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RESEARCH ARTICLE

Tracking School-to-Work Transition Among the Youth in the Philippines

Futoshi Yamauchi
International Food Policy Research Institute, Washington, D.C., United States of America
f.yamauchi@cgiar.org

Marites Tiongco
De La Salle University, Manila, Philippines

This paper examines wage variations and turnovers using a unique tracking survey data of Filipino youth who were initially sampled at Grade 6. The analysis also uses mathematics and English test scores at Grade 6 to proxy for cognitive abilities. The empirical results show that returns to education and ability increase with labor market experience and occupational upgrading. The study highlights the importance of academic achievements, measured by both years of schooling completed and academic test scores, in upgrading occupations of youth to realize higher returns in the labor market, even though many youths often start with irregular and undesirable jobs. Returns to labor market experience are relatively large and tend to be higher if educational attainment and/or mathematics test scores are higher. Variance of unobserved components also increases with experience, augmented by both education and ability, which is consistent with the stepping-stone model of occupational changes towards regular work. Hence, it is important to equip the youth with knowledge and competencies and the right attitude and strengthen their skill development for a smooth transition from school to a productive and decent work.

Keywords: wage variations, human capital formation, mathematics and English test score, transition from school to work, stepping-stone, tracking survey, Philippines

JEL classifications: I2, J3, O1

The transition from school to work of young individuals critically affects the efficiency of subsequent human capital formation in economic activities. Youth often switch from a temporary job to another without settling in a permanent or regular job. Moreover, young individuals experience mismatch between their qualifications and skills required by their jobs, and turnovers are quite common at the early stage of their labor market experiences. As a result, a high unemployment rate among youth is still a primary problem of developing country labor markets including the Philippines (Figure 1).

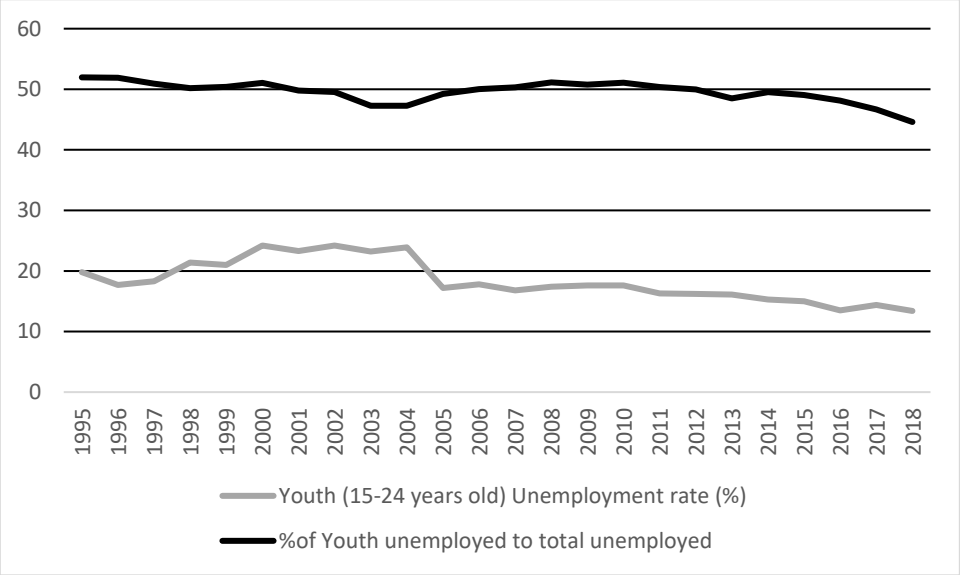


Figure 1. Youth unemployment rate (%) in the Philippines, 1995–2018.
Source: Philippine Statistics Authority OpenSTAT Database (psa.gov.ph).

Empirical studies of occupational mobility show that mobility is relatively greater in the early stage but decreases over time (Farber, 1999; Hall & Kasten, 1976; Neal, 1999). If heterogeneous workers and firms are first matched and the quality of the match is revealed gradually through learning, we can explain relatively large mobility in the early stages of labor market participation and the stylized fact that wages increase with tenure (Jovanovic, 1978). Flinn (1986) structurally tested the implications and supports joint determination of wages and turnover. In the sociology literature, Wilk, Desmarais, and Sackett (1995) support that gravitation to jobs commensurate with ability; highly able workers converge to jobs that require high levels of cognitive ability. If specific human capital accumulates over time, it is also optimal for workers to stay at the current firm since returns to the investment are accrued later. Though many studies suggest positive returns to labor market experience, only a few studies explicitly used a measurement of training investments to estimate returns to training (that is, largely, specific human capital). For example, Yamauchi, Poapongsakorn, and Srianant (2009) show significantly positive returns to on-the-job training among plant workers in Thailand. Thus, the frequency of turnovers decreases with tenure. However, whether the youth choose riskier (more difficult) or safer (easier) jobs at the beginning of their careers remains unanswered.

Complexity of job mobility has been a central problem in labor market research (e.g., Farber, 1999; Hall and Kasten, 1976; Neal, 1999). In his seminal work, Rosen (1972) emphasizes the importance of learning opportunities along with production activities, which characterizes the dynamic occupational choices of workers. There are largely two lines of theoretical discussion in this area. First, Bandit models assert that agents learn about their ability by working; adolescents choose (subjectively) riskier jobs to learn about their abilities (Johnson, 1978; Miller, 1984). Prendergast and Stole (1996) used a similar framework to show that youngsters who are eager to learn react to signals aggressively. Using a similar setup, Yamauchi (2001) studied the dynamics of earnings inequality in societies that exhibit different degrees of ability (endowment) and noise (shock) variances. Thus, Bandit models predict large variations in wages in the early stages of workers' careers. Second, the stepping-stone theory asserts that agents try an easy job first to accumulate experience that will be useful for their next steps, when they switch to more difficult jobs (Jovanovic & Nyarko, 1997). They use an input-target Bayesian learning model. Theoretically, the intuition behind the decision regarding sticking to one activity or switching to the next is essentially shared with Parente (1994) and Jovanovic and Nyarko (1996). Under this theory, wage variations are likely small at the early stage of labor market experience but increase gradually.

Several literatures share a couple of ideas on the role of education on earnings occupational mobility. First, Johnson (1978) conjectures that the subjective uncertainty about one's own ability is likely to be small among the relatively educated. Second, education may increase learning speed (Rosen, 1972; Rosenzweig, 1995). In an input target model, Rosenzweig (1995) argues that educated agents have a better precision in the learning process, which results in faster learning. For a more recent summary of related studies, see Rosenzweig (2010). Third, in the context of stepping-stone mobility, skill transferability can be an increasing function of education (general human capital versus specific human capital). Separately from the above line of research, Sicherman and Galor (1990) showed that schooling increases the likelihood of occupational upgrading. They find that education significantly increases career mobility controlling for occupation types (defined at the one-digit level). This finding is consistent with Neal (1999), who supports two-stage search behavior, under which workers change their careers primarily in the early stage and tend to change only employers (firms) later.

In a separate context, complementarities between schooling and destination experience among migrants were supported in the Bangkok labor market (Yamauchi, 2004). Upon arrival at the destination market, migrants start learning about their own abilities and their match to potential occupations. Wage growth is higher among educated migrants since they are matched to occupations that require more skills.

In many developing countries, details of labor market behavior especially among youth typically remain veiled due to lack of appropriate data. This paper addressed the shortcoming of lack of empirical data in investigating the role of education and ability in explaining wage dynamics (and the process of occupational mobility) among young people. This paper uses unique student tracking data to examine wage dynamics and work experience of youth during the transition from school to labor markets. The survey was implemented in eight provinces of the Philippines in 2010–2011 to track 3,451 former students from 101 elementary schools and capture their schooling, work, and family histories. The study also uses the Grade 6 national achievement test score data to match with the sample students. This unique data set enables us to understand the roles of schooling and ability in determining their wage growth at the early stages of their labor market experience.

The survey data records the most updated monthly wage for each work among various work characteristics. If work contents (e.g., positions) changed, we traced wages even within the same firm. Thus, the survey recorded an increase in wages associated with promotion within a firm. For example, a worker who switched from Line A to B and experienced a large change of products produced or the nature of production process in which he/she was engaged or a worker who is transferred from Factory A (Location a) to B (Location b). A teenager who started working as a home helper then found a new job that promotes sales at a store. All these were recoded as separate jobs. In each case, a four-digit occupation code was assigned based on the Philippine Standard Occupational Classification. A great advantage of the above data is their ability to be used to analyze the part of wage variations associated with work changes, especially that adolescents and young adults frequently change their work (this fact is supported by our sample as well as the literature). As described in Section 3, the average observed tenure in this group is surprisingly short, that is, 1.53 years (including incomplete cases where the employee remains at the current work).

In addition to education, ability can also be complementary with labor market experience. A large volume of studies examined returns to tenure, that is, whether wage rises with tenure or experience. For example, see Altonji and Shakotko (1987), Altonji and Williams (1997), Abraham and Farber (1987), and Topel (1991). Farber (1999) summarizes the literature. Farber and Gibbons (1996) showed that time-invariant variables correlated with ability but unobserved by employers are likely to become increasingly correlated with wages as experience increases. They also claimed that the role of education does not depend on labor market experience. The analysis in Section 4 uses academic achievement test scores in mathematics and English to understand how the scores affect changes in wages. Ability appears to augment returns to experience, which is similar to Farber and Gibbons (1996).

The empirical evidence shows that returns to experience are relatively large among adolescents. Second, returns to experience are higher if educational attainment and/or mathematics test scores are higher.

Education and ability together augment gains in earnings from the accumulation of labor market experience. The paper is organized as follows. Sections 2 and 3 describe the data and empirical framework, respectively. Empirical findings are summarized in Sections 4 and 5.

STUDENT TRACKING SURVEY

This section describes the data used in the analysis. The data come from the survey conducted in eight education divisions (provinces) in the Philippines from July 2010 through April 2011. The survey aimed to gather household and individual data to assess the impact of a large school-based intervention called the Third Elementary Education Project (TEEP), implemented in 23 relatively poor divisions in the period of 2001 to 2006. In a school-based management setting, schools are given an incentive to manage proactively and more independently of the government. Schools were free to raise funds from their partner communities and parents and independently decide on key issues such as improvement plan and school finance. TEEP intervention included a package of investments: (1) school building construction and renovation, (2) textbooks, (3) teacher training, (4) school-based management, and (5) other facility and equipment support (Yamauchi & Liu, 2013). Note that except principal-led projects on a school building, schools or communities did not influence initiation of the above interventions. The survey includes four intervention and four nonintervention divisions. Each intervention division is paired with an adjacent nonintervention division in the same area so that both divisions have similar socioeconomic characteristics. The paired areas include (1) Ifugao and Nueva Vizcaya, (2) Antique and Iloilo, (3) Negros Oriental and Cebu, and (4) Leyte and Western Samar. Figure 2 maps the eight sample provinces in the Philippines. The following sampling procedure was followed.

First, provinces and municipalities were purposively selected; relatively poor municipalities (school districts) in each division were chosen. Municipalities of census-2000 income classes ranked 3 to 5 (where the highest income is Rank 1 and the poorest is Rank 6) were chosen from the adjacent area (near the division border) of an intervention and a nonintervention division. In one intervention division, all of our school districts were taken from income classes ranked 4 and 5, which created an imbalance with the paired nonintervention division where some of the school districts are ranked 3.

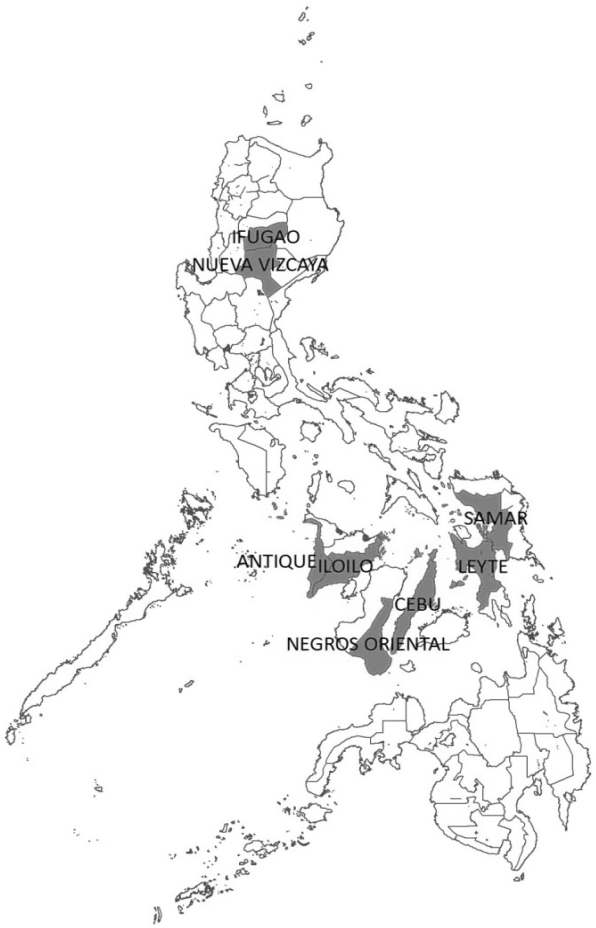


Figure 2. Sample provinces.

Second, schools were randomly sampled from the list of elementary schools in school year (SY) 2002/03 satisfying three criteria: (1) total enrollment larger than 120, (2) monograde (at least one class for each grade), and (3) complete (having Grades 1 to 6). That is, schools had an average of at least 20 students in each grade. In each intervention division, 15 schools were randomly sampled from the basic list satisfying the above criteria. Similarly, 10 schools were randomly sampled in nonintervention divisions. In Antique (an intervention division), we added two more schools since we found that two schools were severely damaged in a typhoon in 2006. Therefore, we have 17 schools in Antique.

Third, we collected lists of students enrolled at Grade 6 in SY 1999/2000, SY 2004/05, and SY 2005/06. SY 1999/2000 is a preintervention cohort, while both SY 2004/05 and 2005/06 are cohorts that were exposed to a school intervention if they lived in the intervention divisions. If schools did not keep student lists, we replaced them with schools that were randomly resampled from the basic school lists. In Nueva Vizcaya, it was difficult to get the student lists from one school at the early stage, so this school was omitted from our sample. Instead, we increased the number of students from two large schools (the total number of sample students in the division is kept the same).

We randomly sampled 15 students from the SY 1999/2000 Grade 6 class and 20 students together from the Grade 6 classes of SY 2004/05 and 2005/06. The sampling was done regardless of gender and age. Note that since the listed students are those who were enrolled at that time, some of our sample students might not have graduated from their elementary schools, so we used enrollees as the basis since graduation creates sample selection.

In the student tracking survey, we tracked our sample students to collect information on their schooling and work histories in detail as well as marriage, anthropometry, and illness. The survey successfully tracked 3,451 cases out of the total of 3,487 students, which resulted in the tracking rate of 98.97%. Either a face-to-face or phone interview was adopted. There were two stages in tracking activities. First, the teams tracked students who lived within their original divisions. Second, in the case of out-of-division tracking, the teams attempted to schedule face-to-face interviews with students who lived in the National Capital Region (Manila), Baguio, and Cebu City. The teams tried to visit students who lived within the sample provinces, the above three metropolitan areas, or between northern Luzon and Manila to conduct face-to-face interviews. For students who lived outside these areas, we basically used phone interviews.

Table 1 shows the composition of our sample households and students. We have a total of 3,451 students in our sample. TEEP divisions and cohorts (school years of 2004/05 and 2005/06) are oversampled. Among TEEP divisions, Ifugao shows smaller numbers in each Grade 6 sample year due to the decision to drop some unreliable cases' information in the second visit in the division.

Table 2 shows the highest grade completed. Though our sample has different age groups (cohorts) due to its sampling design, many of our students completed four years of high school. This is highly expected since even TEEP students (Grade 6 in SY 2004/05 and 2005/06) would be expected to reach age 17 in the survey period. It is worth noting that students graduate from high school at age 15/16 if they had no delay or repetition in schooling and that they often started working while studying (e.g., on-the-job trainings, internships, or apprenticeships).

To characterize the poverty levels of our sample households, we construct asset values in 2000 (evaluated at the 2010 price). The household survey collected information on asset holdings and values in 2010. For 2000, we only captured asset holdings. Using the unit values in 2010 and asset holdings in 2000, it is possible to estimate the values in 2000. In case they did not own an asset in 2010 but owned it in 2000, we used the average unit value in the same barangay (community) to estimate the asset value in 2000. The distribution of the 2000 total asset values follows log normal, which does not alert any irregularity in this sample.

In both face-to-face and phone interviews, the survey captured schooling and work histories in detail.

Table 1. *Sample Student Distributions*

Grade 6 School Year	Antique	Cebu	Ifugao	Iloilo	Leyte	Negros Oriental	Nueva Vizcaya	Western Samar
1999–2000	244	143	188	143	212	227	139	142
2004–2005	159	107	137	97	158	161	92	96
2005–2006	177	95	145	111	135	145	101	97
Total (3,451)	580	341	470	351	505	533	332	335

Table 2. *Grade Completed*

Grade	Numbers	%	Cumulative
Grade 5	16	0.46	0.46
Grade 6	408	11.82	12.29
First-year high school	235	6.81	19.10
Second-year high school	233	6.75	25.85
Third-year high school	283	8.20	34.05
Fourth-year high school	1,432	41.50	75.54
First-year college	359	10.40	85.95
Second-year college	185	5.36	91.31
Third-year college	79	2.29	93.60
Fourth-year college	199	5.77	99.36
Fifth-year college	16	0.46	99.83
Master's units	5	0.14	99.97
Theology units	1	0.03	100.00
Total	3,451	100.00	

Since our sample students were Grade 6 enrollees in particular school years, we omit questions on their schooling histories up to that stage. Detailed information starts from high school entry and onward. We collected information on school (name and school ID), school type (public or private), age started, graduated or not, age graduated, age stopped if not graduated, reasons for stopping, and whether still in school. At the college level, we also captured course majored first and degree attained.

On their transition from school to work, the survey asked the first time they left their parents' households and whether they returned permanently or temporarily, the reasons, and whether they currently live with their parents. On work history, details were identified for each work (if they are engaged for more than a month). Many of our sample students have experienced several works, which often started when they were still in school. The survey collected information on work description, occupation type, employment type, industry, when started and ended, types of reference, payment types, and monthly earnings.

In this survey, we categorized students into three types based on their migration and household membership status: (1) in town, (2) migrant, and (3) transition. In the case of in town, students stay in the same school area. They may or may not live with their parents or guardians. Migrant students live away from their hometown and also are not members of their parent/guardian households. Finally, the third group of students categorized as transition students is those who live physically away from their towns but still belong to their original households. For example, students who are temporarily staying in Manila to look for jobs or who recently started living in a boarding house to attend college at a distance. This group may come back to their households or permanently migrate, which was still uncertain at the time of our survey.

Table 3 shows the distribution of student types: 69.34% of the students live in their original school areas, 22.11% are migrants, and 8.55% are transitory students. If we add migrant and transitory students, more than 30% of our sample students are physically living away from their parents or guardian households.

Table 3. *Student Migration Status*

Status	Numbers	%	Cumulative
In town	2,393	69.34	69.34
Migrant	763	22.11	91.45
Transition	295	8.55	100.00
Total	3,451	100.00	

The spatial distribution of our students by province is summarized in Table 4. The table shows the distributions of the whole sample. The

sample students reside in diverse locations. Former students residing in provinces other than the sample provinces are either migrant or transit students. The number of migrant and transition students in the sample provinces are in parentheses. It is clear in the table that the destination of many former students is Manila, its surrounding provinces, Benguet (Baguio City), and Cebu (Cebu City).

Table 4. *Spatial Distribution of Sample Student Locations*

Province	Numbers	%
NA	4	0.12
Outside the Philippines	5	0.14
Agusan del Norte	1	0.03
Aklan	1	0.03
Albay	1	0.03
Antique	427 (53)	12.37
Basilan	1	0.03
Batangas	11	0.32
Benguet	64	1.85
Bukindnon	1	0.03
Bulacan	16	0.46
Cagayan	4	0.12
Camarines Sur	1	0.03
Capiz	2	0.06
Cavite	40	1.16
Cebu	389 (153)	11.27
City of Manila, First District	26	0.75
City of Manila, Fourth District	85	2.46
City of Manila, Second District	134	3.88
City of Manila, Third District	38	1.10
Davao del Sur	1	0.03
Eastern Samar	1	0.03
Guimaras	2	0.06
Ifugao	350 (91)	10.14
Ilocos Norte	1	0.03
Iloilo	351 (68)	10.17
Isabela	7	0.20
Kalinga	1	0.03
La Union	4	0.12
Laguna	25	0.72
Leyte	383 (40)	11.10
Maguindanao	1	0.03
Misamis Oriental	2	0.06
Mountain Province	1	0.03
Negros Occidental	25	0.72
Negros Oriental	398 (40)	11.53
Nueva Ecija	5	0.14
Nueva Vizcaya	330 (34)	9.56
Northern Samar	3	0.09
Palawan	4	0.12
Pampanga	15	0.43
Pangasinan	7	0.20
Quezon	3	0.09
Quirino	3	0.09
Rizal	27	0.78
Romblon	1	0.03
Siquijor	1	0.03
South Cotabato	1	0.03
Southern Leyte	1	0.03
Sultan Kudarat	1	0.03
Surigao del Norte	2	0.06
Surigao del Sur	1	0.03
Western Samar	238 (16)	6.90
Zambales	2	0.06
Zamboanga del Sur	2	0.06
Total	3,451	

Note. Parentheses show the numbers of migrant and transition students in the sample provinces.

EMPIRICAL FRAMEWORK

In this section, we describe the empirical framework. The empirical inference of this paper is based on wage dynamics. Wage equation is written as

$$\ln w_{it} = \alpha + \beta s_i + \gamma(s_i, a_i)e_{it} + X_i\delta_t + q_i + \varepsilon_{it}, \quad (1)$$

where $\ln w_{it}$ is the log of monthly wage for individual i at the tth job, s_i is years of schooling completed, e_{it} is years of labor market experience up to the tth job, a_i is a measure of ability, X_t is a vector of individual characteristics (time invariant), q_i is the unobserved fixed error component specific to individual i (including ability a_i), and ε_{it} is an error term. Wage is measured in monthly term for each work ($t = 1, 2, \ldots, T$). Parameter γ in this context measures returns to labor market experience, but since a change in wage reflects a

change of work contents, returns to experience are only realized through a series of discrete changes in work contents (among which a major change is that of occupations). The complementarity of schooling and experience is expressed as $\gamma_1(s,a) > 0$; returns to experience increase with years of schooling. More generally, assume that γ_{12} *(s, a)* > 0; that is, ability augments the complementarity between experience and schooling. X_i includes gender, age at which they started to work in the labor market, and, potentially, family backgrounds, and their effects change with jobs.

The above setup creates biased estimates due to potential correlations between human capital variables (s_i and e_{it}) and q_i. If more able workers have attained more schooling and are likely to work longer (or upgrade occupations), the estimated β_t and $\gamma(s_i.a_i)$ are biased upward. To wipe out q_i, Eq. (1) is differenced between the first (t = 0) and latest ($t = T$) jobs:

$$\Delta_{(0,T)} \ln w_i = \gamma(s_i, a_i)e_{iT} + X_i\Delta_{(0,T)}\delta + \Delta_{(0,T)}\varepsilon_i, \quad (2)$$

where the initial market experience $e_{i0} = 0$. The initial shock is not correlated with years of schooling completed under the assumption that workers started working upon completion of schooling. If this assumption is violated, labor market shocks can affect the decision to continue or stop schooling. Labor market experience e_{iT} could also be positively influenced by the current shock, which results in a potentially upward bias in the $\gamma(s_i, a_i)$ estimate. We also control for ability by including test scores on the right-hand side, which mitigates bias due to a potential correlation between wage growth and ability (though Eq. [2] assumes that the unobserved fixed effects are constant in the level, so it can be differenced out). The inclusion of an ability measure (e.g., test scores) is important as it reduces potential upward bias in the estimate of the schooling–experience complementarity.

Finally, the second moment of $\Delta_{(0,T)}\varepsilon_i$, $Var(\Delta_{(0,T)}\varepsilon_i) = \sigma^2(T \mid s,a) + \sigma^2(0 \mid s,a)$. The variance is a function of T; that is, unobservable variations of earnings (conditional on schooling and ability) change with experience. By investigating whether this increases with experience, we indirectly test the contesting models: Bandit and stepping-stone. In the former, it is a decreasing function of experience ($\sigma^2(T) < \sigma^2(0)$), while in the latter, it is an increasing function of experience ($\sigma^2(T) > \sigma^2(0)$).

The crucial difference between the Bandit model and the stepping-stone model comes from what agents learn by choosing a job. In the Bandit model, workers learn about their abilities, while in the stepping-stone model, they learn skills specific to an occupation (which are however partially transferable to another occupation). Changes in wage dispersions allow us to distinguish between the above two theories as an empirical prediction. The wage variation decreases over time in the Bandit model, while it increases in the stepping-stone model.

WAGE DYNAMICS—DESCRIPTIVE ANALYSIS

In this section, we describe wage dynamics and labor market experience from the tracking data. As mentioned, the survey collected information on employment for each work in which our students have ever engaged. Table 5 shows the summary statistics of key variables used in the analysis. On average, our sample individuals began work slightly before age 17. Their average educational attainment is a little below high school completion. These observations imply that they are likely to have had some work experience (though they are short-term) before completing their schooling. In some cases, therefore, both general and specific human capital seems to accumulate at the same time.

Figure 3 shows years of tenure of the first work in the sample. The distribution is highly skewed with the mean of 1.52 years. The median is close to zero. Figure 4 shows years of experience (defined as the period from the first time they worked to the time of the survey). Though the distribution is similarly skewed, the mean is 3.86 years. Given the fact that our sample consists of the youth whose average age is about 20, both years of tenure and experience are small.

Panel A in Table 6 shows summary statistics of log monthly earnings of each work, the first to the tenth. The last row shows the work engaged the latest (including the current one). If a former student worked as a family member and did not receive any salary, it will not show up in the table. The number of observations differs between the first work and

Table 5. *Summary Statistics of Key Variables*

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	3,442	20.1595	3.1955	13	35
Age started	2,081	16.8789	2.7250	7	27
Tenure first work	2,058	1.5321	1.9019	0	11.9167
Experience	2,083	3.8564	2.7954	0	11.9167
Years of schooling completed	3,451	9.6236	2.1051	5	15
Ln monthly earning, first work	2,087	7.7973	0.7630	4.3820	11.0021
Ln monthly earning, latest work	2,096	7.9452	0.7747	4.6052	11.0021
Math test score (percentage)	3,072	53.8748	25.5247	1	100
English test score (percentage)	3,062	54.7314	24.3578	1	100

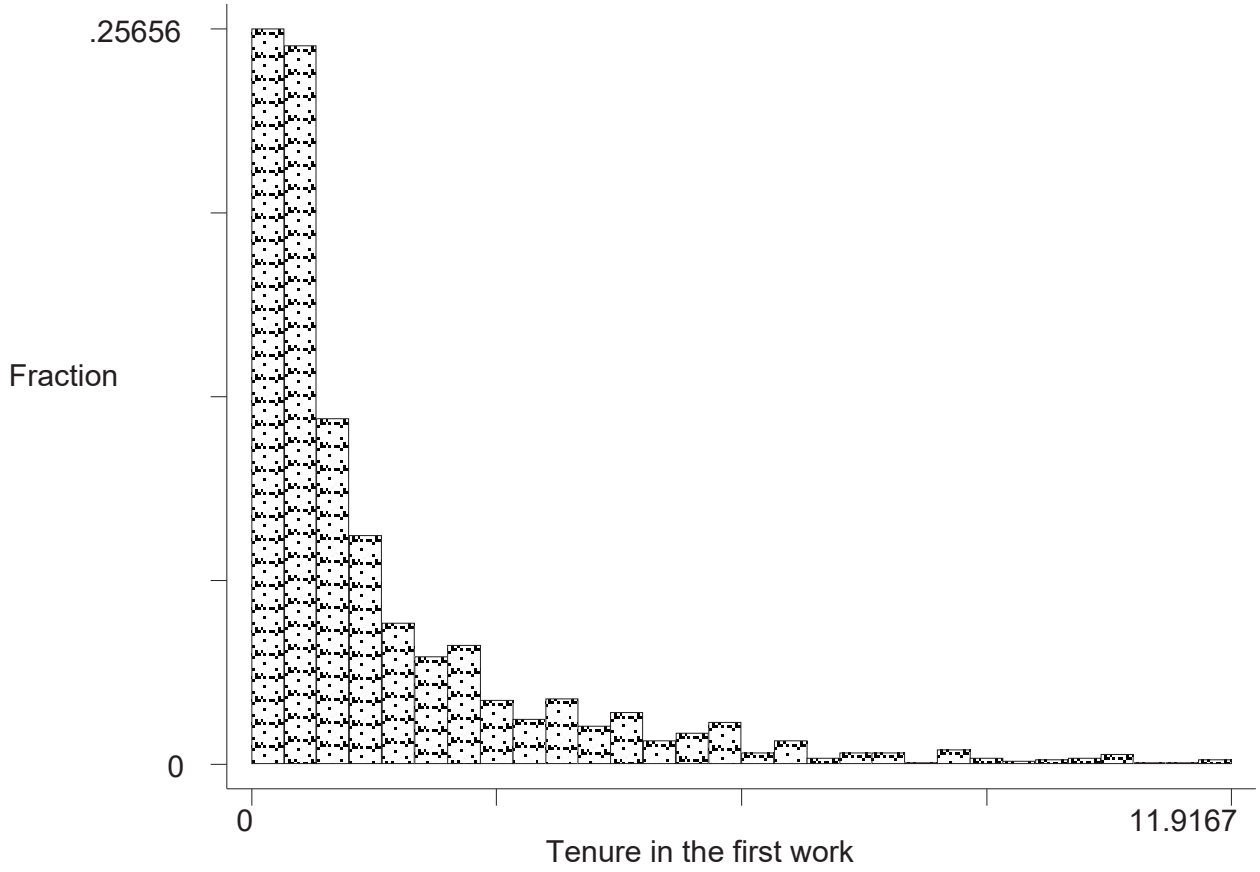


Figure 3. Tenure in the first work.

the latest work because some of them did not receive salary at the first work but are paid thereafter.

The table shows a clear picture of wage dynamics in our sample. On average, wage increases monotonically if students change works, but the variation of wages decreases monotonically. This is probably because only those who have better opportunities can switch to the next work, and this process is selective. Interestingly, the minimum level of wage increases while the maximum decreases simultaneously. The variability of wages tends to become smaller along with occupational changes.

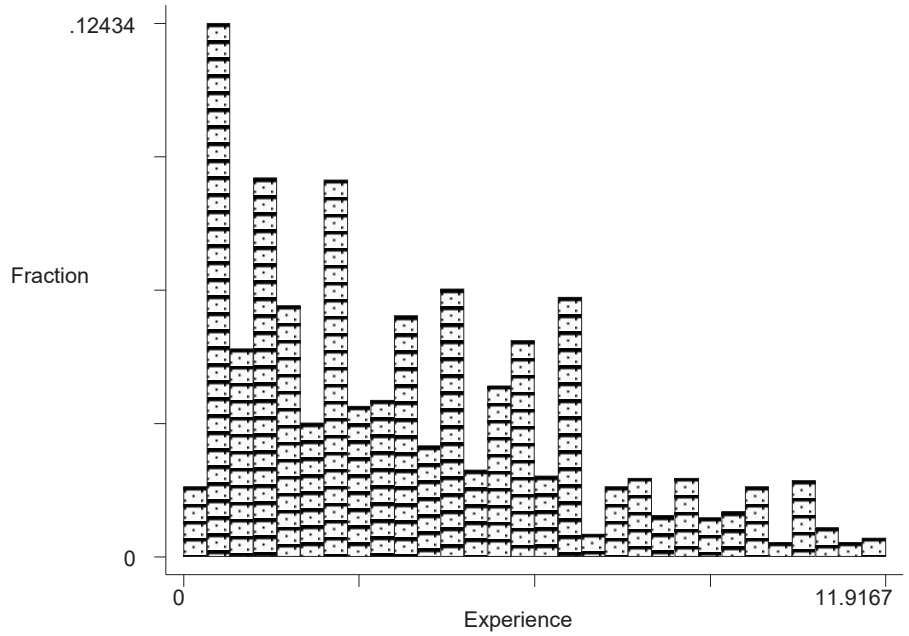


Figure 4. Experience.

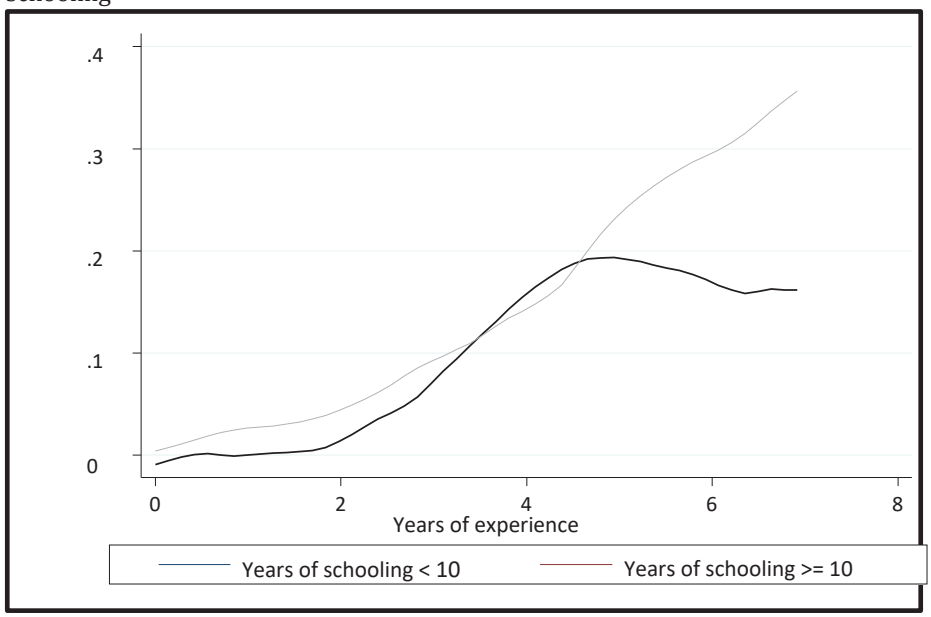
Table 6. *Summary of Wage Changes*

Panel A: Whole Sample = Grade 6 SY 1999/2000, 2004/05, 2005/06					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Ln monthly earning work 1	2,087	7.797334	0.7629667	4.382027	11.0021
Ln monthly earning work 2	953	8.010596	0.7429163	3.688879	11.4721
Ln monthly earning work 3	428	8.158618	0.7347695	5.010635	10.11985
Ln monthly earning work 4	167	8.219925	0.69886	6.214608	9.680344
Ln monthly earning work 5	73	8.243847	0.7370268	5.703783	9.903487
Ln monthly earning work 6	28	8.39052	0.5304251	7.313221	9.305651
Ln monthly earning work 7	12	8.731183	0.5693153	7.600903	9.798127
Ln monthly earning work 8	5	8.377627	0.8083283	7.495542	9.21034
Ln monthly earning work 9	2	9.153375	0.1360278	9.057189	9.249561
Ln monthly earning work 10	1	9.203517	N.A.	9.203517	9.203517
Ln monthly earning latest work	2,096	7.945205	0.7746591	4.60517	11.0021
Panel B: Year = Grade 6 SY 1999/2000					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Ln monthly earning work 1	1,203	7.976535	0.7997942	4.382027	11.0021
Ln monthly earning work 2	685	8.12916	0.7472842	3.688879	11.4721
Ln monthly earning work 3	330	8.234511	0.7401675	5.010635	10.11985
Ln monthly earning work 4	135	8.275191	0.6901957	6.214608	9.680344
Ln monthly earning work 5	57	8.268559	0.7573615	5.703783	9.903487
Ln monthly earning work 6	24	8.458425	0.4740236	7.495542	9.305651
Ln monthly earning work 7	12	8.731183	0.5693153	7.600903	9.798127
Ln monthly earning work 8	5	8.377627	0.8083283	7.495542	9.21034
Ln monthly earning work 9	2	9.153375	0.1360278	9.057189	9.249561
Ln monthly earning work 10	1	9.203517	N.A.	9.203517	9.203517
Ln monthly earning latest work	1,208	8.173788	0.7731775	5.010635	11.0021

Panel B in Table 6 shows similar statistics of the SY 1999/2000 Grade 6 sample. In Panel A, it is possible that a mixture of two cohorts (SY 1999/2000 and SY 2004/05 and 20005/06) created such artifacts. A more homogeneous group from the Grade 6 cohort of SY 1999/2000 also shows the same characteristics, which supports robustness of the above findings. That is, the average wage tends to increase and the variance tends to decrease monotonically as they change jobs. At this stage, it is not clear whether only good performers can upgrade their occupations or work experience generally raises wages.

Figures 5a and 5b describe the effect of labor market experience on wage growth. The vertical axis shows difference in log earnings between the latest and first works. Experience, measured in years by the time between the start of the first work and the beginning of 2011, is on the horizontal axis. Figure 5a shows experience effects for relatively educated and less educated workers. High school completion

(a) Years of schooling



(b) Mathematics test score

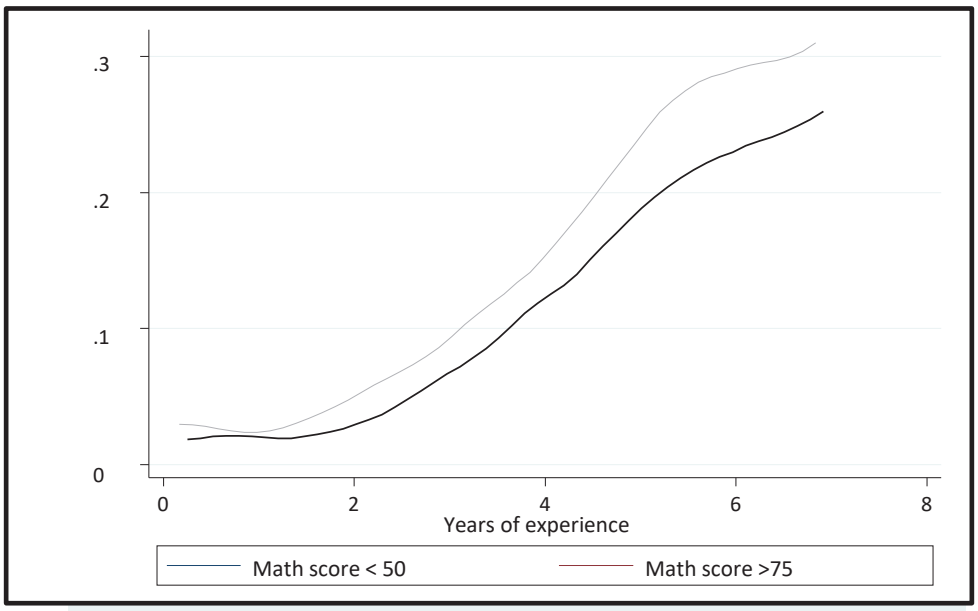


Figure 5. Experience effects.

is used as the threshold. Figure 5b differentiates the sample by mathematics test scores. Interestingly, the relatively more schooled group reaches 40% growth at the seventh year, while the relatively less schooled group only reaches 20% growth in the same span of time. In the latter, concavity sets in after 5 years. The mathematics test score also predicts the slope of wage growth. Those who scored higher than 75% in Grade 6 show a higher wage growth starting from the very beginning of work experience than those who scored less than 50%.

EMPIRICAL RESULTS

Returns to Schooling and Experience

This section summarizes empirical results. In Table 7, log earnings of the first and latest works are used as dependent variables. Column 1 shows a benchmark estimate of returns to schooling at the first job, 0.0862. Age is that of the time when students started the first work. In Column 2, tenure of the first work (measured in years, including both completed and incomplete cases) is used in addition to age at which the first work was started. Note that since by construct, we only observe the average wage for each work (position), the tenure effect could be possibly underestimated, which may offset the usual upward bias in the cross-sectional estimates. The estimate of 0.0196 is about 20% of returns to schooling.

Columns 3 and 4 in Table 7 use the latest job. In Column 3, current age and its square term are used to represent experience effects. Signs of the estimates are consistent with the existing literature; that is, the effect is increasing and concave. Column 4 explicitly uses experience in years (defined in the previous section). Returns to experience are 0.0408, which is more than twice as large as that of the first work tenure and slightly smaller than a half of returns to schooling. In other words, the potential gain from accumulating labor market experience is large.

The above estimates are, however, subject to bias due to unobserved error components that cannot be wiped out in the cross-sectional analysis. To resolve this bias due to unobserved error term, we extend our analysis using panel data of wage growth.

Wage Growth: Complementarity Between Schooling and Experience

Table 8 summarizes panel analysis results using wage growth. We use the sample of former students who started their first work at or after age 15 to exclude work experiences that really started at too early stages. The estimation includes current province dummies to control for local labor market specific factors. In Column 1, experience is captured by the period between the initial and latest works, so it is time variant. We obtain a comparable estimate of returns to experience in the panel estimation, that is, 0.0356.

Table 7. *Wage Regression*

	Dependent: log monthly earnings			
Work	**First**	**First**	**Latest**	**Latest**
Years of schooling	0.0862 (10.93)	0.0884 (11.16)	0.0980 (13.04)	0.0942 (11.55)
Tenure first work		0.0196 (1.87)		
Experience				0.0408 (6.50)
Age started	0.1662 (2.69)	0.1738 (2.75)		0.1291 (2.09)
Age started squared	−0.0024 (1.36)	−0.0025 (1.41)		−0.0018 (1.04)
Age			0.3642 (3.12)	
Age squared			−0.0074 (2.64)	
Female	−0.1902 (6.15)	−0.1786 (5.64)	−0.1937 (6.34)	−0.1793 (5.66)
Province dummies	yes	yes	yes	yes
Number of observations	2,024	2,002	2,067	2,031
Number of provinces	49	49	49	49
R^2	0.2926	0.2979	0.2733	0.2707

Note. Numbers in parentheses are absolute t values with Huber robust standard errors. Current age is age at which first job was started plus experience (years).

Column 2 includes the interaction term of years of experience and schooling. Interestingly, the interaction is significantly positive, whereas returns to experience become insignificant. Experience and schooling show complementarities; that is, education augments the effect of experience on wage growth. The above result remains robust even when years of schooling are introduced linearly in the wage growth equation here. This finding is in fact consistent with what we observed in Figure 5 (Section 4).

Column 3 verifies robustness of the above result by including the estimated value of household assets in 2000, mother/guardian's schooling, and current age. Household assets significantly help students achieve higher wage growth, which may imply that liquidity constraint affects the decision to switch occupations. The asset holding also proxies their family backgrounds. The mother/guardian's characteristics seem not to be generally significant. Even with these controls, we confirm that the complementarity of experience and education remains robust.

Columns 4 and 5 in Table 8 show school dummies to control for unobserved school (or community) specific factors. While province dummies were intended to control for the current labor market conditions, school dummies rather control for their common origin characteristics. The results confirm that the schooling–experience complementarity remains robust. Furthermore, Column 6 interacts the schooling–experience complementarity term and female dummy to see if there is a gender difference. The result does not show a significant difference by gender.

Table 8. *Wage Growth*

Dependent: Monthly earning growth						
Sample: Age started ≥ 15						
Experience	0.0356 (5.80)	−0.0091 (0.49)	−0.0172 (0.89)	−0.0099 (0.50)	−0.0128 (0.63)	−0.0127 (0.62)
Experience × years of schooling		0.0052 (2.54)	0.0056 (2.64)	0.0055 (2.56)	0.0054 (2.47)	0.0053(2.15)
Experience × years of schooling × female						0.0001 (0.09)
Age started	−0.1664 (2.23)	−0.2141 (2.76)	−0.2037 (2.64)	−0.1902 (2.33)	−0.1843 (2.25)	−0.1837 (2.22)
Age started squared	0.0039 (2.04)	0.0051 (2.56)	0.0047 (2.38)	0.0047 (2.22)	0.0044 (2.08)	0.0044 (2.06)
Female	0.0085 (0.31)	−0.0090 (0.32)	−0.0133 (0.47)	0.0192 (0.65)	0.0200 (0.68)	0.0159 (0.39)
Asset 2000			3.27E-08 (2.93)		3.08e-08 (2.48)	3.08E-08 (2.48)
Mother/guardian schooling			0.0031 (1.72)		0.0036 (1.96)	−0.0032 (0.66)
Mother/guardian age			−0.0089 (1.91)		−0.0033 (0.67)	0.0036 (1.96)
Province dummies	yes	yes	yes			
School dummies				yes	yes	yes
Number of observations	1,692	1,692	1,692	1,692	1,692	1,692
Number of provinces	49	49	49			
Number of schools				101	101	101
R^2	0.0973	0.1035	0.1101	0.1182	0.1229	0.1229

Note. Numbers in parentheses are absolute t values with Huber robust standard errors. Current age is age at which first job was started plus experience (years).

In some cases, the complementarity of schooling and experience should be interpreted carefully since some of the former students accumulate work experience while in school, augmenting both general and specific human capital simultaneously. Since market wage increases with years of schooling completed, a part of the estimate returns to experience could be attributed to the result of increased schooling.

In the above analysis, the growth of wages is zero if they did not change works (we only captured one wage from one work). In this sense, positive returns to experience are attributed to work changes. Hence, the results in fact show that education helps agents to switch to a higher pay work in the labor market and augments gains from accumulating labor market experience. This result is supported by Yamauchi (2004), who, using migrants in the Bangkok labor market, showed that schooling and destination experience are complementary, creating higher wage growth among educated migrants in the destination. Moreover, this mechanism reveals that the effect of schooling on lifetime earnings can be much larger than what we observe from the early stage of their labor market experience. The difference in the long-term effect between the more educated and less educated was clear in Figure 5.

Since monthly wage was recorded for each work, this method can potentially create measurement as well as recall errors if the period for one work was long. The average tenure of the first work is 1.52 years, but as Figure 3 shows, some observations have a relatively long period of tenure at the first work. A preliminary analysis showed that those cases were mostly related to engagement family businesses including (seasonal) farming. Table 9 includes years of tenure at the first work (Column 1) and limits the sample to those who experienced the first work only in 4 years (Columns 2 and 3). The effect of the first-work tenure is significantly negative in subsequent wage growth, implying that those who stay in the first job for a long time sacrifice their subsequent wage growth. In all columns, the complementarity between schooling and experience remains robust.

The next analysis uses national achievement test scores explicitly to proxy unobserved abilities. Years of experience are interacted with test scores in mathematics and English (Grade 6), and these test scores are added linearly in the wage growth equation. Table 10 shows basic results confirming that, similar to schooling, unobserved abilities approximated by academic test scores also augment returns to experience. The linear terms of test scores are both

Table 9. *Tenure at First Work*

Dependent: Monthly earning growth			
Sample: Age started ≥ 15		**Tenure at first work < 4**	
Experience	0.0029 (0.15)	−0.0035 (0.16)	−0.0151 (0.63)
Experience × years of schooling	0.0048 (2.31)	0.0055 (2.25)	0.0059 (2.33)
Tenure at first work	−0.0323 (3.46)	−0.0255 (1.69)	
Age started	−0.2080 (2.68)	−0.2056 (2.50)	−0.1947 (2.37)
Age started squared	0.0049 (2.47)	0.0049 (2.31)	0.0045 (2.12)
Female	−0.0203 (0.71)	−0.0213 (0.71)	−0.0256 (0.79)
Asset 2000			3.09E-08 (2.77)
Mother/guardian schooling			0.0037 (1.90)
Mother/guardian age			−0.0104 (2.01)
Province dummies	yes	yes	yes
Number of observations	1,672	1,527	1,527
Number of provinces	49	46	46
R^2	0.1127	0.1125	0.1189

Note. Numbers in parentheses are absolute t values with Huber robust standard errors. Current age is age at which first job was started plus experience (years).

Table 10. *Test Score Effects on Wage Growth*

Dependent: Monthly earning growth			
Sample: Age started ≥ 15			
Experience	−0.0231 (0.99)	0.0117 (0.95)	0.0133 (1.03)
Experience × years of schooling	0.0065 (2.62)		
Experience × math score		0.0005 (1.96)	
Experience × English score			0.0004 (1.64)
Age started	−0.1707 (1.90)	−0.1091 (1.24)	−0.1116 (1.28)
Age started squared	0.0040 (1.75)	0.0025 (1.09)	0.0026 (1.14)
Female	0.0106 (0.33)	0.0339 (1.10)	0.0352 (1.14)
Asset 2000	3.79E-08 (3.36)	4.06E-08 (3.65)	4.23E-08 (3.78)
Mother/guardian schooling	−0.0067 (1.24)	−0.0026 (0.48)	−0.0029 (0.55)
Mother/guardian age	0.0025 (1.26)	0.0028 (1.45)	0.0029 (1.45)
Math score	0.0003 (0.36)	−0.0013 (1.10)	0.0034 (0.35)
English score	−0.0002 (0.15)	−0.0001 (0.11)	−0.0017 (1.31)
School dummies	yes	yes	yes
Number of observations	1,479	1,479	1,479
Number of schools	101	101	101
R^2	0.1323	0.1266	0.1261

Note. Numbers in parentheses are absolute t values with Huber robust standard errors. Current age is age at which first job was started plus experience (years).

insignificant. That is, unobserved abilities do not change wage growth per se but only affect wages by augmenting returns to experience.

In Table 11, the female dummy is interacted with the complementarity term to detect gender difference. None of these interactions with the female dummy is significant (the sign is negative in all cases), so gender difference of the complementarity is not detected. Interestingly, the complementarities with schooling and test scores are more significant than those in Table 10.

Based on Column 1 of Table 11, Figure 6 shows the relationship between the squared residuals and years of experience, differentiated by the level of schooling attained.[1] The graph is consistent with stepping-stone transitions; the (unexplained part of) earnings variance increases as they experience more in the labor market. Furthermore, the slope is higher for the relatively more educated and good academic performers. Education may increase the transferability of human capital from one job to another, but the increased likelihood of changing occupations can introduce additional uncertainty in their earnings too.

CONCLUSIONS

This paper has examined wage dynamics using panel data of adolescents' labor market behavior and outcomes from the Philippines. The study shows, first, that returns to labor market experience are relatively large, nearly a half of the conventional estimate of returns to schooling. Second, returns to experience are higher if educational attainment and/or mathematics scores are higher. Education and ability together augment gains from accumulating labor market experience. Since wage observations are job (or task)-wise, the above results imply that education helps adolescents upgrade their occupations over time.

The earning variance, once conditional on schooling and test scores, was found to increase with experience, which is in favor of the stepping-stone model: youth start from a relatively easy job and upgrade to more difficult jobs by learning about their potentials and preferences. The more educated youth tend to go through this process. In this sense, education seems to hasten the learning process and thus occupational changes.

Table 11. *Test Score Effects on Wage Growth*

Dependent: Monthly earning growth			
Sample: Age started ≥ 15			
Experience	−0.0231 (0.98)	0.0106 (0.86)	0.0125 (0.96)
Experience × years of schooling	0.0066 (2.34)		
Experience × years of schooling × female	−0.00008 (0.05)		
Experience × math score		0.0007 (2.56)	
Experience × math score × female		−0.0004 (1.44)	
Experience × English score			0.0006 (2.00)
Experience × English score × female			−0.0003 (1.12)
Age started	−0.1710 (1.89)	−0.1200 (1.36)	−0.1180 (1.35)
Age started squared	0.0040 (1.74)	0.0028 (1.21)	0.0028 (1.21)
Female	0.0129 (0.30)	0.0922 (2.33)	0.0812 (0.96)
Asset 2000	3.79E-08 (3.35)	3.99E-08 (3.61)	4.26E-08 (3.80)
Mother/guardian schooling	−0.0067 (1.23)	−0.0025 (0.47)	−0.0030 (0.56)
Mother/guardian age	0.0025 (1.26)	0.0028 (1.46)	0.0028 (1.45)
Math score	0.0004 (0.36)	−0.0015 (1.28)	0.0004 (0.40)
English score	−0.0002 (0.15)	−0.0001 (0.09)	−0.0018 (1.44)
School dummies	yes	yes	yes
Number of observations	1,479	1,479	1,479
Number of schools	101	101	101
R^2	0.1323	0.1288	0.1276

Note. Numbers in parentheses are absolute t values with Huber robust standard errors. Current age is age at which first job was started plus experience (years).

High unemployment rate among youth is a typical phenomenon of the Philippine labor markets. Job mismatch and turnovers are quite common at the early stage of their labor market experiences in those countries. The evidence from the tracking survey showed the importance of academic achievements, measured by both years of schooling completed and academic test scores, in upgrading their occupations to realize higher returns in the labor market, despite the fact that many youths often start undesirable jobs at the onset. In other words, returns to education and ability increase with experience. Hence, it is important to prepare the youth for the school-to-work transition, equip them with knowledge and competencies and the right attitude, and strengthen skill development as they can to situate themselves in a productive and decent work.

Further research is needed to analyze the nonlinearity of school-to-work transition of youth to consider the process of lifelong learning and the type and quality of employability. This would entail unpacking the other underlying factors of the transition of young people such as individual motivation and aspirations, school quality, competencies and skills demanded in the labor market, migration, automation, artificial intelligence, and other emerging technologies.

NOTE

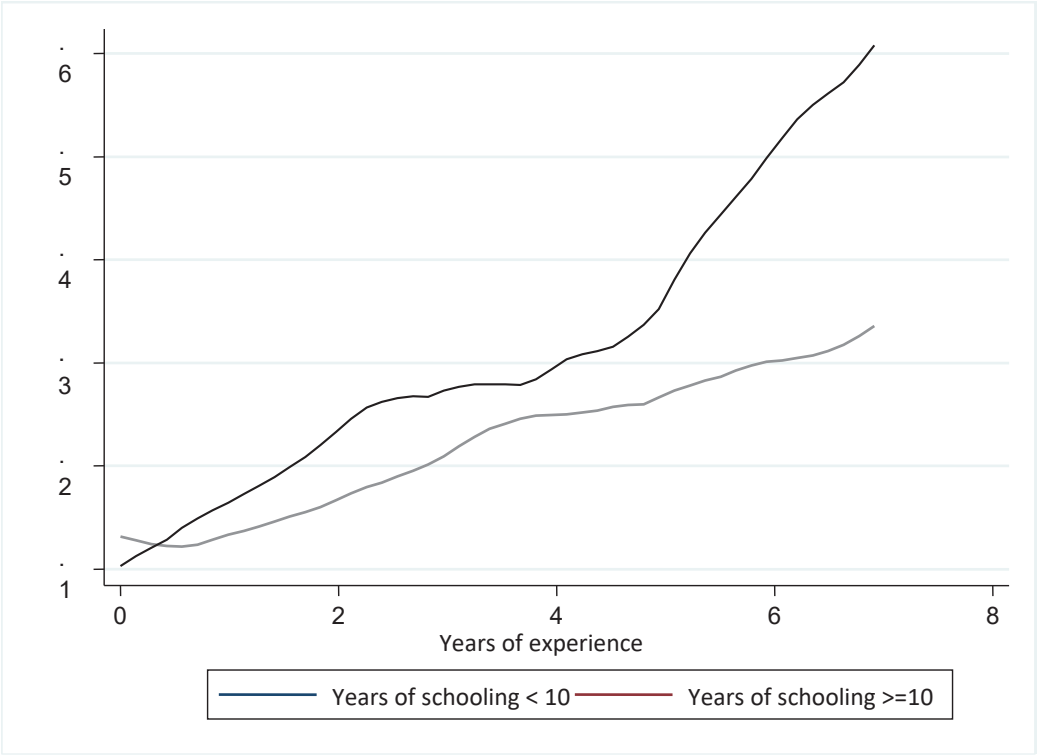
[1] A preliminary analysis supported heteroscedasticity, that is, jointly significantly correlated with years of experience, years of schooling and test scores.

REFERENCES

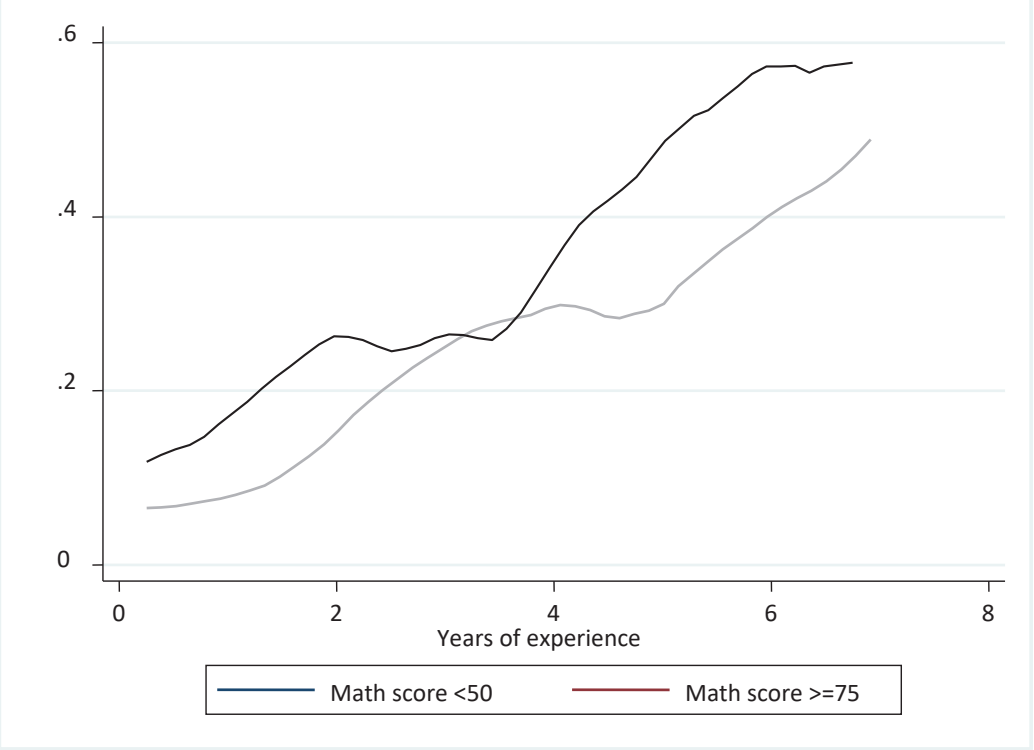
Abraham, K. G., & Farber, H. S. (1987). Job duration, seniority and earnings. *American Economic Review*, *77*, 278–297.

Altonji, J. G., & Williams, N. (1997). Do wages rise with job seniority: A reassessment. *Industrial and Labor Relations Review*, *58*, 370–397.

(a) Years of schooling



(b) Mathematics score



(c) English score

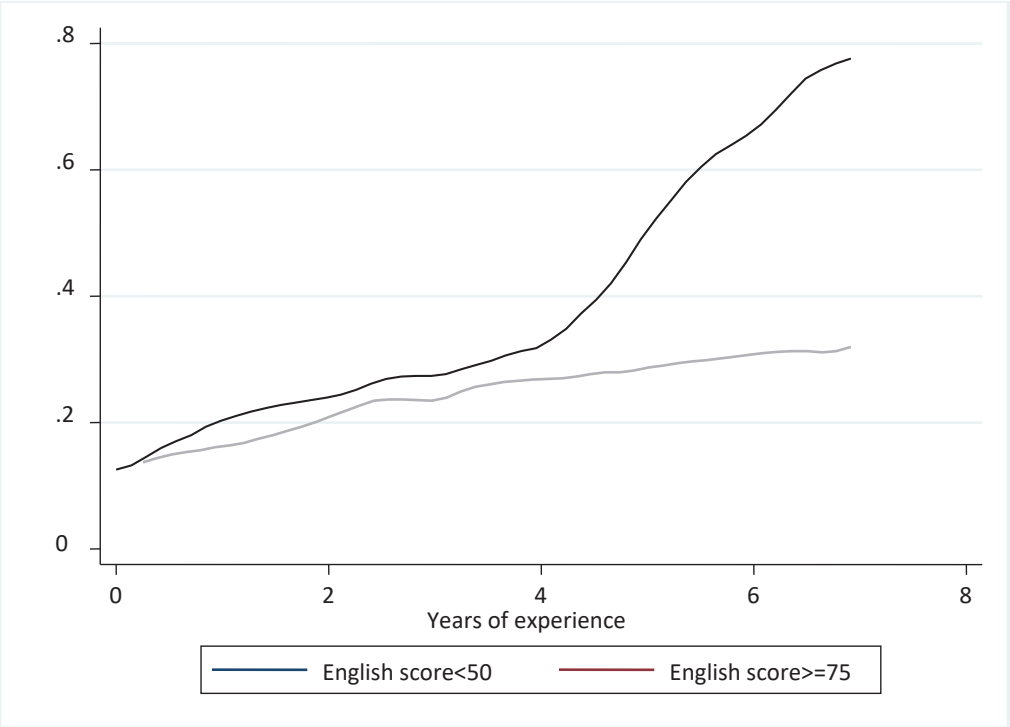


Figure 6. Error variance (squared residuals).

Altonji, J. G., & Shakotko, R. (1987). Do wages rise with seniority? *Review of Economic Studies*, *54*, 437–459.

Farber, H. S. (1999). Mobility and stability: The dynamics of job change in labor markets. In Ashenfelter, O. & D. Card (Eds.), *Handbook of Labor Economics* (Vol. 3, pp. 2439-2483). Amsterdam: Elsevier.

Farber, H. S., & Gibbons, R. (1996). Learning and wage dynamics. *Quarterly Journal of Economics*, *111*, 1007–1047.

Flinn, C. J. (1986). Wages and job mobility of young workers. *Journal of Political Economy*, *94*, S88–S110.

Hall, R. E., & Kasten, R. A. (1976). Occupational mobility and the distribution of occupational success among young men. *American Economic Review: Papers and Proceedings*, *66*, 309–315.

Johnson, W. R. (1978). A theory of job shopping. *Quarterly Journal of Economics*, *92*, 261–277.

Jovanovic, B. (1978). Job matching and the theory of turnover. *Journal of Political Economy*, *87*, 972–990.

Jovanovic, B., & Nyarko, Y. (1996). Learning by doing and the choice of technology. *Econometrica*, *64*, 1299–1310.

Jovanovic, B., & Nyarko, Y. (1997). Stepping-stone mobility. *Carnegie-Rochester Conference Series on Public Policy*, *46*, 289–325.

Miller, R. A. (1984). Job matching and occupational choice. *Journal of Political Economy*, *92*, 1086–1120.

Neal, D. (1999). The complexity of job mobility among young men. *Journal of Labor Economics*, *17*, 237–261.

Parente, S. L. (1994). Technology adoption, learning-by-doing, and economic growth. *Journal of Economic Theory*, *63*, 346–369.

Prendergast, C., & Stole, L. (1996). Impetuous youngsters and jaded old-timers: Acquiring a reputation for learning. *Journal of Political Economy*, *104*, 1105–1134.

Rosen, S. (1972). Learning and experience in the labor market. *Journal of Human Resources*, *7*, 325–342.

Rosenzweig, M. (1995). Why are there returns to schooling? *American Economic Review: Papers and Proceedings*, *85*, 153–158.

Rosenzweig, M. (2010). Microeconomic approaches to development: Schooling, learning and growth. *Journal of Economic Perspectives*, *24*, 81–96.

Sicherman, N., & Galor, O. (1990). A theory of career mobility. *Journal of Political Economy*, *98*, 169–192.

Topel, R. (1991). Specific capital, mobility and wages: Wages rise with job seniority. *Journal of Political Economy*, *99*, 145–176.

Wilk, S. L., Desmarais, L. B., & Sackett, P.R. (1995). Gravitation to jobs commensurate with ability: Longitudinal and cross-sectional tests. *Journal of Applied Psychology*, *80*, 79–85.

Yamauchi, F. (2001). Does inequality of labor earnings emerge in young days or later? Labor earnings dynamics and learning about individual ability in heterogeneous society. *Journal of Economic Behavior and Organization*, *44*, 413–434.

Yamauchi, F. (2004). Are experience and schooling complementary? Evidence from migrants' assimilation in the Bangkok labor market. *Journal of Development Economics*, *74*, 489–513.

Yamauchi, F., & Liu, Y. (2013). "Impacts of an early stage education intervention on students' learning achievement: Evidence from the Philippines." *Journal of Development Studies*, *49*, 208–222.

Yamauchi, F., & Liu, Y. (2017). *Gender asymmetries: Dynamic impacts of an early-stage school intervention in the Philippines* Review of Development Economics, 22:220-241

Yamauchi, F., Poapongsakorn, N., & Srianant, N. (2009). Technical change and the returns and investments in firm-level training: Evidence from Thailand. *Journal of Development Studies*, *45*, 1633–1650.