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Career effects of occupation-related vocational education: Evidence from the military's internal labor market

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ABSTRACT

Prior research on the labor market success of secondary vocational education has produced mixed results, with several studies finding wage gains only for individuals who work in training-related occupations. We contribute to this debate by focusing on a single occupation and organization and by comparing the careers of employees with and without occupation-related training in high school. We use longitudinal data on the careers of military recruits who completed high school Junior Reserve Officers' Training Corps (JROTC), a military science program that has features of a vocational training and school-to-work program. We find that the occupation-specific training received via JROTC reduces early turnover and improves long-run job stability for those who choose military jobs, suggesting that an important effect of vocational training is to improve job match quality. We also find that promotion rates for vocational graduates are similar to their peers, suggesting that vocational education in general works by improving occupational sorting.

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1. Introduction

The role of vocational education in the high school curriculum has long been a controversial topic in education reform debates (Levesque, Lauen, Teitelbaum, Alt, & Librera, 2000; U.S. Department of Education, 2004). The controversy is fueled in part by mixed results on the labor market effects of vocational education (for a survey see Bishop & Mane, 2004). Some studies report positive wage effects when vocational graduates work in training-related jobs (Neuman & Ziderman, 1991, 1999). Since only 43% of vocational graduates work in occupations that match their training (Bishop, 1989), this finding raises questions about the effectiveness of vocational education. Hotchkiss (1993) finds no short-run wage gains, regardless of whether vocational education matches future occupations. Meer (2007) finds that long-run wage gains for vocational graduates are due to students' self-selection into tracks (vocational or academic). These findings have divergent policy implications and highlight the need for a better understanding of the pathways via which secondary vocational education affects labor market success.

Our study analyzes the impact of vocational education using data for employees in one occupational category. Examining within-occupation outcomes avoids confounding the effects of vocational training with occupational self-selection. In addition, rather than focusing on wages as in prior studies, we examine early turnover, long-run job attachment, and productivity. This allows us to pinpoint the channels through which vocational education contributes to job market success. For example, vocational education may directly enhance job skills within an occupation, thus increasing worker productivity (human capital effect). Alternatively, vocational education may improve *ex ante* information about specific jobs, professions, and employers, resulting in more stable or longer careers (job

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match effect). Wage gains could result in either case, but for policy purposes, it is important to know whether vocational education increases wages by enhancing productivity, or by increasing the job-market attachment. We investigate what drives the estimated wage gains in the vocational literature, after holding constant occupational selection, firm-specific training, and across-firm variation. Our findings also shed light on why the documented wage effects are more pronounced in the long run and for those working in occupations that match most closely their vocational training.

We focus on a high school military science program, Junior Reserve Officers' Training Corps (JROTC), which is similar to other vocational education programs in its scope and curriculum. However, unlike other vocational programs whose graduates enter different firms and occupations, JROTC prepares students for careers in the military. Exploiting this link, we use data on U.S. Navy recruits and observe the performance of JROTC graduates in their military careers. We analyze vocational training effects by comparing the performance of new 'hires' with and without JROTC training.

Military data are well suited for this analysis, since the military represents both an employer and a broad occupational 'cluster' (Levesque, Laird, Hensley, Choy, & Cataldi, 2008). The military's rigid personnel system holds constant factors that confound the estimated effects of vocational education when using public data, such as differences in the amount of firm-specific training or placement of employees in different or fast tracks. Most importantly, the military data allow us to examine the direct effect of vocational training on both job performance and on job attachment.

Another problem we can sidestep with these data is the definition of 'occupation' and identifying 'occupation–training matches.' Vocational programs feed into many different occupations and prior studies vary in their definitions of occupational categories.[1] Furthermore, the way occupational controls, broad or narrow, are factored in the estimations varies greatly, complicating the comparison of effects across studies. Including occupation controls may lead to an overestimation of vocational training effects if individuals self-select into various occupations based on their comparative advantage. While adjusting for occupational self-selection can yield causal effects, it leaves open the possibility that vocational training works precisely by improving such sorting, rather than by improving occupation-specific skills. Given our large sample of individuals working in the same occupation, we can avoid bias both from occupational self-selection and from across-occupation wage variance.

While the JROTC–military relationship is unique in that training is linked to one employer, the analysis provides insights that generalize across vocational programs and employers. JROTC mimics typical vocational training in its goals, curriculum, and target population. For example, JROTC enrollees typically are non-college-bound students interested in learning about a potential occupation. JROTC offers elective courses that impart skills used in the military. Similar to school-to-work programs (STW), JROTC conveys information about the profession by both simulating military life and by providing instruction from former military personnel.[2]

Although not a profit-maximizing firm, the US military is a cost-minimizing organization that competes for recruits by designing contracts that attract individuals with the requisite skills. Labor economists traditionally have analyzed military enlistment as an occupational choice with recruits weighing the benefits and costs of enlisting relative to civilian employment opportunities (see, e.g., Asch & Hosek, 2007; Warner & Asch, 2001). To be competitive in the youth labor market, the military must tailor compensation packages to attract and retain the required quantity and quality of personnel (Hosek & Sharp, 2001). Similar to private firms, the military offers firm-specific training, and the return to that training depends on the expected employment duration of training recipients. Due to the absence of lateral entry, the military seeks new recruits who stay in service sufficiently long to allow recoupment of training costs. These constraints force the military to define job match the same as private firms – in terms of low turnover (Jovanovic, 1979). While it may appear that the military can obligate recruits to binding contracts until the costs of recruiting and training are recovered, in reality the military does not gain from employing or retaining individuals who are poor matches. Therefore, about 30% of new recruits leave the military without completing their service obligations and without any repercussions. Thus, the military aims to improve the quality of match at entry, allows those who are mismatched to leave, and incentivizes continued employment via reenlistment bonuses, similar to other firms that use compensation packages to hire and retain employees.

2. Background

JROTC enrolls over 500,000 students in more than 3300 high schools (20% of all public high schools).[3] As in vocational and STW programs, JROTC offers both academic and vocational courses and is linked to a specific employer.[4] The curriculum includes core subjects such as citizenship, communications, geography, health, and physical fitness. Each high school's JROTC program is affiliated with one of the military branches and uses retired military personnel

[1] In general, the vocational education literature defines 'occupation' very broadly. Neuman and Ziderman (1999) identify eight occupational categories for vocational education, whereas Hotchkiss (1993) identifies only two.

[2] For an analysis of STW programs, see, e.g., Neumark and Rothstein (2006).

[3] For information on JROTC see Coumbe, Kotakis, and Gammell (2008) and Laurence and Estrada (2003).

[4] STW programs include school-based learning, work-based learning, and connecting activities. School-based learning includes academic and vocational courses; work-based learning includes hands-on job training, mentoring, and instruction in a workplace (via internships and apprenticeships). STW connection activities establish partnerships with employers to ease the school-to-work transition (Neumark, 2009). JROTC is comparable to STW activities such as job shadowing, mentoring, and internships.