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Abstract

This paper develops a model which provides a characterization of the joint distribution of the duration of search, accepted wages and skills with unobserved heterogeneity based on Eckstein and Wolpin (1995). We aim to estimate the effect of cognitive and socio-emotional skills on first job wages and duration of job search. Observed and unobserved heterogeneity are exploited as sources of identification. The data is drawn from the 2010 ENHAB which has not been used for this purpose before and which contains full retrospective information on first job outcomes and children. The model is estimated through a maximization of the joint Likelihood. Preliminary results regarding wages show that socio-emotional skills are the most valued among high skilled individuals, whereas cognitive skills are the most valued among low skilled individuals. Predicted wages for type I individuals are always above the observed wage, for every schooling level. Regarding duration of first job search, results show that the socio-emotional high skilled individual receives more job offers than the cognitive high skilled with the same schooling level.

JEL CODES: J13, J21
KEYWORDS: Cognitive skills, socioemotional skills, first job, wages, job search.

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1 Introduction

Literature has focused on the role of cognitive and socioemotional abilities on academic performance and labor market outcomes. Studies show a strong positive relationship of abilities on productivity (Cunha and Heckman, 2007; Gill and Prowse, 2015; Hanushek and Woessmann, 2008).

These estimates show contemporaneous correlation between abilities and wages or employability. They do not take into account dynamic aspects in abilities formation and wages. This is important because a high percentage of the variance in earnings is explained by permanent unobserved differences at first job. In particular, Lillard and Willis (1979) found that 73 percent of the variance in earnings is explained by permanent unobserved differences (controlling for schooling, experience, race and gender) identified by the variance of wages at first job. However, there is no literature on the relationship between cognitive and socioemotional abilities and the first wage.

The main objective of this paper is to estimate the contribution of cognitive and socioemotional abilities on the quality of the first job. Quality of the first job is measured by the joint distribution of wages and time spent searching for the first job. For that purpose we develop a job search model which characterizes the joint distribution of wages and time spent searching for the first job as a function of abilities. Abilities affect the joint distributuion through the value of matching, the arrival rate of offers and the cost of search.

Estimating the role of abilities in having a high quality first job is particularly important in developing countries where population is remarkably distributed between two groups: high able and low able individuals.

A first job can most fruitfully be employed as a predictor of the subsequent career when it is used in conjunction with other determining factors such as education and parentâĂŹs occupation. The American occupational structure encourages and requires a sizable minority of those beginning in a disadvantaged state to rise, though it never gives them as good an opportunity as those who are more fortunate at the beginning of their careers (Lipset and Malm, 1955).

The salary presented commonly measures the quality of first job. However, other indicators reflect quality such as the nature of the job, the time spent searching for it, and its conditions (part time or full time) (Abel, Deitz, and Su, 2014).

Some jobs require more socio-emotional skills than others. They can be more important in certain low skill occupations, in particular in the service sector (Bowles, Gintis, and Osborne, 2001). An average Latin American worker is twice as likely to be employed in the service sector than in manufacturing (World Bank Group, 2014). Gradually, the economy is shifting towards a non-cognitive skill oriented job creation. A vast amount of literature exists on the formation of cognitive and non-cognitive abilities (Cunha F. , Heckman, Lochner and Masterov, 2005) (Cunha and Heckman, The Technology of Skill Formation, 2007), as well as the development of those abilities and their results in the labor market (Heckman, Stixrud and Urzua, 2006).

In the region, there are some studies about the incidence of cognitive and non-cognitive abilities in several areas: their relation with health and parental care in Ecuador (Paxson and Schady, 2007), with conditional transfers in Nicaragua (Macorus, Schady, and Vakis, 2012), and with a preschool program in Bolivia (Behrman, Cheng, and Todd, 2004). In Peru, studies show the importance of these skills on accessing to a college education (Castro and Yamada, 2011), on the gender wage gap (Yamada, Lavado, and Velarde, 2013) and their return on income (Díaz, Arias, and Vera Tudela, 2011). Still a space remains for research on the relationship between cognitive and non-cognitive skills with the probability of being hired at a quality level first job.

A World Bank survey indicates that Peruvian employees claim that workers generally lack the required skills for the job, though it is not yet clear which are the skills that are absent (Jaramillo and Silva-Jáuregui, 2011). Kuhn and Weinberger report that employers five most highly valued personal qualities, in order, were: communication skills, motivation/initiative, teamwork skills, leadership skills, and academic achievement/GPA (Kuhn and Weinberger, 2002). The majority reflects socio-emotional or soft skills that are best developed from pre-school through high school education. While some of these socio-emotional skills can be developed on the job, firms are less likely to train on these foundational skills since there is a higher risk the investment is captured by other employers (Arias, 2014). Policy interventions in education matters are most successful when they happen at early stages of the student formation (Brunello and Schlotter, 2011). Disadvantages found at an early age will result in the intergenerational transmission of poverty and inequalities if not addressed by policymakers before children reach adulthood (Lopez, 2014).

The paper is organized as follows. The following section presents the formal model. Section 3 and 4 present the econometric implementation − the construction of the likelihood function − and the identification of the model through unobserved heterogeneity. Section 5 describes the data and sample. Section 6 presents preliminary results and section 7 concludes.

2 The Model

We propose a model which provides a characterization of the joint distribution of the duration of search, accepted wages and skills with unobserved heterogeneity. The model is based on Eckstein and Wolpin (1995) incoporating a simple skills formation technology. The main objective of the model is to estimate the effect of skills on the duration of job search and on accepted wages for first job.

Consider a simple job search model where a worker (w), who lives forever, meets a firm (π) with probability P which is a function of the effort of the worker: P= (s^w, s^π;g); where s^j, j=w,π, is the effort madej by j to meet members of the other group. G(.) is a function of the effort of the two parties and a vector of parameters g. The effort s^j involves incurring cost $c_j(s^j)$.

Once a firm and a worker meet they sample a value of their match that is equal to $m \in [0, M]$. The value of m is a random draw from the distribution function F(m). Let w(m) be the wage and

$\pi(m)$ be the profits of the firm from a match of value m. Then, it is required that, w(m)+$\pi(m) \leq$ m

Each worker can meet at most one firm in each period. If the firm and the worker arrive at an agreement about w(m) and $\pi(m)$, search finishes. If they do not agree, then they can search again during the next period. Time is assumed to be disrete.

The division of ths surplus m is determined by the static Nash Axiomatic solution relative to the disagreement outcome of continued search. The solution is the following. Given increasing functions w(m) and $\pi(m)$ and constant value s^j, let $V^j = (s^j; s^i)$ denote the steady state expected value of search by party j, (j=w,π); it is given by the equation:

$$V^j(s^j; s^i) = -c_j(s^j) + PEmaxj(m), \delta^j V^j(.) + (1-P)\delta^j V^j(.) \tag{1}$$

The search policy is characterized by a constante reservation value m_j, that is, search until the match value m is above m_j. j=w,π. Now, the steady state expected value of search can be written as follows:

$$\begin{aligned} V^j(s^j, m_j; s^i) = & -c_j(s^j) + PE(j(m)|m > m_j)Pr(m > m_j) \\ & + P\delta^j V^j(s^j, m_j; s^i)Pr(m < m_j) \\ & + (1-P)\delta^j V^j(s^j, m_j; s^i) \end{aligned} \tag{2}$$

The optimal search strategy of party j is to maximize $V^j(s^j, m_j; s^i)$ with respect to s^j and m_j. let $\bar{V}^j$, j=w,π, denote the maximized value of V^j with respect to s^j and m_j. At each date the disagreement values for the worker and the firm are the one period discounted value of continued search, that is, $\delta^j \bar{V}^j$.

The Nash Axiomatic bargaining solution is efficient, which implies that equation holds as an equality and in equiilibrium is required that only for match values m $\geq \delta^w \ \bar{V}^w + \delta^\pi \ \bar{V}^\pi$ will the worker and the firm arrive at an agreement. Hence, the solution is characterized by worker and firm reservation match values such that $m_w = m_\pi = m*$, whre $m*$ is the reservation match value satisfying: $m* = \delta^w \bar{V}^w + \delta^\pi \bar{V}^\pi$.

The Axiomatic Nash bargaining solution for a non-symmetric case with a weight α for workers implies that the wage schedule satisfies:

$$w(m) = \delta^w \bar{V}^w + \alpha(m - m*) \tag{3}$$

and the profit schedules satisfies:

$$\pi(m) = \delta^\pi \bar{V}^\pi + \alpha(m - m*) \tag{4}$$

The solution for V^j, j=w, π, must satisfy:

$$\bar{V}^w = max_{s^w,m*}[-c_w(s^w) + P\alpha E(m - m*)|m > m*)Pr(m > m*]/(1 - \delta^w) \tag{5}$$

and

$$\bar{V}^\pi = max_{s^\pi,m*}[-c_\pi(s^\pi) + P(1 - \alpha)E(m - m*)|m > m*)Pr(m > m*]/(1 - \delta^\pi) \tag{6}$$

Solving for$m*$ we have: $\delta^j \bar{V}^j$, j=w, π. The model provides a complete characterization of the joint distribution of the duration of search and accepted rents for both parties, sorkers and firms. The distribution is affected by the parameters, δ^w, δ^π and α and the functions of the model, G8.), $c_w(.)$, $c_\pi(.)$ and F(m).

Workers with different levels of observed levels of schooling are assumed to have different fundamentaql parameters. we assume that heterogeneity is fully pbserved by firms.[1] Furthermore, heterogeneity in characteristics also exists within schooling groups, i.e. differences in cognitive and socioemotional abilities.The latter are unobserved by the econometrician.

The unobserved heterogeneity provide a potential explanation for the observed differences between schooling groups: low schooling groups have lower mean accepted wages and longer durations of unemployment. Suppose that within each shooling level there are two types of individuals. One type has a low match productivity mean and the other a high mean. Because workers with a low mean will search intensively, they will also have a lower offer probability and a lower reservation wage than the high-mean type. The resulting hazard rate of the low mean type may be lower than that of the high mena type, leading to a longer mean duration of unemployment. If some group are disproportionately of the low mean type, beacuse they have less cognitive and socioemotional abilities, then they will have lower mean accepted wages and longer durations.

3 Econometric Implementation

Let us assume that the match value m comes from a log-normal distribution with density function:

$$f(m) = \frac{1}{m\sigma_m(2\pi)^{1/2}} exp(-\frac{1}{2}(\frac{ln\ m - \mu}{\sigma_m})^2) \tag{7}$$

Using the properties for the mean of the log normal distribution, it can be shown that:

$$E(m|m > m*)Pr(m > m*) = exp(\frac{1}{2}\sigma_m^2 + \mu)[1 - \Phi(\frac{ln\ m* - (\sigma_m^2 + \mu)}{\sigma_m})] \tag{8}$$

where Φ is the normal cdf. The probability of accepting a job conditional on search, the hazard rate (h), is given by:

$$h(s^w, s^\pi, m*) = P(1 - F(m*)) \tag{9}$$

[1] We should relax this assumption.

where P is the probability given optimal effort levels in equilibirum. The density function of wage conditional on acceptance of a job is given by:

$$z(w(m)|m > m*) = \frac{1}{w(m)\sigma(2\pi)^{1/2}} exp[(-\frac{1}{2}(\frac{ln\ w(m) - ln0.5 + \mu}{\sigma}))^2]. \frac{1}{1 - F(m*)} \tag{10}$$

We extend the model by assuming that the population of workers in a given schooling level consists of K different type of individuals where each type may have a different value of the cost of search and a different value of the mean of the distribution of the match. We also assume that the observed wage, w^o, is measured without error. Hence: ln w^o= ln w , where w^o is the observed wage and w(m) is the true wage. The joint probability that the wage exceeds the reservation wage (w^*) and that w^o is realized is:

$$Pr(w(m) > w*(m), w^o) = Pr(w(m) > w*(m)|w^o)Pr(w^o) \tag{11}$$

$$Pr(w(m) > w^*(m), w^o) = [1 - \Phi(\frac{ln\ w^* - ln0.5 - \mu}{\sigma})]x\frac{1}{w^o}\frac{1}{\sigma}\phi(\frac{lnw^o - (ln0.5 + \mu)}{\sigma}) \tag{12}$$

where $\sigma^2 = \sigma_m^2$ and ϕ is the normal pdf.

The main objective is to estimate the correlation of cognitive and socioemotional abilities with a measure of quality of the first job. We follow the model proposed by Cunha et. al. (2010) in the sense that abilities today depend on latent abilities (unobserved heterogeneity) and on all activities related to skill formation (e.g. schooling, experience and on the job training). Thus prediction of abilities before the first job is possible just by knowing the motion law of abilities and schooling trajectories, assuming that experience on the job training are only accumulated after the first job.

We use several mesaures of cognitive and socioemotional abilities to identify unobserved heterogeneity in contrast to Cunha et. al (2007) who proposed the identification of a latent dynamic factor model using panel data information on measured tests. The main assumption here is that the we are assuming a latent model identified by the correlation between measured tests. In other words, the correlation between measured tests is only explained by a latent common factor (unobserved heterogeneity). In particular, we have 4 cognitive tests and 6 socioemocional tests. Let Z_r^j be the rth test for j=C,S. We establish the following system based on Heckman et. al. (2007):

$$Z_r^j = \mu_r^j + \alpha_r^j\theta^j + u_r \tag{13}$$

where θ is the latent ability and u are independent measurement errors. We assume that $E(\theta) = 0$ and $\alpha_1^j = 1$. Under these assumptions, we identify μ, α and θ:

$$\theta^j = \frac{1}{R^j}\sum_{r=1}^{R^j}\frac{Z_r^j - \mu_r^j}{\alpha_r^j} \tag{14}$$

where R is the total number of tests.

We do not have information on skills before first job for all individuals. Skills are affected by events during working lifetime: tenure in the current job, number of jobs unemployment spells. In addition to tenure and the unmber of previous jobs, we exploit the fact that we have duration of job search before first job for all individuals. We assume that duration of job search before first job is the most important unemployment spell (or equivalently, once an individual gets her first job, she is permanently emplyed). We assume the following law of motion of skills:

$$\theta^j = \alpha_0^j + \alpha_1^j d_2 + \alpha_2^j d_3 + \alpha_3^j X + \alpha_4^j T + \alpha_5^j + \epsilon^j \quad j = C, S \tag{15}$$

where θ is the latent ability, d_2 is a dichotomous variable which takes the value of 1 if duration of first job search lasted more than 1 month and less than 3 months, d_3 is a dichotomous variable which takes the value of 1 if duration of first job search lasted more than three months, X is the number of previous jobs, T is the number of months in the current job and ϵ is a measurement error.

The likelihood function for I individuals of K types, each with a completed spell length of d_i and an observed wage of w_i^o, is:

$$\begin{aligned} L(\Psi) =& \Pi_{i\in I}\Sigma_{k=1}^K \gamma_k [1 - P_k(1 - \Phi(\frac{lnw_k * -(ln0.5 + \mu_k)}{\sigma}))]_i^d P_k \\ & [1 - \Phi \frac{lnw_k * -ln0.5 - \mu_k)}{\sigma}] \\ & \frac{1}{w_i^o}\frac{1}{\sigma}\phi(\frac{lnw_i^o - (ln0.5 + \mu_k)}{\sigma}) \\ & \frac{1}{\sigma_C}\phi(\frac{\theta^C - \alpha_0^C - \alpha_1^C d_2 - \alpha_2^C d_3 - \alpha_3^C X - \alpha_0^C T}{\sigma_C}) \\ & \frac{1}{\sigma_S}\phi(\frac{\theta^S - \alpha_0^S - \alpha_1^S d_2 - \alpha_2^S d_3 - \alpha_3^S X - \alpha_0^S T}{\sigma_S}) \end{aligned} \tag{16}$$

where γ_k i the proportion of type k in the population and Ψ is a vector of parameters.We paramterize mean wages and the offer probability:

$$\mu_k = \theta_{0k} + \theta_{1k} C_k + \theta_2 S_k + \theta_3 T + \theta_4 X + \theta_5 T + \theta_6 A \tag{17}$$

$$P_k = \frac{exp(\beta_{0k} + \beta_{1k} C + \beta_{2k} S)}{1 + exp(\beta_{0k} + \beta_{1k} C + \beta_{2k} S)} \tag{18}$$

However consistency of this estimator is not achieved due to the small number of measured tests by individuals. Hence, a grouped fixed effect estimator is proposed. Consistency is achieved as long the number of groups is known or a functional form is assumed.

Regarding sources of heterogeneity (unobserved to the econometrician): from latent abilities which drives decisions on first job choices behaviors. This heterogeneity allows matching serial and contemporaneous correlation in measured tests. This heterogeneity is observationally equivalent

as if it were considered in first job choices. This economy has 2 types.[2] The probability of type 1 follows a logistic function conditioned on Ω_0, discrete measurements of cognitive and socio-emotional skills:

$$Prob(type1|\Omega_0) = \frac{(\gamma_0 + \gamma_1 D_C + \gamma_2 D_S)}{1 + exp(\gamma_0 + \gamma_1 D_C + \gamma_2 D_S)} \tag{19}$$

where D_C is a dummy variable that takes the value of 1 if the individual's cognitive skill exceeds the sample's mean and D_S is a dummy variable that takes the value of 1 if his/her socio-emotional skill exceeds the sample's mean.

4 Identification

There are two sources of heterogeneity. Observed heterogeneity between schooling groups and unobserved heterogeneity within schooling groups in the mean of wages and in the arrival rate of offers.

The variance of unobserved heterogeneity in the mean wages is identified by the correlation of observed wages and (latent) abilities. Heterogeneity in the arrival rate of offer is identified by the correlation between the time spent searching and abilities. Unobserved types are identified by the correlation between different measures of cognitive and socioemotional abilities. Parameters of the mean of wages are identified by the correlation of tenure, experience and age with wages. Parameters of the law of motion of abilities are identified by the correlation between experience, tenure with cognitive and socioemotional abilities. Parameters related to the evolution of abilities conditional on time spent searching are identified by the mean of abilities conditional on time spent searching.

Correction of endogeneity is necessary to estimate the effect of cognitive and socioemotional abilities on time spent searching and wages (at first job). The model considers three sources of endogeneity: unobserved heterogeneity in wages and in the ariaval rate of offer, self selection to working and measurement error in abilities. Thus, in addition to

5 Data

To address labor supply characteristics we use Peruvian's database ENHAB 2010 (Survey of Skills and the Labor Market), a World Bank project developed with collaboration of Peruvian research institutes. ENHAB is a nationally representative household survey that comprises information on urban areas of 11235 randomly selected individuals from 2600 cities. This unique labor force survey -first of its kind in Latin America-, includes measures of cognitive (PPVT-4, verbal ability, working memory and mathematics problem-solving) and socio-emotional skills (Big-Five Personality

[2]Future exercises will increase the number of types.

Factors and Grit) of a random sample from the population age 14-50. It also contains information on household living conditions, demographic information, academic achievement, current employment/earnings and early labor market participation.

Our main module for the analysis on first job is the labor insertion segment. Detailed questions about age at first job, methods for job search, duration of first job search, credentials of workers, reservation wages, perceptions on factors affecting employability and factors affecting willingness to move for a better job are available. This database will enable us to relate non-cognitive and cognitive abilities with the quality of first job, as well as the importance of the first job in their current employment status. Concretely, relevant variables for this research are monthly earnings, duration of first job search, tenure on current job, schooling level, age and cognitive and socioemotional abilities. In order to maximize the proposed likelihood, we should clean the database. Originally, ENHAB has 11 235 individuals. Out of the 11235, 2501 have information on wages and 2656 have information on cognitive and socioemotinal skills. However, only 620 have both information on wages and skills. Therefore, our sample consists on 620 individuals.

Specifically, we will work with four subsamples, each with different schooling levels: (i) individuals with incomplete secondary education, (ii) individuals with complete secondary education, (iii) individuals with complete non-university higher education and (iv) individuals with complete university higher education. Table 1 shows relevant descriptive statistics for our four subsamples. On the side of the skills, it is observed that cognitive skills are higher for subsamples with higher educational levels. Such relationship is not observed in the socioemotional skills. On the side of wages, it is observed that these are higher for subsamples with higher educational levels. Figure 1 illustrates this scenario. On average, wage is higher when schooling is higher (as mentioned before) and wage is lower when duration of first job search was higher. This suggests that the more educated individuals are being employed faster.

Table 1: Descriptive Statistics for the ENHAB sample

	All	Incomplete Secondary Education	Complete Secondary Education	Complete Non-university Higher Education	Complete University Higher Education
Cognitive Abilities					
PPVT	184.76	165.20	184.09	192.29	200.35
	(0.844)	(1.732)	(1.136)	(1.567)	(1.338)
Mathematics/Problem solving	11.02	8.34	10.94	11.68	13.51
	(0.152)	(0.321)	(0.217)	(0.326)	(0.263)
Language proficiency	21.45	15.80	21.16	23.54	26.30
	(0.346)	(0.622)	(0.478)	(0.786)	(0.825)
Working memory	7.44	6.59	7.51	7.78	7.86
	(0.061)	(0.143)	(0.087)	(0.128)	(0.139)
Non-cognitive Abilities					
Grit	30.46	28.25	30.27	31.31	31.50
	(0.249)	(0.635)	(0.366)	(0.557)	(0.476)
Extraversion	26.04	23.54	26.30	27.48	26.65
	(0.214)	(0.506)	(0.312)	(0.467)	(0.462)
Cooperation	16.65	16.16	16.63	16.96	16.95
	(0.118)	(0.284)	(0.176)	(0.287)	(0.252)
Consciousness	29.62	28.52	29.80	30.34	29.64
	(0.185)	(0.432)	(0.265)	(0.440)	(0.449)
Emotional stability	18.810	17.754	18.704	19.642	19.422
	(0.168)	(0.411)	(0.254)	(0.379)	(0.344)
Openness	24.65	23.46	24.73	25.48	24.89
	(0.154)	(0.363)	(0.231)	(0.333)	(0.345)
Labor Market Variables					
Monthly Earnings	919.83	603.32	843.91	1047.60	1334.86
(S/.)	(39.075)	(89.713)	(50.334)	(105.771)	(96.065)
Duration of first job search	1.52	1.23	1.07	2.22	2.36
(months)	(0.117)	(0.237)	(0.106)	(0.347)	(0.418)
Tenure on current job	4.61	3.69	3.35	6.76	6.83
(months)	(0.246)	(0.464)	(0.302)	(0.694)	(0.704)
Minimum observed earnings	100.00	100.00	120.00	120.00	100.00
(S/.)					
Other Variables					
Age	30.08	27.47	28.42	33.00	34.42
(years)	(0.371)	(0.924)	(0.520)	(0.827)	(0.748)
N	620	118	287	106	109

Note: Standard deviations in parenthesis.

6 Results

The estimation has three sets of estimated parameters from: the wage equations, the arrival of an offer probability and the skills' law of motion equations.

Table 2 presents maximum likelihood estimates of structural parameters. Top panel shows estimates of the parameters of wage equations. In general, the signs of the coefficients are the expected: positive on experience, positive on tenure in current job and positive on age. Those variables increase the individual's human capital and employability. Regarding wages, there are two unobserved types: individuals with high skills (type I) and individuals with low skills (type II). Average wages constant of wage equation − for type I individuals are always above those of type II individuals with the same schooling level.

How are skills affecting these average wages. For type I individuals in every schooling level, the increase of wages due to socio-emotional skills is higher than that due to cognitive skills. On the contrary, for type II individuals, the increase of wages due to cognitive skills is higher. Within a context of low skilled individuals, cognitive ability outweighs. Whereas among high skilled individuals, socio-emotional ability is more valued.

Middle panel shows estimates of the parameters of the arrival of an offer probability. First, for every schooling level and for both types of individuals, socio-emotional skills have a higher contribution to the probability of arrival of an offer. On average the socio-emotional high skilled individual receives more job offers. Second, as for wages, there are two unobserved types (high skilled/low skilled). Up to complete basic education, the signs of the coefficients are the expected: positive for both cognitive and socio-emotional skills and for both types of individuals. Those cases are intuitive: higher skills increase the likelihood of receiving a job offer.

Beyond complete basic education, two cases draw attention to. First, for individuals with non-university higher education, effects of both cognitive and socio-emotional skills are negative. Technical careers in Peru focus on very specific kind of jobs. It is expected that those jobs will be demanded or not without cognitive or socio-emotional skills playing a role. Second, the coefficient of cognitive skills for type I individuals with university education is negative. Cognitively, all individuals within this group type I with university are well prepared. Then, socio-emotional skills are the comparative advantage while cognitive skills are not as relevant.

Finally, some statistics predicted by the model, given parameter estimates, can be compared with the actuals observed in data. Table 3 shows actual and predicted wages for each schooling level. For every case, type I individuals' predicted wages are above the observed average wage and type II individuals' predicted wages are below it.

Table 2: Results

	All	Incomplete Secondary Education	Complete Secondary Education	Complete Non-university Higher Education	Complete University Higher Education
Wages (type I)	$\mu_k = \theta_{0k} + \theta_{1k}C_k + \theta_2 S_k + \theta_3 T + \theta_4 X + \theta_5 T + \theta_6 A + \epsilon$; k=1,2				
Constant	7.089***	6.955***	7.584***	7.491***	7.633***
Cognitive ability	0.001***	0.007***	-0.001***	-0.001***	0.011***
Socioemotional ability	-0.047***	0.037***	0.032***	0.037***	0.072***
Experience	0.008***	0.031***	0.011***	-0.018***	0.055***
Tenure	0.022***	0.035***	0.022***	0.023***	0.020***
Age	0.018**	0.009***	0.016**	0.007**	0.007**
Wages (type II)					
Constant	6.583***	6.322***	6.618***	7.115***	7.091***
Cognitive ability	0.010***	0.001***	0.005***	0.007***	0.010***
Socioemotional ability	0.007***	0.021***	0.002***	0.005***	-0.008***
Experience	0.008***	0.031***	0.011***	-0.018***	0.055***
Tenure	0.022***	0.035***	0.022***	0.023***	0.020***
Age	0.018**	0.009***	0.016**	0.007**	0.007**
Prob. of arrival of an offer (type I)	$P_k = \frac{exp(\beta_0+\beta_C C+\beta_S S)}{1+exp(\beta_0+\beta_C C+\beta_S S)}$; k=1,2				
Constant	0.001***	0.011***	0.067***	-0.016***	-0.120***
Cognitive ability	0.002***	-0.004***	0.012***	-0.003***	-0.002***
Socioemotional ability	0.099***	0.097***	0.054***	-0.014***	0.335***
Prob. of arrival of an offer (type II)					
Constant	-0.410***	-0.186***	-0.010***	-0.690***	-0.932***
Cognitive ability	-0.005***	-0.003***	0.005***	-0.005***	0.007***
Socioemotional ability	0.025***	0.044***	0.047***	-0.036***	0.067***
Cognitive Abilities	$\theta^j = \alpha_0^j + \alpha_1^j d_2 + \alpha_2^j d_3 + \alpha_3^j X + \alpha_4^j T + + \alpha_5^j X^2 + \epsilon^j$; j=C,S				
Constant	-0.049***	-17.202***	-1.449***	5.100***	14.473***
Duration of job search of 3-6 months	0.224***	-0.011***	-1.346***	-6.670***	1.899***
Duration of job search of 6+ months	1.601***	1.722***	-3.521***	-1.015***	-1.044***
Experience	-0.145***	-0.084***	0.154***	-0.617***	0.153***
Tenure	0.064***	-0.025***	-0.017***	0.088***	0.017***
Squared Experience	-0.002***	-0.023***	-0.001***	0.001***	-0.012***
Socioemotional Abilities					
Constant	-0.988***	-3.509***	-1.098***	1.281***	-1.036***
Duration of job search of 3-6 months	-0.203***	-0.349***	-0.834***	0.740***	-1.161***
Duration of job search of 6+ months	0.255***	0.102***	0.879***	-1.037***	0.448***
Experience	0.148***	0.567***	0.137***	-0.046***	0.346***
Tenure	0.054***	-0.024***	-0.006***	0.075***	0.026***
Squared Experience	-0.002***	-0.022***	-0.002***	0.002***	0.001***
N	620	118	287	106	109

NOTE: * indicates 10% significance level; ** indicates 5% significance level; and *** indicates 1% significance level of the mean test between males and females.

Table 3: Wages: observed and predicted

	All	Incomplete Secondary Education	Complete Secondary Education	Complete Non-university Higher Education	Complete University Higher Education
Wages					
Observed	919.83	606.32	843.91	1047.60	1334.86
Predicted (type I)	769.20	814.00	1978.26	1401.80	2519.56
Predicted (type II)	464.57	489.18	746.09	973.37	1289.44
N	620	118	287	106	109

7 Final Remarks

This paper addresses the estimation of the effect of cognitive and socio-emotional skills on two labor outcomes for the first job: (i) wages and (ii) duration of job search. We exploit skills and first job outcomes from the 2010 ENHAB which has not been used before for this purpose. We develop a model which provides a characterization of the joint distribution of the duration of search, accepted wages and skills with unobserved heterogeneity based on Eckstein and Wolpin (1995). This model helps interpreting the estimated effect, exploiting differences in first job wages and duration of job search taking into account skill formation in contrast to cross-sectional work.

Regarding wages, results show that socio-emotional skills are the most valued among high skilled individuals. On the contrary, among low skilled individuals, the cognitive skills are the most valued ones. Results also show that type I individuals' predicted wages are always above the observed average wage and type II individuals' predicted wages are always below it. Regarding duration of job search, results show that the socio-emotional high skilled individual receives more job offers than the cognitive high skilled with the same schooling level. It was also shown that both cognitive and socio-emotional skills increase the likelihood of receiving an offer for lower schooling levels. Whereas for higher schooling levels only socio-emotional skills increase their chances of receiving an offer.

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