5-2010

Learned Workers: Predicting Adult Education in the Labor Force

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LEARNED WORKERS:

PREDICTING ADULT EDUCATION IN THE LABOR FORCE

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A THESIS

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Master of Arts

Major: Sociology

Under the Supervision of Professor Helen A. Moore

Lincoln, Nebraska

May, 2010

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University of Nebraska, 2010

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In a highly competitive labor force, human capital is a marketable resource. However, the human capital model fails to explain the substantial number of adults pursuing education after they enter the workforce. Not only are increasing numbers of adult students pursuing credentials in the form of degrees and certificates, they pursue other types of education as well. Using the 2005 National Household Education Survey on adult education, I predict participation patterns in workers over the age of 25 using queuing and intersectionality theories to explain gender, race and age variations. For adults pursuing education, employer support demonstrates racial/ethnic differences across employees. Latino employees receive less support for education after controlling for human capital and queuing effects. Overall, employees with more education credentials benefit most from employer support.

Education in the United States (U.S) follows an implicit American Dream ideology: if you work hard in school, and graduate, you will have occupational success and increasing income opportunities. Human capital theory (Becker 1975) mirrors this world view, and consequently ignores social structures which differentially help or hinder people from achieving goals and resources when they are employed before or during the educational credentialing process. Based on the assumption that everyone has equal access to education and training while young and prior to employment, human capital models fail to account for the high proportion of employed adults who participate in educational activities every year, and the variations in their participation across different work settings.

After entering the workforce, many adults continue their education, challenging these human capital assumptions that education functions primarily as preparation for labor force activity. In 2005, roughly 40% of employed workers participated in job-related coursework (U.S. Department of Education 2008a). This is a decline from 2003, but still much higher than in 1995 or 1999. The overall increase in the number of adults pursuing education may not fully be explained by human capital theory, and we know little about the patterns and timing of educational pathways among employees. Queuing theory (Reskin and Roos 1990) challenges human capital explanations for individual choices in preparing for work, by positing that motivations for education are confounded by the supply and demands of the labor force and by social roles that may be gendered or racialized (Hostetler, Sweet and Moen 2007). Further training may also be prompted by these supply and demand processes, but our knowledge of these social constructions is limited. Current literature describes the population of adult learners (non-traditional

students) primarily within the credentialing systems (colleges and universities), but we lack information on the range of educational pathways among employed adults. Rather than transferring this limited human capital model to all adult learners, we can ascertain if patterns of college attendance in the adult workforce also generalize across types of education, and identify predictors of how employed adults accomplish this education in different employment settings.

First, I review the basic assumptions of human capital theory and analyze current patterns of educational attainment among U.S. workers. Then I review inequalities in higher education attainment, specifically in regard to gender, and how queuing theory expands our understanding of these processes. Both of these theories assume all preparation for work occurs prior to entering the workforce. I investigate workers' participation in adult education (when and in what forms of education do they participate), and levels of employers' support for that education (when and under what conditions they support adult education for their employees). I particularly focus on the role of gender and family constraints within queuing theory, and age dynamics, as social factors that challenge human capital assumptions about adult education. Finally, I consider how gender and age intersect with race and ethnicity to influence both participation in adult education, and variations in patterns of employer support. Using the 2005 U.S. Department of Education's National Household Education Survey (NHES) data on adult education (AE), I use logistic regression to examine these outcomes while controlling for human capital factors.

Human Capital Theory

Human capital theory (or neoclassical economic theory) describes these patterns of resource achievement for individuals. One of the basic tenets is that investment in education and training has the greatest return for the young, as earnings have the sharpest increase early in careers, and more accrual time (Becker 1975; Elman and O'Rand 2002: Jacobs and Stoner-Eby 1998; Taniguchi 2005). The "specialized human capital hypothesis" claims that employment or skill specialization is the primary cause of unequal rewards between different jobs for the same worker due to training requirements (Tam 1997). More qualifications (i.e. education, credentials, experience) and greater work specialization are expected to have higher compensation (McCall 2000; Tam 1997; Taniguchi 2005), driving workers to pursue greater investment in the employer defined human capital. Similar to any type of investment, costs are associated with attaining skills and knowledge.

The Organization for Economic Co-operation and Development (OECD: 2009) reports that the U.S. has a growing demand for highly-skilled workers, but sufficiently educated applicants are available to fill the positions. This creates a competitive job market for employees that varies by available market conditions (McCall 2000). Academic credentials (human capital) are often used as a signal of the trainability and dedication of potential employees (Bills and Wacker 2003; Collins 1979; Taniguchi 2005), but this is criticized for a lack of evidence (Ollenburger and Moore 1992). Fewer than 20% of people without a college degree are employed in skilled jobs, compared to approximately 65% of those with a college degree (OECD 2009).

Most current or potential employees pursue developing their own human capital with the expectation that their (future) employer will compensate them for their knowledge, time, effort, and lost opportunities (Tam 1997). Becker (1975) concludes that on-the-job (OTJ) training is only supported when the employer either expects a higher future productivity, or it does not cost employers anything to provide it. Becker argues that general OTJ training is primarily useful for new employees, whose lower wages offset the costs. More specialized, job (or employer) specific training is expected to result in a higher productivity and higher wages, resulting in less incentive to change jobs (Becker 1975), but also restricted application (Elman and O'Rand 2002; Tam 1997).There is also a spatial component to human capital attainment, as job markets vary by location, and some industries are more localized than others (McCall 2000), so training may not be portable.

Adult education (AE) has many definitions and forms in the U.S. For many governmental agencies, adult education refers to programs to increase literacy, English proficiency, and gaps from primary and secondary education (OECD 2005). While AE is a term applied to different types of learning, it is not often used to describe on-the-job training, or work related courses outside of degree granting institutions. According to the U.S. Department of Education, some 27% of adults participate in on-the-job training in the U.S., but these data are not comprehensive (2008a). Even if the definition of AE was broadened to include all types of learning done by adults (as the National Household Education Survey does), the available information on participation is limited (Elman and O'Rand 2002), leaving a void in our understanding of adult human capital attainment among workers in the U.S.

Based on what we know about human capital attainment in young adults, and the relationship between education and the labor force, we can make predictions about human capital in later life. I expect to find a strong relationship between the requirements of the labor force and educational preparation. Specifically, the relationship between qualifications and compensation lead workers to pursue further education to fulfill perceived (or stated) employer/market demands. Prior education not only acts as a signaling mechanism to employers, but as socialization for continued education, leading me to expect that workers with greater human capital will pursue AE at higher rates. The increasing demand for high-skilled workers creates an environment that supports ongoing human capital development, particularly in specialized labor markets. Human capital theory posits that there will be a negative relationship between age and education and no structural gendered or racial differences, but the current patterns of AE challenge these assumptions, which I discuss in the next section.

Adult Education: Age and Gender

Age and gender are expected to differ from other background variables in this analysis. Age is an integral part of applying human capital theory, since it predicts a positive relationship between age and educational activities prior to employment, and a negative relationship once employed. Gender appears to be a moderating influence, creating divergent patterns of educational attainment and labor force participation (Jacobs 1996). Women constitute just over half of the U.S. population, and 54.4% of them were employed in 2009, (compared to 64.5% of men: U.S. Department of Labor 2010c), and the differential effects of gender as a social construct are not fully accounted for in human capital theory.

The median age for first college entry in the U.S. is 19.5 years, but fewer than 60% will finish their "four year" degree (OECD 2009). Most research focuses on traditional students (ages 18-24) and undergraduates in college, in part due to institutional research and convenient populations. There is less information regarding non-traditional students (age 25+), but still a large body of literature primarily focuses on college and university participation. This is problematic when the National Longitudinal Surveys show that 42 year olds have held ten jobs, on average, since they turned 18 (U.S. Department of Labor 2007). Even if ten different jobs have the same responsibilities and skill requirements, there are changes in work procedures and technology change over time. Occupational instability and changing work identities/statuses suggests a greater need for retraining and continuing adult education (Babineau and Packard 2006; Scanlon 2008; Simpson, Greller and Stroh 2002).

What we know about AE is mostly based on standard college/university research. In fact, the label of "non-traditional" is specific to the college/university environment as a comparison to the typical, full-time student (Richardson and King 1998). Research on the college student population reveals that age has particular effects on education and occupational outcomes. In the classroom, instructors report that older students have a positive impact on the class as a whole, and are better able to synthesize learning with their prior knowledge (Richardson and King 1998; Taniguchi 2005). Outside the classroom, the effects are less positive. Within the work force, non-traditional students have lower wages than their younger counterparts, although the characteristics and circumstances leading a worker to take on the additional responsibilities of education may make up some of the deficit (Taniguchi 2005).

The number of non-traditional students (aged 25 and older) continues to climb in colleges and universities. The U.S. Department of Education (2008a) reported over 6.9 million students aged 25 and older enrolled in college/university in 2006, with a projected 8.2 million by 2017. Jacobs and Stoner-Eby (1998) identify cohort effects for part of this increase: as baby-boomers aged, the adult population grew larger than younger cohorts, creating a larger potential pool of adult students. Another explanation is that labor market changes and technological advances result in the need for education and training later in the career (Hostetler, et al. 2007). Taniguchi (2005) reports that the greatest job growth is in fields that college graduates are overqualified for, which may result in the increase of other types of education. These patterns of supply and demand indicate that human capital theory is not a sufficient explanation of human resource attainment. More research is needed on additional types of education, as well as demographic patterns within the broader spectrum of adult learning.

The pursuit of AE is often linked to prior educational experiences and life choices. Human capital theory suggests that differential high school experiences (GED versus diploma) would predict non-traditional education patterns, but this has not been supported (Taniguchi and Kaufman 2007). Traditional credential education may be delayed by early work experience and marriage, as well as women's childbirth and men's military enlistment (Elman and O'Rand 2004; Hostetler, et al. 2007). These experiences that delay formal education may be a benefit, as older students may have clearer educational expectations, be more driven, and be more successful at transferring these characteristics into their work life (Taniguchi 2005). As traditional higher education is associated with a delay of roles that carry a stronger social impact for women (marriage

and fertility: Jacobs 1996), the relationship between gender, age and AE is complicated. Specifically, life stage and job market conditions have been shown to be more highly associated with women's return to school than men's return. While both men and women who marry early (before the age of 23) have higher rates of AE participation compared to those who marry later, women have a much higher likelihood of pursuing AE overall (Hostetler, et al. 2007).

The effect of gender on education is complicated by more than marriage and fertility. Human capital theorists explain gender differences in career aspirations as the result of individual choice (Correll 2004). According to Becker (1975), women have been more likely to pursue education that is applicable to a wider range of activities than someone (presumed male) who is dedicated to the labor market. This assumes that women are not dedicated to the labor market, and choose work that allows more time for other interests or responsibilities, or need more flexible/transportable job schedules due to family responsibilities. This assumption is true for some, but not all, reflecting continued normative gender expectations. In 2009, approximately 54% of women in the U.S. were part of the labor force, compared to 64% of men (U.S. Department of Labor 2010c). Women's absences from the labor market are often the result of family decisions, but have the potential for what Mincer and Polachek (1978) call "atrophy". Atrophy occurs when work experience is interrupted, and those with greater human capital, with assumed higher earnings, face greater losses from interruptions. These losses may be one reason for increased pursuit of AE for women, although it is difficult to tease out the specific mechanisms.

Unlike class and race based inequalities in higher education and the labor market, there are few gender differentials in regards to educational access and credentials (Jacobs 1996). Jacobs notes that men and women experience college differently and have different outcomes. At the undergraduate level, more women are enrolling in college (U.S. Dept. of Education 2008b), but are more likely to enroll part-time and not in the highest paying majors and fields (Jacobs 1996). While non-traditional women have higher dropout rates, their returns to education have greater rewards than for men, including more career advancement and higher wages, even without getting a degree (Dougherty 2005; Elman and O'Rand 2004; Giancola, Munz and Trares 2008; Taniguchi 2005). Perhaps due to this phenomenon, there is a stronger negative relationship between age and education for men, consistent with human capital theory (Hostetler, et al. 2007; Taniguchi 2005).

Pursuit of college in later life is positively related to attending college as a traditional student, although there are gender differences here, as well (Babineau and Packard 2006; Elman and O'Rand 2002; 2004; Hostetler, Sweet, and Moen 2007; Jacobs and Stoner-Eby 1998). There are indications that greater job insecurity (real or perceived) increases women's pursuit of AE more than for men (Hostetler, et al. 2007; Elman and O'Rand 2002). Elman and O'Rand (2002) found that those most likely to go back to school have some college experience, but no formal degree, and hold technical skills without managerial experience. A later study by Elman and O'Rand (2004) showed that women with an associate's or vocational degree were less likely to pursue adult education even though they receive wage gains for each year of reentry schooling up to a bachelor's degree. These patterns show that past education and current employment factors

influence the attainment of human capital, and in this project I focus on AE and the influences of gender, age and employment characteristics. One model that accounts for gendered patterns of job entry beyond human capital models is queuing theory.

Queuing Theory and Work

Few occupations provide equality between men and women in regards to pay, occupational status and advancement even when human capital factors are controlled (Chae 2002; Jacobs 1996). Research debates whether this is the effect of demand processes such as labor queuing, or supply side choices such as job queuing, class choices, college major, or family planning (Correll 2001, 2004; Fernandez and Mors 2008; Okamoto and England 1999; Reskin and Roos1990). Queuing theory focuses on the ranking and sorting process by which employers choose and support attractive workers (the labor queue) and workers choose attractive jobs (Fernandez and Mors 2008; Reskin and Roos 1990). Historically, job opportunities for women were fewer and more restricted across types of job categories. Recent economic downturns have resulted in high job losses in male dominated fields such as construction and manufacturing (U.S. Dept. of Labor 2010b). Jobs are currently more plentiful in female dominated fields, but they typically pay less, and often require the same level of investment in time, resources and education, with fewer opportunities for mobility and promotion (Jacobs1996; Reskin and Roos1990; Roksa 2005).

Gender roles and family dynamics can also influence supply-side choices, acting as barriers to occupational goals (Correll 2001; Hostetler, et al. 2007; Taniguchi and Kaufman 2007). Early studies of women's employment outside the home focused

primarily on the family structure, rather than individual decision making, but still neglected external structures that limit or advance women's employment (Goldin 2006). Research on stereotype threat has shown that individual aspirations are not a complete picture of paid labor segregation. Correll (2001) found that self-assessments of ability and competence could be manipulated to reflect dominant gender norms, lowering female achievement, even when gender differences did not exist in skills or abilities.

Queuing processes and details have been measured by indicators of occupational segregation. These measures may be sufficient to account for gender variation between fields, but do not say anything about queuing within fields. Within occupations there may be different trajectories based on specialization and gender norms. Specialization through AE may actually limit the transferability of skills to other jobs or fields. Data limitations often make it difficult to tease out the actual processes of queuing, but the effects are clear (Jacobs 1996). Due to the demands and characteristics of different workplaces, it is necessary to consider within and between occupational differences when looking at gender, employment and AE. Women are more likely to be employed in nonprofit or public sectors, and men in private sectors, where the incomes are higher (Roksa 2005). Female dominated occupations tend to have more opportunities for part-time work and be more family friendly, but have limited job benefits (Okamoto and England 1999). In this project, gender may distinguish both AE involvement and employer investment across occupations that are differentially queued. The impact of occupational segregation on the process of building human capital and AE may be further complicated by the intersectionality of gender with race and ethnicity.

Intersectionality and Education Queues

Demographic distinctions are descriptive, but not just of individual life. Race, ethnicity, class, and gender do not exist independently: they are interconnected and create social context that is necessary for understanding societal patterns and change (Amott and Matthaei 1996; Collins 2000). A woman is not just a woman, she is also black, and/or Latina, and/or a mother, and/or middle class. These details are not minor; they place the actor within a social hierarchy that effectively constrains their choices (Amott and Matthaei 1996). These constraints have differential effects on access to resources, education, queuing, and labor force goals and activities.

Racial and ethnic minorities are more likely to pursue AE than whites, especially those with lower socioeconomic status (Elman and O'Rand 2004; OECD 2005; Richardson and King 1998; Taniguchi and Kaufman 2007). While there are distinct trends across groups, there are all differences within groups. Specifically, black women are more likely to go back to school and work in male dominated fields compared to females in other racial/ethnic groups even though they have smaller economic returns than whites (Becker 1975; Elman and O'Rand 2004; Okamoto and England 1999). According to Becker, in general, minority women are more likely to be in college due to their greater tie to the workforce. Not only has there been a longer history of minority women in the workforce, but patterns of discriminatory hiring and pay practices, and homogamy within minority communities suppress potential upward mobility that provides the option of labor force attachment (Amott and Matthaie 1996).

Experiences in the workforce are greatly influenced by the reciprocal relationship between education and income. Greater resources enable pursuit of more education, and greater resources are often the intended result of higher education. While differential access to education explains much of the pay gap for racial/ethnic minorities, it does little to address gendered pay disparities (Jacobs 1996). Education explains very little of the gendered wage differential between men and women, but employment experience explains a lot more (Kilbourne et al. 1994). The overall gender and race pay gaps cannot be simply explained, but there is a strong effect of gender composition within an occupation on starting wages (England, Reid and Kilbourne 1996). As a predictor of education, income has mixed results. Elman and O'Rand (2002) found that people with higher wages are less likely to pursue adult education, while the U.S. Department of Education (2008b) reports the greatest AE participation in within their highest income category (over $75,000 a year), but it is unknown if this holds across racial and ethnic groups.

To further complicate our understanding of AE, research demonstrates that family structure affects both educational attainment and income (Elman and O'Rand 2002). Elman and O'Rand (2004) find that each additional child reduces wages for their parents, especially for women. The presence of young children discourages enrollment in four-year programs for both men and women (Taniguchi and Kaufman 2007), but does not deter adult education (Elman and O'Rand 2004). Women's marital status is clearly linked to timing of education, type of program, course of studies and labor force commitment. Unmarried women are more likely to be traditional students, and in four-year college programs, while type of studies and labor force commitments are often linked to family

planning (Elman and O'Rand 2002; Goldin 2006; Hostetler, et al. 2007; Reskin 1993; Taniguchi and Kaufman). Taniguchi and Kaufman found that marital status does not affect men's educational choices, but married men earn higher wages than their single counterparts (Elman and O'Rand 2004), perhaps due to family pressures or the social "breadwinner" role. Given the possible intersections of roles and statuses that impact labor force activity and AE participation, more information is needed to understand the patterns of educational behavior by gender, age and work status.

Research Questions

Human capital theory predicts that background differences such as gender, race/ethnicity and family structure would not change the pursuit of resources, with the exception of age, based on economic investment arguments. Previous research has shown that distinctions do exist in adult education participation, especially for gender. Not only do women pursue education at higher levels than men, AE varies by other background characteristics such as race and employment characteristics, reinforcing arguments for intersectionality research. To better understand these behavioral patterns and how they fit into the larger literature, I pose the following questions: first, following college participation trends, do women across all occupational categories invest in adult education at a higher rate than men? Second, after controlling for prior human capital and family structure, do women of different racial/ethnic groups participate in AE at similar rates to each other and to men? And finally, what is the relationship between employer support and AE participation? Do these benefits accrue to women across employment categories the same as to men? Using logistic regression, I investigate these questions, testing for effects of human capital and queuing.

Adult Education

Human capital theory posits that background variables do not further influence the pursuit of AE participation beyond pre-employment credentials. Given the literature reviewed, it seems clear that this is an insufficient explanation of educational and labor force processes across the life cycle. Human capital models do posit that age will be negatively associated with the pursuit of AE, which is my first hypothesis. Controlling for gender, my second hypothesis is that women will pursue AE at a higher rate than men, regardless of other considerations like family structure, occupation, and income, . My third hypothesis is that occupational controls will change the effects of the human capital variables due to pre-employment queuing effects. Additionally, the effect of gender on AE participation should be reduced once occupational controls are included. Given what we know about the intersections of gender and other background variables, I expect gender to have a moderating effect on race and income as predictors of adult education participation.

Employer Support

Employer support of AE contradicts timing of human capital school-then-work models. The information available on employer support of education as a worker benefit is both limited and contradictory. National studies provide little information on types of support and access to such resources (Bills and Wacker 2003). In fact, the most detailed information is from previous Adult Education surveys by the U.S. Department of Education. Lee and Clery (1999) made sharp distinctions between credential programs and other types of education, and gave three reasons for employers providing support:

first-to address an aging workforce, second- to increase productivity and global competitiveness, and third- to increase skill demands in the labor force. These reasons are consistent with human capital theory as a reflection of employer's needs, but do not address the potential differing effects of queuing or intersectionality. The lack of knowledge about employer support drives the hypotheses predicting employer support of AE.

Given the needs of different labor sectors, I hypothesize that occupational controls will explain variations in employer support beyond human capital variables alone. Consistent with queuing theory, I expect that employer support will vary significantly over different occupational sectors. To test how well the human capital model predicts employer support, my third hypothesis is that there will not be employee background differences in relation to employer support of AE.

DATA AND METHODS

I conduct a secondary analysis of the 2005 Adult Education interviews within the National Household Education Survey (NHES-AE:2005; IRB approved, project #9717). This survey is collected every other year by the National Center for Education Statistics, while the Adult Education (AE) interviews were collected approximately every other survey cycle (i.e. every 3-4 years) until 2005. That year, a random national sample of 8,904 adults (persons over the age of 16 who were not enrolled in high school or below, institutionalized or serving in the military) were questioned on their participation in AE activities within the previous 12 months. The education courses ranged from basic skills through post-doctoral coursework, certificates, and personal interest courses. In addition

to AE activities, participants were asked questions about household characteristics, employment, income and standard demographic information. The combination of oversampling of some populations (blacks and Hispanics and adults with educational activity) and the sampling method resulted in the need for weighting to account for selection, undercoverage and nonresponse bias (Hagedorn et al. 2006a). These data include a weight that adjusts for these issues, applied to all analyses discussed here. More complex survey weights were available, but due to the limitations of statistical software regarding logistic regression and model fit (Heeringa, West and Berglund 2010), they were not used for this research.

To investigate non-traditional education, my sample was limited to adults over the age of 25 in the workforce (n= 4,798). The age of 25 as a cut-off for adult learners has been used traditionally in the literature (Jacobs and Stoner-Eby 1998; Taniguchi 2005) and has been identified as the point at which most people have completed full time schooling (Kerckhoff 2001). According to the 2000 U.S. Census, there were almost 182 million Americans aged 25 or older, and they represented 66.1% of the total U.S. population (U.S. Census 2009). With the continued rise in adult learners, this cutoff has been criticized (Alexander 2001), but fewer than 40% of credential students were over the age of 25 in 2006, and less than a quarter were full time (U.S. Department of Education 2008a). Limiting the sample to only those in the workforce reduces the number by 11%, but increases the likelihood that the AE is job related. Of this sample, 56% participated in AE, which NHES states is an oversample of the population. This is actually difficult to determine, as many of the types of education covered by the interview are not recorded or regulated in a systematic way.

I limited the types of education covered in my sample as well. For the purposes of this research, basic skills courses (English as a second language, basic skills, GED, and high school diploma equivalency) have been included as adding to human capital and potentially increasing labor force opportunities. Given the importance of credentials in our society, college and university courses have been added, as well as vocational and apprenticeship coursework. Directly related to AE in the workforce are the work-related courses. The NHES:AE includes personal interest courses and many informal kinds of education, such as watching videos or reading magazines, but these are omitted from this analysis. All other types of education have been excluded from the analyses.

Dependent Variables

The first dependent variable is general participation in AE, recorded as a dichotomous variable. For the purposes of this study, independent and informal coursework and personal interest courses were omitted, leaving the following types of education: English as a second language (ESL), General Education Development (GED) or high school diploma equivalency, basic skills, vocational, apprenticeships, college or university courses, and work-related courses. The categories are not mutually exclusive, and respondents could indicate enrollment in multiple courses over the preceding year. Participation in any of these courses was recorded as general participation.

Employer support of education as an employee benefit is the second dependent variable. Due to skip patterns within the survey, questions about employer support of education and motivation were only asked of those participating in AE. However, as not all AE pursuit had employer support, predictions of support are analyzed on a sub-sample

of the analysis (*n*= 2,692, 56% of the sample). While five forms of support were measured (at the workplace, during work hours, paid while, employer paid tuition/fees, and/or employer paid books/materials), there were not significant differences between them for prediction of support. As a result, a single, dichotomous variable was used for the dependent variable, AE.

The dependent variables for both samples are binary, so logit regression models were constructed. Logit models allow for nonlinear predictions of dichotomous variables and an understanding of changes in the independent variables (Long and Freese 2006). The independent variables were grouped theoretically: human capital, queuing and demographic variables (see Table 1 for descriptive statistics).

The human capital variables include regional location, labor force status (full-time or part-time), whether continuing education is required for their job, prior education, and age. Regional location, part-time employment, required education and prior education are all dichotomized, and age is a continuous variable. Regional location refers to the census regions of the U.S. (Northeast, South, Midwest, and West), and has been made into dummy-variables. Part-time labor force status is defined as less than 35 hours of paid labor a week, and is dichotomized (1=part-time). Required continuing education is based on a single question of the respondents: “Does your occupation have legal or professional requirements for continuing training or education?” (Hagedorn et al. 2006b). A yes answer on this question is coded as one, no is coded as zero. Prior education is based on the highest completed grade at the time of the interview. The categories are less than a high-school diploma, a high school diploma or an equivalent, some college /an associate’s degree or vocational/technical school, and a bachelor’s degree or higher.

These categories have been recoded into dummy variables, with the bachelor's degree or higher as the comparison group.

Since the dataset is cross-sectional and queuing effects are often difficult to discern (as previously discussed), the effects of queuing are controlled through occupational dummy variables. The occupational variables were based on the levels outlined in the 2000 Standard Occupational Classification (SOC) Manual (Hagedorn et al. 2006b). The SOC is used by the U.S. Department of Labor to classify workers, and is updated regularly to reflect to current structure of U.S. occupations (U.S. Dept. of Labor 2010). The categories have been collapsed for larger sampling numbers and to match traditional social science recoding (Hagedorn et al. 2006b). Rather than combine sales, service and administrative categories together, as many analyses do, I analyzed them separately, to see if there are different patterns of AE participation and employer support. The categories that require pre-employment credentials are the largest, with executives/managers, engineers/architects, natural scientists/mathematicians, social scientists/religious workers/lawyers, post-secondary teachers/counselors/librarians, teachers, health diagnosticians, nurses/pharmacists/therapists, writers/artists/athletes, health technologists, and other technologists all grouped together. Manual labor occupations were grouped together, as well: agriculture/forestry, mechanics, construction, production and transportation/material moving. Marketing/sales occupations, administrative/ clerical positions and service work were each coded as separate categories. The 35 people in the sample who had "miscellaneous" occupations were dropped from the analysis.

The demographic variables include gender (female=1), race/ethnicity, having children under the age of six (yes=1), partner status, and income. All variables are dichotomous, with the exception of the natural log of income. Race/ethnicity is based on a self-report, and any race identification that included Hispanic overrode any other categories stated. The remaining groups are non-Hispanic white, black, and all other races, and all four categories were made into dummy variables. Partner statuses are also dummy variables, and represent single-never married, currently married, and separated/divorced/widowed. To protect participants, income was truncated at $150,000 in the public data by NHES, and this range was used in the natural log.

FINDINGS

The findings are discussed separately in a series of models. First, the models predicting adult education participation are explained, then the models predicting employer support of that education. Within each section, the sample is described before discussing the models, which are additive. Each group of variables has been regressed individually on AE and employer support, and with and without gender. Table 2 shows the seven models regressing adult education participation on human capital, queuing, and demographic variables. Table 3 shows eight models regressing employer support on the same variable categories, as well as the type of education being pursued (not available for the sample in Table 2). The demographic variables used in the models differ, depending on model fit, which was determined using likelihood-ratio tests. Please see Appendix A for further models and variables not used due to model trimming. For the sake of clarity, the models will be discussed in the order analyzed. How these models illustrate the hypotheses, human capital and queuing will be elaborated in the discussion section.

Adult Education Participation

Overall, more than half (56%) of the sample had participated in some type of work-related AE within the past twelve months (see Table 1). Of those, 80% had participated in work-related courses beyond basic skills, GED, vocational classes or college/university coursework. Looking at background characteristics, we can compare them to national data from the 2000 U.S. Census (comparisons are in brackets unless otherwise stated). Of those participating in AE, women constituted 61%, compared to 52% in the U.S. population ages 25 and older (U.S. Census 2009). The workers participating in AE were overwhelmingly White (77% [75.1%]), followed by Black (9% [12.3%]), Hispanic (8% [12.5%[1]]) and all others (6% [12.6%]). Relatively few AE workers had young children (under six years old) at home, and most were either currently married (61% [54.4%]) or previously married (21% [19.5]). Given that the average age of the AE participants was forty-five, in a range of 25-84, it is not surprising to see fewer singles and small children. Location added significantly to some of the models, although the distribution was fairly equal, and no difference between the overall sample of workers and those who pursued AE.

The majority of those pursuing AE had a BA or higher (56% [24.4, U.S. Census 2009]), although a little over a quarter (27% [27.4]) had some college, or an AA. Only 3% [19.6] of the learned workers in the sample did not have a high school diploma or an equivalent. The high number of degrees is mirrored by breakdown of occupational fields. Fifty-nine percent of the individuals pursuing AE work in professional fields, followed by administrative personnel (13%), and manufacturing employees (11%). Those working

[1] Census data constructs ethnicity separate from race.

in service and sales occupations represent the smallest proportion of those pursuing AE (9 and 8%, respectively). The average income for AE participants is higher than for the overall workforce, at $40,508 a year, compared to $36,356 [mean household $56,644]. Few of the workers were employed part time (20%), and less than half (47%) are required to have continuing education for their profession.

As can be seen in Table 2, the human capital variables (Model 1) together have a pseudo R-squared of 11%. Prior education, age, and required continuing education are significant predictors across all models. The logged odds of pursuing AE are 2.17 lower for people without a high school diploma, 1.25 lower for high school graduates, and .35 lower for those workers with some college or an AA compared to those individuals with a BA. The requirement for continuing education for a job reduced the log odds of pursuing AE by 55%. Age has a negative relationship with the pursuit of adult education. For each additional year of age over 25, the odds of pursuing AE decrease by about 2% across all models. Region and part-time employment are not significant, but that labor force status changes with the addition of gender.

Gender was expected to be a moderating influence, yet none of the human capital interactions added significantly to the AE models. The addition of gender did not increase the pseudo R-squared to 13%. Consistent with previous studies on nontraditional students, women were twice as likely as men to pursue AE. Overall, the addition of gender in Model 2 changed the pattern little, with the exception of the previously mentioned employment status. Prior to the addition of gender, part-time employees had 16% lower odds of pursuing AE, which is not significantly different than full-time workers. Including gender in the regression reduced the odds of part-time workers

pursuing AE by 21% (.667/.84), resulting in 0.40 lower logged odds for part-time workers, compared to full-time.

Queuing variables were added in Model 3 (minus gender), and increased the explained variance by one and a half percent over Model 1. The addition of the occupational variables did not substantively change the effects of the human capital variables, but there were differences from Model 1, most notably effects of prior education. The odds of a worker without a high school diploma pursuing AE were higher than in Model 1, but still significantly (81%) lower than someone with a BA. There was a greater difference for individuals with a high school diploma, once occupation was controlled for. Instead of the 72% lower odds in Model 1, the worker with a high school diploma in Model 3 had 59% lower odds of pursuing AE compared to someone with a BA, once the demands and/or preparation for an occupation was included in the regression, as represented by the queuing variables. In Model 3, workers with some college or an AA degree were not significantly different than their counterparts with a BA. The relationship between age and AE participation did not vary across the models.

In Model 3, only one occupational category differed considerably from the others: the administrative worker was somewhat less likely (-25%) to pursue AE than the professional, but this difference was only marginally significant. The other occupations all had between 45-60% lower odds of pursuing AE than someone in a professional field. The odds for a sales worker pursuing AE were 50% lower, for service workers 45% lower, and for manual employees 59% lower, indicating a distinct difference in post-hiring education between the professional occupations and those in marketing, service, or

manufacturing. This pattern remained much the same after the addition of gender in Model 4.

In Model 4, the logged odds of participating in AE were 0.67 higher for women than for men, or almost twice as likely. Like Model 2, the inclusion of gender made the difference in employment status significant, but changed little else in Model 4. Instead of the non-significant 17% difference between full-time and part-time employees, it increased to 31% lower odds after gender was taken into account. While there was little difference within the queuing variables, the addition of gender increased the significance of the administrative occupational categories, illustrating that employees in those fields had 37% lower odds of participating in AE than professionals. Overall, Model 4 had a pseudo R-squared of 14%.

Model 5 had a slightly higher pseudo R-squared than Model 3, the previous model omitting gender. Model 5 included the background variables that added significantly to the model: race/ethnicity and income. Although none of these variables added significantly to Model 5, the likelihood ratio tests indicate that these variables add to the models, but had little effect on the previously discussed independent variables. Black employees had 0.19 higher logged odds of participating in AE than whites, while Hispanic workers had 0.09 lower logged odds, and other racial and ethnic categories 0.14 lower logged odds of AE participation. There was a positive relationship between income and AE participation, but it was not significant in Model 5. The only difference between Models 5 and 6 is the inclusion of gender. Like previous models, gender makes labor status significant, but in this model, it also makes income significant. For each unit

increase of income, the logged odds of participating in AE increase by 0.04. Neither interactions between gender and income or race/ethnicity were significant.

Occupational categories and gender interact, indicating differential access by labor queues, as illustrated in Model 7. Almost 50% of the women in this sample work in professional fields, and this is the omitted category. Only two of the interaction terms are significant, the two smallest categories. The smallest proportion of women make up 7% of the workers, or 20% of the manual occupation category. These women also had the lowest odds of participating in AE, at 0.38 lower odds than a female in a professional field. Women in marketing and sales occupations have the second smallest representation of workers (5%), and 0.06 lower odds of participating in AE. The pattern continues with women in the service industry. Representing 7% of those in the labor force, they have 20% higher odds of participating in AE, while the women who make up 12% of the labor force in an administrative capacity have 0.43 higher odds of participating in AE. In this model, all previous variables are included. The human capital variables are much the same as in Model 6, the last model with gender. The influence of income and race/ethnicity are the same as in Model 6, as well.

Part-time workers had a 0.33 lower logged odds of participating in AE compared to full-time workers. Workers whose continuing education was required for their profession had 0.67 lower logged odds of participating in AE during the required timeframe. The patterns of prior education were similar to the previous models, with the workers without education credentials having the lowest odds (-80%) of participating in AE compared to those with BAs. Among the workers who had education credentials, those with only a high school diploma were significantly different (-62%) from those

with the college degree, while the employees with some college were not very different from workers with a BA, on average. Age had the same negative relationship throughout all the models of reducing AE, as predicted by human capital. There was a significant effect of income on AE participation, where a one unit increase in the natural log of income increased the odds of taking part in AE by 4%. Overall, Model 6 had a pseudo R-squared of 14.7%.

Employer Support Models

I asked about the relationship between employer support and AE participation. Due to the limitations of the data, I cannot fully answer this question, but I can provide more information than before. I hypothesized that occupational controls will explain more than human capital variables alone, and (consistent with queuing theory) that employer support will vary significantly over different occupational sectors. I also hypothesized that there will be differential employer support by employee background. To begin with, I will describe the sample of employees that were participating in AE.

The majority of the workers who had participated in AE had some level of employer support (77%). Sixteen percent were employed part time, and fewer than half (46%) were required to have continuing education for their job. Eighty five percent of the workers with employer support had either a BA or higher (58%) or some college coursework (27%), with only 2% having less than a high school diploma. The overwhelming majority (62%) worked within professional occupations, followed by administrative/clerical jobs (14%). An equal number were part of the service and manufacturing workplaces (9% each), with 6% working in sales. The average income of

supported workers was $41,857 a year, higher than the average of the overall sample, and the subsample of AE participants.

The majority of the workers receiving employer support were female (63%), white (79%), and married (61%). Nine percent of the supported workers were Black, 6% were Hispanic, and 6% were of other racial/ethnic background. Twenty-one percent were previously married, 18% were single, and 14% had children under the age of six to support. The average age was significantly younger than the overall sample, at 45 years (t=4.29, p=<0.001). The regional dispersion was very similar to the overall sample.

The employer support models are presented in Table 3. The human capital variables in Model 1 result in a pseudo R-squared of 0.05. The only contrast to the AE participation regressions was the addition of a nonlinear age variable. For each year of age, the odds of having employer support increase by 17%, but this increase is decelerated by 0.002 for each additional year of age (see figure 2).In predicting employer support, the effect of region is marginally significant: workers in the Midwest have 42% higher odds of having employer support than workers in the South, and this pattern holds across all of the models. Employment status does not vary by the addition of gender in these models. Part-time workers had 0.74 lower logged odds of having employer support for AE, while workers who need continuing education for their job had 0.35 lower logged odds of having support. As for prior education, only those without a high school diploma had significantly lower odds (-77%) of having employer support compared to those with a BA or higher.

Model 2 shows the addition of gender to the human capital model. A female worker had 43% higher odds over men of having employer support, while part-time employees had 58% lower odds, compared to full-time workers. In Model 7, these two variables interacted, but the remaining variables followed the same patterns and significance as in Model 1.

The occupational categories as proxies for labor market queues were added to the regressions starting in Model 3. The inclusion of the queuing variables changed the effects of some of human capital variables. Once again, only those workers without education credentials were significantly different than workers with a BA or higher, with a 1.12 decrease in the logged odds of having employer support. While not statistically significant, there appears to be a change in employer support by prior education. Starting in the model, individuals with less than a BA, and at least a high school diploma are more likely to have support than workers with a four year degree or more. The linear effect of age on having support was slightly lower, but was still nonlinear. There were patterns across the occupations, but only two categories were significantly different than the professional workers: sales and manufacturing. Workers in both sales and manufacturing had much lower odds of having employer support for AE, 63% and 53% lower, respectively. Interestingly, administrative workers had 0.19 higher logged odds of support, but this finding was not significant. The addition of gender in Model 4was not significant, and did not increase the pseudo R-squared.

The addition of racial and ethnic categories in Model 5 did little to change the effects of the occupational controls, and had minor, insignificant effects on the human capital variables. Within the racial/ethnic categories, only Hispanic workers were

significantly different from Whites, with 0.61 lower logged odds of having employer support for AE, and this pattern carries across the remaining models. Black employees were more likely to have employer support, and the other groups were less likely, but as already mentioned, it was not a significant difference. Model 6 includes gender, but like Model 4, it did not change or add to the model.

Models 7 and 8 include a number of interaction terms between gender and labor force variables. Over the course of the models, prior education had become less significantly related to having employer support, such that in Model 7, those workers without education credentials had 61% lower odds of support, compared to those with a BA. While gender was not significant after Model 2, the interactions of gender and labor force status with the service industry were significant. Women working part-time had 0.33 lower logged odds of having employer support than women working full-time. Women in service work (the third smallest category, 10% of female workers) had 42% lower odds of having employer support. All of the other occupational categories had lower odds of support compared to women in professional occupations, but were not significantly different.

Including the type of education being pursued changes many of the patterns established through regressing employer support on the independent variables, as can be seen in Model 8. The effects of employment status did not change, but the significance of required continued education declined in terms of employer support. The influence of lacking credentials is apparent once type of education being pursued is added. After controlling for credential or work-related AE, workers without a high school diploma or equivalent have 68% lower odds of having support than workers with a college degree.

The remaining human capital variables followed the same patterns as previous models. The occupational controls and background variables maintained the same patterns and significance in Model 8 as in previous regressions, and the interactions of Model 7 change little as well. Accounting for education being pursued, employees that are participating in credential education (which is usually transferable), have 0.93 lower logged odds of employer support, compared to work-related educational activities.

DISCUSSION

The purpose of this study was to examine the mechanisms related to educational participation after initial entry into the workforce. Human capital theorists predict that the structural inequalities present in pre-employment education will disappear once occupational categories are controlled. As suggested by the literature review and the current findings demonstrate, that is not the case. Queuing and intersectionality models posit that pre-employment inequalities shape the trajectories of the workers from the queue throughout their careers. In particular, gender and race/ethnicity have been shown in past research to be associated with substantial differences in regards to educational attainment, compensation and benefits in the workforce. Yet much of the research on the labor market and higher education, specifically adult education, portray a divide between education and the labor market: while there is a reciprocal relationship, they are not often discussed as progressively interrelated for adult workers across life cycles (for an exception, see Elman and O'Rand 2002, who also use NHES:AE data). Results from the current study show that age and gender have different effects on AE and employer support of AE, and that the effects of queuing decrease the impact of prior human capital characteristics.

The interrelation between education and the labor force for adult workers is difficult to untangle from the processes of human capital attainment and queuing. Education and labor force activities cover such a broad range of activity, for so much of most people's lives, and are influenced by so many factors; our theoretical explanations are just templates that we lay over patterns to see how they fit. Looking at the fit of human capital, queuing and intersectional models in predicting AE participation and employer support for these activities, we see that there are limits to what they explain, and what data can tell us. In this section, I will work through my research questions and results, and discuss how well these models fit the patterns of behavior described in these findings.

I started my discussion with the limits of human capital theory, but here I will explain the extent to which it fits. I included regional controls, labor status, requirements, prior education and age as a proxy for human capital attainment. As hypothesized, there is a negative relationship between age and AE participation. It is a small decline, but a significant one. Given the amount of time the average worker spends in the workforce, the 2% decrease in the odds of participating in AE has a real effect over the worker's life time. Figure 1 shows the relationship between age and probability of AE participation, with different slopes by gender. There was not an interaction between gender and age, but there is a definite pattern based on sex categories. There is not the sudden, steep decrease that human capital theory suggests, but it is a persistent decline, and there are distinctive differences by gender, mirroring the AE activity of women in credential programs. Women workers have a significantly higher probability of pursuing AE over the lifetime

compared to men, not reaching the AE likelihood of a 25 year old male worker until their late 60s.

Labor force status is the only human capital variable to change significantly with the addition of gender to the models. Without accounting for gender, workers with part-time labor force status are somewhat less likely to be participating in AE. With the inclusion of gender, there is a significant decrease in the amount of AE participation by labor force status, as gender differences account for much of the variation in AE participation. The interaction between labor force status and gender was not significant, although we know that women are more likely to work part-time, in jobs that have fewer benefits and lower compensation (Fernandez and Mors 2008; Reskin and Roos 1990).

The effect of job required continuing education is interesting. At first glance it would seem that workers who are required to update knowledge or skills over time would pursue AE more than other workers, and receive more support for this endeavor. Instead we find much lower odds of participation and at least 25% lower odds of receiving employer support. The likelihood of participation is confounded by the time line of the survey. The NHES only asks about activities completed within the last twelve months, which limits this information to a twelve month period in 2004-2005. The expectation for employer support could be understood as a type of pre-existing condition. If the training is required to do the job (as part of licensure, or maintaining a certificate), and there is a robust queue of employees, the employer may not have any motivation to cover the cost. Like most of the human capital variables, required continuing education did not vary greatly by gender.

The effects of gender on AE participation are strong, but not necessarily in the direction I expected. Across all the models, women are more likely to pursue AE. The effect of gender on AE participation is reduced once occupational controls are added, but there was not variation in race/ethnicity or income by gender, as I predicted. Instead, there was an effect of gender on occupational categories as predictors of AE activity.

The relationship between gender and queuing in relation to AE participation is particularly strong for some occupational categories. As previously mentioned, there is an 8% decrease in the effect of gender on AE participation after occupational controls are added. This is explained in the significant interactions between gender and occupation for marketing/sales occupations and manual labor work. There is a great deal of variation in the AE activity of women between different occupations, which may be related to within occupation specializations.

The effects of other background variables are quite small, indicating that once human capital, queuing and gender are accounted for, little variation exists among other human capital characteristics. Given what we know about queuing, and the limits of these data, this finding is not very surprising. To really understand the process of queuing, we would need to have longitudinal data, as cross-sectional data does not give us ordered information. The impact of individual characteristics depends on an ordered process. Family obligations, such as whether or not a person is married, and/or has children have been shown to impact both education and labor force activity (Correll 2001; Hostetler, et al. 2007; Taniguchi and Kaufman 2007), but these influences have already been absorbed by the queuing process. With these data, we have no way of knowing if these events happened before entering the workforce, or after, or any changes that have occurred as a

result. The distinctions between supply and demand processes and the differences between individual and structural influences are all lost within these data.

What the findings tell us is that queuing is an important part of the models for predicting employer support. As hypothesized, the addition of occupational controls in the models did increase the explained variance of the employer support models over the human capital variables alone. This difference did little to change the patterns of the human capital variables, mostly impacting the effects of prior education, which also has an impact on queuing. Some of the individual characteristics that influence access to education in pre-tertiary and tertiary education (race/class/socioeconomic status) appear to be relevant in obtaining employer support for AE. It could be argued that there is less call for AE in certain occupations, yet the entire sample regressed on employer support were participating in AE (due to the survey design), and almost a quarter of them did not have employer support, but were motivated to pursue AE anyway.

Racial and ethnic background did not appear to significantly influence the pursuit of AE, at least not beyond queuing processes. This pattern did not hold for employer support: there appear to be differential effects of race/ethnicity for receiving employer support for AE. I tested interactions between race/ethnicity and queues, and found a few that were significant, but they did not add significantly to the model. In addition, each category (i.e. Hispanic sales workers) represented a very small part of the sample, often less than one percent (*n*=<30*)*. Overall, Hispanic workers had significantly lower odds of having employer support of their AE activities than whites, even after controlling for human capital variables, occupational categories and gender. Black, non-Hispanic workers were slightly more likely to receive employer support than whites, and other

racial/ethnic categories slightly less. Since the usual explanations for discriminatory action have already been controlled for (prior education, region, occupational sector), and the largest proportion of Hispanic workers participating in AE are in professional fields, the distinction between the two groups cannot be casually explained away. Again, I do not have the data to analyze the forces at work, but ethnic stereotypes, prejudices and discrimination do seem to be a plausible explanation, which human capital models do not explain away.

The relationship of age to employer support of AE both supports and challenges the human capital thesis. Unlike the human capital model, additional years of age over 25 increase the likelihood of receiving employer support, up to a point, approximately 45 years of age (see figure 2). There is a slight plateau until about age 50, at which point employer support declines fairly rapidly. The 40-60 year old age range is a group with historically low college enrollment rates (Jacobs and Stoner-Eby 1998), which suggests the possibility that demand forces are working to maintain or increase skill levels in a population that would not seek further training on their own.

The lack of historical information about on-the-job training, and non-credential AE makes it difficult to do more than hypothesize about these patterns. Workers early in their career may be expected to have obtained training appropriate to their position, especially considering the high proportion of AE participants with prior college education. In contrast, older workers appear to be “worth” the investment by employers up to a point, although the costs of this education are not known. Becker (1975) argued that employers would be more likely to provide training when it did not cost them anything, or expected higher future productivity. It is possible that the cost of not training

older/senior employees would be greater than the potential return over time. Within this sample, 43% of the workers have employer support, and 62% of those are in professional fields, which include managerial positions, engineers, teachers, and health practitioners. Given the technological advances of the 20th century, and the increasing emphasis on credentials in the workforce (Elman and O'Rand 2002), this pattern of employer support is not unexpected. Unfortunately, we do not have a great deal of information on employer support of education, and what we do know is limited to credentialed AE activities.

The limited information on employer support led me to somewhat general research questions about the relationship between support and human capital, queuing and background variables. I questioned the relationship between employer support of AE and AE activity, as well. Overall, I find that women are far more likely to pursue AE, but do not have significantly higher odds of employer support, once queuing categories are controlled. There are different patterns by occupation, as well. Women in manual labor fields have the lowest odds of participating in AE compared to women in professional fields, yet women in sales have the lowest levels of employer support compared to the same group, although not at a significant level. There are also racial and ethnic differences between the two sets of analyses. There are not significant differences in AE participation by racial/ethnic groups, yet there is significantly less employer support for Hispanic workers, compared to both white and black workers. Hispanic workers are overrepresented in manual work and sales occupations, both categories that are significantly less likely to have employer support. Yet even after occupation is controlled for, the racial/ethnic differences still exist.

Many of the individual characteristics that have been shown to be related to educational pursuit and timing were not relevant in predicting AE in the labor force. The impacts of gender roles, racial or ethnic background, and family dynamics are all subsumed under the effects of queuing, which we cannot further specify with these data. What we can tell is that queuing processes have a powerful impact on human capital attainment in adults. Whatever supply or demand processes work to sort people into their respective occupational categories, those occupations have a greater effect on demands for and access to further training.

Limitations and Further Research

As with any research, and especially with secondary data, there are limitations to what these data can tell us. To begin with, the data are cross-sectional and cannot show patterns over time, or determine causality. Many of the social factors that predict traditional educational attainment are not collected, limiting the comparative analysis between traditional students (about which we know a lot), and AE participants in the workforce (of which we know little).

We have several potential trajectories illustrated within this dataset. First, and seemingly the most common, is a modified traditional human capital model: education-then-work, followed by a “refresher” to keep up, or perhaps for an occupational change. Second, are the delayed human capital acquirers: they entered the labor force, maybe without even finishing high school, and have returned to school to better their occupational chances. Third are the traditional human capital modelers who obtained an education and entered the workforce, and have not (within the last year) revisited

education. There are any number of other pathways to describe the interrelated connections between education and the labor force, but we do not have the data to articulate them, as the questions are just not asked.

The limitations of this dataset are outweighed by the information it provides. This is a fairly unique national data set with multiple, cross-sectional collections, and comparisons can be made, and further research could replicate these analyses across prior years. There are five prior AE surveys, from 1991-2005, although not all of the questions match up, they provide information that is not available at a national level, or for such a large sample. Unfortunately, as of August 2009, the Institute of Education Sciences (part of the National Center for Education Statistics, that collects the NHES data) stated that they had no plans to collect further cycles of AE surveys (NHES training seminar), and as of March, 2010, it was no longer listed as a current postsecondary survey on the National Center for Education Statistics website.

Without further cycles of AE surveys, can we get a better picture of queuing processes as they relate to AE? Broad occupational categories mask details of queuing and job segregation by race and gender. Further research could match census data and Bureau of Labor Statistics information to create a more comprehensive picture of ascribed characteristics within sub- fields. However, this would not address the pre-employment queuing process, or the social factors of childhood that predict educational attainment in adulthood. It is possible that a large scale longitudinal survey, such as the National Longitudinal Survey of Youth would give researchers the necessary tools to fill in the picture I have sketched out, but it was beyond the scope of this project.

This project was pursued to investigate the patterns of educational attainment and differential outcomes by gender and occupation. What I found was that the traditional human capital approach to education fails to account fully for education of workers within the structure of the labor force. Little is known about how workers participate in education outside of colleges and universities, and occupational queuing masks many of the characteristics that predict traditional, credential education. Given the increasing number of years spent in the workforce, the decline of life-long positions, and the ever-evolving technological impact on the labor market, the process of adult human capital attainment needs to be better understood. This research provides more information about an often overlooked activity and the processes that are associated with it.

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Figure 1

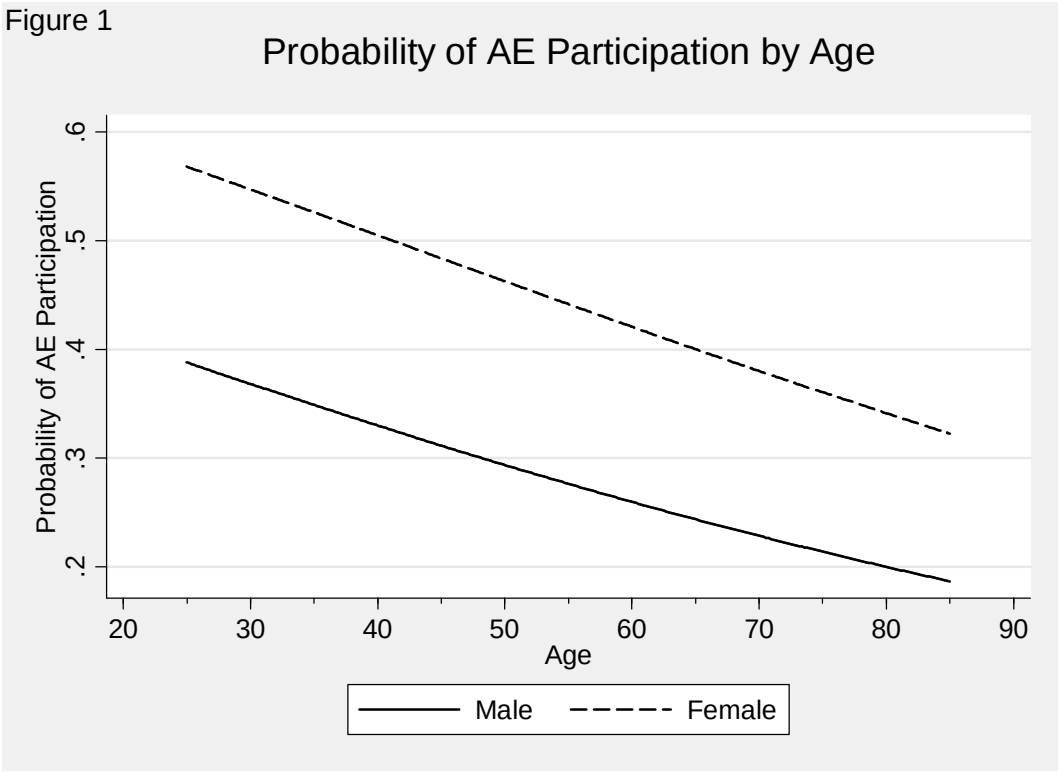

Figure 2

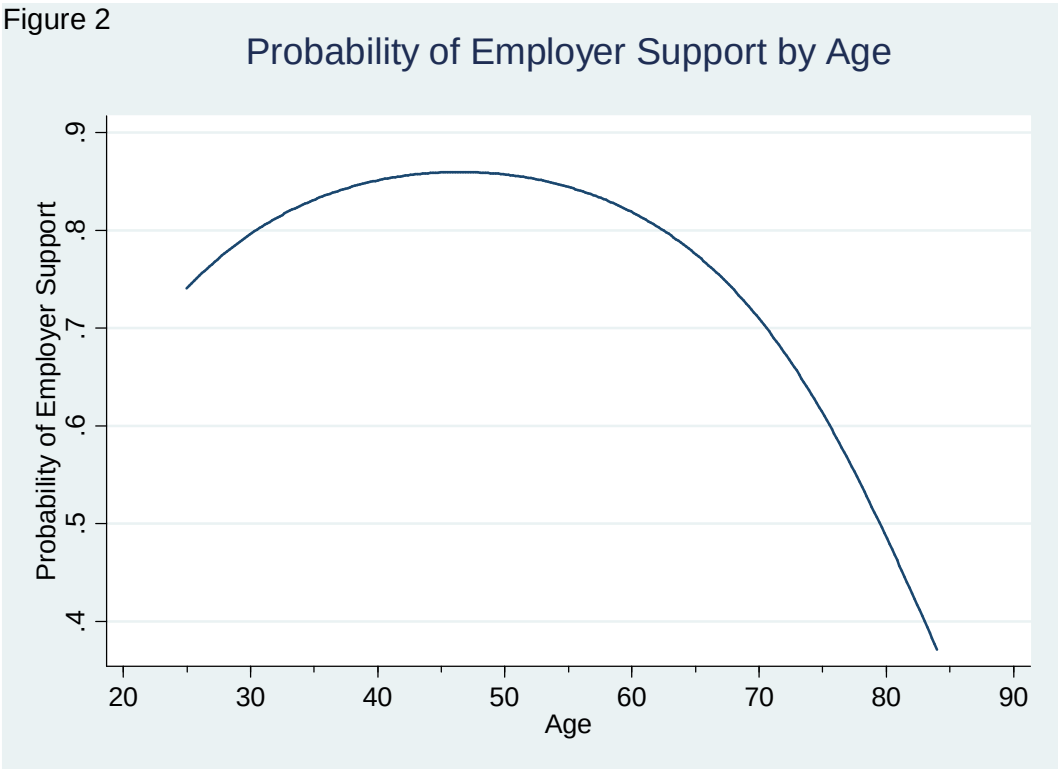

Table 1: Descriptive Statistics

	Full Sample: N=4798 Workers Aged 25+				Subsample: N=2692 AE Participants				Subsample: N=2070 Employer Supported			
Dependent Variables	Mean or %	Std. Dev.	Min	Max	Mean or %	Std. Dev.	Min	Max	Mean or %	Std. Dev.	Min	Max
Adult Education (AE) participation	56%		0	1	100%		1	1	100%		1	1
Employer support of AE					77%		0	1	100%		1	1
Independent Variables												
Human Capital Variables												
Employed part-time	23%		0	1	20%		0	1	16%		0	1
Continuing education required for job	58%		0	1	47%		0	1	46%		0	1
Prior Education												
Less than a high school diploma	8%		0	1	3%		0	1	2%		0	1
High school diploma or equivalent	20%		0	1	14%		0	1	14%		0	1
Some college/Associate's degree	26%		0	1	27%		0	1	27%		0	1
Bachelor's degree or higher*	46%		0	1	56%		0	1	58%		0	1
Age	46.53	12.10	25	90	45.30	11.56	25	84	45.23	11.09	25	82
Female	54%		0	1	61%		0	1	63%		0	1
Queuing Variables												
Professional*	46%		0	1	59%		0	1	62%		0	1
Sales	10%		0	1	8%		0	1	6%		0	1
Administrative	14%		0	1	13%		0	1	14%		0	1
Service	11%		0	1	9%		0	1	9%		0	1
Manual	19%		0	1	11%		0	1	9%		0	1
Background Variables												
Race/Ethnicity												
White, non-Hispanic*	75%		0	1	77%		0	1	79%		0	1
Black, non-Hispanic	8%		0	1	9%		0	1	9%		0	1
Hispanic	10%		0	1	8%		0	1	6%		0	1
All other races	6%		0	1	6%		0	1	6%		0	1
Marital Status												
Single	18%		0	1	18%		0	1	18%		0	1
Married*	60%		0	1	61%		0	1	61%		0	1
Separated/Divorced/Widowed	22%		0	1	21%		0	1	21%		0	1
Natural log of Income	8.79	3.08	0	11.92	9.20	2.86	1.25	11.92	9.33	2.81	1.64	11.92
Has children under the age of 6	14%		0	1	14%		0	1	14%		0	1
Region												
Northeast	18%		0	1	18%		0	1	17%		0	1
South*	37%		0	1	37%		0	1	37%		0	1
Midwest	22%		0	1	22%		0	1	23%		0	1
West	23%		0	1	24%		0	1	23%		0	1
Education Pursuing												
ESL/GED/Basic Skills					2%		0	1	1%		0	1
Vocational/Apprenticeships					5%		0	1	3%		0	1
College/University					15%		0	1	13%		0	1
Work-Related Courses					80%		0	1	84%		0	1

*reference category for analyses

Table 2: Logistic Regression Analysis for Variables Predicting Adult Education Participation

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Human Capital Variables														
Northeast	0.986		0.994		0.975		0.976		0.976		0.969		0.955	
	[-0.10]		[-0.05]		[-0.18]		[-0.17]		[-0.17]		[-0.22]		[-0.32]	
Midwest	0.907		0.919		0.939		0.931		0.944		0.924		0.911	
	[-0.78]		[-0.67]		[-0.48]		[-0.55]		[-0.44]		[-0.60]		[-0.71]	
West	0.989		0.995		0.981		0.98		1.009		0.996		0.985	
	[-0.08]		[-0.04]		[-0.15]		[-0.16]		[0.07]		[-0.03]		[-0.11]	
Employed part-time	0.843		0.667	***	0.829		0.689	***	0.856		0.718	**	0.72	**
	[-1.53]		[-3.55]		[-1.68]		[-3.31]		[-1.33]		[-2.84]		[-2.77]	
Continuing ed. required	0.454	***	0.475	***	0.471	***	0.492	***	0.472	***	0.494	***	0.51	***
	[-8.34]		[-7.75]		[-7.69]		[-7.17]		[-7.64]		[-7.12]		[-6.68]	
Less than HS diploma	0.114	***	0.116	***	0.192	***	0.175	***	0.21	***	0.198	***	0.2	***
	[-9.42]		[-9.25]		[-6.58]		[-6.94]		[-6.24]		[-6.48]		[-6.50]	
HS diploma or equivalent	0.286	***	0.273	***	0.407	***	0.376	***	0.415	***	0.389	***	0.382	***
	[-10.12]		[-10.35]		[-6.42]		[-7.01]		[-6.20]		[-6.69]		[-6.87]	
Some college/AA	0.704	**	0.669	***	0.885		0.837		0.902		0.861		0.845	
	[-3.19]		[-3.61]		[-0.99]		[-1.44]		[-0.83]		[-1.19]		[-1.35]	
Age	0.984	***	0.983	***	0.982	***	0.982	***	0.982	***	0.981	***	0.981	***
	[-4.21]		[-4.27]		[-4.32]		[-4.46]		[-4.49]		[-4.70]		[-4.71]	
Female			2.073	***			1.951	***			1.995	***	2.562	***
			[7.55]				[6.61]				[6.73]		[6.48]	
Queuing Variables														
Marketing/Sales					0.502	***	0.5	***	0.507	***	0.507	***	0.693	
					[-4.20]		[-4.18]		[-4.11]		[-4.05]		[-1.54]	
Administrative					0.747	†	0.628	**	0.765	†	0.649	**	0.583	†
					[-1.86]		[-3.03]		[-1.69]		[-2.81]		[-1.94]	
Service					0.548	***	0.537	***	0.562	***	0.559	***	0.663	
					[-3.63]		[-3.79]		[-3.41]		[-3.48]		[-1.53]	
Manual					0.405	***	0.508	***	0.418	***	0.535	***	0.66	*
					[-5.97]		[-4.34]		[-5.78]		[-4.05]		[-2.39]	
Background Variables														
Natural log of income									1.028		1.039	*	1.039	*
									[1.56]		[2.09]		[2.13]	
Black, non-Hispanic									1.208		1.12		1.142	
									[1.10]		[0.65]		[0.77]	
Hispanic									0.915		0.885		0.891	
									[-0.46]		[-0.63]		[-0.61]	
All other races									0.869		0.876		0.908	
									[-0.73]		[-0.68]		[-0.50]	
Interactions														
Female*Sales													0.528	*
													[-1.97]	
Female*Administrative													1.031	
													[0.09]	
Female*Service													0.708	
													[-1.08]	
Female*Manual													0.404	**
													[-2.92]	
Constant	5.401	***	4.084	***	6.785	***	5.257	***	5.227	***	3.697	***	3.29	***
	[7.93]		[6.40]		[8.65]		[7.30]		[5.62]		[4.25]		[3.80]	
Observations	4798		4798		4798		4798		4798		4798		4798	
Pseudo R-squared	0.112		0.131		0.129		0.142		0.13		0.144		0.147	

expb coefficients; t statistics in brackets

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 3: Logistic Regression Analysis for Variables Predicting Employer Support

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Human Capital Variables								
Northeast	0.891	0.88	0.859	0.853	0.85	0.844	0.838	0.817
	[-0.56]	[-0.62]	[-0.72]	[-0.75]	[-0.75]	[-0.78]	[-0.81]	[-0.92]
Midwest	1.421 †	1.42 †	1.476 †	1.473 †	1.462 †	1.459 †	1.465 †	1.484 †
	[1.70]	[1.70]	[1.87]	[1.87]	[1.83]	[1.82]	[1.84]	[1.89]
West	0.997	0.992	0.961	0.959	1.026	1.022	1.001	0.989
	[-0.02]	[-0.04]	[-0.21]	[-0.22]	[0.13]	[0.11]	[0.01]	[-0.06]
Employed part-time	0.479 ***	0.422 ***	0.461 ***	0.44 ***	0.455 ***	0.434 ***	0.215 ***	0.251 ***
	[-4.59]	[-5.12]	[-4.66]	[-4.73]	[-4.72]	[-4.81]	[-5.58]	[-4.97]
Continuing ed. required	0.708 *	0.728 *	0.711 *	0.721 *	0.713 *	0.723 *	0.746 *	0.772 †
	[-2.43]	[-2.25]	[-2.36]	[-2.30]	[-2.34]	[-2.28]	[-2.06]	[-1.81]
Less than HS diploma	0.23 ***	0.237 ***	0.325 **	0.321 **	0.4 *	0.397 *	0.386 *	0.325 **
	[-4.28]	[-4.28]	[-3.09]	[-3.12]	[-2.53]	[-2.55]	[-2.50]	[-2.87]
HS diploma or equivalent	1.007	0.973	1.214	1.19	1.252	1.228	1.199	1.119
	[0.03]	[-0.13]	[0.85]	[0.75]	[0.97]	[0.88]	[0.78]	[0.48]
Some college/AA	0.937	0.921	1.06	1.049	1.073	1.063	1.091	1.127
	[-0.40]	[-0.50]	[0.31]	[0.25]	[0.38]	[0.33]	[0.47]	[0.62]
Age	1.167 ***	1.161 ***	1.151 ***	1.149 ***	1.153 ***	1.151 ***	1.139 ***	1.109 **
	[4.04]	[3.89]	[3.62]	[3.57]	[3.65]	[3.60]	[3.33]	[2.65]
Age^2	0.998 ***	0.998 ***	0.998 ***	0.998 ***	0.998 ***	0.998 ***	0.999 ***	0.999 **
	[-4.02]	[-3.89]	[-3.68]	[-3.64]	[-3.74]	[-3.70]	[-3.40]	[-2.94]
Female		1.429 *		1.16		1.163	1.316	1.346
		[2.35]		[0.94]		[0.95]	[1.28]	[1.38]
Queuing Variables								
Marketing/Sales			0.371 ***	0.374 ***	0.38 ***	0.383 ***	0.456 *	0.404 *
			[-3.96]	[-3.92]	[-3.98]	[-3.93]	[-2.15]	[-2.48]
Administrative			1.259	1.214	1.319	1.272	1.804	1.753
			[0.92]	[0.78]	[1.11]	[0.97]	[1.24]	[1.25]
Service			0.663	0.662	0.663	0.662	1.598	1.591
			[-1.54]	[-1.54]	[-1.59]	[-1.58]	[1.08]	[1.06]
Manual			0.47 **	0.5 **	0.476 **	0.507 **	0.593 †	0.543 *
			[-3.21]	[-2.79]	[-3.15]	[-2.74]	[-1.81]	[-2.10]
Background Variables								
Black, non-Hispanic					1.122	1.111	1.159	1.188
					[0.39]	[0.35]	[0.48]	[0.57]
Hispanic					0.543 *	0.538 *	0.553 *	0.537 *
					[-2.43]	[-2.47]	[-2.34]	[-2.46]
All other races					0.758	0.768	0.827	0.888
					[-1.07]	[-1.01]	[-0.74]	[-0.46]
Interactions								
Female*Part-time							2.549 **	2.256 *
							[2.77]	[2.39]
Female*Sales							0.704	0.728
							[-0.75]	[-0.67]
Female*Administrative							0.596	0.603
							[-0.94]	[-0.97]
Female*Service							0.275 *	0.272 *
							[-2.45]	[-2.43]
Female*Manual							0.548	0.606
							[-1.22]	[-1.05]
College Coursework								0.394 ***
								[-5.21]
Constant	0.171 *	0.162 *	0.285	0.275	0.292	0.281	0.308	0.738
	[-2.06]	[-2.10]	[-1.42]	[-1.45]	[-1.38]	[-1.42]	[-1.30]	[-0.33]
Observations	2692	2692	2692	2692	2692	2692	2692	2692
Pseudo R-squared	0.053	0.057	0.077	0.078	0.082	0.083	0.091	0.106

expb coefficients; t statistics in brackets

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Appendix A:

The full models, including interaction that added to the models, but resulted in very small categories, and were omitted.

Table 4: Predicting AE Participation. Compare to Table 2.

Table 4: Logistic Regression Analysis for Variables Predicting Adult Education Participation

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Human Capital Variables								
Employed part-time	0.84	0.67 ***	0.83 †	0.69 ***	0.85	0.72 **	0.84	0.7 **
	[-1.57]	[-3.59]	[-1.71]	[-3.35]	[-1.36]	[-2.87]	[-1.46]	[-2.99]
Continuing ed. required	0.45 ***	0.48 ***	0.47 ***	0.49 ***	0.47 ***	0.49 ***	0.47 ***	0.51 ***
	[-8.33]	[-7.75]	[-7.70]	[-7.18]	[-7.63]	[-7.12]	[-7.67]	[-6.72]
Less than HS diploma	0.12 ***	0.12 ***	0.19 ***	0.18 ***	0.21 ***	0.2 ***	0.21 ***	0.2 ***
	[-9.51]	[-9.33]	[-6.64]	[-7.00]	[-6.28]	[-6.52]	[-6.24]	[-6.51]
HS diploma or equivalent	0.28 ***	0.27 ***	0.41 ***	0.38 ***	0.41 ***	0.39 ***	0.41 ***	0.38 ***
	[-10.21]	[-10.45]	[-6.43]	[-7.02]	[-6.23]	[-6.72]	[-6.33]	[-7.00]
Some college/AA	0.7 **	0.67 ***	0.88	0.84	0.9	0.86	0.89	0.83
	[-3.21]	[-3.63]	[-1.00]	[-1.45]	[-0.83]	[-1.20]	[-0.98]	[-1.48]
Age	0.98 ***	0.98 ***	0.98 ***	0.98 ***	0.98 ***	0.98 ***	0.98 ***	0.98 ***
	[-4.24]	[-4.29]	[-4.33]	[-4.46]	[-4.50]	[-4.70]	[-4.50]	[-4.63]
Female		2.08 ***		1.95 ***		1.99 ***		2.58 ***
		[7.56]		[6.61]		[6.72]		[6.50]
Queuing Variables								
Marketing/Sales			0.5 ***	0.5 ***	0.51 ***	0.51 ***	0.47 ***	0.63 *
			[-4.20]	[-4.18]	[-4.12]	[-4.06]	[-4.18]	[-1.97]
Administrative			0.75 †	0.63 **	0.77 †	0.65 **	0.59 **	0.47 *
			[-1.85]	[-3.02]	[-1.70]	[-2.81]	[-3.06]	[-2.56]
Service			0.55 ***	0.54 ***	0.56 ***	0.56 ***	0.62 *	0.74
			[-3.62]	[-3.78]	[-3.41]	[-3.48]	[-2.41]	[-1.03]
Manual			0.4 ***	0.51 ***	0.42 ***	0.53 ***	0.47 ***	0.74
			[-6.02]	[-4.40]	[-5.85]	[-4.12]	[-4.50]	[-1.63]
Background Variables								
Natural log of income					1.03	1.04 *	1.03	1.04 *
					[1.55]	[2.07]	[1.44]	[2.00]
Black, non-Hispanic					1.22	1.13	1.4	1.32
					[1.16]	[0.73]	[1.20]	[0.98]
Hispanic					0.92	0.9	0.59 †	0.57 *
					[-0.41]	[-0.58]	[-1.83]	[-2.06]
All other races					0.88	0.89	0.87	1
					[-0.66]	[-0.61]	[-0.49]	[-0.01]
Interactions								
Black*Sales							0.97	0.99
							[-0.05]	[-0.01]
Black*Administrative							1.8	1.82
							[1.20]	[1.25]
Black*Service							0.7	0.65
							[-0.74]	[-0.92]
Black*Manual							0.38 †	0.39
							[-1.87]	[-1.76]

***Table continued on next page

Hispanic*Sales							3.57 *	3.9
							[2.25]	[2.44]
Hispanic*Administrative							3.47 *	3.29 *
							[2.31]	[2.29]
Hispanic*Service							1	0.99 *
							[-0.00]	[-0.03]
Hispanic*Manual							1.24	1.28
							[0.46]	[0.54]
Other races*Sales							0.71	0.58
							[-0.55]	[-0.87]
Other races*Administrative							3.43 *	2.96 †
							[2.16]	[1.89]
Other races*Service							0.88	0.73
							[-0.22]	[-0.52]
Other races*Manual							0.57	0.49
							[-1.00]	[-1.22]
Female*Sales								0.56 †
								[-1.78]
Female*Administrative								0.98
								[-0.08]
Female*Service								0.73
								[-1.02]
Female*Manual								0.44 **
								[-2.68]
Constant	5.28 ***	4.02 ***	6.65 ***	5.14 ***	5.15 ***	3.61 ***	5.3 ***	3.21 ***
	[8.29]	[6.65]	[8.94]	[7.49]	[5.76]	[4.30]	[5.87]	[3.84]
Observations	4798	4798	4798	4798	4798	4798	4798	4798
Pseudo R-squared	0.11	0.13	0.13	0.14	0.13	0.14	0.14	0.16

expb coefficients; t statistics in brackets
† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5: Predicting Employer support. Compare to Table 3.

Table 5: Logistic Regression Analysis for Variables Predicting Employer Support

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Human Capital Variables									
Northeast	0.89	0.88	0.86	0.85	0.85	0.84	0.73	0.68	0.66
	[-0.56]	[-0.62]	[-0.72]	[-0.75]	[-0.75]	[-0.78]	[-1.18]	[-1.42]	[-1.51]
Miwest	1.42 †	1.42 †	1.48 †	1.47 †	1.46 †	1.46 †	1.78 *	1.73 †	1.81 *
	[1.70]	[1.70]	[1.87]	[1.87]	[1.83]	[1.82]	[1.97]	[1.88]	[2.02]
West	1	0.99	0.96	0.96	1.03	1.02	0.93	0.88	0.88
	[-0.02]	[-0.04]	[-0.21]	[-0.22]	[0.13]	[0.11]	[-0.28]	[-0.50]	[-0.50]
Employed part-time	0.48 ***	0.42 ***	0.46 ***	0.44 ***	0.46 ***	0.43 ***	0.42 ***	0.19 ***	0.22 ***
	[-4.59]	[-5.12]	[-4.66]	[-4.73]	[-4.72]	[-4.81]	[-5.14]	[-5.74]	[-5.13]
Continuing ed. required	0.71 *	0.73 *	0.71 *	0.72 *	0.71 *	0.72 *	0.69 *	0.73 *	0.75 *
	[-2.43]	[-2.25]	[-2.36]	[-2.30]	[-2.34]	[-2.28]	[-2.53]	[-2.24]	[-1.98]
Less than HS diploma	0.23 ***	0.24 ***	0.33 **	0.32 **	0.4 *	0.4 *	0.37 **	0.34 **	0.28 **
	[-4.28]	[-4.28]	[-3.09]	[-3.12]	[-2.53]	[-2.55]	[-2.66]	[-2.69]	[-3.11]
HS diploma or equivalent	1.01	0.97	1.21	1.19	1.25	1.23	1.22	1.18	1.09
	[0.03]	[-0.13]	[0.85]	[0.75]	[0.97]	[0.88]	[0.89]	[0.71]	[0.36]
Some college/AA	0.94	0.92	1.06	1.05	1.07	1.06	1.08	1.1	1.13
	[-0.40]	[-0.50]	[0.31]	[0.25]	[0.38]	[0.33]	[0.42]	[0.50]	[0.66]
Age	1.17 ***	1.16 ***	1.15 ***	1.15 ***	1.15 ***	1.15 ***	1.17 ***	1.15 ***	1.12 **
	[4.04]	[3.89]	[3.62]	[3.57]	[3.65]	[3.60]	[3.83]	[3.50]	[2.77]
Age^2	1 ***	1 ***	1 ***	1 ***	1 ***	1 ***	1 ***	1 ***	1 **
	[-4.02]	[-3.89]	[-3.68]	[-3.64]	[-3.74]	[-3.70]	[-3.81]	[-3.45]	[-2.96]
Female		1.43 *		1.16		1.16		1.33	1.36
		[2.35]		[0.94]		[0.95]		[1.29]	[1.41]

***Table continued on next page

Queuing Variables							
Marketing/Sales	0.37 ***	0.37 ***	0.38 ***	0.38 ***	0.3 **	0.35 *	0.32 *
	[-3.96]	[-3.92]	[-3.98]	[-3.93]	[-2.77]	[-1.98]	[-2.10]
Administrative	1.26	1.21	1.32	1.27	1.96	2.48	2.44
	[0.92]	[0.78]	[1.11]	[0.97]	[1.59]	[1.30]	[1.36]
Service	0.66	0.66	0.66	0.66	0.73	1.74	1.77
	[-1.54]	[-1.54]	[-1.59]	[-1.58]	[-0.73]	[0.84]	[0.85]
Manual	0.47 **	0.5 **	0.48 **	0.51 **	0.7	0.85	0.83
	[-3.21]	[-2.79]	[-3.15]	[-2.74]	[-0.83]	[-0.35]	[-0.38]
Background Variables							
Black, non-Hispanic			1.12	1.11	2.85 **	3.03 **	3.22 **
			[0.39]	[0.35]	[2.61]	[2.72]	[2.95]
Hispanic			0.54 *	0.54 *	1.02	1.01	1.06
			[-2.43]	[-2.47]	[0.06]	[0.04]	[0.14]
All other races			0.76	0.77	0.92	1.06	1.22
			[-1.07]	[-1.01]	[-0.25]	[0.18]	[0.61]
Interactions							
Black*Sales					0.92	0.78	0.72
					[-0.09]	[-0.26]	[-0.34]
Black*Administrative					0.1 ***	0.1 ***	0.09 ***
					[-3.31]	[-3.41]	[-3.52]
Black*Service					0.44	0.49	0.47
					[-1.15]	[-0.89]	[-0.93]
Black*Manual					0.21 †	0.2 †	0.17 †
					[-1.67]	[-1.65]	[-1.77]
Hispanic*Sales					0.39	0.38	0.35
					[-1.26]	[-1.27]	[-1.35]
Hispanic*Administrative					0.47	0.5	0.42
					[-1.05]	[-0.95]	[-1.23]
Hispanic*Service					0.31	0.32	0.31
					[-1.51]	[-1.51]	[-1.50]
Hispanic*Manual					0.34	0.34	0.3 †
					[-1.59]	[-1.53]	[-1.73]
Other races*Sales					0.35	0.3	0.27
					[-1.06]	[-1.22]	[-1.27]
Other races*Administrative					0.6	0.53	0.42
					[-0.69]	[-0.85]	[-1.14]
Other races*Service					0.69	0.56	0.48
					[-0.52]	[-0.75]	[-0.96]
Other races*Manual					1.27	1.16	1.19
					[0.35]	[0.22]	[0.26]
Northeast*Sales					1.05	1.15	1.11
					[0.08]	[0.21]	[0.15]
Northeast*Administrative					0.77	0.83	0.83
					[-0.40]	[-0.30]	[-0.29]
Northeast*Service					3.04 †	3.27 †	3.2 †
					[1.69]	[1.74]	[1.67]
Northeast*Manual					1.78	2.02	2.09
					[0.94]	[1.19]	[1.27]
Midwest*Sales					3.69 *	3.9 *	3.82 *
					[2.01]	[2.15]	[2.10]
Midwest*Administrative					1.96	2.09	2.14
					[1.12]	[1.21]	[1.20]
Midwest*Service					0.44	0.5	0.48
					[-1.36]	[-1.10]	[-1.14]
Midwest*Manual					0.27 *	0.28 *	0.25 *
					[-2.18]	[-2.13]	[-2.27]

***Table continued on next page

West*Sales							1.29	1.29	1.28
							[0.44]	[0.45]	[0.42]
West*Administrative							1.46	1.54	1.56
							[0.66]	[0.74]	[0.79]
West*Service							1.35	1.46	1.52
							[0.42]	[0.53]	[0.56]
West*Manual							0.97	1.06	0.92
							[-0.05]	[0.09]	[-0.13]
Female*Part-time								2.75 **	2.39 *
								[2.88]	[2.46]
Female*Sales								0.75	0.79
								[-0.63]	[-0.52]
Female*Administrative								0.63	0.66
								[-0.76]	[-0.72]
Female*Service								0.25 *	0.25 *
								[-2.38]	[-2.34]
Female*Manual								0.51	0.56
								[-1.30]	[-1.14]
College Coursework									0.37 ***
									[-5.54]
Constant	0.17 *	0.16 *	0.29	0.28	0.29	0.28	0.21	0.23	0.59
	[-2.06]	[-2.10]	[-1.42]	[-1.45]	[-1.38]	[-1.42]	[-1.71]	[-1.57]	[-0.55]
Observations	2692	2692	2692	2692	2692	2692	2692	2692	2692
Pseudo R-squared	0.05	0.06	0.08	0.08	0.08	0.08	0.12	0.13	0.14

expb coefficients; t statistics in brackets
† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Appendix B

Earlier models: Predicting Adult Education

Logistic Regression Analysis for Variables Predicting Adult Education Participation						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Human Capital Variables						
Employed part-time	0.84	0.665 ***	0.827	0.686 ***	0.871	0.732 **
	[-1.57]	[-3.59]	[-1.71]	[-3.35]	[-1.21]	[-2.72]
Continuing ed. required	0.454 ***	0.476 ***	0.471 ***	0.492 ***	0.472 ***	0.494 ***
	[-8.33]	[-7.75]	[-7.70]	[-7.18]	[-7.69]	[-7.15]
Less than HS diploma	0.115 ***	0.116 ***	0.193 ***	0.177 ***	0.203 ***	0.193 ***
	[-9.51]	[-9.33]	[-6.64]	[-7.00]	[-6.41]	[-6.60]
HS diploma or equivalent	0.284 ***	0.272 ***	0.406 ***	0.376 ***	0.412 ***	0.388 ***
	[-10.21]	[-10.45]	[-6.43]	[-7.02]	[-6.29]	[-6.74]
Some college/AA	0.702 **	0.667 ***	0.884	0.836	0.889	0.853
	[-3.21]	[-3.63]	[-1.00]	[-1.45]	[-0.94]	[-1.26]
Age	0.984 ***	0.983 ***	0.982 ***	0.982 ***	0.979 ***	0.979 ***
	[-4.24]	[-4.29]	[-4.33]	[-4.46]	[-5.09]	[-5.15]
Female		2.075 ***		1.95 ***		1.974 ***
		[7.56]		[6.61]		[6.62]
Queuing Variables						
Marketing/Sales			0.502 ***	0.5 ***	0.504 ***	0.505 ***
			[-4.20]	[-4.18]	[-4.17]	[-4.10]
Administrative			0.748	0.629 **	0.764	0.647 **
			[-1.85]	[-3.02]	[-1.72]	[-2.84]
Service			0.549 ***	0.537 ***	0.557 ***	0.552 ***
			[-3.62]	[-3.78]	[-3.50]	[-3.57]
Manual			0.403 ***	0.506 ***	0.411 ***	0.523 ***
			[-6.02]	[-4.40]	[-5.94]	[-4.23]
Background Variables						
Never Married					0.841	0.811
					[-1.22]	[-1.48]
Separated/Divorced/Widowed					1.335 *	1.187
					[2.30]	[1.33]
Natural log of income					1.028	1.039 *
					[1.57]	[2.10]
Constant	5.283 ***	4.016 ***	6.646 ***	5.141 ***	5.711 ***	3.989 ***
	[8.29]	[6.65]	[8.94]	[7.49]	[6.10]	[4.60]
Observations	4798	4798	4798	4798	4798	4798
Pseudo R-squared	0.112	0.131	0.128	0.141	0.132	0.145
expb coefficients; t statistics in brackets						
† p<0.10, * p<0.05, ** p<0.01, *** p<0.001						

Earlier models: Predicting Employer Support

Logistic Regression Analysis for Variables Predicting Employer Support								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Human Capital Variables								
Employed part-time	0.485 ***	0.428 ***	0.246 ***	0.472 ***	0.23 ***	0.455 ***	0.214 ***	0.255 ***
	[-4.56]	[-5.09]	[-4.91]	[-4.66]	[-5.15]	[-4.72]	[-5.28]	[-4.42]
Continuing ed. required	0.712 *	0.732 *	0.723 *	0.714 *	0.722 *	0.713 *	0.706 *	0.77
	[-2.41]	[-2.22]	[-2.31]	[-2.34]	[-2.28]	[-2.34]	[-2.43]	[-1.76]
Less than HS diploma	0.219 ***	0.224 ***	0.227 ***	0.285 ***	0.323 ***	0.4 *	0.438 *	0.768
	[-4.36]	[-4.37]	[-4.27]	[-3.69]	[-3.32]	[-2.53]	[-2.22]	[-0.60]
HS diploma or equivalent	1.011	0.979	0.975	1.047	1.019	1.252	1.245	1.322
	[0.05]	[-0.10]	[-0.12]	[0.21]	[0.09]	[0.97]	[0.94]	[1.14]
Some college/AA	0.937	0.922	0.929	0.954	0.952	1.073	1.087	1.173
	[-0.40]	[-0.49]	[-0.45]	[-0.29]	[-0.30]	[0.38]	[0.45]	[0.81]
Age	1.167 ***	1.161 ***	1.155 ***	1.168 ***	1.154 ***	1.153 ***	1.141 ***	1.101 *
	[4.06]	[3.91]	[3.71]	[4.05]	[3.67]	[3.65]	[3.37]	[2.39]
Age^2	0.998 ***	0.998 ***	0.998 ***	0.998 ***	0.998 ***	0.998 ***	0.999 ***	0.999 **
	[-4.04]	[-3.90]	[-3.67]	[-4.07]	[-3.65]	[-3.74]	[-3.43]	[-2.77]
Female		1.421 *	1.254		1.22		0.969	0.968
		[2.31]	[1.33]		[1.10]		[-0.16]	[-0.16]
Female*PT employment			2.099 *		2.194 *		2.552 **	2.354 *
			[2.16]		[2.30]		[2.70]	[2.35]
Background Variables								
Black, non-Hispanic				1.196	1.665	1.122	1.671	1.672
				[0.64]	[1.01]	[0.39]	[0.97]	[1.15]
Hispanic				0.551 *	0.343 **	0.543 *	0.377 **	0.582
				[-2.17]	[-2.88]	[-2.43]	[-2.66]	[-1.30]
All other races				0.836	0.882	0.758	0.8	0.91
				[-0.67]	[-0.47]	[-1.07]	[-0.87]	[-0.35]
Northeast				0.879	0.882	0.85	0.855	0.859
				[-0.62]	[-0.61]	[-0.75]	[-0.74]	[-0.68]
Midwest				1.42 †	1.453 †	1.462 †	1.5 †	1.479
				[1.69]	[1.78]	[1.83]	[1.94]	[1.81]
West				1.065	1.058	1.026	1.024	1.05
				[0.33]	[0.30]	[0.13]	[0.13]	[0.25]
Female*Black					0.584		0.552	0.589
					[-0.90]		[-0.95]	[-0.93]
Female*Hispanic					2.208		1.921	1.448
					[1.59]		[1.37]	[0.70]
Queuing Variables								
Marketing/Sales						0.38 ***	0.379 ***	0.353 ***
						[-3.98]	[-4.06]	[-4.35]
Administrative						1.319	1.277	1.243
						[1.11]	[1.03]	[0.89]
Service						0.663	0.66	0.68
						[-1.59]	[-1.56]	[-1.37]
Manual						0.476 **	0.488 **	0.495 **
						[-3.15]	[-2.83]	[-2.63]
Pursuing Education								
ESL/GED/Basic Skills								0.126 ***
								[-4.18]
Vocational/Apprenticeship								0.368 ***
								[-3.43]
College Coursework								0.419 ***
								[-4.71]
Work-related Courses								1.536 *
								[2.45]
Constant	0.176 *	0.166 *	0.194	0.173 *	0.2	0.292	0.354	0.793
	[-2.04]	[-2.09]	[-1.88]	[-2.01]	[-1.80]	[-1.38]	[-1.15]	[-0.24]
Observations	2692	2692	2692	2692	2692	2692	2692	2692
Pseudo R-squared	0.049	0.053	0.056	0.058	0.069	0.082	0.089	0.132
expb coefficients; t statistics in brackets								
† p<0.10, * p<0.05, ** p<0.01, *** p<0.001								