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The Assumed Benefits and Hidden Costs of Adult Learners' College Enrollment

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Abstract This study investigates the effects of adults' enrollment in and graduation from a two-year college on their hourly wages and occupational status in U.S. by employing a growth curve model and a piecewise model. College enrollment reduced hourly wages and occupational status by 13.8 % and 2.74 points, respectively. Less-educated workers whose wages were the main source of income were more likely to compromise their occupational status for a better work-study balance and thus to realize wage penalties during schooling. While a two-year college degree acquired in adulthood had significant positive effects on hourly wages and occupational status, the said positive economic returns from the degree were moderated by their self-esteem.

Keywords College enrollment · Adult learner · Wages · Occupational status · Self-esteem · Piecewise growth modeling

Learning is a central part of modern life (Bills 2004). Technological progress and increasing job insecurity mean that an ongoing learning process must be placed at the center of working life to keep abreast of contemporary knowledge and skills (Elman and O' Rand 1998). Individuals' interest in a linear transition from school to work is being replaced by that in work-to-school and work-to-work transitions (Keeling et al. 1998). Given this growing trend, most higher education institutions in the U.S. now offer school re-entry programs targeting workers. Only 60 % of U.S. college students were under the age of 25, whereas the rest were returning adult learners attending colleges or pursuing

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continuing education (Berker et al. 2003). For workers seeking to transition from a peripheral to a core worker, a two-year college degree has the potential to act as a mechanism for social mobility. Given its implication on both the greater socio-economic stage as well as the individual, the barrier of adult education can thus be examined as a social issue with respect to equity and efficiency (Tilak 2008).

While recent trends have been to expand educational opportunities for adult learners, these cohorts are likely to be limited in the number of hours available towards educational pursuits due to pre-established life schedules. Indeed, approximately 60 % of adult learners enrolled in a two-year college do not earn their degree within 6 year (Berker et al. 2003). Given the complex roles and responsibilities assumed by the average adult learner, studying requires not only considerable sacrifices, but also persistence (Merriam et al. 2007). Stress and physical exhaustion from studies can also sway the adult learners' engagement towards their educational pursuits (Kasworm 2003). Thus, studying may not be compatible, with work, even perhaps hindering it.

However, few studies have provided a detailed understanding of adult learners' earnings and occupational status during their schooling. Previous studies focusing exclusively on wage differentials at the time of graduation have typically ignored the entire process of obtaining higher qualifications, although changes in wages and degree attainment may be asynchronous (Kane and Rouse 1995; Leigh and Gill 1997). Young traditional students forego earnings during schooling (Becker 1993). However, for non-traditional adult learners whose wages are the main source of income, the question becomes whether they sacrifice income for schooling, or are they able to manage their work and study without ensuing consequent wage penalties? We lack information for nontraditional students.

For adults with a high school diploma, a two-year college degree presents an attractive mechanism for socio-economic mobility. However, not all degree attainment is equal, as non-cognitive traits of individual learners may influence how the degree attainment is transferred to labor market advantages. Recent studies on the determinants of wages have emphasized the importance of non-cognitive traits such as self-esteem and its relations to after-degree behavior (Heckman et al. 2006). The positive effects of self-esteem in acquiring a job and socioeconomic status are well documented (Klein et al. 1991). Conversely, however, overconfident workers overestimate their expected level of ability, which often exceeds their actual ability. Although recent studies show adverse effect of high self-esteem (Bernardo and Welch 2001; Reuben et al. 2013), we know little about how adult learners' non-cognitive trait such as self-esteem are related to the results of adult education. Maximizing awareness by providing information on any hidden risks may help contribute to mitigating the barriers to expanding educational opportunities for adult learners.

Theoretical Framework

The vast majority of employees seeking upward mobility within the workplace often pursue education as the most effective means of achieving these goals (Merriam et al. 2007). This reasoning stems from the fact that occupations are often stratified via educational level, and enhancing educational attainment can thus be presumed to benefit the employee in terms of wages or occupational status. The Human Capital Theory and the Screening Hypothesis provide two contradictory explanations for the relationships between education and wages (Bills 2004). On the one hand, the Human Capital Theory argues that the difference in wages between employees is due to the differences in their respective

human capital investments such as education, training, and mobility (Becker 1993; Paulsen and Smart 2001). Human capital investments directly augment individual skills and knowledge to enhance productivity which, directly profits the labor market. The Screening Hypothesis, on the other hand, challenges the notion that increasing education translates to increased individual productivity. The argument postulated is that the value of education is to screen individuals based on their capacity for higher productivity. Employers who do not have information on individual employees assign them to jobs based on productivity indicators such as education (Bills 2004). As Fig. 1 illustrates, individuals receive higher wages from their educational attainment not because their education enhances productivity, but because it signals a higher innate ability (Spence 1981). Thus, controlling for both cognitive and non-cognitive abilities will eliminate the relationship between educational levels and wages (Brunello and Schlotter 2011). Furthermore, the presence of the sheepskin effect, a larger return to completion of degree rather than of credits, challenges the idea of Human Capital Theory (Paulsen and Smart 2001). Professions often require educational credentials, as opposed to credits, and thus it could be argued that the adult learner's pursuit of a college degree is a form of rent seeking behavior (Bills 2004).

The Human Capital Theory postulates that the learners' decision to pursue a college degree depends on the expected costs and the benefits of attaining the degree (Paulsen and Smart 2001). Costs associated with a college degree are further grouped into either direct costs or opportunity costs. The direct costs refer to the costs incurred via the pursuit of education per se; these refer to tuition fees, books, supplies, etc. The opportunity costs refer to forgone earnings that adult students elect to sacrifice for the pursuit of education (Becker 1993; Paulsen and Smart 2001). Given that the majority of adult learners are likely employed, their opportunity costs compared to those of a traditional student have substantially different aspects because adult learners' study increases job-related skills and knowledge. Thus, it is likely that their wages during schooling may be dependent on two opposite sources of productivity: productivity increase from knowledge and skill enhancement (Barrow and Rouse 2005; Kane and Rouse 1995) or decline in productivity due to a decrease in dedication or engagement to work (Kasworm 2003; Simpson 2000; Tharenou 2001). While failure to adjust to a work-and-study schedule may result in a loss of earnings, if the adult learner is able to effectively transmit college learning to workplace performance, the losses incurred from decrease in workplace engagement could then be supplemented with the resulting enhanced productivity, therefore mitigating losses in earnings. This aspect may translate to further differentiations between adult learners and traditional learners. Occupations of traditional students, if any, for the vast majority of cases are largely menial tasks such as dish washing and car parking, and does not lend itself to any translation of studies to workplace (Broadbridge and Swanson 2006; Mortimer et al. 1996). Adult learners' educational pursuits are largely job-related, while conversely, traditional students' jobs are not related to their field of studies (Ford and Bosworth 1995; Pickering and Watts 2000; Merriam et al. 2007; Watts 2002). Similarly, adult learners usually engage in full-time work with part-time study, while traditional learners conversely engage in full-time study with part-time work (Orozco and Cauthen 2009). Lastly, adult learners' decision to pursue college enrollment is inherently a more informed decision than their traditional learner counterparts (Knowles et al. 1998; Moore 2010). Due to their experiences, adult learners are able to deduce connections between what they've learned and its potential implications in work, and thus, their college enrollment is a practical means of improving their standard of employment, and by extension, life in general (Merriam et al. 2007).

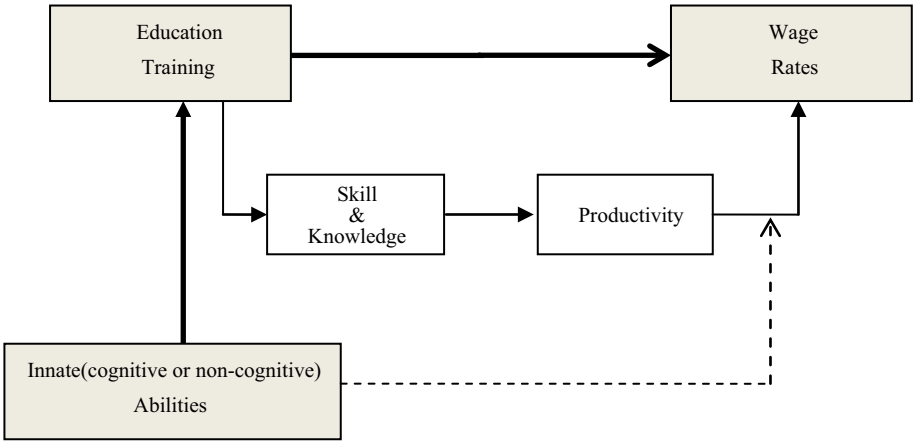

Fig. 1 Relationship between education and wage rates. *Solid lines* denote paths for human capital theory. *Bold lines* denote paths for screening hypothesis. *Dotted lines* illustrate paths where individual traits moderate the effect of education on wage rates

Studies demonstrate risks of overconfidence in terms of overplacement (Alicke and Govorun 2005), positive illusions (Taylor and Brown 1988), and comparative-optimism (Kruger and Burrus 2004). Overconfident workers may expect too much return in labor market from degree achievement (Reuben et al. 2013). When subjectively expecting value for two-year college degree is higher than an objective value of the degree, the attainment of two-year college degree in spite of cognitive growth may not always guarantee labor market advantage. Overconfident workers may aim at prestigious job and their application may be likely to be rejected, especially when scarcity of two-year college degree is falling due to mass higher education. Thus as shown in Fig. 1, their enhanced productivity will not lead to assumed wage rates and their overconfidence may moderate returns for education, resulting in wage penalty in labor market.

Adult Learner's College Enrollment and Occupational Outcomes

Job or family responsibilities are often listed as one of the barriers to adult learning, and learning in adulthood is particularly vulnerable to a perceived significant other's perception and support (Coyle-Shapiro et al. 2004; Fairchild 2003; Kasworm 2003). Participation in adult learning may lead to decreased job performance or may require an exemption from overtime work (Coyle-Shapiro et al. 2004). School assignment-related stress and physical exhaustion may interrupt or distract adult learners' job performance (Kasworm 2003), and employers may discriminate against adult learners who are perceived to be less devoted to their work responsibilities (Tharenou 2001). Aycock (2003) documented adult learners' dependency on their coworkers. Meanwhile, workers may take jobs with fewer responsibilities during schooling. Intermittent work involvement due to schooling may hinder the skills and knowledge of employees and translate to productivity of employees (Simpson 2000). Research on the barriers to learning in adulthood suggests that adults' school enrollment may lead to lower work productivity. Less dedication to job responsibilities during the schooling period may also subject adult learners to wage decreases.

Yet, other studies have suggested that a higher number of completed education credits leads to wage benefits, even without a degree. Kane and Rouse (1995) found that a two-year college attendee without a degree was likely to earn more than a person who lacked any college education. Barrow and Rouse (2005) further suggested the benefits of continuing education by showing that an additional year of college enrollment brought wage benefits. Similarly, according to the efficiency wage theory that Akerlof and Yellon (1986) proposed, employers may increase the wages of adult learners in anticipation of their future productivity, and in order to reduce employee turnover. That is, employers who are reluctant to lose trained workers will raise their pay, and workers who are more highly paid will remain with their current job. All of these findings support the idea that adult learners will receive wage benefits even prior to receiving a degree.

The implications of previous studies on labor market outcomes during schooling are contradictory. The wages of adult college-goers are influenced by two opposing effects: a positive effect due to an increase in skill and knowledge from schooling and a negative effect due to a decreased engagement to a job; either the adult learner may be penalized for reducing their engagements or responsibilities to their jobs due to seeking an advanced degree, or adult learners may receive benefits from increased schooling, even prior to attaining a degree. However, previous studies have not focused on the economic effects of adult learners' combining work with studying. Furthermore, such studies have not paid attention to the effect of schooling on occupational standing. The question of how the changes in skill endowment that stem from a partial completion of a degree or job responsibilities during schooling affect adult learners' wages and occupational status has not been empirically tested.

Adult Learner's College Degree Attainment and Non-Cognitive Traits

Non-cognitive abilities affect employees work performance as well as labor market outcomes in a manner similar to cognitive abilities (Farkas et al. 1997). Non-cognitive ability is defined as a set of productive behaviors and characteristics, including personality traits (Farkas 2003), self-esteem (Heckman and Rubinstein 2001), and motivation (Moss and Tilly 2001). Rosenbaum (2001) showed that the two ability traits work differently in the labor market depending on workers' job status, noting that non-cognitive abilities are more important in lower-level workers than cognitive ability when accounting for the effects of their skills on their job status and wages, and vice versa for higher-level workers. Heckman and Rubinstein (2001) noted a striking result in GED recipients. They found that GED recipients had cognitive abilities equal to those of high school graduates and higher cognitive abilities than their high-school dropout counterparts without a GED degree. However, GED recipient, when compared to their high-school dropouts, had comparatively lower non-cognitive skill and received lower wages. This would seem to suggest that GED recipients are penalized because they are presumed to possess the qualifications and cognitive skills to necessary to graduate from high school but they did not to fully utilize them—illustrating lower non-cognitive traits. Thus, non-cognitive ability is more important to lower-level workers than cognitive ability in accounting for the effects of skills on their wages.

Among the diverse range of non-cognitive abilities, self-esteem has been particularly treated as a panacea for social problems (Hewitt 1998). Studies have depicted low self-esteem as a source of dysfunction in social life and high self-esteem as a source of advantage in the labor market (Rosenberg and Owens 2001). High feelings of self-worth

and esteem lead individuals to take action to accomplish their beliefs about themselves. Ambitious goals accompanying high self-esteem motivate workers to become less vulnerable to external adversity (Judge and Hurst 2007). As the self-fulfilling prophecy implies, high self-esteem workers are likely to hold a high status job, but workers with low self-esteem take on respective lower status jobs (Rosenberg and Owens 2001). Thus, self-perceived competence facilitates job performance which leads to a return in wage differentials (Heckman and LaFontaine 2006).

The majority of studies on self-esteem traits have approached the query with a one-size-fits-all mentality, while recent studies on self-esteem would indicate that this is not always the case. Crocker and Park (2004) suggest that employees with a higher self-esteem tend to "validate their abilities and qualities in the domains in which self-worth invested (p. 393)." Weiss (2010) found that the effects of non-cognitive traits were not linear with wages; non-cognitive traits yielded rewards in low or high paying jobs, but not in middle paying jobs. Other studies have pointed out the drawbacks of high self-esteem in situations that may threaten self-image (Baumeister et al. 2003; Baumeister et al. 1993).[1] Baumeister et al. (1993) suggest that people with high self-esteem tend to overestimate their abilities in circumstances that challenging their self-esteem and thus fail to manage their abilities effectively. When they encounter situations not meeting their self-esteem, they are likely to behave violently or antisocially (Baumeister et al. 1996). Similarly, Crocker and Park (2004) identified traits deemed as defensive mechanisms associated with high self-esteem: avoiding the situation, putting themselves in inhibitory conditions, lowering expectations, and taking comfort from others' precedents of negative outcomes. Bernardo and Welch (2001) suggest that subjective overconfidence regarding one's abilities may lead to setting goals that are beyond the individual's capacity and the selection of risky actions that are doomed to fail.

Attention to adult learners' non-cognitive abilities and their effects on socioeconomic outcomes have garnered much less attention when compared to its cognitive ability counterpart. Due to the existing circumstances by which employers may undervalue adults' college enrollment as a signal of lower cognitive ability, social evaluations of adult learners may not be in balance with their perceived competence from attainment of a college degree (Bernardo and Welch 2001; Rowan-Kenyon 2007; Weiss 2010). The stronger the perceived self-esteem, the more effort and time devoted to the job, leading to positive outcomes at the labor market. However, adult learners over-cherishing their two-year college degree accomplishments may risk foregoing assumed labor market result.

Objective of the Study

From examining the existing literature, there exists a considerable knowledge gap in understanding of the benefits and costs of adult learners' enrollment in two-year college programs. Studies have rarely examined the effects of adult learners' schooling period on their wages and occupational status. Little is known about changes in occupational status and wages over the whole process of degree attainment. Given this context, the main objective of this study will be to investigate the changes in adult learners' wages and occupational status during and after their adult education. More specifically, this study has the following two research objectives:

[1] Psychologist conceptualized this situation as ego threat (Leary et al. 2007).

(1) By employing a growth curve model and a piecewise model, this study investigates the growth discontinuity in wages and occupational status after adult learners' enrollment in two-year colleges.
(2) It examines the effects of adult learners' characteristics, particularly their non-cognitive abilities, on their labor market outcomes.

By investigating both wage rates and occupational statuses simultaneously, this study reflects on how adult learners cope with study and employment requirements. By becoming more aware of the associated potential occupational status benefit as well as wage changes, assumptions regarding the trends in the strategies adult learners employ to determine schooling may be deduced. Additionally, considering both indicators also provides a mechanism from which to understand the behaviors of adult learners' following the periods after graduation.

Data and Method

Sample

The data examined in this study were taken from the National Longitudinal Survey of Youth 79 (NLSY 79). The NLSY 79 was composed of 12,686 individuals who were aged from 14 to 22 years old in 1979. The survey includes an oversampling of Blacks and Hispanics.[2] This study sampled paid workers aged between 25 and 55, between 1990[3] and 2008. Table 1 shows the filtering process used to construct the study sample. To concentrate on the relationship between labor market outcomes and adult learners' enrollment in and graduation from two-year colleges, based on workers' educational credentials and college enrollment history, a research design with a comparison group was applied. Samples were divided into a target group and a comparison group. The target group was composed of 154 workers who had attained an associate degree as their highest qualification between 1990 and 2008. The comparison group consisted of 1,578 workers who had only a high school diploma without any college experience. Dividing the samples into two groups is to confirm that there exists no group difference in occupational outcomes prior to college enrollment. Due to the fact that most adult learners engaged in their degrees intermittently as shown in Table 2, comparing outcomes during the degree does not signify group difference.

Dependent Variables

As dependent variables, log hourly wages and occupational status were used to measure changes in economic return and occupational standing when adult learners gained a college diploma. It should be noted that these hourly wages were not influenced by payroll deduction due to a prepaid tuition deduction or a tuition contribution from employers because the NLSY 79 asked respondents to report their wages before deduction (U. S. Department of Labor 2008). When workers changed jobs, the first job of the specific survey year was used. The wages for each year were then adjusted for inflation by using the

[2] Sample weight was applied to individuals in the level-2 model to adjust for the unequal sample selection probability of an oversample for Blacks and Hispanics.

[3] In 1990, every participant in NLSY79 was aged over 25, the age at which literature often distinguishes adult learners from traditional college students.

Table 1 Sample construction

Selection criteria	Valid case (*n*)	
	Comparison group	Target group
Total sample in 1979	12,686	
High school diploma between 1990 and 2008	4,359	
Excluded some college	1,578	154

CPI Index to reflect the dollar value for 2008. Occupational status was measured using the standard Duncan SEI scores, which the NLSY 79 provided (Duncan 1961).

Independent Variables

As this study applied multilevel growth modeling, the independent variables were classified into two kinds: level-1 and level-2. The level-1 variables were work-experience and the time-points of college enrollment and graduation. Table 2 shows the coding system for the time-points in the level-1 model. Work-experience was specified with linear (*Exp*) and quadratic (Exp^2) terms[3]. Work experience was calculated as age minus the summation of the years of schooling and six additional years to account for preschooling. Time points for schooling were distinguished by three different time spans, which were time prior to the enrollment (*Pre-degree*), time spent combining school and work (*During-degree*), and time after having attained the degree (*Post-degree*). *Pre-degree* was coded as 1 to assess the time before workers in the target group enrolled in a college. To fit the model into data which indicated that adult students were intermittently enrolled in a school such as Case B in Table 2, *during-degree* was coded 1 for a year of college attendance and otherwise 0. Unlike previous research (Osgood 2005) that used a piecewise growth model in which the group membership of individuals was time-invariant and therefore specified as level-2, the time-varying characteristic of adult learners' college enrollment in our study was specified in the level-1 model. *Post-degree* was coded 1 for the year in which workers in the target group attained their degree, otherwise 0. The level-2 independent variable was self-esteem. The NLSY administered the Rosenberg self esteem subscale, which is composed of ten questions (e.g., I am a person of worth). It was applied to the respondents in 1987. Self-esteem was centered on the grand mean in order to make the interpretation of intercept (γ_{00}) meaningful (Raudenbush and Bryk 2002).

Control Variables

Local unemployment rates were included in the level-1 model and cognitive abilities, gender, and race, were incorporated in the level-2 model. Unemployment rates for each respondent's residence, which can explain individual wage growth (Blanchflower and Oswald 1994; Card 1995), were provided from the NLSY 79 Geocode data. Cognitive ability was assessed by the age-adjusted Armed Services Vocational Aptitude Battery (ASVAB), which was administered to the respondents who were aged 14–17 in 1979. ASVAB scores were age-adjusted by being regressed on age group dummies and centered on the grand mean (Raudenbush and Bryk 2002). Males were coded 0 and females were coded 1. Three racial categories are included in the analysis: non-Black/non-Hispanics,

Table 2 Coding example for level-1 components

Timing	Year	Group[a]	Wages[b]	Log wages	SEI	Exp[c]	Exp Squ-2	Pre-degree	During-degree	Post-degree
Case A										
Pre	1990	1	940	6.85	52	−8	62	1	0	0
	1991	1	902	6.80	52	−7	47	1	0	0
	1992	1	808	6.69	52	−6	34	1	0	0
	1993	1	784	6.66	52	−5	23	1	0	0
During	1994	1	765	6.64	48	−4	14	0	1	0
	1996	1	873	6.77	48	−2	2	0	1	0
Post	1998	1	1,042	6.95	62	0	−2	0	0	1
	2000	1	1,139	7.04	62	2	2	0	0	1
	2002	1	1,208	7.10	62	4	14	0	0	1
	2004	1	1,293	7.16	62	6	34	0	0	1
	2006	1	1,068	6.97	62	8	62	0	0	1
	2008	1	1,300	7.17	62	10	98	0	0	1
Case B										
Pre	1990	1	1,152	7.05	25	−6	34	1	0	0
During	1991	1	1,266	7.14	52	−5	23	0	1	0
	1992	1	977	6.88	48	−4	14	0	0	0
	1993	1	1,219	7.11	52	−3	7	0	1	0
	1994	1	1,275	7.15	25	−2	2	0	0	0
	1996	1	1,167	7.06	25	0	−2	0	1	0
	1998	1	1,225	7.11	25	2	2	0	1	0
	2000	1	1,158	7.05	25	4	14	0	1	0
Post	2002	1	1,428	7.26	25	6	34	0	0	1
	2004	1	1,448	7.28	39	8	62	0	0	1
	2006	1	2,670	7.89	39	10	98	0	0	1
	2008	1	1,923	7.56	39	12	142	0	0	1
Case C										
	1990	0	998	6.91	19	−9	79	0	0	0
	1991	0	1,068	6.97	19	−8	62	0	0	0
	1992	0	1,036	6.94	19	−7	47	0	0	0
	1993	0	1,006	6.91	19	−6	34	0	0	0
	1994	0	995	6.90	19	−5	23	0	0	0
	1996	0	963	6.87	19	−3	7	0	0	0
	1998	0	822	6.71	19	−1	−1	0	0	0
	2000	0	905	6.81	11	1	−1	0	0	0
	2002	0	1,050	6.96	23	3	7	0	0	0
	2004	0	1,050	6.96	23	5	23	0	0	0
	2006	0	1,185	7.08	23	7	47	0	0	0
	2008	0	1,230	7.11	23	9	79	0	0	0

[a] 1 stands for the experimental group and 0 signifies the control group

[b] Wages means the average hourly wage rates adjusted for 2004 dollar value (measured in cents)

[c] Exp means the grand-mean centered work-experience, which is age-20

Blacks, and Hispanics. Categories were dummy-coded, with non-black/non-Hispanics as the reference group.

Analyses

This study applied multilevel growth modeling in which occasions in each wave were nested within individuals. Specifying the level-1 model with time-varying variables could illustrate the effect of workers' time-variant college enrollment status on the dependent variable. Wages and occupational status are a function of the linear and quadratic terms of work experience (Hauser et al. 2000; Mincer 1974). The level-1 specification with the linear and quadratic terms of work experience formulated the base hourly wage and occupational status growth rates for the entire span together with the local unemployment rates and the three schooling timeframes were specified with an addition to the base rates of work experience (Osgood 2005; Raudenbush and Bryk 2002).[4] The level-2 model was formulated using time-invariant individual characteristics, such as cognitive ability, self-esteem, gender, and race. The random effect approach in this modeling allowed for dependence within waves by incorporating varying intercept and coefficients in the level-2 model. Because multilevel modeling has an advantage for unbalanced data, such as differences in time points and spacing across individuals due to non-response and missing data, it can permit longitudinal investigation to proceed without losing cases (Raudenbush and Bryk 2002).

When applying the multilevel growth model, the piece-wise method was added to the level-1 model. This allowed the modeling and incorporation of nonlinearity and discontinuity at time-points (Osgood 2005; Raudenbush and Bryk 2002). Breaking down transitional stages in terms of college enrollment and graduation enabled investigation of the possibility that a college degree's effect on wages and occupational status might not be subsequent only to obtaining the degree; i.e., the piece-wise method offered insights into labor market outcomes around the time of degree achievement. This coding arrangement allowed three level-1 coefficients of time-points (i.e., *Pre-degree*, *During-degree*, and *Post-degree*) that could reflect differences in the effects of college enrollment and graduation on wages and occupational status between the target and comparison groups. Coefficients β_{40}, β_{50}, and β_{60}[5] represent the group difference in the log hourly wages and occupational status prior to college enrollment (*Pre-degree*), during college enrollment (*During-degree*), and after the attainment of a degree (*Post-degree*), respectively.

Given that group membership was not assigned randomly, this study employed a design that addressed potential threats to internal validity because adult learner's self-selection of college enrollment may bias results due to participants' abilities (Shadish et al. 2002). First, this study examined cognitive and non-cognitive abilities and investigated the effects of these two elements in explaining changes in wages and occupational status. Second, this study added a time-series design by applying multiple measurements to wages and occupational status with change in the enrollment status of adult learners. Measuring wages and occupational status before enrollment allows for examination of selection biases and multiple measurements for each stage of enrollment helps with identification of the effects of historical events. Third, this study incorporated a piecewise design to specify phases of

[4] These metrics allowed for identification of the typical patterns suggested by Mincer's human capital earning function (Mincer 1974). Furthermore, these metrics were designed to find a way to identify growth in the Socioeconomic Index specified.

[5] Refer to the equations in the next page.

discontinuity in wages and occupational status by status of enrollment; that is, from before enrollment to during enrollment and from during enrollment to after enrollment. Lastly, in order to differentiate between the within-individual effects from the between-individual effects, the average values of work experiences in linear and quadratic terms were added to the level-2 intercept. The resulting estimates from this method are identical to the effects of group-mean centering (Osgood 2005), which is a well known means of removing the effects of unobservable time-invariant confounders on level-1 time-variant variables (Baltagi 2001).

To ascertain whether variance components of level-1 variables should have been fixed or varied in the level-2 model, they were examined using deviance statistics to fit the level-2 model into the data.[6] Then, preliminary analysis was conducted applying multiparameter tests[7] to examine which set of level-2 variables were needed in a level-2 model and which variables at level-2 interacted with the level-1 variable. Tests showed that all level-2 predictors needed to be incorporated in the level-2 intercept. For log hourly wages, cognitive ability moderated the effects of work experience and squared work experience on wages (β_{11} and β_{21}); gender moderated the effects of squared work experience on wages (β_{22}), and self-esteem moderated the effects of *post-degree* on wages (β_{51}). Meanwhile, cognitive ability moderated the effects of work experience on occupational status (β_{11}); gender moderated the effects of work experience and *during-degree* on occupational status (β_{11} and β_{41}). Additionally, we tested the sensitivity of the homogenous level-1 variance models with an alternative error structure. The first-order auto-regressive (AR) model is a frequent option for homogenous level-1 variance models because the variances at each given time correlates with the previous times (Singer and Willett 2009). The AR model identified two error terms in level-1 models; the previous error term (e_{t-1}) and a new disturbance term (v_t).[8] Also, we applied a growth mixture model (GMM) to identify the unknown subgroup's wage trajectories of adult learners.[9] The final model was thus specified as follows:

Level-1 (Y_{ti} is Log Hourly Wages or Occupational Status)

$Y_{ti} = \pi_{0i} + \pi_{1i}(Exp) + \pi_{2i}(Exp^2) + \pi_{3i}(Unemployment\ rates) + \pi_{4i}(Pre\text{-}degree) + \pi_{5i}(During\text{-}degree) + \pi_{6i}(Post\text{-}degree) + e_{ti}$ (For AR model, $e_t = \rho e_{t-1} + v_t$, where ρ is the autoregressive parameter and v_t is another random error)

Level-2 for Log Hourly Wages

$$\pi_{0i} = \beta_{00} + \beta_{01}\,(Cognitive) + \beta_{02}\,(Self\text{-}esteem) + \beta_{03}\,(Gender) + \beta_{04} - \beta_{05}\,(Race) + \mu_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11}\,(Cognitive) + \mu_{1i}$$
$$\pi_{2i} = \beta_{20} + \beta_{21}\,(Cognitive) + \beta_{22}\,(Gender) + \mu_{2i}$$
$$\pi_{3i} = \beta_{30}$$
$$\pi_{4i} = \beta_{40}$$

[6] Variances in the linear and quadratic terms for work experience were significant but variances for local unemployment rates and three schooling-related time-points were not significant.

[7] Multiparameter tests allowed for simultaneous investigation of the statistical significance of each level-2 predictor on each level-2 equation, without inflating the statistical significance level (Raudenbush and Bryk 2002).

[8] Analyses were conducted using *xtmixed* command of Stata.

[9] The results of GMM models are displayed in Appendix 1.

$$\pi_{5i} = \beta_{50}$$
$$\pi_{6i} = \beta_{60} + \beta_{51}$$

Level-2 for Occupational Status

$$\pi_{0i} = \beta_{00} + \beta_{01}\,(Cognitive) + \beta_{02}\,(Self\text{-}esteem) + \beta_{03}\,(Gender) + \beta_{04} - \beta_{05}\,(Race) + \mu_{0i}$$
$$\pi_{1i} = \beta_{10} + \beta_{11}\,(Cognitive) + \beta_{12}\,(Gender) + \mu_{1i}$$
$$\pi_{2i} = \beta_{20} + \mu_{2i}$$
$$\pi_{3i} = \beta_{30}$$
$$\pi_{4i} = \beta_{30}$$
$$\pi_{5i} = \beta_{40}$$
$$\pi_{6i} = \beta_{50}$$

Results

Basic Statistics

As shown in Table 3, a total of 1,732 workers (986 males, 764 females) were considered in this study, which examined the procedural effects of adult learners' enrollment in college and attainment of a degree on log hourly wages and occupational status. About 9 % of workers ($n = 154$) were assigned to the target group, while the majority of workers ($n = 1{,}578$) were in the comparison group. The mean log real hourly wage rate was about 7.17, which corresponded to $12.99 per hour in 1999. The mean Duncan Index was 38.89. Workers' years of job experience (grand-mean centered) ranged from −28.59 to 15.41. The overall local unemployment rates for samples were 6 % between 1990 and 2008. The fact that each mean value of pre-degree, during-degree, and post-degree was lower than the group mean value in level-2 signifies an unbalanced data design, which was due to non-response, missing data and unmet situations related to criteria caused by intermittent enrollment in schooling.

Compositional differences between the two groups were investigated by using a *t* test on the level-2 predictors. As shown in Table 3, adult learners in the target group had significantly higher scores for cognitive ability ($M = 58.66$) than did workers in the comparison group ($M = 50.71$). However, there was no significant difference in self-esteem between the two groups. There were more female adult learners in the target group ($M = 0.66$) than in the comparison group ($M = 0.41$) and more Hispanic adult learners in the target group ($M = 0.22$) than in the comparison group ($M = 0.05$). However, there was no significant difference in black workers between two groups.

The Effects of Background Variables on Growth in Wages and Occupational Status

As shown in Table 4, the initial status of hourly wages was affected positively by cognitive ability and self-esteem and negatively by gender and race. Unit increase in cognitive ability and self-esteem enhanced the initial wages by 0.4 and 14.3 %, respectively. Women received 21.6 % lower wages than men and Black workers received 10.9 % lower wages than their white counterparts. The linear term for work experience (β_{10}) was significant; the hourly wages grew by 1.9 % yearly. The initial effects of cognitive ability on wages were decreased by 0.01 % yearly. The quadratic term (β_{20}) for work experience was significant but negative, indicating that wage growth rates decrease as work experience increases. The

Table 3 Basic statistics

Variable	*n*	*M*	SD	Min	Max	Group difference		
						Target (SD)	Comp (SD)	t value
Level-1								
Log real hourly wages	17,686	7.171	0.651	0	12.061			
Socioeconomic Index	18,353	38.892	22	3	96			
Centered Work experience	20,388	0	6.392	−28.592	15.412			
Quadratic Centered Work experience	20,388	40.861	45.021	0	817			
Unemployment rates	20,330	0.061	0.022	0.020	0.210			
Pre-degree	20,342	0.034	0.161	0	1			
During-degree	20,337	0.012	0.121	0	1			
Post-degree	20,361	0.032	0.181	0	1			
Level-2								
Group (comparison 0, target 1)	1,732	0.089	0.281	0	1			
Cognitive abilities[a]	1,732	51.322	24.191	1	99	58.663 (24.975)	50.714 (24.030)	3.621**
Self-esteem[b]	1,732	3.341	0.412	1.701	4	3.363 (0.456)	3.342 (0.405)	0.653
Gender (Male 0, Female 1)	1,732	0.431	0.501	0	1	0.664 (0.475)	0.411 (0.492)	5.591**
Hispanic	1,732	0.051	0.261	0	1	0.102 (0.303)	0.049 (0.217)	2.574*
Black	1,732	0.132	0.332	0	1	0.127 (0.335)	0.129 (0.335)	0.064

Weighted means and standard deviations for level-2 variables

** $p < .01$; * $p < .05$

[a, b] Skewness (Kurtosis) values are 0.172 (−0.874) and 0.051 (−0.542), respectively

Table 4 The effects of background variables on growth in wages and occupational status

Fixed effect	Model 1 (log wage rates)			Model 2 (occupational status)		
	β	*se*	*p*	β	*se*	*p*
Individual mean status, π_{00}						
Intercept, β_{00}	7.367	0.019	0.000	34.099	0.667	0.000
Cognitive, β_{01}	0.004	0.000	0.000	0.160	0.016	0.000
Self-esteem, β_{02}	0.143	0.021	0.000	5.148	0.843	0.000
Gender, β_{03}	−0.216	0.017	0.000	11.070	0.660	0.000
Hispanic, β_{04}	0.046	0.024	0.056	2.531	0.961	0.020
Black, β_{05}	−0.109	0.022	0.000	−3.425	0.879	0.000
Mean growth rate, π_{1i}						
Intercept, β_{10}	0.019	0.001	0.000	0.916	0.045	0.000
Cognitive, β_{11}	−0.0001	0.000	0.003	−0.004	0.001	0.006
Gender, β_{12}				−0.275	0.066	0.000
Mean acceleration rate, π_{2i}						
Intercept, β_{20}	−0.0002	0.000	0.028	0.018	0.004	0.000
Cognitive, β_{21}	−0.000	0.000	0.000			
Gender, β_{22}	0.001	0.000	0.000			
Unemployment rates, π_{3i}						
Intercept, β_{30}	−1.042	0.197	0.000	1.679	5.887	0.776
Random effect						
Level 1, e_{ij}	0.501			14.018		
Level 2, τ_{00}	0.297		0.000	12.677		0.000
τ_{10}	0.029		0.000	1.120		0.000
τ_{20}	0.003		0.000	0.084		0.000

Male is used as the reference group. The coefficients for mean values of work experience and squared work experience are not presented

declined wage growth rates were higher for men than women (β_{22}). A unit increase in the local unemployment rates (β_{30}) decreased wage rates by 1.25 %.

Occupational status was initially affected by cognitive ability, self-esteem, gender and race. Unit increase in cognitive ability and self-esteem enhanced occupational status by 0.160 and 5.148, respectively. Women initially had 11.070 point higher Duncan occupational index scores than men. Hispanic workers had 2.531 point higher scores in the same index than their white counterparts. Black workers held jobs that were 3.425 points lower in the same index than white workers. The linear term for occupational status (β_{10}) was significant; the occupational status grew by 0.916 points yearly. The growth rate of occupational status was negatively affected by cognitive ability (β_{11}) and gender (β_{12}). The quadratic term (β_{20}) for work experience was significant but positive, indicating that the growth rates of occupational status increase as work experience increases (β_{20}). The local unemployment rates (β_{30}) were insignificant.

Trends in Wage rates and Occupational Status by Enrollment Status

For wages, according to Table 5, the coefficient for the pre-degree (β_{40}), which is the group difference in log hourly wages rates, was 0.026 but was not significant, implying that

Table 5 The effects of schooling on growth in wages and occupational status

Fixed effect	Model 3 (log wage rates)			Model 3-1 (AR model)			Model 4 (Occupational status)			Model 4-1 (AR model)		
	β	*se*	*p*	β	*se*	*p*	β	*se*	*p*	β	*se*	*p*
Individual mean status, π_{00}												
Intercept, β_{00}	7.366	0.019	0.000	7.360	0.018	0.000	34.016	0.666	0.000	34.038	0.664	0.000
Cognitive, β_{01}	0.004	0.000	0.000	0.004	0.000	0.000	0.159	0.016	0.000	0.162	0.015	0.000
Self-esteem, β_{02}	0.147	0.021	0.000	0.139	0.020	0.000	5.136	0.841	0.000	5.264	0.815	0.000
Gender, β_{03}	−0.215	0.017	0.000	−0.215	0.017	0.000	10.984	0.659	0.000	11.022	0.639	0.000
Hispanic, β_{04}	0.045	0.024	0.065	0.044	0.023	0.054	2.124	0.959	0.027	2.263	0.928	0.015
Black, β_{05}	−0.109	0.022	0.000	−0.112	0.023	0.000	−3.485	0.878	0.000	−3.208	0.850	0.000
Mean growth rate, π_{1i}												
Intercept, β_{10}	0.019	0.001	0.000	0.019	0.001	0.000	0.906	0.045	0.000	0.896	0.044	0.000
Cognitive, β_{11}	−0.0001	0.000	0.003	−0.0001	0.000	0.008	−0.004	0.001	0.034	−0.004	0.001	0.008
Gender, β_{12}							−0.299	0.066	0.001	−0.314	0.064	0.000
Mean acceleration rate, π_{2i}												
Intercept, β_{20}	−0.0002	0.000	0.023	−0.0003	0.000	0.023	0.018	0.003	0.000	0.015	0.003	0.000
Cognitive, β_{11}	−0.0002	0.000	0.000	−0.0002	0.000	0.008						
Gender, β_{03}	0.001	0.000	0.001	0.001	0.000	0.001						
Unemployment rates, π_{3i}												
Intercept, β_{30}	−0.010	0.001	0.000	−0.093	0.020	0.000	1.982	5.880	0.736	2.483	6.065	0.682
Pre-time, π_{4i}												
Intercept, β_{40}	−0.026	0.019	0.175	−0.028	0.020	0.175	−0.125	0.587	0.830	−0.191	0.634	0.762
During-degree, π_{5i}												
Intercept, β_{50}	−0.138	0.019	0.000	−0.130	0.019	0.000	−2.743	0.550	0.013	−2.956	0.450	0.001
Post-time, π_{6i}												
Intercept, β_{60}	0.042	0.020	0.035	0.042	0.020	0.037	3.684	0.604	0.000	3.388	0.622	0.000
Self-esteem, β_{61}	−0.129	0.043	0.003	−0.129	0.044	0.003						

Table 5 continued

Fixed effect	Model 3 (log wage rates)			Model 3-1 (AR model)			Model 4 (Occupational status)			Model 4-1 (AR model)		
	β	*se*	*p*	β	*se*	*p*	β	*se*	*p*	β	*se*	*p*
Random effect												
Level 1, e_{ij}	0.500	0.002	0.000	0.537	0.004	0.000	13.997	0.080	0.000	15.626	0.130	0.000
Level 2, τ_{00}	0.296	0.007	0.000	0.256	0.007	0.000	12.650	0.249	0.000	11.558	0.261	0.000
τ_{10}	0.029	0.000	0.000	0.023	0.001	0.000	1.116	0.028	0.000	0.894	0.036	0.000
τ_{20}	0.003	0.000	0.000	0.002	0.000	0.000	0.084	0.004	0.000	0.018	0.009	0.000
ρ				0.369	0.013	0.000				0.463	0.010	0.000

Male is used as the reference group. The coefficients for mean values of work experience and squared work experience are not presented

there were no pre-existing differences between groups after controlling for initial status; that is, before the target group attended college, workers from both groups had the same hourly wages and wage differences caused by the two groups' cognitive abilities were absorbed in initial wages. Figure 2 shows no difference in the log hourly wage rate trends between baseline and pre-degree. Meanwhile, the coefficient for the during-degree period (β_{50}), the difference in the log hourly wages between employees who had attended colleges compared to their non-attending counterparts were −0.138, which corresponds to a 13.8 % decrease in hourly wages. This illustrates that during their enrollment in a two-year college, the hourly wage of adult learners' who were combining work and college decreased by an average of 13.8 %. Figure 1 shows that the wage rate trend for the during-degree period shifted down from the baseline. Meanwhile, the coefficient for *post-degree* (β_{60}), which explains the returns from a college degree, was 0.042. This signifies that obtaining a college degree led to an increase in hourly wages by an average of 4.2 %, compared to workers with only a high school diploma. Figure 1 shows that wage trends after the attainment of college degrees shifted up from the during-degree line. There was a significant interaction effect between *Post-degree* and *Self-esteem*. Since self-esteem was centered on the grand mean, the coefficient (β_{61}) represents the change in the log hourly wages for the one unit increase above the mean value for self-esteem. In that the direction of the interaction effect was opposite to the main effects of post-degree, the effect of *post-degree* depends on the level of the *Self-esteem*. For the adult learners who successfully achieved a two-year college degree, one unit increase above the average value of self-esteem, which corresponds to 2.5 standard deviations, led to a 12.9 % decrease in hourly wages.

Figure 2 shows change in overall wage trends: summarized wages by enrollment status exhibit discontinuity. There was no difference in pre-enrollment values between the target and comparison groups, there was a drop during enrollment, and an increase after degree attainment.

In terms of occupational status, the coefficient for the pre-degree (β_{40}), which indicates the group difference in SEI score, was 1.982 but it, as shown in Table 5, was not

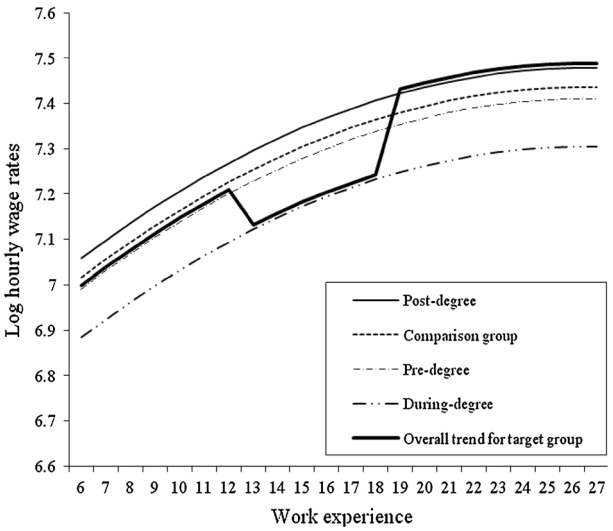

Fig. 2 Log hourly wage change in the process of obtaining a college degree

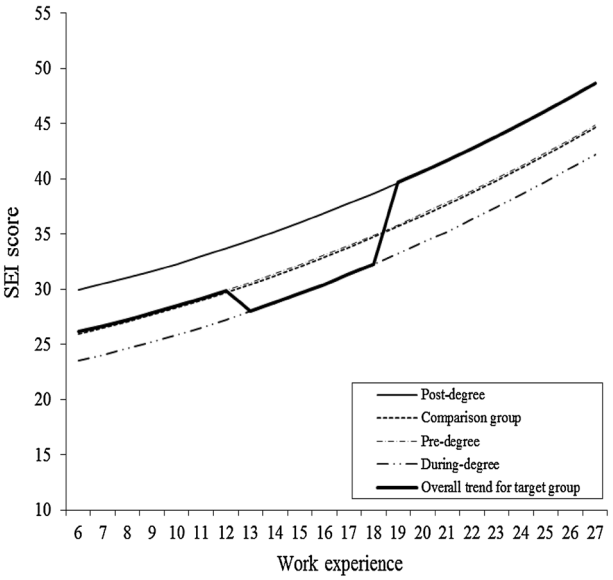

Fig. 3 Occupational status change in the process of obtaining a college degree

significant, implying that there were no pre-existing differences between groups. The coefficient for the during-degree period (β_{50}) was −2.743, indicating that attending a two-year college decreased the SEI score by an average of 2.743. The coefficient for *post-degree* (β_{60}), which explains the returns from a college degree, was 3.684, signifying that obtaining a college degree led to an increase in occupational status by an average SEI score of 3.684, compared to workers with only a high school diploma. Figure 3 shows the change in overall occupational status trends. This shows that overall, occupational status increases as work experience increases, given that the acceleration rate (β_{20}) for occupational status is positive. There was no initial difference in occupational status between employees who had and hadn't attended college. For the time of pursuing a degree, the occupational status growth curve shifted down and then the occupational status trends for the attainment of college degrees shifted up from the during-degree line.

Model 3-1 and Model 4-1 in Table 5 show how an autoregressive error structure affects the estimates of fix and random effects and their standard errors. The autoregressive parameters (ρ) were 0.369 and 0.463, indicating that wages or SEI scores at t time are significantly dependent on measurements at $t - 1$ time. When the models of homogenous level-1 variance were compared to the first-order auto-regressive models, the magnitudes of fixed effects did not change but random effects were slightly smaller in AR models. Thus, though the error structure is better represented in AR model compared to homogenous level-1 variance model, results demonstrate that estimates of homogenous level-1 variance models are robust.

Discussion

This study focuses on the effects of adult learners' enrollment in and graduation from a two-year college program on their hourly wages and occupational status. We employed a

research design comparing a target group with a comparison group and a piecewise growth modeling to identify growth discontinuity across the whole process of obtaining a two-year college degree. These results indicate that changes in wages/occupational status and the attainment of a degree were not sequential. More specifically, college enrollment reduced hourly wages and occupational status by 13.8 % and 2.74 points, respectively. Given that it takes a substantial amount of time for adult learners to earn a degree, the results suggest that their wages and occupational status during schooling are influenced by decreased job dedication or the selection of a less responsible job. In addition, the attainment of a two-year college degree led to positive economic and occupational returns, but the economic returns garnered by the degree were negatively moderated via adult learners' self-esteem. Hourly wages and occupational status during schooling were lower for adult learners than for workers with only a high school diploma, indicating that college enrollment compelled adult learners to take less responsible or productive jobs, although their education enhanced their skills and knowledge. Wages were influenced by characteristics of individual workers and occupations. Because we used wages before any deductions, the deduction in wages was not due to the direct cost of education such as tuition and books. In addition, occupational status declined during schooling. These results imply that occupational factors play an important role in reducing adult learners' hourly wages during their schooling. The result indicating reduced hourly wages suggests that adult learners may undertake low-prestige jobs to offset the increased demands of schooling and thus, the time and effort spent on studies compel them to forego their job responsibilities (Aycock 2003; Fairchild 2003; Kasworm 2003). Simply put, combining education with work is not an easy task for adult learners.

The results clearly demonstrate that a two-year college degree acquired in adulthood can lead to significant increases in hourly wages and occupational status. With only within-individual variance considered, the college degree, on average, produced a 4.2 % increase in hourly wages. We considered both cognitive and non-cognitive abilities and found similar results, which suggests that the degree does matter in determining wages regardless of workers' initial abilities. Consistent with previous studies (Farkas et al. 1997; Heckman et al. 2006; Murnane, Willer, and Levy Murnane et al. 1995; Raudenbush and Kasim 1998), after controlling for a worker's cognitive and non-cognitive abilities, measured between the ages of 14 and 17, college education influenced hourly wages throughout their professional career. This result supports the human capital theory. In addition, the presumed effect of adult learners' college degree on wage rates was contingent upon their self-esteem. For workers with only a high school diploma, the higher the self-esteem, the higher the hourly wages were throughout their professional life (Heckman et al. 2006). By contrast, for those with a two-year college degree, the higher the self-esteem, the lower the hourly wages were. These results may be explained through self-knowledge bias and self-defeating behavior (Baumeister et al. 1993, p. 143). An individual's subjective overconfidence may lead to risky behaviors. Bernardo and Welch (2001) showed that overconfident individuals are likely to play a pioneering role by taking action but often make mistakes, thereby receiving lower payoffs. This may also apply to adult workers with a high level of self-esteem. Adult workers with a college degree may increase their reservation wages beyond the amount that they believe is appropriate (Hofler and Murphy 1994). According to job search theory, when reservation wages exceed current wages, workers tend to feel underpaid and start to search for new jobs. Therefore, the propensity of highly confident workers to overvalue their ability and knowledge puts them in a risky position.

Policy and Practical Implications

Expanding educational opportunities across generations is an on-going challenge in any knowledge-based society. Given that adult learners tend to require more time to finish their degree and that their income stems mainly from wages because they are typically low-income workers (Rowan-Kenyon 2007), the existence of wage and occupational status penalties during their schooling suggests an important policy implication. This study's results suggest that financial fragility arises not only from tuition and other related direct expenses but also from a decrease in income during schooling. From the perspective of employee compensation, wages and occupational status penalties may serve as a fair mechanism for reduced contributions to a job (Gerhart et al. 1995). Therefore, this decrease in compensation during college enrollment can be a fair opportunity cost for the increase in wages after the degree. Nevertheless, this wage penalty could also present a barrier to the amount of time that adult learners are able to dedicate to their education and to their graduation, given that the majority of adult learners are often those with only a high school diploma, and thus from a lower-income pool.

Therefore, they may face dual financial difficulties from a decrease in disposable income and an increase in educational expenses. Because adult learners over the age of 25 have difficulty relying on their parents for their tuition (Kasworm 2003), financial vulnerability can be the most salient issue for these learners. However, there has not yet been a study which has examined the negative effects of an adult learners schooling on wages. In this regard, policies aimed at financial support for tuition as well as for wage penalties should be considered for adult learners.

Limitations and Future Research

This study is not without limitations. This study does not provide data regarding the behavioral traits of adult learners, that is, who possesses a high-level of self-esteem, and thus results in an ultimately lower wage following their college graduation. Because an increase in occupational status is often followed by job turnover, the latter may be the mechanism through which self-esteem operates. While college degrees may satisfy the requirements of professions stratified by educational level, a weakness may be the potentially resulting high self-esteem which could be a critical drawback. A future study may examine the behaviors following job-turnover that exhibit a casual relationship with wage penalties.

Appendix 1

A comparison of group membership derived from GMM and piecewise regression model

This study demonstrated that adult learners' wage rates depend on college enrollment and completion. However, adult learners who enrolled in community colleges may consist of unobserved subgroups. Thus we investigate additionally how known group distinction according to college enrollment, a priori, is related to latent group membership. First, employing the GMM, we identified the distinctive shape of the subgroup's wage trajectories (Duncan et al. 2002; Vaughn and Witko 2013). Then, we applied a multinomial

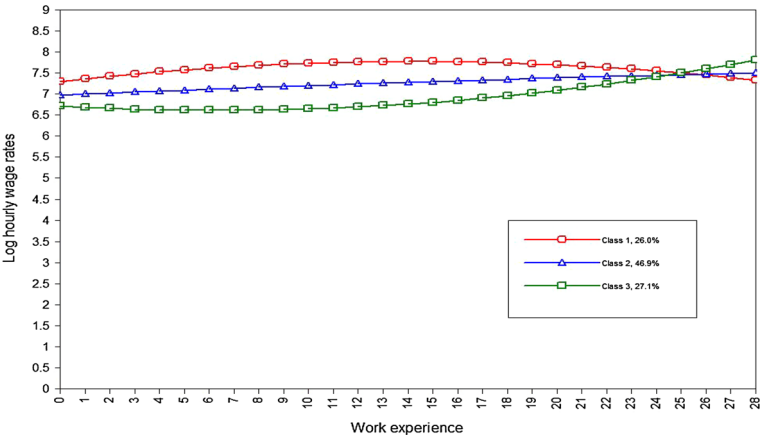

Fig. 4 Fitted growth lines using growth mixture model. The number 0 in work experience stands for 6 years after high school graduation

Table 6 Identifying the number of trajectory class

No. of classes	Model fit index		Posterior probability for 3-class model			Proportions of latent classes
	BIC	Entropy	1	2	3	
1	32,081	–	.941	.072	.000	0.422
2	27,387	0.86	.042	.922	.043	0.261
3	25,999	0.84	.002	.071	.933	0.267
4	26,948	0.83				

Table 7 Results of multinomial logistic model for trajectory class membership

Variable	β (Class 2)[a]	e^{β}	β (Class 3)[a]	e^{β}
College enrolled	0.766 (0.308)*	1.878	0.846 (0.416)**	2.035
Constant	0.556 (0.127)**	4.384	0.003(0.186)	0.016

* $p < .05$; ** $p < .01$

[a] Reference category is Class 1

logistic regression to predict the subgroup membership by a priori, college enrollment status.

GMM identifies several trajectories of homogeneous individuals through classification based on similar patterns of growth trajectories (Nagin 1999). Comparing model fit indices such as Bayesian Information Criteria (BIC) and Entropy we determined the number of latent classes (Skrondal and Rabe-Hesketh 2004). The smallest BIC provides the number of latent trajectory classes fitting the data better. An Entropy value closer to one is preferred. BIC and Entropy displayed in Table 6 indicate the three class solution. Figure 4 displays the fitted growth trajectories for the three latent classes; 42.2 % of individuals (Class 1) were classified into the inverse U-shape-pattern class, 26.1 % of individuals (Class 2) were classified into the linear-shape-pattern class, and 26.7 % of individuals

(Class 3) were classified into the U-shape-pattern class. Individuals in Class 2 and 3 compared to those in Class 1 undergo wage drops by some time point and experience wage gains after that point.

We tested whether class membership for three types of wage trajectories depends on the college enrollment status. Table 7 shows the results of a multinomial logistic regression examining the relationship between latent class membership and college enrollment status. Class 1 was used as a reference. For college enrollment status, the odds of being in Class 2 are 0.766 times the odds for being in Class 1. The odds of being in Class 3 were 0.846 times that of being in Class 1. These results indicate that individuals in Class 2 and 3, the class that adult learners likely belong to, will undergo wage drops during schooling compared to those in Class 1, whereas those in Class 2 and 3 were more likely to experience wage gains after degree than those in Class 1. These were similar to the results of piecewise regression modeling during and after college degree, which are displayed in Table 5.

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