

## **Youth Unemployment, Labor Market Transitions, and Scarring: Evidence from Bosnia and Herzegovina, 2001-2004**

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### Abstract

Relatively little is known about youth unemployment and its lasting consequences in transition economies, despite the difficult labor market adjustment experienced by these countries over the last decade. This paper examines early unemployment spells and their longer-term effects among the youth in Bosnia and Herzegovina (BiH), where the labor market transition is made more difficult by the challenges of a post-conflict environment. This paper uses panel data covering up to 4,800 working-age individuals over the 2001 to 2004 period. There are three main findings from the analysis: First, youth unemployment is high, about twice the national average. Younger workers are more likely to go into inactivity or unemployment and are also less likely to transition out of inactivity, holding other things constant. Second, initial spells of unemployment or joblessness appear to have lasting adverse effects on earnings and employment. There is no evidence, however, that the youth are at a greater risk of “scarring,” or suffer disproportionately worse outcomes from initial joblessness compared to other age groups. Third, higher educational attainment is generally associated with more favorable labor market outcomes. Skilled workers are less likely to be jobless and are less likely to transition from employment into joblessness. However, there is evidence that the penalty from jobless spells may also be higher for more educated workers. We speculate that this may be due in part to signaling or stigma, consistent with previous findings in the literature.

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## I. Introduction

Young people everywhere experience considerable difficulties entering the labor market. On average, across regions, youth unemployment is about 2 to 3 times the national unemployment rate. Youth unemployment is typically concentrated among the less educated workers, but in some labor markets the unemployment rate is high even among the most educated workers.

While such unemployment spells may be temporary, and the associated income loss also short-lived, there is some evidence that the consequences of these early unemployment spells may impose enduring disadvantages on individual workers. Over the last two decades a growing literature has emerged on the post-unemployment labor market disadvantage of the youth, or what is otherwise known as a labor market “scar.” Following an initial experience of unemployment, many individuals have been found to be vulnerable to new rounds of unemployment (“unemployment scar”), lower post-unemployment wages (“wage scar”), or both.

Much of this literature has been drawn from labor market experiences in advanced economies (e.g., OECD 1998, Gregg and Tominey 2005, Arulampalam 2000). Much less is known about scarring in transition economies, where unemployment and labor market adjustment have been prominent public policy issues following the early transition period but where little is known about their lasting consequences.<sup>1</sup> In large part, this has been due to the relative scarcity of longitudinal data.

This note examines early unemployment spells and their longer-term effects among the youth in Bosnia and Herzegovina. It uses data drawn from the Living in BiH/Living Standards Measurement Survey (LSMS), a rare, longitudinal database covering up to 4,800 working-age individuals over the 2001 to 2004 period. It documents the labor market outcomes of individuals up to three years after the initial period, and estimates their covariates.

The rest of the note is organized as follows: Section II provides a brief survey of the literature on youth unemployment and scarring. Section III discusses the data sources and the descriptive statistics. Section IV provides the empirical framework and reports the main results. We conclude in Section V.

## II. Brief Review of Related Literature

Many young men and women face significant difficulties entering the labor market. According to most measures, the youth are more likely to be unemployed than adults, although significant variations in unemployment exist between urban and rural sector, between developed and developing countries, as well as between poor and rich

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<sup>1</sup> One important exception is a recent study of Hungary (Audas and others 2005). There have also been studies of labor market transitions in former socialist economies (see Boeri and Terrell 2002 for a brief survey of the literature).

households. There are variations based on gender as well: Young women are more likely than young men to stay out of the labor force.

The youth currently constitute a quarter of the working-age population worldwide, of which some 47 percent are unemployed. According to estimates drawn from the ILO, the global unemployment rate for youth has increased steadily over the last 10 years, from 11.7 percent in 1993 to 14.4 percent in 2003.<sup>2</sup> Youth unemployment rates vary widely across regions, from a low of 7 percent in East Asia to 13.4 percent in industrial economies to a high of 25 percent in the Middle East and North Africa.<sup>3</sup> Furthermore, there is considerable cross country variation, not only in the levels of youth unemployment but also in the ratio of the youth to adult unemployment rate. A very high ratio in some countries is a signal of atypical youth difficulties in the transition to work and a source of concern for policymakers.

Across all markets, youth unemployment rate is typically 2 to 3 times higher than the adult unemployment rate, regardless of the aggregate level of unemployment. In the Europe and Central Asia (ECA) region, the average unemployment rate for youth is 21 percent, about twice as high the unemployment rate of adults. The jobless rate, which includes the unemployed as well as the discouraged youth, is estimated to be as high as 24 percent. The youth jobless rate is higher among females (26 percent) and in rural areas (24 percent). O’Higgins (2004) shows that transition countries in Europe, nowhere is the youth unemployment rate lower than 10% and in Bulgaria, Croatia, Poland and Slovakia it is over 35%. In 2002, the ratio of youth to adult unemployment rate was found to be just under 2-to-1 in EU countries, whilst in the EU accession countries it was 2.2. More generally the ratio tends to be higher in Southern Europe.

Table 1. Average Unemployment and Jobless Rates for Youth:  
Selected Countries in Europe & Central Asia

	Unemployment	Jobless
Adult	11	21
Youth	21	24
<i>of which:</i>		
Male	22	22
Female	21	26
Urban	22	22
Rural	23	24

<sup>2</sup> ILO (2004). The ILO produces global and regional estimates based on several national surveys and the ILO Global Employment Trends model.

<sup>3</sup> ILO (2004).

Kolev and Saget (2005) provide evidence from countries in South East Europe (SEE) that over a decade after the start of transition period and despite economic recovery in most countries in the region, the employment prospects for young workers are still dismal. They find that the average youth unemployment rate was over twice the European Union average, and thrice the average adult unemployment rate. Together with high youth unemployment rates, Kolev and Saget also report the growth of pools of jobless young workers not looking for work as well as large numbers of young workers working in unprotected environments.

O'Higgins (2004) found that in Poland, Hungary, Czech Republic and the Slovak Republic, the incidence of long-term unemployment among the youth is large and not much lower than the long-term incidence of unemployment among adults. In other countries in Latin America, Eastern Europe, and in the former Soviet Union, evidence from longitudinal data also suggests that young workers experience sustained spells of unemployment.<sup>4</sup>

*Does the initial experience of unemployment lead to permanent labor market disadvantage among the youth?* The existing empirical evidence is inconclusive. In the United States, most studies find that spells of unemployment after leaving school do not result in persistent unemployment later in life. This corresponds to fairly high transition rates from unemployment into employment: 46 percent of unemployed youth are employed one month later. The corresponding transition rates in France, Germany, and the United Kingdom are much lower, ranging from 4 to 14 percent, and there is more evidence that early unemployment leads to persistent unemployment. One-third of the unemployed in France have been unemployed more than a year, compared with 8.5 percent in the United States.<sup>5</sup>

The adverse effects of early unemployment spells on subsequent employment outcomes and employment stability have been found to persist for as long as seven years in France, compared with only two years in the United States.<sup>6</sup> The degree of persistence appears to be responsive to business cycles; that is, where the local economy is experiencing job growth, the adverse consequences of early unemployment seems less permanent. Early analysis using longitudinal data from the United States (Corcoran 1982 and Ellwood 1982) show that foregone participation lowers future wages. In addition, Burgess et al (2003), using British Data, show that scarring effect of early unemployment tends to be greatest for the least educated and disadvantaged youth.<sup>7</sup>

A separate strand of the literature focuses on displaced workers and examines the consequences of layoffs on subsequent employment and wage outcomes. Kletzer and Fairlie (2003) using NLSY79 data found that the wage disparity between displaced workers and their non-displaced counterparts persisted through the five years following displacement. In general, the effect of displacement on workers could be explained by

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<sup>4</sup> Borgarello and others (2005). The countries covered include Albania, Argentina, Georgia, Hungary, Poland, Russia, Ukraine, and Venezuela.

<sup>5</sup> Ryan (2001)

<sup>6</sup> Ryan (2001).

<sup>7</sup> Burgess and others (2003).

the loss of firm-specific human capital,<sup>8</sup> and most studies find that the effects of displacement are largest among older workers. For example, Jacobson et al (2003) also using US data found that longer term adverse effect of displacement tend to be smaller for younger workers. Topel (1990) finds that wages among young displaced workers converge to the wages of their non-displaced counterparts. In the United Kingdom, Gregory and Jukes (2001) found that while risk of unemployment is lowest among prime age and the highest paid men, the wage penalty for experiencing unemployment is lowest among young men and the low paid, namely, those who have the least firm-specific human capital to lose.

A recent literature explores how in presence of asymmetric information, previous unemployment spells might act as a device to reveal information to future employers. For example, Gibbons and Katz (1991) develop a signaling model in which employers obtain information about the productivity of their workers based on previous experience in the labor market. They tested their model using data on displaced workers from the United States. They found that selective lay offs that are not due to plants shut down contain information about workers' productivity. These workers, in turn, suffer larger costs than workers who are displaced due to a plant closure. This signaling model was also supported by data from Canada's survey of displaced workers.<sup>9</sup> In Italy, Lupi and Ordine (2002) found that in regions with high unemployment rate, experiencing unemployment does not signal poor quality of workers and as a result have less adverse implications on future outcomes compared to those unemployed in regions with low unemployment rate. This stigma or signaling effect seems to be highest among the most educated youth, those who are less likely to experience unemployment. For example, Hyttinen and Rouvinen (2006), using data from the European Community Household Panel, show that the adverse effect of temporary spells of unemployment and/or self employment—what they call “the stigma of failure”—is larger for more educated workers compared to the less educated workers.

Initial difficulties in employment experienced by young people may have consequences outside the labor market. In particular, weak youth labor markets have been observed to delay other life transitions. In Europe, the average age when the youth leave their homes has steadily increased, especially in southern European countries. In Italy, 80 percent of males aged 18-30 still live with their parents, compared with 25 percent in the United States. Across OECD countries, the average age at marriage has increased while the average number of children per household has fallen. Deteriorating conditions in youth labor markets have at least a partial role in explaining these recent changes in life transitions. Youth tend to delay leaving their parents' homes during recessions. Differences in the relative strength of country youth labor markets can explain observed differences across countries in the average age of home leaving.<sup>10</sup> In

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<sup>8</sup> Becker (1975) seminal contribution to human capital literature makes the distinction between job specific and general human capital.

<sup>9</sup> See Denise J. Doiron (1995)

<sup>10</sup> Card and Lemieux (2000).

Germany and Spain, the likelihood of leaving home increases significantly with youth employment status and labor earnings.<sup>11</sup>

This paper contributes to the literature on youth unemployment in transition economies by focusing on Bosnia and Herzegovina (BiH), where little is known about the labor market in general and youth unemployment in particular. Relatively few relevant empirical studies exist. These include the first BiH labor market study (World Bank 2002); a study of the gender dimensions of the labor market, (Lokshin and Mroz 2003); the labor market chapters of the World Bank's Country Economic Memorandum<sup>12</sup>; and a recent note on poverty and the labor market (Tiongson and Yemtsov 2006).

In the case of Bosnia and Herzegovina, the difficult transition period is made doubly challenging by post-conflict environment. Thus, while relatively little is known about them, the longer-term consequences of unemployment and inactivity may have an impact not only on individuals' future outcomes in the labor market but also on the longer-term stability of the region. Finally, Bosnia and Herzegovina has a rare, but little used, panel data, one of the few panel datasets in the region. The availability of this dataset allows us to study systematically youth unemployment and its consequences over a four year period

### **III. Data and Descriptive Statistics**

The longitudinal data used in the analysis are drawn from the Bosnia and Herzegovina 2001 Living Standards Measurement Survey (LSMS) and its subsequent waves, from 2002-2004, otherwise known as the "Living in BiH" Survey. The LSMS was first conducted in September-November 2001, a collective effort by the international donor community (World Bank, UNDP, and UK DfID) and the three local statistical agencies. Some 5,400 households (corresponding to about 9,400 individuals) were interviewed in 2001, about half of which have been interviewed each year through 2004. The sampling frame provided representative data at the national level, for each of the two Entities that constitute Bosnia and Herzegovina (FBiH and RS), and by type of municipality (World Bank 2003).

The LSMS, as is typical of multi-topic surveys, includes multiple modules and collects information from households and individuals on their income and consumption behavior, labor market activity, educational attainment or current enrollment, health status and health care utilization, and others. This note uses the labor market module covering individuals' labor market status, job search behavior, occupation and industry of employment, and wage levels. Survey responses to questions on employment and job search behavior (i.e., whether an individual has been looking for work over the reference period and whether he/she is ready to work in two weeks) allow for the calculation of unemployment consistent with the ILO definition, except in the 2003 wave, where ILO-

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<sup>11</sup> Blanco and Kluge (2002).

<sup>12</sup> See World Bank 2005a) and an update of the 2002 labor market study, with special focus on industrial relations (World Bank 2006).

consistent unemployment indicators could not be computed due to “routing error.” For estimating labor market dynamics, data are drawn from each of the four waves using a total common sample of 6,360 individuals, although the samples of working-age individuals and working-age individuals currently in the labor force are of course much lower. We use both panel weights and wave-specific weights, as appropriate, but the results are invariant to weighting.

Table 2. Descriptive Statistics: Bosnia and Herzegovina, 2001-2004  
(In units as indicated)

	In percent of the labor force			In percent of the working age population		
	2001	2002	2004	2001	2002	2004
Men	65	64	63	49	49	50
Age Groups						
Age 15-24	14	15	15	22	23	19
Age 25-44	52	51	50	41	40	41
Age 45-54	26	25	26	21	21	23
Age 55+	8	9	9	17	17	17
Educational Attainment						
Unfinished Elementary	7	7	6	13	13	12
Elementary	21	22	22	31	31	28
Vocational	42	40	38	32	31	31
High School	20	21	24	18	19	23
College (2+ years)	5	4	4	3	3	3
University	5	5	5	3	3	3
Unemployment Rate	16	22	22			
Labor Force Participation				48	53	59

*Source* : LSMS and authors' calculations.

Table 2 reports selected descriptive statistics of the sample used in our empirical analysis. The distributions of age, gender and skills are presented for each year (2001, 2002 and 2004). The labor force participation rate increased from 40 percent in 2001 to 59 percent in 2004. Despite this increase, the participation rate in Bosnia and Herzegovina is low compared to other ECA countries, mostly due to the very low labor force participation rate among women. Average unemployment rate is high, and increased from 16 percent in 2001 to 22 percent in 2004. The characteristics of the work force (and the working population) are fairly stable, where youth represent around 22 percent of the working population (the decline from 2001 to 2004 is due to the ageing for

the panel). The educational attainment is relatively high, with over 70 percent with vocational education, secondary education or more. Interestingly the level of secondary education has increased significantly over the sample years, offset by a corresponding decrease in vocational education.

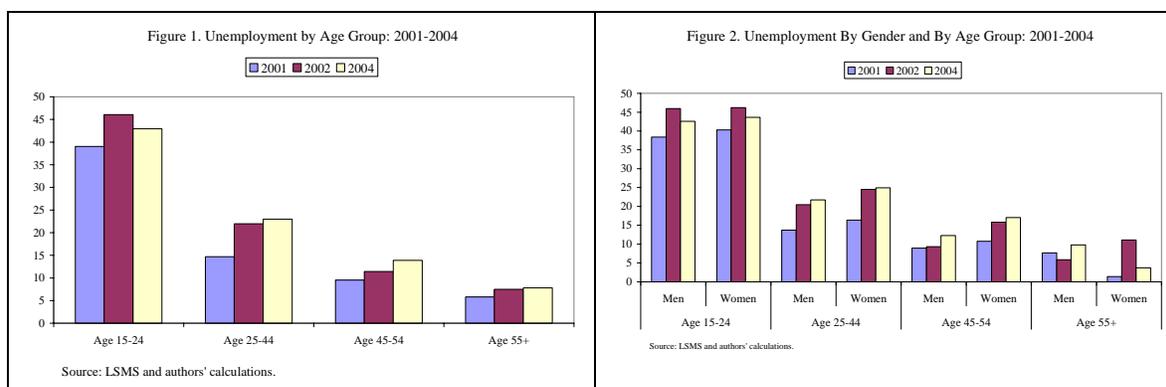
What do we know of youth labor market transitions in the ECA region? Appendix Table 1 reports summary data on labor market transition from selected countries in the region, including Bulgaria, Estonia, Poland, Russia and Turkey where panel data are available and allow us a systematic examination of the labor market experience of younger workers. There are three main observations on labor market transition dynamics based on Appendix Table 1:

- *Young people have high persistent unemployment spells.* In Bulgaria more than 57 percent (63 percent) of males (females) less than 30 years of age remained unemployed between 1991 and 1992. In Poland, two-thirds of the young unemployed in 2000 were found to remain unemployed 4 years after.
- *The youth who are employed are more likely than adults to leave employment and become either unemployed or out of the labor force.* In Poland, those aged 15 to 24 are twice more likely to become unemployed, while in Turkey, employed youth are more than 50 percent more likely to become unemployed relative to their adult counterparts.
- *Finally, the youth, particularly young women, are more likely to become discouraged and leave the labor force completely.* In Turkey, more than 90 percent of young women were like to leave the workforce between 2000 and 2001.

## IV. Empirical Findings

### A. Early transitions

In Bosnia and Herzegovina, despite the end of the civil conflict in the late 1990s, the youth have had significant difficulties entering the labor market and have experienced excessive instability in their early years of the transition to work. In 2004, the unemployment rate was 62 percent for those between 15-19 years old, and 37 percent for those between 20-24 years old, compared to 22 percent for adults in the same year.



Combining the 15-19 and 20-24 age groups together, the youth unemployment rate is higher than any other age group (Figure 1). On average, it is about twice the aggregate unemployment rate, although the disparity has narrowed somewhat over time. Across all age groups, women consistently experience higher unemployment rates than men (Figure 2). Among the youth, female unemployment rates have been over 40 percent between 2001 and 2004.

Table 3 reports the labor market transition probabilities for working-age individuals in Bosnia and Herzegovina, between 2001 and 2002 and between 2001 and 2004. The columns represent the labor market outcomes in 2002 and 2004 for each of the labor market states in 2001. These outcomes persist in the first few years of youth experience in the labor market. Among those 15-24 who were unemployed in 2001, 77 percent were jobless one year later, and 58 percent were still jobless three years later. Even among youth employed in 2001, a third of them were jobless in 2002, and a quarter of them were still jobless in 2004.

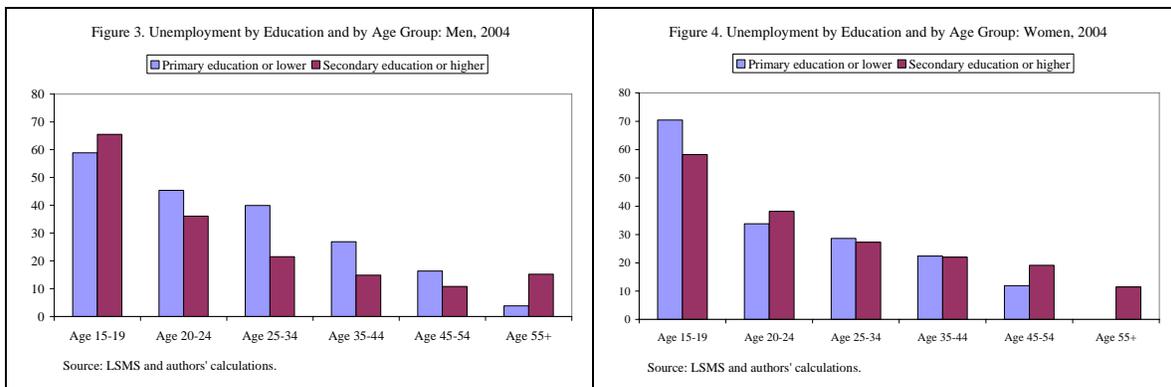
Table 3. Panel Estimates of Transition Probabilities in Bosnia and Herzegovina, 2001-2004

	Employment status in 2002			Employment status in 2004		
	Inactive	Unemployed	Employed	Inactive	Unemployed	Employed
Employment Status in 2001						
All						
Inactive	73.3	12.4	14.3	63.3	15.3	21.3
Unemployed	32.3	33.7	33.9	30.0	27.4	46.6
All employed	13.0	6.9	80.6	12.9	8.3	78.7
Ages 15-24						
Inactive	71.0	16.6	12.4	53.4	21.2	25.5
Unemployed	36.3	40.3	23.5	25.8	32.3	41.9
All employed	20.3	13.5	66.3	11.4	15.2	73.4

Source: LSMS and authors' calculations.

In general, this does not compare favorably with other economies in transition, where flows out of joblessness among young workers are much larger (see Appendix Table 1). For example, in Estonia in the mid-1990s, close to half of all unemployed workers found employment the following year. In Russia, over this same period, over 40 percent moved out of unemployment. The flow of young workers out of unemployment in Poland, however, is comparable to that of Bosnia and Herzegovina.

Because transitions patterns are also affected by other individual characteristics, like educational attainment, marital status and geographic location, it is important to examine to what extent the conclusions from Table 3 remain valid once we control for these factors. Figure 3, for example, illustrates how among males, the unemployment rate for both skilled and unskilled workers decreases with age. However, among the youngest workers, the average unemployment rate of skilled men is higher than that of less skilled men. As age increases, the average unemployment rate among of skilled workers falls more rapidly that that of the less skilled workers. At age 35-44, for example, the unemployment rate of skilled workers is substantially lower than that of the less skilled workers. Figure 4 shows a similar breakdown of unemployment rates by skill or education level, and by age. Compared to Figure 3, Figure 4 suggests that the unemployment rate among females is higher than among males, across age groups and skill levels. In addition, while unemployment falls with age, skilled women do not have perceptibly lower unemployment rates than less skilled women. In the case of women in the labor force, then, there is some evidence that education does not confer as much advantage as it does to men.



To properly account for observable individual characteristics, we report the results of a multivariate model. Appendix Table 2, reproduced from Tiongson and Yemtsov (2006) reports the results of a multinomial logit model of labor market transitions between 2001 and 2002, and between 2001 and 2004. This specification follows those of previous models of transition probabilities (see for example Lauerova and Terrell 2002; Bukowskiy and Lewandowski, 2005). The results broadly confirm that there are significant differences in labor market transitions by gender, age, education, and geographic location. In particular, when compared to women, men are less likely to leave employment into inactivity, and those unemployed are more likely to access employment, while those out of the labor force are also more like to enter the labor force.

The results also suggest that education facilitates transitions into employment, reduce the likelihood of becoming unemployed, and lower the exit out of the labor force. These estimates are significant for year to year transitions, as well as over 3 years period. The age differences remain consistent with earlier estimates. In particular, the results suggest that younger workers are more likely to go into inactivity or unemployment, holding other variables constant. They are also less likely to move out of inactivity into either employment or unemployment both in the short and medium term.

### ***B. The effect of early labor market experience on later outcomes***

What are the effects of experiencing jobless spells in 2001 and 2002 on employment outcomes in 2004? What are the effects of experiencing unemployment spells on earnings in 2004? Does the effect vary with among different groups? We use a simple probability model of employment or unemployment on observable characteristics and unemployment history to estimate the effect of early difficulties in the labor market on subsequent outcomes. Because of the panel structure of the data, individuals who experienced unemployment or jobless spells in 2001 could be traced in 2004 and their employment status is observed. For those who are employed in 2004, their wages are also observed.

Controlling for workers' characteristics, e.g. gender, age, education, marital status, and geographic location, those who suffered a spell of unemployment or inactivity at any point over the 2001-2002 period were also found to have faced a greater likelihood of unemployment or joblessness (both inactivity and unemployment) in 2004. Among young workers, the experience of joblessness is associated with about 11 percent greater probability of unemployment and 30 percent greater probability of joblessness. The effect on earnings is also significant. For all workers, in Bosnia and Herzegovina, a spell of joblessness is associated with lower wages.

#### *Labor Market Activity*

Table 4 and Appendix Tables 4 and 5 report probit regression results using the baseline model described in the previous section. In estimating the impact of previous labor market experience on subsequent outcomes, we test the baseline model using various sub-samples, including samples of younger workers only, of male workers, and younger male workers, to test the robustness of the results.

We use two measures of current and previous labor market activity: the first is a measure of unemployment and the second is a measure of joblessness. In particular, the dependent variable in Table 4 and Appendix Table 4 is a binary measure of unemployment; the regression results are thus based on a sample of individuals currently in the labor force. On the other hand, the dependent variable in Appendix Table 5 is a binary measure of joblessness (i.e., treating both the unemployed and those out of the labor force as "jobless") and the sample includes all working-age individuals. As for the measure of previous labor market experience, Table 4 uses a binary measure of previous unemployment, representing the experience of at least one unemployment spell, either in

2001 or 2002. Appendix Tables 4 and 5 use a binary measure of joblessness; this measure allows for the possibility of a jobless spell either in 2001 or 2002, or both.

The results suggest that between 2001 and 2004, young workers who suffered a spell of unemployment or joblessness (i.e., including either unemployment or inactivity) at any point over the 2001 to 2002 period also faced a greater likelihood of unemployment or joblessness in 2004. This is true for all workers as a group as well as for the subgroups of young workers or young male workers.

The magnitude of impact is not trivial. Among young workers, the experience of an unemployment spell is associated with about 11 percent greater probability of unemployment and 30 percent greater probability of joblessness (marginal effects are not shown)

Table 4. Previous Unemployment Spell and the Probability of Unemployment in 2004  
(Probit regression coefficients; t-statistics in parentheses; includes only those in the labor force)

	(1) All	(2) All men	(3) Young <sup>1</sup>	(4) Young men <sup>1</sup>
Male	-0.1694** (2.51)		-0.1358 (1.18)	
<b>Age groups</b>				
Age 25-44	-0.4090*** (3.83)	-0.3870*** (2.95)		
Age 45-54	-0.6160*** (5.25)	-0.5460*** (3.97)		
Age 55-64	-0.8571*** (5.13)	-0.6471*** (3.13)		
Single	0.1741** (2.01)	0.3005*** (2.86)	0.6423*** (2.90)	0.8097** (2.46)
<b>Educational attainment</b>				
Vocational	-0.1283 (1.21)	-0.2179* (1.85)	-0.3027 (1.54)	-0.2366 (0.88)
High School	0.0056 (0.05)	-0.1082 (0.87)	-0.1363 (0.68)	-0.1596 (0.63)
College	-0.171 (1.00)	-0.1446 (0.66)	-0.9164** (2.14)	-1.3293** (2.11)
University	-0.5506*** (3.09)	-0.7610*** (3.15)	-0.8172** (2.25)	-1.2790** (2.31)
Ever unemployed (2001-02)	0.8449*** (8.05)	0.8631*** (7.18)	0.2959** (2.29)	0.3586** (2.24)
Constant	-0.5229*** (3.24)	-0.7779*** (4.76)	-0.7644*** (2.79)	-1.1434*** (2.78)
	2975.00	1867.00	623.00	413.00
Entity (location) dummy	Yes	Yes	Yes	Yes
Observations	2,975	1,867	623	413

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Standard errors are corrected for stratification and intra-cluster correlation.

<sup>1</sup>Those who were in the 15-24 age bracket in 2001.

## *Wages*

For estimating wage effects, we use a simple wage regression model of the following form:

$$\log(w_{it}) = \alpha + \beta X_{it} + \gamma Z_{i(t-1)} + \varepsilon_{it} \quad (1)$$

for individual  $i$ , at year  $t=2004$ .  $X$  includes the usual characteristics of individual  $i$ , while  $Z$  is a vector of indicators of labor market activities in the past 3 years period, including a previous spell of unemployment. We also examine whether there are important interactions between labor market outcomes and education, in general whether scarring is much more severe for less educated workers.

Table 5 reports the OLS regression results for earnings. The results are based on a standard Mincer regression where the log of wages is a function of age and age-squared (proxies of experience), educational attainment, and other control variables. Columns (1) to (3) use the full sample of employed individuals, progressively allowing for a fuller set of control variables. Column (3), for example, controls for both industry and sector of employment. Meanwhile, columns (4) to (6) use sub-samples similar to the previous tables.

One important issue in estimating this model is the lack of control for the likely endogeneity of the unemployment history. That is, it is usually argued that because being unemployed in any previous period might not be orthogonal to wage determination. In the context of this model, if some time-unobservable individual characteristics affect both employment status and wages, then the estimated effect of previous employment on wages might be biased. However, if most of the selection is driven by observable individual characteristics, the bias in the estimated effect on wage growth might not be very severe. Unfortunately, the relatively short time span covered by our panel data presents us from properly accounting for endogeneity. We thus restrict our analysis to a standard OLS earnings regression.

We are unable to establish, among young workers, any significant link between the previous experience of joblessness and future wage levels, although for all workers as a group, having suffered a spell of unemployment is correlated with lower wages. The impact can be considerable. The results suggest that the wage levels of those who were previously unemployed are some 10 percent lower than those of their counterparts, holding other things constant.

Table 5. Earnings Regressions in 2004 By Selected Sub-Samples  
(OLS regression coefficients; t-statistics in parentheses)

	(1) All workers	(2) All workers	(3) All workers	(4) All male workers	(5) All young workers <sup>1</sup>	(6) All young male workers <sup>1</sup>
Male	0.1959*** (5.40)	0.1821*** (5.14)	0.1671*** (5.08)		0.0067 (0.07)	
Age	0.0204* (1.72)	0.0224* (1.94)	0.0305*** (2.95)	0.0287* (1.92)		
Age-squared	-0.0002* (1.69)	-0.0003** (1.98)	-0.0004*** (2.87)	-0.0003* (1.95)		
Single	0.03 (0.74)	0.00 (0.02)	0.00 (0.03)	0.03 (0.43)	0.2913** (2.46)	0.33 (1.35)
<b>Educational attainment</b>						
Vocational	0.1178*** (2.62)	0.0674 (1.51)	0.0451 (1.06)	0.0575 (1.19)	0.2069* (1.70)	0.2991** (2.39)
High School	0.1667*** (2.90)	0.1151** (2.17)	0.1027** (2.06)	0.1059 (1.56)	0.0638 (0.45)	0.0806 (0.49)
College	0.3218*** (4.42)	0.2903*** (3.76)	0.2905*** (3.91)	0.1394 (1.51)	0.0705 (0.55)	0.123 (0.99)
University	0.6900*** (9.26)	0.6332*** (9.45)	0.6283*** (9.29)	0.5494*** (5.70)	0.5445*** (3.83)	0.5307*** (3.24)
Ever unemployed (2001-02)	-0.1185*** (2.60)	-0.0985** (2.16)	-0.1016** (2.39)	-0.1380** (2.59)	-0.089 (1.07)	-0.0627 (0.57)
Constant	5.4312*** (21.02)	5.1655*** (18.61)	5.0999*** (21.08)	5.5426*** (16.29)	5.7227*** (30.97)	5.6215*** (21.31)
Entity (location) dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	Yes	No	No	No
Sector dummies	No	No	Yes	No	No	No
Observations	1,816	1,798	1,797	1,208	305	205
R-squared	0.16	0.22	0.28	0.13	0.15	0.14

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%  
Standard errors are corrected for stratification and intra-cluster correlation.  
<sup>1</sup>Those who were in the 15-24 age bracket in 2001.

### *Does the scarring effect vary with individual characteristics?*

The overall results from the previous analysis show that education and experience shelters workers from unemployment and improve earnings. The results also show that on average those who experience unemployment spells tend to have their wages and employment opportunities lower than others who have similar age and education characteristics but have more favorable employment histories.

To what extent there are differences across skills and age in the impact of previous bad outcomes on current employment and wage outcomes among workers in Bosnia and Herzegovina could be also be tested. The results in Tables 4 and 5 and Appendix Tables 4 and 5 imply that these effects are higher for adults than youth. This possibly reflects a larger loss of specific human capital among adults compared to young workers as previously found in the literature.

We can also test the effects for different skills groups. To do so, a slight modification of the model estimated in the previous section could be used.

$$\log(w_{it}) = \alpha + \beta X_{it} + \gamma Z_{i(t-1)} X_{it} + \varepsilon_{it} \quad (3)$$

The interaction between the X and Z allows estimating the effect on previous unemployment spells on individuals with different skills. Table 6 shows the estimated

coefficients for 3 different education levels: lower than primary, vocational and secondary, and post secondary education. The effect on wages and unemployment of either being ever unemployed or jobless is often large and significant. The penalty is highest among the most educated. Among those with post secondary education, experiencing an adverse employment shock reduces future wages by 30 percent. The effect on future unemployment also becomes steeper for those with high skills compared to low educational attainment.

The results suggest that some strong signaling effect could be in play. Experiencing unemployment among highly educated workers could reveal poor quality, compared to unemployment among low skilled that might be subject to less selection.

Table 6. Unemployment Scar by Education Group: Impact on Unemployment and Wages  
(Coefficient estimates from earnings regression and probit regression)

	Impact on Wages (OLS)		Impact on Unemployment (Probit)	
	Ever Jobless	Ever Unemployed	Ever Jobless	Ever Unemployed
Educational attainment				
Unfinished primary and primary education	-0.1273 (1.45)	-0.1115 (1.40)	1.2043*** (7.39)	0.9289*** (5.52)
Vocational and secondary education	-0.1059* (1.87)	-0.1454*** (2.96)	1.2377*** (12.65)	0.7549*** (6.62)
College and university education	-0.2868*** (3.45)	-0.1885** (2.01)	1.7337*** (6.10)	1.1470*** (3.69)

T statistics in parentheses. Standard errors are corrected for stratification and intra-cluster correlation.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## V. Concluding Observations

The stylized facts on youth unemployment have been drawn mostly from labor market experiences in advanced economies. Relatively less is known about scarring in transition economies, despite a difficult transition period over the last decade and despite the prominence of labor market adjustment issues in these economies. Furthermore, little is known about the lasting consequences of unemployment and inactivity in these countries. This has been due in large part to the relative scarcity of longitudinal data. In this paper, we use panel data from Bosnia and Herzegovina to examine youth unemployment over the 2001 to 2004 period.

Three main conclusions are supported by this analysis:

First, it is clear that young people face several barriers in transition to work in Bosnia and Herzegovina. This difficulty is reflected in high incidence of unemployment among youth compared to adults. It is also reflected in long duration in the transition

from school to work. Younger workers are also more likely to go into inactivity or unemployment or are less likely to transition out of inactivity, holding other things constant.

Second, initial spells of unemployment or joblessness appear to have lasting unfavorable effects. Early difficulties in the transition to work have dynamic implications and could reduce the ability to better integrate youth into the labor market. The micro evidence indicates that the experience of joblessness raises the probability of experiencing another spell by up to 30 percent even after 2 years despite controlling for age, education, marital status and location. Being previously unemployed also lowers future wages by an average 10 percent. There is no evidence, however, that the youth are at a greater risk of scarring, or suffer disproportionately worse outcomes from initial spells of unemployment and joblessness, compared to other age groups. If anything, the wage and unemployment scar may be larger in magnitude for much older workers.

Third, educational attainment is generally associated with more favorable labor market outcomes. Educated workers are less likely to be jobless and are less likely to transition from employment into joblessness. However, the penalty from jobless spells may also be higher for more educated workers. We speculate that this may be due to stigma or signaling, consistent with previous findings.

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Appendix Table 1. Transition Probabilities By Age

Country	Year	Employment to			Unemployment to			Labor Force to		
		Employment	Out of Labor Force	Unemployment	Employment	Out of Labor Force	Unemployment	Employment	Unemployment	Out of Labor Force
Bulgaria	1991-1992				36.9	3.1				
All					42.5	0.0	57.5			
Men, age 30 or younger					33.3	3.6	63.1			
Women, age 30 or younger										
Estonia	1994		6.0	5.0	41.0	12.0		12.0	3.0	
All										
Men, age 15-24		83.7	8.8	7.5	48.6	16.2 <sup>1</sup>	35.2	18.7	6.8	74.5
Women, age 15-24		81.2	4.5	14.3	47.6	28.5 <sup>1</sup>	23.9	18.6	10.3	71.1
Poland	1997-2004		3.6	3.2	22.9	14.5				
All										
Age 15-24		85.9	5.5	8.6	27.4	11.6	61.0			
Poland	2000-2004				19.4	13.8				
All					22.7	11.2	66.1			
Age 15-24										
Russia	1995-1996		6.2	5.6	39.5	14.5		7.6	3.4	
All										
Age 18-24		81.3	8.9	9.8	41.4	18.0	40.6	20.1	12.5	67.4
Turkey	2000-2001		17.0	3.5	45.7	8.1		11.6	2.3	
All										
Age 15-19		58.2	35.0	6.8	30.9	15.5	53.6	11.8	3.3	85.0
Age 20-24		72.3	22.1	5.6	47.7	7.8	44.5	12.5	4.8	82.7
Men, age 15-19		69.6	23.7	6.7	41.7	15.0	43.3	16.6	4.3	79.2
Men, age 20-24		78.5	14.1	7.4	59.5	1.3	39.2	24.0	12.0	63.9
Women, age 15-19		49.3	41.7	9.0	12.9	6.5	80.7	6.6	2.4	91.0
Women, age 20-24		68.2	28.7	3.1	25.0	10.0	65.0	7.2	2.4	90.4

Sources: Bulgaria - Jones and Kato (1997); Estonia - Eamets (2001); Poland (1997-2004) - Bulowski and Landowski (2005a, 2005b); Russia - Foley (1997); Turkey - Tasci and Tansel (2005).

<sup>1</sup>Small sample size.

Appendix Table 2. Multinomial Logit Model: Labor Market Transitions: 2001-2002  
(Standard errors in parentheses)

	Employment Transitions		Unemployment Transitions		Inactivity Transitions	
	to Inactivity	to Unemployment	to Inactivity	to Employment	to Unemployment	to Employment
<b>Men</b>	-0.815*** (0.165)	0.278 (0.229)	-0.926** (0.432)	0.823** (0.350)	0.779*** (0.157)	0.892*** (0.174)
<b>Age (years)</b>						
25-44	-0.951*** (0.315)	-0.472 (0.329)	-0.200 (0.325)	0.328 (0.409)	0.542** (0.263)	1.100*** (0.288)
44-54	-0.630* (0.335)	-1.333*** (0.432)	0.246 (0.535)	0.784 (0.533)	-0.118 (0.288)	0.953*** (0.352)
55+	0.290 (0.340)	-1.442** (0.610)	2.410** (1.201)	1.783 (1.310)	-2.616*** (0.421)	-0.269 (0.399)
<b>Single</b>	0.146 (0.262)	0.708*** (0.244)	0.121 (0.341)	-0.821** (0.346)	0.269 (0.247)	0.374 (0.308)
<b>Education</b>						
Vocational	-0.657*** (0.213)	-0.333 (0.257)	-0.070 (0.347)	-0.080 (0.352)	1.205*** (0.203)	0.771*** (0.172)
High School	-0.547* (0.324)	-0.703** (0.282)	0.057 (0.453)	0.172 (0.425)	0.646*** (0.198)	0.336 (0.226)
College	-1.269*** (0.411)	-1.070** (0.539)	-0.574 (1.120)	0.274 (0.895)	1.713** (0.705)	0.133 (0.614)
University	-3.675*** (1.038)	-1.108** (0.453)	-33.627*** (1.010)	0.818 (1.133)	0.257 (1.042)	1.180** (0.550)
<b>Constant</b>	-0.224 (0.422)	-1.873*** (0.505)	0.108 (0.629)	-0.191 (0.669)	-2.573*** (0.392)	-2.037*** (0.380)
Number of Obs		2126		422		2439

Source : Reproduced from Tiongson and Yemtsov (2006).

Note : The following are base groups: Female, 15-24 years of age, elementary or unfinished elementary school education, Banja Luka municipality. Standard errors are corrected for stratification and intra-cluster correlation.

Appendix Table 3. Multinomial Logit Model: Labor Market Transitions: 2001-2004  
(Standard errors in parentheses)

	Employment Transitions		Unemployment Transitions		Inactivity Transitions	
	to Inactivity	to Unemployment	to Inactivity	to Employment	to Unemployment	to Employment
<b>Men</b>	-0.925*** (0.159)	0.285 (0.207)	-1.926*** (0.440)	-0.252 (0.476)	1.012*** (0.163)	1.166*** (0.167)
<b>Age (years)</b>						
25-44	-0.484 (0.300)	-0.814*** (0.283)	0.341 (0.398)	0.065 (0.371)	0.645*** (0.239)	0.458 (0.280)
44-54	0.476 (0.331)	-1.130*** (0.397)	0.934 (0.568)	0.535 (0.634)	-0.538* (0.294)	-0.267 (0.289)
55+	1.475*** (0.386)	-3.524*** (1.090)	24.235*** (0.887)	22.287 (0.887)	-3.163*** (0.531)	-1.459*** (0.352)
<b>Single</b>	0.130 (0.245)	-0.118 (0.231)	-0.046 (0.335)	-0.553 (0.379)	0.748*** (0.209)	0.362 (0.283)
<b>Education</b>						
Vocational	-0.602*** (0.189)	-0.380 (0.237)	-0.030 (0.373)	1.190** (0.457)	0.428** (0.168)	0.818*** (0.143)
High School	-1.141*** (0.250)	-0.782** (0.317)	0.428 (0.464)	0.761 (0.516)	0.113 (0.208)	0.478** (0.184)
College	-0.944*** (0.349)	-0.328 (0.395)	-1.455 (1.485)	1.715* (0.996)	2.277*** (0.783)	0.943 (0.614)
University	-2.339*** (0.484)	-1.833*** (0.532)	-33.714*** (1.308)	0.766 (1.134)	0.487 (0.939)	0.780* (0.418)
<b>Constant</b>	-0.869** (0.432)	-0.783** (0.388)	1.162 (0.905)	0.821 (0.781)	-1.926*** (0.341)	-1.746*** (0.342)
Number of Obs		2107		421		2306

Source : Reproduced from Tiongson and Yemtsov (2006).

Note : The following are base groups: Female, 15-24 years of age, elementary or unfinished elementary school education, Banja Luka municipality. Standard errors are corrected for stratification and intra-cluster correlation.

Appendix Table 4. Previous Jobless Spell and the Probability of Unemployment in 2004  
(Probit regression coefficients; t-statistics in parentheses; includes only those in the labor force)

	(1) All	(2) All men	(3) Young <sup>1</sup>	(4) Young men <sup>1</sup>
Male	0.0513 (0.65)		-0.0938 (0.77)	
<b>Age groups</b>				
Age 25-44	-0.1304 (1.28)	-0.0849 (0.64)		
Age 45-54	-0.3073** (2.49)	-0.2609* (1.72)		
Age 55-64	-0.6668*** (3.72)	-0.4840** (2.21)		
Single	0.0624 (0.66)	0.1257 (1.16)	0.5036** (2.03)	0.426 (1.10)
<b>Educational attainment</b>				
Vocational	0.0336 (0.30)	-0.115 (0.86)	-0.1394 (0.66)	-0.0717 (0.24)
High School	0.0636 (0.60)	-0.1336 (1.05)	-0.1508 (0.78)	-0.2245 (0.95)
College	0.1093 (0.62)	0.0612 (0.28)	-0.9157** (2.10)	-1.2887* (1.94)
University	-0.3141 (1.65)	-0.6553** (2.43)	-0.8450** (2.32)	-1.3217** (2.38)
Ever jobless (2001-02)	1.2297*** (14.60)	1.1731*** (10.64)	0.9788*** (4.38)	1.2401*** (5.22)
Constant	-1.5409*** (8.40)	-1.4672*** (8.01)	-1.4710*** (3.85)	-1.7942*** (3.40)
Entity (location) dummy	Yes	Yes	Yes	Yes
Observations	2,975	1,867	623	413

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%  
Standard errors are corrected for stratification and intra-cluster correlation.

<sup>1</sup>Those who were in the 15-24 age bracket in 2001.

Appendix Table 5. Previous Jobless Spell and the Probability of Joblessness in 2004  
(Probit regression coefficients; t-statistics in parentheses; includes working-age population only)

	(1) All	(2) All men	(3) Young <sup>1</sup>	(4) Young men <sup>1</sup>
Male	-0.3982*** (8.07)		-0.5165*** (5.73)	
<b>Age groups</b>				
Age 25-44	-0.2721*** (2.78)	-0.2416* (1.93)		
Age 45-54	-0.187 (1.62)	-0.1859 (1.37)		
Age 55-64	0.3225*** (2.67)	0.3687** (2.54)		
Single	-0.0558 (0.65)	0.0763 (0.81)	0.1084 (0.64)	0.5215 (1.30)
<b>Educational attainment</b>				
Vocational	-0.1797** (2.34)	-0.2045* (1.90)	-0.4167*** (2.67)	-0.4017* (1.68)
High School	-0.0898 (1.27)	-0.1512 (1.56)	-0.0423 (0.30)	-0.0985 (0.58)
College	-0.2960** (2.24)	-0.0817 (0.47)	-1.0600** (2.32)	-0.9214 (1.24)
University	-0.6096*** (4.36)	-0.5236*** (2.88)	-0.9490*** (3.15)	-0.8069** (2.17)
Ever jobless (2001-02)	1.5874*** (25.50)	1.4307*** (16.60)	1.2955*** (8.22)	1.3848*** (6.78)
Constant	-0.6310*** (4.39)	-1.0533*** (7.00)	-0.4336* (1.77)	-1.4596*** (3.07)
Entity (location) dummy	Yes	Yes	Yes	Yes
Observations	4,832	2,442	1,119	599

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%  
Standard errors are corrected for stratification and intra-cluster correlation.

<sup>1</sup>Those who were in the 15-24 age bracket in 2001.