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EARNINGS AND EMPLOYMENT BENEFITS OF ADULT HIGHER EDUCATION IN COMPARATIVE PERSPECTIVE: EVIDENCE BASED ON THE OECD SURVEY OF ADULTS SKILLS (PIAAC)

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Abstract

This paper compares across OECD countries the earnings and labor force status differentials of adults who completed their Higher Education (HE) degree within and beyond the normative age that is typically associated with the qualification attained. Much formal education activity is now undertaken by adults over the age of 25 or returning youths who are not in their initial cycle of studies. Adult Higher Education (AHE) defined in this way is an established phenomenon in many countries. Moreover, qualifications and formal education are increasingly a function of well-developed Adult Learning Systems. Yet, while AHE is growing in some countries it is being discouraged in others and ill understood. Past adult education activity that has led to an individual's highest level of qualification is often ignored, yet understanding these activities and their potential role in skill development is crucial for education and labor market policy. A related issue that magnifies the problem is that highest qualifications is typically associated with initial formal education, but increasingly this is not case. In fact, the extent to which learning opportunities are extended to adults and the extent to which this seamlessly feeds into qualification measures may reflect critical structural and policy differences across countries that are essential for understanding better variations in adult skill profiles and also labor market success. Data from the Program for the International Assessment of Adult Competencies (PIAAC), which is a 23 country comparative study of adult learning and skills, enables a closer look at this phenomena using an international comparative lens. The analysis focuses on the incidence of AHE and statistical differentials in labor market outcomes associated with the completion of qualifications within vs beyond the normative age. Findings suggest that HE qualifications promote labor market attachment, productivity and overall employment, regardless of whether adults completed their HE qualification within or beyond the normative age, and that there is no systematic pattern in the differentials of the two types of students across countries.

Key words

Adult higher education; adult learning; adult education; nontraditional students; returns to higher education; benefits of higher education; earnings differentials; PIAAC; OECD Survey of Adult Skills; adult learning systems; adult learning statistics

Introduction

Adult Learning Systems (ALS) are increasing in importance in today's modern society, and the degree of *openness* of Higher Education (HE) systems to nontraditional students, or alternatively Adult Higher Education (AHE), is an important component of advanced ALS (Desjardins, in press, 2017). In this paper, *openness* of HE is defined as the proportion of adults who attained their HE qualification beyond the normative age (i.e. beyond the age in which students would have attained their highest qualification had they followed the normative path). This signifies the degree of flexibility and diversity in HE provision structures, for example, in terms of access, admission and selection policies, as well as capacity.

AHE is an established phenomenon in many countries but in some cases it is being discouraged and in others it is simply underdeveloped. While it is a type of adult learning that is growing as part of the lifelong learning agenda, it is a trend that is being discouraged in some countries because older students in HE systems are seen as an indication of inefficiency. Therefore, this is an important topic surrounding the growth of HE and the value of public investment in HE. Danish and Swedish officials for example, under the guise of saving the welfare state have sought to reduce the average age of graduates. In another example, Daghbashya (2012) considers the share of students aged 26 or over in HE as a source of inefficiency in her assessment of the efficiency of HE institutions in Sweden.

There are indeed sharp differences across countries in the extent to which HE systems are open to adults beyond the normative age. In some countries the HE system remains relatively closed by effectively limiting access to equivalent qualifications for adults who did not follow the normative path, and instead focus HE provision on younger cohorts as they follow the normative path. Such differences may be an important source of variation that explains economic success and other outcomes in different countries. But the idea that focusing HE provision on younger adults, increases efficiency may be an ill-conceived notion and too simplistic. In fact, it can be argued that the extent to which learning opportunities are extended to adults and the extent to which this seamlessly feeds into qualification measures may reflect critical structural and policy differences across countries that are essential for understanding better variations in adult skill profiles and also labor market success. Specifically, that the extent of AHE is potentially important for boosting labor market attachment, productivity and the skill supply.

The merits of AHE have been scrutinized in a number of countries at the micro level in terms of labor market success such as earnings and employability, but the Program for the International Assessment of Adult Competencies (PIAAC) dataset allows for broader comparative insights on benefits of AHE at the micro level as well as a glimpse on the macro level implications such as overall employment rates and the adult skill profile at the country level. From this perspective, our paper briefly summarizes the evidence on the merits of AHE and uses the PIAAC dataset to: report the incidence of AHE in comparative perspective; compare earnings and employment differentials of traditional vs nontraditional students; and, examine correlations at the country level between the *openness* of HE systems to nontraditional students and the employment rate as well as cross-national adult skill profiles.

The incidence of Adult Higher Education in comparative perspective

The highest qualification attained by an individual is typically associated with initial formal education. But this is not necessarily the case, particularly in countries with more advanced Adult Learning Systems (ALS) which feature formal education structures that are more *open* to nontraditional students. Much formal education activity is now undertaken by adults over the age of 25 or returning youths who are not in their initial cycle of studies. This is often difficult to recognize because past adult education activity that has led to an individual's highest level of qualification is rarely captured, and thus its significance ignored. Yet, understanding the extent of these activities and their potential role in skill development as well as other labor market effects is crucial for education and labor market policy. From this perspective, highest formal qualifications attained are increasingly a function of well-developed ALS, which are increasingly difficult to distinguish from HE systems.

Nontraditional students are defined as adults who completed HE at a later age than students who otherwise followed the normative pathway (i.e. traditional students). Age cut-offs between traditional and nontraditional students vary by study (see Chung, Turnbull & Chur-Hansen, 2014), but the most common cut-off is approximately age 24 or 25. This is a reasonable age but what is considered nontraditional in different contexts depends on established norms and actual flows within different countries. To be sure, these norms are changing. For instance, in the US, as of 2011, 38% of those enrolled in HE are over the age of 25, and 25% are over the age of 30. This increased from 21.3% in 1990 to 31.7% in 2013 (NCES, 2015b). Enrollment for those over the age of 25 is expected to increase another 23% by 2019 (Hess, 2011). In fact, enrollment in the US of nontraditional in the US is expected to grow at a much faster rate than traditional students between 2012 and 2022 (21.7% vs. 8.7%) (NCES, 2015a).

In this paper, we consider two alternative definitions in order to examine the sensitivity of the age cut-offs used to define students who can be considered *nontraditional*. Our *standard* definition considers adults to have been nontraditional students if they completed their: first-level tertiary degree (Bachelor level, or ISCED 5a or 5b¹) at age 26 or older; second level tertiary degree (Master level, ISCED 6²) at age 27 or older; and, advanced or research degree (Doctoral level, ISCED 7) at age 31 or older. To our knowledge, age cut-offs by level of HE qualification (i.e. bachelor, master or doctoral) are not common. Our *conservative* definition considers adults to have been nontraditional students if they completed their: first-level tertiary degree (BA, ISCED 5a or 5b) at age 31 or older; second level tertiary degree (MA, ISCED 6) at age 31 or older; and, advanced or research degree (PhD, ISCED 7) at age 35 or older. Figure 1 shows the proportion of nontraditional students who completed HE on the basis of both of these definitions. The left panel shows results for the standard definition and the right panel shows results for the more conservative definition.

Results for the standard definition (left panel of Figure 1) suggest that for many countries, a non-trivial proportion of adults have completed their studies as nontraditional students, or alternatively, as *adult learners*. In fact, had they still been in their program of study that led to their highest qualification within

¹ For the US, ISCED 5a corresponds to a Bachelor's degree (e.g. BA, AB, and BS) and ISCED 5b to vocational associate's degree (e.g. AA or AS) (OECD, 2013b). Accordingly, a certificate from a college for completion of a program before AA or BA is excluded from ISCED 5a and 5b. The ISCED 1997 classification was used in PIAAC where ISCED 5a refers to an academic associate's degree programs (short duration and intermediate theoretically-based: AA or AS), bachelor's degree programs (medium and first theoretically-based: BA or BS), and post-graduate certificate programs (long and second: post-graduate certificates (e.g. teaching credential)), while ISCED 5b includes vocational associate's degree programs (short and first: e.g. AA or AS) (OECD, 1999; UNESCO-UIS, 2015).

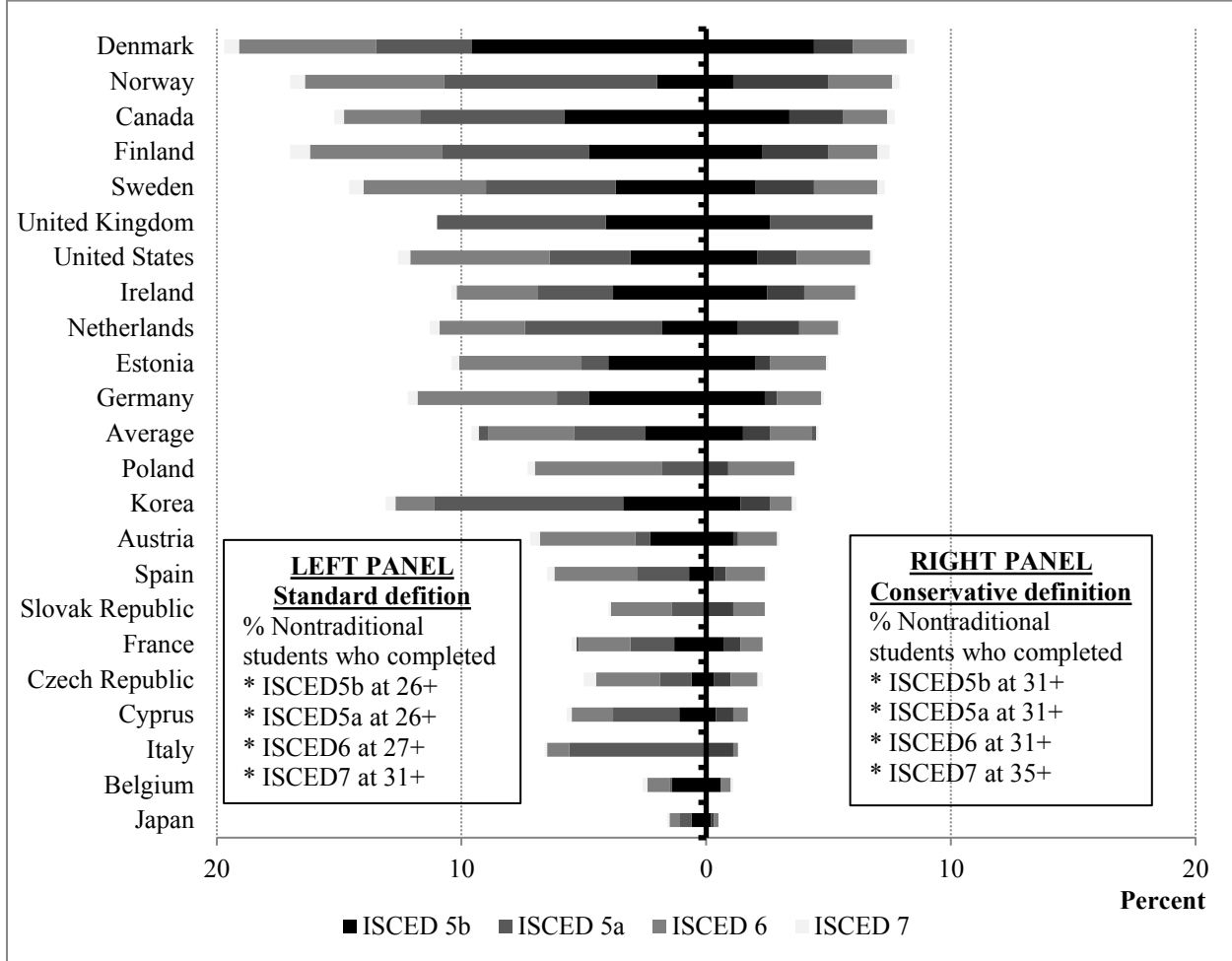
² ISCED 6 also includes professional degrees (e.g. MD, LLB, and JD)

the last 12 months, they would typically be considered to have participated in adult education according to most adult learning statistics (e.g. Patterson and Paulson, 2015).

Countries with the highest incidence of adults who completed their HE as nontraditional students include the Nordic countries (Denmark, Norway, Finland and Sweden) as well as Canada, the UK and the US. Korea, Ireland, Estonia, the Netherlands and Germany also feature incidence rates that are higher than the average across the countries included in the analysis. Perhaps not surprisingly, these are also the countries that tend to feature the highest rates of adult learning when defined as the percent of adults aged 25 and over who participated in some form of education or training in the 12 months prior to a survey (see OECD, 2013a, p.211).

As per our definitions, adults may have started out as traditional students, but for whatever reason completed their study at an age older than what is expected had they otherwise followed the shortest allowable pathway. This is one reason why we are interested in the more conservative definition. Even with the more conservative definition (right panel of Figure 1) results suggest that in many countries there is still a non-trivial proportion of adults who completed their studies as nontraditional students. As expected, however, the incidence drops by about half with the more conservative definition. Korea and Italy's drop is especially high which suggests that their HE systems are much less open to nontraditional students over the age 30, compared to their degree of *openness* to nontraditional students between the ages of 25 to 30.

FIGURE 1. Percent of nontraditional students (standard and conservative definitions) who completed HE, by type and level of degree



Left panel: Percent of adult who completed ISCED 5a or 5b (BA) over the age of 25, ISCED 6 (MA) over 26 and ISCED 7 (PhD) over 30.
Right panel: Percent of adult who completed ISCED 5a, 5b (BA), or 6 (MA) over the age of 30, and ISCED 7 (PhD) over 35.

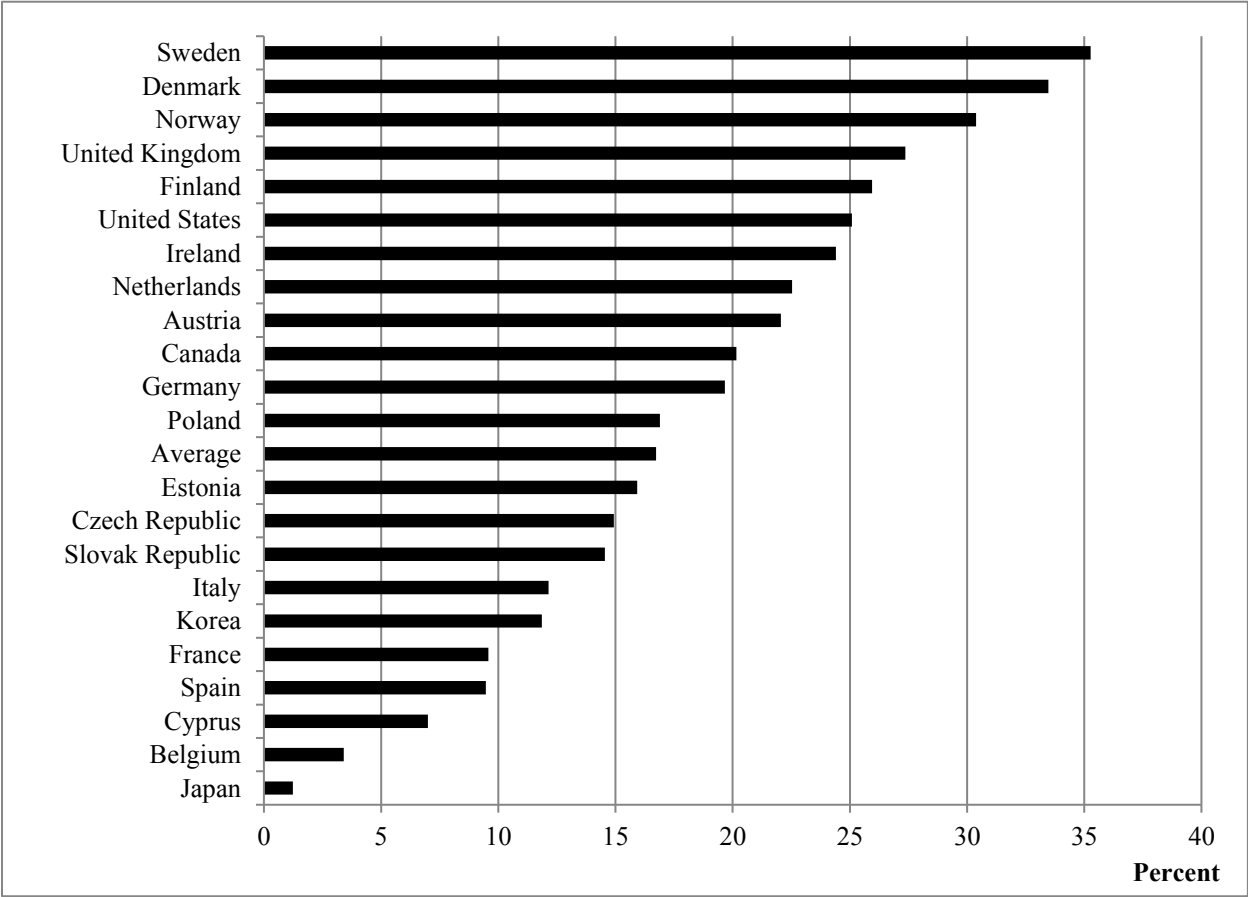
Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.
 Note: See Appendix Table A1 for corresponding estimates.

In general, these data on the incidence of AHE provide a good indication of the degree of *openness* of HE systems to nontraditional students. To our knowledge, the *openness* of HE systems as defined here has not been commonly used. However, previous studies related to nontraditional students have addressed several issues that may foster or hinder the degree of *openness* of HE systems to nontraditional students. In general, nontraditional students face various barriers to returning to and completing HE. Admission procedures are a major bottleneck for nontraditional students (Erisman & Steele, 2015) which may be discouraging (Wyatt, 2011). Low completion rates among degree-seeking nontraditional students are also a growing concern (Brown, 2012; Taniguchi & Kaufman, 2005). These students are two times more likely than traditional students to drop out school in the first year (Brown, 2012), and less than 20% of nontraditional students complete a HE degree (Lewin, 2011). This is not solely due to their individual capacity, but also institutional commitment to nontraditional students' needs. Experts share

a consensus that nontraditional students have needs that are different from those of traditional students (Brown, 2012). Fostering HE completion among nontraditional students therefore requires HE institutions to modify both the services they provide to nontraditional students and the way in which those services are executed (Erisman & Steele, 2015). From this perspective, a high incidence of AHE can be taken as an indication that HE provision structures are more *open*, flexible and diverse and thus more effective at catering to the needs of adults and the labor market.

Taken as an indicator of the relative degree of *openness* of HE systems in different countries, Figure 2 compares the proportion of adults who completed HE at the age of 31 or older with those who completed at the age of 30 or under. As can be seen, about one in three adults finished their HE degree over the age 30 in Sweden, Denmark and Norway, while about one in four did so in the UK, the US and Finland. According to these estimates, the incidence of AHE appears to be very high in some countries. At the same time, there is considerable variation across countries with some exhibiting very low levels of access for nontraditional students to HE.

FIGURE 2. Ratio of adults completing HE at age 31 or over vs those completing at 30 or under



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.
 Note: As specified in Figure 1, the age cut-off for PhD students (ISCED 7), which is a very small proportion, is set at 35+.

A brief overview of findings on higher education outcomes for traditional vs nontraditional students

Previous findings on benefits to traditional students

There is a vast literature in the economics of education and labor economics which has examined the returns to schooling and the determinants of wages across countries (e.g. Arias, Hallock, & Sosa-Escudero, 2001; Card, 1999; Harmon, Oosterbeek, & Walker, 2000; Psacharopoulos, 1994; Willis, 1986). Specifically, the positive impacts of HE on economic returns have been reported in many studies (e.g. Baum, Ma, & Payea, 2013; Kjelland, 2008; Walker & Ahu, 2003). Regardless of the age at which students complete their degree, HE is widely believed to improve the lives of those who participate. Moreover, the benefits of HE are frequently shared with the societies in which individuals are a part (Baum *et al.*, 2013), although there are certainly positional effects too whereby individual lives improve simply by moving up in the socioeconomic hierarchy and hence their improved lives can come at the expense of others³ (Desjardins, 2008). Focusing only on private returns, which is the most frequently analyzed (Badescu, D'Hombres, & Villalba, 2011), sets this complication aside, even if this all too often leaves results vulnerable to interpretations that do not account for possible fallacies of composition.

Across the OECD, HE graduates are found to earn a substantial premium relative to adults who have only attained upper secondary credentials (OECD, 2012). Those with vocationally-oriented HE earn on average a premium of about 30% and those with academically-oriented HE or advanced research credentials earn a premium of about 70% in comparison with adults who have only attained only upper secondary or post-secondary non-tertiary HE (OECD, 2014). During a 40-year full-time working life, the median earnings of HE degree recipients without an advanced degree are, on average, approximately 65% higher than that of upper secondary school graduates (Baum *et al.*, 2013). On a yearly basis, the average premium is about 10% per additional year of HE in the US (Oreopoulos & Petronihevich, 2013), and it averages above 8%, varying in range from 4% to 15% in 21 OECD countries (Boarini & Strauss, 2010). Premiums have been found to steadily increase as workers move further along their career paths, from a 20% advantage in men's late 20s to early 30s to a 51% advantage in their late 30s to early 40s⁴ (Brand & Xie, 2010). The differences among median earnings by educational level are smaller in the early career years for example, for 25-29 years old. But these are found to increase by 50% by the age of 40-44 for those with bachelor's degrees, and by 57% for those with master's degrees (Carnevale, Rose & Cheah, 2011).

Premiums also seem to have strengthened across time. The earnings premium has been consistent and rising over the past 40 years (1987-2011) in the US for those with bachelor's degrees, and particularly for those with advanced (graduate) degrees.

After accounting for costs, both direct (e.g. tuition fees) and indirect (e.g. income taxes, social contribution to levies and loss of salary due to delayed entry into the labor market), net rates of returns reveal similar positive results (OECD, 2014), supporting the overall worthiness of investing in HE. Not

³ Positional effects refer to the impact of the interaction between HE and the labor market in terms of helping individuals gain access to well-paying jobs with good benefits. HE as a positional good may operate as a sorting mechanism for the labor market (West, 2000). Accordingly, HE may confer positional advantage in the labor market on those completing their HE degree which may simply come at the expense of others rather than leading to overall positive impacts on the economy .

⁴ This is estimated under the population homogeneity assumption, i.e. different members of a population respond identically to higher education.

least, individuals with HE degrees are more likely to be employed and work full time than individuals with upper secondary school diplomas (Baum, Kurose, & Ma, 2013).

Economic returns to HE are not identical for all members of a society (Card, 1999), i.e. there are variations in the earnings premium, which are dependent upon socio-demographic factors such as gender, race/ethnicity and socioeconomic status. For instance, average annual earnings for bachelor's degrees are higher for men than for women in the US (\$14,925 vs \$12,337) (Perna, 2003). But this does not hold across countries. For example, Conlon and Patrignani (2011) find that women post a marginally higher return compared to men (29.7% vs. 23.5%) in the UK. Indeed, returns can vary widely across countries, often due to institutional variations and/or labor market policies and practices. Focusing on Europe, Badescu *et al.* (2011) conclude that the wage returns to HE vary greatly across Europe, with the highest premiums found in Eastern European countries (e.g. Slovenia, Hungary and Lithuania) and the lowest in Scandinavian countries (e.g. Sweden, Norway and Denmark). According to their OLS estimates, wage premiums are highest in Portugal (98%) and lowest in Sweden (21%).

Previous findings on benefits to nontraditional students

An important cross-country variation as can be seen from Figure 1 and 2 is the degree of *openness* of the HE systems to nontraditional students. As defined above, nontraditional students can be considered adult learners. In other research, for example, adult education (adult learners) may be interchangeably used with other terms such as educational upgrading, further education, and mature-age education. Coelli, Domenico, and Zakirova (2012) define mature-age education as an educational upgrade later in life, specifically as “any study towards a formal education qualification for those aged 25 to 64 years (p. 8).” Similarly, Egerton (2001b) defines mature student status as “entry into first degree studies at age 21 or older and entry into higher degree studies at age 25 or older (p. 14)”. But, Woodfield (2011) defines mature students as those over the age of 21 on entry to HE.

The outcomes to nontraditional students in HE are generally addressed and measured in terms of labor market outcomes such as employment probabilities, earnings, and career progress (occupational mobility) (e.g. Buchholz, Unfried, & Blossfeld, 2014; Wahler, Buchholz, Jensen, & Unfried, 2014). Comparison groups can vary, for example, those who graduated at the normative age (traditional students), or adults who do not participate in HE at all (Kilpi-Jakonen, vono De Vilbena, Kosyakova, Stenberg, & Blossfeld, 2012). Some studies emphasize comparisons to other types of adult education. For instance, Triventi and Barone (2014)⁵ compare the magnitude of economic returns to non-formal training (i.e. at least one job-related experience without any certificate) in the short term to returns to formal adult education (i.e. at least one adult learning experience that lead to a recognized certificate⁶) across 22 industrialized countries.

Both cross-sectional studies, which compare nontraditional students who completed a level with those that did not, as well as longitudinal studies, which examine educational trajectories vs outcomes across time, have reported positive labor market outcomes (e.g. Coelli, Domenico, & Zakirova, 2012; Stenberg, de Luna, & Westerlund, 2011; Vanttaja & Jarvinen, 2006). But there is a debate on whether the effects of mature-age education, or alternatively Adult Higher Education (AHE) are worthwhile. Silles (2007)

⁵ They find that returns to non-formal training appears to be systematically larger than returns to formal adult education, but their analysis is based on flow measures and not necessarily the highest qualification attained.

⁶ A recognized certificate includes university degree, college trade-vocational or apprenticeship certificate, elementary- or secondary-school diploma).

found no evidence of an earnings return to formal education qualifications acquired in adulthood in the UK.

In general, a narrative of disadvantage is prominent within the academic and policy literature on mature students' HE experience (Woodfield, 2011). Many studies, based on large-scale quantitative databases through small-scale qualitative studies, argue that mature students are disadvantaged in the graduate labor market (Woodfield, 2011). Specifically, some studies shed light on mature graduates' disadvantage in comparison with early graduates, i.e. traditional-entry graduates, in terms of income after graduation (e.g. Egerton, 2000; Holmlund, Liu & Nordström Skans, 2007; Klausen, 2011; Purcell et al., 2007; Taniguchi, 2005). Older mature graduates have been found to be more vulnerable to employment problems than younger mature graduates, to be more likely to be 'economically inactive', and to be less well paid (e.g. Egerton, 2001b; Purcell & Elias, 2004; Purcell, Wilton, & Elias, 2007; Redmond, 2006). Blasco (2002) also points out that among mature graduates, those over 24 years of age experience greater disadvantages in the labor market than their counterparts aged 21 to 24 at entry to HE. In relation to work experience, progressive improvements in the rate of return for older mature graduates may come too late to correct initial losses (Purcell & Elias, 2004). Even with work experience controlled for, mature graduates earn less than traditional graduates (Blundell, Dearden, Goodman, & Reed, 1997; Egerton & Parry, 2001). For instance, mature graduates aged 40 and older earned approximately 85% of what younger graduates make (Woodley, 1991). The type of employment is one of the factors affecting the prospect of lower returns for mature graduates (Egerton, 2001b). The majority of mature graduates tend to end up working in the public sector in which rates of pay are lower than in the private sector (Egerton, 2000; 2001a; Inglis & Murphy, 1999)

Advantages of mature graduates are also reported in many different empirical studies (e.g. Coelli *et al.*, 2012; Elman & O'Rand, 2004; Woodfield, 2011). The time it takes for positive outcomes to be realized has also been studied (e.g. Coelli *et al.*, 2012; de Vilhena & Gamundi, 2014). In general, the probability of employment is found to increase (Coelli *et al.*, 2012).

Differentials by gender

The effects of mature-age education on labor market outcomes differ by gender (e.g. Coelli *et al.*, 2012; Egerton, 2001a, 2001b; Woodfield, 2011) and the type and level of education undertaken (e.g. Coelli *et al.*, 2012). In general, mature-age education has stronger effects for men than for women (Coelli *et al.*, 2012), but the results from many studies including those introduced above suggest that the effects of mature-age education for women are mixed. For women, the effects are limited and mostly related to the individuals' employment status. In particular, the strongest effects are detected with regard to the probability of employment for previously non-employed women. Enrolling in a bachelor degree or higher increases the probability of holding a permanent job by ten percentage points for those women who already worked permanently and the same effect can be found with respect to the completion of a bachelor degree or higher (Coelli *et al.*, 2012). Also, women who undertook VET studies (certificates and diplomas) increased their likelihoods of attaining a job by 33 percentage points and also their disposable income (Coelli *et al.*, 2012). Enrolment in university studies (bachelor and above) also produced positive effects on the labor market: increased probability of retaining a permanent job by almost 10 percentage points for women and increased wage rates for men (Coelli *et al.*, 2012). Egerton (2001b) estimated private rates of return to mature-age education and concluded that women mature graduates fare the worst in terms of labor market opportunities. Conversely, Crichton and Dixon (2011) reached a

conclusion that on average, diplomas at level 5-6⁷ appear to be related to an increase in relative earnings for women, but not for men. Similarly, Saar *et al.* (2014) report a result that formal education obtained later in life increases the likelihoods of upward occupational mobility for women.

Differentials by social origins

Social origins also influence labor market opportunities for mature graduates entering the labor market (e.g. Egerton, 2000, 2001c). This makes sense since participation in formal education among workers is often an individual choice that is affected by socio-demographic characteristics (e.g. gender, age, and the educational level attained) (Treiventi & Barone, 2014). Egerton (2001c) investigated occupational outcomes across social classes. Specifically, he looked at differences of early and mature graduates who were considered to belong to the 'manual' vs 'service' class and concluded that (1) those who are from service class origins are more successful than those who are from manual origins in acquiring upper than lower service class jobs; (2) unemployment tends to be higher for mature graduates who are from intermediate and manual origins than for mature graduates who are from service class origins; (3) five years after completion, graduates who are from any origins have low unemployment rates, though graduates who are from manual origins have much higher rates of unemployment in the first four years after completion; (4) though manual class mature graduates face many penalties, mature study still stimulates intergenerational social mobility. Focusing on occupational-class mobility, de Vilhena and Gamundi (2014) conclude that a significant and positive mobility effect was related to educational upgrading, but only for men. They also point out that the effect of educational upgrading is not immediate but rather slow, though positive.

Other country specific findings

There are significant cross-country variations in the magnitude of advantages and disadvantages of mature graduates.

According to Hango (2010), HE experiences of **Canadian** mature graduates are helpful for gaining a foothold in the labor market, but not necessarily for higher earnings. Significant wage and earnings returns appear to be obtainable only when a HE certificate is earned, especially for men (Drewes, 2010; Zhang & Palameta, 2006). Benefits (e.g. wages and employment gains) of mature-age education appear to be relative, depending on characteristics of those participating in mature-age education. Benefits are strong, in particular for individuals experiencing unemployment (Drewes, 2010), poorly-educated (Myers & Myles, 2005), and attending HE shortly following job loss (Frenette, Upward, & Wright, 2011).

In **Sweden**, upgraders from upper secondary to a university degree, increase their employment probability by about 7.5 percentage points for men and 6 percentage points for women (Kilpi-Jakonen & Stenberg, 2014). Similarly, investigating the economic returns on HE degrees obtained in ages above 30 for individuals with upper-secondary schooling, Hallsten (2011) found strong employment effects and small effects on earnings while employed, i.e. late HE degrees increase the employment rate by 18 percentage points and earnings by 12 percent.

Wahler, Buchholz, Jensen, and Unfried (2014) examined the labor market returns to adult learning (e.g. the risks of unemployment, the employment chances of the unemployed, and direct career mobility⁸) in **Denmark** using longitudinal analyses and multivariate event history methods. They found that for adult

⁷ There are 10 levels of study in HE in New Zealand. The lowest level is a certificate (levels 1 to 4) and the highest is doctoral degrees (level 10).

⁸ Annual income increases of at least 10 percent are classified as upward career mobility, whereas downward mobility is identified as a loss of income of 5 percent or more.

learners older than 25, HE participation considerably decreases the risk of becoming unemployed⁹ for both women and men, improves full-year unemployed persons' likelihoods of becoming employed (the second highest; vocational upper secondary is the highest), and increases both the likelihoods of upward mobility and the risk of downward mobility. These findings suggest that individuals who participate in HE are more mobile in general.

Kilpi-Jakonen, Sirnio, and Martikainen (2014) investigated two labor market outcomes (the average number of months of unemployment per year and annual income) in **Finland** using repeated measures linear regression, and the method of generalized estimation equations with an exchangeable correlation structure to measure population-averaged effects while taking into consideration within-subject correlation. According to them, in general, adult learners¹⁰ appear to be marginally disadvantaged in comparison with younger graduates. The beneficial effects of graduation on unemployment are quite similar for adult and younger graduates regardless of educational levels completed. Yet, for adult learners at the HE level, there is a significant increase in income after graduation for both women and men, but not as much as for younger graduates. Also found are that women do not attain the same income levels as their male counterparts.

A formal adult education upgrade also affects labor market outcomes in **Hungary**. In comparison with no educational upgrade, HE is the best form of adult educational upgrade and offers the most important improvements (i.e. positive effects on upward labor market mobility), especially for men, and earning a HE degree is associated with decreases in the risk of losing a job (i.e. negative effects on downward labor market mobility), especially for women (Csanadi, Csizmaday, & Robert, 2014).

Conducting an occupational mobility analysis (i.e. the effects of adult formal education on occupational mobility) in **Estonia**, Saar, Unt, and Roosmaa (2014) found that individuals who have attained HE turn out to be more upwardly mobile than individuals with primary, vocational or general secondary education. Accordingly, it is argued that participation in formal adult education (post-secondary) has a positive impact on upward occupational mobility in Estonia¹¹.

Buchler, Chesters, Higginson, and Haynes (2014) looked into the effects of completing a course of adult education on occupational status in **Australia** and concluded that doing so¹² leads to a significant increase in occupational status¹³ in the year of completion (an average of 5.4 points on a scale of 0-100) and in the following years (ranging from 3.0 to 4.8 points), regardless of whether or not the completed

⁹ However, in comparison with other educational levels, with exception of non-formal adult learning, when controlling for educational background, the magnitude of unemployment risks of completing HE appears to be the lowest for men, but the second highest for women.

¹⁰ These are defined as those enrolling in an educational institution at the minimum age of 25 and graduating during the follow-up with a qualification at a higher level or in a different field compared with the previous highest educational qualification.

¹¹ Occupational mobility is defined as mobility between first and second job after completing the highest educational level in this study. The difference between two consecutive work episodes measured by the International Socio-Economic Index scale was used to measure upward and downward mobility. .

¹² Completion of an adult educational qualification is defined as either completing a doctorate after 29, a master's degree after 26, a graduate diploma, graduate certificate, or honors degree after 25, a bachelor degree or advanced diploma after 24, a diploma, associate degree after 23; or certificate level I or a diploma after 22.

¹³ Occupational status scale, which is based on the respondents' current main job in any given year, ranges from 0 to 100, where a higher value indicates a higher occupational status. The mean is 40.2 across 10 waves of survey data collection between 2001 and 2010.

qualification resulted in a higher level of qualification. Also they report that the returns to adult education increase until approximately three years after completing adult education, at which point the returns reach the peak and thereafter decrease somewhat. Even, completing adult education results in an increase in occupational status with all other factors held constant (e.g. place of birth, education level, and employment contract). These benefits vary across different groups. Completing adult education benefits some groups (e.g. individuals born in non-English speaking countries, individuals without a postgraduate degree, and fixed-term employees).

Coelli *et al.* (2012) examined ten labor market and wellbeing outcomes (e.g. total disposable income, job satisfaction, the perception of the degree of utilization of individual skills within the job, hourly wage rate, weekly working hours, life satisfaction, satisfaction with employment opportunities, occupational status, probability of employment, and probability of permanent employment) to measure the effects of mature-age enrolment and of completing adult education courses on labor market outcomes in **Australia**. A small number of outcomes are just affected by mature-age education. For instance, enrollment in a bachelor degree or higher increases the chances of women holding a permanent job by about 10 percentage points and paid off for individuals who were already employed before the education spell. The probabilities of retaining a job are higher for men after university-level education than for other individuals.

Employing a difference-in-difference approach (i.e. comparing the study group members over the pre-study to post-study period with a matched comparison group of working adults who did not return to education) to investigate the earnings benefits obtained by adults aged 25-64 years completing a certificate or diploma-level qualification at a HE level in **New Zealand**, Crichton and Dixon (2011) concluded that only a small proportion of the graduates increased their relative earnings by three years afterwards at levels 1-3 or 4, in particular in certain fields of study (e.g. a 7% increase in the relative earnings in the society, culture, and welfare field for women at level 1-3 certificates, 4% at level 4 certificates, and 8% at level 5-6 diplomas; engineering or business and management for men).

Table 1. A summary of findings on benefits to nontraditional students from studies referenced above

Studies	Outcomes	Methods	Significance
<i>Cross-national</i>	Positive wage returns to adult learning across industrialized 22 countries, in particular for non-formal education; but a limited short-term impact on wages for formal education (Triventi & Barone, 2014)	Interval regression	Significant; 95% confidence intervals are reported in figures.
<i>Country-specific</i>			
Canada	Positive returns (both annual earnings and hourly wage) (Zhang & Palameta, 2006)	Linear regression	Significant (p<.05)
Sweden	Strong employment effects & small earnings effects (Hallsten, 2011); Employment effects (Kilpi-Jakonen & Stenberg, 2014)	Fixed effects with matching Linear probability model	Significant (p<.001) 95% confidence intervals are reported in figures.
Denmark	Decreasing risk of unemployment, increasing chances of employment, positive upward career mobility (Wahler et al., 2014)	Logistic regression	
Finland	Significant increase in income (Kilpi-Jakonen et al., 2014)	Linear regression	
Hungary	Positive upward labor market mobility & negative downward labor market mobility for all (men and women) (Csanadi et al., 2014)	Binomial regression	Upward mobility: Significant (p<.10) Downward mobility: Significant (p<.05)
Estonia	Positive upward occupational mobility, in particular for women (Saar et al., 2014)	Competing risks regression	Significant (p<.05)
Australia	Significant, positive increase in occupational status (Buchler et al., 2014); Higher probabilities of retaining a job after completing HE, in particular for women (Coelli et al., 2012)	Fixed-effects regression Multivariate regression	Significant (p<.05) Significant (p<.01)
New Zealand	Increasing relative earnings (Crichton & Dixon, 2011)	Difference in difference analysis	

What are the comparative earnings and employment differentials of traditional vs nontraditional students using PIAAC data?

We now turn to an empirical analysis of the labor force status and earnings differentials of adults who completed their HE degree above the normative age, using the conservative definition discussed earlier, and using the PIAAC dataset.

The PIAAC Data

The data analysis is based on own calculations using the PIAAC data (also known as the OECD Survey of Adults Skills). This dataset comprises high quality and comparative data on adult skills and adult learning for 23 countries. See OECD (2013a) for technical details on the study including on scope, sampling, and response rates. The PIAAC study follows up on previous large-scale co-operative efforts undertaken by

governments, national statistics agencies, research institutions and multi-lateral agencies, namely the 1994-1998 International Adult Literacy Survey (IALS) and 2003-2007 Adult Literacy and Lifeskills Survey (ALLS). The dataset is publicly accessible, but analyses for Germany and the US are based on special arrangements from relevant authorities. Data for Australia was not accessible and it was not possible to include Canada in the earnings analysis in a comparative way.

There are at least two distinct approaches to conceptualizing Adult Higher Education (AHE) participation in PIAAC. The first involves the identification of nontraditional students aged 25 to 65 who participated in formal education programs toward ISCED 5a, 5b, 6 or 7 either at the time of the survey or at some point in the 12 months preceding the survey. This is the typical definition for calculating the incidence of adult learning in formal education programs using a 12 month reference period. It was used for example in the analysis by Triventi and Barone (2014). The definition does not capture whether the student is at the beginning or middle point of their degree, or whether they completed their degree or indeed whether it is related to their highest qualification attained. In this sense, it is a *flow measure* with limited information. The second approach involves the identification of nontraditional students aged 25 to 65 who completed ISCED 5a, 5b, 6 or 7 at an age deemed to be *non-normative, mature or nontraditional*, and thus considered to have participated in AHE at some point in their life to attain their highest educational degree. The individual may have engaged in AHE and completed their degree in the year prior to the survey or 5, 10, 15 or however many years ago. In this sense, it is a *stock measure*. The two approaches are rather different. A stock measure is more appropriate than a flow measure in examining economic returns of HE qualification attainment (see Conlon & Patrignani, 2011; OECD, 2012¹⁴). Thus, the data analysis that follows is based on the definition of a stock measure.

Sample, exclusions and descriptive statistics

The PIAAC samples are representative of adult populations aged 16 to 65. Therefore, there are in principle no selection problems in the sample. A sampling weight is used to calculate all estimates in order to take into account complex survey designs and thus adjust for sampling error.

Figures 1 and 2, already introduced, include overview results for 22 countries for which data was made available in the PIAAC dataset. These results revealed that the incidence of AHE however defined, is non-trivial, but varies widely across countries. On this basis, a choice was made to select the top nine countries in terms of the incidence of AHE for further analysis, specifically to compare earnings and employment participation differentials of HE graduates who are traditional vs nontraditional. The countries selected for further analysis are: Denmark, Finland, Germany, Korea, the Netherlands, Norway, Sweden, the UK and the US.

Estimates reported on the incidence of AHE are based on representative adult populations aged 26 to 65. That is, as (potentially) traditional students in HE, youths aged 16 to 25 are excluded from the analysis. Similarly, estimates reported on the employment rate associated with AHE are based on representative adult populations aged 26 to 65. Table 2 outlines the sample sizes and provides basic descriptive statistics associated with this population.

¹⁴ The net present value of HE as “an estimate of the net economic benefits to an individual who completes HE, over his or her working life, expressed in the value of money today” is measured by estimating the economic benefits associated with an individual completing HE in comparison with, for example, an individual completing an upper secondary education (OECD, 2012, p. 3).

In contrast, estimates reported on the earnings premium associated with AHE are based on adults aged 26 to 65 who were considered to be employed at the time of the survey (assessed using an adapted version of the ILO LFS module)¹⁵. Separately, adults with earnings in the bottom and top 2 percentiles were excluded from the analysis. Typically, the bottom 2 percentiles feature zero or very low earnings, and the top two percentiles typically feature outlier data. See Tables 3 and 4 for relevant descriptive statistics associated with this population.

¹⁵ It is possible for adults to be deemed employed using this module, even if the individual subjectively views themselves as unemployed or under-employed, or for example, as a student. As an example, individual may be employed in internships or unpaid work, and view themselves as unemployed. For this reason, and also to adjust for intensity of work effort vis-à-vis monthly earnings, subjective labor force status is controlled for in the OLS models.

TABLE 2. Descriptive statistics for adult populations aged 26 to 65.

	DK	FI	DE	KO	NL	NO	SE	UK	US	Total
Sample size	616	448	431	550	420	405	355	752	407	6608
Average age	46	46	45	44	46	45	46	45	45	45
Average years of paid work	25	22	22	15	22	22	23	23	23	22
Column %										
Gender										
Men	50	50	50	50	50	51	50	49	48	49
Women	50	50	50	50	50	49	50	51	52	51
Native and language status										
Native-born, native language	88	95	84	98	85	85	79	83	81	83
Native-born, Foreign language	1	2	1	0	1	1	2	2	2	2
Foreign-born, Native language	1	1	4	1	4	1	2	6	4	4
Foreign-born, Foreign language	10	2	11	1	10	13	16	9	12	11
Subjective labor force status										
Employed full-time	61	64	54	63	46	66	63	55	59	58
Employed part-time	11	7	20	9	28	14	14	18	11	13
Student, apprentice, intern	3	4	2	1	1	3	3	1	2	2
Other	25	26	23	27	25	18	19	26	28	27
Attainment rate %										
Completed highest qualification in AHE (standard definition)	24.3	21.0	14.8	15.8	13.7	21.0	18.1	13.6	16.0	15.1
Completed highest qualification in AHE (conservative definition)	10.5	9.2	5.9	4.6	6.7	9.9	9.1	8.5	8.7	7.5
Highest qualification attained within and beyond cut-off age used for conservative definition										
ISCED 5b (at age 31 or over)	5.4	2.8	3.0	1.8	1.6	1.4	2.4	3.2	2.7	2.8
ISCED 5b (at age 30 or under)	15.9	14.3	10.4	14.5	2.2	3.7	6.7	10.0	6.2	8.8
ISCED 5a (at age 31 or over)	2.0	3.3	0.6	1.5	3.1	4.9	3.0	5.3	2.0	1.7
ISCED 5a (at age 30 or under)	5.6	9.7	2.6	19.1	16.8	15.8	8.3	20.3	15.5	12.5
ISCED 6 (at age 31 or over)	2.7	2.5	2.2	1.1	1.9	3.3	3.3	0.0	3.8	2.8
ISCED 6 (at age 30 or under)	7.6	9.0	13.8	1.4	7.4	10.1	8.1	0.0	7.1	6.8
ISCED 7 (at age 36 or over)	0.4	0.6	0.1	0.2	0.1	0.3	0.4	0.0	0.2	0.2
ISCED 7 (at age 35 or under)	0.9	1.0	1.2	0.4	0.7	0.7	0.7	0.0	1.2	1.0
Did not complete Higher Education	59.3	56.9	64.3	59.5	63.6	57.3	66.2	59.2	56.7	58.1

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

TABLE 3. Descriptive statistics for employed populations aged 26 to 65

	DK	FI	DE	KO	NL	NO	SE	UK	US	Total
Sample size	4225	3156	3040	3684	2849	3125	2734	4630	2613	44992
Average age	45	44	44	43	44	44	45	43	44	44
Average years of paid work experience	24	21	22	16	22	22	22	23	23	22
Average monthly earnings (US\$ PPP)	4057	3242	3179	3041	3424	4043	3125	3087	4133	3702
Column %										
Gender										
Men	52	50	53	61	54	52	52	53	51	53
Women	48	50	47	39	46	48	48	47	49	47
Native and language status										
Native-born, native language	89	95	86	98	87	86	82	84	82	84
Native-born, Foreign language	1	1	1	0	1	1	2	1	2	2
Foreign-born, Native language	1	1	4	1	4	1	2	6	4	4
Foreign-born, Foreign language	9	2	9	1	8	13	14	9	12	11
Subjective labor force status										
Employed full-time	79.7	84.4	67.6	85.0	59.3	80.2	79.3	73.8	78.6	76.6
Employed part-time	14.6	8.6	26.2	12.2	37.5	16.2	17.5	23.4	13.9	17.3
Student, apprentice, intern	1.9	1.5	1.5	0.4	0.7	1.1	0.9	0.6	1.1	1.0
Other	3.8	5.5	4.7	2.4	2.5	2.5	2.3	2.2	6.4	5.1
SES (Parent education)										
Lower than secondary education	32.5	42.9	10.9	60.4	51.1	29.2	44.8	28.5		
Secondary education	38.7	41.0	55.5	26.6	25.3	40.0	22.7	45.9		
Higher than secondary education	28.9	16.1	33.6	12.9	23.6	30.9	32.5	25.6		
Cognitive skills										
Level 1 or below	11.4	6.8	14.8	13.2	9.3	9.1	9.9	12.4		
Level 2	33.8	24.6	34.2	40.0	24.1	29.3	27.6	30.5		
Level 3	43.3	43.3	40.2	40.2	44.6	44.8	44.3	40.5		
Level 4/5	11.6	25.3	10.8	6.7	21.9	16.8	18.1	16.7		
Attainment rate %										
Completed highest qualification in AHE (Standard definition)	27.9	24.7	16.2	18.7	16.0	23.6	20.3	15.7	18.5	17.3
Completed highest qualification in AHE (Conservative definition)	11.7	10.8	6.4	5.2	8.0	11.3	10.1	9.5	10.0	8.5

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Adults in the bottom and top 2 percentiles of the earnings distribution are excluded. Population is employed according to LFS assessment module but individuals may still subjectively view themselves as unemployed or under-employed, or for example, as a student. As an example, individuals may be employed in internships or unpaid work, and view themselves as unemployed.

TABLE 4. Number of cases excluded as outlier data

	DK	FI	DE	KO	NL	NO	SE	UK	US	Total
Before exclusion of outlier data										
Sample size	4387	3274	3161	3848	2952	3237	2815	4813	2718	46757
Average monthly earnings (US\$ PPP)	6481	3351	3519	3251	9268	4296	3309	3452	11046	7608
After exclusion of outlier data										
Sample size	4225	3156	3040	3684	2849	3125	2734	4630	2613	44992
Average monthly earnings (US\$ PPP)	4057	3242	3179	3041	3424	4043	3125	3087	4133	3702
Number of cases excluded as outliers	162	118	121	164	103	112	81	183	105	1765
Percent of cases excluded as outliers	3.7	3.6	3.8	4.3	3.5	3.5	2.9	3.8	3.9	3.8

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Results

Employment differentials

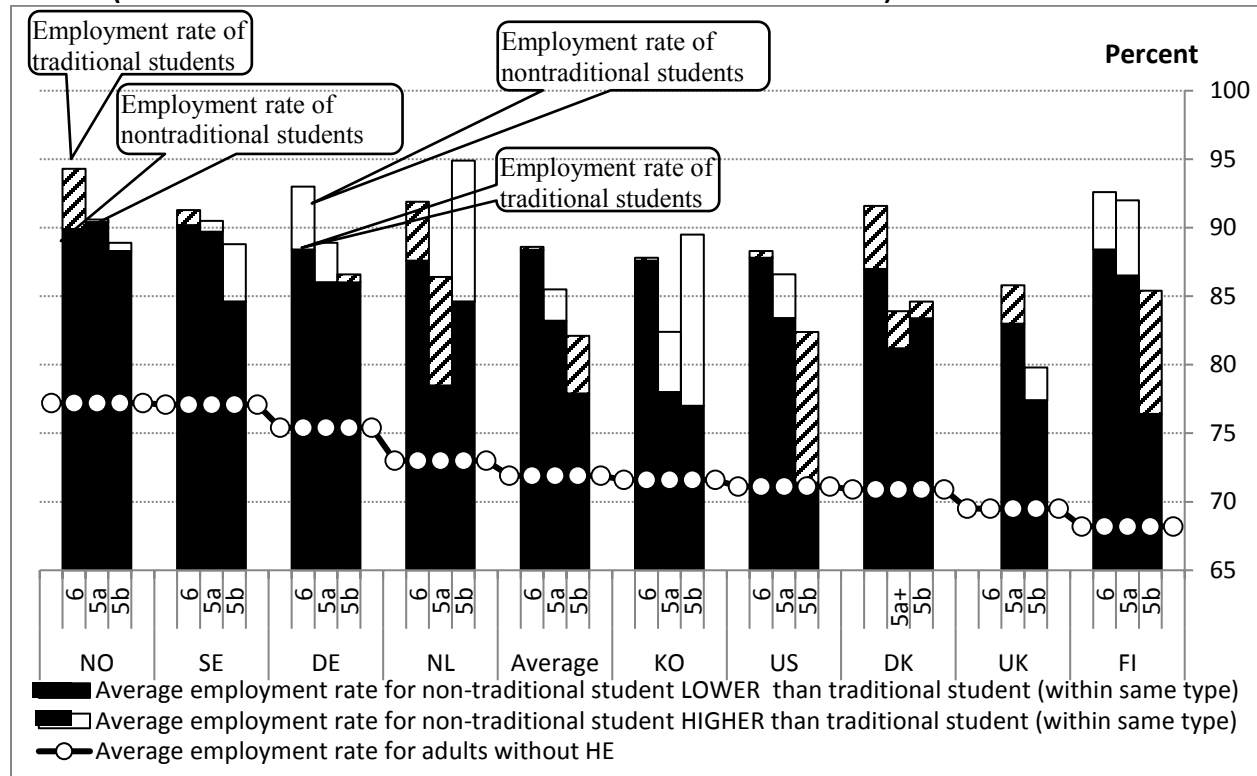
There are two main findings in relation to employment differentials. First, consistent with previous findings discussed above, a general cross-country pattern can be discerned from Figure 3, namely that the employment rates of adults who attain a HE degree are considerably higher (mostly more than twice higher) than the employment rates of adults who do not attain a HE degree. This holds regardless of the type or level of degree or whether students were beyond the normative age (conservative definition) of graduation when they attained their highest degree. Results show a clear increased probability of being employed that is associated with HE attainment. Separately, the probability of being employed increases with the level of the HE degree. Adults with ISCED 7 (PhD – not shown in Figure 3) degrees show the highest probability followed by ISCED 6 (Masters), 5a (academic bachelors) and 5b (vocational or professional bachelors). Only in the Netherlands and Korea, do adults with an ISCED 5b degree show considerably higher probabilities of being employed than those with ISCED 5a and even 6.

Second, employment differentials are different across countries, depending on type of degrees and type of student (i.e. traditional vs. nontraditional). Differences do arise by type of student, with students attaining their degrees closer to the normative age displaying slightly higher probabilities of being employed for some types of HE in some countries (e.g. the Netherlands for ISCED 5a and 6; Denmark for all three ISCED levels), while in other cases it is nontraditional students that display higher probabilities (e.g. Denmark for ISCED 5a and 6; Finland for ISCED 5a and 6)¹⁶. A notable finding is in the US for ISCED 5b graduates. Specifically, US adults who were beyond the normative age when they completed their ISCED 5b degree do not necessarily display higher probabilities of being employed than adults who did not complete a HE degree at all. This is the only finding that contradicts the general cross-country pattern of increased probabilities of HE graduates being employed. In contrast, the same adults in Korea or the Netherlands show significantly higher probabilities of being employed, and even significantly higher than adults who completed their ISCED 5b near the normative age (i.e. traditional students).

¹⁶ White bar and bar are indicative of the difference in employment rate between traditional and nontraditional students. White bars indicate higher probability of being employed for nontraditional students and dashed parts for traditional students, respectively.

Overall, attaining a HE degree increases the probability of participating in the labor market whether or not the student is close to or well above the normative age. These results suggest that AHE, or alternatively the *openness* of HE systems to nontraditional students is a good thing for activating the population to be employed. Reinforcing this idea, Figure 4 reveals a strong positive correlation between the degree of *openness* of HE systems and overall employment rates (correlation=.67). In Figure 4, the indicator on the degree of *openness* of HE systems is defined as the ratio of HE graduates over the age of 30 vs under the age of 30.

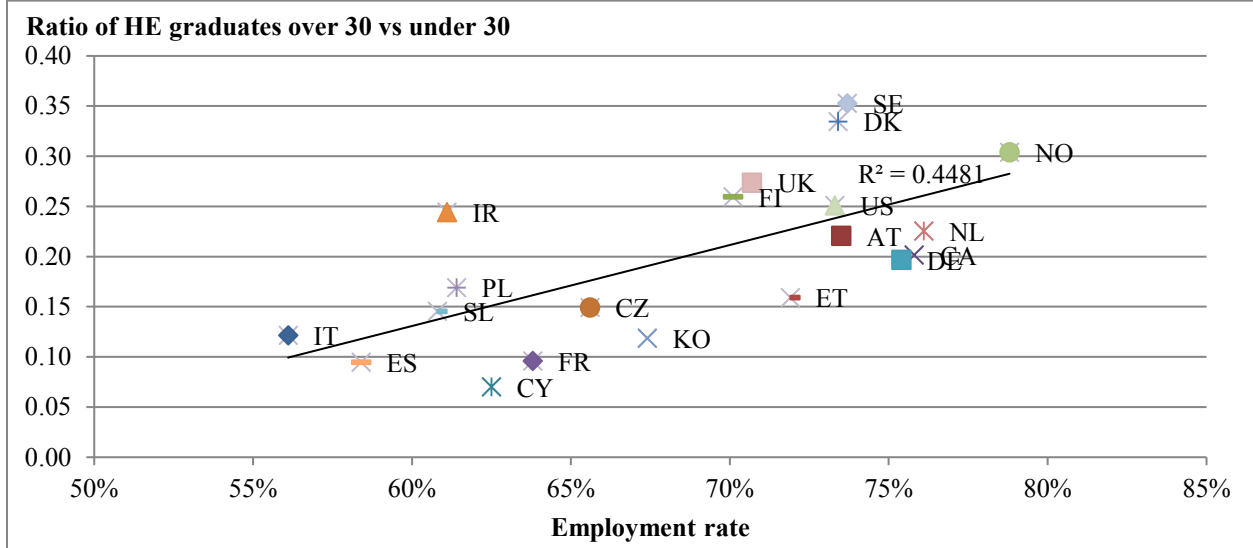
FIGURE 3. Average employment rate for adults aged 26 to 65 who have attained higher education (HE) vs those who have not attained HE, by type and level of degree (ISCED 5a, 5b and 6) and type of student (conservative definition of nontraditional vs traditional student)



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Notes: See Table A2 in Appendix for detailed results.

FIGURE 4. Openness of HE systems to nontraditional students and employment rate: Correlation between ratio of HE graduates over vs under the age of 30 and employment rate



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

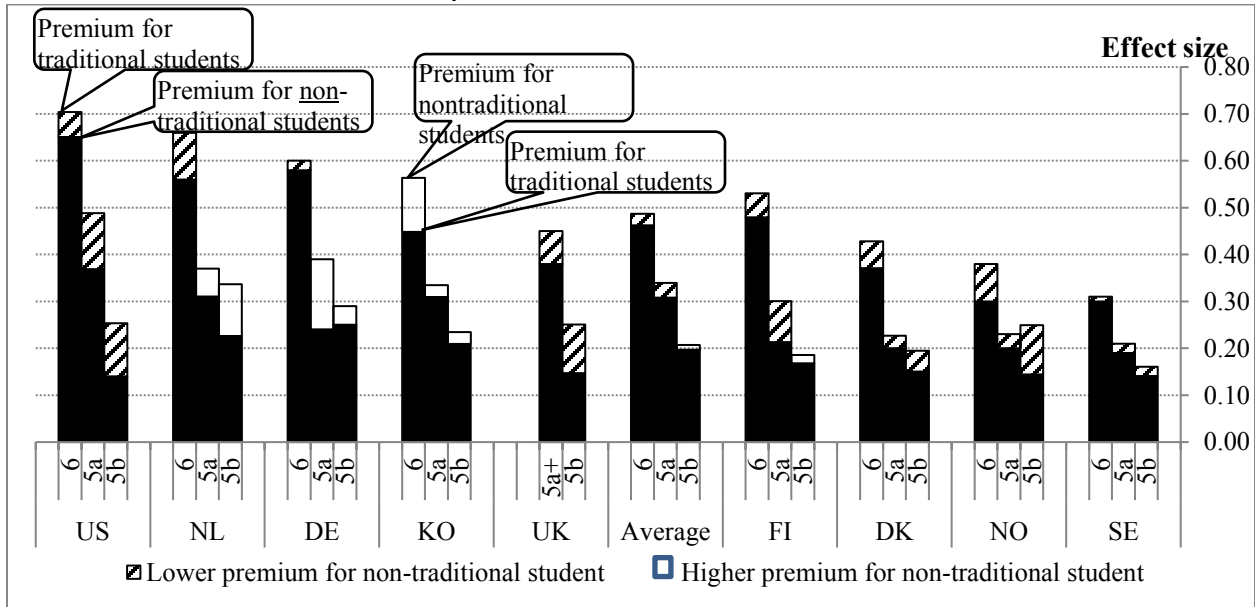
Note: Pearson correlation coefficient is .67.

Earnings differentials

Results for earnings differentials mirror those of employment differentials. In general, adults who attain a HE degree earn significantly more than adults who do not attain a HE degree. Figure 5 reveals that this holds in all nine countries considered regardless of the type or level of degree or whether students were beyond the normative age of graduation when they attained their highest degree. Without exception, premiums increase on average with the level of the HE degree. Adults with ISCED 7 degrees (PhD – not shown in Figure 5) earn the most on average, followed by ISCED 6 (Masters), 5a (academic bachelors) and 5b (vocational or professional bachelors).

Similar to employment differentials, differences do arise by type of student, with students attaining their degrees closer to the normative age displaying higher premiums for some types of HE in some countries, while in other cases it is nontraditional students that display higher premiums. On average across countries, however, nontraditional students tend to earn marginally less than adults who completed their degree closer to the normative age. This is particularly the case in the UK where differentials between traditional vs nontraditional students are largest. A penalty for attaining a HE degree beyond the normative age is also apparent in Norway and Sweden, and for certain types in Denmark, Finland, Germany and Korea. Only in the Netherlands, do nontraditional students who completed a HE degree beyond the normative age earn more on average across all types of HE degrees.

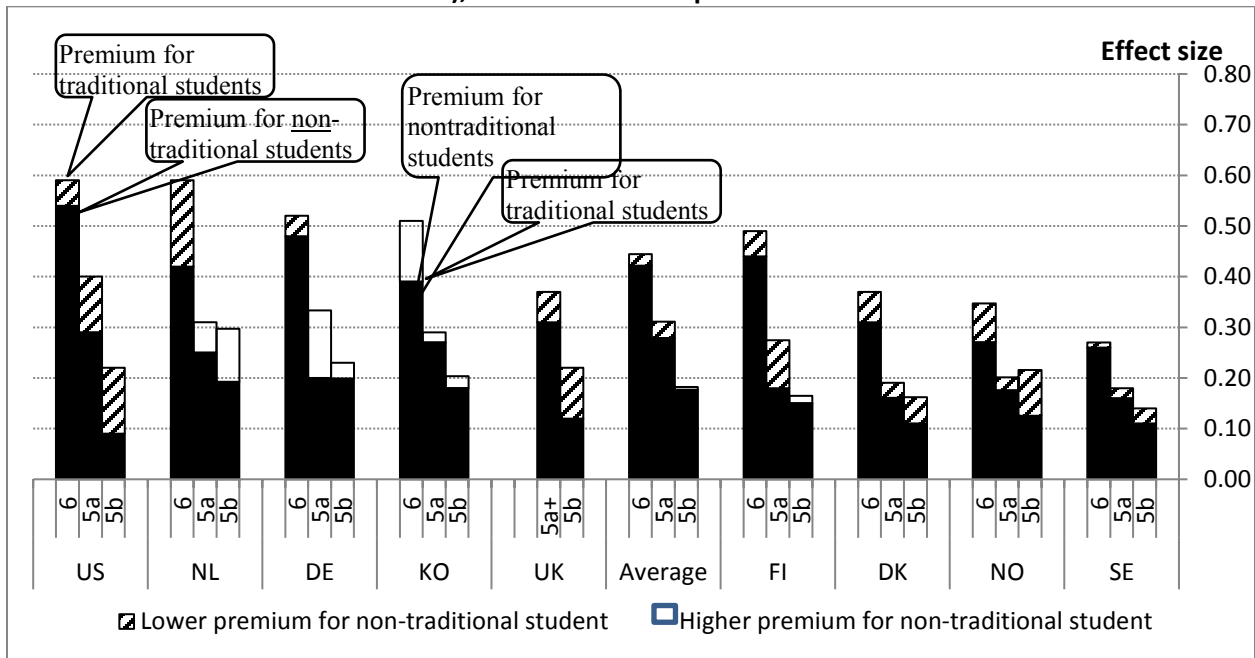
FIGURE 5. Earnings premium for adults aged 26 to 65 who have attained HE relative to those who have not completed HE, by type of degree and type of student (conservative definition of nontraditional vs traditional student)



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Notes: See Table A3 in Appendix for detailed results and Table A6 for statistical comparison of coefficients for traditional vs nontraditional students.

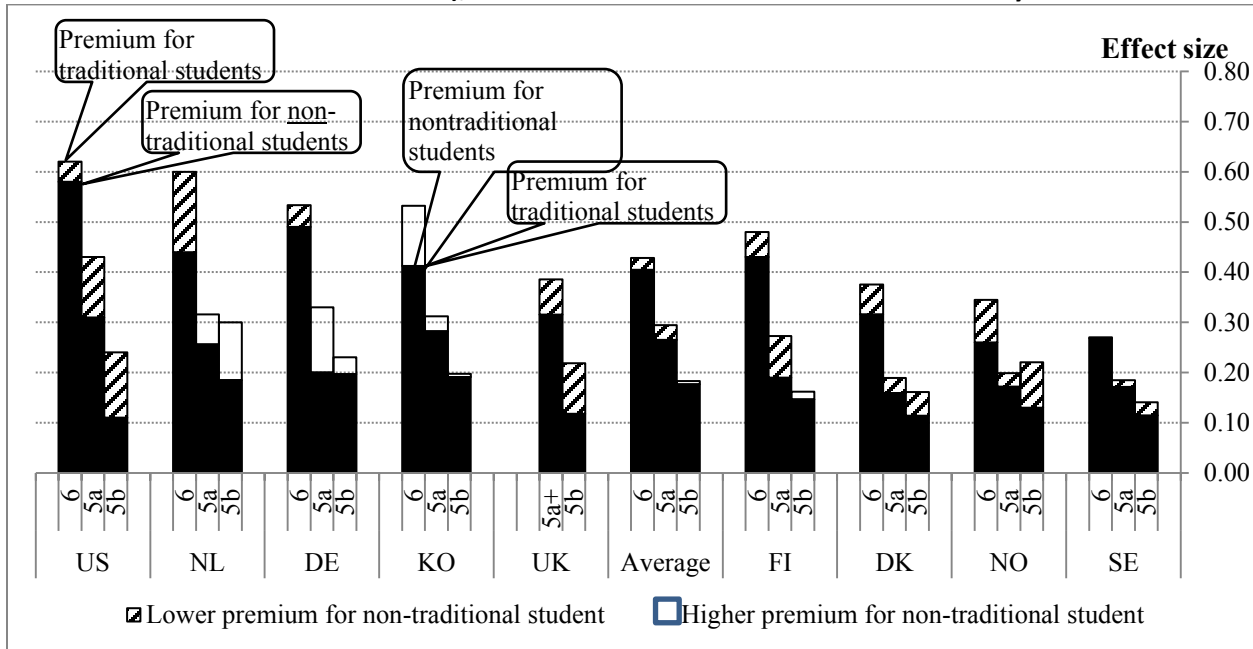
FIGURE 6. Earnings premium for adults aged 26 to 65 who have attained HE relative to those who have not completed HE, by type of degree and type of student (conservative definition of nontraditional vs traditional student), control added for parents' education



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Notes: See Table A4 in Appendix for detailed results and Table A7 for statistical comparison of coefficients for traditional vs nontraditional students.

FIGURE 7. Earnings premium for adults aged 26 to 65 who have attained HE relative to those who have not completed HE, by type of degree and type of student (conservative definition of nontraditional vs traditional student), control added for a direct measure of literacy skills



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Notes: See Table A5 in Appendix for detailed results and Table A8 for statistical comparison of coefficients for traditional vs nontraditional students.

Results in Figures 6 and 7 are adjusted for an indicator of socio-economic origin, namely level of parents' education, and also a direct measure of literacy skills, respectively, to see if they affect earning premiums. These added controls which reflect social disadvantage and cognitive ability explain some of premiums relative to those who did not attain HE at all, and also some of the observed differential between nontraditional vs traditional students. However, the fact that there are small differences in the overall patterns between Figures 5, 6 and 7 imply that the relative disadvantage of nontraditional vs traditional students more or less remains unchanged. This suggests that the observed differentials between traditional vs nontraditional students cannot easily be attributed to the social disadvantage of older graduates, or even differences in cognitive ability, although these factors do seem to be involved.

Discussion

The observed earnings penalties associated with completing a HE degree at an age beyond the normative age may be related to demand or supply side factors or both.

On the demand side, employer hiring and career progression practices may discriminate against older graduates. For example, many well-paying jobs are linked to early career recruitment and in-company training programs. Such jobs may be beyond reach for adults who attain their highest degree beyond the normative age. Demand and supply conditions for certain sectors of the production or occupational structure, as well as demographic factors may also play a role. Such factors may be important for interpreting cross-country differences. For example, nontraditional graduates in the Netherlands do not appear to be penalized for graduating at later ages.

On the supply side, graduating at an older age may be linked to disadvantaged characteristics such as lower ability, motivation or other dispositions. And employers may discriminate against such disadvantages, in some contexts more so than others. For example, it has been well observed in cross-national analyses that the American labor market may be the most effective in sorting workers according to cognitive skills differences, which can be difficult to otherwise observe. Devroye and Freeman (2001) concluded that in the US people are sorted on the labor market by literacy proficiency more than any other country. Blau and Kahn (2001) confirmed this by suggesting that knowledge and skills play a significant role in explaining relatively high US wage inequalities. And specifically analyzing the PIAAC data, Hanushek et al. (2015) found considerable heterogeneity in returns to skills across countries. In particular, the US is among the group of countries with the highest returns; its returns are about twice as large as the returns of countries among the lowest group (e.g. Sweden, the Czech Republic and Norway). Leuven (2001) also found that the relation between schooling and cognitive scores is steeper in the US than in other countries. Findings above in Figure 7 also suggest this to be case to some extent. When controlling for an indicator of cognitive ability, earnings differentials between traditional vs nontraditional students are attenuated. This suggests that some of the observed differences in Figure 5, are due to cognitive ability differences among younger and older graduates, and that this may be recognized by employers in extending employment benefits.

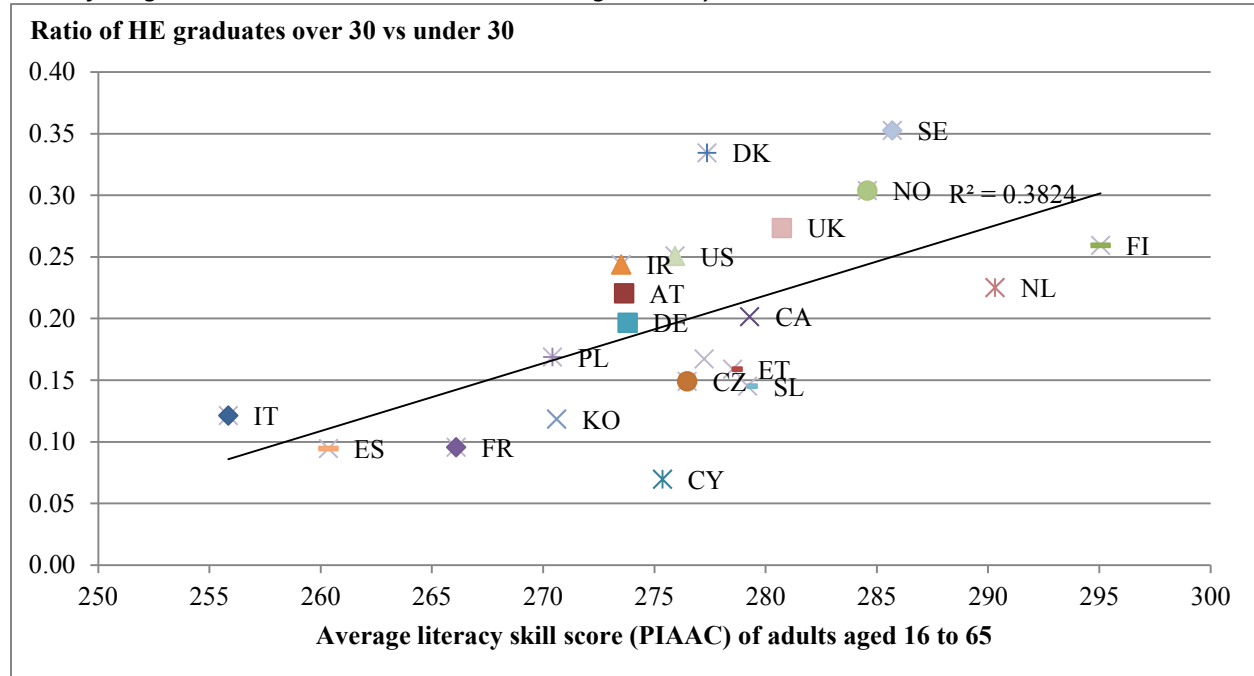
Entering into or completing a HE degree at a later age can occur for any number of reasons. It may be related to the unequal chances to enter in HE at the normative age because of socio-economic differences. Results in Figure 6, for example, suggest that social background plays a role in explaining earnings differences between traditional vs nontraditional students. It may also be related to failing K-12 schools. Comparative data show, for example, that large proportions of high school aged youth in many countries do not score at levels of literacy that are considered to be adequate to understand, evaluate, use and engage with written texts to participate in society, to achieve one's goal, and to develop one's knowledge and potential.

Whatever the reason, alternatives to the traditional route and second chances add to the skill base of the citizenry and workforce. Indeed, there appear to be significant benefits to the *openness* of HE systems to nontraditional students. First, open HE systems provide second chances to individuals which in turn significantly affects their life chances, for example, as seen in their increased probability to hold a job and earn more, which is good for both individuals and society. Increased employment provides important public benefits because it is key for sustaining any welfare state by helping to buttress the public purse via taxable income. Second, open HE systems help to nourish talent that would otherwise be used less efficiently or wasted.

Lastly, open HE systems seem to foster greater general type skill levels among the adult population by fostering the development of skills but also engagement in activities that make use of and reinforce those skills, such as being engaged in more demanding jobs. For example, Figure 8 reveals a strong positive correlation between the degree of *openness* of HE systems and the average of a measure of cognitive skill in the population (correlation=.62). The measure of cognitive skill is the average literacy score of adult aged 16 to 65 as measured in PIAAC. Among other skills, PIAAC measured a key information processing skill, namely literacy (OECD, 2013a). Literacy is defined as the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one's goal, and to develop one's knowledge and potential. There is no arbitrary standard distinguishing adults who have or do not have these literacy skills. For example, many previous studies have distinguished between adults who are either "literate" or "illiterate". Instead, PIAAC conceptualized and measured

proficiency along a continuum (denoted on a scale ranging from 0 to 500 points) and this is used to identify how well adults use information to function in society and the economy.

FIGURE 8. Openness of HE systems to nontraditional students and skill profile: Correlation between ratio of HE graduates over vs under 30 and average literacy score



Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Pearson correlation coefficient is .62.

Conclusions

Adult Learning Systems (ALS) are increasing in importance in today's modern society, as is evidenced by the growth of various forms of adult learning (Desjardins, in press, 2017). The degree of *openness* of HE systems to nontraditional students, or alternatively Adult Higher Education (AHE), is an important component of advanced ALS. Based on PIAAC data, it can be seen that there is a non-trivial proportion of adults that have completed their HE studies as nontraditional students. This is the case even when using the most conservative definitions, which only consider adults who attained their HE degree beyond the normative age. However, major differences in the incidence of AHE are observed across countries. By extension, this confirms the existence of sharp differences in the extent to which ALS are well developed and coordinated across advanced industrialized nations. These differences may be an important source of variation that explains economic success and other outcomes in different countries.

Four key findings emerge from the analysis as follows. First, the PIAAC data confirm what other studies have shown at the micro level, that older HE graduates do, on average, have better employment and earning outcomes than their counterparts with no HE qualifications. Second, the study shows that there is no systematic pattern at the micro level to suggest that older HE graduates experience less favorable labor market outcomes compared to those of traditional age students. This depends on type and level of qualification as well as country. Third, earnings boosts are observed regardless of literacy proficiency levels or socio-economic background. Fourth, the study found strong correlations between the proportion of older HE graduates and the overall employment rate as well as skill profiles at the macro level. All of these results are based on a conservative definition of nontraditional students.

The findings suggest that higher qualifications, whether attained within or beyond the normative age, promote labor market attachment of adults, productivity and overall employment across the skill proficiency and socioeconomic spectrum. They also suggest that HE systems catering to the needs of adults over their lifespan may play a role in boosting the skills measured in PIAAC, or alternatively mitigating their loss. In summary, the benefits associated with the *openness* of HE systems appear to be substantial. Not least, they are crucial for redressing social disadvantages, promoting equity and accordingly, social justice.

Further research can be conducted with PIAAC to examine the interaction of AHE with skill loss as people age. Other avenues for further research might involve more detail on who pursues AHE (which can be done with PIAAC) and why including a more detailed contextualization of the US experience; identifying more precisely what constitutes flexible and diverse HE provision structures that cater to the needs of adults and the labor market; and, comparing the role of both labor market and education institutions and policies in enabling or constraining AHE for labor market purposes.

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Appendix

Table A1. Percent of nontraditional students (standard and conservative definitions) who completed HE, by type and level of degree (Figure 1: left panel)

	ISCED 5b (age 25+)	ISCED 5a (age 25+)	ISCED 6 (age 26+)	ISCED 7 (age 30+)	ISCED 5a+ (age 26+)	Total
Austria	2.3	0.6	3.9	0.4		13.4
Belgium	1.4	0.1	0.9	0.2		5.9
Canada	5.8	5.9	3.1	0.4		26.7
Cyprus	1.1	2.7	1.7	0.2		7.4
Czech Republic	0.6	1.3	2.6	0.5		13.6
Denmark	9.6	3.9	5.6	0.6		40.8
Estonia	4.0	1.1	5.0	0.3		18.7
Finland	4.8	6.0	5.4	0.8		33.2
France	1.3	1.8	2.1	0.2	0.1	13.0
Germany	4.8	1.3	5.7	0.4		28.3
Ireland	3.8	3.1	3.3	0.2		21.0
Italy		5.6	0.9	0.1		10.7
Japan	0.6	0.5	0.4	0.1		2.6
Korea	3.4	7.7	1.6	0.4		14.5
Netherlands	1.8	5.6	3.5	0.4		24.6
Norway	2.0	8.7	5.7	0.6		34.4
Poland		1.8	5.2	0.3		19.7
Slovak Republic		1.4	2.5	0.1		9.0
Spain	0.7	2.1	3.4	0.3		11.2
Sweden	3.7	5.3	5.0	0.6		28.7
United Kingdom	4.1				6.9	23.0
United States	3.1	3.3	5.7	0.5		27.7

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Distinction between ISCED5a, ISCED6 and ISCED7 are not available for France and the UK. For Canada, the proportion of PhDs is estimated. Results correspond to Figure 1 (left panel).

Table A1 (cont'd). Percent of nontraditional students (standard and conservative definitions) who completed HE, by type and level of degree (Figure 1: right panel)

	ISCED 5b (age 30+)	ISCED 5a (age 30+)	ISCED 6 (age 30+)	ISCED 7 (age 35+)	ISCED 5a+ (age 30+)	Total
Austria	1.1	0.2	1.6	0.1		5.1
Belgium	0.6		0.4	0.1		1.7
Canada	3.4	2.2	1.8	0.3		13.6
Cyprus	0.4	0.7	0.6			2.5
Czech Republic	0.3	0.7	1.1	0.2		5.6
Denmark	4.4	1.6	2.2	0.3		14.9
Estonia	2.0	0.6	2.3	0.1		7.4
Finland	2.3	2.7	2.0	0.5		16.2
France	0.7	0.7	0.9			5.1
Germany	2.4	0.5	1.8	0.1		9.1
Ireland	2.5	1.5	2.1	0.1		11.4
Italy		1.1	0.2			2.2
Japan	0.2	0.1	0.2			0.7
Korea	1.4	1.2	0.9	0.2		4.1
Netherlands	1.3	2.5	1.6	0.1		10
Norway	1.1	3.9	2.6	0.3		16.1
Poland		0.9	2.7	0.1		6.6
Slovak Republic		1.1	1.3			4.3
Spain	0.3	0.5	1.6	0.1		3.9
Sweden	2.0	2.4	2.6	0.3		14.8
United Kingdom	2.6				4.2	14.3
United States	2.1	1.6	3.0	0.1		13.5

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Distinction between ISCED5a, ISCED6 and ISCED7 are not available for France and the UK. Results correspond to Figure 1.

Table A2. Average employment rate for adults aged 26 to 65 who have attained higher education (HE) vs those who have not attained HE, by type and level of degree (ISCED 5a, 5b and 6) and type of student (conservative definition of nontraditional vs traditional student) (Figure 3)

	DK		FI		DE		KO		NL		NO		SE		UK		US	
	%	s.e.	%	s.e.	%	s.e.	%	s.e.	%	s.e.	%	s.e.	%	s.e.	%	s.e.	%	s.e.
Did not complete ISCED 3	61	1.6	53	2.2	56	2.7	63	1.3	63	1.4	69	1.9	62	1.7	59	1.1	61	2.6
ISCED 3 (at age 26 or over)	71	2.6	72	2.5	75	4.4	64	9.5	81	2.6	81	2.8	70	3.6	78	2.3	67	3.2
ISCED 3 (at 25 or under)	77	1.1	73	1.3	78	1.0	76	0.9	81	1.2	83	1.7	85	1.1	76	1.2	74	1.4
ISCED 4 (at age 26 or over)	74	6.6	83	3.9	88	5.2					83	3.5	84	3.2	73	13.7	71	3.1
ISCED 4 (at age 25 or under)	74	5.8	81	4.2	89	2.1					79	2.4	86	2.9	49	31.1	78	3.6
ISCED 5b (at age 31 or over)	83	1.9	76	3.5	86	3.4	90	2.8	95	3.0	89	3.8	89	3.5	80	3.7	71	3.9
ISCED 5b (at age 30 or under)	85	1.2	85	1.4	87	1.7	77	1.7	85	1.7	88	4.5	85	2.6	77	1.8	82	2.3
ISCED 5a (at age 31 or over)	81	3.6	92	2.3	89	6.6	82	3.9	79	3.4	91	1.9	91	2.6	83	2.1	87	3.8
ISCED 5a (at age 30 or under)	84	1.9	87	1.7	86	3.1	78	1.3	86	1.3	90	1.0	90	1.7	86	1.0	83	1.4
ISCED 6 (at age 31 or over)	87	2.7	93	2.2	93	2.6	88	5.9	88	3.8	90	1.9	90	1.2			88	6.2
ISCED 6 (at age 30 or under)	92	1.0	88	1.6	88	1.4	88	3.7	92	1.4	94	1.0	91	1.4			88	1.9
ISCED 7 (at age 36 or over)	92	4.2	79	7.7	81	20.9	100	0.0	64	22.9	94	5.2	100	0.0			100	0.0
ISCED 7 (at age 35 or under)	98	1.3	96	2.7	97	2.5	91	7.0	99	1.3	97	2.8	93	4.5			91	3.7

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012. Results correspond to Figure 3.

Table A3. Earnings premiums for adults aged 26 to 65 who have attained HE relative to those without HE (Figure 5)

	DK		FI		DE		KO	
	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>
Age	-.01***	.00	-.01***	.00	-.02***	.00	-.02***	.00
Years of paid work experience	.01***	.00	.01***	.00	.02***	.00	.02***	.00
Gender								
Men	.13***	.01	.20***	.02	.11***	.03	.34***	.03
<i>Women</i>								
Parent education								
Upper secondary	.02	.02	.04	.02	.11**	.04	.05*	.02
Higher than upper secondary	.03	.02	-.01	.03	.11**	.04	.09**	.03
<i>Less than upper secondary</i>								
Native and language status								
Native-born, native language	.21***	.02	.17***	.05	.16***	.04	.26*	.10
Native-born, foreign language	.27**	.08	.15*	.09	.23*	.08	.49***	.20
Foreign-born, native language	-.03	.12	.14*	.08	.24***	.07	.24	.13
<i>Foreign-born, foreign language</i>								
Subjective labor force status								
Employed full-time	.35***	.05	.32***	.05	1.20***	.08	.24***	.09
Employed part-time	-.06	.06	-.31***	.06	.47***	.09	-.22***	.09
Student, apprentice, intern	-.89***	.11	-.38***	.13	-.09	.11	-.83***	.17
<i>Other</i>								
Highest qualification attained								
ISCED 5b (at age 26 or over)	.15***	.02	.19***	.03	.29***	.04	.23***	.05
ISCED 5b (at age 25 or under)	.19***	.03	.17***	.02	.25***	.04	.21***	.02
ISCED 5a (at age 26 or over)	.20***	.04	.21***	.02	.39***	.12	.33**	.03
ISCED 5a (at age 25 or under)	.23***	.05	.30***	.03	.24***	.09	.31***	.04
ISCED 6 (at age 27 or over)	.37***	.02	.48***	.03	.58***	.05	.56***	.05
ISCED 6 (at age 26 or under)	.43***	.04	.53***	.03	.60***	.04	.45***	.13
ISCED 7 (at age 31 or over)	.52***	.06	.74***	.05	.84***	.10	.73***	.14
ISCED 7 (at age 30 or under)	.56***	.07	.86***	.07	1.06***	.06	.91***	.20

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Reference categories are italicized. Results correspond to Figure 5. *p < 0.10; **p < 0.05; ***p < 0.

Table A3 (cont'd). Earnings premiums for adults aged 26 to 65 who have attained HE relative to those without HE (Figure 5)

	NL		NO		SE		UK		US	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Age	-.01***	.00	.00***	.00	.00***	.00	.00***	.00	.00	.00
Years of paid work experience	.02***	.00	.01***	.00	.01***	.00	.01***	.00	.01***	.00
Gender										
Men	.26***	.03	.17***	.01	.09***	.02	.21***	.02	.24***	.03
<i>Women</i>										
Parent education										
Upper secondary	.09***	.02	.07***	.02	.06***	.02	.14***	.03	.21***	.03
Higher than upper secondary	.08***	.03	.06**	.02	.04**	.02	.21***	.04	.26***	.04
<i>Less than upper secondary</i>										
Native and language status										
Native-born, native language	.19***	.05	.19***	.02	.13***	.02	.14***	.04	.08*	.04
Native-born, foreign language	.41***	.17	-.06	.09	.15***	.04	.20*	.11	.24***	.10
Foreign-born, native language	.19***	.07	.14*	.08	.14***	.05	.20***	.06	.06	.07
<i>Foreign-born, foreign language</i>										
Subjective labor force status										
Employed full-time	.95***	.11	.70***	.08	.50***	.09	.44***	.12	.61***	.11
Employed part-time	.47***	.11	.11***	.08	.08	.10	-.44***	.12	-.32***	.13
Student, apprentice, intern	-.31***	.23	-.64***	.13	-.32***	.15	-.66***	.53	-.63***	.18
<i>Other</i>										
Highest qualification attained										
ISCED 5b (at age 26 or over)	.34***	.03	.14***	.04	.14***	.03	.15***	.05	.14***	.07
ISCED 5b (at age 25 or under)	.23***	.08	.25***	.04	.16***	.03	.25***	.04	.25***	.05
ISCED 5a (at age 26 or over)	.37***	.04	.20***	.02	.19***	.03			.37***	.06
ISCED 5a (at age 25 or under)	.31***	.04	.23***	.02	.21***	.03			.49***	.04
ISCED 6 (at age 27 or over)	.56***	.05	.30***	.03	.30***	.03			.65***	.05
ISCED 6 (at age 26 or under)	.66***	.04	.38***	.03	.31***	.03			.70***	.08
ISCED 7 (at age 31 or over)	.76***	.05	.47***	.04	.52***	.06			.62***	.10
ISCED 7 (at age 30 or under)	.64***	.09	.54***	.10	.50***	.09			.78***	.12
ISCED 5a+ (at age 27 or over)-UK							.38***			
ISCED 5a+ (at age 26 or under)-UK							.45***			

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Reference categories are italicized. Results correspond to Figure 5. *p < 0.10; **p < 0.05; ***p < 0.01

Table A4. Earnings premiums for adults aged 26-65 with HE relative to those without HE, control added for parents' education (Figure 6)

	DK		FI		DE		KO	
	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>
Age	.00***	.00	.00***	.00	-.02***	.00	-.01***	.00
Years of paid work experience	.01***	.00	.01***	.00	.02***	.00	.02***	.00
Gender								
Men	.13***	.02	.20***	.02	.11***	.03	.34***	.02
<i>Women</i>								
Parent education								
Upper secondary	.01	.02	.03	.02	.08**	.04	.04	.02
Higher than upper secondary	.01	.02	-.02	.03	.06	.04	.07*	.03
<i>Less than upper secondary</i>								
Literacy								
Level 2	.09***	.02	.07**	.04	.09***	.04	.13***	.04
Level 3	.17***	.03	.15***	.03	.24***	.04	.20***	.04
Level 4 and 5	.20***	.03	.18***	.04	.34***	.05	.30***	.05
<i>Level 1 or below</i>								
Native and language status								
Native-born, native language	.16***	.02	.12***	.05	.08**	.05	.16	.10
Native-born, foreign language	.23**	.08	.10	.09	.17*	.08	.41*	.19
Foreign-born, native language	-.07	.12	.08	.08	.20***	.07	.18	.12
<i>Foreign-born, foreign language</i>								
Subjective labor force status								
Employed full-time	.34***	.05	.33***	.05	1.20***	.08	.23***	.09
Employed part-time	-.07	.05	-.30***	.06	.47***	.09	-.21***	.09
Student, apprentice, intern	-.90***	.12	-.39***	.13	-.14	.11	-.84***	.17
<i>Other</i>								
Highest qualification attained								
ISCED 5b (at age 26 or over)	.11***	.02	.16***	.03	.23***	.04	.20***	.05
ISCED 5b (at age 25 or under)	.16***	.03	.15***	.02	.20***	.04	.18***	.02
ISCED 5a (at age 26 or over)	.16***	.04	.18***	.02	.33***	.11	.29**	.03
ISCED 5a (at age 25 or under)	.19***	.05	.27***	.03	.20***	.09	.27***	.04
ISCED 6 (at age 27 or over)	.31***	.02	.44***	.03	.48***	.05	.51***	.05
ISCED 6 (at age 26 or under)	.37***	.04	.49***	.03	.52***	.04	.39***	.12
ISCED 7 (at age 31 or over)	.46***	.06	.70***	.05	.74***	.10	.65***	.14
ISCED 7 (at age 30 or under)	.50***	.07	.83***	.07	.95***	.06	.85***	.20
ISCED 5a+ (at age 27 or over)-UK								
ISCED 5a+ (at age 26 or under)-UK								

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Reference categories are italicized. Results correspond to Figure 6. *p < 0.10; **p < 0.05; ***p < 0.01

Table A4 (cont'd). Earnings premiums for adults aged 26-65 with HE relative to those without HE, control added for parents' education (Figure 6)

	NL		NO		SE		UK		US	
	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>	β	<i>s.e.</i>
Age	-.01**	.00	.00***	.00	.00***	.00	.00***	.00	.00	.00
Years of paid work experience	.02***	.00	.01***	.00	.01***	.00	.01***	.00	.01***	.00
Gender										
Men	.26***	.03	.17***	.01	.09***	.02	.20***	.02	.24***	.03
<i>Women</i>										
Parent education										
Upper secondary	.06***	.02	.06***	.02	.05***	.02	.08***	.03	.17***	.03
Higher than upper secondary	.05**	.03	.03	.02	.02	.02	.13***	.04	.19***	.04
<i>Less than upper secondary</i>										
Literacy										
Level 2	.21***	.04	.15***	.04	.11***	.03	.13***	.04	.13***	.04
Level 3	.31***	.04	.23***	.04	.16***	.03	.27***	.04	.27***	.04
Level 4 and 5	.38***	.05	.25***	.04	.21***	.03	.42***	.05	.41***	.06
<i>Level 1 or below</i>										
Native and language status										
Native-born, native language	.09*	.05	.12***	.03	.06**	.02	.06	.02	-.01	.04
Native-born, foreign language	.38***	.15	-.09	.09	.09	.04	.13	.04	.16**	.10
Foreign-born, native language	.14**	.07	.08	.07	.09	.05	.14**	.05	.01	.07
<i>Foreign-born, foreign language</i>										
Subjective labor force status										
Employed full-time	.93***	.10	.68***	.08	.49***	.09	.44***	.12	.61***	.11
Employed part-time	.45**	.11	.11***	.08	.08	.10	-.44***	.12	-.30***	.13
Student, apprentice, intern	-.35***	.24	-.66***	.13	-.34***	.15	-.71***	.52	-.65***	.18
<i>Other</i>										
Highest qualification attained										
ISCED 5b (at age 26 or over)	.30***	.03	.12***	.04	.11***	.03	.12***	.05	.09***	.07
ISCED 5b (at age 25 or under)	.19***	.08	.22***	.04	.14***	.03	.22***	.04	.22***	.05
ISCED 5a (at age 26 or over)	.31***	.05	.17***	.02	.16***	.03			.29***	.06
ISCED 5a (at age 25 or under)	.25***	.03	.20***	.02	.18***	.03			.40***	.04
ISCED 6 (at age 27 or over)	.42***	.05	.26***	.03	.26***	.03			.54***	.05
ISCED 6 (at age 26 or under)	.59***	.05	.34***	.03	.27***	.03			.59***	.08
ISCED 7 (at age 31 or over)	.63***	.07	.42***	.04	.47***	.06			.49***	.11
ISCED 7 (at age 30 or under)	.55***	.09	.49***	.09	.49***	.08			.64***	.12
ISCED 5a+ (at age 27 or over)-UK							.31***	.04		
ISCED 5a+ (at age 26 or under)-UK							.37***	.04		

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Reference categories are italicized. Results correspond to Figure 6. *p < 0.10; **p < 0.05; ***p < 0.01

Table A5. Earnings premiums for adults aged 26-65 with HE relative to those without HE, control added for literacy skills (Figure 7)

	DK		FI		DE		KO	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Age	.00***	.00	.00***	.00	-.02***	.00	-.01***	.00
Years of paid work experience	.01***	.00	.01***	.00	.02***	.00	.02***	.00
Gender								
Men	.13***	.01	.20***	.02	.11***	.03	.33***	.02
<i>Women</i>								
Literacy								
Level 2	.09***	.02	.07***	.04	.10***	.04	.13***	.04
Level 3	.17***	.03	.15***	.04	.26***	.04	.21***	.04
Level 4 and 5	.20***	.03	.18***	.04	.36***	.06	.31***	.05
<i>Level 1 or below</i>								
Native and language status								
Native-born, native language	.16***	.02	.12***	.05	.10**	.05	.16	.10
Native-born, foreign language	.23**	.08	.10	.09	.15	.07	.42*	.19
Foreign-born, native language	-.07	.12	.09	.08	.21***	.07	.18	.12
<i>Foreign-born, foreign language</i>								
Subjective labor force status								
Employed full-time	.34***	.05	.32***	.05	1.20***	.08	.23***	.09
Employed part-time	-.07	.05	-.31***	.06	.47***	.09	-.21***	.09
Student, apprentice, intern	-.90***	.12	-.39***	.13	-.14	.11	-.84***	.17
<i>Other</i>								
Highest qualification attained								
ISCED 5b (at age 26 or over)	.11***	.02	.16***	.03	.23***	.04	.20***	.05
ISCED 5b (at age 25 or under)	.16***	.03	.15***	.02	.20***	.04	.19***	.02
ISCED 5a (at age 26 or over)	.16***	.04	.19***	.02	.33***	.11	.31**	.03
ISCED 5a (at age 25 or under)	.19***	.05	.27***	.03	.20***	.09	.28***	.04
ISCED 6 (at age 27 or over)	.32***	.03	.43***	.03	.49***	.05	.53***	.05
ISCED 6 (at age 26 or under)	.38***	.04	.48***	.03	.53***	.04	.41***	.12
ISCED 7 (at age 31 or over)	.46***	.05	.69***	.05	.74***	.10	.67***	.14
ISCED 7 (at age 30 or under)	.50***	.07	.82***	.07	.96***	.06	.89***	.18
ISCED 5a+ (at age 27 or over)-UK								
ISCED 5a+ (at age 26 or under)-UK								

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Reference categories are italicized. Results correspond to Figure 7. *p < 0.10; **p < 0.05; ***p < 0.01

Table A5 (cont'd). Earnings premiums for adults aged 26-65 with HE relative to those without HE, control added for literacy skills (Figure 7)

	NL		NO		SE		UK		US	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Age	-.01***	.00	.00***	.00	.00***	.00	.00**	.00	.00	.00
Years of paid work experience	.02***	.00	.01***	.00	.01***	.00	.01***	.00	.01***	.00
Gender										
Men	.26***	.03	.17***	.01	.09***	.02	.20***	.02	.24***	.03
<i>Women</i>										
Literacy										
Level 2	.21***	.04	.15***	.04	.12***	.03	.15***	.04	.16***	.04
Level 3	.32***	.04	.23***	.03	.16***	.03	.29***	.04	.31***	.04
Level 4 and 5	.40***	.05	.26***	.04	.22***	.03	.46***	.05	.45***	.06
<i>Level 1 or below</i>										
Native and language status										
Native-born, native language	.09*	.05	.12***	.03	.06	.02	.04	.04	.04	.04
Native-born, foreign language	.37***	.15	-.09	.09	.09	.04	.11	.10	.14*	.10
Foreign-born, native language	.15**	.07	.08	.08	.09	.05	.14**	.06	.03	.07
<i>Foreign-born, foreign language</i>										
Subjective labor force status										
Employed full-time	.93***	.10	.69***	.08	.49***	.10	.44***	.12	.60***	.11
Employed part-time	.46***	.11	.11**	.08	.07***	.10	-.43***	.12	-.31***	.12
Student, apprentice, intern	-.33***	.23	-.67***	.13	-.35***	.15	-.70***	.51	-.65***	.18
<i>Other</i>										
Highest qualification attained										
ISCED 5b (at age 26 or over)	.30***	.04	.13***	.04	.11***	.03	.14***	.05	.11***	.05
ISCED 5b (at age 25 or under)	.19***	.08	.22***	.04	.14***	.03	.23***	.04	.24***	.05
ISCED 5a (at age 26 or over)	.33***	.05	.17***	.02	.17**	.03			.31***	.06
ISCED 5a (at age 25 or under)	.27***	.03	.20***	.02	.18***	.03			.43***	.04
ISCED 6 (at age 27 or over)	.45***	.05	.26***	.03	.27***	.03			.58***	.05
ISCED 6 (at age 26 or under)	.60***	.04	.34***	.03	.27***	.03			.62***	.08
ISCED 7 (at age 31 or over)	.64***	.07	.42***	.04	.48***	.06			.54***	.11
ISCED 7 (at age 30 or under)	.59***	.10	.49***	.10	.48***	.08			.69***	.13
ISCED 5a+ (at age 27 or over)-UK							.34***	.03		
ISCED 5a+ (at age 26 or under)-UK							.42***	.04		
<i>Did not complete higher education</i>										

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: Reference categories are italicized. Results correspond to Figure 7. *p < 0.10; **p < 0.05; ***p < 0.01

Table A6. Comparison of coefficients for two independent samples (t-statistic) for highest qualification attained (Figure 5)

	DK			FI			DE			KO		
	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t
ISCED 5b (at age 26 or over)	.15	.02	-1.10	.19	.03	.55	.29	.04	.71	.23	.05	.37
ISCED 5b (at age 25 or under)	.19	.03		.17	.02		.25	.04		.21	.02	
ISCED 5a (at age 26 or over)	.20	.04	-.47	.21	.02	-2.50***	.39	.12	1.00	.33	.03	.40
ISCED 5a (at age 25 or under)	.23	.05		.30	.03		.24	.09		.31	.04	
ISCED 6 (at age 27 or over)	.37	.02	-1.34*	.48	.03	-1.18	.58	.05	-.31	.56	.05	.79
ISCED 6 (at age 26 or under)	.43	.04		.53	.03		.60	.04		.45	.13	
ISCED 7 (at age 31 or over)	.52	.06	-.43	.74	.05	-1.39*	.84	.10	-1.89**	.73	.14	-.74
ISCED 7 (at age 30 or under)	.56	.07		.86	.07		1.06	.06		.91	.20	
ISCED 5a+ (at age 27 or over)-UK												
ISCED 5a+ (at age 26 or under)-UK												

	NL			NO			SE			UK			US		
	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t
ISCED 5b (at age 26 or over)	.25	.03	1.29*	.15	.02	-1.94**	.19	.03	-.47	.29	.04	-1.56*	.23	.05	-1.28*
ISCED 5b (at age 25 or under)	.16	.02		.19	.03		.17	.02		.25	.04		.21	.02	
ISCED 5a (at age 26 or over)	.42	.03	1.06	.20	.04	-1.06	.21	.02	-.47	.39	.12		.33	.03	-1.66*
ISCED 5a (at age 25 or under)	.36	.03		.23	.05		.30	.03		.24	.09		.31	.04	
ISCED 6 (at age 27 or over)	.55	.04	-1.56*	.37	.02		.48	.03	-.24	.58	.05		.56	.05	-.53
ISCED 6 (at age 26 or under)	.49	.05		.43	.04	-.24	.53	.03		.60	.04		.45	.13	
ISCED 7 (at age 31 or over)	.75	.08	1.17	.52	.06		.74	.05	.18	.84	.10		.73	.14	-1.02
ISCED 7 (at age 30 or under)	.84	.08		.56	.07	.18	.86	.07		1.06	.06		.91	.20	
ISCED 5a+ (at age 27 or over)-UK															-1.24
ISCED 5a+ (at age 26 or under)-UK															

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: the test statistic examines whether the coefficients for traditional vs nontraditional students are statistically different. Results correspond to Figure 5. *p < 0.10; **p < 0.05; ***p < 0.01

Table A7. Comparison of coefficients for two independent samples (t-statistic) for highest qualification attained (Figure 6)

	DK			FI			DE			KO		
	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t
ISCED 5b (at age 26 or over)	.11	.02	-1.39*	.16	.03	.28	.23	.04	.53	.20	.05	.37
ISCED 5b (at age 25 or under)	.16	.03		.15	.02		.20	.04		.18	.02	
ISCED 5a (at age 26 or over)	.16	.04	-.47	.18	.02	-2.50***	.33	.11	.91	.29	.03	.40
ISCED 5a (at age 25 or under)	.19	.05		.27	.03		.20	.09		.27	.04	
ISCED 6 (at age 27 or over)	.31	.02	-1.34*	.44	.03	-1.18	.48	.05	-.62	.51	.05	.92
ISCED 6 (at age 26 or under)	.37	.04		.49	.03		.52	.04		.39	.12	
ISCED 7 (at age 31 or over)	.46	.06	-.43	.70	.05	-1.51*	.74	.10	-1.80**	.65	.14	-.83
ISCED 7 (at age 30 or under)	.50	.07		.83	.07		.95	.06		.85	.20	
ISCED 5a+ (at age 27 or over)-UK												
ISCED 5a+ (at age 26 or under)-UK												

	NL			NO			SE			UK			US		
	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t
ISCED 5b (at age 26 or over)	.30	.03	1.29*	.12	.04	-1.77**	.11	.03	-.71	.12	.05	-1.56*	.09	.07	-1.51*
ISCED 5b (at age 25 or under)	.19	.08		.22	.04		.14	.03		.22	.04		.22	.05	
ISCED 5a (at age 26 or over)	.31	.05	1.03	.17	.02	-1.06	.16	.03	-.47				.29	.06	-1.53*
ISCED 5a (at age 25 or under)	.25	.03		.20	.02		.18	.03					.40	.04	
ISCED 6 (at age 27 or over)	.42	.05	-2.40**	.26	.03		.26	.03	-.24				.54	.05	-.53
ISCED 6 (at age 26 or under)	.59	.05		.34	.03	-1.89**	.27	.03					.59	.08	
ISCED 7 (at age 31 or over)	.63	.07	1.17	.42	.04		.47	.06	-.20				.49	.11	-.92
ISCED 7 (at age 30 or under)	.55	.09		.49	.09	-.71	.49	.08					.64	.12	
ISCED 5a+ (at age 27 or over)-UK										.31	.04	-1.06			
ISCED 5a+ (at age 26 or under)-UK										.37	.04				

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: the test statistic examines whether the coefficients for traditional vs nontraditional students are statistically different. Results correspond to Figure 6. *p < 0.10; **p < 0.05; ***p < 0.01

Table A8. Comparison of coefficients for two independent samples (t-statistic) for highest qualification attained (Figure 7)

	DK			FI			DE			KO		
	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t
ISCED 5b (at age 26 or over)	.11	.02	-1.39*	.16	.03	.28	.23	.04	.53	.20	.05	.19
ISCED 5b (at age 25 or under)	.16	.03		.15	.02		.20	.04		.19	.02	
ISCED 5a (at age 26 or over)	.16	.04	-.47	.19	.02	-2.22**	.33	.11	.91	.31	.03	.60
ISCED 5a (at age 25 or under)	.19	.05		.27	.03		.20	.09		.28	.04	
ISCED 6 (at age 27 or over)	.32	.03	-1.20	.43	.03	-1.18	.49	.05	-.62	.53	.05	.92
ISCED 6 (at age 26 or under)	.38	.04		.48	.03		.53	.04		.41	.12	
ISCED 7 (at age 31 or over)	.46	.05	-.46	.69	.05	-1.51*	.74	.10	-1.89**	.67	.14	-.96
ISCED 7 (at age 30 or under)	.50	.07		.82	.07		.96	.06		.99	.18	
ISCED 5a+ (at age 27 or over)-UK												
ISCED 5a+ (at age 26 or under)-UK												

	NL			NO			SE			UK			US		
	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t	β	s.e.	t
ISCED 5b (at age 26 or over)	.30	.04	1.23	.13	.04	-1.59*	.11	.03	-.71	.14	.05	-1.41*	.11	.05	-1.84**
ISCED 5b (at age 25 or under)	.19	.08		.22	.04		.14	.03		.23	.04		.24	.05	
ISCED 5a (at age 26 or over)	.33	.05	1.03	.17	.02	-1.06	.17	.03	-.24				.31	.06	-1.66**
ISCED 5a (at age 25 or under)	.27	.03		.20	.02		.18	.03					.43	.04	
ISCED 6 (at age 27 or over)	.45	.05	-2.50***	.26	.03		.27	.03	.00				.58	.05	-.42
ISCED 6 (at age 26 or under)	.60	.04		.34	.03	-1.89**	.27	.03					.62	.08	
ISCED 7 (at age 31 or over)	.64	.07	.49	.42	.04		.48	.06	.00				.54	.11	-.88
ISCED 7 (at age 30 or under)	.59	.10		.49	.10	-.65	.48	.08					.69	.13	
ISCED 5a+ (at age 27 or over)-UK										.34	.03	-1.60*			
ISCED 5a+ (at age 26 or under)-UK										.42	.04				

Source: Own calculations based on the Survey of Adult Skills (PIAAC), 2012.

Note: the test statistic examines whether the coefficients for traditional vs nontraditional students are statistically different. Results correspond to Figure 7. *p < 0.10; **p < 0.05; ***p < 0.01