Adult Education And Training Programs For Older Adults In The U.S.: National Results And Cross-National Comparisons Using PIAAC Data

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ANNEX

ADULT EDUCATION AND TRAINING PROGRAMS FOR OLDER ADULTS IN THE U.S.: NATIONAL RESULTS AND CROSS-NATIONAL COMPARISONS USING PIAAC DATA

ABSTRACT: Continuous learning over the life course is necessary to effectively compete in a knowledge-based global economy. Shifts in the age structure of the U.S. labor force combined with increased labor force participation among older adults add to the importance of gaining a better understanding of how adult education and training (AET) influences labor market outcomes for middle-aged and older workers. This study used data from the Program for the International Assessment of Adult Competencies (PIAAC) and the Survey of Consumer Finances (SCF) to examine the relationship in the U.S. between participation in AET programs and employment, labor force participation, income, and net worth for adults aged 45 to 65. Participation in an AET program in the 12 months preceding the survey significantly improved the log odds of both employment and labor force participation and significantly improved the log odds of moving up one income quintile. Lower income groups and the unemployed were less likely to participate in AET than higher income groups and the employed. We also compared outcomes of AET participation in the U.S. with those in Germany, Japan, Sweden, and the U.K. and examined policies for lifelong learning in those countries.

INTRODUCTION

Population aging is occurring in countries around the world, both more and less developed. Life expectancies have increased and fertility rates have declined, resulting in a larger proportion of the world's population in older age groups and a smaller portion in traditional working-age groups (Bloom, Boersch-Supan, McGee, & Seike, 2011). In an effort to ensure the adequacy of pensions and maintain continued economic growth, many member countries of the Organisation for Economic Cooperation and Development (OECD) have implemented policies to encourage people to remain in the labor force at older ages. Retirement reforms, such as higher retirement ages linked to increases in life expectancy, have been implemented in some countries, and early retirement plans are being eliminated. A retirement age of 67 is now quite common (OECD, 2013b).

The age structure of the U.S. labor force has changed dramatically in recent decades, largely due to the aging of the baby boomer cohort which includes about 77 million people born between 1946 and 1964 (Colby & Ortman, 2014). In 2022, the U.S. labor force is projected to include 163.5 million people and of those, 73.4 million (44.9%) will be aged 45 and above as compared to 29.0% in 1992. Over the past several decades, labor force participation rates have increased for both the 55 to 64 and 65 to 74 age groups. While labor force participation rates for men in the 55 to 64 age group have been relatively flat over the past two decades, participation rates have approximately doubled for both males and females ages 65 to 74. Increases in labor force participation rates have been especially dramatic for females, projected to increase from 46.5% in 1992 to 64.3% in 2022 for the 55 to 64 age group and from 12.5% to 28.3% for the 65 to 74 age group over the same time period (Toossi, 2013). Females tend to have intermittent work experiences (Moen, Sweet, & Swisher, 2005), which provides some explanation for their

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Figure 1.
U.S. Labor Force Distribution by Age Group – 1992 to 2022 (percent)
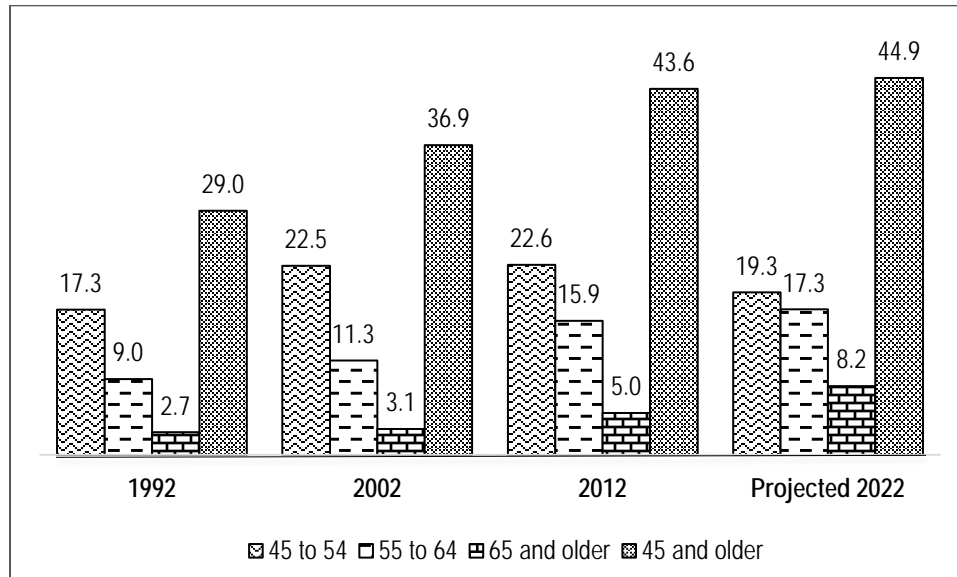
Source: Toossi (2013)

relative increases in participation rates at older ages as compared to men. In addition, there have been more employment opportunities for females in recent decades. These trends are depicted in Figures 1, A.1, and A.2. Shifts in the age structure of the U.S. labor force and increased labor force participation among older adults, combined with an increasingly global, technology and knowledge based economy add to the importance of gaining a better understanding of how adult education and training (AET) influences labor market outcomes for middle-aged and older workers. To accomplish this, we used data from the Program for the International Assessment of Adult Competencies (PIAAC) and the Survey of Consumer Finances (SCF) to examine the relationship in the U.S. between participation in AET programs and employment, labor force participation, income, and net worth. We also compared outcomes of AET participation in the U.S. with those in Germany, Japan, Sweden, and the United Kingdom (U.K.) and examined policies for lifelong learning in those countries. The focus of our study was adults ages 45 to 65.

LITERATURE REVIEW

The OECD has long recognized lifelong learning as necessary to satisfy multiple economic, social, and educational policy objectives; this was formalized in the 1996 report *Lifelong Learning for All.* Creating incentives for public and private investment to encourage education from early childhood through retirement was a recommended strategy (OECD, 1996). Brown, Fang, and Gomes (2012) describe education in the U.S. as a sort of trade-off—education

costs students' time and financial resources, with the cost of tertiary education being particularly steep relative to wage gains. This complements the established economic notion of education, even if it is no or low cost, as a sort of temporal trade, where the gratification of work derived earnings is postponed in order to increase the potential gratification at a later date (Brown et al., 2012; Posner, 1995). This traditional calculation, however, does not take into account the continuing education that workers often participate in outside of the traditional education framework, particularly as the trade is less between wages and training and is instead a trade between leisure time and training (Schultz, 1961). Continuing education for working adults, most often called "lifelong learning" or "adult education and training," offers workers the chance to build their skill set, increase their human capital, and improve their economic outlook (Bishop, 1998).

HUMAN CAPITAL, AGING, AND ADULT EDUCATION AND TRAINING

Baptiste (2001) defines human capital as the "knowledge, attitudes, and skills that are developed and valued primarily for their economically productive potential" (pp. 185). More broadly, human capital is the combination of innate talents and skills learned via education and training (Keeley, 2007). This comports with the notion that workers are more than just an economic resource; rather, they are an asset in which a society ought to invest. As the twenty-first century progresses, this investment in human capital becomes even more important, as the global economy continues to evolve from one dominated by labor-intensive manufacturing to one where the "knowledge" sector reigns (Keeley, 2007). This is a result of the twin forces of globalization and automation—whereby rapid technological advancement has resulted in skills becoming obsolete at a rapid pace, increasing the need for additional occupational training in new skills for those of all ages, including and especially for individuals currently in the workforce (Bloom, Canning, & Fink, 2010; OECD, 2014b).

This rapidly changing economy is, in part, responsible for the dramatic rise in socioeconomic inequality that has stirred so much concern in the post-industrialized world. In this new knowledge-centric economic system, highly skilled workers enjoy a much higher level of economic security and income relative to their lesser skilled counterparts, a gap comparable to the discrepancies that existed prior to the Great Depression (Goldin & Katz, 2009). As a result of this discrepancy, many workers seek to further their own skill level and many governments look to invest in increasing the overall human capital of their citizens. AET is one possible means to achieve this end. In developed economies, traditional education typically ends sometime between the late teens and mid-twenties; however, it is increasingly necessary for adults to continue their education past this traditional time frame (Keeley, 2007). AET can be either formal (learning that takes place in education and training institutions and leads to recognized credentials and diplomas), non-formal (learning that takes place in educational and training settings, but does not typically lead to a formalized credential), or informal (learning that takes place in everyday life and is not necessarily intentional and may not even be recognized by the individuals themselves as contributing to their knowledge and skills) (Commission on European Communities, 2000).

All types of AET are meant to provide workers with the necessary skills to perform in the modern globalized and knowledge-based economy (Keeley, 2007) and offer workers the opportunity to improve their economic security and maintain or improve their socioeconomic status. Because of this, AET has the potential to reduce socioeconomic inequalities (OECD, 2011a). In the U.S., lifelong learning has become increasingly necessary so workers of all ages have skills employers require and to have a workforce that is competitive globally in a knowledge economy (Cummins, 2014).

Lifelong learning will also help address the concerns of policy makers regarding the rapidly aging global population and might alleviate skill and occupational mismatches for available jobs (International Labour Organization, 2013). The challenges of an aging population, in a way, complement the skills gap as both can be addressed, partially, by AET. Participation in AET improves the likelihood that older workers will remain in the workforce (OECD, 2004). Research from multiple countries suggests increasing labor force participation at older ages and delaying retirement could increase gross domestic product while also benefiting national wealth and public debt (Eberstadt & Hodin, 2014; Franklin, 2014; Ogawa & Matsukura, 2005) while enhancing individual level economic security in retirement (Butrica, 2011). Because of these potential benefits, AET is increasingly emphasized by governments as a means to provide workers with skills necessary to remain in the labor force at older ages (Keeley, 2007; OECD, 2004; OECD, 2011a).

Even though lifelong learning has the potential to benefit older workers, improve a nation's economic outlook, and reduce inequality (OECD, 2011a), older workers in the U.S. and in other countries, especially those with low skills, are less likely to participate in training programs than their younger counterparts (Canduela et al., 2014; Fouarge, Schils, & de Grip, 2010; Johnson, 2007). Older workers throughout the world often face either subtle or outright discrimination when offered the opportunity to pursue AET (Urwin, 2006). This is so, despite an abundance of international research that suggests older workers who receive this training are more likely to stay in the workforce and, in turn, likely to benefit the economy overall (Butrica, 2011; OECD, 2004; Zwick, 2011). Increasingly, however, governments and older workers hope to rectify this general oversight by expanding access to and encouraging participation in AET programs (OECD, 2011a). Older and low skilled workers may be reluctant to participate in AET because of a lack of understanding of the economic benefits, fear of returning to the classroom and taking exams, and a lack of availability of programs structured to meet their unique needs (Fouarge, et. al., 2010; OECD, 2014b; Zwick, 2011). Fear of returning to the classroom may result from low self-confidence for developing new skills. Convincing older workers that they are capable of successful learning and providing them with supports can alleviate lack of self-confidence (Maurer, 2001). Student success courses structured to help older students prepare for the rigors of college education, such as programs to improve memory and study skills are examples (Portland Community College Taskforce on Aging, 2007). Flexible class scheduling, peer mentoring, intrusive advising, tutoring, assistance in navigating the system, and providing students the opportunity to interact with other students are additional mechanisms to encourage

student success (Field, 2011a; Grubb, 2009; Hagedorn, 2010; Karp, 2011; OECD, 2014b). It is also important that advisors and faculty have an understanding of the special needs faced by older students (Karp, 2011). Reducing test-taking fears might be accomplished through improved study skills, learning how best to prepare for an exam, and how to relax before an exam (Sapp, 2013).

Employers in the U.S. and other countries may be reluctant to provide training opportunities for older workers because of perceived lack of return on investment due to the time required to recover training costs (Angotti & Belmonte, 2012; Johnson, 2007; OECD, 2004). In reality, a 50 year old employee is likely to remain with an employer longer than a 20 or 30 year old. Because of increases in retirement ages, a 50 year old worker may still be in the labor force at age 67 (Flynn & McNair, 2007). Gaining a better understanding of how adults benefit from lifelong learning at older ages is important from both a policy and practice perspective, as AET seems to hold the key to alleviating many of the aforementioned social concerns.

Little previous research has examined the labor market benefits of AET or lifelong learning programs and research that has been conducted is largely from the U.K. Field (2011b, 2012) found both earnings and employability benefits through participation in adult learning programs. Dorsett, Lui, and Weale (2013) and Jenkins, Vignoles, Wolf, and Galindo-Rueda (2002) also identified improved employment prospects as a benefit to lifelong learning programs and noted a further benefit: individuals who participate in one lifelong learning program are more likely to enroll in additional learning programs. Fouarge et al. (2010) examined the difference in economic returns to training by low- and high-educated workers and found that returns were positive and similar for both.

RESEARCH QUESTIONS

This study examined outcomes for U.S. residents included in the PIAAC study who participated in formal and non-formal adult education and training. In addition, comparisons of country level data were made between the U.S. and U.K. (i.e., England and Northern Ireland), German, Sweden, and Japan. These countries were selected based on high labor force participation rates at older ages and for their recognition of the importance of lifelong learning. For several decades, the European Union (EU) has been at the forefront of implementing policies that encourage lifelong learning (Fleming, 2011). Sweden was recognized by the OECD (2001) for its success in implementing lifelong learning policies. Sweden and Japan are well above the OECD average for labor force participation rates for older workers. In 2013, the OECD average labor force participation rate for those aged 55 to 64 was 59.7% whereas the rate for that age group in Japan was 69.4% and in Sweden was 77.7% (OECD, 2013a). Adults aged 45 to 65 were the focus of this research. The following research questions were addressed:

1. Is there a relationship between participation in formal and non-formal AET and labor force participation and employment?
   a. Is there a relationship between participation in formal and non-formal AET and employment status?

  b. Is there a relationship between participation in formal and non-formal AET and labor force participation?

2. Is there a relationship between participation in formal and non-formal AET and higher levels of income and net worth?

  a. Is there a relationship between participation in formal and non-formal AET and income quintile?

  b. How does net worth vary between those in the top and bottom quintiles of net worth?

3. What are the characteristics of AET programs, including financing schemes, in the U.K., Germany, Sweden, and Japan as compared to the U.S.?

4. Based on participation in AET, how do outcomes (i.e., labor force participation, employment, and income levels) in the U.S. compare to the U.K., Germany, Sweden, and Japan?

METHODOLOGY

DATA

  The data we used are from PIAAC, a survey organized by the OECD and conducted by each participating country (OECD, 2014a), and from the Survey of Consumer Finances (Board of Governors of the Federal Reserve System, 2010). Twenty-three countries were included in Round 1 of the PIAAC survey, which was conducted between August of 2011 and March of 2012, and an additional nine countries will participate in Round 2 between 2012 and 2016. An additional national level supplemental survey for the U.S., focusing on younger workers, older workers (ages 66 to 74), and an increased sample of unemployed adults, finished collecting data in April of 2014, but is not expected to be available until early 2016 (National Center for Educational Statistics, 2014). This emphasis on older workers reflects the demographic trends in the U.S. labor market and the increased importance of studying adults who remain in the labor force beyond the traditional retirement age.

  The goal of PIAAC is to assess and compare basic skills and a broad range of competencies of adults from participating countries. The survey consists of an extensive background questionnaire and an assessment that scores participants in literacy, numeracy, and problem solving skills. The background questionnaire includes basic demographic data along with information regarding the development and maintenance of skills, such as education, participation in various types of adult education and training programs, employment and labor market status, and income (OECD, 2010). The International Adult Literacy Survey (IALS), conducted between 1994 and 1998, and the Adult Literacy and Life Skills Survey (ALL), conducted between 2003 and 2008, both serve as models for the background questionnaire and the assessment portion of the survey (Goodman et al., 2013; Kis & Field, 2013; OECD, 2013c). Sample sizes in the 24 countries included in Round 1 ranged from 3,892 in the Russian Federation to 27,285 in Canada. The U.S. had 5,010 participants (OECD, 2013c). Sample sizes for the countries and age groups included in this study are shown in Tables A.1 and A.2.

Survey Design

The PIAAC survey was conducted among non-institutionalized adults ages 16 to 65. The background survey and assessment portions of PIAAC were administered in a private setting, such as a library or the participant's home. Participants had the option of taking the assessment portion, which included assessments of numeracy, literacy, and problem solving skills, on a computer or on paper. However, since the problem solving portion of the assessment considers the use of technology in everyday life, participants who opted for a paper exam were only given the literacy and numeracy exams (Kis & Field, 2013).

Survey participants were sampled using a one-stage, two-stage, three-stage, or four-stage stratified probability method, a complex sampling technique requiring an extensive system of weights and repetitions to accurately run tabulations and regressions. The U.S. used a four-stage stratified probability design whereas sampling techniques for other countries varied. For example, Sweden used a one-stage method and Germany and Japan used a two-stage method (Kis & Field, 2013; Mohadjer, Krenzke, & Van de Kerckhove, 2013). For the current project, we used the data from the background questionnaire. This portion of PIAAC collects a wide range of demographic information, including gender, age, language spoken, education, income, and work history (OECD, 2010). Relevant to our project are the questions concerning participation in AET, income quintile, labor force status, reasons for non-participation in AET and demographic characteristics, such as age, sex, and education.

Missing Data, Weights, and Repetitions

There are two types of missing data in the PIAAC study—data missing by design, such as the withholding of German income information to help guarantee privacy, and omitted data, such as a participant not disclosing income information. To assure a representative and unbiased sample, missing values for income were imputed using other demographic traits to estimate likely values for the missing data (Kis & Field, 2013). The nonresponse bias analysis of the sample found differences in the characteristics of respondents who participated in the background questionnaire compared with those who refused. Weighting adjustments were effective in reducing this bias such that the potential amount of non-response bias at the background questionnaire phase was likely negligible (Goodman et al., 2013). The extensive use of weights and replications to produce unbiased results with accurate standard errors was an integral part of the PIAAC study. This process helps to mitigate sample bias by assuring that underrepresented groups, like Hispanics in the U.S., are effectively represented (Goodman et al., 2013; Kis & Field, 2013).

The Survey of Consumer Finances

To supplement PIAAC data, we used data from the 2010 Survey of Consumer Finances (SCF) to examine the relationship in the U.S. between net worth and income quintile. The SCF, sponsored by the Federal Reserve Board, is a triennial survey and provides detailed information on the finances of U.S. families. About 6,500 families participate in the survey and because of

the complex sample design, which includes oversampling of wealthy families, an analysis weight variable is required. SCF also uses weighting to adjust for nonresponse that differs by the various groups of interest and statistical techniques to impute missing data. Because of the design of the SCF sample, data from SCF can be compared to data from other surveys only in terms of medians (Bricker, Kennickell, Moore, & Sabelhaus, 2012). While SCF is based on household level data and PIAAC is based on individual level data, the relative differences between net worth for lower and higher income groups is relevant to consider as older age groups approach retirement. SCF focuses specifically on families' balance sheets and retirement accounts and was more appropriate for this analysis than other data sets, such as the Survey of Income and Program Participation (SIPP).

Measures

Dependent variables

Variables used in this research are shown in Table A.3 of the Annex. Outcome variables we examined included employment status, labor force participation, income, and wealth. To create variables for employment status and labor force participation, we recoded the variable which included the categories of "employed," "unemployed" and "out of the labor force." To ensure consistency across countries, this variable was derived from several questions in the background questionnaire. "Employed" includes persons who during a specified period were either in paid employment or self-employment (OECD, 2011b). The income variable includes annual net income before taxes and deductions and categories are income quintiles. Quintiles were determined using the entire sample and as a result, quintiles for specific age groups will not have an approximately equal number of observations. SCF calculates net worth by subtracting liabilities from assets. In addition to assets such as real estate, stocks, bonds, and savings accounts, assets include tax-deferred accounts, such as individual retirement accounts or employment-based 401(k) accounts but do not include Social Security or employer-sponsored defined-benefit plans. SCF data were used to estimate median net worth by income quintile and age group. These data were then used to create a net worth variable by income quintile for each of the two age groups included in our analyses (e.g., net worth for the top income quartile in SCF for the 45 to 54 age group was matched with the top income quartile in PIAAC for the same age group). Net worth data were only used for the U.S. analysis.

Independent variables

Independent variables used to predict these outcomes are related to participation in job-related and non-job related formal and non-formal AET activities. Data for informal AET was not included in the analyses. A description of each variable along with how variables were recoded is included in Table A.3. To ensure adequate statistical power, each of the AET variables were examined to determine if an adequate sample sizes existed for participants in each of the age categories (i.e., 45 to 54 and 55 to 65) for each of the research questions. Due to small samples sizes, we were limited to formal and non-formal adult education and training for U.S.

logistic regression analyses (Research Questions 1 and 2), which encompasses all of the adult education and learning activities, and age groups were combined to 45 to 65. Again, because of small sample sizes in some of the comparison countries, we were not able to examine outcomes separately for older adults using logistic regression techniques and were only able to compare the U.S. and the U.K. for employment outcomes. For the chi-square tests we analyzed the 45 to 54 and 55 to 65 age groups separately for four of the categories of AET, all based on participation during the 12 months prior to the survey: non-formal AET, job-related non-formal AET, formal and non-formal AET, and formal and non-formal job-related AET in the U.S. and formal and non-formal AET for country comparisons.

Covariates

Covariates included in our models are age, sex, self-rated health, education, and native speaker. These were selected because of their potential to influence the dependent variables. As with the independent variables, we examined each variable category to ensure an adequate sample size, which resulted in consolidation of some categories. For example, for the self-rated health variable, we combined "poor" and "fair." Because self-rated health and education have multiple categories, for the U.S. data analyses we created dummy variables and used "fair/poor" as the reference group for self-rated health and "upper secondary" as the reference group for education. Due to the small number of observations in the "non-native" category in the comparison countries, we did not include that variable in those analyses. Due to small sample sizes for some educational categories in the comparison countries, we were limited to three educational categories for the country level comparisons. For example, the U.K. includes "tertiary bachelor's degree" in the "master/research degree" category and several countries have a small number of observations in the "post-secondary, non-tertiary" category. As a result, we grouped all post-secondary education into a single category for cross-national comparisons.

Statistical Analysis

To analyze these data, we used a series of binary logistic and ordinal logistic regression models and chi-square tests. To address Research Question 1, we used binary logistic regressions to analyze how participating in AET relates to employment and labor force participation. For Question 2, we used ordinal logistic regressions to examine the relationship between income, wealth, and participation in AET. To address Question 4, comparing the U.S. to other nations, both binary and ordinal logistic regressions were utilized. These regressions were run in Stata version 13.1 using an extension macro developed specifically for PIAAC data analysis. This macro allowed for the complex weighting and repetitions to be done efficiently (Pokropek & Jakubowski, 2014).

The relationship between participation in various types of AET and employment, labor force participation, and income for ages 45 to 54 and 55 to 65 was also evaluated using the chi-square (χ^2) test. In addition, chi-square tests were used to compare the relationship between AET participation and outcomes (employment, labor force participation, and income quintile) between the U.S. and Germany, Sweden, the U.K., and Japan. The chi-square test is a non-parametric test

to measure the relationship between two categorical variables and is less sensitive to small samples sizes. Because of the complex sample design, we report the (second order) design-adjusted Rao-Scott F-test statistic rather than the uncorrected Pearson chi-square test statistic.

We performed a series of Z-tests to examine the differences between regression slope coefficients for the AET variable to compare two-country samples. Significant Z-scores identify significant differences in the slope coefficients between the two samples. The Z-test is an appropriate technique to examine the equality of effects between samples from mutually exclusive populations. With the two coefficients from two samples represented as b_1 and b_2, and SE as the standard error, the Z-test can be performed using the following equation (Paternoster, Brame, Mazerolle, & Piquero, 1998):

$$Z = \frac{b_1 - b_2}{\sqrt{SEb_1^2 + SEb_2^2}}$$

RESULTS

DESCRIPTIVE STATISTICS

Descriptive statistics, including data on sample sizes for each country, are shown in Tables A.1, A.2, and A.4. The sample size in the U.S. for the 45 to 54 age group was 1,084 and for the 55 to 65 age group was 1,066. The U.K had the largest sample sizes for both age groups. The U.S. and the U.K. had greater proportions of females than males in both age groups whereas proportions of males and females in other countries varied by age group. With the exception of the 55 to 65 age group in the U.K., the education category with the greatest proportion of observations was "upper secondary" for both age groups and for the U.K. it was "lower secondary or less" for the 55 to 65 age group. The U.K. had no observations in the "tertiary bachelor's degree" because this educational category is included in the "master/research degree" category. Self-rated health was lower for the 55 to 65 age group in all countries. Employment rates were generally high for both age groups; the U.S. had the highest unemployment rate (6.8% for the 45 to 54 age group and 6.5% for the 55 to 65 age group) and Japan had the lowest unemployment rates for both age groups (1.7% for the 45 to 54 age group and 2.9% for the 55 to 65 age group) Sweden had the highest labor force participation rates for both age groups (91.7% for the 45 to 54 age group and 70.8% for the 55 to 65 age group) and the U.K has the lowest (85.8% for the 45 to 54 age group and 58.1% for the 55 to 65 age group). Employment and labor force participation rate comparisons are depicted graphically in Figures A.3 and A.4.

Sweden had the highest participation rate (67.7%) in formal and non-formal AET (FNFAET12) for the 45 to 54 age group whereas the U.S. had the highest participation rate for the 55 to 65 age group (50.4%). Participation rates for formal and non-formal AET in the U.S. were 55.8% and 50.4% for the respective age groups. Country comparisons by country and age group for formal and non-formal AET is depicted in Figure 2 and comparisons for other types of AET are included in Figures A.5 - A.7.

Figure 2.
Participation in Formal or Non-Formal AET in 12 Months Preceding Survey, by Age Group
(percent of population)
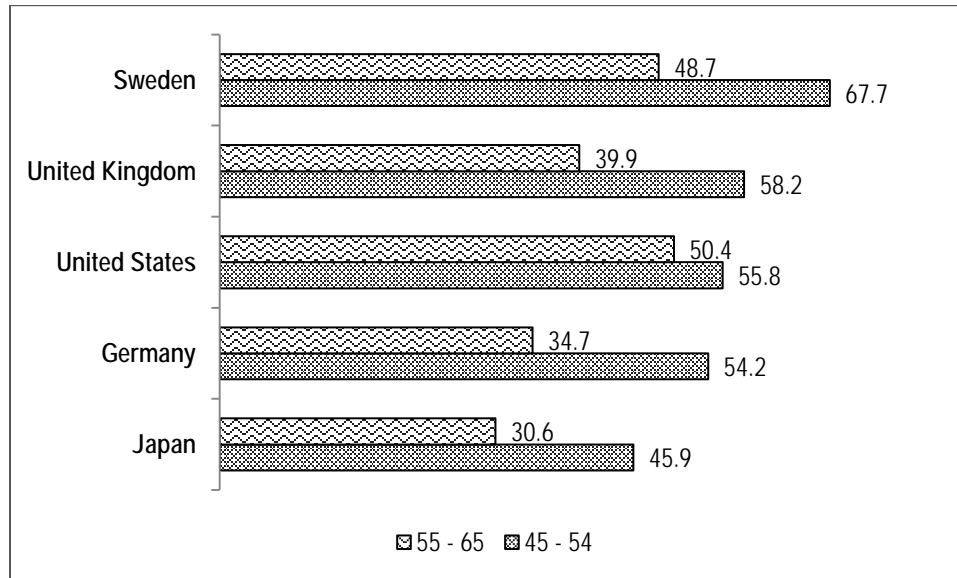
Source: OECD (2014a)

RESEARCH QUESTION 1: IS THERE A RELATIONSHIP BETWEEN PARTICIPATION IN FORMAL AND NON-FORMAL AET AND LABOR FORCE PARTICIPATION AND EMPLOYMENT?

Research Question 1 examined the relationship between AET participation and labor force outcomes, including employment status (i.e., unemployed versus employed) and labor force participation (participates in the labor force versus no labor force participation). Results of the chi-squares tests that examined the relationship between employment and labor force participation with formal and non-formal AET are shown in Tables A.5 and A.6. Results of the logistic regression analyses for employment and labor force participation with formal and non-formal AET as the predictor are shown in Table A.7. Because of small sample sizes in the "unemployed" category for older age groups, we used "AGE10LFS" for the age variable rather than the recoded variable that consolidated the 45 to 54 and 55 to 65 age groups. We examined the relationship between hours of participation in AET and labor force outcomes but results were not statistically significant and are not shown.

Employment

Research Question 1a: Is there a relationship between participation in formal and non-formal AET and employment status? The chi-square test was used to evaluate the relationship between participation in different types of AET and employment status. Results for participation in formal and non-formal AET (FNFAET12) for the 45 to 54 age group are shown in Table A.5 and for the 55 to 65 age group in Table A.6. There was a significant relationship between participation in formal and non-formal AET in the prior 12 months and employment status ($F_{R-S, Pearson} = 24.98$, $p<.001$) for the 45 to 54 age group. Only 29.9% of the unemployed group participated in AET as compared to 64.5% of the employed group. For the 55 to 65 age group, there was no significant relationship between participation in AET and employment status. Results of analyses for other types of AET (i.e., formal and non-formal job-related AET, non-formal education, and non-formal job-related education) are included in Tables A.8 – A.13 in the Annex. There was a significant relationship between participation in all categories of AET and employment status for the 55 to 65 age group, but none in any AET category for the 45 to 54 age group.

Individuals who participated in AET in the 12 months prior to the survey had an expected improvement in the log odds of employment of 0.684 ($p <.001$), indicating a positive relationship. The likelihood of employment improved with age, as a one unit, ten year, increase in age had a 0.262 ($p <.001$) expected increase in the log odds of employment. For example, a 55 year old can expect an increase in the log odds of employment of 1.048 (4*0.262). Females had an expected decrease of -0.376 ($p <.01$) in the log odds of employment as compared to males. Two categories of education also had a statistically significant relationship with employment. Individuals with a tertiary bachelor's degree had an expected increase of 0.631 ($p <.01$) in the log odds of employment relative to a high school diploma (i.e., upper secondary) and a master's/research degree had an expected increase of 0.620 ($p <.05$) in the log odds of employment compared to a high school diploma. Individuals with self-rated health of "good" had an expected improvement in the log odds of employment of 0.524 ($p <.01$) relative to self-rated health of "poor" or "fair." Self-rated health of "very good" and "excellent" also had significant expected increases in the log odds of employment compared to "poor" or "fair" self-rated health. Native language proficiency did not have a statistically significant relationship with employment. Although females can expect a reduction in the log odds of employment as compared to males, a 55-year old female with a high school diploma and in good health can expect an improvement of 1.88 in the log odds of employment through participation in an AET program (i.e., 0.684 + 1.048 + (-.376) + 0.524 = 1.88).

Labor Force Participation

Research Question 1b: Is there a relationship between participation in formal and non-formal AET and labor force participation? The chi-square test was used to evaluate the relationship between participation in different types of AET and labor force participation. Results for participation in formal and non-formal AET (FNFAET12) for the 45 to 54 age group

are shown in Table A.5 and for the 55 to 65 age group in Table A.6. There was a significant relationship between participation in formal and non-formal AET and labor force participation for both the 45 to 54 age group ($F_{R-S, \, Pearson}$ = 104.42, $p<.001$) and the 55 to 65 age group ($F_{R-S, \, Pearson}$ = 172.70, $p<.001$). Results of analyses for other types of AET (i.e., FNFAETJR, NFE12, and NFE12JR) are included in Tables A.8 – A.13 in the Annex. There was a significant relationship between participation in all categories of AET and labor force participation for both age groups.

Participating in formal and non-formal AET in the last 12 months improved the expected log odds of participating in the labor force by 1.384 ($p <.001$). Older workers, however, are less likely to participate in the labor force—being over 45 reduced the log odds of labor force participation by -0.382 ($p <.001$) as compared to the 25 to 44 age group. As with employment, females were less likely to participate in the labor force with a -0.984 ($p <.001$) expected reduction in the log odds relative to their male counterparts. Other than "lower secondary or less," which was negatively related to labor force participation, none of the categories of education had a statistically significant relationship with labor force participation nor did native language proficiency. Individuals with self-rated health of "very good" had an expected improvement in the log odds of labor force participation of 1.587 ($p <.001$) relative to those who rated their health as "poor" or "fair." Results of those in the "good" and "excellent" self-rated health categories also had a significant expected increase in the log odds of labor force participation.

RESEARCH QUESTION 2: IS THERE A RELATIONSHIP BETWEEN PARTICIPATION IN FORMAL AND NON-FORMAL AET AND HIGHER LEVELS OF INCOME AND NET WORTH?

Research Question 2 examined the relationship between AET participation and income and wealth along with how net worth varied between the top and bottom quintiles of net worth.

Research Question 2a: Is there a relationship between participation in formal and non-formal AET and income quintile? The chi-square test was used to evaluate the relationship between participation in different types of AET and income. Results for participation in formal and non-formal AET (FNFAET12) for the 45 to 54 age group are shown in Table A.5 and for the 55 to 65 age group in Table A.6. As noted earlier, income quintiles are based on the entire sample and as a result, income quintiles by age group do not have an approximately equal number of observations in each group. For example, the lowest income quintile in the 45 to 54 age group has 103 (13.7%) observations whereas there were 206 (27.3%) observations in the highest income quintile. Because net worth quintiles are derived from income quintiles, results are nearly identical and are not shown. There was a significant relationship between participation in formal and non-formal AET and income quintile ($F_{R-S, \, Pearson}$ = 15.36, $p<.001$) for the 45 to 54 age group and for the 55 to 65 age group ($F_{R-S, \, Pearson}$ =4.20, $p<.05$). Overall, 66.3% of the 45 to 54 age group participated in AET but there were substantial differences in participation by the lowest and highest income quintiles. For the 44 to 54 age group, 47.4% of the lowest income

quintile participated in formal and non-formal AET as compared to 83.4% of the highest income quintile. Overall AET participation by the 55 to 65 age group was 65.8% and as with the 45 to 54 age group, there were substantial differences in AET participation rates by the top and bottom income quintiles. The AET participation rate for the lowest income quintile was 50.5% compared to 77.4% for highest income quintile. Results of analyses for other types of AET (i.e., FNFAETJR, NFE12, and NFE12JR) are included in Tables A8 – A13 in the Annex. There was a significant relationship between participation in these categories of AET and income quintile for both the 45 to 54 and 55 to 65 age groups.

Results of the ordinal logistic regression analyses for income with formal and non-formal AET as the predictor are shown in Table A.7. Because the net worth variable is derived from the income variable, the results are very similar to income and are not shown. Individuals who participated in formal and non-formal AET in the 12 months prior to the survey had an expected improvement in the log odds of moving up one income quintile of 0.441 ($p <.001$). Results for age and sex were also significant. Adults ages 45 to 65 had an expected improvement of 0.593 ($p <.001$) in the log odds of moving up one income quintile compared to the 18 to 44 age group whereas females had an expected reduction in the log odds of moving up one income quintile of -1.027 ($p <.001$) compared to males. Individuals with less than a high school diploma (i.e., lower secondary or less) had an expected reduction in the log odds of moving up one income quintile of -0.686 ($p <.001$) relative to a high school diploma whereas a tertiary bachelor's degree had an expected increase of 1.331 ($p <.001$) in the log odds of moving up one income quintile relative to a high school diploma. Results were also significant for a master's/research degree and a tertiary professional degree. Individuals with self-rated health of "very good" had an expected improvement in the log odds of 0.785 ($p <.001$) in moving up one income quintile relative to those who rated their health as "poor" or "fair." The "good" and "excellent" self-rated health categories also had a significant expected improvement in the log odds of moving up one income quintile. Native language proficiency did not have a statistically significant relationship with income.

Research Question 2b: How does net worth vary between those in the top and bottom quintiles of net worth? The Survey of Consumer Finances was used to estimate median net worth by income quintile and age group. Results are shown in Table A.14. For the 45 to 54 age group, estimated median net worth for the lowest income quintile was $9,550 whereas it was $578,400 for the highest income quintile. The gap was even larger for the 55 to 65 age group with estimated median net worth for the lowest income quintile of $14,990 and $1,064,500 for the highest income quintile.

REASONS FOR NON-PARTICIPATION IN THE U.S.

To better understand why some groups in the U.S. are less likely to participate in AET programs, we examined this question in the background questionnaire: *Which of the following reasons prevented you from participating in education and training? Please indicate the most important reason* (question B_Q26b). We examined the relationship between reasons for non-

participation by age-group, income quintile, education, and sex. The results are shown in Tables A.15 – A.18. "Too busy" was the most common reason for the 45 to 54 and 55 to 65 age groups, followed by "too expensive." For the lowest two income quintiles, "too expensive" was the most frequent response. For the lowest income quintile, 35.2% said AET participation was too expensive whereas for the highest income quintile, only 12.2% responded that AET was too expensive. For the highest income quintile, "too busy" was the most common answer (52.0%) whereas only 16.1% in the bottom income quintile cited "too busy" as the reason for non-participation. These responses suggest low-income individuals might have the time for training, but find it to be too expensive. The two most frequent reasons for non-participation by those with upper-secondary degrees and beyond upper secondary were "too expensive" and "too busy." A greater proportion of those with only upper secondary degrees cited expense as the reason for non-participation as compared to the beyond upper secondary category (i.e., 28.3% versus 25.0%). As with other comparisons, for both males and females, the most common two reasons for non-participation were "too expensive" and "too busy," with more females than men citing "too expensive" as the reason (27.9% versus 23.7%) and more males than females citing too busy as a reason (35.0% versus 24.2%), although if we combine "too busy" with "no time – family demands," the proportions of men and women are almost equal.

Affordable opportunities for females and low-income and education groups to participate in AET programs might improve labor market outcomes. Outreach programs that inform people about opportunities for AET participation along with the benefits of participation, flexible scheduling, and programs that support program completion would also benefit these groups.

RESEARCH QUESTION 3: WHAT ARE THE CHARACTERISTICS OF AET PROGRAMS, INCLUDING FINANCING SCHEMES, IN THE U.K., GERMANY, SWEDEN, AND JAPAN AS COMPARED TO THE U.S.?

Research Question 3 was addressed through an examination of journal articles along with government reports and reports by private organizations describing country level policies and practices for the provision of adult education and lifelong learning programs and for their financing. These brief overviews are not intended to draw conclusions about lifelong learning policies in other countries. The European Union (EU) has played a key role in formulating policy for its member states. An overview of EU efforts to encourage implementation of programs is provided, which will be followed by country level overviews, strategies to fund lifelong learning, and conclude with a discussion comparing country level policies and practices.

European Union

Several initiatives for improvements in education and lifelong learning and increased labor force participation at older ages have been implemented by the European Union (EU). One such initiative, the Bologna Process, focused on increasing participation in education, including lifelong learning (European Commission, 2013; Keeling, 2006). Most EU countries are aligning themselves with the Bologna Process, but some countries are more advanced in developing

programs that encourage lifelong learning. For example, countries with more flexible programs, including distance learning and those that offer financial support, have greater participation in lifelong learning (Broek & Hake, 2012). More recently, the EU created a strategic plan for education that considers skill investment in the context of economic growth. Identified priorities for member states include reducing the number of low-skilled adults and developing high-quality vocational education and training programs that align with skill shortages. The plan also proposed shared responsibility among the government, employers, and individuals to fund educational programs (European Commission, 2012).

Germany

Over the past decade, Germany has increased its focus on access to educational programs by non-traditional students. These reforms are described in a "Strategy for Lifelong Learning in the Federal Republic of Germany," which resulted from the European Year of Lifelong Learning in 1996 and the Bologna Process (Institut Arbeit und Technik, 2012). As a means to increase social inclusion, in recent years Germany has focused on "second chance" routes to higher education, but efforts are not as advanced as in Nordic countries (Orr & Hovdhaugen, 2014). Germany's strategy for lifelong learning encourages participation in formal, non-formal, and informal learning during all phases of life (Bund-Länder Kommission, 2004). Lifelong learning initiatives recognize demographic changes in Germany, the need for a qualified labor force, and the need to increase participation in continuing education to be more in line with international averages (Institut Arbeit und Technik, 2012).

One of the challenges in implementing adult education programs is responsibility for the education system rests primarily with the states; the federal government plays a minor role (Institut Arbeit und Technik, 2012) and institutions who implement policies have been slow to accept the need for lifelong learning (Wolter, 2012). Several sources of funding are available for adult learners: the public sector, employers, social groups (e.g., churches, labor unions) and continuing education institutions. There are also various types of educational savings plans available to support individual's continuing vocational education.

Sweden

Lifelong learning has been important in Sweden for many decades (Broek & Hake, 2012). Sweden invests heavily in lifelong learning programs that target low-skilled workers to ensure they are employable (Guzman, Pawliczko, Beales, Till, & Voelcker, 2012). Nordic countries are known for offering "second chance" routes to higher education, which provide additional mechanisms to widen participation, especially to underrepresented groups (Orr & Hovdhaugen, 2014). Lifelong learning in Sweden is largely funded by the government through high taxes. The government also provides incentives for employers to provide training as a non-taxable benefit. Programs are available through the public school system for people of all ages who want to improve skills for their current occupation or be trained in a new occupation (Ericson, 2005).

United Kingdom

Lifelong learning in the U.K. did not become part of the educational discourse until recent years. Economic pressures at universities resulting from reductions in public funding have resulted in a greater focus on traditional aged students. There have, however, been some efforts to widen participation by underrepresented groups, but low socioeconomic status remains a barrier (Osborne & Houston, 2012). In their 2011 survey of adult participation in learning, Aldrich and Tuckett (2011) noted a decline in opportunities for lifelong learning, with the lowest class experiencing the largest decline in program participation. In an effort to address issues related to an aging population and resulting shrinkage of the traditional working-age groups, the U.K. encourages people to remain in the workforce at older ages. To achieve this, learning opportunities will need to be available as transitions occur over the life course, which will involve closer integration of policies and practices at national and local levels (McNair, 2009). U.K. ministers have recently highlighted the structure of the National Student Loan System as a means to encourage older adults to improve their employment opportunities through completing educational programs. The U.K.'s student loan system is contingent on income and the income threshold makes it unlikely that older students will be required to repay borrowed funds (S. McNair, personal communication, May 14, 2013). The U.K. is also examining models for personal learning accounts, but is proceeding with caution because of past experience with individual accounts (Johnson, Holt, Khan, Morin, & Sawicki, 2010). England introduced individual learning accounts in 2001, but irregularities, such as training providers providing low-quality training and allegations of fraud, resulted in suspension of the system in less than 6 months (Schuetze, 2007).

Japan

Japan has long recognized the importance of lifelong learning and promotes the idea of learning at all stages of life. The Lifelong Learning Bureau within the Ministry of Education, Science, and Culture is responsible for implementing policies to promote lifelong learning, which has been well accepted by those responsible for education as well as business and industry sectors (Sawano, 2012). Lifelong learning opportunities are available throughout Japan at venues such as university extension courses and online through Cyber University (Ogden, 2010). All types of adult education are encouraged for people of all ages, including formal, non-formal and informal learning (Young & Rosenberg, 2006). Employer supported learning programs were reduced when Japan's lifetime employment system began to erode in the early 2000s and as a result, the cost of lifelong learning programs has shifted from the employer to the individual (Hamaaki, 2012; Han, 2007).

The Japanese government has made a strong commitment to supporting labor force participation after age 60, as is evidenced by its high labor force participation rates for older age groups. A policy implemented to encourage working at older ages was the establishment of the Silver Human Resource Center (SHRC). Each SHRC chapter provides community based employment opportunities and free skills training through Senior Works Programs (Williamson

& Higo, 2007). In 2011, the SHRC served about 760,000 people aged 60 and older with a budget of approximately $2.9 billion (Japanese Ministry of Health, Labour and Welfare, 2013).

United States

Several major commissions have studied lifelong learning in the U.S., beginning in the 1960s. The Lifelong Learning Act of 1976 supported the notion of lifelong learning, but there were no funds appropriated for programs and no centralized authority to implement strategies (Commission for a Nation of Lifelong Learners, 1997; Kidd, 1979). Although the Act was not implemented, it did generate much discussion and debate about lifelong learning concepts (Kidd, 1979) but without funding or policy capability, lifelong learning in the U.S. is quite decentralized and varied in its effectiveness (Kasworm, 2012). Over the past several years, there have been increased efforts to encourage more adults to return to school to improve their skills; this has been an important strategy for state and local governments seeking to attract new employers to their communities (Hollenbeck, 2008). The U.S. Department of Education included in both its 2011-2014 and 2014-2018 strategic plans a goal to increase opportunities for lifelong learning opportunities for adults (U.S. Department of Education, 2012, 2014a). A report submitted by the U.S. Department of State (2012) to the United Nations in accordance with commitments made at the Sixth International Conference on Adult Education noted non-formal training for adults on a variety of topics is available through the U.S. Department of Agriculture's Cooperative Extension System. With their open-access policies and affordable tuition, community colleges play an important role in providing opportunities to adult learners seeking to upgrade skills, either through credit or non-credit courses. Other attractive features of community colleges include flexible class schedules, accelerated programs, and blended learning programs (i.e., combining in-person and on-line classwork) (Tate, Klein-Collins, & Steinberg, 2011).

Publicly sponsored employment and job training programs are available through The Workforce Innovation and Opportunity Act (WIOA), which supersedes the Workforce Investment Act (WIA) of 1998, and the Senior Community Service Employment Program (SCSEP). WIOA has job and career centers located throughout the U.S. and serves workers of all ages. WIOA reauthorizes the Adult Education and Family Literacy Act and strengthens the alignment between adult education, postsecondary education, and employers (U.S. Department of Education, 2014b). SCSEP is designed to provide low-income adults aged 55 and older with work-based training opportunities and is the only federally sponsored employment program that serves older adults exclusively. SCSEP participants are placed in part-time subsidized employment with the goal of gaining work experience that will lead to full-time employment. In 2013, SCSEP had about 44,400 authorized positions for subsidized employment and a budget of $424.8 million (U.S. Department of Labor, 2014). Legislation to permit the establishment of lifelong learning accounts was introduced in 2011 but was never enacted. This legislation would have provided tax incentives for career-related skills development through lifelong learning.

One of the major challenges to lifelong learning in the U.S. is access: participation rates are lower for those with the lowest education levels as compared to college graduates and employers are less likely to offer work-related training to older workers and workers with low-

skills (Commission for a Nation of Lifelong Learners, 1997; Lerman, McKernan, & Riegg, 2004).

Financing Lifelong Learning

Funding lifelong learning is generally viewed as a shared responsibility among the government, employers, and individuals (e.g., European Commission, 2012; Gara, 2012; OECD, 2004, 2005). There are wide variations among countries in how this is accomplished. In some countries, the government is the primary funder whereas in other countries employers or individuals provide the majority of funding. Several key points were identified by the OECD (2004), including the importance of personal empowerment in choosing what, how, when and where to learn, the need for co-financing between public and private sources with the government focusing its resources on the disadvantaged, and the necessity to identify additional co-financing strategies. Examples of co-financing strategies include individual learning accounts (ILAs), known as drawing rights models in some countries, and employer sponsored tuition refund programs. ILAs have some similarities to individual retirement accounts with contributions by the employer, employee, and in some cases governments through tax incentives and permit employees to withdraw funds for training over their working careers (Council for Adult & Experiential Learning, 2012; Schuetze, 2007). Another mechanism to fund AET is incumbent worker training programs which are typically funded jointly by the employer and the government, generally at the state or local level. In the U.S., states have an incentive to fund this training to retain and attract new companies and to have a competitive workforce (Hollenbeck, 2008).

Summary

A common theme of lifelong learning programs of the countries included in this research is the recognition of lifelong learning as a strategy to maintain a competitive workforce and to facilitate work at older ages. While countries generally recognize the need to increase participation rates in adult learning programs by lower income groups, policies and program funding are lacking to achieve this goal. With the exception of Sweden, financing lifelong learning is considered to be a shared responsibility between the individual, employers, and the government and in most cases the government plays a relatively minor role. Sweden, on the other hand, offers lifelong learning programs at no cost through its public school system. Lifelong learning accounts are intended to encourage learning throughout the life course and provide an example of a program that has shared responsibility by the government, the individual, and the employer.

RESEARCH QUESTION 4: BASED ON PARTICIPATION IN AET, HOW DO OUTCOMES (I.E., LABOR FORCE PARTICIPATION, EMPLOYMENT, AND INCOME LEVELS) IN THE U.S. COMPARE TO THE U.K., GERMANY, SWEDEN, AND JAPAN?

Based on participation in formal and non-formal AET, Research Question 4 examined how outcomes (i.e., labor force participation, employment, and income levels) in the U.S. compared to the U.K., Germany, Sweden, and Japan. No income data was available for Germany so we were unable to make income comparisons between the U.S. and Germany. Due to small samples sizes for some age groups, we did not perform separate analyses by age group. Results for the chi-square tests are shown in Tables A.19 – A.24 and logistic regression analyses comparing these countries are shown in Tables A.25 – A.27.

Employment

The chi-square test was used to compare the relationship between participation in formal and non-formal AET and employment between the U.S. and the U.K, Germany, Sweden, and Japan. The results are shown in Tables A.19 and A.20. The 45 to 54 and 55 to 65 age groups were analyzed separately. For the 45 to 54 age group, the relationship between AET participation and employment was significant for all countries except Japan. For the 55 to 65 age group, the results were only significant in Sweden. For the 45 to 54 age group, Sweden had the highest AET participation rate for both the unemployed (52.1%) and the employed (72.0%). The U.S. had the lowest AET participation rate for the unemployed (29.9%) and Japan had the lowest rate of participation for the employed (51.0%). The U.S. had the widest gap (34.6%) in AET participation by the unemployed as compared to the employed and Germany had the lowest gap (13.3%). For the 55 to 65 age group, the U.S. had the highest AET participation rate for the employed (64.0%) whereas the U.K. had the highest AET participation rate for the unemployed (66.8%). Germany had the lowest AET participation rate for the unemployed (26.1%) and Japan had the lowest AET participation rate for the employed (38.5%). Germany had the widest gap (20.4) in AET participation by the unemployed as compared to the employed and the U.S. had the smallest gap (7.8%).

For the logistic regression analyses, due to small sample sizes for the unemployment group, only the U.K. and the U.S. were compared for employment status. Using formal and non-formal AET as the predictor, the expected improvement in the log odds of employment was statistically significant for both countries. The expected improvement in log odds of employment was 0.698 ($p <.001$) in the U.S. and 0.572 ($p <.001$) in the U.K. Age and self-rated health were both significant predictors of an expected improvement in the log odds of employment, but sex was only significant in the U.S with females experiencing an expected reduction in the log odds of employment as compared to males. As compared to "upper secondary," the "beyond upper secondary" education category was a significant predictor of an expected improvement in the log odds of employment in both the U.S. and the U.K., but only in the U.K. was "lower secondary or less" a significant predictor of an expected reduction in the log odds of employment. We

compared the *b* coefficients for the AET variable using the formula recommended by Paternoster et al. (1998); regression coefficients for the AET variable were not significantly different.

Labor Force Participation

The chi-square test was used to compare the relationship between participation in formal and non-formal AET and labor force participation, between the U.S. and the U.K, Germany, Sweden, and Japan. For both the 45 to 54 and 55 to 65 age groups, there was a significant relationship between AET participation and labor force participation in all countries ($p < .001$). For the 45 to 54 age group, Sweden had the highest rate (71.2%) of AET participation by those in the labor force and Germany had the highest rate of AET participation (31.0%) for those not in the labor force. Japan had the lowest rate of AET participation for those not in the labor force (16.2%) and the lowest rate of AET participation (50.7%) for those in the labor force. For the 55 to 65 age group, the U.S. had the highest rates of AET participation for both those not in the labor force (21.1%) and in the labor force (64.9%). Germany had the lowest AET participation rate (12.9%) for those not in the labor force while Japan had the lowest AET participation rate (38.2%) for those in the labor force.

Individuals who participated in formal and non-formal AET had a significant expected improvement in the log odds of labor force participation in all five countries. The expected improvement in the log odds of labor force participation was 1.360 ($p < .001$) in the U.S., 0.780 ($p < .001$) in Germany, 1.030 ($p < .001$) in Sweden, 1.616 ($p < .001$) in the U.K., and 1.247 ($p < .001$) in Japan. With the exception of Sweden, increasing age was a significant predictor in an expected reduction in the log odds of labor force participation. Females in all countries saw a significant expected reduction in the log odds ($p < .001$) of labor force participation as compared to males. As compared to "upper secondary," the "lower secondary or less" education category was a significant predictor of an expected reduction of the log odds of labor force participation in all countries. "Beyond upper secondary was a significant predictor in the expected log odd of labor force participation in Sweden and Germany. Self-rated health was also a significant predictor of labor force participation in all countries.

We compared the *b* coefficients for the AET variable between the U.S. and each of the other four countries. The *Z*-score comparing the *b* coefficients for the AET variable for the U.S. and Germany was 4.07 ($p<.01$) suggesting the effects of AET participation on labor force participation were greater in the U.S. than in the Germany. The only other significant *Z*-score was between the U.S. and Sweden at 2.16 ($p<.05$) suggesting the effects of AET participation on labor force participation were greater in the U.S. than in Sweden.

Income

The chi-square test was used to compare the relationship between participation in formal and non-formal AET and income. There was a significant relationship between AET participation and income quintile for both age groups in all countries. For the 45 to 54 age group, Sweden had the highest overall AET participation rate (72.7%) along with the highest rate of AET participation for both the lowest income quintile (55.7%) and the highest income quintile

(84.6%). The U.S. had the widest gap (36.0%) in AET participation between the highest and lowest income quintiles among the countries included in the analyses and Sweden had the lowest gap (28.9%). Japan had the lowest rates of AET participation for all income quintiles for both age groups. For the 55 to 65 age group, the U.S. had the highest overall participation rate for AET participation (65.8%) and the highest participation rate (50.5%) for the lowest income quintile while Sweden had the highest rate of participation (81.3%) for the highest income quintile. Sweden had the widest gap (34.7%) in AET participation between the highest and lowest income quintiles whereas the U.S. had the narrowest gap (26.9%). Country comparisons of AET participation for the highest and lowest income quintiles along with the average are depicted in Figures 3 and 4.

Individuals who participated in formal and non-formal AET had an expected increase in the log odds of moving up one income quintile in all countries. The expected increase in log odds was 0.554 ($p <.001$) in the U.S., 0.699 ($p <.001$) in Sweden, 0.713 ($p <.001$) in the U.K., and 0.798 ($p <.001$) in Japan. Age was a significant predictor in expected increase in the log odds of moving up one income quintile in income as was self-rated health, except in Japan. The two categories of education were both significant predictors in the expected change in log odds of moving up one income quintile in all countries when compared to the "upper secondary" group, but the "lower secondary or less" had a significant expected *reduction* in the log odds of moving up one income quintile whereas the "beyond upper secondary group" had a significant expected *improvement* in the log odds of moving up one income quintile. Females can expect a significant ($p <.001$) reduction in the log odds of moving up one income quintile as compared to males in all countries.

Figure 3
Participation in Formal and Non-formal AET for Selected Income Quintiles, Ages 45 to 54
(percent of population)

Country	Quintile	Value
Sweden	Highest	84.6
Sweden	Average	72.7
Sweden	Lowest	55.7
U.S.	Highest	83.4
U.S.	Average	66.3
U.S.	Lowest	47.4
U.K.	Highest	81.7
U.K.	Average	67.6
U.K.	Lowest	50.4
Japan	Highest	70.0
Japan	Average	51.8
Japan	Lowest	39.0
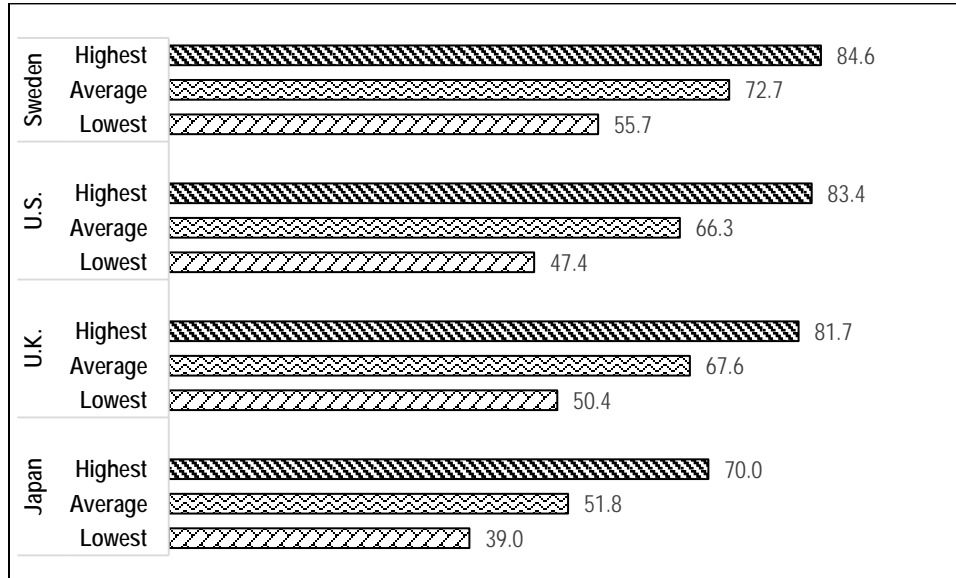
Source: OECD (2014a)

Figure 4
Participation in Formal and Non-formal AET for Selected Income Quintiles, Ages 55 to 65
(percent of population)

Country	Quintile	Value
Sweden	Highest	81.3
Sweden	Average	63.5
Sweden	Lowest	46.6
U.K.	Highest	79.6
U.K.	Average	59.3
U.K.	Lowest	48.4
U.S.	Highest	77.4
U.S.	Average	65.8
U.S.	Lowest	50.5
Japan	Highest	57.2
Japan	Average	38.7
Japan	Lowest	28.1
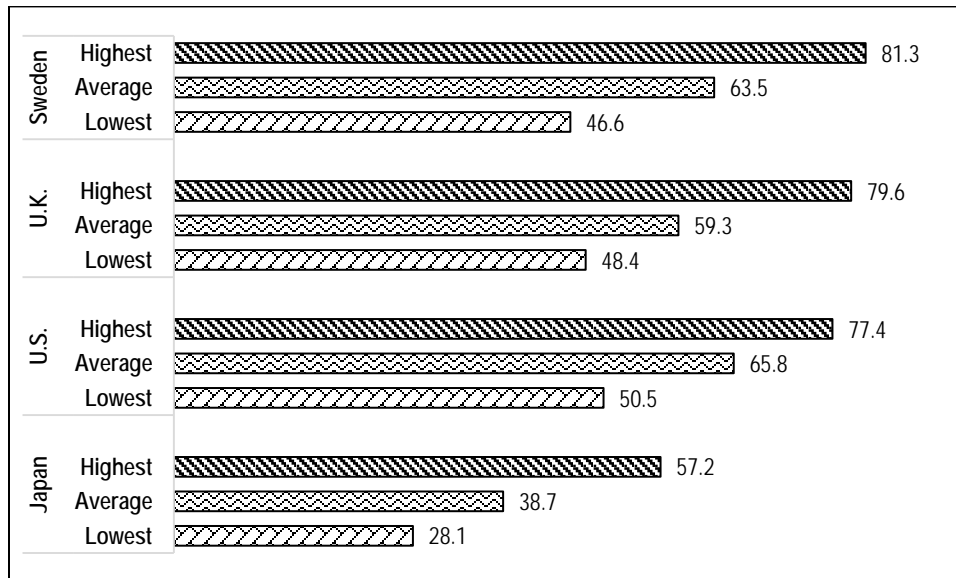
Source: OECD (2014a)

The *Z*-test produced significant results in the comparisons of the *b* coefficients for the AET variable between the U.S. and Japan. The *Z*-score suggests the effects of AET participation on income quintile were greater in Japan than in the U.S. (U.S./Japan, *Z*-score = -2.27, *p* <.05).

SUMMARY OF FINDINGS

This study examined the effect of participation in formal and non-formal adult education on employment, labor force participation, and income for adults aged 45 to 65. Because of a small sample size in the "unemployed group," we were unable to analyze the 45 to 65 age group separately for the employment outcome in the U.S using logistic regression techniques. Participation in AET was associated with an expected improvement in the log odds of employment. We were able to analyze employment for the 45 to 54 and 55 to 65 age groups in the U.S. separately using a chi-square test, which revealed smaller proportions of the unemployed in both the 45 to 54 and 55 to 65 age groups participated in AET as compared to the employed. This is of concern because the unemployed may require additional training to become reemployed. The unemployed often rely on publicly sponsored training programs but there may be a lack awareness of these programs. Lack of awareness of programs and the economic benefits of training, fear of returning to the classroom at older ages, and low funding levels for training programs are potential causes for low participation rates by the unemployed.

There was also a significant relationship between AET participation and labor force participation in the U.S., but the implications are not necessarily straightforward, especially in the context of low AET participation rates by the unemployed. For example, during the recent recession, some of the unemployed simply withdrew from the labor force and thus shifted from "unemployed" to "not in the labor force" (Krueger, Cramer, & Cho, 2014). Participation in an AET program during the period of unemployment might prevent some from early withdrawal from the labor force and participation in AET by individuals who are out of the labor force might result in their returning to the labor market.

The relationship between AET participation and income is important from two perspectives. First, participation in AET increases the likelihood of moving up a level in income quintile. Second, for both the 45 to 54 and 55 to 65 age groups, the lowest income quintile participates in AET at a substantially lower rate than the top income quintile for all of the countries included in this study. This finding is consistent with previous research (Angotti & Belmonte, 2012; Johnson, 2007; OECD, 2004) and reinforces the importance of making opportunities available for lower-income groups to participate in AET. Estimates of net worth in the U.S. by income quintile are also a cause for concern, especially for those in the lowest income group who are approaching retirement. Continued participation in the labor force, which might be facilitated through participation in AET, would provide low-income older workers the opportunity to move to a higher income group and increase retirement savings.

Females and those with lower levels of education were more likely to have poorer outcomes in employment, labor force participation, and income as compared to males and the more highly educated. For example, females who participated in formal and non-formal AET

had an expected decrease in the log odds of employment, labor force participation, and moving up one income quintile as compared to males. Individuals with less than a high school diploma who participated in formal and non-formal AET had an expected decrease in the log odds of employment, labor force participation, and moving up one income quintile as compared to those with a high school diploma. Females tend to experience more disorderly careers due to childbearing and household responsibilities and as a result, might be at a lower starting point than males when they return to school. Flexible work and class schedules along with other supportive services to improve self-confidence and study skills (e.g., tutoring, peer mentoring, opportunities to interact with other students and faculty outside the classroom) are especially important for females and lower education groups to succeed (Field, 2011a; Grubb, 2009; Hagedorn, 2010; Hostetler, Sweet, & Moen, 2007; Karp, 2011; Kyndt, Govaerts, Keunen, & Dochy, 2013). Both females and those with lower levels of education could benefit from outreach programs that provide information on the benefits of adult education and opportunities for participation.

Our review of lifelong learning programs and policies in the countries included in this study revealed several common threads. Each country has recognized the need for individuals to remain in the labor force at older ages and has also recognized the importance of lifelong learning to maintain a skilled workforce to compete in the global economy and that low-skilled workers are especially in need of training programs. Implementing programs that facilitate AET participation by lower income groups has generally been a challenge for policy makers. Financing schemes, such as lifelong learning accounts and increasing the availability of AET to low-income and low-skilled groups at little or no cost, will facilitate increased participation in AET programs.

Comparison of U.S. PIAAC data with that from Germany, Sweden, the U.K, and Japan also produced interesting results. Consistent with U.S. outcomes, these countries had lower AET participation rates by the unemployed compared to the employed and there were wide variations in AET participation between the lowest income quintile and the highest income quintile. For all countries, there was a significant relationship between AET participation and income.

CONCLUSIONS

IMPLICATIONS FOR POLICY AND PRACTICE

The combination of increased labor force participation at older ages and a shift in the age distribution of the U.S. labor force results in the need for programs and policies to encourage and facilitate work at older ages. Despite widespread recognition that older workers may require skill upgrades to remain in the labor force at older ages, policies and funding are lacking to facilitate training older workers (Cummins, 2013; Field & Canning, 2014). Policies that provide opportunities for older adults to participate in AET programs are necessary to ensure economic security in retirement, a competitive labor force, and economic growth. Implementation of policies that focus on lower income groups and the unemployed, who are likely the most in need of skill upgrades and most at risk for economic insecurity in retirement, are especially important.

This will likely involve additional funding for public programs, such as SCSEP or WIOA. Outreach programs are necessary to provide unemployed workers a better understanding of the importance of remaining in the labor force to ensure financial security in retirement. Examples of policies to encourage participation in AET include tax credits for AET expenses, lifelong learning accounts, incumbent worker training programs, and publicly sponsored training programs for low-income and unemployed workers. Policies that support a shared responsibility by the government, the individual, and employers are key but how the costs are shared needs to vary by income level so the most in need have low- or no-cost opportunities for AET.

From a practice perspective, providers of educational programs will benefit from the knowledge that AET programs have a positive impact on outcomes for older adults. For example, implementation of outreach programs to make older adults aware of training opportunities and the economic benefits of training, along with providing advice on sources of funding, could encourage increased enrollment. If older adults are not aware of training opportunities, policies that provide funding for low-income groups and the unemployed will have little effect. Flexible class schedules, including on-line classes, would allow greater participation by people who are too busy to attend on-campus classes during daytime hours. In addition, programs that help older and low-skilled workers overcome their fear of returning to the classroom at older ages could increase AET participation.

Both policy and practice can be informed by the reasons for non-participation in AET. Cost was a common reason cited for non-participation by lower-income groups and women. Lack of time (i.e., "too busy" or "no time, family demands") was also a common reason for non-participation. These reasons are consistent with the findings of this research. Affordable AET opportunities for low-income groups and women might increase participation rates and improve labor market outcomes. Flexible scheduling, including evening and distance learning programs, might also increase participation among all income groups.

FUTURE RESEARCH

As gerontologists, our research focus is older adults. With that in mind, there are several research topics of interest using PIAAC, IALS, and ALL data. Cohort analyses could provide valuable information on how literacy and numeracy skills and participation in AET have changed over time for the baby boomer cohort. Examples of potential research include:

- Examination of the relationship between participation in AET and literacy, numeracy, and problem solving skills for older adults.
- Examination of outcomes (i.e., employment, labor force participation, and income) based on AET participation for the baby boomer cohort (those born between 1946 and 1964) using IALS, ALL, and PIAAC data (i.e., repeated cross sectional design for comparison of aggregate level data). Because of the banding of age groups, we cannot exactly match the baby boom cohort in each data set.
- Examination of literacy skills for the baby boomer cohort using IALS, ALL, and PIAAC data.

- Examination of numeracy skills for the baby boomer cohort using ALL and PIAAC data.
- Data from the U.S. National Supplement will increase the sample size of unemployed adults and add a sample of adults ages 66 to 74. An increased sample of unemployed older adults would allow us to better analyze the impact of participation in AET on that population. Given the increase in labor force participation of the 66 to 74 age group, analyses of the benefits of AET participation for that age group could provide useful information.
- The current research could be expanded through qualitative research to gain a better understanding of how and where older adults participate in AET. Learning more about how older adults become aware of educational opportunities and barriers they face would also be useful in developing outreach programs and strategies to address barriers.
- The current research could also be expanded by a more thorough examination of lifelong learning policies in the countries included in this study. For example, delving more deeply into options for funding schemes and strategies to encourage participation by the unemployed and lower income groups could be accomplished through an expanded literature review and key informant interviews.

PIAAC's rich data provide multiple opportunities to examine how older adults benefit from participation in educational programs.

CONTRIBUTION TO RESEARCH

Investments in human capital for people of all ages has become increasingly emphasized but little research has empirically examined the effects of participation in adult education programs on labor market outcomes for middle-aged and older adults. The changing age structure of the U.S. labor force combined with continued work at older ages has increased the need for research in this area. Gaining a better understanding of how middle-aged and older adults benefit from participating in adult education programs is an essential area of study so practitioners and policy makers can make informed decisions.

While many of the results from the regression analyses and chi-square tests were statistically significant, the results are not generalizable and we cannot suggest causality. This study does, however, contribute to existing research by examining how AET participation, or lack of participation, benefits older adults. Consistent with previous research, we found that lower income groups are less likely to participate in AET programs. We also found that participation in AET increases the likelihood of an older adult moving into a higher income category and enhances the likelihood of employment and remaining in the labor force. Another important finding is that the unemployed, who are perhaps the most in need of skill upgrading, are less likely to participate in AET as compared to those who are employed. The combination of these findings makes an important contribution to existing research. Evidence based research that demonstrates the benefits of lifelong learning for older and lower-skilled workers will be essential for allocation of funding for such programs. Making affordable lifelong learning

programs available to people of all ages, especially lower income groups and the unemployed, will continue to be a challenge for policy makers and practitioners.

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ANNEX

Table A.1.
Sample Sizes by Country and Sex, Ages 45 to 54

	Male	Female	Total
Germany	630	679	1,309
Japan	477	560	1,037
Sweden	450	476	926
United Kingdom	837	1,047	1,884
United States	513	571	1,084
Total	2,907	3,333	6,240

Table A.2.
Sample Sizes by Country and Sex, Ages 55 to 65

	Male	Female	Total
Germany	463	506	969
Japan	630	651	1,281
Sweden	532	500	1,032
United Kingdom	816	1,058	1,874
United States	463	603	1,066
Total	2,904	3,318	6,222

PIAAC Variable Name	Variable and Recoding Description	New Variable Name (s)
Dependent Variables		
C_D05	Employment status with "unemployed" recoded as "0" and "employed" recoded as "1." "Out of the labor force," "not known," and "not stated" were recoded to missing.	unemptoemp
C_D05	Labor force participation with "out of the labor force" recoded to "0" and the combination of "employed" and "unemployed" were recoded to "1." Not known and not stated were recoded to missing.	laborpart
D_Q18a_T	Annual net income before taxes and deductions in quintiles. Some countries had a "0" code for "no income"; that category was combined with the first quintile. There were a small number of cases (i.e., 32 in the U.S., 48 in the U.K., and 10 in Japan) in the no-income category.	D_Q18a_T
networth	The net worth variable is from the Survey of Consumer Finances. SCF data were used to determine median net worth by income quintile and age group. These data were then used to create a net worth variable by income quintile for each of the two age groups included in our analyses (e.g., net worth for the top income quartile in SCF for the 45 to 54 age group was matched with the top income quartile in PIAAC for the same age group).	wealth45to55 wealth55up
Independent Variables		
FNFAET12	Participated in formal or non-formal AET in 12 months preceding survey. Those excluded from the AET population (i.e., coded "0" in "AETPOP") were recoded to missing. "Unknown" and "students in the regular cycle of education" were also coded to missing. Codes: "did not participate = "0" and "participated" = "1"	FNFAET12
FNFAET12JR	Participated in normal or non-formal AET for job-related reasons in 12 months preceding survey, which includes the same data as FNFE12JR, formal or non-formal education for job related reasons. Those excluded from the AET population (i.e., coded "0" in "AETPOP") were recoded to missing. "Unknown" and "students in the regular cycle of education" were also coded to missing. Codes: "did not participate = "0" and "participated" = "1"	FNFAET12JR
FNFAET12JR	Participated in normal or non-formal AET for job-related reasons in 12 months preceding survey, which includes the same data as FNFE12JR, formal or non-formal education for job related reasons. Those excluded from the AET population (i.e., coded "0" in "AETPOP") were recoded to missing. "Unknown" and "students in the regular cycle of education" were also coded to missing. Codes: "did not participate = "0" and "participated" = "1"	FNFAET12JR
Independent variables		

Variable and Recoding Descriptions for Variables included in Analyses

PIAAC Variable Name	Variable and Recoding Description	New Variable Name (s)
NFE12	Participated in non-formal education in 12 months preceding survey. Those excluded from the AET population (i.e., coded "0" in "AETPOP") were recoded to missing. "Unknown" and "students in the regular cycle of education" were also coded to missing. Codes: "did not participate = "0" and "participated" = "1	NFE12
NFE12JR	Participated in non-formal education for job-related reasons in 12 months preceding survey. Those excluded from the AET population (i.e., coded "0" in "AETPOP") were recoded to missing. "Unknown" and "students in the regular cycle of education" were also coded to missing. Codes: "did not participate = "0" and "participated" = "1"	NFE12JR
Covariates	.	
AGE10LFS	Recoded "ages 45 to 54" = "0" and "ages 55 to 65" = "1," all others coded as missing.	age45up
GENDER_R	Recoded as "male" = "0" and "female" = "1"	female
EDCAT6	Renamed EDCATNEW and created dummy variables for each category. Reference group is EDNEW2, postsecondary education. Recoded EDCAT6 to three educational categories for analyses of comparison countries, including the U.S. Dummy variables created for each of the categories	EDCATNEW EDNEW1 – EDNEW6 EDCAT3 E31-E3-3
Selfhealth	Self-rated health; recoded to combine "fair" and "poor" due to low number of observations and created dummy variables for each category. Reference group is shREC1, poor/fair.	selfhealthREC shREC1– shREC4
NATIVESPEAKER	Recoded to "native speaker" = "0" and "not a native speaker = "1"	notnative
Other Variable Analyzed		
B_Q26b	Recoded to include 7 categories for reasons of non-participation; categories such as "valid skip" and "other" were recoded as missing.	AETwhy

Descriptive Statistics of the Population by Country and Age Group (percent of)

Age Group	U. S.		Germany		Japan		Sweden		U.K.	
	45 - 54	55 - 65	45 - 54	55 - 65	45 - 54	55 - 65	45 - 54	55 - 65	45 - 54	55 - 65
Age Group	53.1	46.9	55.3	44.7	44.3	55.7	48.5	51.5	52.4	47.6
Male	47.6	47.1	50.2	48.8	49.4	51.1	49.3	50.5	49.3	48.9
Female	52.4	52.9	49.8	51.2	50.6	48.9	50.7	49.5	50.7	51.1
Education										
Lower secondary or less	11.4	10.4	8.9	9.9	7.9	21.6	19.2	30.8	27.7	35.1
Upper Secondary	40.7	42.8	51.5	53.4	41.1	48.0	41.0	34.5	37.1	34.2
Post-secondary non-tertiary	9.9	8.7	5.1	2.7	2.0	1.3	10.1	7.9	0.1	0.4
Tertiary professional degree	9.7	8.0	14.8	14.4	21.7	9.8	8.9	10.0	13.0	13.8
Tertiary bachelor's degree	16.5	15.8	3.2	3.7	24.7	18.1	9.6	7.9	N/A	N/A
Master/research degree[1]	11.8	14.3	16.5	15.9	2.6	1.2	11.2	8.9	22.1	16.5
Self-rated Health										
Poor or Fair	18.6	23.7	14.4	20.5	31.5	35.9	18.4	25.0	19.0	24.3
Good	30.6	28.9	26.4	33.4	46.5	46.9	29.4	29.6	27.3	28.8
Very Good	31.3	30.5	42.8	35.2	17.2	13.3	28.9	25.0	35.3	33.3
Excellent	19.5	16.9	16.4	10.9	4.8	3.9	23.3	20.4	18.4	13.6
Native Speaker	84.3	88.6	89.9	92.1	99.9	99.9	80.5	86.8	91.6	93.8
Employed	93.2	93.5	97.3	95.9	98.3	97.1	96.0	96.0	94.9	95.0
Participates in Labor Force	85.9	69.0	89.3	66.3	86.3	66.3	91.7	70.8	85.8	58.1
Participated in AET										
FNFAET12	55.8	50.4	54.2	34.7	45.9	30.6	67.7	48.7	58.2	39.9
FNFAET12JR	47.1	39.1	42.3	24.3	35.5	18.5	54.2	35.3	49.2	28.3
NFE12	53.7	48.9	53.5	34.6	45.4	30.1	65.1	47.9	53.8	38.4
NFE12JR	45.4	38.1	42.5	24.0	35.0	18.3	51.4	34.8	45.1	27.0

[1] The U.K. includes bachelor's degrees in the "master/research degree" category.

Table A.5.
Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET12) and Employment, Labor Force Participation, and Income for ages 45 to 54 in the U.S.

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	41 (70.1)	21 (29.9)	24.98	1, 79	<.001
Employed	298 (35.5)	537 (64.5)			
Labor Force Participation					
Not in the labor force	131 (81.4)	31 (18.6)	104.42	1, 79	<.001
In the labor force	339 (37.8)	558 (62.2)			
Income Quintile					
Lowest	57 (52.6)	46 (47.4)	15.36	3.64, 287.83	<.001
Next Lowest	69 (48.0)	68 (52.0)			
Middle	55 (42.0)	87 (58.0)			
Next to highest	40 (23.2)	126 (76.8)			
Highest	32 (16.6)	174 (83.4)			
Total n (income)	253 (33.7)	501 (66.3)			

Table A.6.
Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET12) and Employment, Labor Force Participation, and Income for ages 55 to 65 in the U.S.

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	22 (43.8)	27 (56.2)	1.04	1, 44	0.314
Employed	225 (36.0)	430 (64.0)			
Labor Force Participation					
Not in the labor force	264 (78.9)	75 (21.1)	172.70	1, 44	<.001
In the labor force	247 (35.1)	457 (64.9)			
Income Quintiles					
Lowest	41 (49.5)	49 (50.5)	4.20	3.67, 161.35	<.05
Next lowest	30 (36.6)	50 (63.4)			
Middle	45 (40.1)	74 (59.9)			
Next to highest	37 (30.0)	97 (70.0)			
Highest	33 (22.6)	111 (77.4)			
Total n (income)	186 (34.2)	381 (65.8)			

Table A.7.
U.S. Estimation Results for Employment, Labor Force Participation, and Income by Participation in Formal and
Non-Formal Adult Education and Training (FNFAET12)

	Model 1 Employment	Model 2 Labor Force Participation	Model 3 Income
Intercept	0.632*	0.649***	
	(0.303)	(0.141)	
Cut 1 - Intercept			-0.792***
			(0.151)
Cut 2 - Intercept			0.531***
			(0.147)
Cut 3 - Intercept			1.655***
			(0.150)
Cut 4 - Intercept			2.878***
			(0.156)
Did not participate in FNFAET12 (ref. grp.)	-	-	-
Participated in FNFAET12	0.684***	1.384***	0.441***
	(0.149)	(0.112)	(0.0840)
Age (all age groups)	0.262***		
	(0.0629)		
Ages 18 to 44 (ref. grp.)		-	-
Ages 45 to 65		-0.382***	0.593***
		(0.0989)	(0.0758)
Male (ref. grp.)	-	-	-
Female	-0.376**	-0.984***	-1.027***
	(0.141)	(0.103)	(0.0765)
Education			
Lower secondary or less	-0.259	-0.316*	-0.686***
	(0.221)	(0.156)	(0.131)
Upper secondary (ref. grp.)	-	-	-
Post-secondary, non-tertiary	-0.0142	0.196	0.211
	(0.247)	(0.183)	(0.136)
Tertiary professional degree	0.219	-0.0315	0.714***
	(0.265)	(0.182)	(0.137)
Tertiary bachelor's	0.631**	0.0894	1.331***
	(0.219)	(0.150)	(0.109)
Master's/ research degree	0.620*	0.266	2.070***
	(0.281)	(0.193)	(0.129)
Self-Rated Health			
Poor/fair (ref. grp.)	-	-	-
Good	0.524**	1.150***	0.621***
	(0.201)	(0.129)	(0.136)
Very good	0.827***	1.587***	0.785***
	(0.208)	(0.137)	(0.135)
Excellent	0.748**	1.213***	0.872***
	(0.236)	(0.156)	(0.141)
Native speaker (ref. grp.)	-	-	-
Not a native speaker	0.221	0.164	-0.207
	(0.209)	(0.147)	(0.111)
Pseudo R2	.0.06	0.18	0.1
Observations	3,540	4,325	2,952

Robust standard errors in parentheses.
 *** $p<0.001$, ** $p<0.01$, * $p<0.05$

Table A.8.

Relationship in the U.S. between Participation in Formal and Non-Formal Adult Education and Training for Job-Related Reasons (FNFAET12JR) and Employment, Labor Force Participation, and Income for Ages 45 to 54

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	29 (57.9)	20 (42.1)	2.78	1, 44	.1024
Employed	278 (44.9)	351 (55.1)			
Labor Force Participation					
Not in the labor force	314 (94.0)	19 (6.0)	264.18	1, 44	<.001
In the labor force	307 (45.8)	371 (54.2)			
Income Quintile					
Lowest	51 (63.1)	38 (39.9)	8.58	3.76,	<.001
Next lowest	40 (53.7)	33 (46.3)		165.45	
Middle	53 (48.1)	59 (51.9)			
Nest to highest	45 (35.1)	85 (64.9)			
Highest	38 (25.7)	101 (74.3)			
Total *n* (income)	227 (42.3)	316 (57.7)			

Table A.9.

Relationship in the U.S. between Participation in Formal and Non-Formal Adult Education and Training for Job-Related Reasons (FNFAET12JR) and Employment, Labor Force Participation, and Income for ages 55 to 65

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	45 (78.3)	15 (21.7)	22.09	1, 44	<.001
Employed	349 (43.6)	443 (56.4)			
Labor Force Participation					
Not in the labor force	146 (93.8)	12 (6.2)	142.76	1, 44	<.001
In the labor force	394 (46.0)	458 (54.0)			
Income Quintile					
Lowest	65 (65.2)	30 (34.8)	17.37	3.69,	<.001
Next lowest	75 (55.4)	54 (44.6)			
Middle	66 (51.6)	67 (48.4)			
Next to highest	49 (31.3)	109 (68.7)			
Highest	44 (22.3)	155 (77.7)			
Total *n* (income)	299 (41.6)	415 (58.4)			

Table A.10.

Relationship in the U.S. between Participation in Non-Formal AET (NFE12) and Employment, Labor Force Participation, and Income for ages 45 to 54

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	26 (53.0)	23 (47.0)	3.84	1, 44	.05645
Employed	231 (37.1)	424 (62.9)			
Labor Force Participation					
Not in the labor force	268 (80.3)	71 (19.7)	180.60	1, 44	<.001
In the labor force	257 (38.1)	447 (61.9)			
Income Quintile					
Lowest	41 (49.5)	49 (50.5)	5.11	3.73,	<.001
Next lowest	31 (39.3)	49 (60.7)		164.31	
Middle	48 (43.2)	71 (56.8)			
Next to highest	38 (30.4)	96 (69.6)			
Highest	33 (22.6)	111 (77.4)			
Total *n* (income)	191 (35.3)	376 (64.7)			

Table A.11.

Relationship in the U.S. between Participation in Non-Formal Education (NFE12) and Employment, Labor Force Participation, and Income for ages 55 to 65

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	44 (75.2)	18 (24.8)	28.19	1, 44	<.001
Employed	310 (37.3)	525 (62.7)			
Labor Force Participation					
Not in the labor force	138 (85.0)	24 (15.0)	116.33	1, 44	<.001
In the labor force	354 (39.9)	543 (60.1)			
Income Quintile					
Lowest	53 (53.5)	39 (46.5)	14.32	3.77	<.001
Next lowest	71 (49.6)	66 (50.4)		165.75	
Middle	56 (42.3)	86 (57.7)			
Next to highest	44 (26.8)	122 (73.2)			
Highest	35 (18.5)	171 (83.5)			
Total *n* (income)	264 (35.4)	490 (64.6)			

Table A.12

Relationship in the U.S. between Participation in Job- Related Non-Formal AET (NFE12JR) and Employment, Labor Force Participation, and Income for ages 45 to 54

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	30 (60.5)	19 (39.5)	2.92	1, 44	.094
Employed	283 (45.6)	345 (54.4)			
Labor Force Participation					
Not in the labor force	318 (95.3)	15 (4.7)	276.81	1, 44	<.001
In the labor force	313 (46.6)	364 (53.4)			
Income Quintiles					
Lowest	53 (64.4)	36 (35.6)	8.25	3.69	<.001
Next lowest	40 (54.7)	33 (45.3)		162.34	
Middle	54 (49.0)	58 (51.0)			
Next to highest	46 (36.0)	83 (64.0)			
Highest	40 (26.7)	99 (73.3)			
Total *n* (income)	233 (43.3)	309 (56.7)			

Table A.13.

Relationship in the U.S. between Participation in Non-Formal Adult Education and Training for Job-Related Reasons (NFE12JR) and Employment, Labor Force Participation, and Income for ages 55 to 65

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
Employment Status					
Unemployed	46 (81.0)	14 (19.0)	22.38	1, 44	<.001
Employed	357 (45.1)	434 (54.9)			
Labor Force Participation					
Not in the labor force	152 (96.1)	6 (3.9)	121.32	1, 44	<.001
In the labor force	403 (47.5)	448 (52.5)			
Income Quintile					
Lowest	67 (67.8)	28 (32.2)	16.56	3.64,	<.001
Next lowest	75 (56.4)	54 (43.6)		160.32	
Middle	65 (51.6)	68 (48.4)			
Next to highest	52 (33.2)	106 (66.8)			
Highest	48 (24.9)	150 (75.1)			
Total *n* (income)	307 (43.3)	406 (56.7)			

Table A.14.
Estimated Net Worth in the U.S. by Age Group and Income Quintile
(percent in each category shown in parentheses)

	Ages 45 to 54		Ages 55 to 65	
Income quintile				
Lowest	$9,550	(13.7)	$14,990	(15.9)
Next lowest	$18,900	(18.2)	$62,090	(14.1)
Middle	$72,300	(18.8)	$148,400	(21.0)
Next to highest	$139,470	(22.0)	$218,080	(23.7)
Highest	$578,400	(27.3)	$1,064,500	(25.3)

Source: The Board of Governors of the Federal Reserve System (2010)

Table A.15.
Reasons for Non-Participation in Training by Age Group (*n*, row percent of population)

Age	Lacked prerequisites	Too expensive	No employer support	Too busy	Class offered inconvenient time or place	No time-family demands	Something unexpected came up
<25	10 (4.0)	61 (29.5)	3 (1.1)	47 (19.6)	62 (32.0)	24 (8.6)	14 (7.1)
25-34	7 (1.2)	123 (29.6)	18 (3.9)	113 (29.5)	36 (9.4)	90 (22.3)	14 (4.1)
35-44	10 (2.9)	92 (24.4)	12 (2.9)	98 (28.2)	37 (10.6)	88 (25.4)	16 (5.5)
45-54	5 (1.5)	83 (22.4)	21 (6.2)	112 (35.5)	36 (11.6)	48 (13.4)	31 (9.4)
55-65	6 (2.5)	61 (24.2)	17 (5.2)	70 (29.9)	51 (19.6)	27 (12.4)	17 (6.2)
Total	38 (2.3)	420 (26.1)	71 (3.9)	440 (29.0)	222 (14.8)	277 (17.6)	92 (6.3)

$F_{R-S, Pearson} = 4.91$, $p<.001$

Table A.16.
Reasons for Non-Participation in Training by Income Quintile (*n*, row percent of population)

Income Quintile	Lacked prerequisites	Too expensive	No employer support	Too busy	Class offered inconvenient time or place	No time-family demands	Something unexpected came up
Lowest	7 (3.3)	72 (35.2)	7 (2.1)	37 (16.1)	38 (18.7)	28 (11.4)	24 (13.2)
Second Lowest	8 (2.9)	76 (35.3)	9 (4.1)	58 (25.0)	23 (11.9)	37 (16.8)	8 (3.9)
Middle	6 (2.1)	69 (26.7)	8 (3.1)	72 (35.4)	28 (13.0)	36 (16.3)	7 (3.4)
Next Highest	3 (0.9)	45 (18.1)	15 (5.4)	86 (38.6)	42 (19.0)	31 (13.9)	9 (4.0)
Highest	3 (1.3)	31 (12.2)	19 (6.3)	131 (52.0)	29 (10.7)	38 (14.6)	7 (2.9)
Total	27 (2.1)	293 (25.1)	58 (3.9)	384 (34.2)	160 (14.5)	170 (14.6)	55 (5.3)

$F_{R-S, Pearson} = 5.15$, $p<.001$

Table A.17
Reasons for Non-Participation in Training by Education (*n*, row percent of population)

Education	Lacked prerequisites	Too expensive	No employer support	Too busy	Class offered inconvenient time or place	No time-family demands	Something unexpected came up
Lower Secondary	8 (9.4)	25 (23.1)	3 (3.0)	20 (23.3)	8 (12.2)	22 (20.8)	6 (8.1)
Upper Secondary	17 (2.6)	161 (28.3)	17 (2.6)	135 (27.8)	78 (15.1)	84 (14.7)	45 (8.9)
Beyond upper secondary	13 (1.3)	234 (25.0)	51 (4.9)	285 (30.4)	136 (14.9)	177 (19.2)	40 (4.4)
Total	38 (2.3)	420 (26.1)	71 (3.9)	440 (29.0)	222 (14.8)	277 (17.7)	91 (6.3)

$F_{R\text{-}A, \, Pearson}$ = 7.19, *p*<.001

Table A.18
Reasons for Non-Participating in Training by Sex (*n*, row percent of population)

	Lacked prerequisites	Too expensive	No employer support	Too busy	Class offered inconvenient time or place	No time-family demands	Something unexpected came up
Male	18 (2.6)	154 (23.7)	32 (4.4)	214 (35.0)	105 (17.1)	65 (11.6)	29 (5.6)
Female	20 (2.1)	266 (27.9)	39 (3.5)	226 (24.2)	117 (12.9)	212 (22.5)	63 (6.9)
Total	38 (2.3)	420 (29.1)	71 (3.9)	440 (29.0)	222 (14.8)	277 (17.6)	92 (6.3)

$F_{R\text{-}A, \, Pearson}$ = 3.46, p<.001

Table A.19

Country Comparisons in the Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET) and Employment, Ages 45 to 54

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
U.S.					
Unemployed	41 (70.1)	21 (29.9)	24.98	1, 79	<.001
Employed	298 (35.5)	537 (64.5)			
Germany					
Unemployed	104 (54.0)	91 (46.0)	10.92	1, 79	<.01
Employed	1,431 (40.7)	2,276 (59.3)			
Sweden					
Unemployed	13 (47.9)	13 (52.1)	5.51	1, 79	<.05
Employed	214 (28.0)	622 (72.0)			
U.K.					
Unemployed	46 (54.7)	40 (45.3)	8.09	1, 79	<.01
Employed	477 (34.3)	898 (65.7)			
Japan					
Unemployed	5 (64.2)	4 (35.8)	0.96	1, 79	0.330
Employed	426 (49.0)	457 (51.0)			

Table A.20

Country Comparisons in the Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET) and Employment, Ages 55 to 65

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
U.S.					
Unemployed	22 (43.8)	27 (56.2)	1.04	1, 44	0.314
Employed	225 (36.0)	430 (64.0)			
Germany					
Unemployed	18 (73.9)	5 (26.1)	3.57	1, 79	.062
Employed	330 (53.5)	286 (46.5)			
Sweden					
Unemployed	18 (58.2)	11 (41.8)	4.81	1, 79	<.05
Employed	257 (37.9)	488 (62.1)			
U.K.					
Unemployed	27 (33.2)	27 (66.8)	1.09	1, 79	0.300
Employed	401 (43.0)	527 (57.0)			
Japan					
Unemployed	12 (71.1)	4 (28.9)	0.53	1, 79	0.468
Employed	526 (61.5)	342 (38.5)			

Table A.21

Country Comparisons in the Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET) and Labor Force Participation, Ages 45 to 54

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
U.S.					
Not in labor force	131 (81.4)	31 (18.6)	104.4	1, 79	<.001
In labor force	339 (37.8)	558 (62.2)			
Germany					
Not in labor force	510 (69.0)	272 (31.0)	136.97	1, 79	<.001
In labor force	1,535 (41.4)	2,367 (58.6)			
Sweden					
Not in labor force	42 (71.5)	21 (28.5)	33.85	1, 79	<.001
In labor force	227 (28.8)	635 (71.2)			
U.K.					
Not in labor force	345 (80.8)	63 (19.2)	131.34	1, 79	<.001
In labor force	523 (35.4)	938 (64.6)			
Japan					
Not in labor force	99 (83.8)	20 (16.2)	49.68	1, 79	<.001
In labor force	431 (49.3)	461 (50.7)			

Table A.22

Country Comparisons in the Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET) and Labor Force Participation, Ages 55 to 65

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design Based F	df, rdf	p
U.S.					
Not in labor force	264 (78.9)	75 (21.1)	172.7	1, 44	<.001
In labor force	247 (35.1)	457 (64.9)			
Germany					
Not in labor force	260 (87.1)	43 (12.9)	79.95	1, 79	<.001
In labor force	348 (54.3)	291 (45.7)			
Sweden					
Not in labor force	206 (81.7)	52 (18.3)	158.42	1, 79	<.001
In labor force	275 (38.7)	499 (61.3)			
U.K.					
Not in labor force	729 (84.4)	143 (15.6)	173.52	1, 79	<.001
In labor force	428 (42.5)	554 (57.5)			
Japan					
Not in labor force	307 (84.3)	59 (15.7)	77.70	1, 79	<.001
In labor force	538 (61.8)	346 (38.2)			

Table A.23.

Country Comparisons in the Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET) and Income, Ages 45 to 54

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
U.S.					
Lowest	57 (52.6)	46 (47.4)	15.36	3.64,	<.001
Next lowest	69 (48.0)	68 (52.0)		287.83	
Mid-level	55 (42.0)	87 (58.0)			
Next to highest	40 (23.2)	126 (76.8)			
Highest	32 (16.6)	174 (83.4)			
Total n (income)	253 (33.7)	501 (66.3)			
Sweden					
Lowest	32 (44.3)	50 (55.7)	8.04	3.89,	<.001
Next lowest	58 (35.6)	107 (64.4)		307.01	
Mid-level	43 (26.9)	133 (73.1)			
Next to highest	39 (23.8)	143 (76.2)			
Highest	29 (15.4)	173 (84.6)			
Total n (income)	201 (27.3)	606 (72.7)			
U.K.					
Lowest	83 (49.6)	87 (50.4)	12.95	3.90,	<.001
Next lowest	119 (54.0)	123 (46.0)		308.15	
Mid-level	95 (30.4)	165 (69.6)			
Next to highest	67 (25.02)	210 (75.0)			
Highest	56 (18.3)	259 (81.7)			
Total n (income)	420 (32.4)	844 (67.6)			
Japan					
Lowest	105 (61.0)	65 (39.0)	14.54	3.83	<.001
Next lowest	76 (63.6)	49 (36.4)		302.69	
Mid-level	65 (59.8)	46 (40.2)			
Next to highest	68 (45.9)	85 (54.1)			
Highest	74 (30.0)	182 (70.0)			
Total n (income)	388 (48.2)	427 (51.8)			

Table A.24.

Country Comparisons in the Relationship in the U.S. between Participation in Formal and Non-Formal AET (FNFAET) and Income, Ages 55 to 65

	Non-Participation Group n (% of population)	Participation Group n (% of population)	Significance		
			Design-based F	df, rdf	p
U.S.					
Lowest	41 (49.5)	49 (50.5)	4.20	3.67,	<.05
Next lowest	30 (36.6)	50 (63.4)		161.35	
Mid-level	45 (40.1)	74 (59.9)			
Next to highest	37 (30.0)	97 (70.0)			
Highest	33 (22.6)	111 (77.4)			
Total *n* (income)	186 (34.2)	381 (65.8)			
Sweden					
Lowest	64 (53.4)	58 (46.6)	10.12	3.77,	<.001
Next lowest	55 (47.7)	67 (52.3)		298.17	
Mid-level	47 (35.5)	98 (64.5)			
Next to highest	36(27.5)	110 (72.5)			
Highest	27 (18.7)	123 (81.3)			
Total *n* (income)	231(36.5)	456 (63.5)			
U.K					
Lowest	111 (51.6)	89 (48.4)	8.70	3.84,	<.001
Next lowest	90 (58.3)	82 (41.7)		303.05	
Mid-level	65 (31.5)	100 (68.5)			
Next to highest	49 (41.3)	96 (58.7)			
Highest	33 (20.4)	124 (79.6)			
Total *n* (income)	348 (40.7)	491 (59.3)			
Japan					
Lowest	130 (71.9)	51 (28.1)	8.26	3.65,	<.001
Next lowest	113 (64.3)	68 (35.7)		288.61	
Mid-level	99 (66.6)	51 (33.4)			
Next to highest	60 (63.2)	38 (36.8)			
Highest	78 (42.8)	106 (57.2)			
Total *n* (income)	480 (61.3)	314 (38.7)			

Table A.25.
Country Comparisons of Estimation Results for Employment and
Participation in Formal and Non-Formal Adult Education and Training

	U.S.	U.K.
Intercept	0.532	-0.121
	(0.327)	(0.317)
Did not participate in FNFAET12 (ref. grp.)	-	-
Participated in FNFAET12	0.698***	0.572***
	(0.152)	(0.148)
Age (all age groups)[1]	0.265***	0.418***
	(0.0626)	(0.0655)
Male (ref. grp.)	-	-
Female	-0.379**	0.0586
	(0.140)	(0.144)
Education		
Lower secondary or less	-0.208	-0.385*
	(0.209)	(0.168)
Upper secondary (ref. grp.)	-	-
Beyond upper secondary	0.353*	0.799***
	(0.161)	(0.181)
Self-Rated Health	0.277***	0.372***
	(0.0802)	(0.0793)
Pseudo R2	0.05	0.09
Observations	3,540	5,977

Note: Due to small sample sizes in some countries for the 45 – 65 age group, we could not analyze that age group separately.

Robust standard errors in parentheses.
 *** $p<0.001$, ** $p<0.01$, * $p<0.05$

Country Comparisons of Estimation Results for Labor Force Participation and
Participation in Formal and Non-Formal Adult Education and Training

	U.S.	Germany	Sweden	U.K.	Japan
Intercept	1.155***	1.294***	0.383	1.236***	2.150***
	(0.229)	(0.234)	(0.239)	(0.203)	(0.220)
Did not participate in FNFAET12 (ref. grp.)	-	-	-	-	-
Participated in FNFAET12	1.360***	0.780***	1.030***	1.616***	1.247***
	(0.108)	(0.0931)	(0.107)	(0.101)	(0.0994)
Age (all age groups)	-0.214***	-0.149***	-0.00508	-0.264***	-0.155***
	(0.0462)	(0.0419)	(0.0480)	(0.0410)	(0.0397)
Male (ref. grp.)	-	-	-	-	-
Female	-0.974***	-0.631***	-0.686***	-1.073***	-1.510***
	(0.101)	(0.0948)	(0.110)	(0.0931)	(0.0957)
Education					
Lower secondary or less	-0.374*	-1.153***	-0.786***	-0.581***	-0.280*
	(0.151)	(0.127)	(0.134)	(0.110)	(0.133)
Upper secondary (ref. grp.)	-	-	-	-	-
Beyond upper secondary	0.133	0.383***	0.308*	-0.0907	-0.0484
	(0.110)	(0.108)	(0.127)	(0.108)	(0.0921)
Self-Rated Health	0.452***	0.336***	0.514***	0.480***	0.117*
	(0.0562)	(0.0543)	(0.0586)	(0.0483)	(0.0525)
Pseudo R2	0.17	0.13	0.15	0.21	0.14
Observations	4,325	4,604	3,858	8,045	4,628

Note: Due to small sample sizes in some countries for the 45 – 65 age group, we could not analyze that age group separately.

Robust standard errors in parentheses.
 *** $p<0.001$, ** $p<0.01$, * $p<0.05$

Country Comparisons of Estimation Results for Income and Participation in Formal
and Non-Formal Adult Education and Training

|	U.S.	Sweden	U.K.	Japan
Cut 1 - Intercept	0.398*	0.276	-0.709***	-1.860***
	(0.181)	(0.164)	(0.166)	(0.156)
Cut 2 - Intercept	1.711***	1.614***	0.466**	-0.419**
	(0.181)	(0.166)	(0.166)	(0.153)
Cut 3 - Intercept	2.813***	2.603***	1.500***	0.770***
	(0.186)	(0.171)	(0.168)	(0.152)
Cut 4 - Intercept	3.991***	3.766***	2.718***	2.026***
	(0.194)	(0.178)	(0.172)	(0.156)
Did not participate in FNFAET12 (ref. grp.)	-	-	-	-
Participated in FNFAET12	0.554***	0.699***	0.713***	0.798***
	(0.0818)	(0.0816)	(0.0796)	(0.0698)
Age (all groups)	0.365***	0.323***	0.188***	0.160***
	(0.0324)	(0.0299)	(0.0310)	(0.0285)
Male (ref. grp.)	-	-	-	-
Female	-1.019***	-1.258***	-1.395***	-2.188***
	(0.0755)	(0.0733)	(0.0773)	(0.0719)
Education				
Lower secondary or less	-0.686***	-0.418***	-0.546***	-0.376***
	(0.125)	(0.105)	(0.0949)	(0.111)
Upper secondary (ref. grp.)	-	-	-	-
Beyond upper secondary	1.108***	1.013***	0.943***	0.691***
	(0.0852)	(0.0786)	(0.0859)	(0.0723)
Self-Rated Health	0.306***	0.272***	0.191***	0.00675
	(0.0402)	(0.0367)	(0.0379)	(0.0382)
Pseudo R2	0.09	0.08	0.08	0.13
Observations	2,952	3,011	5,171	3,450

Note: Due to small sample sizes in some countries for the 45 – 65 age group, we could not analyze that age group separately.
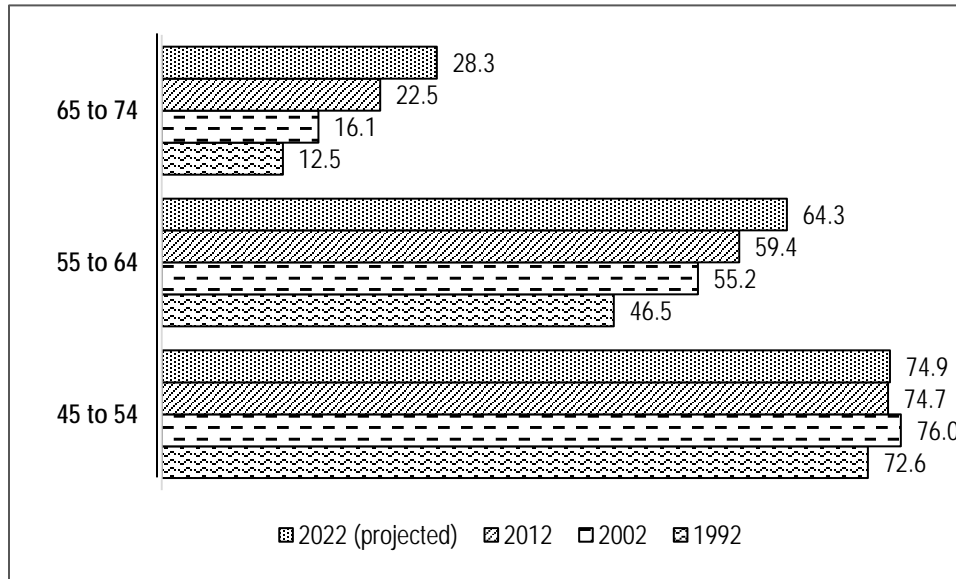
Robust standard errors in parentheses.
*** $p<0.001$, ** $p<0.01$, * $p<0.05$

Figure A.1.
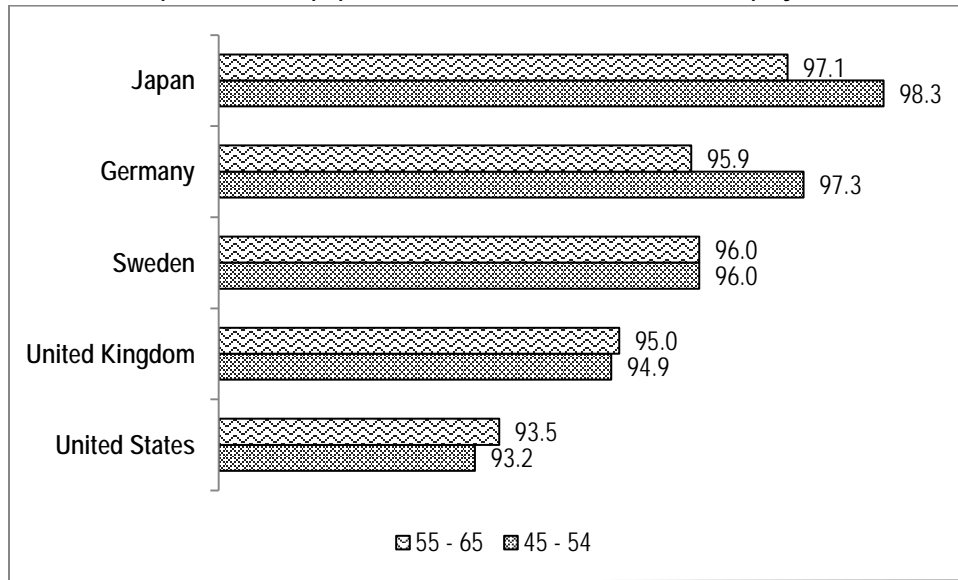**U.S. Male Labor Force Participation by Age Group –1992 to 2022 (percent of)**
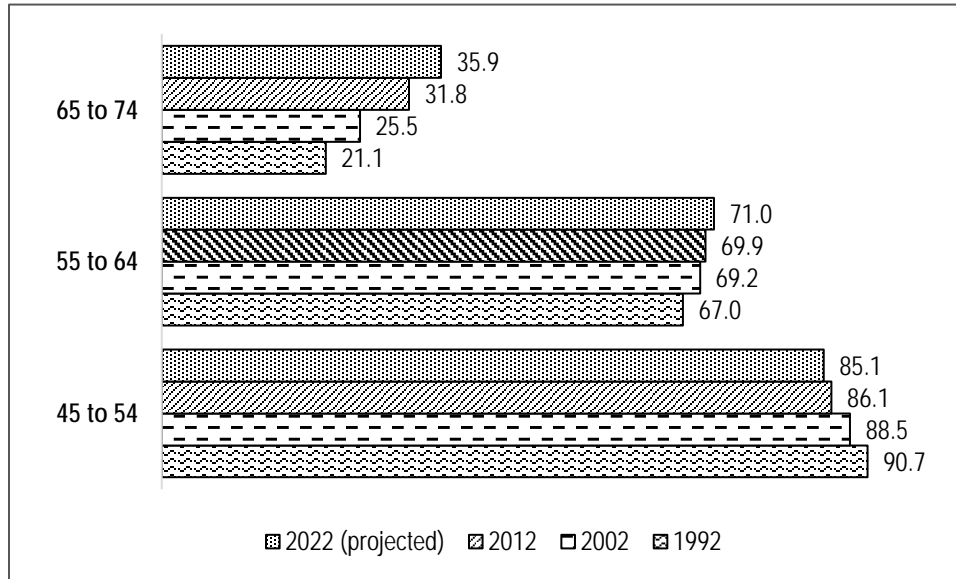
Source: Toossi (2013)

Figure A.2.
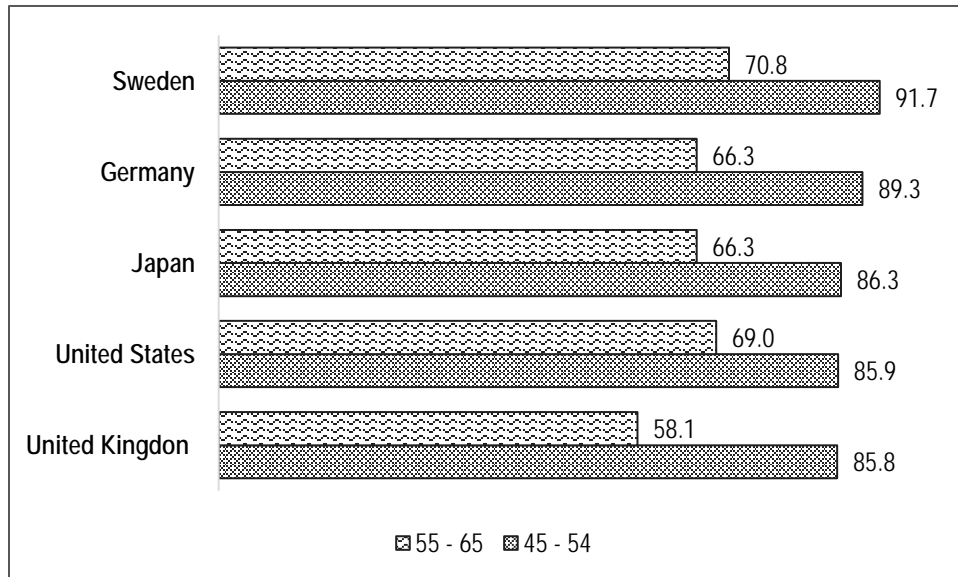**U.S. Female Labor Force Participation by Age Group –1992 to 2022 (percent of)**

Source: Toossi (2013)

Figure A.3.
Employment Status of the Population by Country and Age Group
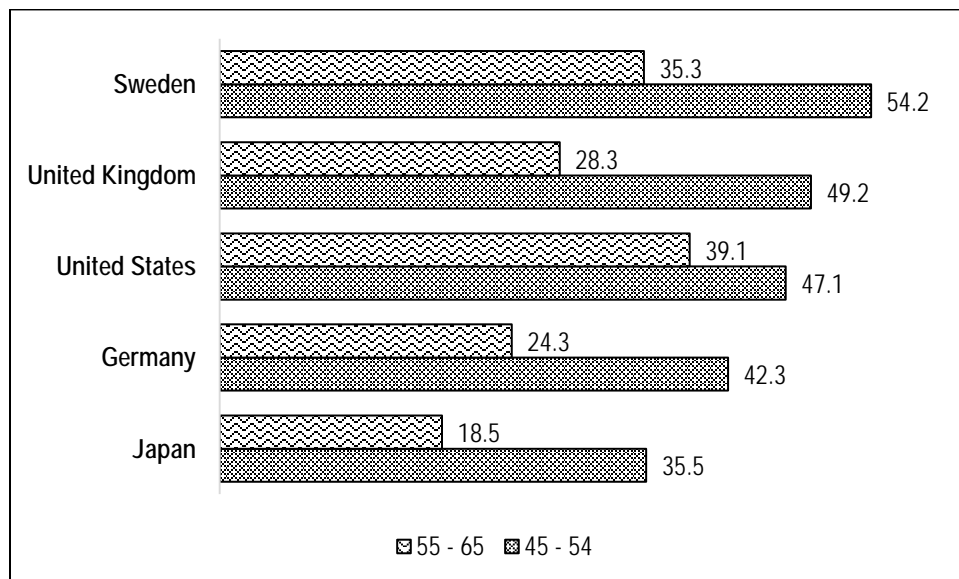(percent of the population in the labor market who are employed)

Source: OECD (2014a)

Figure A.4.
Labor Force Participation Rate of the Population by Country and Age Group (percent of population)
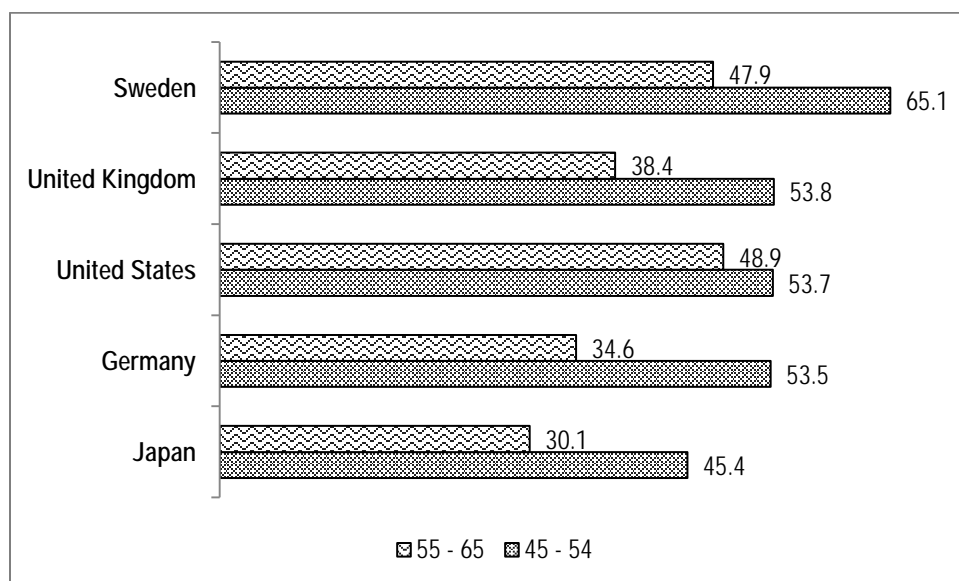

Source: OECD (2014a)

Figure A.5
Participation in Formal or Non-Formal AET (FNFAET12JR)
for Job Related Reasons in 12 Months Prior to Survey, by Age in the U.S. (percent of population)

Sweden — 35.3 / 54.2
United Kingdom — 28.3 / 49.2
United States — 39.1 / 47.1
Germany — 24.3 / 42.3
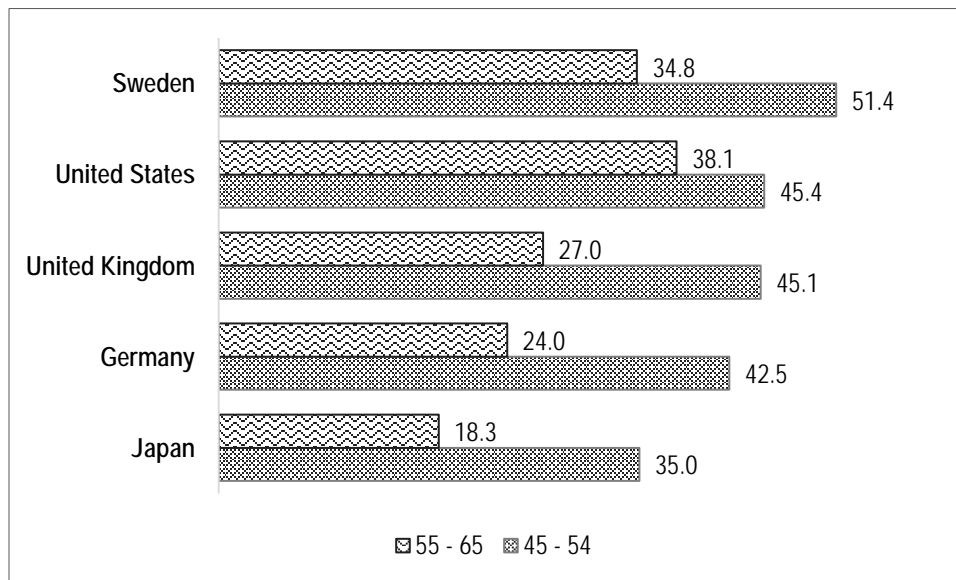Japan — 18.5 / 35.5

☒ 55 - 65   ☒ 45 - 54

Source: OECD (2014a)

Figure A.6.
Participation in Non-Formal Education (NFE12) in 12 Months
Preceding Survey, by Age Group in the U.S. (percent of population)

Sweden — 47.9 / 65.1
United Kingdom — 38.4 / 53.8
United States — 48.9 / 53.7
Germany — 34.6 / 53.5
Japan — 30.1 / 45.4

☒ 55 - 65   ☒ 45 - 54

Source: OECD (2014a)

Figure A.7.
Participation in Non-Formal Education for Job-Related (NFE12JR)
Reasons in 12 Months Preceding Survey, by Age Group in the U.S. (percent of population)

Source: OECD (2014a)