seasonal correction)

Source: Employment and unemployment in the Russian Federation, May 2010 (Follow-up surveys on



employment) (<http://www.gks.ru>)

Table 4 - Unemployment rate by age groups in Russia

| | Total | Age | | | | | | | | | |
|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| | | < 20 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60 + |
| 2000 | 9,8 | 27,6 | 16,2 | 10,6 | 9,5 | 9,3 | 8,4 | 7,2 | 6,1 | 7,1 | 6,2 |
| 2001 | 8,8 | 29,1 | 15,1 | 8,7 | 9,0 | 8,0 | 7,6 | 6,6 | 5,5 | 6,1 | 5,6 |
| 2002 | 8,5 | 27,8 | 14,3 | 8,8 | 8,6 | 7,4 | 7,0 | 6,3 | 6,2 | 5,5 | 5,6 |
| 2003 | 7,8 | 30,0 | 14,4 | 7,8 | 7,2 | 7,1 | 6,1 | 6,0 | 5,3 | 4,7 | 4,4 |
| 2004 | 7,9 | 32,1 | 13,8 | 7,6 | 6,9 | 7,3 | 6,4 | 6,4 | 5,9 | 4,7 | 5,3 |
| 2005 | 7,1 | 29,2 | 12,3 | 7,1 | 6,5 | 5,8 | 5,5 | 5,7 | 5,3 | 3,9 | 4,8 |
| 2006 | 6,7 | 27,8 | 14,2 | 7,2 | 5,0 | 5,8 | 5,0 | 5,7 | 4,7 | 3,7 | 2,7 |
| 2007 | 5,7 | 24,0 | 11,2 | 5,0 | 5,6 | 4,4 | 5,1 | 4,6 | 4,3 | 2,6 | 2,6 |
| 2008 | 7,0 | 30,9 | 12,9 | 6,5 | 6,6 | 5,8 | 5,4 | 5,1 | 5,4 | 4,6 | 4,7 |
| 2009 | 8,2 | 28,0 | 16,9 | 8,3 | 7,2 | 6,8 | 6,5 | 6,8 | 6,0 | 6,6 | 4,0 |

Source: Economically active population in Russia, (Based on sample survey), Statistical Bulletin, Moscow, 2010, (<http://www.gks.ru>)

4. Final Considerations

Youth labour market performance is extremely difficult to study due to interactions with schooling and many other reasons, highlighted by the literature reviewed in Section 2.

In this paper (still in a preliminary version) we obtained the following main results for Russian regions: (i) descriptive evidence clearly highlighted the huge regional differences in terms of total and youth unemployment rates, (ii) according to all models the higher the level of development of the region the less the level of common and youth unemployment; (iii) the consequences of the first crises (1998-1999) for youth unemployment are more serious than the consequences for general unemployment; (iv) the problem of youth and general unemployment is more serious for South and Siberian federal districts; (v) during the 1998-1999 crisis periods the problem of youthful unemployment in southern district has become more aggravated; (vi) we did not discover the impact of the second crisis beginning (2008 year) on youth and general unemployment.

Waiting for the 2009 regional data (that will permit to complete the assessment of the last crisis impact), we can derive the following further preliminary consideration: it seems that - similarly to many other countries (like Germany, Italy and France) - "internal flexibility", i.e. working time reductions (due to labour hoarding and underemployment), mitigate the impact of last crisis on total and youth unemployment rates in many Russian regions, but the recovery will be probably in several regions a "job-less recovery" with a low "new-hiring rate" that will particularly affect young people, i.e. youth unemployment rates will further increase and persist at high level. So, the monitoring of regional labour market dynamics is extremely important in order to better define general and specific economic and institutional policy interventions. In addition to counter cyclical economic policy measures - devoted to avoid that the creation of "keynesian unemployment" will persist over time increasing the "structural unemployment" - effective national and regional development policies seem of crucial importance together with further improvements and integration of active and passive labour policies. We argue that the regional level - according to the best practices in many other countries - seems the more appropriate government level for active labour market policies.

Appropriate "active" policies are even more required, especially in regions where youth performance was awful even before the crisis. In this respect, also the improvement in the school-to-work transition institutions (e.g. placement services and educational and training activities) is of key importance. As for the "educational system", a progressive shift towards an effective "dual and flexible" system seems appropriate in order to avoid that the "NEET generation" (Not in Employment or in Education or in Training) will expand.

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Appendix

Table A1 - List of Russian regions

| ID | Russian Federation |
|------------------------------------|---------------------|
| Central Federal District | |
| 1 | Belgorod region |
| 2 | Bryansk region |
| 3 | Vladimir region |
| 4 | Voronezh region |
| 5 | Ivanovo region |
| 6 | Kaluga region |
| 7 | Kostroma region |
| 8 | Kursk region |
| 9 | Lipetsk region |
| 10 | Moscow region |
| 11 | Orel region |
| 12 | Ryazan region |
| 13 | Smolensk region |
| 14 | Tambov region |
| 15 | Tver region |
| 16 | Tula region |
| 17 | Yaroslavl region |
| 18 | Moscow |
| North West Federal District | |
| 19 | Republic of Karelia |
| 20 | Republic of Komi |
| 21 | Arkhangelsk region |
| 22 | Vologda region |
| 23 | Kaliningrad region |
| 24 | Leningrad region |
| 25 | Murmansk region |
| 26 | Novgorod region |
| 27 | Pskov region |
| 28 | Saint-Petersburg |

| | South Federal District |
|----|---|
| 29 | Republic of Adygea |
| 30 | Republic of Dagestan |
| 31 | Republic of Ingushetia |
| 32 | Republic of Kabardino-Balkaria |
| 33 | Republic of Kalmykia |
| 34 | Republic of Karachaevo-Cherkessia |
| 35 | Republic of Northen Osetia – Alania |
| 36 | Krasnodar Territory |
| 37 | Stavropol Territory |
| 38 | Astrakhan region |
| 39 | Volgograd region |
| 40 | Rostov region |
| | Privolzhsky (Volga) Federal District |
| 41 | Republic of Bashkortostan |
| 42 | Republic of Marii El |
| 43 | Republic of Mordovia |
| 44 | Republic of Tatarstan |
| 45 | Republic of Udmurtia |
| 46 | Republic of Chuvashia |
| 47 | Perm territory |
| 48 | Kirov region |
| 49 | Nizhny Novgorod region |
| 50 | Orenburg region |
| 51 | Penza region |
| 52 | Samara region |
| 53 | Saratov region |
| 54 | Ulyanovsk region |
| | Ural Federal District |
| 55 | Kurgan region |
| 56 | Sverdlovsk region |
| 57 | Tumen region |
| 58 | Chelyabinsk region |
| | Siberian Federal District |
| 59 | Republic of Altay |
| 60 | Republic of Buryatia |
| 61 | Republic of Tyva |
| 62 | Republic of Khakassia |
| 63 | Altay Territory |
| 64 | Krasnoyarsk Territory |
| 65 | Irkutsk region |
| 66 | Kemerovo region |
| 67 | Novosibirsk region |
| 68 | Omsk region |
| 69 | Tomsk region |
| | Far East Federal District |
| 70 | Republic of Sakha (Yakutia) |
| 71 | Kamchatka territory |
| 72 | Primorsky Territory |
| 73 | Khabarovsk Territory |
| 74 | Amur region |
| 75 | Magadan region |
| 76 | Sakhalin region |
| 77 | Jewish autonomous area |
| 78 | Chukotka autonomous area |

Table A2 - Variables description

| Variables | Definition | Comment |
|---|---|--|
| Dependent variables | | |
| UNEMPL | The level of unemployment is determined as a ratio of the unemployed to the total number of economically active population, in percentage. | Official definition of unemployment rate |
| YUNEMPL | The level of unemployment in 20-29 age group (is determined as a ratio of the unemployed in 20-29 age group to the total number of economically active population of the 20-29 age group, in percentage). | Official definition of 20-29 age group unemployment rate, data are available only at 1998, 2000, 2002, 2004, 2006, 2008 years. |
| UNDIF | The difference of unemployment in 20-29 age group and in whole population, in percentage. | We calculated this variable using the following formula: $UNDIF = YUNEMPL - UNEMPL$ |
| YOUNEMPLOYMENT | A ratio of the unemployed in 20-29 age group to the total number of population of the 20-29 age group, in percentage. | We calculated this variable using the following formula: $YOUNEMPLOYMENT = YOUTHUN * UNEMPL * ACTIVITY / SHARE$ |
| TOTALUNEMPL | Total unemployment - a ratio of the unemployed to the total number of population, in percentage. | We calculated this variable using the following formula: $TOTALUNEMPL = UNEMPL * ACTIVITY / 100$ |
| UNEMDIF | The difference of unemployment shares in 20-29 age group and in whole population, in percentage. | We calculated this variable using the following formula: $UNEMDIF = YOUNEMPLOYMENT - TOTALUNEMPL$ |
| Control variables | | |
| GDPGROWTH | A ratio of gross domestic product in the current year and in the previous one in percentage minus 100 percentages. | YEAR = 1998, 1999, ..., 2008 |
| GDPGROWTH2 | A ratio of gross domestic product in the current year and two years ago in percentage minus 100 percentages. | YEAR = 1998, 2000, ..., 2008 |
| GDPPP | Purchasing parity per capita GDP. | GDP per capita in the region divided by MINRATIO. |
| LESSMIN | The percentage of total population in the region with incomes below the subsistence level. | |
| CENTRAL, NORDWEST, SOUTH, VOLGA, URAL, SIBERIA, FAREAST | Dummy variable for corresponding Russian Federal Districts. | |
| d1998, d1999, d2008 | Dummy variable for corresponding years. | |
| Auxiliary variables | | |
| YOUTHUN | A ratio of 20-29 age unemployed to the total number of unemployed, in percentage. | |
| ACTIVITY | Share of economically active population (labour force) - persons, which for the observed period are considered employed or unemployed. | The number of the economically active population includes data on employed and unemployed based on the results of surveys on employment of population. |
| SHARE | A ratio of 20-29 age group to 16-72 age group, in percentage. | |
| GDPpercap | GDP per capita in the region. | |
| MINRATIO | The ratio of subsistence minimum level in the region and in Russia as a whole. | |

Table A3. Spearman coefficients

| | yunempl | unempl | gdppp | gdpgrowth2 | lessmin |
|-----------|------------|------------|------------|------------|---------|
| yunempl | 1.0000 | | | | |
| unempl | 0.9209*** | 1.0000 | | | |
| gdppp | -0.6508*** | -0.6873*** | 1.0000 | | |
| gdprowth2 | -0.3409*** | -0.3297*** | 0.4330*** | 1.0000 | |
| lessmin | 0.5154*** | 0.5703*** | -0.7767*** | -0.1763*** | 1.0000 |

| | younemployment | comunempl | gdppp | gdprowth | lessmin |
|----------------|----------------|------------|------------|------------|---------|
| younemployment | 1.0000 | | | | |
| comunempl | 0.9326*** | 1.0000 | | | |
| gdppp | -0.6939*** | -0.6615*** | 1.0000 | | |
| gdprowth | -0.2697*** | -0.2552*** | 0.3568*** | 1.0000 | |
| lessmin | 0.5569*** | 0.5463*** | -0.7081*** | -0.0911*** | 1.0000 |

*** - P-v for hypothesis about independence of two corresponding variables is less than 0.01

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