

**[Marco Manacorda](#), Furio Camillo Rosati, Marco Ranzani  
and Giuseppe Dachille**

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ORIGINAL ARTICLE

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# Pathways from school to work in the developing world

Marco Manacorda<sup>1,2,3,4</sup>, Furio Camillo Rosati<sup>4,5,6,7,8\*</sup>, Marco Ranzani<sup>6,9</sup> and Giuseppe Dachille<sup>5,6,7</sup>

\* Correspondence:

frosati@ucw-project.org

<sup>4</sup>IZA, Bonn, Germany

<sup>5</sup>University of Rome 'Tor Vergata', Rome, Italy

Full list of author information is available at the end of the article

## Abstract

This paper uses novel micro data from the ILO-STWT surveys to provide evidence on the duration, endpoint, and determinants of the transition from school to work in a sample of 23 low- and middle-income countries around the world. The paper analyzes both transition to the first job and to the first stable job. It also illustrates the effects of several correlates, including age of school leaving, gender, work while attending school, and others on the probability of transition and on its duration. The negative effects of low levels of human capital and high levels of population growth on job finding rates are offset by widespread poverty and lack of unemployment insurance, which lead overall to faster transitions in low-income compared to middle-income economies. By lowering reservation wages and speeding transitions, however, these forces lead to worse matches, as measured by the probability of attaining stable employment in the long run, highlighting the trade-off that policy makers face in developing countries.

**JEL Classification:** J64, 057

**Keywords:** Transition duration, Hazard model, Youth unemployment, Developing countries, School-to-work transition

## 1 Introduction

In this paper, we present novel evidence on transition durations from school to work and on the probability of ever finding employment and stable employment in a sample of 23 low- and middle-income countries around the world. To do so we exploit unique and yet unutilized micro data from the ILO School to Work Transition (STWT) surveys that collect retrospective information on work histories on a sample of around 35,000 individuals aged 15 to 29 around the world.

Young individuals are at particular risk of unemployment and joblessness. This is true both in developed and in the developing world (ILO 2013, 2014). In addition to joblessness, underemployment, informality, low wages, and lack of quality employment affect youth labor markets, especially in low-income countries.

A critical stage in an individual's working life is the transition leading from school to the first employment spell. Lengthy transitions impose an array of individual and possibly social costs and they might potentially lead to worse job matches, either due to the effects of prolonged unemployment spells on human capital stock or to employers perceiving long unemployment spells as a signal of low productivity. Long transitions

might even translate into worse labor market outcomes in the long term, i.e., lower employability, lower wages, and/or poor quality jobs.

One should not necessarily assume though that fast transitions are an indication of good matches or are individually or socially desirable. Short durations might be the result of low reservation wages or poor prospects of finding decent employment and in turn lead to long-term underemployment and poor quality employment.

Some evidence exists on the length of transitions from school to work in more advanced and, to a minor extent, in emerging economies (see for example Cunningham and Salvagno 2011 and OECD 1998, Quintini et al. 2007, Quintini and Martin 2014, Ryan 2001 for high-income countries). Much of this evidence points to the role of lack of adequate skills as an obstacle to timely and successful transitions. Considerably less is known, however, about the characteristics and key correlates of transition from school to work in developing countries. As the majority of youth worldwide live in low- and middle-income countries, characterizing these transitions and understanding their determinants is of primary importance.

There is convincing evidence from more advanced economies on the negative effect of protracted job search and unemployment, especially during youth. Long-term unemployment has itself adverse consequences on the probability of finding work through negative state dependence (Machin and Manning 1999), and post-unemployment wages appears to be negatively affected by the length of the unemployment period (see for example Card et al. 2007, Lalive 2007, Schmieder et al. 2014). A number of related studies also show evidence of the scarring effects of joblessness, which can persist in an individual's life (see Ellwood 1982, Gregg and Tominey 2005, Mroz and Savage 2006, Bender and von Wachter 2006).

Economic theory rooted in the canonical search and matching model (Pissarides 2000) suggests that the demographic bulges and the low arrival rate of high quality wage offers that characterize many developing economies will negatively affect employment prospects in the long run, although their effects on transition durations are ambiguous. While demographic pressure and the paucity of decent job opportunities are likely to mechanically lead to lower job offer arrival rates and longer transition durations, these will also push workers to accept low wages and low quality jobs. As better opportunities than the current ones are unlikely to materialize in the future, there are disincentives to wait when job-to-job mobility is costly, fostering circles of poor quality employment and underemployment.

Similarly, widespread poverty and lack of unemployment insurance that also characterize low-income economies will likely lower reservation wages and speed the transition process, as well as possibly directly lead to worse labor market outcomes in the long run.

In order to systematically investigate the length and endpoint of the transition process from school to the labor market and its determinants in low- and middle-income countries, in this work we use retrospective data on work histories since the time of leaving school on a sample of around 35,000 individuals from Africa, Asia, Latin America, and the Caribbean and Eastern Europe. These data are clearly right-censored, as not all individuals will have transited to employment by the time of the survey. More importantly, not all of those who are observed not having transited at the time of the survey will necessarily ever transit to employment, let alone to high quality employment. In order to account for this, we fit to the data a split-cure model (Schmidt and Witte 1989) where we simultaneously parameterize the probability of ever

transiting to employment (or stable employment) and the duration of unemployment. This allows us to obtain estimates of baseline hazard rates net of differences in socio-economic characteristics of the population across countries.

In our sample of countries, and similar to high-income countries, hazard rates display pronounced negative duration dependence. While transition durations are on average not very dissimilar from those observed in high-income countries, this masks substantial heterogeneity across regions. Transition durations are the lowest in low-income countries in Sub-Saharan Africa and Asia and the Pacific and the highest in middle-income countries in Latin America and the Caribbean and in particular in the Middle East and North Africa. We also find that in some low- and middle-income countries a substantial fraction of individuals are predicted to never transit to employment.

We next investigate the determinants of the heterogeneity in the transition duration and the probability of ever transiting to employment or to stable employment across individuals and countries. Those with higher levels of education (proxied by higher school-leaving age) and those with work experience while in school transit faster and are more likely to ever find employment than early school leavers, possibly pointing to the role of early human capital accumulation and education in shaping transitions. Women are less likely to transit and, if they transit, generally do so at a slower rate than men, although we remain agnostic on whether this reflects preferences or constraints.<sup>1</sup>

We show that, despite the extreme pressure put on labor markets by demographic bulges that negatively affect job finding rates especially in Sub-Saharan Africa, transition durations are markedly lower in low-income countries compared to middle- and high-income countries due to a combination of widespread poverty and lack of unemployment insurance, both of which negatively affect reservation wages. These same forces appear to lead to a lower probability of finding employment and stable employment in the long run. Although one has to be cautious in drawing any causal inference from this evidence, these results suggest that shorter durations driven by low reservation wages in low-income countries have potentially long-run welfare costs in terms of a reduced probability of achieving high quality employment.

We also find some suggestive evidence that additional years of compulsory education are associated with shorter durations to the first—and in particular the first stable—job. This suggests a role for educational policies in smoothing the transition to employment and in particular quality employment.

The rest of the paper is organized as follows. Section 2 presents the data. Section 3 presents simple descriptive statistics on youths' labor market status across 28 countries for which the ILO survey data are available. Section 4 presents estimates of the split sample model for 23 (of the 28) countries for which work histories can be reliably derived from the surveys and investigates the individual and macro correlates of such phenomena. Section 5 concludes.

## **2 Data: the ILO School To Work Transition surveys**

Through the Work4Youth partnership with The MasterCard Foundation, the International Labour Organization has recently embarked on an unprecedented data collection effort on youths' labor market outcomes in a sample of 28 low- and middle-income countries around the world. This effort is in response to the paucity of data, in particular of systematically comparable data, on labor market outcomes and transitions

from many non-high-income countries. The list of countries, including sample sizes, geographical coverage, and sample period is presented in Table 10 in Appendix. The survey includes countries in five regions: from middle-income countries in Latin American and the Caribbean (LAC: Brazil, Colombia, El Salvador, Jamaica, Peru), Eastern Europe and Central Asia (EECA: Armenia, Kyrgyz Republic, Republic of Macedonia, Republic of Moldova, Russian Federation, Ukraine), and Middle East and North Africa (MENA: Egypt, Jordan, Occupied Palestinian Territory, Tunisia) to low- and very low-income countries in Asia and the Pacific (AP: Bangladesh, Cambodia, Nepal, Samoa, Vietnam) and Sub-Saharan Africa (SSA: Benin, Liberia, Madagascar, Malawi, Tanzania, Togo, Uganda, Zambia).

The surveys were conducted between the third quarter of 2012 and the third quarter of 2013. The data are nationally representative with the exception of the Russian Federation, Colombia, and Peru.

The surveys collect a large set of information on current labor market status plus selected retrospective information on labor market experiences for a nationally representative sample of individuals aged 15–29. Retrospective information is collected since the time the individuals left school or since the first labor market experience for those who never attended school. This is integrated with information on current individual- and household-level characteristics (such as age, gender, highest education level completed, age left education, area of residence, etc.).

Retrospective labor market information covers all past spells of employment and job search. For each spell, the data report the start and end months and years. Note that the surveys only collect information on past employment spells among individuals not currently in education. Information on work during school for those not currently in education is limited to a variable for whether or not an individual worked while attending school; there is no information on labor market experience for those currently in school.

No information is available on wages or earnings other than for the current employment spell. There is also little information on individual and household characteristics in the past or on how they evolved over time.<sup>2</sup>

As the ILO-STWT surveys only collect information on labor market spells from the time the individual left school, we cannot identify employment spells that happened and concluded *before* leaving school (although, as said, we have an indicator on whether individuals worked or not while attending school). More importantly, for each employment spell that started before leaving school but that was ongoing at the time the individual left school, the survey reports as a start date the month following the one of leaving school.<sup>3</sup> In practice, this means that one cannot distinguish genuine direct transitions from school to work from apparent transitions, i.e., transitions that happened before leaving school and that continued after the individual left school. For this reason, one needs to be very cautious in interpreting spells recorded as starting just after leaving school as direct transitions from school to work.

In the following section, we present descriptive statistics on current employment status. In Section 4, we turn to an analysis of the transition from school to work. Section 5 concludes.

### **3 Labor market and education outcomes at the time of the survey**

Labor market and education outcomes for young individuals aged 15–29 in each of the 28 countries are reported in Table 1. In the remainder of the analysis, we weigh

**Table 1** Current labor market and education outcomes, individuals aged 15–29

Region	Country	Unemployment rate	Employment to population ratio	Labor force participation	Education participation
Asia and the Pacific	Bangladesh	10.3	37.9	42.3	23.5
	Cambodia	2.1	74.1	75.7	33.3
	Nepal	19.2	38.5	47.7	59.6
	Samoa	16.7	21.7	26.1	36.7
	Vietnam	2.8	64.1	66.0	31.2
Average		8.4	48.0	51.9	29.9
Eastern Europe and Central Asia	Armenia	30.2	30.7	43.9	45.3
	Kyrgyz Rep.	4.0	58.3	60.7	41.1
	Macedonia, FYR	43.3	27.9	49.3	47.0
	Moldova, Rep.	14.1	31.7	36.9	42.9
	Russian Fed.	11.7	53.6	60.7	36.1
	Ukraine	16.8	44.7	53.8	41.6
Average		13.2	50.8	58.4	37.8
Latin America and the Caribbean	Brazil	17.9	53.9	65.7	36.8
	Colombia	12.5	57.8	66.1	45.3
	El Salvador	19.9	41.8	52.2	36.2
	Jamaica	33.0	39.9	59.5	35.2
	Peru	10.6	54.0	60.4	44.7
Average		16.4	54.2	64.9	39.0
Middle East and North Africa	Egypt	15.7	45.6	54.1	28.9
	Jordan	24.1	29.9	39.4	42.9
	OPT	37.0	24.3	38.5	44.8
	Tunisia	31.8	31.2	45.7	38.1
Average		18.0	43.0	52.2	30.8
Sub-Saharan Africa	Benin	9.1	27.6	30.4	49.3
	Liberia	19.8	49.3	61.4	60.5
	Madagascar	1.3	78.9	79.9	22.1
	Malawi	7.8	66.5	72.1	36.2
	Tanzania	21.1	43.6	55.3	29.0
	Togo	7.5	62.4	67.4	39.9
	Uganda	5.0	63.1	66.4	39.5
	Zambia	17.7	43.5	52.8	40.4
Average		11.5	55.3	61.9	34.8
Tot. average		13.0	50.9	58.3	34.8

Notes. The table reports the labor market and enrollment status at the time of the survey. All data are weighted by sampling weights. Region and worldwide averages are obtained using population weights. Source: ILO-STWT surveys

observations for each country by sampling weights. This allows us to obtain estimates of the population parameters in each of the countries analyzed.

The average (population weighted) unemployment rate across all countries is 13% (column 1). This is in contrast to an average unemployment rate for 15–29-year-olds across the OECD of 16.2% in 2012 (ILO, 2013). Unemployment is the lowest in low-income countries, in particular SSA and AP (11 and 8%, respectively) and the highest in MENA (18%) and LAC (16%).<sup>4</sup>

Unemployment is only one indicator of young persons' fortunes in the labor market. Table 2 reports data on the type of jobs held by employed youth. Again, some regional patterns are apparent: self-employment and unpaid family work are more prevalent in low-income countries (46 and 25%, respectively, in SSA relative to a sample mean of 25 and 18%, respectively); and wage employment is less likely in low-income countries (28% in SSA relative to a sample mean of 56%) compared to high-income countries. In contrast, the fraction of young workers working for a wage is as high as 87% in EECA.

In order to complement information on the quality of jobs held, the last column of Table 2 reports information on the fraction of working youth in stable employment, defined as wage work with an indefinite contract or with a contract of at least 12 months' duration.<sup>5</sup> Again, not surprisingly, the fraction of youth in stable employment tends to be higher in middle-income countries than in low-income countries, reflecting patterns of stable and wage employment in the adult population. EECA countries in particular show the highest rates of stable employment (79%), followed by countries in LAC (62%).

In sum, youth unemployment is widespread in middle-income countries and so are, comparatively speaking, high quality jobs, while the reverse is true in low-income countries. These results point to the direction of lack of high quality jobs, widespread poverty, and lack of social insurance possibly driving both low unemployment and low quality employment among youth in low-income countries. We try to assess the effect of these variables more formally in the next section through a focus on transitions from school to work.

#### 4 Transition from school to work

Higher incidence of youth unemployment in middle-income countries—and in particular in MENA countries—compared to low-income countries can be due to lower inflows into employment or higher outflows out of employment and higher turnover. In the rest of the paper we focus on accession rates and in particular on the transition to the first employment spell and to the first spell of stable employment. We focus on individuals who left education; we disregard those who never attended school, for whom the concept of school to work transition clearly does not apply.<sup>6</sup>

Among those who left education, a sizeable fraction (28%, i.e., 45% of those who ever attended) left education before age 15 (see column 2 of Table 3). As expected, this fraction is particularly high in SSA (65% of those who ever attended).

Table 3 presents also information on completed transitions. On average, 38% of youth aged 15–29 report having attended school and having had one work experience since the time they left education (column 5). This fraction is the lowest in MENA (27%). A substantial fraction of individuals—around 20%—also worked while in school (column 4).

Note that if around 61% of those out of school had a job since leaving education (this is 37.6 in column 5 divided by 61.2 in column 1), only about 31% of these individuals ( $=19.2/61.2$ ) had at least one spell of stable employment; this fraction is unsurprisingly the lowest in SSA (14%).

Finally, a substantial share of individuals had no work experience after leaving school (16.5%, this is the sum of columns 7 and 8). Nineteen percent ( $=11.8/61.2$ ) of individuals have been continuously out of the labor force since the time of leaving school while a small fraction ( $8\% = 4.7/61.2$ ) had at least one spell of job search or training. As illustrated below, youth continuously out of the labor force are disproportionately women.

**Table 2** Characteristics of jobs currently held, individuals aged 15–29

Region	Country	Fraction of employed individuals by type of employment				Fraction in stable employment
		Wage employment	Self-employment	Unpaid family worker	Other	
Asia and the Pacific	Bangladesh	54.6	32.14	11.15	2.11	40.5
	Cambodia	34.4	18.9	46.8	0	25.1
	Nepal	40.6	17.4	40.6	1.4	31.9
	Samoa	71.4	27.5	1.1	0	59.4
	Vietnam	58.3	15.9	25.2	0.5	43.0
Average		53.4	25.0	20.2	1.4	39.7
Eastern Europe and Central Asia	Armenia	74.9	8.2	16.9	0	65.5
	Kyrgyz Rep.	40.1	18.0	41.9	0	33.2
	Macedonia, FYR	66.7	7.2	21.9	4.2	50.9
	Moldova, Rep.	80.1	18.0	1.9	0	76.4
	Russian Fed.	90.6	8.5	0.9	0	80.6
Ukraine	85.7	10.2	3.2	0.9	81.6	
Average		87.4	9.3	3.0	0.2	78.9
Latin America and the Caribbean	Brazil	74.9	20.6	2.9	1.7	69.8
	Colombia	75.8	21.0	2.8	0.5	56.7
	El Salvador	56.9	20.9	22	0.2	43.8
	Jamaica	68.2	24.6	0	7.2	57.5
	Peru	69.5	20.0	10.3	0.2	23.9
Average		74.0	20.6	4.1	1.4	62.1
Middle East and North Africa	Egypt	73.9	8.9	17.2	0	16.3
	Jordan	93.8	4.5	1.7	0	89.3
	OPT	82.2	8.8	8.9	0.1	75.5
	Tunisia	76.0	7.8	15.9	0.4	58.8
Average		75.4	8.5	16.1	0.0	25.7
Sub-Saharan Africa	Benin	11.7	56.3	21.4	10.6	9.4
	Liberia	11.7	46.5	32	9.8	8.3
	Madagascar	13.0.	33.8	52.8	0.4	8.2
	Malawi	20.8	63.2	15.5	0.5	8.2
	Tanzania	35.9	42.8	18.2	3.2	27.9
	Togo	14.5	45.1	30.5	10.0	10.8
	Uganda	24.6	53.3	21.4	0.6	19.6
Zambia	39	31.2	26.8	3.0	26.6	
Average		27.8	46.0	25.4	2.8	18.7
Tot. average		56.5	24.7	18.3	2.1	42.8

Notes. See notes to Table 1

#### 4.1 Duration analysis

Data in Table 3 are right-censored as individuals who have not transited to employment by the time of the survey might do so in the future. To circumvent this problem, we fit a duration model to the data (see Lancaster 1990 and Jenkins 2005), separately by country. This allows us to compute duration to employment—overall and by sub-



**Table 3** Labor market and education histories, individuals aged 15–29

Region	Country	Left education	Left education before age 15	Never in education	Worked while in school	Individuals who have left education			
						Worked since leaving school	Stable work since leaving school	No work since leaving school but searched/training	Never in labor force
	Bangladesh	76.5	n.a.	13.9	12.8	31.4	13.8	2.5	28.2
	Cambodia	66.7	50.0	2.6	40.6	61.7	27.6	0.6	1.9
	Nepal	40.4	27.7	7.9	29.3	23.4	9.4	2.2	6.8
	Samoa	63.3	20.3	0.1	3.9	29.5	25.1	1.8	30.6
	Vietnam	68.8	48.8	2.2	19	61.4	40.2	0.9	3.7
Average		64.4	33.8	1.5	20.2	43.7	26.2	1.3	17.2
Eastern Europe and Central Asia	Armenia	54.7	7.00	0.3	11.9	34.5	25.8	9.2	10.6
	Kyrgyz Rep.	58.9	11.4	0.6	25.8	46.9	19.4	2.1	9.0
	Macedonia, FYR	53.0	21.3	0.9	14.0	27.0	20.4	17.4	6.8
	Moldova, Rep.	57.1	14.1	0.5	39.3	46.7	8.1	2.00	5.3
	Russian Fed.	63.9	4.4	0.0	23.4	50.0	44.6	4.6	5.7
	Ukraine	58.4	3.6	0.0	29.7	47.00	41.6	4.5	6.6
Average		57.5	9.9	0.5	21.2	42.3	23.2	5.2	9.1
Latin America and the Caribbean	Brazil	63.2	16.4	0.1	90.9	51.3	45.2	2.1	0.2
	Colombia	54.7	n.a.	n.a.	n.a.	36.9	29.4	1.8	2.3
	El Salvador	63.8	41.1	1.7	25.2	41.2	29.6	2.8	16.8
	Jamaica	64.8	16.3	0.0	21	44.7	37.9	14.9	4.7
	Peru	55.3	12.6	0.5	39.4	44.1	37.4	2.4	8.0
Average		63.1	28.1	0.9	29.5	43.3	34.3	6.7	10.1
Middle East and North Africa	Egypt	71.1	n.a.	5.8	21.9	25.5	4.5	7.0	8.3
	Jordan	57.1	20.4	0.5	6.0	32.2	30.2	7.8	16.7
	OPT	55.2	12.7	0.2	14.6	26.3	10.4	10.4	10.4
	Tunisia	61.9	33.8	2.2	22	33.4	26	10.0	9.9
Average		57.7	14.1	1.0	14.3	27.1	12.6	9.5	11.1
Sub-Saharan Africa	Benin	50.7	52.0	28.8	14.4	13.0	2.2	7.3	1.5
	Liberia	39.5	24.4	10.5	20.3	12.3	1.2	5.4	3.3
	Madagascar	77.9	63.4	14.8	39.7	47.8	11.3	0.3	1.9
	Malawi	63.8	n.a.	4.5	25.9	47.7	12.3	1.3	10.4
	Tanzania	71.0	23.2	2.5	19.5	44.5	17.3	4.0	15.7
	Togo	60.1	43.4	15.9	22.9	33.8	6.5	6.6	1.9
	Uganda	60.5	43.1	4.2	39.7	48.1	18.7	1.8	5.0
	Zambia	59.6	16.2	2.8	13.7	15.8	6.3	7.7	15.1
Average		60.9	39.8	13.2	21.5	33.0	8.7	5.2	6.3
Tot. average		61.2	27.7	4.1	20.0	37.6	19.2	4.7	11.8

Notes. The table reports statistics on past labor market experiences collected retrospectively at the time of the STWT survey. See also notes to Table 1

groups defined on observable characteristics—and to derive baseline transition probabilities net of compositional effects, i.e., differences in observable characteristics of the youth population across countries. We can also explore the determinants of transition duration across countries and we turn to this in the next section.

As illustrated in Table 3, a relatively large number of out of school youth have been continuously inactive since the time they left education. This is possibly an indication that some of these individuals will never transit to employment. Treating these individuals as if they had extremely long transition durations might lead one to erroneously conclude that mean transition durations are very high. In order to account for this possibility, we employ a split-population (also sometimes referred to as split-cure) model (Schmidt and Witte 1989). This model provides a simultaneous estimate of the duration of the transition to employment among those who are expected to transit as well of the probability of never transiting (also sometimes referred to as the probability of being cured).

Before proceeding to the estimation of the model, we have applied a variety of sample selection criteria to the data (see Table 10 in the Appendix). The information provided by the surveys as well as sample sizes vary considerably across countries. In some countries, the data quality is poor or the information provided is scant, making it necessary to exclude them from the analysis. This applies to Bangladesh, Colombia, Liberia, Malawi, and Zambia, leaving us with a sample of 23 countries out of the 28 for which ILO-STWT surveys are available.<sup>7</sup> Note that for Egypt we drop more than 40% of the sample while for Macedonia and the OPT we drop about 20% of the observations. We retain these countries in the analysis, but some care should be exerted in interpreting the estimates, especially in the case of Egypt.

On average we have around 1500 observations per country. Given the limited number of observations, highly parameterized models often fail to converge. For this reason, and after some experimentation, we have decided to parameterize the probability of never experiencing a failure (i.e., of never transiting to a job) as a log-log distribution and to constrain the hazard function to follow a proportional hazard Weibull distribution. The Weibull parameterization constrains the hazard function to be monotonically increasing or decreasing in duration while the proportional hazard specification restricts the hazard rate to be parallel across groups with different values of the covariates.<sup>8</sup>

Model estimates of the transition to the first employment spell for the 23 countries for which we have data are reported in the Appendix. Table 12 in the Appendix contains the estimates of the probability of never transiting to a job and Table 13 in the Appendix the estimates of the duration model for individuals expected to eventually transit to a job. The split-population model fails to converge for Brazil due to a very small number of censored observations in the data. For this country, we decided, therefore, to estimate a standard proportional hazard Weibull model, and hence, while we report model estimates for the duration of the transition from school to the first job (in Table 13 in the Appendix), we do not report model estimates for the probability of never transiting (Table 12 in the Appendix).

We include a number of covariates in the model. Given the limited number of observations and characteristics available in the survey, and since most of the characteristics are observed at the time of the survey rather than at the time of leaving school (i.e., at the onset of risk), we are constrained in the number of variables that we can include in the model. The model includes a gender dummy, a dummy for urban/rural location,

dummies for father's educational level (up to primary, up to secondary, and higher), dummies for three school-leaving age groups (less than 16, between 16 and 18, and greater than 18),<sup>9</sup> a dummy for whether or not the individual ever worked while in school and (a 3-year average of) per capita GDP growth at the time of leaving school, in order to account for the possible impact of initial labor market conditions on the subsequent probability of finding employment. Finally, we include dummies for missing values of all included variables. Note that not all variables (or not all values of these variables) are available for all the countries in the sample, so we report associated coefficients for the variables (or the categories of variables) for which data are available. As for the descriptive statistics, estimates are weighted by sampling weights.

#### 4.2 Probability of never transiting into employment after leaving school

In order to characterize the transition from school to work across countries, we focus on the predicted probabilities of never transiting and mean durations (among those expected to transit) based on the estimated split-cure model. These figures are easier to interpret than the estimates of the model parameters. We also present mean durations and mean probabilities separately by groups defined based on observable characteristics in order to characterize heterogeneity across groups.

Table 4, column 1, reports the predicted probability of never transiting to work in each of the countries analyzed. This fraction ranges from 1% in Vietnam to 50% in Samoa. On average, across all our sample of countries, around 17% of youth out of school are expected to never transit to employment. The predicted fraction of youth never expected to transit is the highest in the MENA region, on the order of 10%, and it is the lowest in SSA and AP, with a probability of transition to employment of more than 90%.<sup>10</sup>

Estimates of the transition to stable employment are reported in column 2 of Table 4. Some caution is needed here, as stable employment is rare in many countries in our sample and the number of individuals in stable employment in the data is often very limited, implying that estimates of the model parameters are often imprecise. The share of youth expected to never transit to a stable job is the lowest in LAC (on the order of 45%) and the highest in MENA (at around 78%).

In order to quantify the role of observable characteristics in explaining differences in transition probabilities across countries, we have recomputed these probabilities while keeping individual characteristics fixed. To do so, we have computed predictions from each country-specific model over the entire sample of data (i.e., for all the individuals in all the countries in our dataset).

Figure 1 in the Appendix plots these composition-free estimates versus in-sample predictions. The figure shows that these two series line up remarkably well, implying that observable characteristics play a little role in explaining differences across countries in the probabilities of transition. These differences are most likely due to differences in structural or cyclical economic factors, although clearly one cannot rule out the possibility that unobserved individual characteristics, which we cannot account for, are also responsible for these differences.

#### 4.3 Duration of transitions from school to work

Estimates of the baseline hazard function, i.e., of the probability of finding a job in the current period conditional on not yet having found one up to the previous period, are

**Table 4** Predicted probability of never transiting from school to work

Region	Country	Employment	Stable employment
Asia and the Pacific	Cambodia	0.03	0.44
	Nepal	0.26	0.73
	Samoa	0.50	0.77
	Vietnam	0.01	0.21
Average		0.07	0.35
Eastern Europe and Central Asia	Armenia	0.31	0.44
	Kyrgyz Rep.	0.15	0.63
	Macedonia, FYR	0.09	0.14
	Moldova, Rep.	0.12	0.84
	Russian Fed.	0.08	0.83
	Ukraine	0.17	0.26
Average		0.11	0.68
Latin America and Caribbean	Brazil	–	–
	El Salvador	0.31	0.58
	Jamaica	0.10	0.26
	Peru	0.08	0.44
Average		0.12	0.45
Middle East and North Africa	Egypt	0.15	0.87
	Jordan	0.28	0.24
	OPT	0.35	0.34
	Tunisia	0.23	0.40
Average		0.17	0.78
Sub-Saharan Africa	Benin	0.36	0.86
	Madagascar	0.03	0.77
	Tanzania	0.07	0.55
	Togo	0.06	0.55
	Uganda	0.05	0.57
Average		0.08	0.63
Tot. average		0.10	0.60

Notes. The table reports the estimated fraction of individuals predicted not to transit to employment (column 1) or to stable employment (column 2) over their working life. Estimates are derived from results in Tables 12 and 14

reported in Fig. 2 in the Appendix. There is evidence across all countries of negative duration dependence: the probability of finding a job among the survivors falls as duration increases, in line with findings from the unemployment literature in more developed economies (e.g., Machin and Manning 1999).<sup>11</sup>

Column 1 of Table 5 reports the average estimated duration of the transition to the first employment spell among those who are ever expected to transit. Durations are top-coded at 150 months. Average duration to first employment across all countries considered is just above 2 years (i.e., 27 months). This number again masks substantial heterogeneity across regions and countries. Transitions are the longest in MENA, with an average duration of 52 months, i.e., four and half years, and the lowest in AP, at 11 months, followed by EECA, SSA, and LAC.

Given that the distribution of durations is highly skewed to the right, median durations are possibly a better indication of central tendency. Median durations are

**Table 5** Average transition duration from school to work (months)

Region	Country	Mean time spent to find first employment	Mean time spent to find first stable employment	Median time spent to find first employment	Median time spent to find first stable employment
Asia and the Pacific	Cambodia	3.5	>150	3.2	92.1
	Nepal	9.2	19.4	7.6	13.9
	Samoa	9.9	16.5	6.8	10.5
	Vietnam	27.5	>150	21.2	57.9
Average		10.9	27.2	7.7	14.9
Eastern Europe and Central Asia	Armenia	12.5	49.7	11.8	44
	Kyrgyz Rep.	25.8	44.9	22	43.6
	Macedonia, FYR	>150	>150	>150	>150
	Moldova, Rep.	7.6	3.8	7.3	3
	Russian Fed.	15.7	40.3	11.2	21.6
	Ukraine	7.6	11.7	7.1	9.4
Average		16.6	47.9	15.6	42.3
Latin America and Caribbean	Brazil	19.3	45.8	11.4	32.1
	El Salvador	20.1	17.9	14.7	14.7
	Jamaica	50.4	100.7	25.5	48.5
	Peru	6.4	26.3	5.3	22.7
Average		24.9	55.7	14.0	33.4
Middle East and North Africa	Egypt	57	>150	26.7	45.6
	Jordan	45.3	>150	39.1	>150
	OPT	40.4	142.2	35.5	120.9
	Tunisia	35.3	90.8	28.7	32.7
Average		52.1	146.0	29.0	63.9
Sub-Saharan Africa	Benin	9.7	31.3	8.4	18
	Madagascar	12.1	>150	3.2	80.1
	Tanzania	26.3	105.7	22.5	57.3
	Togo	33.7	>150	25.2	>150
	Uganda	10.2	28.9	9.1	25.2
Average		25.7	129.7	18.8	103.1
Tot. average		26.8	86.2	17.3	53.1
Europe	Austria	19.09	33.0	–	–
	Belgium	20.4	45.0	–	–
	Denmark	14.6	21.3	–	–
	Finland	27.6	44.3	–	–
	France	24.3	40.7	–	–
	Germany	18.0	33.8	–	–
	Greece	21.3	51.5	–	–
	Ireland	13.2	28.7	–	–
	Italy	25.5	44.8	–	–
Portugal	22.6	51.5	–	–	

**Table 5** Average transition duration from school to work (months) (*Continued*)

Spain	34.6	56.6	–	–
United Kingdom	19.4	36.1	–	–
Tot. average	23.0	41.3	–	–

Notes. The table reports the estimated average and median duration from school to the first employment (columns 1 and 3) and the first stable employment (columns 2 and 4) among individuals aged 15–29 expected to eventually transit to employment. The data are derived from model estimates reported in Tables 13 and 15. Notes: Data for Europe come from Quintini et al. (2007). Mean durations are top-coded at 150 months (this value is also used to compute averages). See also notes to Table 1

reported in column 3 of Table 5. This is effectively the time by which 50% of individuals in each country are predicted to have transited to employment after leaving school. As expected, median durations are systematically below average durations, especially in countries with high durations (and on average 17 months, i.e., almost one and a half year), but the ranking across regions is preserved.

An alternative way to characterize the distribution of durations is to compute the predicted fraction of youth expected to find their first job within 6, 12, or 36 months of leaving school. These are reported in Appendix 16 in the Appendix. In most of the countries, at least 50% or more of the youth (among those eventually expected to transit to a job) are expected to be in employment within 6 months after leaving school, the exception being countries in the MENA region and a few others such as, for example, Vietnam and Togo. After 3 years, 90% of youth have transited to a job in most countries. In countries from the MENA region and a few from SSA, however, there are between 20 and 25% of youth still in transition 3 years after leaving school.

As in the case of the probability of ever transiting, we have attempted to assess to what extent cross-country differences in mean durations can be attributed to differences in the composition of the population. As shown in Fig. 3 in the Appendix, there is no evidence of compositional effects being responsible for a significant share of the differences in average transition durations across countries.

Column 2 of Table 5 reports average transition durations to the first stable employment.<sup>12</sup> Again figures are top-coded at a value of 150 months. Average transition duration to stable employment is around 86 months, i.e., just over 7 years. Duration to stable employment is the lowest in AP, LAC, and EECA (with an average duration of between 27 and 56 months) and the highest in MENA (at 146 months).

It is instructive to compare the durations in the low- and middle-income countries under analysis to those in high-income countries. The bottom panel of Table 5 reports the estimated average transition duration in sample of European countries estimated by Quintini et al (2007) based on the European Community Household Panel (waves 2 to 8). Despite differences in methodology and data collection instruments, average transition time to the first job across the EU countries in the sample (23 months) is very close to the average in our sample of low- and middle-income countries (27 months). Again, there is variability across EU countries but this is not as pronounced as the one in our sample.

In sum, we find that transition durations in low- and middle-income countries, with the notable exception of the MENA region, are slightly shorter than in advanced economies. This overall conclusion is tempered by the observation that a substantial fraction of youth in the low- and middle-income countries under analysis—on average

10%—are expected to never transit to employment, let alone to stable employment. Not only are transitions to stable employment unlikely to occur but also, when they do in fact occur, they are lengthy.

#### 4.4 Heterogeneity analysis

In this section we investigate differences in the probability of never transiting to work and in the duration to employment across groups defined based on observable characteristics.

To do so we compare mean predicted values obtained by varying the values of the variable of interest, while keeping constant the values of all other variables. For example, in the case of gender, for each country we compute predicted probabilities of never transiting and durations assuming that all individuals in that country's sample are either all females or all males. A comparison between these two predictions provides an estimate of the effect of the gender differentials in transition durations and probabilities while keeping all other characteristics fixed.

##### 4.4.1 Gender

Gender appears to be a very significant predictor of young persons' transition status after leaving education. The first two columns of Table 6 show that the probability of never transiting to employment is disproportionately high for females (on average 25% compared to 9% for males); this is particularly true in middle-income countries in MENA, LAC, and EECA. In contrast, there are not very pronounced gender differences in AP and SSA.<sup>13</sup>

Not only are females less likely to transit to employment than males but also those who do in fact eventually transit are expected to experience substantially longer transition durations than men in several countries. This is shown in columns 1 and 2 of Table 7 that report average median duration separately for boys and girls. Even restricting to those eventually expected to transit, females suffer a disadvantage in terms of duration to employment compared to males of around 13 months, i.e., over a year (25 months versus 12 for boys).

##### 4.4.2 School leaving age

Column 2 of Table 3 illustrates that in many countries in our sample, especially from SSA and AP, a substantial fraction (on average 28%) of youth leave school by age 15.

Columns 3 to 5 of Table 6 show that in almost all regions early school leavers are disadvantaged in terms of the probability of ever transiting to employment relative to those who stay in school longer (the probability of ever transiting is 86% for early school leavers compared to 92% among those who leave education after age 18). With the exception of MENA, where those with high levels of education tend to transit at a slower rate, the disadvantage among early school leavers is also evident in the duration of transition to employment, in columns 3 to 5 of Table 7. While median transition duration is on the order of almost 2 years (23 months) for those who left education by age 15, among those who leave school after age 18 is less than 1 year (11 months).<sup>14</sup> If school-leaving age precedes the legal age of employment, this could contribute to explain longer transition durations among early school leavers compared to those who stay on longer. The circumstance that the probability of ever transiting to a job is lower for early school leavers suggests some returns from attending school longer (although unobserved heterogeneity is clearly an alternative explanation).

**Table 6** Predicted probability of never transiting from school to work—by groups

Region	Country	By gender		By age left education			By whether individual worked while in school	
		Males	Females	<16	16–18	>18	Did not work	Worked
Asia and the Pacific	Cambodia	0.02	0.04	0.03	0.03	0.02	0.04	0.01
	Nepal	0.16	0.38	0.23	0.26	0.28	0.32	0.17
	Samoa	0.47	0.52	0.62	0.51	0.38	0.50	0.33
	Vietnam	0.01	0.01	0.00	0.02	0.02	0.01	0.00
Average		0.04	0.09	0.05	0.05	0.07	0.08	0.04
Eastern Europe and Central Asia	Armenia	0.07	0.47	0.44	0.37	0.23	0.32	0.15
	Kyrgyz Rep.	0.02	0.27	0.20	0.18	0.06	0.16	0.11
	Macedonia, FYR	0.06	0.11	0.41	0.00	0.08	0.09	0.04
	Moldova, Rep.	0.03	0.18	0.11	0.14	0.09	0.13	0.09
	Russian Fed.	0.04	0.12	0.17	0.10	0.06	0.08	0.05
Average		0.11	0.23	0.27	0.23	0.13	0.19	0.12
Average		0.11	0.24	0.29	0.23	0.13	0.11	0.07
Latin America and Caribbean	Brazil	–	–	–	–	–	–	–
	El Salvador	0.10	0.43	0.31	0.31	0.29	0.35	0.17
	Jamaica	0.17	0.10	0.00	0.19	0.08	0.14	0.09
	Peru	0.04	0.12	0.12	0.09	0.06	0.11	0.03
Average		0.06	0.17	0.14	0.13	0.10	0.15	0.06
Middle East and North Africa	Egypt	0.04	0.29	0.21	0.27	0.00	0.16	0.06
	Jordan	0.03	0.63	0.37	0.39	0.12	0.28	0.24
	OPT	0.07	0.67	0.50	0.47	0.16	0.36	0.31
	Tunisia	0.12	0.35	0.20	0.21	0.26	0.25	0.14
Average		0.05	0.32	0.22	0.27	0.04	0.18	0.08
Sub-Saharan Africa	Benin	0.32	0.40	0.00	0.00	0.00	0.39	0.04
	Madagascar	0.02	0.03	0.37	0.36	0.36	0.04	0.01
	Tanzania	0.08	0.07	0.02	0.03	0.03	0.07	0.07
	Togo	0.06	0.05	0.10	0.10	0.03	0.07	0.02
	Uganda	0.02	0.08	0.10	0.00	0.04	0.06	0.04
Average		0.07	0.09	0.11	0.08	0.09	0.09	0.05
Tot. average		0.09	0.25	0.14	0.14	0.08	0.11	0.06

Notes. The table reports the estimated fraction of individuals predicted not to transit to employment over their working life separately for different groups of individuals. See also Notes to Table 5

#### 4.4.3 Work prior to leaving education

A question that naturally arises in analyzing the transition from school to work is the impact of involvement in work prior to leaving education. As illustrated in column 4 of Table 3, the share of youth that worked while at school is far from negligible (on average 20%); this fraction is particularly high in low-income countries in SSA and AP. Although the data do not provide information on the characteristics of work performed (whether continuous or seasonal, its duration, the sector of employment, whether market work or unpaid occasional work in the family farm/enterprise, etc.), in many cases those combining school and work began doing so prior to the minimum working age and therefore were child laborers according to national laws and international standards.



**Table 7** Median transition duration from school to work (months)—by groups

Region	Country	By Gender		By age left education			By whether individual worked while in school	
		Males	Females	<16	16–18	>18	Did not work	Worked
Asia and the Pacific	Cambodia	3.0	3.4	4.4	3.0	2.8	4.0	2.4
	Nepal	5.4	10.6	14.8	7.5	5.6	7.5	8.5
	Samoa	6.6	7.6	27.0	7.0	4.1	6.9	3.6
	Vietnam	19.2	23.9	42.1	15.7	8.8	23.9	14.5
Average		14.4	18.8	32.1	12.5	7.4	18.2	11.9
Eastern Europe and Central Asia	Armenia	8.1	15.2	257.0	11.9	9.9	12.9	5.5
	Kyrgyz Rep.	15.0	26.2	38.4	25.3	12.1	23.1	14.3
	Macedonia, FYR	120.3	121.6	>150	126.8	78.2	124.8	24.5
	Moldova, Rep.	6.7	8.3	7.1	7.7	7.1	9.0	5.0
	Russian Fed.	9.8	11.9	29.8	22.6	9.3	11.3	8.2
	Ukraine	5.6	7.5	6.4	10.1	5.7	7.3	5.4
Average		10.5	12.7	30.2	15.1	9.0	11.9	7.8
Latin America and Caribbean	Brazil	10.3	12.5	20.1	10.7	6.6	16.4	2.0
	El Salvador	6.2	19.1	19.1	19.6	14.0	19.1	8.7
	Jamaica	17.4	48.3	114.6	23.9	17.4	38.1	14.6
	Peru	4.0	7.4	10.4	5.4	3.7	6.4	3.6
Average		9.5	12.4	19.9	10.4	6.6	15.5	2.5
Middle East and North Africa	Egypt	14.0	82.8	12.7	13.3	29.3	28.2	15.0
	Jordan	17.5	59.0	41.0	21.3	14.9	35.9	15.2
	OPT	25.0	55.3	34.8	35.5	40.7	40.8	14.3
	Tunisia	21.2	41.6	37.9	28.7	21.5	32.7	18.8
Average		15.0	76.7	17.3	15.5	27.5	29.2	15.4
Sub-Saharan Africa	Benin	11.2	6.1	18.7	9.9	7.8	8.7	6.7
	Madagascar	2.8	3.2	3.2	3.9	3.3	4.3	2.5
	Tanzania	15.9	30.3	33.8	21.0	20.5	23.9	15.3
	Togo	27.2	22.2	21.3	28.4	34.9	29.0	16.1
	Uganda	7.1	11.4	10.5	8.7	6.7	11.4	6.8
Average		11.2	17.4	19.5	13.8	13.0	15.7	9.8
Tot. average		11.7	24.6	22.7	12.6	11.4	16.7	8.2

Notes. The table reports the estimated median duration from school to the first employment separately for different groups of individuals. See text for details

While early labor market involvement might harm subsequent employability due to its negative effect on schooling, it could also operate in the opposite direction: learning-by-doing associated with work early in life might also provide valuable human capital (in the form of both cognitive and non cognitive skills) and speed the transition into the labor market. However, one has to be cautious in attaching a causal interpretation to these estimates, as those with early work experiences might have persistently low reservation wages, implying that they display persistently high labor market attachment (see Hotz et al. 2002).

The results in Tables 6 and 7 (columns 6 and 7) show that working while in school is associated to a greater probability of working later in life and typically shorter durations. As in fact we are conditioning on school-leaving age—hence, albeit imperfectly,

controlling for the detrimental effect of early work on school attainment—this suggests that either low reservation wages or the experience associated with early work involvement leads to greater employment in youth. This clearly does not mean that these youth are better off during their life cycle, as the jobs that they eventually attain are likely of worse quality relative to the jobs of those who did not work as children.

#### **4.4.4 Additional covariates**

We fail to find consistently signed effects of the other covariates on the duration to employment and on the probability of ever transiting to employment across the countries in the sample. While, for example, higher GDP growth at the time of entering the labor market appears to reduce the length of transition from school to work in many of the countries analyzed, there are exceptions to this (e.g., in Tanzania). Possibly higher economic growth, while being associated with stronger labor demand and hence faster transitions, might also affect reservation wages or the expectation of finding work in the future and hence increase duration transitions.

Mixed results are also found for the rural/urban dummy and for indicators for father's education. Again, while higher levels of education among fathers might positively affect the speed of transition or the probability of ever finding employment through, for example, valuable labor market contacts or intergenerational persistence in ability and human capital, higher father's education might also negatively affect durations and the overall probability of employment through an increase in reservation wages.

## **5 Exploring the macro determinants of transition from school to work**

In this section we attempt to gauge some evidence about the determinants of the cross-country dispersion in the fraction of individuals predicted to never transit to the labor market and in the duration from school to work.

To do so, we regress the estimated mean transition durations and the probabilities of never transiting to employment or to stable employment (from Tables 4 and 5) on a number of country-level characteristics from the World Bank Development Indicators (World Bank (WB) 2015), the Worldwide Governance Indicators (World Bank (WB) 2015), and the Doing Business Indicators (World Bank (WB) 2015). These datasets provide a very large number of variables on country socioeconomic characteristics, measures of governance and ease of doing business.

Due to the limited number of observations, we are severely restricted in the number of variables that we are able to include in the model. After some experimentation, we have decided to retain only the variables that have typically statistically significant effects on the outcomes of interest (see Table 17 in the Appendix). First, we include log per capita GDP as a proxy indicator for country economic development.

As increased supply of labor is likely to affect youth employment at fixed labor demand, we also include in the model the growth rate of the population. One would expect higher population growth to increase both the duration of transition to work and the probability of never transiting.

We also include the national poverty rate, as measured by the fraction of the population living on less than 1.25 US dollars per day. Greater incidence of poverty is likely to be associated with lower reservation wages and hence shorter durations.

Alongside these variables, we include two variables capturing labor market policies. First, we include a dummy for the availability of unemployment insurance. Unemployment insurance schemes might increase durations via their positive effect on the reservation wage, although they might eventually lead to better matches. Second, in order to control for labor market regulations, we include a measure of minimum wage bite (the ratio between the minimum wage and value added per worker). This should capture higher labor costs that might in turn reduce firms' hiring.<sup>15</sup>

All these variables are measured in the most recent year in which they are available (typically between 2012 and 2014). Summary statistics for these variables are reported in Table 18 in the Appendix. These statistics refer to 22 countries out of the 23 for which duration models can be estimated (excluding the Occupied Palestinian Territory, for which no information is available from published statistics).

The table clearly shows that population growth is much higher in SSA than in the rest of the world (although MENA countries also have high population growth) as is the poverty rate (followed by AP). Perhaps surprisingly, the minimum wage bite is the highest in AP followed by SSA countries, although clearly this only typically applies to wage workers in urban areas, i.e., a small share of the labor force. Finally, unemployment insurance is typically more widespread in middle-income countries in EECA, MENA, and LAC compared to low-income countries in AP and SSA.

Regression results are reported in Table 8. Each column refers to a separate dependent variable and each row to a different regressor. In the model we include dummies for missing values of the included variables. For ease of interpretation, we express all variables in terms of their standard deviation across all countries for which ILO-STWT surveys are available. We also weigh observations by population weights using GLS.

We start by focusing on average duration to the first employment spell in column 1.<sup>16</sup> Although national economic development, as measured by per capita GDP, appears to speed the rate of transition, the coefficient is not statistically significant at conventional levels.

Row 2 illustrates that a one standard deviation increase in the rate of population growth (around 1, i.e., half of the difference between EECA and SSA) leads to an increase in average duration of around 17 months. The effect of the poverty rate is the opposite: a one standard deviation increase the poverty rate (20 percentage points, again not too far from half of the difference between SSA and EECA) leads to a reduction in transition durations of around 17 months.

We next turn to the policy variables. Both an increase in minimum wage bite and the availability of unemployment insurance lead to an increase in the length of transitions, although only the latter displays a statistically significant effect. An increase in the fraction of the population covered by unemployment insurance of one standard deviation (0.40, again roughly the difference between SSA and EECA) leads to a rise in unemployment insurance of around 6 months.

In column 2 we include as an additional control the number of years of compulsory education. Point estimate remain similar (although coefficients on population growth and unemployment insurance become now statistically insignificant at conventional levels). There is also evidence that longer compulsory schooling tends to shorten, although, only marginally, the length of transition to the first employment spell (again point estimates are not significant).

**Table 8** Macro correlates of the predicted transition duration from school to work and the probability of never attaining employment (without region fixed effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average duration from school to employment		Average duration from school to stable employment		Probability of never attaining employment		Probability of never attaining stable employment	
log GDP	-1.470 (6.588)	0.117 (18.655)	-27.208 (23.128)	4.079 (63.607)	-0.061 (0.064)	0.097 (0.106)	-0.022 (0.098)	0.034 (0.171)
Pop. growth	16.821** (5.869)	18.269 (12.659)	43.807* (20.606)	54.078 (43.161)	-0.049 (0.042)	0.053 (0.071)	-0.017 (0.064)	0.061 (0.114)
Poverty rate	-17.330*** (5.778)	-17.440** (6.391)	-47.489** (20.284)	-50.363** (21.791)	-0.003 (0.037)	-0.037 (0.043)	0.140** (0.058)	0.164** (0.070)
Minimum wage	6.662 (4.001)	7.053 (5.145)	23.178 (14.047)	25.161 (17.543)	0.002 (0.025)	0.037 (0.031)	-0.009 (0.039)	0.000 (0.050)
UI	5.821* (3.057)	5.961 (3.407)	25.255** (10.732)	24.136* (11.616)	-0.035 (0.020)	-0.040 (0.023)	-0.061* (0.031)	-0.037 (0.037)
Years compulsory educ.		-0.068 (3.225)		-8.598 (10.995)		-0.042 (0.032)		0.032 (0.051)
Observations	22	22	22	22	21	21	21	21
R <sup>2</sup>	0.611	0.612	0.573	0.598	0.282	0.448	0.829	0.856

Notes. The table reports regression of the each dependent variable (in the first row) on a number of macro-economic indicators across countries. Estimation method GLS with weights equal to population size. Standard errors in brackets. \*\*\*, \*\*, \*: significant at 1, 5, and 10 percent level, respectively

Columns 1 and 2 of Table 19 in the Appendix in the Appendix present similar regressions, where now the sample includes in addition to the countries in the ILO-STWT surveys also European countries for which estimates of the duration to the first job are available (see Section 4.3). For comparability with Table 8, all variables are expressed relative to the standard deviation across all countries in the ILO-STWT surveys. Compared to Table 8, point estimates are remarkably similar although, unsurprisingly, these are more precise. This is a result worth noting. It suggests that the effect of structural and policy variables in determining the length of transition to the first employment spell are similar across low-/middle- and high-income countries. Differences in transition durations across countries are largely ascribable to differences in structural and policy variables.

Column 3 of Table 8 reports results for the average transition duration to the first stable employment spell. Coefficients have typically the same sign as those for the duration to the first employment spell (whether stable or not), although they are also typically larger in magnitude. Overall, it appears that the same factors that explain differentials in transition durations to employment across countries also explain differentials in transition durations to stable employment. Again results are qualitatively similar if we additionally include among the regressors the number of years of compulsory education (in column 4 of Table 8) or if we include in the sample European countries (columns 3 and 4 of Table 19 in the Appendix). Interestingly, once we include European countries in the sample, there is evidence of large negative and statistically significant effects of increases in years of education on transition to the first stable job (point estimate 22, implying a duration to the first stable job around 2 years shorter for a one standard deviation increase in the duration of the compulsory schooling cycle, equivalent to 2.64 years).

Columns 5 and 6 of Table 8 focus on the probability of never transiting to employment. Regression coefficients are all statistically insignificant, although mostly of the expected sign. Column 7, which focuses on the probability of never attaining stable employment, is perhaps the most informative. It appears in particular that greater incidence of poverty hampers young peoples' probability of finding stable employment (with a one standard deviation increase in the poverty rate leading to a rise in the probability of never attaining employment of 14 percentage points). Unemployment insurance (UI) acts in the opposite direction, with a one standard deviation increase in the fraction of the population covered by UI leading to a rise in the probability of finding stable employment over one's life of 6 percentage points.<sup>17</sup>

Results in the Table 9 and in columns 5 to 8 of Table 19 in the Appendix include in addition region fixed effects (respectively for the restricted sample of countries in the ILO-STWT surveys and with the additional inclusion of European countries). In practice we only exploit the variation across countries in the same region for identification, easing some concerns that the estimates in the top panel are driven by unobserved differences across very dissimilar countries with different unobservable characteristics. Although results are less precise, they are qualitatively similar to those obtained without the inclusion of region fixed effects in the top panel, lending some credibility to the estimates discussed above.

Overall, results in Tables 8 and 9 and 19 show that demographic and structural economic factors are major determinants of the transition from school to work in low- and middle-income countries. While greater pressure on the labor markets induced by higher population growth leads to longer durations in low-income countries compared to middle-income countries, these effects are largely compensated by much lower reservation wages driven by widespread poverty and lack of unemployment insurance that together speed the transition from school to work. As for MENA, where durations are

**Table 9** Macro correlates of the predicted transition duration from school to work and the probability of never attaining employment (with region fixed effects)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average duration from school to employment		Average duration from school to stable employment		Probability of never attaining employment		Probability of never attaining stable employment	
log GDP	-15.094 (10.964)	-28.244 (17.010)	17.717 (37.331)	12.575 (58.410)	-0.103 (0.071)	-0.034 (0.126)	-0.019 (0.131)	0.032 (0.240)
Pop. growth	-0.969 (11.156)	-10.594 (14.876)	19.071 (37.985)	16.256 (51.083)	-0.060 (0.073)	0.014 (0.124)	0.180 (0.134)	0.210 (0.236)
Poverty rate	-14.082* (7.083)	-11.851 (7.653)	10.680 (24.116)	10.229 (26.279)	-0.012 (0.046)	-0.040 (0.061)	0.178* (0.086)	0.174 (0.115)
Minimum wage	5.473 (3.926)	3.246 (4.561)	3.217 (13.366)	2.275 (15.663)	0.025 (0.026)	0.047 (0.040)	0.036 (0.049)	0.041 (0.076)
UI	6.202** (2.624)	5.315* (2.842)	21.096** (8.935)	21.064* (9.761)	-0.037* (0.020)	-0.044 (0.024)	-0.063 (0.036)	-0.056 (0.047)
Years compulsory educ.		0.964 (3.267)		-7.875 (11.219)		-0.032 (0.040)		0.003 (0.075)
Observations	22	22	22	22	21	21	21	21
R <sup>2</sup>	0.821	0.849	0.815	0.842	0.663	0.693	0.885	0.889

Notes. The table reports similar regression to those in Table 8 with the additional inclusion of region fixed effects. Standard errors in brackets. \*\*\*, \*\*, \*: significant at 1, 5, and 10 percent level, respectively

remarkably high, it appears that high population growth and generous unemployment insurance are largely responsible for long durations.

Although it appears that unemployment insurance lengthens transition durations, there is also evidence that the support to the unemployed offered by unemployment insurance schemes leads to an overall increase in the probability of ever finding employment and in particular stable employment. Although one has to be cautious in interpreting these estimates as causal, this might point to the negative effects of short durations on the probability of finding stable employment, highlighting the trade-off that policy makers face in these countries.

We also find a role for education policies in affecting the transition from school to work and in particular to stable work. Even in the presence of adverse structural conditions—such as high population growth and widespread poverty—an increase in the length of the compulsory educational cycle appears to speed this transition.

## 6 Conclusions

This paper uses ILO-STWT survey data to provide novel systematic evidence on duration and endpoint of the transition from school to work in a sample of 23 low- and middle-income countries around the world, and to investigate some of the determinants of the differential lengths of transition across these countries.

Although transition durations are on average not very dissimilar from those in high-income countries, notably Europe, on the order of 2 years, there is substantial heterogeneity across the countries in the sample. In particular, countries in the Middle East and Northern Africa region display markedly longer transition duration than all other countries, in line with high rates of youth unemployment. Moreover, a substantial fraction of youth in the low- and middle-income countries under analysis—on average 10%—are expected to never find employment, let alone quality employment, over their life cycle.

Durations as well as the risk of never transiting to employment over one's life cycle are considerably higher among women compared to men, although we remain agnostic on whether these differentials reflect preferences or constraints. There is also a clear positive association between levels of human capital, notably school-leaving age and work prior to leaving school, on labor market success, measured by a greater probability of finding employment and a shorter search spell.

In closing we have assessed the determinants of the durations and endpoints of the school-to-work transition across the countries analyzed. Consistent with predictions from theory, we find that demographic and structural economic factors are major determinants of the transition from school to work in low- and middle-income countries. While higher population growth leads to longer durations in low-income countries compared to middle-income countries, this effect is more than compensated by widespread poverty and lack of unemployment insurance that together depress reservation wages, speed the transition from school to work and reduce the probability of finding quality employment over one's life cycle, especially in Sub-Saharan Africa and Asia and the Pacific regions.

Although, given the limitation of the data, we are unable to carry out a full welfare analysis, this evidence is suggestive of the circumstance that in low-income countries short search durations induced by low reservation wages and lack of social protection lead to poor labor market matches that harm young workers' probability of finding employment, and in particular stable employment, in the long-run, in turn contributing to persistent social and economic exclusion.

However, we find some evidence that additional years of compulsory education are associated with shorter durations to the first—and in particular the first stable—employment.<sup>18</sup> This suggests a role for educational policies in offsetting the negative consequences of adverse structural or cyclical and on youth's labor market outcomes.

## Endnotes

<sup>1</sup>The literature on school-to-work transition, including De Freitas 2008, Raffe 2008 and Bell and Blanchflower 2011 points to the fact that youth unemployment has long lasting consequences through lack of experience and negative signaling to employers. Pastore 2015 and Pastore and Giuliani 2015 focusing on the youth employment gap, find that European countries deal with this issue by providing very heterogeneous combinations of general education and formal training. While the literature on youth unemployment in developed countries is relatively abundant, evidence on school-to-work transition for developing countries is scant. Country-level studies show that workers in some developing countries experience longer durations than those in developed countries, with a particular disadvantage among women (see, for instance, Matsumoto and Elder 2010, El Zanaty and Associates 2007, Corbanese and Rosas 2007, Pastore 2008, Alissa 2007, New Era 2008).

<sup>2</sup>For each past employment spell, the data also report the type of employment (whether wage-worker, unpaid family worker or self-employed), and, for wage workers, the existence and characteristics of the work contract (whether written or oral and whether temporary or stable) but as said no information on wages.

<sup>3</sup>The only exception is Brazil for which employment spells prior to the time of leaving school are recorded. For consistency, we artificially left-censor the data for Brazil at the time of leaving school.

<sup>4</sup>The average employment to population rate across the low and middle countries in our sample in column (2) of Table 1 is around 51%. In contrast to unemployment, there is no obvious pattern across regions, with employment rates above the sample average in countries in SSA (55%) and LAC (54%).

<sup>5</sup>The ILO provides an explicit definition of “Decent work” as work that “sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women”. Source: ILO (<http://www.ilo.org/global/topics/decent-work/lang-en/index.htm>).

<sup>6</sup>On average, in the sample of countries under analysis, a significant fraction (4.6%) of individuals never attended school (column 3 of Table 3). This fraction is as high as around 10% in Sub-Saharan Africa and effectively zero in LAC and EECA.

<sup>7</sup>For Bangladesh we have no information about the month, but only about the year, of the beginning of each spell. For Colombia there is no information on the date of leaving school. Missing information on the date of leaving school also reduces the sample for Malawi by almost 90% and, for this reason, we also exclude this country from the analysis. Moreover we exclude Zambia because of missing date of starting work for one third of the sample. We also decided to exclude Liberia from the sample because,

once observations with missing variables are excluded, we are left with a very small sample (around 250 observations).

<sup>8</sup>Although this parameterization is necessarily restrictive, as it does not allow the hazard function for example to first decrease and then increase in duration, its advantage is parsimony, as the hazard function only depends on two parameters. Given the small number of observations available for each country and the varying quality of the data, we have found that split-population models that allow for a larger number of parameters fail to converge in most of the countries.

<sup>9</sup>We prefer to use age left education rather than highest education level achieved because the latter is defined only coarsely and the categories of completed education vary across countries. Some degree of caution is needed here though, as, due to late entry, intermittent attendance and widespread grade retention individuals with the same age left education might have different levels of completed education.

<sup>10</sup>Note though that, because of data limitations, we are unable to report estimates from three African countries, two of which (Liberia and Zambia) have remarkably low transition rates, at least based on censored spells (see column 5 of Table 3).

<sup>11</sup>It is well known that negative duration dependence might mask unobserved heterogeneity (Maddala 1983; Lancaster 1990; van den Berg and van Ours 1996). Unfortunately the test for unobserved heterogeneity has not been developed for the case of a split-cure model. For this reason we have estimated standard duration models where we account for unobserved heterogeneity (frailty models, see Hougaard 1995 and Sahu et al. 1997). Results are available upon request. Although we are unable to reject unobserved heterogeneity based on a standard likelihood ratio test, estimates of the hazard still show negative duration dependence.

<sup>12</sup>The hazard rates for the duration to stable employment (not shown but available upon request) also display clear negative duration dependence.

<sup>13</sup>Although these numbers might seem high, they are not too different from inactivity rates among prime age individuals in the EU28 (as of 2014 these numbers were 8.5% for males and 20.5% for males).

<sup>14</sup>Although we find that workers with higher levels of education tend to transit faster, over-education—i.e. the mismatch between workers' human capital and the demand for skills—can lead to long transitions among most educated workers. This is likely to be particularly important for young workers (see, e.g., Battu et al. 1999; Dolton and Vignoles 2000). Indeed, there is evidence that over-education constitutes a significant hurdle for the transition to adequate jobs and is associated to lower earnings (Hartog 2000) and lower job satisfaction (see, e.g., Tsang 1987; Allen and van der Velden 2001). An additional element that deserves consideration in weighting pros and cons of speedy transitions is that short transitions might lead to precarious or fixed-term employment, which might have itself consequences on later outcomes. In this respect, Cockx and Picchio 2012, Graaf-Zijil et al. 2014 and van den Berg et al. 2002 find that temporary work leads to a greater probability of entering permanent employment in the future. On the other end, Gagliarducci 2005 finds evidence that repeated spells in temporary employment are detrimental to achieving permanent employment.

<sup>15</sup>The threat posed by minimum wages to the employment of youths, for whom the statutory minimum wage is more likely to be binding than for adults, has long been recognized, as employers in competitive markets are predicted to respond to an



increased minimum wage by reducing labor demand. This prediction however has not found broad empirical support (see seminal work by Card and Krueger 1994).

<sup>16</sup>Results not reported are very similar if we use median as opposed to mean durations.

<sup>17</sup>Note that we do not have estimates for the probability of ever attaining employment or stable employment for European countries (see Section 4.3), so we do not report the corresponding regressions in Table 19.

<sup>18</sup>Unfortunately, no cross-country data set exists that provides systematic information on expenditure in vocational training/education for the countries under analysis. Therefore, we cannot include these variables in the regressions.

## Appendix

**Table 10** School-to-work transition surveys information. Note: in the case of Liberia the survey covers youths aged between 15 and 35 years of age and total sample size is 1,876. In the case of Madagascar 5 individuals report an age out of range (below 15 and above 29), total sample size is 3,300. In the case of Samoa no information or are of residence (urban vs. rural) is available in the data. Source: ILO school-to-Work Transition Surveys

Region	Country	Sample size (15–29 years age group)	Geographical coverage	Reference period
Asia and the Pacific	Bangladesh	9197	National	01–03/2013
	Cambodia	3552	National	07–08/2012
	Nepal	3584	National	04–05/2013
	Samoa	2914	National	11–12.2012
	Vietnam	2722	National	12/2012–012/013
Eastern Europe and Central Asia	Armenia	3216	National	10–11/2012
	Kyrgyz Rep.	3930	National	07–09/2013
	Macedonia, FYR	2544	National	07–09/2012
	Moldova, Rep.	1158	National	01–03/2013
	Russian Fed.	3890	11/83 regions	07/2012
	Ukraine	3526	National	02/2013
Latin America and the Caribbean	Brazil	3288	National	06 2013
	Colombia	6014	Urban	09/11 2013
	El Salvador	3451	National	09/12 2012
	Jamaica	2584	National	02–04/ 2013
	Peru	2464	Urban	12/ 2012– 02/ 2013
Middle East and North Africa	Egypt	5198	National	11/12 2012
	Jordan	5405	National	12/ 2012–01/ 2013
	OPT	4320	National	08–09/ 2013
	Tunisia	3000	National	02–03/ 2013
Sub-Saharan Africa	Benin	6917	National	12/ 2012
	Liberia	1504*	National	07–08/ 2012
	Madagascar	3295*	National	05–06/ 2013
	Malawi	3102	National	08–09/ 2012
	Tanzania	1988	National	02–03/ 2013
	Togo	2033	National	07–08/ 2012
	Uganda	3811	National	12/ 2012– 01/ 2013
Zambia	3206	National	02–04/ 2013	

**Table 11** Details of the sample selection procedures

Region	Country	Original sample	Out of school sample	Missing information			Inconsistencies				Final sample	Fraction of observations dropped
				Missing date of beginning work	Missing activity	Missing date of leaving education	Sample with no missing info	Date left education exceeds date of survey interview	Date left education negative	Date left education greater than date starting work (except for Brazil)		
Asia and the Pacific	Bangladesh	9197	5664	Missing dates of beginning work								
	Cambodia	3552	2269	0	0	0	2269	5	0	0	2264	0.2
	Nepal	3584	1120	0	0	0	1120	0	0	5	1115	0.4
	Samoa	2914	1845	37	1	1	1806	15	0	37	1754	4.9
	Vietnam	2722	1752	4	22	14	1712	0	0	56	1656	5.5
Eastern Europe and Central Asia	Armenia	3216	1850	0	1	0	1849	0	0	0	1849	0.1
	Kyrgyz Rep.	3930	2222	0	12	4	2206	1	0	179	2026	8.8
	Macedonia, FYR	2544	1263	6	20	0	1237	8	0	0	1229	2.7
	Moldova, Rep.	1158	578	0	34	0	544	0	0	0	544	5.9
	Russian Fed.	3890	2472	18	124	26	2304	29	1	163	2111	14.6
Latin America and the Caribbean	Ukraine	3526	1969	0	9	0	1960	2	0	140	1818	7.7
	Brazil	3288	1976	23	283	32	1638	4	0	0	1634	17.3
	Colombia	6014	3205	Missing dates of leaving school								
	El Salvador	3451	2287	35	4	1	2247	4	0	20	2223	2.8
	Jamaica	2584	1582	6	68	0	1508	4	0	0	1504	4.9
Middle East and North Africa	Peru	2464	1386	0	6	0	1380	4	0	12	1364	1.6
	Egypt	5198	3439	1293	0	51	2095	0	0	53	2042	40.6
	Jordan	5405	3089	0	0	76	3013	8	0	94	2911	5.8
	OPT	4320	2236	22	62	449	1703	7	0	38	1658	25.8
	Tunisia	3000	1714	208	0	12	1494	1	0	15	1478	13.8



**Table 12** Estimates of split-cure model—first employment—probability of never transiting

Age left education	Armenia	Benin	Brazil	Cambodia	Egypt	El Salvador	Jamaica	Jordan	Macedonia, FYR	OPT	Peru	Samoa	Tanzania
16–18	0.273* (0.152)	0.021 (0.108)	–	–0.064 (0.090)	–0.290** (0.130)	–0.002 (0.086)	–2.737 (31.047)	–0.115 (0.199)	3.928*** (1.237)	0.147 (0.190)	0.143 (0.142)	0.342*** (0.120)	0.012 (0.243)
After 18	0.827*** (0.174)	0.020 (0.102)	–	0.044 (0.111)	3.204 (28.437)	0.080 (0.101)	–2.374 (31.048)	1.821*** (0.220)	2.114*** (0.654)	2.227*** (0.323)	0.375*** (0.157)	0.710*** (0.125)	0.637*** (0.300)
Work in school	0.706*** (0.144)	1.275*** (0.176)	–	0.351*** (0.096)	0.860*** (0.169)	0.644*** (0.087)	0.147 (0.156)	0.300 (0.269)	0.759* (0.399)	0.251 (0.170)	0.551*** (0.121)	0.493*** (0.162)	0.022 (0.322)
Father education													
Primary	–0.328** (0.166)	–0.054 (0.120)	–	0.280** (0.141)	–0.036 (0.165)	0.846** (0.330)	0.112 (0.185)	0.086 (0.145)	–2.557*** (0.707)	–0.112 (0.170)	0.092 (0.083)	0.092 (0.083)	–0.052 (0.236)
Secondary	–0.407** (0.173)	–	–	–	0.010 (0.357)	–	–0.510** (0.258)	0.279 (0.239)	–1.713* (0.957)	–0.096 (0.187)	0.139 (0.174)	–	–1.137*** (0.315)
Urban	–0.101 (0.089)	–0.115 (0.081)	–	–0.110 (0.099)	–0.225* (0.121)	0.437*** (0.079)	0.068 (0.145)	–0.287* (0.172)	1.806*** (0.488)	0.038 (0.204)	–	–0.453*** (0.107)	0.128 (0.217)
Female	–1.407*** (0.100)	–0.232*** (0.079)	–	–0.251*** (0.086)	–1.501*** (0.136)	–1.108*** (0.079)	0.362** (0.173)	–2.776*** (0.153)	–0.597** (0.303)	–2.767*** (0.231)	–	–0.028* (0.051***)	–0.641*** (0.226)
GDP growth at time of leaving education	0.014*** (0.005)	0.190*** (0.036)	–	0.033*** (0.011)	–0.016 (0.036)	0.018 (0.018)	–	0.007 (0.034)	0.066 (0.058)	–0.025 (0.016)	–	0.051*** (0.013)	–
Observations	1849	1402	–	2246	2011	2213	1499	2873	1228	1546	1341	1736	1001
	Togo	Tunisia	Ukraine	Vietnam	Uganda	Madagascar	Nepal	Russian Fed.	Kyrgyz Rep.	Moldova, Rep.			



**Table 13** Estimates of split-cure model—first employment—proportional Weibull hazard function

	Armenia	Benin	Brazil	Cambodia	Egypt	El Salvador	Jamaica	Jordan	Macedonia, FYR	OPT	Peru	Samoa	Tanzania
Age left education													
16–18	0.343** (0.146)	-0.127 (0.113)	0.521*** (0.106)	0.254*** (0.052)	-0.031 (0.090)	-0.017 (0.081)	0.968*** (0.112)	0.434*** (0.096)	0.351* (0.188)	-0.015 (0.155)	0.479*** (0.115)	0.933*** (0.150)	0.297*** (0.110)
After 18	0.471*** (0.160)	0.001 (0.110)	0.929*** (0.107)	0.287*** (0.063)	-0.516*** (0.092)	0.186** (0.090)	1.165*** (0.130)	0.672*** (0.097)	0.649*** (0.194)	-0.112 (0.175)	0.755*** (0.119)	1.302*** (0.155)	0.310*** (0.117)
Work in school	0.610*** (0.091)	0.146 (0.116)	1.786*** (0.270)	0.337*** (0.047)	0.387*** (0.066)	0.475*** (0.071)	0.591*** (0.099)	0.568*** (0.110)	1.004*** (0.106)	0.745*** (0.100)	0.425*** (0.069)	0.460*** (0.157)	0.278** (0.116)
Father education													
Primary	-0.132 (0.130)	-0.306** (0.130)	0.243*** (0.092)	0.046 (0.068)	-0.044 (0.085)	-0.718*** (0.149)	-0.198 (0.131)	0.082 (0.075)	0.328*** (0.101)	0.146 (0.114)		0.201** (0.093)	0.057 (0.113)
Secondary	-0.024 (0.134)		-0.136 (0.245)		0.013 (0.105)		0.412* (0.234)	0.150 (0.104)	0.270 (0.210)	0.070 (0.117)	-0.186* (0.105)		
Urban	-0.261*** (0.076)	-0.228*** (0.083)	-0.021 (0.095)	-0.144** (0.058)	0.004 (0.063)	-0.029 (0.069)	0.100 (0.088)	0.068 (0.078)	-0.285*** (0.099)	-0.027 (0.129)			-0.222** (0.096)
Female	-0.449*** (0.082)	0.325*** (0.083)	-0.170** (0.073)	-0.076* (0.045)	-1.094*** (0.090)	-0.676*** (0.076)	-0.631*** (0.087)	-0.806*** (0.125)	-0.007 (0.094)	-0.564*** (0.260)	-0.450*** (0.069)	-0.096 (0.082)	-0.402*** (0.088)
GDP growth at time of leaving education	-0.011** (0.005)	-0.083** (0.037)	-0.016 (0.016)	-0.014** (0.007)	-0.052*** (0.018)	0.001 (0.016)		0.023 (0.014)	-0.008 (0.017)	0.014 (0.011)	0.012 (0.012)	-0.012 (0.014)	0.097** (0.049)
Ln(g)	-0.339*** (0.025)	-0.615*** (0.025)	0.181*** (0.027)	-0.406*** (0.014)	-0.485*** (0.021)	-0.507*** (0.020)	-0.481*** (0.028)	-0.412*** (0.022)	-0.484*** (0.033)	-0.341*** (0.032)	-0.316*** (0.022)	-0.364*** (0.026)	-0.475*** (0.031)
Observations	1849	1402	1575	2246	2011	2213	1499	2873	1228	1546	1341	1736	1001

**Table 13** Estimates of split-cure model—first employment—proportional Weibull hazard function (Continued)

	Togo	Tunisia	Ukraine	Vietnam	Uganda	Madagascar	Nepal	Russian Fed.	Kyrgyz Rep.	Moldova, Rep.
Age left education										
16–18	-0.146 (0.099)	0.173 (0.142)	-0.353** (0.162)	0.630*** (0.072)	0.107 (0.066)	-0.151** (0.074)	0.421*** (0.116)	0.196 (0.167)	0.271** (0.126)	-0.046 (0.144)
After 18	-0.252** (0.119)	0.351*** (0.129)	0.100 (0.158)	1.004*** (0.074)	0.263*** (0.075)	-0.024 (0.101)	0.601*** (0.108)	0.823*** (0.163)	0.751*** (0.130)	-0.000 (0.160)
Work in school	0.300*** (0.103)	0.343*** (0.100)	0.246*** (0.068)	0.318*** (0.072)	0.306*** (0.057)	0.388*** (0.058)	-0.079 (0.090)	0.228*** (0.074)	0.314*** (0.087)	0.363*** (0.108)
Father education										
Primary	-0.432*** (0.104)	0.018 (0.136)		-0.015 (0.061)	0.160* (0.083)	-0.324*** (0.078)	-0.187 (0.144)	-0.059 (0.074)	0.067 (0.097)	
Secondary		-0.251 (0.200)	0.023 (0.068)	-0.206* (0.112)	-0.087 (0.092)	-0.326* (0.175)		0.062 (0.084)	-0.182 (0.139)	0.146 (0.192)
Urban	-0.181* (0.095)	-0.221** (0.098)	-0.053 (0.070)	-0.327*** (0.055)	-0.249*** (0.068)	-0.353*** (0.066)	-0.380*** (0.102)	0.124* (0.066)	-0.368*** (0.071)	-0.312** (0.126)
Female	0.102 (0.094)	-0.416*** (0.111)	-0.232*** (0.062)	-0.140*** (0.054)	-0.284*** (0.057)	-0.084 (0.055)	-0.416*** (0.092)	-0.141** (0.064)	-0.364*** (0.076)	-0.132 (0.106)
GDP growth at time of leaving education	0.002 (0.011)	-0.016 (0.023)	-0.007* (0.004)	-0.102*** (0.025)	-0.005 (0.013)	0.000 (0.005)	0.045 (0.032)	-0.009 (0.008)	-0.015 (0.010)	-0.018 (0.011)
Ln(g)	-0.680*** (0.031)	-0.484*** (0.031)	-0.233*** (0.020)	-0.447*** (0.020)	-0.521*** (0.018)	-0.365*** (0.017)	-0.474*** (0.027)	-0.344*** (0.020)	-0.426*** (0.024)	-0.478*** (0.035)
Observations	832	1463	1725	1620	1903	1511	1110	1984	1780	507

Notes. The table reports estimates of the hazard function of transitioning to employment after leaving school from a split-cure model, separately by country, except for Brazil for which estimates are derived from a standard proportional Weibull hazard model. The hazard function is parameterized as  $g t^{s-1} \exp(X\beta/m)$ , where  $t$  is time elapsed since leaving school. Estimates of the vector  $m$  and  $\log(g)$  reported in the Table. See also notes to Table 12 in the Appendix

**Table 14** Estimates of split-cure model—first stable employment—probability of never transiting

	Armenia	Benin	Brazil	Cambodia	Egypt	El Salvador	Jamaica	Jordan	Macedonia, FYR	OPT	Peru	Samoa	Tanzania
Age left education													
16–18	0.269 (0.240)	0.482 (0.323)		-0.594*** (0.158)	0.614 (0.482)	0.220** (0.097)	-0.858* (0.475)	-0.132 (0.229)	16.693 (750.850)	-0.469 (0.521)	-0.049 (0.176)	0.467*** (0.178)	0.103 (0.418)
After 18	0.975*** (0.247)	0.812*** (0.200)		-0.246 (0.168)	1.339*** (0.399)	0.231** (0.104)	-0.571 (0.483)	5.031 (51.854)	16.239 (750.850)	1.375** (0.537)	-0.003 (0.193)	0.248 (0.195)	-0.320 (0.396)
Work in school	-0.163 (0.166)	0.890*** (0.266)		0.224 (0.180)	0.162 (0.333)	0.043 (0.090)	-0.209 (0.157)	-0.244 (0.227)	-0.703 (0.661)	0.920* (0.538)	0.015 (0.119)	0.132 (0.263)	0.501 (0.429)
Primary	-0.053 (0.196)	0.415* (0.230)		0.167 (0.139)	0.417 (0.339)	0.608** (0.253)	0.137 (0.186)	-0.163 (0.173)	-14.541 (750.850)	0.441 (0.326)	-0.050 (0.129)	-0.050 (0.129)	-0.225 (0.320)
Secondary	0.191 (0.223)				0.850** (0.396)		-0.030 (0.294)	-0.701*** (0.244)	-10.950 (744.011)	0.919*** (0.346)	0.657** (0.325)		
Urban	0.648*** (0.150)	0.471** (0.192)		0.659*** (0.142)	0.437 (0.298)	0.745*** (0.081)	0.339** (0.143)	-0.102 (0.209)	0.772* (0.452)	0.387 (0.344)			0.044 (0.271)
Female	-1.262*** (0.180)	-0.811*** (0.183)		-0.265** (0.119)	-0.470 (0.343)	-0.423*** (0.086)	0.182 (0.151)	-2.416*** (0.175)	-15.745 (750.851)	-3.883*** (0.557)	-0.315*** (0.119)	0.143 (0.111)	0.725 (0.465)
GDP growth at time of leaving education	-0.010 (0.008)	0.085 (0.080)		-0.010 (0.018)	0.040 (0.092)	0.018 (0.022)	-0.056 (0.051)	0.116*** (0.043)	-0.103 (0.114)	-0.036 (0.048)	-0.019 (0.019)	0.097*** (0.022)	0.061 (0.177)
Observations	1849	1401		2246	2010	2211	1486	2879	1228	1544	1342	1728	999
	Togo	Tunisia	Ukraine	Vietnam	Uganda	Madagascar	Nepal	Russian Fed.	Kyrgyz Rep.	Moldova, Rep.			
Age left education													
16–18	3.570 (2.875)	-0.036 (0.214)	0.052 (0.187)	-0.495 (0.342)	-0.030 (0.115)	-0.401 (0.333)	0.218 (0.188)	0.037 (0.525)	0.331 (0.346)	0.396 (0.359)			
After 18	-0.052	0.055	0.264	-0.543*	0.297**	-0.260	0.181	-0.480	1.343***	0.335			



**Table 14** Estimates of split-cure model—first stable employment—probability of never transitioning (Continued)

Work in school	0.820** (0.412)	0.579** (0.225)	0.160* (0.083)	0.044 (0.213)	-0.411*** (0.102)	-0.351 (0.280)	0.258* (0.136)	0.027 (0.200)	-0.180 (0.145)	-0.157 (0.231)
Father education										
Primary	0.724** (0.317)	0.120 (0.302)	0.091 (0.148)	0.079 (0.148)	0.545* (0.298)	-0.253 (0.196)	0.126 (0.188)	-0.236* (0.142)		
Secondary		1.160 (1.204)	0.031 (0.078)	0.166 (0.199)	0.313* (0.178)	0.136 (0.239)	0.099 (0.218)	0.052 (0.168)	0.052 (0.168)	-0.700 (0.482)
Urban	0.132 (0.361)	0.537** (0.257)	0.369*** (0.079)	0.350*** (0.137)	0.820*** (0.129)	0.732** (0.343)	0.392** (0.157)	-0.490*** (0.187)	0.228** (0.107)	0.480** (0.244)
Female	-0.677** (0.281)	-0.481** (0.235)	-0.221*** (0.071)	-0.082 (0.121)	-0.600*** (0.100)	-0.062 (0.251)	-0.937*** (0.158)	-0.629*** (0.179)	-0.182* (0.104)	-0.346 (0.224)
GDP growth at time of leaving education	-0.060 (0.045)	-0.034 (0.053)	0.003 (0.005)	0.262*** (0.084)	-0.041 (0.025)	0.047** (0.023)	0.082 (0.060)	0.035* (0.018)	0.019 (0.015)	0.015 (0.025)
Observations	832	1458	1727	1620	1894	1508	1109	1975	1776	507

Notes: The table reports similar regressions to those in Table 11 in the Appendix for the probability of never transitioning to the first stable employment. Standard errors in brackets. \*\*\*, \*\*, \* significant at 1, 5, and 10 percent level, respectively

**Table 15** Estimates of split-cure model—first stable employment—proportional Weibull hazard function

	Armenia	Benin	Brazil	Cambodia	Egypt	El Salvador	Jamaica	Jordan	Macedonia, FYR	OPT	Peru	Samoa	Tanzania
Age left education													
16–18	-0.186 (0.265)	-0.554 (0.459)	0.542*** (0.090)	0.809*** (0.169)	-0.904 (0.724)	-0.033 (0.127)	1.305*** (0.182)	0.604*** (0.112)	0.932*** (0.308)	0.501*** (0.169)	0.312 (0.205)	0.868*** (0.242)	0.260 (0.472)
After 18	0.427 (0.268)	0.740*** (0.263)	0.721*** (0.092)	1.075*** (0.173)	-0.279 (0.608)	0.424*** (0.127)	1.646*** (0.204)	0.729*** (0.113)	1.289*** (0.312)	0.811*** (0.172)	0.447** (0.225)	1.114*** (0.257)	0.956*** (0.482)
Work in school	1.132*** (0.138)	-0.350 (0.382)	1.136*** (0.197)	-0.663*** (0.173)	0.224 (0.516)	0.482*** (0.100)	0.854*** (0.136)	0.428*** (0.137)	0.542*** (0.148)	0.148 (0.115)	0.389*** (0.133)	0.551* (0.296)	-0.408 (0.458)
Father education													
Primary	-0.433** (0.218)	-0.155 (0.336)	0.288*** (0.077)	0.327** (0.160)	0.337 (0.514)	-0.561** (0.230)	-0.250 (0.173)	0.205*** (0.079)	0.665*** (0.155)	0.211 (0.130)		0.228 (0.162)	0.117 (0.373)
Secondary	-0.523** (0.224)		0.247 (0.154)		0.203 (0.599)		0.037 (0.306)	0.299*** (0.098)	0.593*** (0.219)	-0.047 (0.123)	-0.960*** (0.276)		
Urban	0.118 (0.152)	-0.652** (0.261)	0.431*** (0.087)	-0.117 (0.143)	-0.252 (0.440)	-0.141 (0.095)	0.060 (0.124)	-0.016 (0.085)	0.436*** (0.127)	-0.256* (0.135)			0.067 (0.306)
Female	0.520*** (0.129)	0.153 (0.257)	-0.077 (0.056)	0.115 (0.127)	0.251 (0.479)	-0.400*** (0.099)	-0.358*** (0.120)	-1.185*** (0.086)	0.412*** (0.157)	-0.200 (0.262)	-0.182 (0.138)	0.178 (0.136)	-1.088** (0.441)
GDP growth at time of leaving education	0.001 (0.007)	0.024 (0.103)	-0.024** (0.012)	-0.003 (0.020)	-0.063 (0.126)	0.058** (0.027)	0.051 (0.044)	-0.020 (0.015)	0.011 (0.022)	0.007 (0.016)	0.003 (0.023)	0.036 (0.029)	0.043 (0.206)
Ln(g)	-0.394*** (0.037)	-0.617*** (0.067)	-0.504*** (0.020)	-0.686*** (0.036)	-0.328*** (0.092)	-0.537*** (0.028)	-0.454*** (0.038)	-0.443*** (0.023)	-0.367*** (0.046)	-0.422*** (0.040)	-0.454*** (0.038)	-0.442*** (0.043)	-0.461*** (0.070)
Observations	1849	1402	1582	2246	2011	2213	1499	2873	1228	1546	1341	1736	1001

**Table 15** Estimates of split-cure model—first stable employment—proportional Weibull hazard function (Continued)

	Togo	Tunisia	Ukraine	Vietnam	Uganda	Madagascar	Nepal	Russian Fed.	Kyrgyz Rep.	Moldova, Rep.
Age left education										
16–18	-1.607*** (0.474)	0.319 (0.252)	0.014 (0.199)	1.082*** (0.200)	0.255* (0.143)	1.286*** (0.399)	0.029 (0.257)	0.560 (0.731)	0.528 (0.491)	-0.971** (0.395)
After 18	0.702 (0.464)	0.164 (0.335)	0.543*** (0.193)	2.256*** (0.158)	0.484*** (0.147)	1.418** (0.587)	0.512** (0.225)	1.244* (0.746)	1.649*** (0.481)	-0.662 (0.415)
Work in school	-0.591 (0.379)	0.048 (0.177)	0.117 (0.078)	-0.260 (0.161)	0.197 (0.125)	-0.085 (0.401)	-0.115 (0.179)	-0.223 (0.281)	0.151 (0.185)	0.390 (0.259)
Father education										
Primary	-0.451 (0.302)	0.115 (0.275)	0.061 (0.119)	0.061 (0.119)	-0.053 (0.186)	-0.090 (0.404)	0.282 (0.245)	0.090 (0.292)	-0.100 (0.182)	
Secondary		0.033 (0.437)	0.075 (0.078)	-0.009 (0.182)	-0.315 (0.209)		0.401 (0.330)	-0.172 (0.308)	-0.052 (0.204)	-0.215 (0.529)
Urban	0.650** (0.314)	-0.273 (0.239)	-0.079 (0.082)	0.243** (0.115)	-0.415*** (0.144)	-0.708* (0.399)	-0.523** (0.241)	0.644** (0.274)	0.048 (0.131)	-0.829*** (0.271)
Female	0.250 (0.283)	-0.493** (0.236)	-0.167** (0.071)	0.130 (0.096)	0.149 (0.118)	0.203 (0.343)	-0.586*** (0.224)	-0.612** (0.263)	0.005 (0.135)	-0.455* (0.244)
GDP growth at time of leaving education	0.060 (0.051)	0.037 (0.045)	-0.004 (0.005)	-0.211*** (0.055)	-0.012 (0.031)	-0.051 (0.033)	0.044 (0.064)	-0.026 (0.023)	-0.045** (0.021)	-0.023 (0.029)
Ln(g)	-0.736*** (0.092)	-0.520*** (0.049)	-0.276*** (0.023)	-0.293*** (0.034)	-0.534*** (0.036)	-0.653*** (0.085)	-0.471*** (0.052)	-0.365*** (0.060)	-0.303*** (0.039)	-0.119 (0.079)
Observations	832	1458	1727	1620	1894	1508	1109	1975	1776	507

Notes: The table reports similar regressions to those in Table 13 in the Appendix for the hazard function of transitioning to the first stable employment. Standard errors in brackets. \*\*\*, \*\*, \*; significant at 1, 5, and 10 percent level, respectively

**Table 16** Fraction of individuals predicted to transit from school to work at different durations since the time of leaving school

Region	Country	Share of individuals expected to have transited after					
		6 months		12 months		36 months	
		First	First stable	First	First stable	First	First stable
Asia and the Pacific	Cambodia	0.83	0.34	0.94	0.43	1.00	0.59
	Nepal	0.66	0.52	0.80	0.66	0.95	0.86
	Samoa	0.64	0.55	0.79	0.70	0.94	0.89
	Vietnam	0.44	0.22	0.58	0.32	0.80	0.50
Eastern Europe and Central Asia	Armenia	0.54	0.32	0.70	0.45	0.92	0.68
	Kyrgyz Rep.	0.42	0.31	0.57	0.44	0.80	0.68
	Macedonia, FYR	0.22	0.10	0.31	0.15	0.50	0.28
	Moldova, Rep.	0.68	0.81	0.82	0.93	0.96	1.00
	Russian Fed.	0.49	0.37	0.66	0.51	0.88	0.74
Latin America and the Caribbean	Ukraine	0.62	0.52	0.81	0.70	0.97	0.93
	Brazil	0.58	0.46	0.69	0.59	0.84	0.67
	El Salvador	0.59	0.56	0.73	0.69	0.89	0.87
	Jamaica	0.41	0.32	0.54	0.44	0.75	0.64
Middle East and North Africa	Peru	0.71	0.44	0.85	0.58	0.98	0.81
	Egypt	0.41	0.25	0.53	0.38	0.73	0.62
	Jordan	0.35	0.26	0.49	0.37	0.72	0.57
	OPT	0.31	0.16	0.45	0.24	0.70	0.43
Sub-Saharan Africa	Tunisia	0.39	0.26	0.52	0.36	0.75	0.56
	Benin	0.67	0.53	0.80	0.65	0.94	0.82
	Madagascar	0.77	0.33	0.88	0.42	0.95	0.57
	Tanzania	0.43	0.28	0.57	0.39	0.80	0.58
	Togo	0.48	0.27	0.60	0.34	0.79	0.47
Uganda	0.63	0.44	0.77	0.57	0.93	0.79	

Notes. The table reports the estimated fraction of individuals predicted to transit to employment (among those ever predicted to transit) by country based on model estimates reported in Table 13 in the Appendix

**Table 17** Aggregate indicators: definitions and sources

GDP	GDP per capita, PPP (constant 2011 international \$)	World Bank—World Development indicators
Unemployment rate	Unemployment, total (% of total labor force)	World Bank—World Development indicators
Population growth	Population growth (annual %)	World Bank—World Development indicators
Poverty rate	Poverty headcount ratio at \$1.25 a day (PPP) (% of population)	World Bank—World Development indicators
Minimum wage	Minimum wage to value added per worker	World Bank Doing Business—Labor regulations
Unemployment insurance	Dummy for the availability of unemployment insurance scheme	World Bank Doing Business—Labor regulations
Years of compulsory education	Duration of compulsory education (years)	UNESCO

**Table 18** Aggregate indicators: descriptive statistics

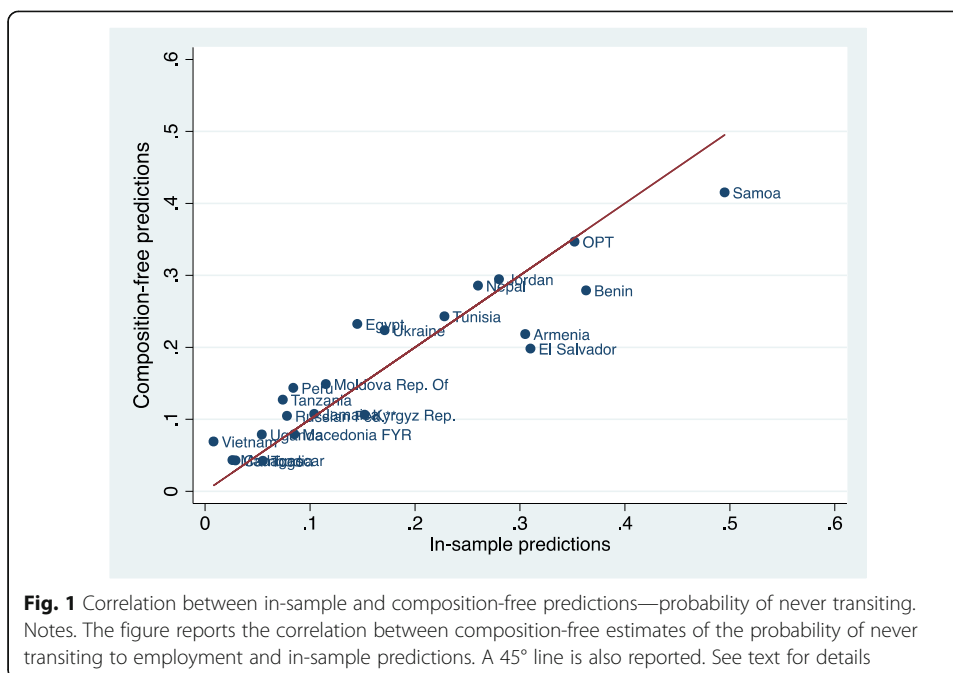
Region	Country	Log GDP	Pop growth	Poverty rate	Minimum wage	Unemp. Insurance	Years comp. education
Asia and the Pacific	Cambodia	7.99	1.80	10.05	0	0	–
	Nepal	7.68	1.17	23.74	0.94	0	–
	Samoa	8.63	0.78	.	0.36	0	8.00
	Vietnam	8.54	1.05	2.44	0.60	1	9.00
Average		8.30	1.16	7.77	0.60	0.68	9.00
Eastern Europe and Central Asia	Armenia	8.93	0.25	1.75	0.25	1	11.00
	Kyrgyz Rep.	8.04	1.98	5.11	0.12	1	9.00
	Macedonia, FYR	9.36	0.07	–	0.51	1	9.00
	Moldova, Rep.	8.42	–0.01	0.23	0.39	1	9.00
	Russian Fed.	10.07	0.22	–	0.17	1	10.00
	Ukraine	9.05	–0.23	0	0.32	1	11.00
Average		9.73	0.17	0.61	0.21	1	10.18
Latin America and Caribbean	Brazil	9.59	0.86	3.75	0.31	1	14.00
	El Salvador	8.92	0.68	2.53	0.49	0	9.00
	Jamaica	9.06	0.27	–	0.37	0	6.00
	Peru	9.34	1.28	2.89	0.34	0	12.00
Average		9.53	0.90	3.61	0.32	0.84	13.52
Middle East and North Africa	Egypt	9.28	1.64	–	0	1	9.00
	Jordan	9.34	2.21	0.08	0.39	–	10.00
	OPT	–	–	–	–	–	–
	Tunisia	9.28	1.00	0.74	0.54	0	9.00
Average		9.29	1.61	0.49	0.08	0.88	9.06
Sub-Saharan Africa	Benin	7.46	2.68	51.61	0.52	0	6.00
	Madagascar	7.22	2.79	87.67	0.74	1	5.00
	Tanzania	7.45	3.03	43.48	0.65	1	7.00
	Togo	7.20	2.59	52.46	1.34	0	10.00
	Uganda	7.22	3.34	37.78	0.02	0	7.00
Average		7.33	3.02	50.92	0.51	0.57	6.72
Tot. average		9.00	1.18	14.68	0.34	0.81	10.37
S.d.		0.94	0.98	22.28	0.26	0.40	2.64
Europe	Austria	10.70	0.52	–	0.26	1	
	Belgium	10.61	0.60	–	0.41	1	
	Denmark	10.65	0.40	–	0.00	1	
	Finland	10.57	0.47	–	0.38	1	
	France	10.52	0.53	–	0.35	1	
	Germany	10.67	0.24	–	0.00	1	
	Greece	10.11	–0.55	–	0.29	1	
	Ireland	10.71	0.18	–	0.37	1	
	Italy	10.44	0.49	–	0.46	1	
	Portugal	10.15	–0.52	–	0.29	1	
	Spain	10.36	–0.24	–	0.31	1	
United Kingdom	10.52	0.63	–	0.27	1		
Average		10.51	0.32	–	0.27	1	

Notes. See Table 17 in the Appendix for details of definitions and sources

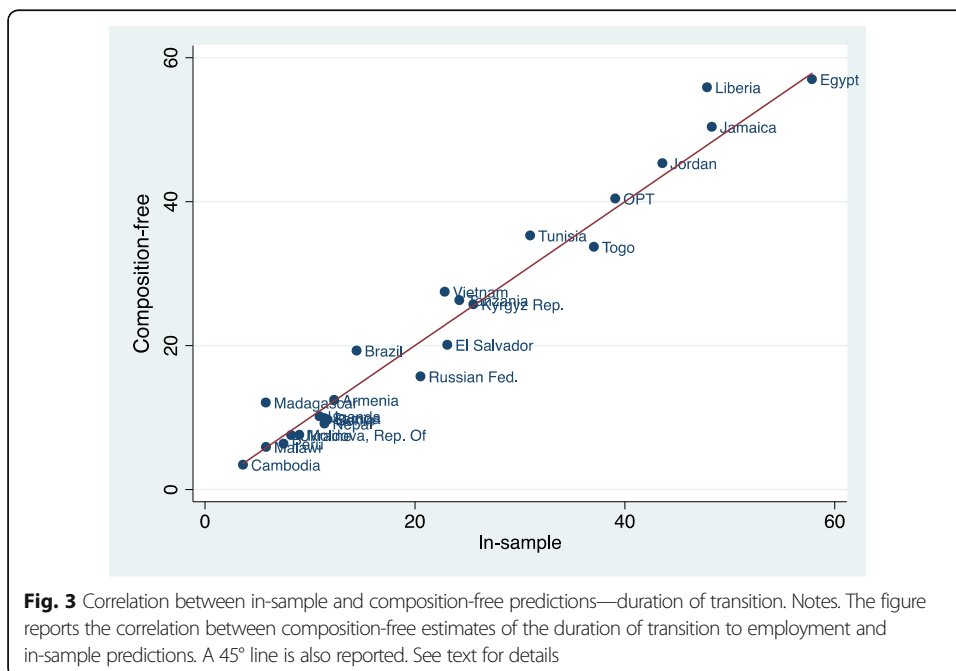
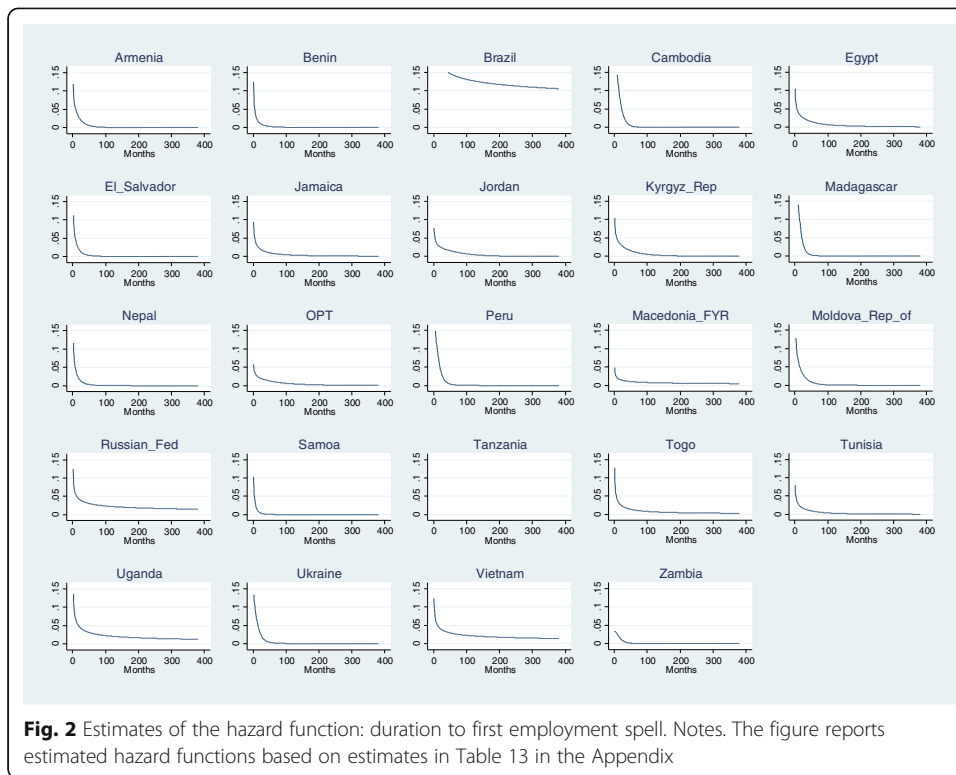
**Table 19** Macro correlates of the predicted transition duration from school—including Europe

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average duration from school to employment		Average duration from school to stable employment		Average duration from school to employment		Average duration from school to stable employment	
log GDP	2.152 (3.792)	3.354 (3.945)	-18.188 (11.854)	-10.959 (11.828)	-14.224** (6.668)	-16.978* (8.294)	-0.489 (21.836)	-8.367 (25.427)
Pop. growth	12.023** (4.419)	12.325** (4.505)	31.240** (13.814)	35.424** (13.509)	-3.265 (4.745)	-2.771 (5.012)	-1.737 (15.540)	3.279 (15.364)
Poverty rate	-11.144** (4.776)	-14.015** (5.050)	-30.190* (14.931)	-41.364** (15.142)	-13.193** (4.955)	-10.661* (5.953)	5.235 (16.227)	15.898 (18.250)
Minimum wage	4.163 (3.043)	4.172 (3.028)	13.540 (9.511)	12.604 (9.079)	4.428* (2.136)	4.161* (2.213)	2.273 (6.996)	1.135 (6.784)
UI	5.281* (2.819)	5.344 (3.162)	23.974** (8.811)	28.423*** (9.481)	6.015*** (1.942)	4.908* (2.426)	21.865*** (6.361)	17.306** (7.439)
Years compulsory educ.		-5.485 (3.465)		-22.298** (10.389)		0.499 (5.348)		-7.905 (16.397)
Observations	34	34	34	34	34	34	34	34
R <sup>2</sup>	0.409	0.467	0.521	0.603	0.801	0.811	0.823	0.852
Region fixed effects	NO	NO	NO	NO	YES	YES	YES	YES

Notes. The table reports similar regressions to those in columns 1 to 4 of Tables 8 and 9 on a sample that also includes European countries. Standard errors in brackets. \*\*\*, \*\*, \* : significant at 1, 5, and 10 percent level, respectively



**Fig. 1** Correlation between in-sample and composition-free predictions—probability of never transiting. Notes. The figure reports the correlation between composition-free estimates of the probability of never transiting to employment and in-sample predictions. A 45° line is also reported. See text for details



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### Competing interests

The IZA Journal of Labor & Development is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

### Author details

<sup>1</sup>Queen Mary University of London, London, UK. <sup>2</sup>CEP (LSE), London, UK. <sup>3</sup>CEPR, Washington, DC, USA. <sup>4</sup>IZA, Bonn, Germany. <sup>5</sup>University of Rome 'Tor Vergata', Rome, Italy. <sup>6</sup>Understanding Children's Work (UCW) Programme, Rome, Italy. <sup>7</sup>ICID, Rome, Italy. <sup>8</sup>ILO, Geneva, Switzerland. <sup>9</sup>World Bank, Washington, DC, USA.

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