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Way station or launching pad? Unpacking the returns to adult technical education[☆]

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ABSTRACT

We estimate returns to diplomas and certificates awarded to adult students by public technology centers, a niche sector of higher education that elevates occupational and competency-based education over transferable credits and traditional degrees. Technology centers cater to nontraditional students, particularly adults seeking part-time training in specific skills. Sub-associate credentials arising from Tennessee Colleges of Applied Technology increase access to new industries, particularly health, and industrial mobility explains half of the employment returns to postsecondary diplomas and at least three-quarters of the earnings returns to certificates. TCAT diploma completers earn \$707–1034 in additional quarterly earnings over non-completers, similar to the returns from community college diplomas. Benefits extend beyond the signal value of completion: students who leave without a credential fare significantly better than matched non-students with a similar history of earnings.

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1. Introduction

Earnings rise by 10%, on average, for each year of college (Oreopoulos and Petronijevic, 2013), and public subsidization indicates that governments worldwide believe higher education to be vital to economic health. More than a seamless continuation of secondary schooling, postsecondary education can also serve as an avenue for workers to gain new skills. Nontraditional adults enjoy average returns to education on par with young, traditional students (Leigh and Gill, 1997; Jacobson et al., 2005a,b). Even more than their younger counterparts, however, adults considering a four-year bachelor's degree

may fear that “averages lie,”¹ i.e., that college is not a guaranteed path to secure employment. The risks of attempting college – stopping out, overestimating aptitude, or overestimating labor demand in one's chosen field – are high and costly for older students, even as the value of a terminal high school diploma falls and employers protest a lack of workers suited for middle-skilled jobs (Bessen, 2014). More practically, leaving the labor force for four or more years in pursuit a bachelor's degree education is untenable for many working-age adults.

Technical higher education focused on narrow, occupational fields is thought to be part of the solution to the so-called “skills gap” as well as a shorter education investment with more direct connections to jobs. The labor market values sub-baccalaureate higher education (Kane and Rouse, 1995; Gill and Leigh, 2003; Belfield and Bailey, 2011), including the certificates, diplomas, and associate's degrees that students can earn in two-year community colleges (Dadgar and Trimble, 2015; Jepsen et al., 2014; Stevens et al., forthcoming). But a community college education is not risk-free: only 26% of community college entrants complete a credential within five years, and completion rates

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¹ Anthony Carnevale of the Georgetown University Center on Education and the Workforce, quoted in Arnold (2015).

are even lower for older, nontraditional students (U.S. Department of Education, 2011). In stark contrast, Tennessee Colleges of Applied Technology (TCATs, previously known as Tennessee Technology Centers), a 27-campus network of public postsecondary training centers, boasted 70–90% completion rates among full-time outgoing students in 2012–13 and 69–95% job placement rates among completers (Tennessee Higher Education Commission, 2013). TCATs offer certificates and diplomas in fields comparable to those offered by the state's community colleges or competing for-profit institutions,² but typically without transferrable college credits and in an environment that resembles a workplace more than a college campus. Most TCAT students enroll part-time; the ratio of full-time equivalent enrollment to total enrollment is just 39% in TCATs versus 64% in the state's community colleges and 85% in its public universities. The TCAT sector is fairly self-contained, and transfer between TCATs and community colleges or universities is very rare.³ TCAT entrants from 2004–2008 tended to be older than new community college students (31 versus 27), about as likely to be eligible for need-based Pell grants (33–34%), but much less likely to have parents with a college education (24% versus 43%).⁴

Non-degree colleges like TCATs occupy a small, niche segment of public education in twenty-two states, enrolling <1% of all postsecondary students in 2006. The largest technology center systems – found in Alaska, Florida, Ohio, Oklahoma, and Tennessee – account for just 2–7% of public college students in their respective states and no more than 16% of students over 25. Nevertheless, public technology centers are under the spotlight in state plans to raise educational attainment and meet future workforce needs.⁵ More generally, by operating at the intersection of states' postsecondary and workforce functions, technology centers can jointly serve employers' demand for skilled workers, policymakers' demand for quick and tangible employment outcomes, and nontraditional students' preference for career-oriented programs.

To date, however, little is known about the quality or persistence of the jobs that technology center alumnae find. We address this shortfall in an otherwise rich literature on returns to sub-baccalaureate education by assessing the role of Tennessee's state-run technology centers in providing marketable or course-correcting human capital to nontraditional adult students. Tennessee Colleges of Applied Technology are renowned for fast, holistic vocational training and impressive job placement records (Hoops, 2010; González, 2012), although the conditional returns to enrollment in institutions like TCATs have rarely been scrutinized closely. By focusing on specific job skills, narrow competencies, and “contact hours” rather than transferable credit hours, skills developed in TCATs may be rendered obsolete by shifting workforce needs and rapid technological development.

We examine the effect of sub-associate enrollment and credentials on near-term employment outcomes for five cohorts of adult Tennesseans who enrolled in one of the state's public technology centers between 2004 and 2008. Ours is a non-experimental setting, and the chief threat to linear regressions applied to this topic is the idea that the earnings and employment of program completers are unobservedly different, in levels and trajectories, than the outcomes

of noncompleters. We address this concern with flexible specifications that condition labor outcomes on individual fixed effects and individual time trends. Our main conclusions are robust to several alternatives discussed in the appendix, including one specification with individual heterogeneity that is quadratic in time.

Findings indicate that technology center students who complete a diploma earn \$707–1034 more per quarter than noncompleters (13–19% of the pre-enrollment average), whereas the returns to terminal certificates are smaller and less robust. Diplomas – known as long-term certificates in states such as California, Michigan, and Washington – signify completion of a program of study (e.g., the “Diesel Technician” program), whereas shorter-term certificates are awarded for the completion of part of a program (for example, a “Diesel Engine Assembly” certificate) or for demonstration of more narrow competencies like “Manicuring.” To the question of why the labor market values these credentials, we delve into two potential mechanisms. The metaphor for one mechanism is that of a launching pad, in that technology centers facilitate the transition to better jobs. Indeed, we find that TCAT credentials increase access to new industries, particularly health, and that industrial mobility explains at least half of short-term gains in employment following postsecondary diploma receipt and upwards of three-quarters of the earnings gains from technology center certificates. Industrial mobility is a much smaller factor in explaining large returns to TCAT diplomas, however, suggesting that the most time-intensive form of TCAT training deepens rather than broadens industrial expertise.

Nevertheless, the fact that adults in our sample typically enter college after a marked decline in earnings and employment raises the question of whether college is little more than a way station for the temporarily unemployed. Completers may benefit more than non-completers from temporarily diverting to a technology center, but would students have been better off by not enrolling at all? Would their employment have rebounded to the same extent without college? Relative to a sample of non-student workers, both linear and matching-based empirical designs suggest non-completers realize significantly higher earnings than non-students up to four years after starting college, suggesting that students attain something other than the signal value of completion. Candidate explanations for non-completers' evident returns include the signal value of enrolling as well as new skills and human capital.

2. Related research

Conceptually, we build on work by Leigh and Gill (1997), who extend related work by Kane and Rouse (1995) and show that adult community college students in the NLSY realize roughly the same returns to education as traditional students who make a seamless transition between high school and community college. Methodologically, our work builds directly from several recent studies using state administrative data to estimate longitudinal wage returns to two-year college credentials.⁶ Belfield and Bailey (2017) summarize this literature as showing “positive but modest returns” to certificates of varying intensity, with nominal quarterly gains of null to \$1680.⁷ Collectively, this research base suggests that associate's degrees increase earnings more than diplomas, which in turn increase earnings more than

² The most popular TCAT programs, by tally of credentials awarded in 2011–2012, were Business Systems Technology, Industrial Maintenance, Industrial Technology, Nursing Assistant, Practical Nursing, and Welding (Tennessee Higher Education Commission, 2013).

³ The demand for and rate of transfer between TCATs and other colleges is expected to grow as more traditional-aged students matriculate to TCATs with the Tennessee Promise free-tuition program.

⁴ Authors' computations using administrative data described in Section 3.

⁵ See, for instance, the “Oklahoma Works” strategic plan to raise educational attainment to 77% by 2025, Tennessee's “Drive to 55” initiative to raise attainment to 55% by 2025, and Ohio's “Attainment Goal 2025,” which seeks to raise attainment to 65%. All three place a priority on postsecondary certificates from technology centers.

⁶ Settings include Kentucky (Jepsen et al., 2014), Washington (Dadgar and Trimble, 2015), Michigan (Bahr et al., 2015), Ohio (Bettinger and Soliz, 2016), and California (Stevens et al., forthcoming), among others.

⁷ A large and methodologically related literature uses administrative or register data to longitudinally examine returns to public job training programs. See, among others, Andersson et al. (2013), Biewen et al. (2014), Heinrich et al. (2013), Mueser et al. (2007). Also see Marcotte (2016) for recent evidence on the labor market returns to a community college education for traditional students making a quick transition between high school and college.

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