Job congruence, academic achievement, and earnings ☆

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ABSTRACT

This study combines a widely held view of how earnings are related to education and job tenure (The Mincer model [1]) with the notion that earnings are associated with the quality of an employer–employee job match. The quality of an individual's occupational choice is measured using job congruence, a commonly-used construct in the psychometric literature. Better-matched individuals should be more productive and, as a result, have higher earnings. Previous studies were unable to address the importance of job preferences to earnings because available data do not include both job congruence and individual earnings. The *Alumni Outcomes Survey*, recently produced by ACT Inc., is among the first data sets to include both variables. We use these data to estimate the importance of job congruence on earnings after controlling both for job tenure and for academic achievement, measured by an individual's ACT score. Results indicate that job congruence is positively correlated with earnings, and has effects on earnings that are of almost equal magnitude with years of education.

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1. Introduction

The premise of this study is that long term salary attainment is explained partly by academic preparation and partly by matching. While educational status and general academic ability are key predictors of salary attainment, we argue that job congruence—the matching of talents to task—is also important. Both factors are directly related to the career and the educational attainment of students and they have significant policy implications for ensuring earnings potential.

This study combines a widely held view of how earnings are related to education and job tenure with the notion common in psychology, that earnings are also associated with the quality of an individual's job match. Specifically, we use the empirical model presented in Mincer (1974), as discussed extensively in Heckman et al. (2003, 2006a,b) as a benchmark in order to explain variation in earnings. This specification has been widely utilized in the economic literature (Weisbrod and Karpoff, 1968; Ashenfelter and Mooney, 1968; Hansen, Weisbrod and Scanlon, 1970; Paglin and Rufolo, 1990; Blackburn and Neumark, 1992; Grogger and Eide, 1995; Card, 1998). The Mincer model provides a benchmark to isolate the effects of academic achievement, as measured by ACT scores, as well as the effect of job congruence from the effects of increased education. To be clear, we note that what we are measuring is a partial correlation between earnings and job congruence. We do not specify a clear causal model for this effect, although implementing such a structure in a search model would not be difficult. But the correlation between job fit and earnings is of independent interest, and we preferred to stay close in spirit and implementation to the Mincer model.

Closely related to job congruence is the notion of overeducation and educational mismatches. There is an extensive literature which relates overeducation to labor–market outcomes such as earnings (Allen and van der Velden, 2001), job turnover (Topel, 1986; Lentz and Mortensen, 2007; Teulings, 2007), occupational choice (Viscusi, 1979), and job satisfaction (Tsang and Levin, 1985). These papers establish a clear connection between individual earnings and match quality. The congruence measure used in this study provides an alternative measure of match quality which can be introduced to this branch of the literature.

Turning to academic preparation, past research in labor economics examines the Armed Services Vocational Aptitude Battery test (ASVAB), a part of the National Longitudinal Survey of Youth (NLSY), as a measure of general intelligence. This ten scale measure of a range of cognitive

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[1] Following Heckman et al. (2003, 2006), by the term Mincer model we mean the the single equation regression model $\ln[w(s,x)] = \alpha_0 + \rho_s S + \beta_0 x + \beta_1 x^2 + \varepsilon$.

abilities is associated with salary attainment within the NLSY sample regardless of education level. An alternative approach is to examine academic achievement level, or the degree to which individual students have mastered the range of college and workforce readiness areas. This is the approach ACT has used when constructing its standardized achievement test based on Mathematics, English, Science, and Reading scales. In particular, the ACT is designed to measure the degree to which students have mastered college readiness using a national curriculum survey of high school and college practices. A composite score on the ACT (based on these four subtests) is associated with academic and persistence outcomes (Noble and Sawyer, 2002), and is a commonly held selection variable for college admissions.

Another factor relates to job mobility, and whether individuals stay or change careers. Perez and Sanz (2005) distinguish between job movers and stayers, and between voluntary and involuntary movers.[2] One reason individuals are likely to change jobs relates to what the workforce adjustment literature (Dawis and Lofquist, 1984; Tinsley, 2000) describes as person–environment congruence. Congruence posits that the degree to which an individual's interests, values, and abilities match or are congruent with an occupation's work demands and reward system the greater the degree of satisfaction, tenure, and production. Put another way, an individual worker fulfills work requirements in exchange for financial, social, and psychological rewards. The greater the fit, the greater the likelihood of positive individual and work outcomes. There is a significant psychometric research literature detailing several ways of measuring P–E congruence and demonstrating the relationship between variants of this multidimensional construct and work outcomes (cf. Kristof-Brown et al., 2005), and a smaller literature in labor economics (see, for example, Polachek and Robst, 1998) based primarily on the Knowledge of the World of Work questions contained in the NLSY.

We examine the degree to which individual career interests correspond to the environment of occupational choice. Individual responses to the survey describe the features of the job that they hold as of the survey date. If individuals are unemployed at the time of the survey, they are asked about the last job at which they were employed. Individuals who choose occupations with high congruence to their interests are likely to stay within the broad career represented by initial occupational choice. People staying within a career have higher salary attainment due to natural progression of work opportunity without lost income due to career change. Oleski and Subich (1996) demonstrate, for example, that employed adults in the process of career change move in the direction of higher job congruence. Singh and Greenhaus (2004) argue that people with high congruence are more likely to use rational decision making in occupational choices, and to have greater self and environmental (i.e., work) awareness.

Tracey and Robbins (2006) demonstrate that congruence is related to college outcomes, including cumulative grade point average, retention, and graduation status. They defined congruence as the degree to which individual students' measured career interests corresponded to their college major choice. They use the Euclidean distance between an individual's measured career interests and their occupational choice after placing both data sources on a common coordinate system called the World of Work Map (WWM; ACT, 2001). The WWM is comprised of two underlying dimensions called People/Things and Data/Ideas. These dimensions provide a representation of the six types of career interests found within most models of career interests (cf. Holland, 1997; Tracey and Hopkins, 2001). Given that individual

interests and occupational choices can be represented as points on these People/Things and Data/Ideas dimensions, the Euclidean distance between these two points is an indicator of congruence.

One purpose of this study is to study how much standard psychometric measures of achievement (ACT scores) and congruence (*CONG*) explain salary attainment after controlling for the standard Mincer variables, which we describe below. These psychometric factors are not highly correlated with age and years of education, which makes them potentially of great interest. As Tracey, Robbins, and Hofsess (2005) demonstrate, career interest formation and academic achievement (as evidenced by change in ACT score over 8th–10th and 12th grade) are independent processes with both being predictive of college success (Tracey and Robbins, 2006).

We find that both ACT scores and job congruence play both a statistically and a quantitatively significant role in explaining variation in earnings. Higher ACT scores lead to higher earnings, which comes as no surprise in the economic literature where there has been much debate about the independent effects of ability versus educational attainment: the Bill Gates phenomenon (Card, 1998). In addition, better job matches are positively correlated with individual earnings. In terms of order of magnitude, a one unit change in congruence has about the same effect as a one unit change in years of schooling. Further, the effects of ACT scores on earnings are approximately the same magnitude as the effects of job congruence. In addition, we find that the variables used in the Mincer specification follow the same pattern typically observed in the literature. Our results indicate that, for men, 12% of the variation in earnings is attributed to the Mincer variables and approximately 1% of the variation in earnings is attributed to ACT scores and job congruence, separately. Moreover, the Mincer variables are approximately orthogonal to the congruence measure so that the R^2 decomposition is approximately additive.

The rest of the paper is presented as follows. Section 2 describes the basic Mincer earnings function and how it can be interpreted with job congruence measures. Section 3 describes the sample and lists the variables used in this study. A detailed explanation of how job congruence variables are constructed is also provided. Section 4 presents the empirical model and describes the estimation results, and Section 5 concludes.

2. The Mincer model

The Mincer model (1958, 1974) specifies an earnings equation of the form

$$ln[w(S,t)] = \beta_0 + \beta_1 S + \beta_2 t + \beta_3 t^2 + \varepsilon, \tag{1}$$

where S is years of education and t is years of work experience. The coefficient, β_1, is interpreted as the rate of return to schooling, which in this formulation is assumed to be the same for all levels of S. One motivation for this earnings function is the compensating variation model (Mincer, 1958). If individuals are assumed to have identical abilities, perfect certainty about future outcomes, and maximize wealth, then they solve the problem:

$$\max_S V(S) = w(S) \int_S^T e^{-rt} dt = \frac{w(S)}{r} \left(e^{-rS} - e^{-rT} \right) \tag{2}$$

As Heckman et al. (1999) note, an equilibrium in this case requires $V(S) = V(S')$, $\forall S'$. Therefore, equating wealth across different levels of schooling and taking logs yields

$$ln\, w(S) = ln\, w(S') + r*S + ln\left[\left(1 - e^{-rT}\right) \Big/ \left(1 - e^{-r(T-S)}\right) \right] \tag{3}$$

The third term in Eq. (3) is an adjustment term for finite age; it goes to zero as T gets large. The implication of Eq. (3) is that the logarithm of earnings should be linear in years of schooling and

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[2] There is some disagreement between the psychometric and econometric literatures with respect to job mobility. Perez and Sanz (2005) find that job movers regardless of reason have lower earnings than those who stay in jobs. However, Bowlus and Neumann (in press) show that job tenure accounts for only a modest percentage of the growth of earnings. By contrast, earnings' growth attributed to switching to higher-paying jobs accounts for a much larger percentage of earnings' growth across the earnings profile. Our study regards job congruence as whether individuals are well-matched to their broad career choices, rather than an individual job.