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The impact of surplus skills on earnings: Extending the over-education model to language proficiency☆

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ABSTRACT

This paper examines whether the framework developed in the educational mismatch field of research can be generalized to language skills. It uses data from the Occupational Information Network (O*NET) database and both "Worker Self-Assessment" and "Realized Matches" procedures to quantify expected levels of English skills in each of over 500 occupations in the US Census. Earnings data from the 2000 US Census for adult male immigrant workers are then examined in relation to these occupational English requirements using the over-education, required education, under-education (ORU) approach. The analyses show that earnings are related to a "correct" matching of an immigrant's language skills with what is expected in his occupation. Mismatches have a small effect on earnings – positive for proficiency in excess of the norms in the occupation and negative for deficits in proficiency. The findings are robust with respect to a range of measurement and specification issues typically examined in ORU studies. It is concluded that the ORU model offers a framework for analysis which can be readily generalized to other forms of investment in human capital.

1. Introduction

Freeman's (1976) book entitled *The Overeducated American*, and Duncan and Hoffman's paper of 1981 which provided an empirically tractable way of defining the required or reference level of education for a worker's occupation, are generally credited with establishing the over-education, required education, under-education (ORU) or education mismatch field of research. This research attempts to merge demand-side considerations with the supply-side approach embedded in the conventional human capital earnings equation. It does this by assigning a required or reference level of education to each occupation. Workers who have more years of education than this benchmark are termed overeducated, in the spirit of Freeman (1976). Workers who have fewer years of education than the benchmark level are termed undereducated. Only those workers who have a level of education on par with the benchmark level are viewed as adequately educated, or correctly matched to the educational requirements of the positions that they hold.

A mismatch between the education levels of workers and the technological requirements of jobs at a point in time can arise simply because there are too many workers with the particular level of education. However, such mismatch can also arise even though the number of jobs requiring a particular level of education is equal to the number of workers with that level of education. Mismatch can arise because of frictions in the labor market, including

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those associated with the spatial distribution of jobs, which mean that a worker cannot readily locate a job that matches his level of education. Over-education can also arise because a worker chooses a lower-level job for which he is currently overqualified, knowing that it is part of a career path to a correctly matched, higher-level position. Under-education can arise especially among older workers (labor market experience compensates for deficiencies in formal schooling).

Moreover, over-education and under-education can arise because the matching of workers and jobs is on the basis of multiple indicators (*e.g.*, ability, motivation, specialized experience), and so workers observed as having too little (much) education for a job may simply have too much (little) of these other productivity enhancing indicators. The quality of matches in the labor market may be a function of the extent of labor market information. Match related information may be better for the native born than for immigrants, for those with higher levels of education, and for those in better developed networks (Munshi, 2003).

Earnings equations that replace the worker's actual years of education with variables for years of required education, years of over-education, and years of under-education, have been shown to have greater explanatory power than the conventional estimating equation that is based only on the years of actual education. These over-education, required education and under-education, or ORU, earnings equations have now been estimated for a large number of countries, time periods and data sets. The general patterns reported in the early overviews by Hartog (2000) and Groot and Maasen van den Brink (2000) continue to characterize the more recent research. There are three main patterns. First, the returns to required levels of education are higher than the returns to actual levels of education. This difference arises because the returns to required levels of skills capture both the payoff to the acquisition of the extra years of education within the occupation and mobility to an occupation where the newly acquired educational qualification can be used effectively. Second, the returns to years of education that are surplus to the benchmark established for the worker's occupation are typically only one-half to two-thirds of the returns to required levels of education. Third, undereducated workers earn more than their counterparts with the same level of education and who are correctly matched to their jobs. Estimates of the ORU model have been shown to be important for understanding a range of labor market outcomes, including gender issues, differences in the earnings of various groups of university graduates, and differences across nativity groups in the payoff to the investment in education (see Chiswick & Miller, 2008b; Dolton & Vignoles, 2000; Kiker, Santos, & de Oliveira, 1997).

In studies of the earnings effects of human capital, researchers have shown the power of the human capital approach through applying the concept to a range of investments, such as formal schooling, on-the-job training, migration (both internal and international), health, information, and language skills. The human capital framework has been shown to yield highly consistent sets of empirical findings when applied to these alternative forms of investments, and this adds considerable confidence to the human capital interpretation of the underlying labor market processes. In this study we follow this approach, and ask whether the ORU framework used in the study of the links between education and earnings can be generalized to cover another form of human capital, namely language skills.

Specifically, this paper addresses, for the United States, the issue of the extent to which the English language requirements or norms in the respondent's occupation influence the respondent's earnings. It also examines the consequences, in terms of earnings, of a discrepancy between the respondent's English proficiency and the requirements in his occupation. The data under study are for adult men, aged 25–64, from the US 2000 Census. In these data there is variation in occupational status which is linked to occupation specific measures of English language requirements, and there is variation in the respondent's English proficiency among the foreign born. Among the native-born adults, however, there is virtually no reported variation in the Census in the respondent's proficiency; nearly all (about 95 percent) report that they are monolingual English language speakers, or if they speak another language at home, nearly all of these men report they speak English "Very Well." Hence, in this study the analysis of the discrepancy between the English language proficiency of the respondents and the requirements of their occupations is limited to the foreign born.

Based on the ORU literature, it is hypothesized that earnings increase with the level of English language skills that are required (or the norm) in the person's occupation, other measured variables the same. This hypothesis arises from the proposition that a worker's productivity is enhanced when oral and/or written communication is less costly with superiors, peers and subordinates on the job and suppliers of intermediate goods and customers. It is also hypothesized that the proficiency of an individual greater than what is "required" in the occupation has a smaller positive effect on earnings, while proficiency below this level has a negative effect on earnings that is smaller in absolute value than that for the required/norm level. This arises from the proposition that while deviations (whether positive or negative) from the linguistic norm in the occupation influence productivity, these effects are likely to be relatively minor or else the respondent would not be in the occupation.

In this exploratory study of whether the ORU technique can be generalized to language proficiency, the occupational level and the respondents' English language proficiency are taken as exogenous. This assumption is consistent with the mainstream approach in the ORU literature.[1,2] Moreover, there is an absence of variables in the data under study that

[1] There are undoubtedly unmeasured variables that account for why there are educational and linguistic mismatches, that is, why some individuals appear to be overqualified (underqualified) given their measured skills compared to others in their occupation. Differences in cohorts (younger *versus* older workers), unmeasured dimensions of ability or quality of skills, random events, and among the foreign born, the international transferability of skills, are presumably relevant. This is the subject of ongoing research, but is beyond the scope of this paper.

[2] For analyses of the determinants of destination language proficiency among immigrants, see Chiswick and Miller (2007).