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Youth unemployment in Italy and Russia: Aggregate trends and individual determinants

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Abstract

Youth unemployment rates in most countries are considerably higher than total unemployment rates and increased significantly in many countries following the global financial crisis. Young people in long-term unemployment risk becoming a 'lost generation'. We investigate individual and family characteristics predicting young people's vulnerability to the scarring effects of long-term unemployment. After overviewing aggregate youth unemployment trends in several European countries, we focus on Russia and Italy – countries with contrasting structural and institutional conditions and exhibiting different macroeconomic trends – in order to determine whether, despite these differences, there were similar patterns in the relationship between individual and family characteristics and the of risk of unemployment and its adverse impacts. We use a Heckman probit model to estimate the unemployment risk of young people – compared to adults – during the period 2004–2011, before and after the global financial crisis. Despite many differences between the two countries, most of the explanatory variables acted in the same direction in each and so we compare the relative size of such effects. The policy significance of the findings is that personal and family characteristics are more amenable to modification than macroeconomic variables. Specific school-to-work interventions are needed to avoid creating a 'lost generation'.

JEL Codes: J64, E24, R11, P51

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Keywords
Global financial crisis, Heckman probit, individual determinants of unemployment, Italy, long-term unemployment, regional unemployment, Russia, school to work transition, youth unemployment

Introduction

The youth unemployment rate (YUR), most commonly referring to individuals aged 15–24 years, is, in most countries, at least twice the total unemployment rate (TUR). In many countries, it increased significantly following the recent the global crisis. Long-term unemployment causes a loss of work experience and human capital, lower employability and reduced earnings over the entire life cycle, raising the risk of a 'lost generation' (Scarpetta et al., 2010). We review determinants of youth unemployment – partly macroeconomic, structural and institutional – but examine mainly the effects of personal and family characteristics.

After overviewing recent youth unemployment trends in a range of countries, we focus our econometric investigations on Italy and Russia. Because these countries differ in macroeconomic, structural and institutional conditions, we assess whether personal and family determinants behave in a similar manner in each. We analyse the probability of being unemployed for young people based on personal or family characteristics, comparing results for the same model for adults. The empirical analysis refers to the period 2004–2011 for both countries, to reflect possible impacts of the global financial crisis. The section 'Recent trends in youth unemployment' illustrates the trends for YURs and TURs in Italy, Russia and other countries. The section 'Factors explaining youth unemployment: A brief survey' reviews the main determinants of youth unemployment, both at macro and individual levels. The section 'The role of individual determinants: The data sets used and descriptive statistics' describes the data sets used in the empirical investigations, providing descriptive statistics for the samples. The section 'Econometric estimation and results' discusses econometric investigation of the determinants of TURs and YURs, for the two countries. The section 'Conclusions' concludes by outlining specific institutional interventions required to minimise the long-term 'scarring' effects of youth unemployment.

Recent trends in youth unemployment

We begin with background trends in the TUR. Even before the crisis there were large variations across countries. In 2007 (Table 1), the TUR was 4.6% in the USA and 7.2% in the European (EU). Within the EU it ranged from 3.6% (the Netherlands) to 11.2% (Slovakia).

The financial crisis led to a more rapid unemployment increase in countries with more flexible labour markets than in markets characterised by rigidities or internal flexibilities (e.g. working hour adjustments). In the EU, unemployment also rose in 2012–2013 because of the new recession caused by the sovereign debt crisis, and despite feeble recovery in 2014, it is expected to remain high for some time. In the EU, overall, unemployment grew by 50%; in the USA, it more than doubled from 2007 to 2010, then fell back to around 7%.

Table 1. Total unemployment rate (TUR; all ages): selected EU countries and comparisons.

	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2013/2007 ratio[a]
European Union (28)	9.3	9.1	8.3	7.2	7.1	9.0	9.7	9.7	10.5	10.9	1.5
Euro area	9.2	9.1	8.4	7.6	7.6	9.6	10.1	10.1	11.4	12.1	1.6
Denmark	5.5	4.8	3.9	3.8	3.5	6.0	7.5	7.6	7.5	7.0	1.8
Germany	10.5	11.3	10.3	8.7	7.5	7.8	7.1	5.9	5.5	5.3	0.6
Ireland	4.5	4.4	4.5	4.7	6.4	12	13.9	14.7	14.7	13.1	2.8
Greece	10.5	9.9	8.9	8.3	7.7	9.5	12.6	17.7	24.3	27.3	3.3
Spain	10.9	9.2	8.5	8.3	11.3	18	20.1	21.7	25	26.4	3.2
Croatia	13.8	12.8	11.4	9.6	8.4	9.1	11.8	13.5	15.9	17.6	1.8
Italy	**8.0**	**7.7**	**6.8**	**6.1**	**6.7**	**7.8**	**8.4**	**8.4**	**10.7**	**12.2**	**2.0**
Lithuania	11.6	8.5	5.8	4.3	5.8	13.8	17.8	15.4	13.4	11.8	2.7
The Netherlands	5.1	5.3	4.4	3.6	3.1	3.7	4.5	4.4	5.3	6.7	1.9
Poland	19.1	17.9	13.9	9.6	7.1	8.1	9.7	9.7	10.1	10.3	1.1
Slovakia	18.4	16.4	13.5	11.2	9.6	12.1	14.5	13.7	14	14.2	1.3
The United States	5.5	5.1	4.6	4.6	5.8	9.3	9.6	8.9	8.1	7.4	1.6
Russia	**7.8**	**7.1**	**7.1**	**6.0**	**6.2**	**8.3**	**7.3**	**6.5**	**5.5**	**5.5**	**0.9**

Sources: Eurostat (2014), Rosstat (Russia: various years).
[a]2012/2007 ratio if 2013 not available.
For full version of this table see Supplementary Table A1, available at http://elr.sagepub.com/content/by/supplemental-data

As noted above, youth unemployment is defined in most countries as referring to individuals aged 15–24 years.[1] However, other ages are sometimes considered; and 'employment' may include underemployment and informal sector employment – particularly relevant to young people in areas such as the South of Italy and certain Russian regions. The pre-crisis YUR exhibited wide variations (Table 2): from 7% in the Netherlands to 22.9% in Greece. In many countries, it was already increasing pre-crisis. The general impact of the crisis was similar for the YUR and the TUR: in the EU, the YUR increased by 50% (Table 2). Nevertheless, even in countries with flexible employment such as the USA, the YUR had a higher persistence than the TUR. Even where the initial impact of the crisis on YUR was moderate, there were serious long run consequences, such as loss of work experience and human capital, lower employability and reduced earnings over the entire life cycle, poorer job quality and a high incidence of precarious employment.

Younger workers, with weaker work contracts, lower qualifications and less experience than older workers, have borne the brunt of the crisis (Arpaia and Curci, 2010). The YUR actually decreased only in Germany. In a number of countries, including Italy, structural factors exacerbated the impact of the crisis on the YUR. Focusing on the YUR/TUR ratio (the last column of Table 2), we see that the YUR was double the TUR in most countries; this was the mean situation in the EU. The best statistics for young people can be found in Germany, where the YUR in 2013 was under 8%. In absolute terms, the highest YURs were those of Greece (58.6%), Spain (55.7%), Croatia (49.9%) and Italy (40%). In Ireland, a country also deeply affected by the crisis, it was 'only' 26.8%.

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Table 2. Youth unemployment rate (YUR; <25 years): selected EU countries and comparisons.

	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2013/2007 ratio[a]	YUR/TUR ratio (2013)
European Union (28)	19.1	18.9	17.6	15.7	15.8	20.1	21.1	21.5	23.0	23.5	1.5	2.2
Euro area	17.9	18.1	16.9	15.4	15.9	20.2	20.9	20.8	23.1	24.0	1.6	2.0
Denmark	8.2	8.6	7.7	7.3	8.1	11.8	13.9	14.3	14.0	13.0	1.8	1.9
Germany	13.8	15.6	13.8	11.9	10.6	11.2	9.9	8.6	8.1	7.9	0.7	1.5
Ireland	8.7	8.6	8.7	9.1	13.3	24	27.6	29.1	30.4	26.8	2.9	2.0
Greece	26.9	26.0	25.2	22.9	22.1	25.8	32.9	44.4	55.3	58.6	2.6	2.1
Spain	22	19.7	17.9	18.2	24.6	37.8	41.6	46.4	53.2	55.7	3.1	2.1
Croatia	32.8	31.9	28.8	24	21.9	25.1	32.6	36.1	43.0	49.9	2.1	2.8
Italy	**23.5**	**24.0**	**21.6**	**20.3**	**21.3**	**25.4**	**27.8**	**29.1**	**35.3**	**40.0**	**2.0**	**3.3**
Lithuania	23.1	16.3	10.2	8.4	13.3	29.6	35.7	32.6	26.7	21.9	2.6	1.9
The Netherlands	9.0	9.4	7.5	7.0	6.3	7.7	8.7	7.6	9.5	11.0	1.6	1.6
Poland	39.6	36.9	29.8	21.6	17.2	20.6	23.7	25.8	26.5	27.3	1.3	2.7
Slovakia	33.4	30.4	27.0	20.6	19.3	27.6	33.9	33.7	34	33.6	1.6	2.4
The United States	11.8	11.3	10.5	10.5	12.8	17.6	18.4	17.3	16.2	15.5	1.5	2.1
Russia	**20.8**	**18.3**	**19.6**	**16.9**	**16.3**	**22.6**	**20.4**	**17.9**	**17.3**	**–**	**1.0**	**3.1**

Source: Eurostat (2014) and Rosstat (Russia; various years).
TUR: total unemployment rate.
[a]2012/2007 ratio if 2013 not available.

There was also wide variation within countries. In Italy where unemployment has traditionally been much higher in Southern regions, the 2007 TUR was 11% in the South compared to 6.1% for the country as a whole; in 2011 (the last available year for regional data), the figures were 13.3% and 8.4%, respectively. For the YUR, the differences were similar, 39.2% in 2011 in the South of Italy and 29.1% in the whole country. The relative increase between 2007 and 2011 (last column of Table 3) appears smaller in the South only because the impact of the economic crisis in such regions lagged, although it was more persistent over time.

Among individual regions, the variations were even greater (Table 3). As an example of 'good' regions, we consider Lombardy, the richest and most populated region in the North but not the best from the point of view of unemployment (the North-East fared even better). The highest unemployment occurred in Campania, a populous region in the South. In 2011, the TURs in these two regions were 5.8% and 15.5% and the YURs were 20.7% and 44.4%, respectively. Despite these significant regional variations, youth unemployment is a worrying problem in all regions of the country.

Similarly, in Russia, there were significant regional variations (Table 4), with the TUR as low as 1.5%–1.7% in St Petersburg and Moscow, and 13% in the North Caucasus.

Factors explaining youth unemployment: A brief survey

Before analysing youth unemployment, we discuss factors associated with unemployment in general. At the macro level we identify three groups of variables: cyclical conditions, structural variables and the institutional framework.[2]

The business cycle is a key explanatory variable of labour demand, hence of employment and unemployment dynamics. The link between gross domestic product (GDP)

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Table 3. Total unemployment rate: regional differences in Italy, 2001–2011.

	2001 (%)	2002 (%)	2003 (%)	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2011/2007
Total unemployment	9.0	8.5	8.4	8.0	7.7	6.8	6.1	6.7	7.8	8.4	8.4	1.4
Lombardy	3.3	3.3	3.6	4.0	4.1	3.7	3.4	3.7	5.4	5.6	5.8	1.7
Campania	18.8	17.6	16.9	15.6	14.9	12.9	11.2	12.6	12.9	14.0	15.5	1.4
South of Italy	16.0	15.0	15.0	14.0	14.0	12.0	11.0	11.0	12.0	13.0	13.3	1.2
Youth unemployment	23.1	22.0	23.6	23.5	24.0	21.6	20.3	21.3	25.4	27.8	29.1	1.4
Lombardy	9.7	10.1	11.2	12.7	13.0	12.3	12.9	12.5	18.5	19.8	20.7	1.6
Campania	45.5	44.7	39.9	37.7	38.8	35.4	32.5	32.4	38.1	41.9	44.4	1.4
South of Italy	39.0	38.0	37.0	36.0	37.0	33.0	31.0	31.0	34.0	38.0	39.2	1.3

Source: ISTAT (Indagine sulle condizioni di vita) (various years).

Table 4. Total unemployment rate: regional differences in Russia, 2004–2013.

	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2013/2004
The Russian Federation	7.8	7.1	7.1	6.0	6.2	8.3	7.3	6.5	5.5	5.5	0.7
Central Federal District	4.7	4.3	4.0	3.1	3.6	5.8	4.6	4.1	3.1	3.3	0.7
Northwestern Federal District	6.0	5.4	4.9	4.1	5.0	6.9	5.9	5.1	4.0	4.3	0.7
Southern Federal District	9.6	8.4	8.2	7.0	6.4	8.6	7.6	7.0	6.2	6.5	0.7
The North Caucasus Federal District	18.8	17.1	22.6	19.2	15.7	16.0	16.5	14.5	13.1	13.0	0.7
Volga Federal District	7.9	7.4	6.5	6,1	6.2	8,6	7.6	6.5	5.3	4.9	0.6
Urals Federal District	7.4	6.7	6.8	4.9	5,5	8.1	8.0	6.8	6.0	5.7	0.8
Siberian Federal District	9.9	9.3	8.7	7.6	8,3	10.5	8.7	8.1	7.1	7.2	0.7
Far Eastern Federal District	8.9	7.9	7.4	6.6	7.7	9.2	8.6	7.4	6.7	6.5	0.7
Moscow	1.6	0.8	1.6	0.8	0.9	2.8	1.8	1.4	0,8	1,7	1.1
St Petersburg	2.7	2.2	2.4	2.1	2.0	4.1	2.6	2.0	1.1	1.5	0.6

Source: Rosstat (various years).

growth and unemployment change is often expressed through Okun's law: changes in Okun coefficients across countries and over time are generally explained by differences in institutions and policies (International Monetary Fund (IMF), 2010). The heaviest impact of the crisis can be delayed up to 3 years and the persistence of effects is sometimes detected for up to 5 years.[3] The impact of GDP on unemployment can be amplified by systemic uncertainty, for instance after financial crises. Other macroeconomic variables seen as significant include productivity growth, trade openness, terms of trade dynamics, the inflation rate and real (long-term) interest rates.

Structural variables include trade specialisations, links between financial structure and real economic activities, and the degree of competitiveness. They also include demographic variables such as population density and age structure, and migration flows.

A third group of variables comprises institutional determinants (Nickell and Layard, 1999). These include regulation and policies concerning product markets (liberalisations, 'economic freedom', etc.), housing markets and labour markets. Some specific variables are degree of unionisation (union density and coverage), collective bargaining

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structures (degree of coordination and/or centralisation), employment protection legislation (EPL), incidence of temporary (or part-time) contracts, labour taxes, unemployment benefits and active labour market policies.[4] Reforms in labour and product markets are mutually reinforcing, justifying comprehensive reform programmes; moreover, improvements in labour market performance require reforms in more than one area of the labour market (Bassanini and Duval, 2009).

Turning to youth unemployment, first we observe that YURs are more sensitive to the business cycle than adult unemployment rates (Blanchflower and Freeman, 2000). Following the recent crisis and the Great Recession, the young have suffered disproportionately (Bell and Blanchflower, 2011;[5] Bruno et al., 2014).

The differential between youth and adult labour market performance is variously explained. First, a lower level of human capital may explain wide differences within the youth group; those with few skills are more exposed not only to higher YUR but also to long-term unemployment, unstable and low-quality jobs, and perhaps social exclusion (Organisation for Economic Cooperation and Development (OECD), 2005). Despite higher education levels than older workers, youth often lack other components of human capital, such as generic and job-specific work experience. In some countries (Belgium, Italy and several eastern EU states), unemployment rates among graduates have been higher than among those with a secondary qualification. An 'experience trap' happens when labour market entrants are never hired and so cannot increase their experience.

Other determinants include the quality and structure of the educational system: it seems that 'dual apprenticeship systems', like the German, guarantee better outcomes. Second, the school-to-work transition system (STWT)[6] can facilitate 'good matches'. Knowledge acquired through formal education may not match the skills required by the labour market, and young workers are generally less efficient in job search activities than adults. Third, the labour market institutions listed above are also important for young workers.

A crucial variable is the diffusion of temporary contracts. Not only are young workers generally among the first to lose their jobs during recessions (especially in countries with the highest EPL on 'permanent contracts'), but labour hoarding practices can further reduce the labour demand for young people.[7] Thus, school-leavers compete with more jobseekers for fewer vacancies and youth unemployment increases and becomes persistent over time: this is the risk of a 'lost generation' (Scarpetta et al., 2010). The young are more often in the NEET (neither employed nor in education or training) group and when employed are frequently underemployed (working part-time despite preference for full-time, or under temporary contracts; Bell and Blanchflower, 2011). There may be a decline in youth labour participation (the 'discouraged worker effect') or intensified emigration flows.

There are few regional-level investigations of adult and youth unemployment. Marelli et al. (2012) show that regional unemployment differentials are wide and persistent and low unemployment regions tend to cluster close to each other; moreover, such differentials show a clear core-periphery pattern. With specific reference to the YUR, we mention Demidova et al. (2013) concerning Russian regions and Demidova et al. (2014) regarding Italian and Russian regions; both studies use distance matrixes to analyse the role of spatial effects. A feature of the Russian labour market is its overall flexibility, in terms of working time and pay, and employer and employee acceptance of informal arrangements (Gimpelson et al., 2010).

In Italy, there is a dichotomy between the North and Central regions and the Mezzogiorno (the South and the two islands), in terms of unemployment rates, activity rates and the informal or 'black' economy (De Santis, 2008).[8] In Russia, both North-South and East-West divisions have been identified (Demidova et al., 2013, 2014). Other types of polarisation include the contrast between urbanised centres (especially Moscow) and the rural regions, affected by economic and demographic decline, with low interregional mobility in Russia (Shilov and Möller, 2009).

We now turn to microeconomic determinants of unemployment, with reference to personal or family characteristics. The limited but increasing number of econometric investigations using micro-data rely either on large samples of cross-sectional units or on longitudinal data. We illustrate the approach through general examples of empirical investigations using micro-data.

Kostoris and Lupi (2002) investigated Italian unemployment using standard logit models to estimate the probability of unemployment, labour force participation and long-term unemployment. They found that youth unemployment, particularly for first-job seekers, strongly depends on family income and wealth. The probability of unemployment decreased if the families had their own businesses. Low education levels increased unemployment risk for first jobseekers but not for those outside the labour market. Average regional per-capita income, local fiscal burden, local public-to-total employment ratio and size of the town of residence were all significant.

The most commonly used personal variables in these studies are gender, age, health conditions, family status (single or married, being head of household, number of children, young adults still living with their parents i.e. cohabitation choice), education level (e.g. primary school, secondary school or tertiary education) and nationality (country of origin or immigrant status).

The most frequently used family variables are family income, socio-economic background (e.g. parental education and employment status) and wealth variables, proxied by easier-to-obtain housing information (e.g. number of rooms, area, available services, presence of computers or use of internet). Household location (urban or rural) is also important, and region of residence plays a key role, providing the previously mentioned regional differentiation in unemployment rates.

The role of individual determinants: The data sets used and descriptive statistics

For our empirical analysis of the period 2004–2011, we considered two data sources: European Union Statistics on Income and Living Conditions (EU-SILC) for Italy and Russia Longitudinal Monitorial Survey of the Higher School of Economics (RLMS-HSE) for Russia.[9] We selected observations relating to youth aged 15–24 years and, for comparison purposes, adults aged 25–60 years for Russia and 25–64 years for Italy, as these countries have different retirement ages and different definitions of 'working age'. Our main variable of interest was the employment status of the respondents, among the 'active' people. We used the International Labour Organization (ILO) definition to determine unemployed persons.

Figure 1 shows the dynamics of the unemployment rate, calculated using sample data for Russia and Italy. Macro level data showed a much higher YUR than TUR. At the end

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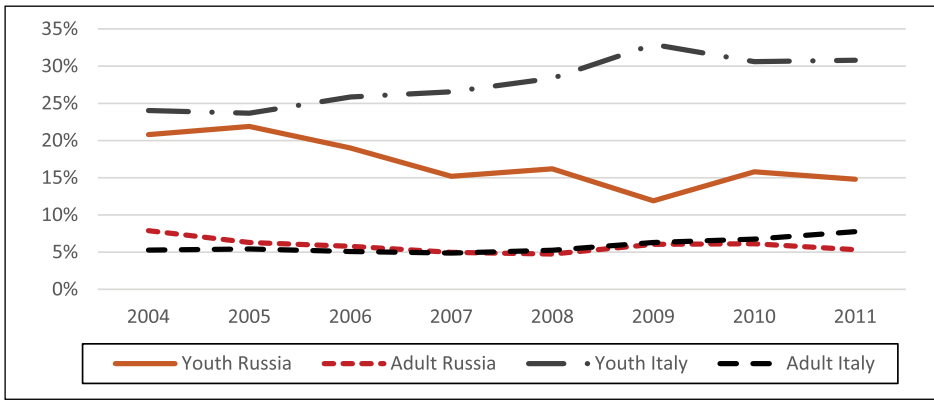

Figure 1. Youth and adult unemployment rates, Italy and Russia, 2004–2011.
Sources: Authors' calculations based on EU-SILC database (Italy) and Russia Longitudinal Monitorial Survey of the Higher School of Economics (RLMS-HSE, various years; Russia).

of the period, the YUR in Italy was twice that of Russia. The unemployment rate for adults was 5% and 6% in Russia and Italy, respectively, while the YUR was 15% and 27%, respectively.

Table 5 presents descriptive statistics for our samples, separately for Russia and Italy and for youth and adults. The average age of the youth in the Russian and Italian databases was similar: 21 years, but of adults was higher in Italy (owing to the different retirement age). The share of men in the Russian sample was lower than in the Italian sample for both youth and adults. The share of young people with tertiary education was higher in Russia (15%) than in Italy (9%). In Russia, people graduate from University at the age of 22 years; in Italy, it is higher and fewer students complete their graduate studies within the standard university period. However, the share of adults with higher education was similar for both countries, while the number of people with secondary education was higher in Italy both for young and adults. The incidence of married individuals in the youth sample was much bigger in Russia (30%) than in Italy (4%). However, there were no significant differences in marital status among adults.

Only 1%–2% of young people in each country had bad health. Around 80% of Russian young people live in urban areas and 33%–36% in Italy. Approximately, 70% of youth in both countries owned a computer. However, only 44% of Russian adults had a computer compared with 70% for Italy. Other household characteristics are listed in Table 5, such as housing size, the number of household members and socio-economic status proxied by disposal family income[10] (computed as a ratio to average family income in the sample and similar in both countries). About 20% of the Russian respondents were not born in Russia. In Italy, this figure was less than 7%.

Econometric estimation and results

We model the probability being unemployed for youth and adults, starting by using binary choice models. The main specification is written as

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Table 5. Descriptive statistics in our sample.

Variable	Italy				Russian Federation			
	Youth		Adult		Youth		Adult	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Share of unemployed	0.27	0.45	0.06***	0.23	0.15	0.36	0.05***	0.21
Age	21.63	1.95	42***	9.64	21.48	2.01	42***	9.87
Male (share)	0.59	0.49	0.58**	0.49	0.51	0.50	0.45***	0.50
Secondary education (share)	0.56	0.50	0.41***	0.49	0.30	0.46	0.28***	0.45
Tertiary education (share)	0.09	0.29	0.23***	0.42	0.15	0.36	0.27***	0.45
Married (share)	0.04	0.19	0.63***	0.48	0.30	0.46	0.74***	0,04
Urban (share)[a]	0.33	0.47	0.36***	0.48	0.79	0.41	0.77**	0.42
Bad health (share)	0.01	0.09	0.03***	0.17	0.02	0.13	0.06***	0.23
Housing per household member[b]	3.59	1.09	3.62**	1.13	10.59	5.52	12.19***	7.02
Number of household members			1.14***		3.45	1.45	1.11*	1.56
Socio-economic status[c]	1.09	0.69	0.70	0.83	1.13	0.91	0.49***	0.95
Computer (share)[d]	0.70	0.46	0.07***	0.46	0.74	0.44	0.18**	0.50
Foreign nationality (Russia) or citizenship (Italy)	0.06	0.24		0.21	0.15	0.36	0.08	0.34
Moscow (share)					0.09	0.28	0.03	0.28
St Petersburg (share)					0.03	0.18		0.18
South of Italy[e] (share)	0.33	0.47	0.06***	0.44				
Number of observations[f]	4330		26,695		11,635		155,182	

SD: standard deviation.

[a]For Italian data, this is the variable DB100 (degree of urbanisation) in European Union Statistics on Income and Living Conditions (EU-SILC), a dummy variable equalling 1 for densely populated areas and 0 for others. For Russia, the variable equals 1 for urban areas and 0 otherwise.

[b]For Italian data, number of rooms per household; Russian data housing in square metres per household member.

[c]Ratio of nominal family income (euros/roubles per household member) to average in the sample per year (adjusted for effects of inflation).

[d]Share of people in sample who own a computer.

[e]Mezzogiorno (Southern regions and the two islands).

[f]Number of observations for Russia is for all variables except nationality. Not all people answered this question. For these variables, see Table 7.

Significance of test of equal means between adult and youth in each country: ***$p < 0.01$; **$p < 0.05$; and *$p < 0.1$.

$$P\left(Y_i = 1 \middle| X\right) = F\left(x_i' \beta\right) \tag{1}$$

where $F(.)$ is a normal distribution function. $Y_i = 1$ if a person is unemployed and 0 otherwise. This occurs when latent variable y_i in latent equation $y_i^* = x_i'\beta + u_{1i}$ is greater than zero. Therefore, $Y_i = 1$ if $y_i^* > 0$. x_i is the vector of explanatory variables, and β is the vector of estimated coefficients. Therefore, we consider a probit model. However, in this case, there is sample selection problem because not all people are active in the labour market.

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To take into account the non-random selection of labour participation for both groups, we estimate probit model with a correction for sample selection (Heckman probit).[11] The binary outcome (1) will be observed only when the individual is active. Therefore, the selection equation is

$$y_i^{select} = \left(z_i'\gamma + u_{2i} > 0\right) \tag{2}$$

where $y_i^{select} = 1$ when the individual is active in the labour market and zero otherwise. z_i is the vector of explanatory variables, and γ is the vector of estimated coefficients. We suppose that the error terms are, from equation (1), $u_{1i} \sim N(0,1)$ and, from equation (2), $u_{2i} \sim N(0,1)$, and $corr(u_{1i}, u_{2i}) = \rho$. If $\rho = 0$ then we can reject non-random selection and we do not need to correct for selection. We test this hypothesis using the Likelihood Ratio test.

To estimate equations (1) and (2), we use the maximum likelihood method. Our explanatory variables for both equations are individual characteristics of the people in the sample (age, gender, education level, marital status, health, having a computer), household characteristics (socio-economic status, housing size), characteristics of location (urban area, unemployment rate in the region) and time effects to control for macro conditions and the crisis effect. However, we use unique variables for the selection equation: the probability of being inactive in the labour market, such as student status and disability.

For the quantitative interpretation and comparisons between countries, we estimate the average marginal effects accounting for the fact that most of our variables are dummies. The average partial effect (APE) for the Heckman probit model is

$$APE_{x_k} = \sum_{i=1}^{N} \frac{\partial P\left(Y_i = 1 | x_i, y_i^{select} = 1\right)}{\partial x_k} \Big/ N \tag{3}$$

for continuous variables. We multiply the average marginal effects by the standard deviation of the corresponding regressor x_k ($APE_{x_k} \cdot \sigma_{x_k}$) in order to measure the significance of the variables, characterising the degree of influence of the variable on the probability. The larger the absolute value of $APE_{x_k} \cdot \sigma_{x_k}$, the larger the contribution of the standard deviation change of the variable x_k to the probability of being unemployed (equation (1)). For discrete variables, the APE is the difference in conditional probabilities of being unemployed for different values of the dummy variable, that is

$$APE_D = \sum_{i=1}^{N} \left[P\left(Y_i = 1 | x_i, D_i = 0, y_i^{select} = 1\right) \right] \Big/ N \tag{4}$$

We estimate equations (1) and (2) separately for both groups in Russia and Italy. In fact, we tested the significance of no differences between the youth and adults for both countries and we can reject such a hypothesis at any significance level.

Econometric results for Italy

The econometric results for Italy are presented in Table 6. Columns 1–3 present the results for young people. Columns 4–6 present results for adults. We considered two

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Table 6. Probit (model 1) and Heckman probit (model 2) for Italy, 2004–2011.

Variables	Youth			Adult		
	Unemployment equation		Selection	Unemployment equation		Selection
	Model 1	Model 2	Model 2	Model 1	Model 2	Model 2
	(1)	(2)	(3)	(4)	(5)	(6)
Student			−2.325***			−0.971***
			(0.024)			(0.016)
Age	−0.117***	−0.139***	0.914***	−0.092***	−0.137***	0.282***
	(0.007)	(0.008)	(0.085)	(0.006)	(0.009)	(0.003)
Age2			−0.018***	0.001***	0.001***	−0.004***
			(0.002)	(0.000)	(0.000)	(0.000)
Disability	−0.071	−0.026	−0.181***	0.173***	0.204***	−0.230***
	(0.077)	(0.076)	(0.052)	(0.022)	(0.022)	(0.011)
Male	−0.118***	−0.171***	0.283***	−0.252***	−0.378***	0.903***
	(0.029)	(0.029)	(0.021)	(0.013)	(0.025)	(0.007)
Secondary education	0.066**	0.056*	0.026	−0.242***	−0.286***	0.361***
	(0.032)	(0.032)	(0.024)	(0.015)	(0.016)	(0.008)
Tertiary education	0.062	0.051	0.082*	−0.174***	−0.255***	0.641***
	(0.057)	(0.056)	(0.042)	(0.018)	(0.023)	(0.010)
Married	−0.394***	−0.278***	−0.587***	−0.295***	−0.267***	−0.165***
	(0.082)	(0.081)	(0.051)	(0.014)	(0.015)	(0.008)
Urban area	0.262***	0.274***	−0.043**	0.147***	0.153***	−0.062***
	(0.030)	(0.030)	(0.022)	(0.013)	(0.013)	(0.007)
Housing	0.056***	0.067***	−0.059***	0.012*	0.016***	−0.035***
	(0.014)	(0.014)	(0.010)	(0.006)	(0.006)	(0.003)
Bad health	0.438***	0.587***	−0.797***	0.290***	0.361***	−0.437***
	(0.160)	(0.157)	(0.095)	(0.034)	(0.035)	(0.016)
Socio-economic status	−0.686***	−0.689***	0.116***	−0.520***	−0.536***	0.185***
	(0.029)	(0.029)	(0.013)	(0.014)	(0.014)	(0.005)
Computer	−0.172***	−0.156***	0.036	−0.144***	−0.150***	0.077***
	(0.033)	(0.032)	(0.025)	(0.014)	(0.014)	(0.008)
Unemployment rate	0.005***	0.006***	−0.005***	0.071***	0.074***	−0.031***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Constant	2.159***	2.804***	−10.315***	0.992***	2.037***	−5.080***
	(0.171)	(0.179)	(0.869)	(0.117)	(0.214)	(0.061)
+ Time effects						
Observations	9940		32,978	126,578		194,068
Uncensored observations		9940			126,578	
Rho			−0.342***			−0.291***
			(0.040)			(0.050)
LR test (independent equation) ($\rho = 0$), chi(1)			75.03			32.29
Log likelihood	−5206.36		−15,035.02	−23,597.02		−116,239.6
Wald chi2(19)	1464.34		1416.8	10,106.19		8525.7
Percentage of correctly predicted (cut off 0.2)	85.73	86.01		32.36	32.46	

LR: likelihood ratio.
Youth: aged 15–24 years; adults: aged 25–64 years. Standard errors in parentheses.
***$p < 0.01$; **$p < 0.05$; and *$p < 0.1$.

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types of models: probit (model 1) and Heckman probit (model 2). The selection equation (model 3) represents the probability of being active in the labour market.

First, we can see that the signs and significance of the coefficients are exactly the same for youth and adults (columns 1, 2 and 4, 5, respectively). However, the correlation between unemployment and the selection equation, rho (ρ), is significant for both groups. Therefore, it is important to control for non-random selection so we focus on results for the Heckman probit (model 2).

First, we consider our main equation of interest, the unemployed equation. The *age* variable was highly significant for young people. The coefficient is negative, meaning that the probability of being unemployed decreased with age. For adults, the relationship between the probability of being unemployed and age is U-shaped, although the threshold of 68.5 years was out of our sample. There is a significant and negative coefficient for women who thus had a higher probability of being unemployed than men. However, the probability of being active was also higher for males for both age groups. *Marital status* was also significant for both youth and adults: the probability of being unemployed was lower for married people. This can be explained in terms of the motivation to find a job upon marriage and the tendency of 'single' young Italians to live with parents and enjoy parental support if unemployed. *Bad health* led, as expected, to a higher probability of being unemployed. If the person owned a *computer*, the probability of being unemployed decreased: this was linked to education and income level.

For adults, we obtained a significant coefficient for secondary and tertiary *education* as the highest qualification level, with higher education reducing the probability of being unemployed. Whereas for youth secondary education level increased the probability of being unemployed and tertiary education was insignificant, for adults the opposite held. Possibly the age range 15–25 years meant that less educated young people had a longer period to seek (and find) a job than those who had only 1 or 2 years for job search between graduation and the age of 25 years.[12] Alternatively, more highly educated people may have been more 'choosy'. Higher education decreased the unemployment risk for adults.

The probability of being unemployed was higher for more densely populated areas. The coefficients for the variable *urban* were significant and positive for both youth and adults. This can be explained by labour supply behaviour: migration to urban areas to search for a job. *Housing* conditions, such as the number of rooms, were significant and positive for both youth and adults. Socio-economic status was highly significant and has negative coefficients for both age groups. However, the result concerning this variable should be interpreted with caution; since socio-economic status is proxied by household disposable income, there might be an endogeneity problem: this could be an explanation of the very high coefficients. Notice that the mentioned problem is undoubtedly more serious in the estimations concerning adults.[13]

To take macroeconomic conditions into account in our model, we also controlled for features such as the regional *unemployment rate*. For both groups, this variable was significant and had a positive sign. There were significant coefficients for the *time dummies* after the year 2007 (not reported in the table). All coefficients for the years 2008–2011 were significant and positive for both youth and adults, reflecting a higher probability of being unemployed in the crisis period.

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In the selection equation (model 3), most of the variables which were significant in the unemployment equation were also significant. However, they had the opposite sign because they estimate the effect of the explanatory variables on the probability of being active in the labour market. Only marital status had the same sign in both equations. The probability of married individuals being active was now lower, perhaps, because in many Italian regions (especially in the South) women are less likely to look for jobs if married.[14] Student status was intentionally included only in the selection equation: it was significant and negative for both age groups. Thus, the probability of being active was lower – as expected – when the individual was a student.

We also controlled for immigrant status (Supplementary Table S3, available at http://elr.sagepub.com/content/by/supplemental-data) and found that *immigrants* had a smaller chance of being unemployed if young, possibly, because young people decide to migrate to Italy only if they have a chance to find a job (the coefficient was not significant for adult individuals).

APEs were used to compare, for the different regressors, the marginal effects for youth and adult individuals (see Supplementary Figure S1, available at http://elr.sagepub.com/content/by/supplemental-data). In general, we found that, apart from the macro level variable unemployment rate, APEs were much higher for young individuals than for adults. Considering the individual regressors, the APE of the variable 'urban' was higher for youth. Socio-economic status, marital status and bad health had the most significant effect on the probability of being unemployed for young people. An increase in socio-economic status by one standard deviation decreased the probability of being unemployed by 0.15. Bad health decreased the probability of being unemployed by 0.11, and marital status decreased this probability by the same value. An increase in age by one standard deviation raised the probability of being unemployed by approximately 0.07 for youth and 0.04 for adults. Therefore, age was more critical for young individuals.

Econometric results for Russia

The econometric results for Russia are presented in Table 7. Columns 1–3 show the results for young people and the other columns for adults. First, we compare results for the probit (model 1) and Heckman probit (model 2). The selection equation (model 3) refers to the probability of being active.

An important difference between models 1 and 2 was found only for the secondary education variable, for youth unemployment and for the regional unemployment rate for adult unemployment. All other variables had the same signs and significance for both types of models. We focus on the results of the Heckman probit model.

First, we consider individual characteristics. There was a significant result for *age*, which had a negative coefficient for both age groups, as in Italy. *Gender* was significant only for adults, with the probability of being unemployed being higher for men. However, gender was significant in the selection equation for both age groups and the 'male' variable had a positive sign. Therefore, the probability of being active in the labour market was higher for men. For young people both *education* proxies were insignificant, while for adults both education levels were significant and had a negative sign. *Marital* status was significant only for youth, showing a reduced probability of being unemployed if married, as in Italy. Bad *health* was significant for unemployment only for adults. The

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Table 7. Probit (model 1) and Heckman probit (model 2) for Russia, 2004–2011.

Variables	Youth			Adult		
	Unemployment equation		Selection	Unemployment equation		Selection
	Model 1	Model 2	Model 2	Model 1	Model 2	Model 2
	(1)	(2)	(3)	(4)	(5)	(6)
Student			−2.088***			−1.917***
			(0.046)			(0.18)
Disability			−0.577***			−0.994***
			(0.119)			(0.035)
Age	−0.146***	−0.055***	0.720***	−0.010***	−0.010***	0.178***
	(0.014)	(0.014)	(0.117)	(0.002)	(0.001)	(0.008)
Age2			−0.014***			−0.002***
			(0.003)			(0.000)
Male	0.018	0.072	0.251***	0.151***	0.182***	0.378***
	(0.050)	(0.048)	(0.036)	(0.028)	(0.028)	(0.020)
Secondary education	−0.134**	−0.06	0.140***	−0.122***	−0.099***	0.224***
	(0.060)	(0.058)	(0.045)	(0.035)	(0.034)	(0.023)
Tertiary education	0.08	0.116	0.115	−0.110***	−0.082**	0.308***
	(0.086)	(0.083)	(0.076)	(0.039)	(0.039)	(0.028)
Married	−0.161***	−0.170***	−0.226***	−0.044	−0.052	−0.174***
	(0.060)	(0.057)	(0.046)	(0.033)	(0.032)	(0.023)
Urban area	0.014	0.051	0.377***	0.103***	0.123***	0.213***
	(0.062)	(0.058)	(0.043)	(0.034)	(0.033)	(0.022)
Bad health	0.12	−0.049	−0.362***	0.253***	0.157***	−0.412***
	(0.175)	(0.167)	(0.115)	(0.053)	(0.056)	(0.032)
Housing	0.003	0.003	0.002	−0.003	−0.003	0.006***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.002)	(0.001)
Socio-economic status	−0.311***	−0.266***	0.113***	−0.281***	−0.270***	0.157***
	(0.038)	(0.037)	(0.022)	(0.024)	(0.024)	(0.014)
Computer	0.120*	0.081	0.330***	−0.162***	−0.123***	0.409***
	(0.063)	(0.060)	(0.046)	(0.034)	(0.034)	(0.024)
Unemployment rate	0.018***	0.012**	−0.030***	0.010**	0.006	−0.040***
	(0.007)	(0.006)	(0.004)	(0.005)	(0.005)	(0.003)
Constant	2.179***	−0.056	−8.168***	−0.979***	−1.046***	−2.431***
	(0.301)	(0.316)	(1.166)	(0.092)	(0.091)	(0.180)
+ Time effects						
Observations	4330		9350	26,695		31,553
Uncensored observations		4330			26,695	
Rho			0.842***			0.453***
			(0.072)			(0.128)
LR test (independent equations) ($\rho = 0$), chi(1)			179.06			15.89
Log likelihood	−1684.43		−4750.91	−4744.01		−15,972.4
Wald chi2(18)	331.46		112.34	472.84		353.89
Percentage of correctly predicted (cut off 0.2)	51.28	44.78		0.08	0.4	

LR: likelihood ratio.
Youth: aged 15–24 years; adults: aged 25–60 years. Standard errors in parentheses.
***$p < 0.01$; **$p < 0.05$; and *$p < 0.1$.

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presence of a computer was significant only for adults, decreasing the probability of being unemployed.

The probability of being unemployed was higher in *urban areas* for adults. A possible reason is the operation of labour supply effects: people move to urban areas to search for jobs. The regional average *unemployment rate* increased the probability of being unemployed for youth and reduced the probability of being active for both age groups. Among the various household characteristics, only *socio-economic status* was highly significant and has a negative coefficient, as in Italy (we must recall again the possible endogeneity problem already discussed in the case of Italy). For Russia, too, we found significant *time effects* (with negative signs in the crisis period) although not all year dummies were significant.

The variables in the selection equation had opposite signs compared to the unemployment equation for both Russia and Italy. Disability and student status were included only in the selection equation: both were significant, and had a negative sign for both age groups.

The percentage of correctly predicted outcomes (unemployed individuals) in the Russian models was lower than for Italy because of the lower number of unemployed people in the sample. It was 44.4% for the youth unemployment model and only 0.4% for the adult one, so the model has low predictive power for adult unemployment in Russia.

The variable non-Russian *nationality*, (Supplementary Table S4, available at http://elr.sagepub.com/content/by/supplemental-data), based on far fewer observations, was significant only for adult unemployment and had a positive sign, as in Italy. It was also significant in the selection equation and had a negative sign for both age groups.

A synthesis of results for both countries

We compare the results for both countries by contrasting the APE (see Supplementary Figures S1 and S2, available at http://elr.sagepub.com/content/by/supplemental-data). The highest negative effect for the probability of being unemployed for youth was found – for both countries – for socio-economic status (notwithstanding the possible distortion caused by the proxy used). The APE of marital status and bad health, which were important for young Italians, were insignificant for young Russians. There was also a difference concerning the urban area variable: the probability of being unemployed was lower for young Russians who live in urban areas, but there was a positive (increasing) effect in the Italian case. Bad health had a strong effect on employment status, for adults in both countries: the APE was 0.03 and 0.02, respectively. Housing conditions had a very low effect on employment status, unlike socio-economic status.

Considering the partial effects for adults, the APE of socio-economic status for adults was the same (−0.027) in Russia and Italy. There was a strong gender effect for adults (Supplementary Figure S3). However, in Russia, adult men had a higher probability of being unemployed (0.01), whereas in Italy, women had the higher probability (0.026). If an adult had tertiary education, the probability of being unemployed was smaller by 0.011 in Russia and 0.017 in Italy. Therefore, for young people the key factors explaining their (un)employment status were socio-economic status and age for both countries, the regional unemployment rate for Russia, and marital status, urban area and bad health for Italy. Individual characteristics, in general, were more important than regional ones. For adults, regional characteristics were also important; and, as for youth, individual

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characteristics provided more significant contributions to the explanation of employment status. In most cases, the APEs for Italian models were higher than for Russian models (in fact, the unemployment risk was higher in Italy and so also the elasticities).

Conclusion

Youth unemployment is much higher than adult unemployment and has been particularly sensitive to the economic cycle. In Russia, it is lower than in Italy – owing to informal activities of young people – but it also increased after the crisis.

Individual and family characteristics were found to be important elements in shaping the differences and trends in youth unemployment, though they were less important than for adults. For instance, this was the case for education (especially tertiary education). Also, gender was more important for adults: females faced higher risk of unemployment in Italy, while the opposite was true in Russia.

The strongest negative marginal effect on the probability of being unemployed, for both countries and age groups, came from the socio-economic status (recalling again the necessary cautions when interpreting this outcome). Moreover, the risk of being unemployed decreased with age for young people (especially in Russia) and with married marital status (being single increasing the risk) in Italy. The strongest positive marginal effects were for the regional unemployment rate, which led to higher unemployment risk. In general, however, regional characteristics were less important than individual and family features as risk factors. Finally for Italy, there was increased unemployment risk during the recent crisis period (2008–2011).

Youth unemployment is detrimental to society because it is a waste of resources; it causes a permanent loss of human capital, affects health and diminishes the well-being of not only the unemployed but also the whole society (e.g. in generalised anxiety over job security). Bell and Blanchflower (2011) found evidence that spells of youth unemployment have harmful impacts on a number of outcomes – happiness, job satisfaction, wages and health – even many years later.

The policy implications of our study are foremost that appropriate ‘school-to-work’ transition services are important, since our results show that a higher level of education, by itself, is not enough to guarantee young people a higher likelihood of employment. Moreover, there is also a need for targeted policies, differentiated by gender (for instance helping women in finding jobs in Italy), and supporting people with bad health or youngsters living in underperforming regions in both countries. We have econometrically detected the importance of the regional unemployment rate in affecting the individual probability of unemployment. The risk of rising – especially after the recent crisis – and persistent unemployment is much higher in such regions. Only through effective policies, we can avoid the threat that a ‘lost generation’ will be with us for many years to come.

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Supplementary Material

Supplemental Material accompanying this article is available at: http://elr.sagepub.com/content/by/supplemental-data

Notes

1. Other definitions are sometimes used. O'Higgins (2011) and Scarpetta et al. (2010) observe that the size of the group of 'youth left behind' can be proxied by the number of young people who are neither employed nor in education or training (NEET). This definition is now used by the Organisation for Economic Cooperation and Development (OECD) and Eurostat.
2. See Marelli et al. (2013), showing that youth unemployment rates (YURs) are particularly sensitive not only to economic growth but also to variables such as economic freedom, labour market reforms, share of part-time employment and active labour market policies (ALMPs).
3. Choudry et al. (2012), considering previous crises in approximately 70 countries, found that youth unemployment increases until 5 years after a financial crisis, with the largest effects in the second and third years.
4. The importance of ALMPs and unemployment benefits in explaining changes in both employment and the unemployment rate are confirmed by Destefanis and Mastromatteo (2010).
5. In this study, the sensitivity of YUR to adult rates, for the OECD countries in the 1970–2009 period, is estimated to be equal to 18.
6. Appropriate 'school-to-work' transition services are fundamental to breaking the work experience trap. (Caroleo and Pastore, 2007; Quintini and Manfredi, 2009).
7. In many countries, for example Italy, practically all recent employment opportunities have been temporary (O'Higgins, 2012).
8. Southern regions were especially hurt by the recent crisis. However, Pastore (2012b) found that that high unemployment regions have a higher, not a lower, rate of reallocation because they suffer from high job destruction, rather than from low job creation. Thus, economic policies should be targeted at increasing labour demand and raising the competitiveness of such regions.
9. ISTAT or Indagine sulle condizioni di vita (various years) is part of the European Union Statistics on Income and Living Conditions (EU-SILC) survey. Authors (of course, not ISTAT) are responsible for the elaborations in this paper. RLMS-HSE (various years) is a series of national surveys designed to monitor the effects of reforms on households and individuals in the Russian Federation.
10. Socio-economic status is an important determinant of youth unemployment. The best proxies would be some variables regarding education or occupation of the parents. The problem is that it is very difficult to combine different questionnaires, separately for each individual household due to complex hierarchical structures (there is a nontrivial coding of the relationship between family members).This is the reason why we have used household disposable income (HDI) as a proxy. The latter variable has, however, some advantages compared to other proxies of socio-economic status; for example, it can cover the easier job search processes in families with higher income.
11. For recent use of this methodology, see Kogan (2011), Pastore (2012a) and Addabbo et al. (2013).
12. The age group 15–24 years is misleading in the case of Italy (15–29 or 15–34 years would be better) but is retained for comparative purposes.
13. Of course, if a household member is unemployed the family income would be lower. In the case of young people, however, the problem is not really severe. In Italy, for example, young people – especially in the age cohort 15–24 years – even when working hold precarious jobs

with very low earnings (on average one-fifth or less than adult workers); this problem has worsened over time (many young workers are hired by means of a 'voucher' system, characterised by extremely low wages). In any case, although youth income is a small and shrinking component of HDI, we do not know how the socio-economic status coefficient estimates are affected.

14. If they did look for jobs, they were more likely to find them, perhaps owing to more intensive search efforts (this explains the negative sign in the unemployment equation).

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