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Article

Equal Access to the Top? Measuring Selection into Finnish Academia

Jouni Helin [1,*], Kristian Koerselman [1,2], Terhi Nokkala [1], Timo Tohmo [2] and Jutta Viinikainen [2]

[1] Finnish Institute for Educational Research, University of Jyväskylä, 40014 Jyväskylä, Finland; E-Mails: jouni.t.helin@jyu.fi (J.H.), kristian.w.koerselman@jyu.fi (K.K.), terhi.p.nokkala@jyu.fi (T.N.)
[2] Jyväskylä University School of Business and Economics, University of Jyväskylä, 40014 Jyväskylä, Finland; E-Mails: timo.j.tohmo@jyu.fi (T.T.), jutta.i.viinikainen@jyu.fi (J.V.)

* Corresponding author. Following the economic tradition, the authors have been listed in alphabetic order

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Abstract
In this article, we draw a parallel between equality of opportunity in educational transitions and equality of opportunity in academic careers. In both cases, many methodological problems can be ameliorated by the use of longitudinal rather than cross-sectional data. We illustrate this point by using Finnish full-population register data to follow the educational and academic careers of the 1964–1966 birth cohorts from birth to the present day. We show how the Finnish professoriate is highly selected both in terms of parental background and in terms of gender. Individuals of different backgrounds differ greatly in the likelihood of completing different educational and academic transitions, but much less in the age at which they make these transitions. By contrast, women's academic careers differ from those of men both in terms of timing and in terms of rates, with women's PhDs and full professorships seemingly delayed compared to those of men. We additionally show with the help of a 2015 cross-section of Finnish professors how such differences are easily overlooked in cross-sectional data.

Keywords
academia; academic career; educational transition; equality; Finland; gender; higher education

Issue
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1. Introduction

The social background and gender of the individuals who eventually reach the top of academia is of interest both with an eye to equality of opportunity in education and academia, and because the composition of the top of academia is likely to affect the nature and direction of teaching, research, and arguably society.

In this article, we summarize and reflect on some of the methodological challenges in estimating equality of opportunity in educational transitions. The same challenges are also present when estimating equality of opportunity in academic careers. In both cases, many statistical and interpretational problems can be greatly ameliorated by following cohorts over time rather than for example studying cross-sections of graduates or academics in any given year. We illustrate this point by showing who does and who does not reach the top of the Finnish academic career ladder by tracing the educational and academic outcomes of the Finnish 1964–1966 birth cohorts from birth to age 49 using population data that combines information from multiple administrative registers held at Statistics Finland.

We find that the Finnish professoriate[1] is highly selected both in terms of parental background and in terms of gender. In the cohorts we study, the children

[1] In the Finnish context, assistant and associate professor positions are rare, and the term "professor" typically refers to a full professor working at a university on a permanent contract.

with different levels of parental education obtained their master's degrees, PhD degrees, and professorships at vastly different rates, but interestingly enough typically at largely similar ages. By contrast, women obtained their PhD degrees later, and their first professorships both later and at substantially lower rates.

The apparent delays in women's academic careers can easily be overlooked in cross-sectional data. At the end of the article, we use a full population cross-section to show that while in 2015 there were more male than female professors in Finland, their age distributions were similar to each other, especially for young professors. This finding would on its own be consistent with an absence of delays in women's academic careers. Such a cross-sectional analysis however conflates between-gender differences in timing and between-cohort differences in rates, and the finding can thus also be explained by women obtaining professorships at higher ages than men, in combination with newer cohorts of women being granted professorships at higher rates than previous ones. Without the use of longitudinal information, we would not be able to separate between the two and may in some cases not even realize how women's careers are delayed. Similarly, we would not be able to know how similar graduation and professorship ages are across socioeconomic groups without the use of longitudinal data.

The article proceeds as follows. In Section 2 we give an overview of the methodological challenges involved in estimating selection into education, and by extension, into academia. In Section 3, we summarize some of the existing literature on inequality of opportunity in academia. We give a short overview of higher education in Finland in Section 4. We present our data and methods in Section 5, and our empirical results in Section 6. In Section 7 we discuss the implications of our results, as well as directions for future research.

2. Measuring Inequality of Opportunity

One interpretation of equality of opportunity is that factors beyond the individual's control should not be allowed to affect outcomes (cf. Roemer, 1998). Since the individual neither chooses parents nor gender, aggregate differences across socio-economic groups and genders can thus be thought of as indicative of violations of equality of opportunity.

Between-group differences are unlikely to capture all inequalities of opportunity for a variety of reasons. With respect to parental background, socio-economic groupings for example hide considerable within-group heterogeneity. Furthermore, individuals are exposed to childhood circumstances which are incompletely captured by fixed parental background variables. There are also within-family differences in opportunities. Siblings for example differ from each other in which genes they happen to inherit from their parents, and in how much time their parents spend with them. A literature review by Björklund and Salvanes (2011) shows just how large the effect of parental background is when such factors are properly taken into account.

There exists a long tradition of studying educational transitions with the goal of pinpointing where, and how differences in attainment occur. It has however proven difficult to interpret the magnitudes of specific transition probabilities. One reason is that the decision to transition to the next level of education is also affected by past choices and future prospects. High school attendance or completion may for example be less attractive to students who do not want to attend higher education, or do not expect to be admitted to higher education. Transitions can also be interdependent in other ways. Individuals may for example have preferences to obtain a certain relative position in the educational hierarchy. A decrease in the selectivity of one level of education can then lead to an increase in the selectivity of the transition to the next level. Because students not only select into levels of education, but also into tracks, strata, fields, institutions and geographies, such countervailing stratification effects may also be observed at the same level, but in a different dimension. (Breen & Goldthorpe, 1997; Lucas, 2001; Epple, Newlon, & Romano, 2002; Torche, 2011).

The measurement of differences in outcomes by parental background is further complicated because newer cohorts grew up with parents that differ greatly from previous cohorts' parents, among others in their level of education. If we compare the outcomes of children of university educated parents today with those a few decades ago, today's group will be much less socially selected in relative terms, even if the parents of both groups had the same level of education in absolute terms. Both relative and absolute levels of education are relevant measures of parental background, but conclusions may differ depending on which measure is used. Karhunen and Uusitalo (2017) show that while Finnish intergenerational educational mobility has increased during the past decades when using an absolute measure of parental education, when using parents' education relative to their birth cohort, mobility has remained constant or even decreased. This finding largely mirrors results from other countries. Bukodi and Goldthorpe (2016) and Fujihara and Ishida (2016) for example draw a similar conclusion based on British and Japanese data respectively, while in Triventi, Panichella, Ballarino, Barone and Bernardi (2016), mobility in Italy has increased whether one uses a relative measure or not.

The selectivity of transitions today not only reflects the equality of opportunity facing the current generation, but also that of previous generations; it matters for measured child mobility how the parent generation was selected into levels of education (Nybom & Stuhler, 2013). As a consequence, equality of opportunity may be increasing when mobility is measured to be decreasing, and vice versa.

In this article we stress the importance of separating the probability that members of different groups obtain specific educational degrees or reach specific milestones

at all from the age at which they do so. If two groups would for example always have been awarded degrees at the same rate, but at different ages, this would still cause the proportion of group members in the work force having those degrees to be skewed at any given time. Furthermore, in practice neither the rate of attainment nor the timing of attainment is constant within groups across cohorts. The interplay of rate and timing changes complicates the interpretation of observed cross-sectional compositional changes. If we for example observe an increase in the proportion of young women among new professors, we cannot easily know whether this is due to a decrease in the age at which women are awarded professorships, or due to an increase in the rate.

3. Inequalities in Academia

Transitions into PhDs and further into academia are much less well studied than lower-level transitions. Nevertheless, studies based on survey data from the US (Mullen, Goyette, & Soares, 2003), the UK (Wakeling & Laurison, 2017), Canada (Zarifa, 2012), Italy (Argentin & Triventi, 2011) and Germany (Jaksztat, 2014) suggest that high-SES graduates are more likely to transition to the postgraduate level. Triventi (2013) arrives at different conclusion. Using a survey of individuals graduated from European institutes of higher education in 2000 he does not find evidence to support that enrolment in PhD programs would be socially selective conditional on graduation from the long programs that allow access to such programs. On the other hand, Mastekaasa (2006) finds that the transition into PhD programs is socially selective using Norwegian register data from 1985 to 1998. Mastekaasa (2005) uses similar data to study gender differences in PhD enrolment and completion and finds only small gender differences in enrolment, and no gender differences in completion rates, even if men and women may drop out for different reasons.

The available evidence suggests that academic careers are socially selective (Andersen, 2001; Möller, 2014; National Science Foundation, 2016). Studies on the experiences of working-class academics (Haney, 2015), and representatives of ethnic minorities (Kelly & McCann, 2014) in academia highlight the importance of cultural or social capital on entering and progression on academic careers (Bancroft, 2013; Pezzoni, Sterzi, & Lissoni, 2012), as well as feelings of displacement or alienation both internationally (Heller, 2011) and in Finland (Järvinen, 2006; Käyhkö, 2014). Studies on the academic careers of men and women suggest that women face a leaky pipeline (Goulden, Mason, & Frasch, 2011; Van Anders, 2004), especially in terms of access to the tenure track and to tenured professorial positions (Goastellec & Pekari, 2013; Goulden et al., 2011; Pinheiro, Geschwind, Hansen, & Pekkola, 2015). This phenomenon has been explained among others by differential family responsibilities (e.g., Ginther & Kahn, 2006), gender differences in the size and depth of professional networks (e.g., Carvalho & Santiago, 2010; Vázquez-Cupeiro & Elston, 2006), undermeasurement and underappreciation of female academics' productivity (e.g., Boring, 2017; Wennerås & Wold, 1997; cf. Bosquet, Combes, & García-Peñalosa, 2018; De Paola, Ponzo, & Scoppa, 2017), and a relative dislike of competitive settings among women, including the competition for senior positions (Bosquet et al., 2018; De Paola et al., 2017). The analysis of the relative importance of actual productivity, its evaluation, and career choices is complicated by their interdependence in a way that mirrors the interdependence of educational transitions. Women in academia may for example shy away from applying for positions they feel they will not be considered for in any case. At the same time, gender gaps in all of these factors seem to vary across country, field, and especially time (cf. Boström & Sundberg, 2018; Ceci, Ginther, Kahn, & Williams, 2014; Van Arensbergen, van der Weijden, & van den Besselaar, 2012).

4. Finnish Higher Education

As in other Nordic countries, Finnish education policy has long been characterized by an emphasis on equal opportunity in access to education. Even if the intake to individual higher education programs is limited by a so-called numerus clausus, public expenditure on higher education is high, tuition fees low or non-existent, and financial support for students relatively generous. (Ahola, Hedmo, Thomsen, & Vabø, 2014; Isopahkala-Bouret et al., 2018; Pechar & Andres, 2011).

University education had gone through a rapid expansion between the 1960s and the 1980s, especially in rural areas (Välimaa, 2018), and the 1964–1966 birth cohorts that we study in this article thus had a width of educational opportunities available to them that would not have been available to their parents. Before the establishment of vocationally-oriented polytechnics in the mid-1990s, universities were the only institutes of higher education in Finland (Välimaa, 2001). University graduates typically graduate with a master's degree, and we use the terms master's degree and university education interchangeably in this article. We thus ignore the intermediate university bachelor's degrees that have been (re)introduced in recent years.

To a lesser degree, the 1964–1966 cohorts have also benefited from an expansion of PhD education. While the number of awarded PhD degrees was growing already in the 1980s, Finnish PhD education lacked organization and funding prior to the graduate school reform of 1994 (Ahola et al., 2014; Välimaa, 2001). The first systematically structured PhD programs were launched in 1995 when the Ministry of Education funded the establishment of nearly a hundred graduate schools with paid PhD student positions (Välimaa, 2001). As a consequence, the yearly number of new PhD degrees has nearly tripled during the past 25 years, with 1 749 PhDs awarded in 2017 (Ahola et al., 2014; Vipunen, 2018). The

number of research staff employed on fixed-term basis through external funding has similarly grown since the mid-1990s, whereas the increase in the number of teaching staff holding permanent contracts has been relatively modest, even slightly decreasing in the most recent years (Aarrevaara, 2007; Löppönen, Lehvo, Vaahtera, & Nuutinen, 2010; Nuutinen, Mälkki, Huutoniemi, & Törnroos, 2016; Pekkola, Kuoppala, Liski, Puhakka, & Rautopuro, 2015). Though Finnish universities have gradually introduced tenure track positions after 2010, assistant and associate professor positions are rare, and the term "professor" typically refers to a full professor working at a university on a permanent contract (Pietilä, 2015).

5. Data and Methods

Much of the existing evidence on equality of opportunity in postgraduate education and academic careers has been based on cross-sectional survey data. They use of surveys always raises questions of representativeness, especially when sampling is not carried out in a way explicitly designed to correct for differential nonresponse, for example by drawing a replacement sample for missing respondents or by the construction and use of survey weights. Surveys also raise questions of measurement error, especially when respondents are asked to recall past events.

We base our study on full population data held at Statistics Finland. These contain information from multiple administrative sources, including population censuses from 1970 onward, and linked employer-employee data from 1987 onward. The data are linked using unique person identifiers based on social security numbers, and the links are thus exact. Both nonresponse and measurement error are likely to be dramatically lower than in survey sources.

From the full population, we select all individuals born in Finland in 1964, 1965 and 1966, residing in Finland in 1988, and having at least one parent present in the registers at any time between 1970 and 2015. The parental restriction is necessary for us to have information on parental education, and removes about 3% of the sample, equally distributed across cohorts. The proportion of residents born outside Finland was very low in this age group in 1988. We thus see this sample as roughly representative of these birth cohorts in 1988.

Because we follow the educational and academic careers of people who were all born at approximately the same time, we greatly ameliorate many of the problems associated with the use of cross-sections. The longitudinal dimension allows us to clearly separate the timing of different educational and academic milestones from between-cohort differences in overall attainment rates. This is particularly important because the large changes that were made to PhD education as well as career tracks in Finnish universities imply that many transitions may look very different for different cohorts. Furthermore, since the distribution of parental education does not differ for observations made at different ages, this reduces the need to separate relative from absolute education levels.

Educational qualifications are based on census information for degrees obtained before 1970, and on the Register of Completed Education and Degrees (RCED) from 1970 onward. We classify sample members as having highly educated parents when at least one parent is observed to have at least a master's degree, as having parents with an intermediate level of education if at least one parent is observed to have any other post-secondary degree, and as having parents with a low level of education if the sample member does not have a known parent with a post-secondary degree. The sizes of these groups are about 10,000, 35,000 and 166,000 people respectively for these cohorts, illustrating how the vast majority of cohort members did not have parents with any post-secondary education at all. For each sample member, we furthermore take the age at which s/he obtained his or her first master's degree if any, and likewise his or her first PhD.

We also consider as an outcome if the sample member was observed to be employed as a professor at a Finnish university. This information is based on the Longitudinal Employment Statistics File (ESF), which contains information on the main employment contract of all individuals in residing in Finland during the last week of each year. The information in ESF originates from state-run pension registers that cover all legal employment contracts, and contains detailed occupational information for the last week of 1995, 2000, and 2004–2015. Since sample members belong to three different birth cohorts, their occupational status will be observed at slightly different ages before 2006 and after 2013. At the end of 2015, for example, the 1964 cohort is observed at age 51, while the 1966 cohort is only observed up to age 49. We therefore limit the analysis to observations at age 49 or below.

It should be noted that we do not observe the outcomes of permanent emigrants. Our results should therefore be interpreted as pertaining to Finnish academics in Finnish academia. About 99% of the sample is however observed as residing in Finland at least once between 2000 and 2015.

6. Results

Panel (a) of Figure 1 shows the timing and incidence of cohort members' first master's degrees by parental education. As can be seen from the figure, the timing looks quite similar across groups, with graduations peaking at age 25 for all three groups, but with lower proportions of cohort members receiving a master's degree at lower levels of parental education.

Panel (b) of Figure 1 shows how the timing of PhDs is largely similar across groups too, with a small negative relationship between parental education level and

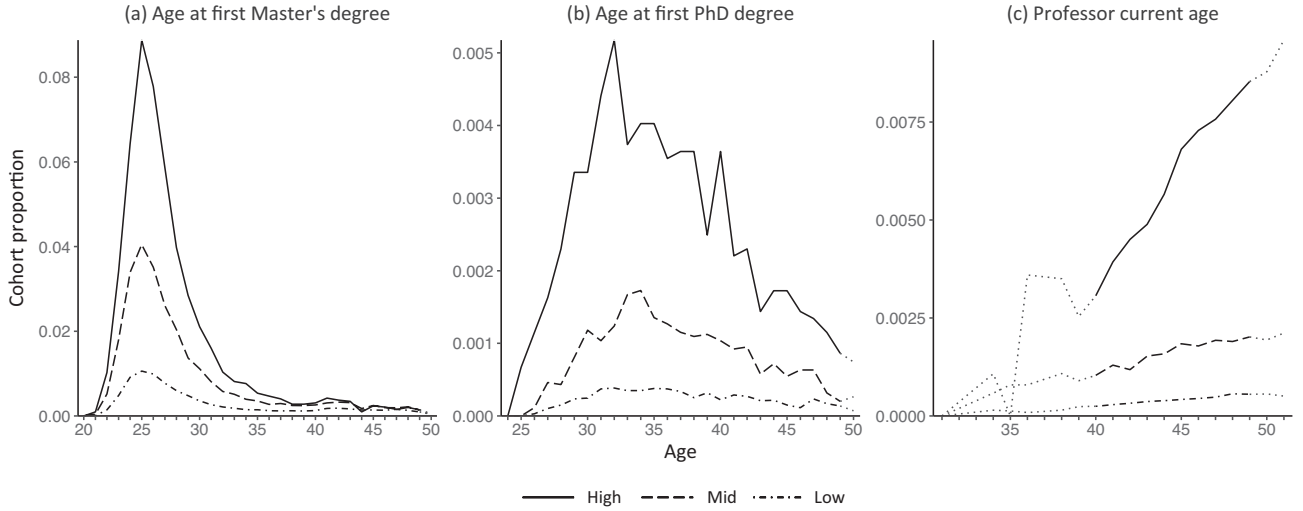

Figure 1. Educational and academic transitions over the lifetime by parental education. Panel (a) of the figure shows the proportion of cohort members obtaining their first master's degree at any specific age separately by the level of parental education. Panel (b) similarly shows the proportion of cohort members obtaining their first PhD degree at any specific age. Panel (c) shows the cohort proportion employed as professors at Finnish universities at different ages. The dotted lines in Panel (c) represent ages for which information is incomplete.

the age at which the PhD is received. In terms of levels, PhDs seem even more selective, with the relative probability of receiving a PhD being even higher for children of university educated parents than among master's degree holders.

Since first professorships are a relatively uncommon occurrence even in population data, we show the stock of professors by age and background in Panel (c). These are the proportions of sample cohorts that are employed as professors at a Finnish university at different ages. Grey, dotted lines indicate ages at which occupational information is missing for at least one out of the three cohorts. The estimated proportions are more variable at these ages both because of the smaller sample sizes and because of compositional effects. Concentrating on ages 40–49, where we have information on all three cohorts, we see that professorships have (proportionally) similar age profiles across groups in terms of timing, but it is hard to see from the figure whether professors are more socially selected than PhDs.

Figure 2 shows similar graphs by gender. From Panel (a), we see that for these cohorts, both the timing and level differences are relatively small for typical master's degree graduates, even if many more women

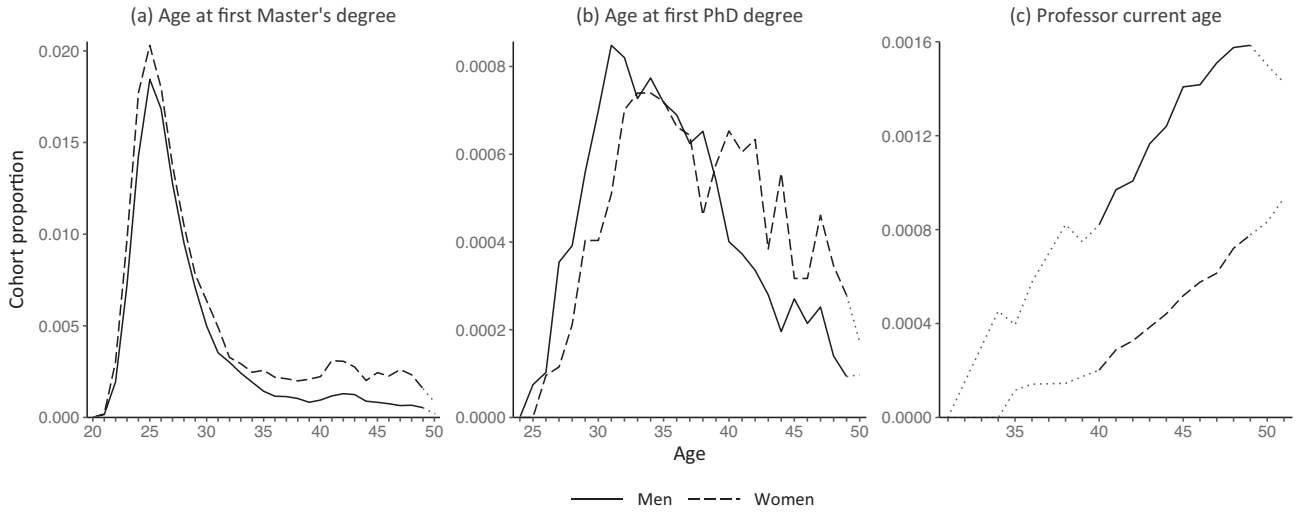

Figure 2. Educational and academic transitions over the lifetime by gender. Panel (a) of the figure shows the proportion of cohort members obtaining their first master's degree at any specific age separately by gender. Panel (b) similarly shows the proportion of cohort members obtaining their first PhD degree at any specific age. Panel (c) shows the cohort proportion employed as professors at Finnish universities at different ages. The dotted lines in Panel (c) represent ages for which information is incomplete.

than men complete a master's degree after the age of 35. When we look at PhDs in Panel (b), there is however a clear timing shift visible, with modal female PhDs receiving their degree two to three years after their male counterparts, and new female PhDs vastly outnumbering new male PhDs during their 40s. Since the 1964–1966 cohorts are still of working age, it is hard to know how many female cohort members will eventually become professors, and therefore to which degree the pattern in Panel (c) is indicative of a pure delay in female academics' careers, and to which degree it is indicative of women not becoming professors at all, but it is clear from the figure that for these cohorts, more men than women are professors by age 49, and that the women who did become professors by that age, did so at a later age on average.

Table 1 shows quartiles of graduation ages and of the age at which individuals become professors. As we have seen in the figures, for the median graduate, differences in the timing of degrees are small by parental background, as are differences in the age at which individuals of different backgrounds receive their first professorship. By gender, median differences are small in the timing of master's degrees. At the PhD level, the median woman defends her PhD 2.3 years later than the median man. The gender difference is about two years for the median first professorship in our data, but since other members of these cohorts will become professors even after age 49, the relatively small size of the difference is likely to be something of a statistical illusion.[2] In Figure 2, the trajectory for women seems to be shifted to the right by about 10 years. While 10 years may thus not be an unreasonable guess for the typical size of the delay, the true figure will be fundamentally unknowable for another decade or two, when these cohorts retire.

For the sake of completeness, we have tested statistically whether the age at which a milestone is reached is identical across groups for each combination of quartile, milestone, and grouping variable. As can be seen from the table, the grouping variable is highly significant everywhere but for the age of first professorships by parental education. Differences in significance levels across tests are however more a reflection of the respective sample sizes than of the magnitude of between-group differences.

We now turn to differences in rates. Table 2 shows the cohort proportions that ever receive a master's degree, a PhD, or a professorship at or before age 49. From the table can for example be seen that 51% of cohort members with at least one university educated parent had received a master's degree by age 49, 6.5% had received a PhD, and a little over 1% had become a professor. As can also be seen from the figures, these numbers are much lower for cohort members whose parents had lower levels of education. Within parentheses, we have added the proportion of cohort members within each group that attained the next level of the academic hierarchy divided by the proportion in the previous column. From the table, it can for example be seen that a little under 13% of master's degree holders with highly educated parents also received a PhD, while only 8% and 7%, respectively, did so in the other two groups. Similarly, about 19% of PhDs of highly educated parents became professors, while in the other two groups the respective proportions were 15% and 13%.

Table 3 shows similar results by gender. About a third more women than men receive master's degrees, about equal proportions receive PhDs, and only about half as many women as men have ever been employed as a professor at a Finnish university by age 49. As a consequence, among men a larger proportion of master's degree holders become PhDs, and a much larger proportion of PhDs become professors.

Table 1. Quartiles of attainment ages by parental education and gender.

	Master's degree			PhD			Professorship		
Parental education	Q25	Q50	Q75	Q25	Q50	Q75	Q25	Q50	Q75
High	25.7	27.2	29.8	32.4	36.2	41.0	39	42	45
Mid	25.7	27.5	31.0	33.5	37.1	41.8	38	41	44
Low	26.1	28.5	34.9	33.4	37.5	42.8	39	42	45
$p(H_0$:*high*=*mid*=*low*)	0.000	0.000	0.000	0.002	0.011	0.001	0.412	0.442	0.474
Gender									
Men	25.8	27.6	30.7	32.3	35.9	40.2	38	41	44
Women	25.9	28.2	34.2	34.2	38.2	43.3	40	43	47
$p(H_0$:*men*=*women*)	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.000

Notes: The table shows the 25th percentile, the median, and the 75th percentile of the ages at which different groups obtain their first master's degrees, their first PhDs, and their first professorships. Differences in age are small at the median for individuals of different parental backgrounds, but larger between gender when it comes to PhDs and professorships. We have added to each specification the result of a Wald test for the ages being equal across groups. Professorship ages are rounded.

[2] Suppose, for example, that a woman would otherwise have become a professor at age 48 but will have her professorship delayed until age 53. Because she is now not included in the group of professors aged 49 or less, the delay has the counter-intuitive effect of reducing rather than increasing the median age of the remaining female professors in the data.

Table 2. Attainment by parental education.

Parental education	N	Master	PhD (PhD/Master)	Professor (Professor/PhD)
High	10433	0.511	0.065	0.013
			(0.127)	(0.194)
Mid	34720	0.265	0.021	0.003
			(0.080)	(0.150)
Low	166279	0.087	0.006	0.001
			(0.068)	(0.129)
Total	211432	0.137	0.011	0.002
			(0.083)	(0.154)
$p(H_0$:*high*=*mid*=*low*)		0.000	0.000	0.000
			(0.000)	(0.001)

Notes: The table shows the cohort proportions of individuals obtaining a master's degree, a PhD, or a professorship at or before age 49 separately by parental education. We have added the proportional difference with the previous level within parentheses. For example, of the master's degree holders that have at least one university educated parent, about 12.7% obtained a PhD. The last two rows show the results of a series of F-test of these proportions being equal across groups.

Table 3. Attainment by gender.

Gender	N	Master	PhD (PhD/Master)	Professor (Professor/PhD)
Men	107298	0.119	0.011	0.002
			(0.094)	(0.210)
Women	104134	0.156	0.012	0.001
			(0.074)	(0.099)
Total	211432	0.137	0.011	0.002
			(0.083)	(0.154)
$p(H_0$:*men*=*women*)		0.000	0.346	0.000
			(0.000)	(0.000)

Notes: The table shows the cohort proportions of individuals obtaining a master's degree, a PhD, or a professorship at or before age 49 separately by gender. We have added the proportional difference with the previous level within parentheses. For example, of male master's degree holders, about 9.4% obtained a PhD. The last two rows show the results of a series of F-test of the proportions being equal across groups.

In Figure 3 we contrast the longitudinal and cross-sectional age profile of professors. Panel (a) is a variant of Figure 2, panel (c), but with female professors plotted on a separate scale. It is clear from the figure that there are more young male professors in our sample than there are young female professors, also in relative terms, with the share of female professors increasing towards the right of the figure. In panel (b) we show the age distribution of all professors under the age of 50 working at Finnish universities in 2015, i.e., we restrict the full population to a cross-section rather than to a narrow set of birth cohorts. As in panel (a), we show male and female professors on separate scales. We can see from panel (b) that the cross-sectional distribution of ages is similar across gender for young professors. It would therefore be tempting to conclude from the cross-section that young women no longer face delays in their academic careers. In the cross-section however, individuals of different ages also belong to different cohorts. A steady increase in attainment rates can thus easily mask a permanent difference in attainment age in cross-sectional data. This illustrates the importance of studying academic career trajectories by following cohorts longitudinally rather than by the use of cross-sections.

7. Discussion

In this article, we show that Finnish professors born in the years 1964–1966 are highly selected in terms of parental education. A large part of this selection is already present among master's degree holders, but both the PhD and professorship transitions are associated with further selectivity. For example, among master's degree holders whose parents lack post-secondary education, about 1 in 110 became professors, while the same number is 1 in 40 among master's degree holders with at least one university-educated parent. The finding that there is additional selectivity after the master's level is consistent with findings from other countries, such as for example those presented in Mullen et al. (2003) and

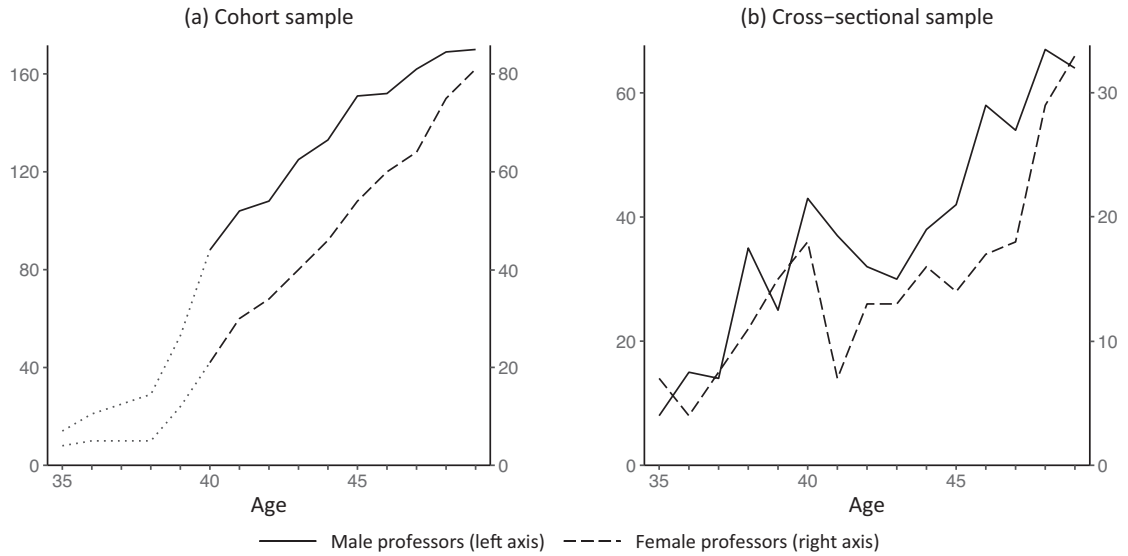

Figure 3. A comparison of longitudinal and cross-sectional gender gaps. Panel (a) shows the number of sample individuals working as professors at different ages longitudinally. The dotted lines represent ages for which information is incomplete. Panel (b) shows the cross-sectional age distribution of all Finnish professors under the age of 50 at the end of 2015. In both panels, the number of male professors is plotted on the left axis using a solid line and the number of female professors is plotted on the right axis using dashed line.

Wakeling and Laurison (2017). The estimates in Triventi (2013) do not have the precision necessary to determine that the transition from master's degrees to PhD degrees would be socially selective in Finland, but our estimates are nevertheless consistent with his.

We know that differences by parental education are likely to underestimate the total effects of family background (cf. Björklund & Salvanes, 2011); individuals of non-academic backgrounds who nevertheless become professors are more likely than others to have been advantaged in other ways. It stands to reason that the top of Finnish academia is therefore likely to be even more socially selected than our results may suggest.

While the share of women holding full professorships is higher in Finland than in the other Nordic countries (European Commission, 2016), Finnish professors are nevertheless highly selected in terms of gender. In the cohorts we study, women were about 30% more likely to obtain a master's degree but were about 50% less likely to have received a professorship by age 49. Though Finland thus seems to do well compared to other countries, in absolute terms gender differences are still large.

It is important to find the mechanisms behind the observed patterns. We find that while there are only small differences in the age at which individuals of different social background pass specific educational and academic milestones, women's academic careers seem clearly delayed compared to those of men. Though the literature suggests a number of reasons why such outcomes may differ by gender, among others differential family responsibilities, the relative importance of these mechanisms merit a thorough quantitative investigation. In this article, we stress the importance of using longitudinal data in studying career delays. Cross-sections almost necessarily combine information from different cohorts to analyze outcomes at different ages. Since cohorts can and do differ from each other, this adds an unwelcome and unnecessary source of error. Register-based population-representative data sets spanning multiple decades are not unique to Finland, and we encourage researchers both in Finland and abroad to use them.

As important as studying mechanisms behind patterns, is evaluating the policies that seek to change them. Historically, we have seen that the democratization of particular levels of education can lead to increased, within-level segregation. The same may be true for academic careers. For example, when Germany introduced the Junior professorship system in 2002, the policy was successful in increasing the share of female professors, but women were typically awarded lower-tier professorship positions, at lower pay (Burkhardt, Nickel, Berndt, Püttmann, & Rathmann, 2016). Inequalities between levels were thus partially replaced by inequalities within levels. Attempts to restructure the academic career paths are also ongoing in other countries. Finnish universities have for example recently introduced different types of tenure tracks (Pietilä, 2015). Rigorous quantitative evaluations of such policies are a necessary complement to qualitative knowledge and suggest a clear path for future research.

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Conflict of Interests

The authors declare no conflicts of interest.

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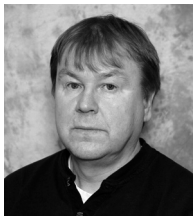
About the Authors

Jouni Helin is a Project Researcher with the Finnish Institute for Educational Research (FIER) at the University of Jyväskylä. He holds a master's degree in Social Sciences and is currently pursuing a PhD. His research interests are in the relationships between higher education and society, with a special focus on education and social stratification, educational choices and transitions, intergenerational mobility, postgraduate education and academic careers.

Kristian Koerselman is an education economist with the Finnish Institute for Educational Research (FIER) at the University of Jyväskylä. Many of his research interests are related to how education systems select, and what they end up selecting on. Kristian has studied the timing of puberty, the age of tracking, and the workings of centralized application systems. Kristian has also worked on issues related to higher education, among others on student financing and on academic careers.

Terhi Nokkala (PhD) is a Senior Researcher at the Finnish Institute for Educational Research (FIER) at the University of Jyväskylä and an Adjunct Professor of Higher Education Administration at the Faculty of Management at the University of Tampere. Her research focuses on the interplay between higher education policy, technological developments, organizational parameters and networks, and individual experiences in various aspects of higher education, with a specific interest in comparative methodology and discourse analysis.



Timo Tohmo is a Senior Researcher in Economics at the Jyväskylä University School of Business and Economics (JSBE), Finland. His research includes regional economics, cultural economics, tourism economics, and the economic impact studies. He has also been interested in intersectoral labor market mobility of Finnish academics.

Jutta Viinikainen (PhD) is a tenured Senior Researcher at the Jyväskylä University School of Business and Economics (JSBE), Finland. Her work is focused on labor and health economics, particularly on the role of personality traits in the labor market, and on how health and health behavior are related to labor market outcomes. More recently, Jutta has also studied the intersectoral labor market mobility of Finnish academics.