The Gender Revolution in Context: How Later Tracking in Education Benefits Girls

Lotte Scheeren, Herman G. van de Werfhorst, and Thijs Bol, *University of Amsterdam*

It is well established that women have surpassed men in educational attainment. The potential effect of educational institutional structures on the "rise of women" has largely been overlooked. In particular, the age of first selection into distinct educational tracks seems important, as the female-favorable gap in educational performance has been shown to widen during the high school years. Using microdata from the European Social Survey and data on tracking age reforms for 21 European countries from 1929 to 2000, we find that reforms promoting later tracking have particularly benefited girls' years of education, net of other influential factors (gender-ideological climate and demand on the labor market). This finding shows that the rise of women is not homogeneous across institutional contexts: some educational systems are more supportive of the enhancement of women's education than others.

Introduction

Women have long been disadvantaged in education compared to men, while currently they outperform men in educational attainment in many industrialized countries. This "rise of women" (DiPrete and Buchmann 2013) is likely to persist and even grow in the upcoming years (Vincent-Lancrin 2008). Although the reversal of the gender gap in educational attainment has occurred in almost all Western countries (OECD 2011), substantial differences exist. Both the magnitude of the gender gap in education and the time at which women caught up with men vary greatly. Most studies have examined individual-level explanations (e.g., Buchmann and DiPrete 2006), but recent work has studied institutional explanations for the cross-country and over-time differences in women's relative educational attainment. This literature has examined mostly contextual factors that influence expected (economic) returns to higher education, such as changes in gender ideological context or the labor market structure (Becker, Hubbard, and Murphy 2010; Goldin, Katz, and Kuziemko 2006). However, the

Research for this paper was made possible through a Vici grant to Herman van de Werfhorst, entitled "Between Institutions and Mechanisms: Education and Inequality in Comparative Perspective," awarded by the Netherlands Organization for Scientific Research (NWO), grant number 453-14-017. *Direct correspondence to University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, PO Box 15508, 1001 NA Amsterdam, The Netherlands; e-mail: L.Scheeren@uva.nl.*

Social Forces 97(1) 193–220, September 2018
doi: 10.1093/sf/soy025
Advance Access publication on 11 April 2018

role of the *educational* institutional context has largely been overlooked. It is unclear whether a specific setup of the educational system works better for one gender than for the other.

In this article, we study whether and how the age of first selection in the educational system affects the gender gap in educational attainment. In many European educational systems, children are tracked into separate school trajectories much more rigorously than in the United States. Especially in early-tracking countries, such as Germany, Austria, and the Netherlands, children enter separate schools for multiple years beginning when they are 10 to 12 years old and have different formal opportunities for their later school careers. Other European systems offer comprehensive education until the age of 16, including Scandinavian countries. Interestingly, these system differences may affect boys and girls precisely in the period when the male-female gap in academic performance widens to the benefit of females, namely, the teenage years (DiPrete and Buchmann 2013; Sammons 1995). If girls have increased advantages during the middle and high school years in terms of cognitive and non-cognitive skills that are conducive to further performance, girls may be at a particular advantage if selection happens later in their school careers.

Whereas some evidence indicates that a later age of selection benefits women's educational attainment relative to men's (Jürges and Schneider 2011; Pekkarinen 2008), no study to date has empirically tested this hypothesis for more than one country or over a long period of time. Including several countries and a long time period allows us to examine the relationship more rigorously. Moreover, a large set of countries enables us to exploit multilevel modeling approaches by which we can examine tracking effects both within countries over time and between countries. In some of these models, we include country and cohort fixed effects to control for all time-invariant country-specific factors and unobserved general time trends that affect all countries.

We combine longitudinal contextual data on educational reforms (Braga, Checchi, and Meschi 2013) from 1929 until 2000 with individual data on completed years of education in 21 European countries, retrieved from the European Social Survey (ESS). In addition to adding country and cohort fixed effects, we also control for a large number of dynamic contextual variables that test rival explanations for changing gender gaps in education, including gender-ideological climate and demand on the labor market.

To foreshadow our results, our models indicate that later tracking favors women's completed years of education. Even when we take into account the possibility that several factors might have changed in certain countries over time, we find that policy reforms with respect to tracking age affect the male-female gap in attained years of education. This result is not only relevant for educational systems with between-school tracking or countries that have experienced educational reform. What we find is that important educational decisions—about what level or educational program to follow—have a differential impact on students from different sexes. More specifically, the timing of these decisions has consequences for gender differences in educational outcomes. This is a finding

that potentially has implications for any intended reform targeting the educational selection and differentiation of specific age groups.

Tracking age and gender inequality

Curricular tracking, also known as ability grouping or educational differentiation, is the extent to which students are allocated into different educational programs, school classes, or schools on the basis of performance and/or aspirations (Vanfossen, Jones, and Spade 1987). Our study focuses on what has been called "between-school tracking" (Chmielewski 2014), which implies that students are separated for several years and enrolled in different curricular programs. Moreover, between these demarcated educational trajectories, often labeled (pre-) vocational and general/academic tracks, it becomes evident which is the more prestigious and which is the less prestigious track (Bol and Van de Werfhorst 2013).

Students are generally streamed into different tracks during secondary education; however, the age at which this occurs differs considerably between educational systems (Braga, Checchi, and Meschi 2013). In this study, we focus on this crucial aspect of tracking: the age at which national educational systems separate students into different programs (Horn 2009). In more selective systems, students are tracked into streams during lower secondary education, sometimes as early as age 10. In comprehensive systems, on the other hand, students remain much longer in untracked classes, up to age 16.

While tracking age is probably one of the most extensively investigated educational system characteristics, it has been rarely studied from a gender perspective. A large body of literature indicates that earlier tracking is associated with increased socioeconomic and ethnic inequality (Horn 2009; Van de Werfhorst and Mijs 2010). Prior research has also demonstrated that a selective system decreases school performance and final educational attainment (Brunello and Checchi 2007; Hanushek and Wössmann 2006). As a consequence, educational systems with early tracking have received a lot of criticism (OECD 2007).

While the focus has thus been mostly on socioeconomic and ethnic inequalities, a few studies have examined the effect of tracking age on gender differences in education, showing that educational systems with a later tracking age tend to favor girls. Jürges and Schneider (2011), who investigated the German system, found that the female-favorable gap in track recommendations and enrollment was slightly larger when the tracking age was 12 instead of 10. Pekkarinen (2008), who examined a Finnish school reform, showed that when the tracking age was postponed from 10–11 to 15–16, the gender differences in the likelihood of picking an academic track and enrolling in tertiary education became larger. Finally, Hadjar and Buchmann (2016) showed that educational attainment of women was relatively higher in late-tracking than in early-tracking educational systems.

Why would we expect that later tracking has (more) positive effects on the educational attainment of females versus that of males? Prior research has demonstrated that the female-favorable gap in educational performance widens over the educational life course (Dekkers, Bosker, and Driessen 2000; DiPrete and

Buchmann 2013). Gender differences in prior educational achievement did not appear to be an important explanation for increasing gender differences in educational achievement during the high school years (Machin and McNally 2005; Sammons 1995), indicating that the gap increases as children grow older. In general, track assignment is based on previous educational performance, as well as expectations about a student's educational potential. In this study, we provide two arguments why the female-favorable gap, in both educational performance and expectations about educational potential, is larger at the end of lower-secondary education than earlier in the educational career.

First, there is a sex difference in the timing and speed of maturation. Generally, during adolescence, girls are developmentally more advanced than boys: girls enter puberty at an earlier age and have more advanced psychosocial and brain development (De Bellis et al. 2001; Giedd et al. 2006). As a consequence, boys temporarily lag behind girls in important non-cognitive skills (Keulers et al. 2010), also referred to as executive functions or social and behavioral skills. These non-cognitive skills include cognitive self-regulation, including planning and sustaining attention, and emotional self-regulation, such as the ability to control emotional responses and sociability (DiPrete and Jennings 2012). Boys' lower non-cognitive skills during adolescence are reflected, for instance, in higher antisocial and disruptive behavior in school and lower attentiveness and school engagement in general (Downey and Vogt Yuan 2005; Jacob 2002). Previous studies showed that girls' advantage in non-cognitive skills, which is already present in kindergarten, increases as they progress through school, resulting in large gender gaps in non-cognitive skills during secondary education (Anderson et al. 2001; DiPrete and Jennings 2012; Keulers et al. 2010). As these skills are important for academic choices and performance (Best, Miller, and Naglieri 2011; OECD 2015), a rising non-cognitive skills gap increases gender gaps in educational performance during secondary education. Moreover, non-cognitive skills are important to signal educational potential (Downey and Vogt Yuan 2005). This suggests that when students have to make educational choices in late-tracking systems compared to early-tracking systems, girls will have a lead over boys in both educational performance and non-cognitive skills. Educational choices made at an older age during secondary education will then likely benefit girls' educational outcomes relative to boys'.

Second, gender identities can also explain gender differences in both social and behavioral skills and educational performance. Boys and girls engage in specific behavior to accomplish a feminine or masculine identity (Morris 2008; West and Zimmerman 1987). "Hegemonic masculinity," the traditional notion of male identity, means being dominant and even sometimes behaving deviantly (Connell and Messerschmidt 2005). Studies have argued that this construction of masculinity promotes boys having "laddish" attitudes, which implies a devaluation of schoolwork and lower school engagement, resulting in lower academic achievement (Francis 1999). Characteristics conducive to academic performance, such as zeal, the ability to cooperate, and academic effort, are stereotyped as feminine (Heyder and Kessels 2015). Boys typically will not engage in stereotypical female behavior, as this might compromise their masculine identity. Hence, boys are more likely to behave in a way that facilitates their construction of masculine identity, with lower

educational performance as a consequence.[1] Scholars have also argued that behavior that is assumed to be more feminine is more consistent with the school setting and therefore rewarded. Behavior that is assumed to be more masculine, on the other hand, is incompatible with this school setting and therefore sanctioned (Heyder and Kessels 2013). The construction of masculinity, and its effect on academic performance, appears to be especially important around the mid-teenage years (Frosh, Phoenix, and Pattman 2002; Swain 2005). This suggests that when educational choices are made later in the educational career, boys will show lower academic effort affecting their educational performance and the expectations about their educational potential. Educational choices in late-tracking systems compared to early-tracking systems will then likely benefit girls' educational outcomes relative to boys'.

The gender gap in educational achievement is not constant over the educational careers of boys and girls. This implies that the sorting structure in tracks will affect boys and girls differently. In a system with early tracking, for example, at age 10, the academic performance of boys and girls is still relatively similar, and so is their mix of predictors of performance, including non-cognitive skills and gender-typical behaviors. Tracking will have more negative consequences for boys when they must enroll in an educational track at a time when they lag behind girls in non-cognitive skills, show more behavioral problems, devalue educational achievement, and have temporarily lower educational performance. Educational choices made at a later age during secondary education will therefore be beneficial for girls' educational attainment. Since we know that tracking decisions have long-term consequences (Dustmann 2004), tracking is likely to affect the gender gap in final educational attainment. Our core hypothesis is therefore that a higher age of first selection will favor women's final educational attainment.

Alternative explanations

Although we focus on tracking as the main contextual explanation, other important factors may also affect gender differences in education. In this section, we discuss three alternative explanations for the changing gender gap in educational attainment over time and cross-country differences: (1) the vocational orientation of educational systems, (2) gender-ideological context, and (3) the structure of the labor market. These factors are not only important potential predictors of the gender gap in attainment but also likely to be correlated with tracking age.

First, educational systems vary not only in the extent to which they track students, but also in the extent to which they offer occupation-specific programs. This vocational orientation of the educational system indicates the extent to which students are provided with job-specific skills as opposed to more general skills. An important argument is that acquiring work-related skills and having work-related experiences in a vocational program can engage students who are at risk of dropping out of school. Prior research has indeed indicated that vocational education decreases dropout rates (Castellano, Stringfield, and Stone 2003), specifically when these vocational programs do not begin very late (Pauly, Kopp, and Haimson

1994). Since vocational education is a more appealing form of education to boys than to girls (Brunello and Checchi 2007), we should consider that vocational education might be specifically beneficial for boys' educational attainment. Since tracking age and vocational education are correlated (early tracked systems tend to have a larger vocational system; see Bol and Van de Werfhorst [2013]), it is especially important to take this system characteristic into account as well.

A second factor that can potentially influence the gender gap in education is gender-egalitarian attitudes within a country. This gender-ideological context is argued to influence gender differences in choices and preferences in education, for instance, by shaping expectations about future education and employment (Charles and Bradley 2002). Previous research has shown that a more gender-egalitarian context positively influences women's educational expectations, enrollment in tertiary education, and final educational attainment (Buchmann, DiPrete, and McDaniel 2008; McDaniel 2010). Several studies have also demonstrated that although large country differences in the gender-ideological context exist, in all Western countries, there was a trend toward more gender-egalitarianism, especially during the second half of the twentieth century (Brewster and Padavic 2000; Inglehart and Norris 2003). Therefore, changes in gender-egalitarian attitudes potentially explain between-country and over-time differences in the educational gender gap. Moreover, the gender climate is possibly related to tracking age. Reforms to adjust tracking age do not arise exogenously but are possibly embedded in wider cultural and political shifts toward equality. We therefore need to control for the gender-egalitarian climate.

A final confounder is the labor market demand. If individuals' anticipated future opportunities shape their present choices and performance (Goldin, Katz, and Kuziemko 2006), individuals are more likely to invest in human capital in contexts where they anticipate more opportunities to apply their skills on the labor market (Becker 1991; Charles and Bradley 2002). Therefore, changes in the labor market structure may affect gender differences in education. During the twentieth century, the occupational structure changed rapidly (Castells and Aoyama 1994), experiencing a transition from manufacturing employment to service-related employment. The expansion of the service sector has been shown to be highly correlated with the growth of women's labor force participation (Becker, Hubbard, and Murphy 2010; OECD 2005) and can partly explain the rising female employment rates (Akbulut 2011). Hence, due to the increase in service-related jobs, more opportunities on the job market arose for women, making it more rational and attractive for them to invest in human capital. We thus expect that the size of the tertiary sector in a country and the structural changes in the labor market over time affect women's educational attainment. The proportion of service-sector employment may furthermore be correlated to tracking age, as both are potentially driven by broader societal trends toward women's empowerment.

Data

The individual-level data for this study are derived from the European Social Survey (ESS). The ESS is a cross-national dataset collected in 36 European countries. To date, the ESS has gathered seven rounds of data, collected biannually between 2002 and 2014. In this study, we use all seven rounds of the ESS for 21 European countries[2] on which we have information about educational institutional structures.[3] Information on contextual-level indicators, all time-varying, is gathered from various other sources described below.

The individual-level data are linked to contextual-level data on the basis of country-specific cohorts.[4] First, respondents are grouped into five-year birth cohorts (e.g., 1961–1965, 1966–1970) within their countries. We match contextual-level variables to the cohorts in which the respondents are 20 years of age. We opted for age 20 because contextual features during adolescence might be specifically important for the decision to continue studying or to choose another path.[5] An example of our data structure is as follows: someone from Germany born in 1964 is grouped into the German 1961–1965 cohort and receives information on all contextual variables, for example, average GDP per capita, for the period 1981–1985 in Germany, when he or she is 20 years of age. Information on tracking age is not connected to 20 years of age but rather to the actual tracking age the respondents experienced during secondary education.

Based on the information we have on tracking age, we can construct 13 birth cohorts (1921–1925 to 1981–1985). Country cohorts containing less than 50 respondents are excluded from the sample. The sample size in our first analysis, including only the native population above 25 years of age, is $N = 143{,}883$. This sample contains 21 European countries all including a maximum of 13 birth cohorts, resulting in 270 country cohorts.

We constructed two other samples, in order to examine the impact of other contextual features. Due to missing data on contextual-level control variables (depending on the variable for which we have data on these indicators since 1960 or 1970), we exclude birth cohorts before 1946–1950 from our second sample. The second sample contains 20 European countries all including a maximum of eight birth cohorts (1946–1950 to 1981–1985), resulting in 124 country cohorts containing $N = 78{,}921$ respondents.[6] In the last step of our analysis, we also include a measure of vocational education. This last sample contains 20 European countries all including a maximum of six birth cohorts (1956–1960 to 1981–1985), resulting in 92 country cohorts containing $N = 52{,}612$ respondents. Although these samples include a lower number of observations and cohorts, they allow us to test for competing explanations.

Variables

Individual-level variables

Educational attainment, our dependent variable, is operationalized as years of completed education.[7] Years of education is self-defined and measures the

number of years of education a person has completed (including also compulsory education), whether part-time or full-time, in full-time equivalents. Years of education was bottom-coded at six years to reflect that everyone has attained some primary education and top-coded at 25 to avoid strong leverage from outliers in educational attainment. A descriptive graph showing how men's and women's years of education evolved over time per country can be found in Appendix A, Figure A1. The main individual-level independent variable of this study is *gender* (male = 1, female = 0).

Contextual-level variables

Tracking age is measured as the age at which students are initially streamed into separate educational trajectories. Information on tracking age is gathered from the educational reform dataset constructed by Braga, Checchi, and Meschi (2013), which contains information on various reforms that influenced the educational system in several European countries between 1929 and 2000. First, this measure is aggregated from a country/year-level measure to a country/cohort-level measure. Subsequently, birth cohorts are linked to the (average) tracking age that cohort experienced during secondary education. Countries that have an undifferentiated system are assigned the age at which students leave secondary education, as this is the moment students will separate into different (educational) trajectories. This measure is continuous, ranging from 10 to 16. For ease of interpretation, we subtracted 10 from the tracking age so that 0 refers to the earliest tracking age (10 years).

Tracking age is arguably the most important feature that determines the level of tracking in an educational system. There are additional features, such as the number and length of different tracks. Due to these features' interrelatedness, it is highly likely that when the tracking age changed within an educational system, these other characteristics changed as well. However, theoretically, we argue that specifically the age of first selection interacts with gender differences in development and is therefore the main characteristic relevant for gender differences in education. Additionally, age of first selection is empirically shown to be the main feature explaining inequality of opportunity (Horn 2009). Moreover, Pekkarinen (2008) showed for Finland that the change in tracking age—not the change in curriculum—influenced gender differences.

Vocational orientation of the educational system is operationalized as the percentage of students enrolled in vocational programs at public and private secondary education institutions relative to students enrolled in all secondary education programs. Vocational education is described as education that is designed for students to acquire knowledge, skills, and competencies specific to a particular occupation, trade, or class of occupations, which may involve work-based components. Data are gathered from the UNESCO Institute for Statistics, which contains country-specific information on this measure from 1970 onward. This measure is aggregated from a country/year-level measure to a country/cohort-level measure and connected to the time when birth cohorts were 15 years of age.[8] The correlation between vocational orientation and tracking age in our data is −0.30. This negative association suggests that in countries that

track earlier, the percentage of students in secondary school that are enrolled in vocational programs is higher.

Gender-ideological climate is operationalized using items from all rounds of the European Values Study (EVS, 1981–2008) and World Values Survey (WVS, 1981–2014). We generated a gender attitude scale based on the extent to which respondents agree with eight statements: (1) A woman has to have children to be fulfilled, (2) A child needs a home with a father and a mother, (3) A woman can be a single parent, (4) A working mother can establish as warm a relationship with children as a non-working mother, (5) Being a housewife is as fulfilling as having a paid job, (6) A preschool child suffers by having a working mother, (7) Women really want a home and children, and (8) When jobs are scarce, men should have a greater right to a job than women. These items are selected on the basis of broad availability with respect to countries and years, as well as their use by previous research (Davis and Greenstein 2009; McDaniel 2008). The items are recoded so that a higher score indicates a more gender-egalitarian attitude and are subsequently standardized. A principal component analysis shows that all items load above 0.4 on one factor, and the Cronbach's alpha of these items is 0.65. We take the mean of the eight items to construct the gender attitudes scale. Respondents who answered fewer than four of the eight questions were coded as missing. However, the attitudes that we derive from the EVS and WVS are for the full population, not for specific cohorts. For this reason, we used a regression model to predict the gender attitudes by birth cohort, age, country, and interactions between all three. Subsequently, we used marginal effects in order to predict the average attitudes of young adults (21- to 30-year-old population) within a country and a cohort between 1941 and 2005. On this final measure, a higher score indicates a more gender-egalitarian climate. This measure is matched to individual-level data when birth cohorts were 20 years of age.

Labor market demand is operationalized as the percentage of total hours worked by employees in the tertiary sector. The data are gathered from the EU KLEMS database (November 2009 release).[9] This database contains internationally comparable industry-level indicators of input, output, and productivity for 30 countries—mostly European Union member states, but also the United States, Australia, Japan, and Korea—from 1970 up to 2007 (O'Mahony and Timmer 2009). This dataset includes information about total hours worked by employees in the different industries per year and per country. The percentage of hours worked by employees in the tertiary sector relative to hours worked by employees in all sectors is calculated.[10] This measure is then aggregated from a country/year-level measure to a country/cohort-level measure and subsequently linked to individual-level data when birth cohorts were 20 years of age.

An overview of all contextual-level indicators, including a short description, years of availability, and the source, is presented in table 1.

Control variables

We include GDP as a control variable on the country cohort level. This variable is measured as the GDP per capita in US dollars, and data were collected from

Table 1. Description, availability, and sources of contextual-level variables

Contextual-level variables	Short description	Years of availability	Birth-cohorts availability	Source
Tracking age	The age of selection into separate educational trajectories	1929–2000	1921–1925 to 1981–1985	Braga, Checchi, and Meschi (2013)
Vocational enrollment	The percentage of students in secondary education that are enrolled in vocational programs	1971 onward	1956–1960 to 1981–1985	UNESCO Institute for Statistics
Gender-ideological climate	The average gender-egalitarian attitudes of young adults	1941–2005	1946–1950 to 1981–1985[a]	World Values Study and European Value Survey
Tertiary sector[b]	The percentage of total hours worked by employees in the tertiary sector	1970 onward	1946–1950 to 1981–1985	EU KLEMS database
Log(GDP)	The logarithm of GDP per capita in US dollars	1960 onward	1946–1950 to 1981–1985[a]	World data Bank

[a]These variable could be connected to earlier birth cohorts, however in the analysis we only use them in combination with other country-level variables. Therefore, we only provide descriptive statistics from the 1946–1950 cohort onward.
[b]Not available for Norway.

the World Data Bank, which contains country-specific information on this measure from 1960 onward. In addition, the logarithm is taken to control for the skewness of the variable. As with all contextual variables besides tracking age, the measure is matched to individual-level data for birth cohorts that were 20 years of age.

At the individual level, we include the father's and the mother's years of education. For both measures, we convert International Standard Classification of Education (ISCED) levels into years of schooling: six years for ISCED = 0–1 (less than lower secondary education completed), nine years for ISCED = 2 (lower secondary education completed), 12 years for ISCED = 3 (upper secondary education completed), 14 years for ISCED = 4 (postsecondary non-tertiary education completed), 16 years for ISCED = 5–6 (tertiary education completed). We also control for the father's occupation when the respondent was 14 years old by including five out of the six following dummy variables: whether the father worked in (1) Routine manual and service occupations, (2) Semi-routine/manual/service occupations, (3) Technical and craft occupations, (4) Clerical and intermediate occupations/middle managers, (5) Higher administrator occupations, or (6) Professional and technical occupations. The descriptive statistics of all individual- and country/cohort-level variables are presented in table 2.

Table 2. Descriptive statistics

	Mean	SD	Min	Max	N
Individual-level variables					
Years of education	12.683	3.877	6	25	143,883
Male	0.469		0	1	143,883
Father's years of education	9.892	3.438	6	16	143,883
Mother's years of education	9.284	3.129	6	16	143,883
Father's occupation					
Routine manual and service	0.243		0	1	143,883
Semi-routine/manual/service	0.175		0	1	143,883
Technical and craft	0.284		0	1	143,883
Clerical and intermediate	0.150		0	1	143,883
Higher administrator	0.051		0	1	143,883
Professional and technical	0.097		0	1	143,883
Contextual-level variables					
Tracking age (10 years = 0)	3.155	1.976	0	6	143,883
Gender-ideological climate	0.120	0.217	−0.300	0.616	78,921
Tertiary sector	59.377	7.690	40.056	77.419	78,921
Vocational enrollment	28.623	13.100	2.129	53.734	52,612
Log(GDP)	9.006	0.899	6.599	10.595	78,921

Methods

We employ a two-level multilevel model to examine the extent to which the effect of gender on years of education is moderated by the age of first selection. This model takes into account that individuals are nested within country cohorts. In this model, we include country fixed effects, which allows us to control for all time-invariant country-specific factors and indicates that the estimators of this model are not contaminated with spurious effects of stable, unmeasured country characteristics (Verbeek 2004). We also incorporate cohort fixed effects, which enables us to control for unobserved general time trends that affect all countries equally. In this model, we thus exploit the within-country over-time variation in tracking age to determine whether policy changes affected the gender slope on years of education. The general equation for this model is the following:

$$\begin{aligned} Y_{ij} = {} & \beta_0 + \sum_{l=l-1} \beta_x L_j + \sum_{k=k-1} \beta_k K_j \\ & + \beta_3 gender_{ij} + \beta_4 trackage_j + \beta_5 gender_{ij} * trackage_j \\ & + \beta_6 X_{ij} + u_{0j} + u_{1j} gender_{ij} + e_{ij} \end{aligned}$$

In this equation, Y_{ij} is the number of years of completed education for individual i in country cohort j; β_x estimates the fixed effects for countries by adding dummies for country L; β_k estimates the fixed effects for cohorts by adding dummies for cohort K; β_3 to β_5 are the estimates of the main effects and cross-level interaction between gender and tracking age; and β_6 estimates the effects of all individual-level control variables. u_{0j} is the error term at the country cohort level; $u_{1j}\,gender_{ij}$ is the error term of the slope variation in gender, as this model includes a random slope for gender; and e_{ij} is the error term at the individual level.

To examine whether the results are sensitive to different specifications of the random effects structure, we also performed the analysis using two other multilevel modeling approaches: a cross-classified model and a hybrid model (Schmidt-Catran 2016; Schmidt-Catran and Fairbrother 2016). The general equations and explanations of these methods can be found in Appendix B.

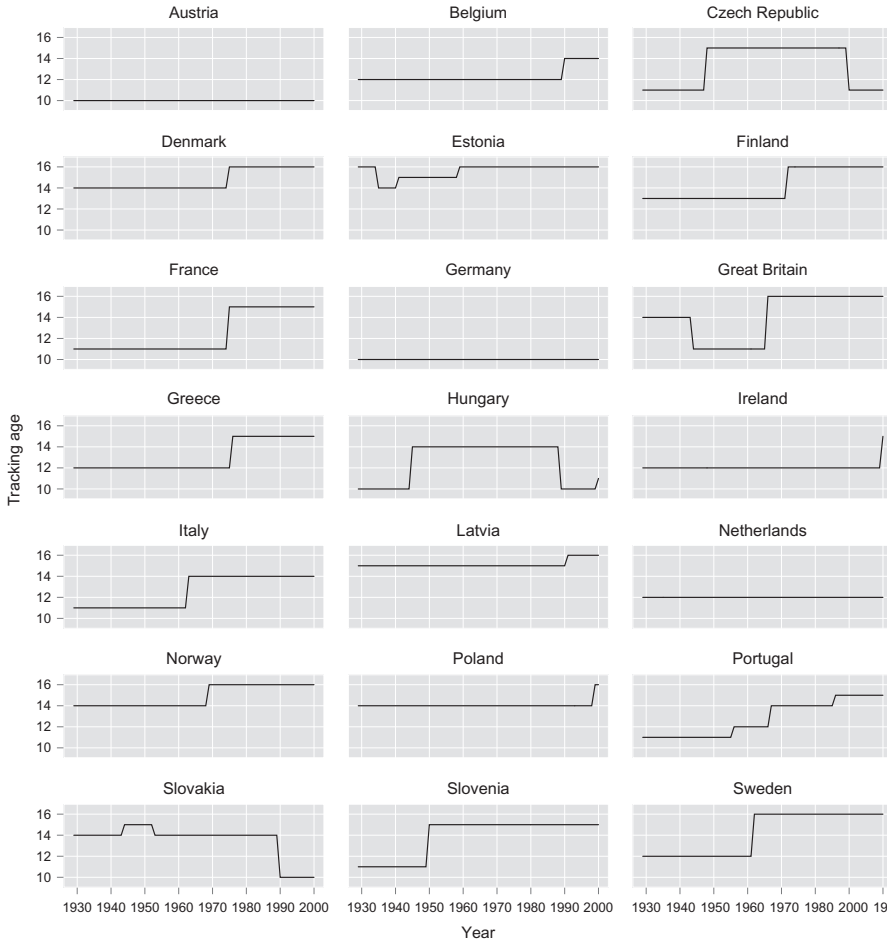
Descriptive results

This paper began with the argument that even though the relative educational attainment of women is increasing in almost all Western countries, large variation exists across countries and over time. Proof for this argument is demonstrated in Figure A1 in Appendix A. Before we continue to our main analysis, we look briefly at the extent to which tracking age actually differs between countries and changes over time. Figure 1 displays the variation in age of first selection over time for all countries included in our sample. It shows that large differences in tracking age not only exist between countries, with some countries selecting students much earlier than other countries, but also sometimes changed within countries. Only in three of the 21 countries does tracking age remain stable (Austria, Germany, and the Netherlands). In general, this figure displays an upward trend in the age of first selection in almost all countries, indicating that most countries postponed tracking age. According to our argument, this upward trend might have contributed to the "rise of women." Figure A2 in Appendix A presents descriptive statistics per country of all other contextual-level variables.

Moreover, we first descriptively examine whether the relationship between gender and education appears to be different for societies with different tracking ages. This relationship is presented in figure 2, which displays the effects of being male on completed years of education for different ages of selection estimated by separate OLS regression models for each country cohort.[11] Each dot in the scatterplot is an estimated effect of being male (relative to being female) on years of education for one country cohort.

The figure clearly shows that whereas the effect of being male on years of education is mainly positive when the tracking age is 10, it decreases and even becomes mostly negative when the tracking age is higher. This is in line with our expectations that a higher tracking age benefits girls' educational attainment. The relationship displayed in the figure may, however, be due to extraneous effects such as general time trends; in general, there was an upward trend in the number of years of education women completed and in the age of first selection.

Figure 1. Variation in tracking age over time for all countries



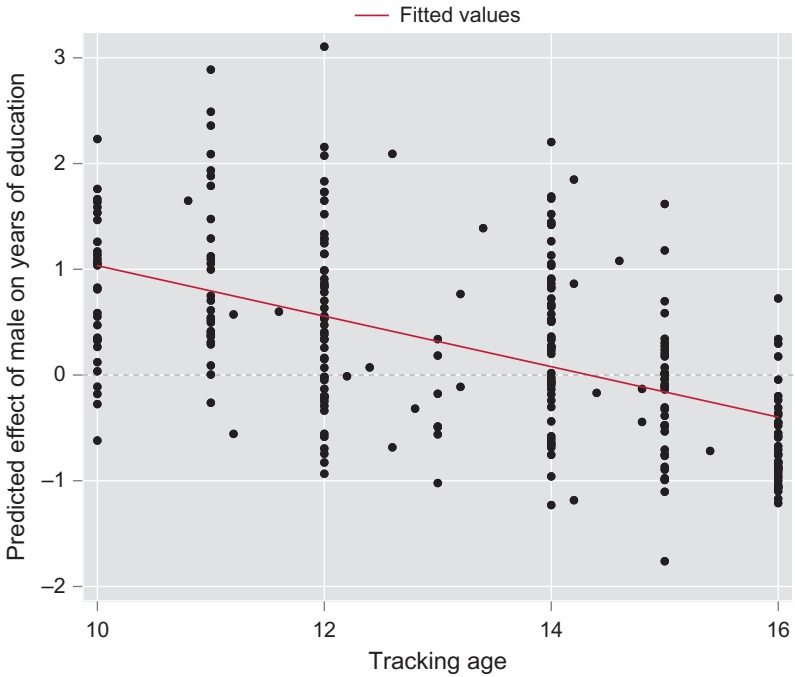
Source: Braga, Checchi, and Meschi (2013).

In our main analyses, we will control for the general time trend and investigate if a policy change (change in tracking age) influenced the effect of gender on years of education.

Results

The baseline model of the two-level multilevel model including only country and cohort fixed effects shows that even though these fixed effects account for a large part of the contextual-level variance, 2.4 percent of the total variance is at the country/cohort level. Subsequently, after including individual-level variables, we test the significance of a random slope for gender. A log likelihood ratio test shows that the model fit is significantly improved when this random slope is

Figure 2. Predicted effect of male on completed years of education for different ages of selection



Note: Each dot in the scatterplot is estimated by separate OLS regression models and displays effect of male (relative to female) on completed years of education for one country cohort. Equation: Y(years of education) = b0 + b1*male + b2*X. In the equation, b2 estimates the effect of all individual-level control variables, which are parent's years of education and dummies for father's occupation.

included ($\chi 2(2) = 1{,}529.72$, $p < 0.0001$), indicating that the effect of gender on education varies across country cohorts.[12]

Table 3 displays the results of the two-level multilevel model of years of education. This model includes country and cohort fixed effects, individual-level indicators, tracking age, and the cross-level interaction between tracking age and gender to potentially explain the random slope of gender.[13] The individual-level indicators, father's and mother's years of education, and father's occupation all have a significant and positive effect on years of education.

The positive and significant main effect of gender indicates that on average, men complete almost one more year of education than girls when the tracking age is 10. We also find a positive main effect of tracking age, with a one-year increase in tracking age leading to a quarter-year more education for women. The cross-level interaction between tracking age and gender shows that the gender effect on years of education differs significantly by age of selection. In line with our expectations, this effect is negative, indicating that the advantage of being male weakens as tracking age increases. This model predicts that the effect

Table 3. Multilevel Linear Regression Models of years of education, with a random slope for male and country and cohort fixed effects

	Model 1	
	B	SE
Individual-level variables		
Father's years of education	0.214***	0.004
Mother's years of education	0.212***	0.004
Father's occupation		
Routine manual and service	ref.	
Semi-routine/manual/service	0.172***	0.025
Technical and craft	0.462***	0.023
Clerical and intermediate	1.320***	0.028
Higher administrator	1.583***	0.043
Professional and technical	1.545***	0.036
Male	0.992***	0.084
Contextual-level variables		
Tracking age	0.241***	0.034
Cross-level interaction		
Tracking age * male	−0.235***	0.022
Constant	4.893***	0.210
Country fixed effects	Yes	
Cohort fixed effects	Yes	
Variance components		
Country cohort	0.406***	
Individuals	9.201***	
Random slope male		
Country cohort	0.413***	
N(individuals)	143,883	
N(country cohorts)	270	

Two-tailed test: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

of being male on years of education even reverses when the tracking age surpasses 14 years. With a 0.25 change in the gender effect on years of education for each year that tracking is delayed, this effect is substantial. It is important to note that this effect is net of the general time trend that we observe across these countries. This cross-level interaction explains 33.9 percent of the random slope for gender.

The results of the cross-classified model and the hybrid model of years of education can be observed in Appendix B. The estimates are consistent across the

different models: for every one-year increase in tracking age, the effect of being male on years of education decreases by a quarter of a year, which indicates that our results are robust to different model specifications.

In table 4, we present the results for when we control this finding for other contextual factors. Since a specific higher-level variable—vocational education—is only available for later cohorts, two separate two-level multilevel models with country and cohort fixed effects are estimated: one without this parameter (model 3) and one with this parameter (model 5). Since the sample size changes with the inclusion of the contextual control variables, the differences in effects might be due to the different sample size as well. To ensure that changes in the results are not caused by the different sample size but rather by the inclusion of other factors, we repeated model 1 with the new sample size restriction in both models (models 2 and 4).

Model 3 shows that after controlling for potential confounders at the contextual level, we still observe a positive significant main effect of gender and tracking age and a negative significant cross-level interaction, although the effect size is smaller. We do not find evidence that gender-ideological context during adolescence influences people's years of education or that the effect differs between men and women. The main effect of tertiary sector is not significant, but the cross-level interaction with gender is negative and significant, indicating that the positive effect of being male on years of education weakens when the size of the tertiary sector grows. The contextual-level control variable GDP shows that as GDP increases, years of education increases. The significance and direction of the effects of individual-level control variables remain stable.

In model 5 (table 4), we also include the size of the vocational sector of the educational system. The results found in this model are slightly different from the results found in model 3, but this is mainly due to the lower number of country cohorts included in this model and not to the addition of the new indicator. Due to the loss of earlier cohorts, the effect of gender is not significant (see model 4), but the outcomes for tracking age and the corresponding cross-level interaction remained the same: a positive effect of tracking age on years of education that is significantly weaker for men than for women. Again, we find no evidence of an effect of gender-egalitarian context on (gender differences in) years of education. Moreover, in this model, we find that a larger tertiary sector is associated with an increase in years of education, but this pattern is not significantly different for men and women. For vocational enrollment, we find a negative significant coefficient, indicating that vocational enrollment is negatively associated with average years of education. For every standard deviation increase in vocational enrollment, completed years of education decreases by 0.22 years (which is equal to 0.06 standard deviations in years of education). The non-significant cross-level interaction illustrates that this effect does not vary for men and women.

In sum, irrespective of the modeling technique that we use or the control variables that we add, we find that the gender gap in years of education is associated with the tracking age. When societies postpone the moment of tracking, female students benefit more from it. To obtain more insight into the size of this effect,

Table 4. Multilevel Linear Regression Models of years of education, controlling for alternative explanations

	Model 2		Model 3		Model 4		Model 5	
	B	SE	B	SE	B	SE	B	SE
Individual-level variables								
Father's years of education	0.186***	0.005	0.186***	0.005	0.159***	0.006	0.159***	0.006
Mother's years of education	0.205***	0.005	0.205***	0.005	0.210***	0.006	0.210***	0.006
Father's occupation								
Routine manual and service	ref.		ref.		ref.		ref.	
Semi-routine/manual/service	0.087*	0.037	0.087*	0.037	0.031	0.045	0.031	0.045
Technical and craft	0.383***	0.034	0.382***	0.034	0.329***	0.042	0.327***	0.042
Clerical and intermediate	1.197***	0.039	1.196***	0.039	1.023***	0.047	1.021***	0.047
Higher administrator	1.395***	0.057	1.395***	0.057	1.153***	0.068	1.151***	0.068
Professional and technical	1.446***	0.049	1.446***	0.049	1.342***	0.059	1.340***	0.059
Male	0.505***	0.097	0.420***	0.096	0.183	0.110	0.210	0.114
Contextual-level variables								
Tracking age	0.178***	0.042	0.208***	0.041	0.137**	0.047	0.157***	0.039
Gender-ideological climate[a]			−0.218	0.547			0.739	0.457
Tertiary sector[a]			0.012	0.020			0.058**	0.017
Log(GDP)			1.232***	0.239			1.034***	0.196
Vocational enrollment[a]							−0.017**	0.005
Cross-level interactions								
Tracking age * male	−0.180***	0.025	−0.147***	0.026	−0.125***	0.026	−0.124***	0.027

(*Continued*)

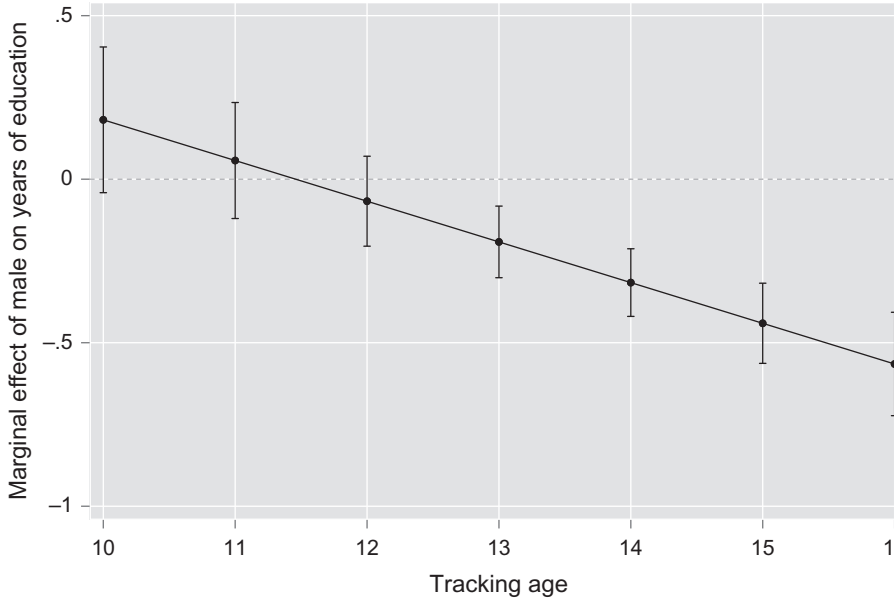
Table 4. ***continued***

	Model 2		Model 3		Model 4		Model 5	
	B	SE	B	SE	B	SE	B	SE
Gender climate[a] * male			−0.027	0.317			−0.035	0.331
Tertiary sector[a] * male			−0.025**	0.009			−0.008	0.010
Vocational enrollment[a] * male							−0.001	0.004
Constant	7.153***	0.187	−2.276	1.769	8.343***	0.172	−0.634	1.772
Country fixed effects	Yes		Yes		Yes		Yes	
Cohort fixed effects	Yes		Yes		Yes		Yes	
Variance components								
Country cohort	0.317***		0.280***		0.201***		0.122***	
Individuals	9.663***		9.663***		9.387***		9.387***	
Random slope for male								
Country cohort	0.273***		0.235***		0.178***		0.172***	
N(individuals)	78,921		78,921		52,612		52,612	
N(country cohorts)	124		124		92		92	

Two-tailed test: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[a]For ease of interpretation, these variables have been mean-centered in the models.

Figure 3. Marginal effect of male on years of education by tracking age



Note: This figure is based on model 5, table 4. The 95 percent confidence intervals are presented.

figure 3 displays the marginal effect of being male on years of education for different ages of selection based on our final model (model 5). This figure demonstrates that when a country raises the tracking age, the model predicts that gender differences in completed years of education in favor of women also increase. It also shows that when children are tracked at an age of 10, 11, or 12, we do not predict a (significant) difference in completed years of education between boys and girls. However, when the tracking age is 16, girls outperform boys in education, with a difference of approximately 0.15 of a standard deviation on years of education. This is a large effect for a system-level factor such as tracking, indicating the importance of a contextual explanation of the gender gap in educational attainment.

Sensitivity analysis

To assess the reliability of our outcomes and check for potential influential countries, we perform sensitivity analyses excluding specific clusters of countries. Table 5 displays four models excluding Scandinavian countries, Eastern European countries, Southern European countries, and West European countries, respectively. In these models, we control for other contextual factors, although the coefficients are not displayed in the table.[14] The results presented in table 5 are highly comparable to those for the full sample. The main effect of being male is overall positive and significant, except for the model excluding Western European countries—indicating boys' presumably much higher

Table 5. Multilevel Linear Regression Models of years of education, testing for influential countries

	W/o Scandinavian countries		W/o Eastern European countries		W/o Southern European countries		W/o Western European countries	
	B	SE	B	SE	B	SE	B	SE
Male	0.434***	0.098	0.447***	0.100	0.369***	0.092	0.148	0.248
Tracking age	0.219***	0.043	0.210***	0.048	0.096**	0.032	0.183*	0.077
Tracking age * male	−0.127***	0.029	−0.129***	0.028	−0.166***	0.026	−0.112*	0.054
N(individuals)	62475		68530		67249		38509	
N(country cohorts)	100		103		101		68	

Note: Scandinavian countries: Denmark, Sweden, Finland, and Norway. Eastern European countries: Czech Republic, Estonia, Hungary, Latvia, Poland, Slovakia, and Slovenia. Southern European countries: Greece, Italy, and Portugal. West European countries: Austria, Belgium, France, Germany, Great Britain, Ireland, and the Netherlands. Based on model 3, table 4.
Two-tailed test: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

educational attainment over girls in these countries. In all models, we still find a positive and significant main effect of tracking age and a negative and significant cross-level interaction, indicating that excluding specific clusters of countries did not dramatically influence our outcomes. While all models show the same pattern, the effects that we find are of course affected by the inclusion (or exclusion) of countries. Nevertheless, the general pattern is robust to selecting different sets of countries.

Conclusion and discussion

Although it is well known by now that women have surpassed men in educational attainment, a good understanding of the reverse educational gender gap remains lacking. In this study, we have focused on the extent to which the educational institutional structure, and more specifically, tracking age, is associated with gender differences in completed years of education. This study is the first to systematically investigate this relationship for a large number of European countries over a long time period. Moreover, we examined various rival dynamic theoretical explanations that potentially affected the reversal of the gender gap.

The main finding of our study is that later tracking improves women's completed years of education relative to men's. This result is robust to different model specifications and tests of several rival explanations. Although this study shows that the postponement of tracking favors women's final years of education, the theoretical explanation underlying this relationship requires further study. We have offered two interrelated mechanisms. First, several scholars have argued that the gender gap in non-cognitive skills increases during secondary education, indicating that the gender gap in educational achievement widens during this period as well. Second, studies point to the importance of gendered identities during secondary education, which affect boys' and girls' performance in education. The general idea underlying these mechanisms is that there is an interaction between the timing of tracking and the varying differences between boys and girls across their school careers. In line with our results, these two mechanisms suggest that in particular, educational choices at the end of lower secondary education will favor girls' educational attainment.

According to Baker (2014), societies have become "schooled societies," embracing a cultural model in which the social positioning of individuals and the structure of society are strongly based on educational qualifications. This cultural model has affected the attraction of higher-level qualifications and may have contributed to a massive expansion of education especially among women (as they lagged behind men). Nevertheless, our study shows that the gender-specific trend in attainment is not the same in all societies, as it was much easier for women to catch up with men (and surpass them) in systems with later tracking. A neo-institutionalist perspective on our findings could, however, imply that reforms promoting later tracking fit schooled societies, as expansion is more easily achieved in later-selecting systems. Hence, a cultural (rather than functional) model of expansion could lie behind both reforms and rising attainments, which would not be at odds with our argument. Nevertheless, it would be difficult for

a cultural model to explain the reversal of the gender gap beyond the equalization of attainment between men and women. Moreover, if our results were interpreted from a neo-institutionalist perspective, it would mean that schooled societies have not evolved everywhere at the same speed.

Women are increasingly becoming more educated than men, and our study shows that educational systems contribute to this phenomenon. However, it is important to stress that there are still large gender gaps in favor of men in education and in the labor market, and more years of schooling does not necessarily translate into more equality in these areas. Bradley (2000) showed that a higher representation of women in higher education did not translate into gender parity in the occupational structure, as gender segregation within the educational system remained high. The postponement of tracking is suggested to be associated with changes in the combination of fields of study represented at specific educational levels, for example by upgrading (e.g., from the secondary to the tertiary level) of traditionally female-labeled educational fields, such as nursing and teaching (Bradley and Charles 2004; Breen et al. 2010). This suggests that, even though women in late-tracking systems complete more years of schooling, women in both systems end up with the same occupational credentials. Nevertheless, research shows that girls are less likely to end up in female-typical educational fields in systems with later tracking, as early gendered career aspirations are less likely to be translated into final educational and occupational outcomes in late-tracking systems compared to early-tracking systems (Charles et al. 2001). Additionally, Pekkarinen (2008) showed that the gender wage gap decreased after the tracking age increased, suggesting that later tracking, potentially via educational attainment, also contributes to women's labor market success. To obtain a more comprehensive understanding of the impact of educational tracking, future research should examine whether tracking age also affects gender differences in fields of study and other educational and labor market outcomes.

As we have shown in this paper, educational systems change over time, which might result in different opportunities for different groups. Our findings indicate an interesting trade-off between gender equality and equality with respect to socioeconomic backgrounds in educational opportunity. Whereas a higher tracking age has repeatedly been shown to diminish socioeconomic inequalities in educational attainment (Van de Werfhorst and Mijs 2010), our study demonstrates that it enhances gender differences in education. Future research should investigate the abovementioned trade-off more thoroughly and examine whether a combination of educational institutional structures can reduce both forms of educational inequality. In a similar vein, future research should investigate intersectionalities between gender and socio-economic background because the effect of tracking on boys' and girls' educational performance might differ across social classes.

In this article, we looked explicitly at between-school tracking. While not all countries track students between schools, most countries employ some type of ability sorting, for example, within schools, such as in the United States or the United Kingdom (Chmielewski 2014; LeTendre, Hofer, and Shimizu 2003).

In these countries students have to make curricular choices as well, for example, content and level of difficulty (Lucas 2001). Our study argues that gender differences are not constant over the educational career, and that choices made at the end of lower secondary education are more likely to benefit girls, irrespective of whether it concerns between-school track choices or within-school curriculum choices. Future research should look at these systems and investigate if tracking has the same effects when it takes a less institutionalized form. Additionally, our findings potentially have implications for any intended reform, both in- and outside Europe, targeting the educational selection and differentiation of specific age groups. For instance, debates in the United States about the consequences of a transition from middle to high school (e.g., Pharris-Ciurej, Hirschman, and Willhoft 2012; Weiss and Bearman 2007) may learn from the relevance of building or removing transitions at crucial age points for gender inequalities.

In conclusion, our article shows that the setup of the educational system can influence the extent to which boys and girls perform well in education. Specifically, this study is the first to provide international evidence that female dominance in educational attainment is enhanced in educational systems that have postponed the tracking age. A higher age of first selection benefits women's completed years of education and therefore contributes to the gender gap in education, indicating that future studies on "the rise of women" should focus on contextual explanations and mechanisms for cross-national and cross-temporal differences. Such contextual explanations cannot neglect the educational institutional structure.

Notes

1. Boys can accomplish a masculine identity with the use of different strategies and practices. Hence, the construction of a masculine identity might not necessarily reduce academic performance, if boys display masculinity in other contexts (e.g., sports) (Morris 2012).
2. Countries included in this study are Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, and Sweden.
3. Since Spain, with a tracking age of six, was an extreme outlier, it was excluded from the sample. The results are highly similar when we include Spain. The selection at age six involved a primary school type specifically designed for farmer families.
4. Country/year would be preferred; however, several contextual-level measures are not measured every year or are sometimes missing within a specific year. Moreover, several country/year combinations did not contain enough respondents, resulting in insufficient variation. Therefore, the data were aggregated to the cohort level.
5. Moreover, choosing a younger age would result in losing many cohorts in the analysis. However, robustness checks are employed and showed that comparable results are obtained when opting for the age of 15 instead of 20.
6. Norway is not included in the KLEM database; therefore, Norway is excluded from the second and third samples.
7. In the data, we could also operationalize educational attainment as the level of education (based on ISCED). In this study, we chose completed years of education, as

we preferred a continuous variable that is easy to compare across countries and time. However, we also performed the analysis using education level, and the results were highly comparable, suggesting that our results are not sensitive to the measurement of the dependent variable. These results are presented in Appendix C, Table A2.

8. Vocational education is linked to respondents at age 15 instead of those at age 20, as at age 15, vocational orientation can influence people's educational choices: whether to enter general or vocational education.
9. The data are publicly available on http://www.euklems.net. The construction of this database is funded by the European Commission, Research Directorate General, as part of the sixth Framework Programme, Priority 8, "Policy Support and Anticipating Scientific and Technological Needs," and as part of the seventh Framework Programme, Theme 8: Socio-Economic Sciences and Humanities. Twenty-four research institutes and national statistical institutes participated in compiling the EU-KLEMS database (O'Mahony and Timmer 2009; see Appendix A).
10. The tertiary sector includes employees who work in wholesale and retail trade, hotels and restaurants, transport, storage and communication, finance, insurance, real estate and business services, public administration and defense, education, health and social work, other community, social and personal services, private households, and in extra-territorial organizations and bodies.
11. These models controlled for parents' education and the father's occupation.
12. The change in degrees of freedom is 2 because we also allow the intercept and slope to covary.
13. Including country-specific linear time trends or even country-specific linear time trends in the gender gap instead of a general time trend did not alter our results.
14. Only vocational enrollment is not included in these models, due to the limited number of cohorts covered. However, including vocational enrollment in these models did not change the results substantially.

About the Authors

Lotte Scheeren is a PhD candidate in the Department of Sociology at the University of Amsterdam. Her research interests include education, gender inequality, and social stratification. In her dissertation, she studies the role of the educational system in shaping gender differences in educational outcomes. Her work has been published in *Research in Social Stratification and Mobility*.

Herman van de Werfhorst is Professor of Sociology at the University of Amsterdam, Director of the Amsterdam Centre for Inequality Studies (www.amcis.uva.nl), and Programme co-leader of the Institutions, Inequalities and Life Courses research group (IIL) of the Amsterdam Institute for Social Science Research (AISSR). He is also a member of the Inter-University Center for Social Science Theory and Methodology (ICS). His work concentrates on inequalities in and through education, mostly in comparative perspective with a focus on institutional arrangements in educational systems. His work has been published in various American, European, and international journals, in the fields of sociology, education, economics, and political science.

Thijs Bol is Associate Professor of Sociology at the University of Amsterdam. His research interests are in occupations, inequality, the transition from school to work, inequality in science, and social stratification. In a current research

project, he investigates school-to-work linkages from a country-comparative perspective. His work has been published in journals such as the *American Journal of Sociology*, *American Sociological Review*, *Sociological Science*, and *Social Forces*. For more information, please see www.thijsbol.com.

Supplementary Material

Supplementary material is available at *Social Forces* online.

References

Akbulut, Rahşan. 2011. "Sectoral Changes and the Increase in Women's Labor Force Participation." *Macroeconomic Dynamics* 15(2):240–64.

Anderson, Vicki A., Peter Anderson, Elisabeth Northam, Rani Jacobs, and Cathy Catroppa. 2001. "Development of Executive Functions Through Late Childhood and Adolescence in an Australian Sample." *Developmental Neuropsychology* 20(1):385–406.

Baker, David P. 2014. *The Schooled Society: The Educational Transformation of Global Culture*. Stanford, CA: Stanford University Press.

Becker, Gary S. 1991. *A Treatise on the Family*. Cambridge, MA: Harvard University Press.

Becker, Gary S., William H. J. Hubbard, and Kevin M. Murphy. 2010. "Explaining the Worldwide Boom in Higher Education of Women." *Journal of Human Capital* 4(3):203–41.

Best, John R., Patricia H. Miller, and Jack A. Naglieri. 2011. "Relations between Executive Function and Academic Achievement from Ages 5 to 17 in a Large, Representative National Sample." *Learning and Individual Differences* 21(4):327–36.

Bol, Thijs, and Herman G. van de Werfhorst. 2013. "Educational Systems and the Trade-Off between Labor Market Allocation and Equality of Educational Opportunity." *Comparative Education Review* 57 (2):285–308.

Bradley, Karen. 2000. "The Incorporation of Women into Higher Education: Paradoxical Outcomes?" *Sociology of Education* 73(1):1–18.

Bradley, Karen, and Maria Charles. 2004. "Uneven Inroads: Understanding Women's Status in Higher Education." *Research in Sociology of Education* 14:247–74.

Braga, Michela, Daniele Checchi, and Elena Meschi. 2013. "Educational Policies in a Long-Run Perspective." *Economic Policy* 28(73):45–100.

Breen, Richard, Ruud Luijkx, Walter Müller, and Reinhard Pollak. 2010. "Long-Term Trends in Educational Inequality in Europe: Class Inequalities and Gender Differences." *European Sociological Review* 26(1): 31–48.

Brewster, Karin L., and Irene Padavic. 2000. "Change in Gender-Ideology, 1977–1996: The Contributions of Intracohort Change and Population Turnover." *Journal of Marriage and Family* 62(2):477–87.

Brunello, Giorgio, and Daniele Checchi. 2007. "Does School Tracking Affect Equality of Opportunity? New International Evidence." *Economic Policy* 22(52):781–861.

Buchmann, Claudia, and Thomas A. DiPrete. 2006. "The Growing Female Advantage in College Completion: The Role of Family Background and Academic Achievement." *American Sociological Review* 71(4):515–41.

Buchmann, Claudia, Thomas A. DiPrete, and Anne E. McDaniel. 2008. "Gender Inequalities in Education." *Annual Review of Sociology* 34:319–37.

Castellano, Marissa, Sam Stringfield, and James R. Stone III. 2003. "Secondary Career and Technical Education and Comprehensive School Reform: Implications for Research and Practice." *Review of Educational Research* 73(2):231–72.

Castells, Manuel, and Yuko Aoyama. 1994. "Paths Towards the Informational Society: Employment Structure in G-7 Countries, 1920–90." *International Labour Review* 133(1):5–33.

Charles, Maria, and Karen Bradley. 2002. "Equal but Separate? A Cross-National Study of Sex Segregation in Higher Education." *American Sociological Review* 67(4):573–99.

Charles, Maria, Marlis Buchmann, Susan Halebsky, Jeanne M. Powers, and Marisa M. Smith. 2001. "The Context of Women's Market Careers: A Cross-National Study." *Work and Occupations* 28(3):371–96.

Chmielewski, Anna K. 2014. "An International Comparison of Achievement Inequality in Within- and Between-School Tracking Systems." *American Journal of Education* 120(3):293–324.

Connell, Raewyn W., and James W. Messerschmidt. 2005. "Hegemonic Masculinity: Rethinking the Concept." *Gender & Society* 19(6):829–59.

Davis, Shannon N., and Theodore N. Greenstein. 2009. "Gender Ideology: Components, Predictors, and Consequences." *Annual Review of Sociology* 35(1):87–105.

De Bellis, Michael D., Matcheri S. Keshavan, Sue R. Beers, Julie Hall, Karin Frustaci, Azadeh Masalehdan, Jessica Noll, and Amy M. Boring. 2001. "Sex Differences in Brain Maturation During Childhood and Adolescence." *Cerebral Cortex* 11(6):552–57.

Dekkers, Hetty P. J. M., Roel J. Bosker, and Geert W. J. M. Driessen. 2000. "Complex Inequalities of Educational Opportunities: A Large-Scale Longitudinal Study on the Relation between Gender, Social Class, Ethnicity and School Success." *Educational Research and Evaluation* 6(1):59–82.

DiPrete, Thomas A., and Claudia Buchmann. 2013. *The Rise of Women: The Growing Gender Gap in Education and What It Means for American Schools*. New York: Russell Sage Foundation.

DiPrete, Thomas A., and Jennifer L. Jennings. 2012. "Social and Behavioral Skills and the Gender Gap in Early Educational Achievement." *Social Science Research* 41(1):1–15.

Downey, Douglas B., and Anastasia S. Vogt Yuan. 2005. "Sex Differences in School Performance During High School: Puzzling Patterns and Possible Explanations." *Sociological Quarterly* 46(2):299–321.

Dustmann, Christian. 2004. "Parental Background, Secondary School Track Choice, and Wages." *Oxford Economic Papers* 56(2):209–230.

Francis, Becky. 1999. "Lads, Lasses and (New) Labour: 14–16-Year-Old Students' Responses to the 'Laddish Behaviour and Boys' Underachievement' Debate." *British Journal of Sociology of Education* 20(3):355–71.

Frosh, Stephan, Ann Phoenix, and Rob Pattman. 2002. *Young Masculinities: Understanding Boys in Contemporary Societies*. Basingstoke, UK: Palgrave.

Giedd, Jay N., Liv S. Clasen, Rhoshel Lenroot, Dede Greenstein, Gregory L. Wallace, Sarah Ordaz, Elizabeth A. Molloy, et al. 2006. "Puberty-Related Influences on Brain Development." *Molecular and Cellular Endocrinology* 256:154–62.

Goldin, Claudia, Lawrence F. Katz, and Ilyana Kuziemko. 2006. "The Homecoming of American College Women: The Reversal of the College Gender Gap." *Journal of Economic Perspectives* 20(4):133–56.

Hadjar, Andreas, and Claudia Buchmann. 2016. "Education Systems and Gender Inequalities in Educational Attainment." In *Education Systems and Inequalities: International Comparisons*, edited by Andreas Hadjar and Christiane Gross, 159–84. Bristol: Policy Press.

Hanushek, Eric A., and Ludger Wössmann. 2006. "Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence across Countries." *Economic Journal* 116(510): C63–76.

Heyder, Anke, and Ursula Kessels. 2013. "Is School Feminine? Implicit Gender Stereotyping of School as a Predictor of Academic Achievement." *Sex Roles* 69(11–12):605–17.

———. 2015. "Do Teachers Equate Male and Masculine with Lower Academic Engagement? How Student's Gender Enactment Triggers Gender Stereotypes at School." *Social Psychology of Education* 18(3):467–85.

Horn, Daniel. 2009. "Age of Selection Counts: A Cross-Country Analysis of Educational Institutions." *Educational Research and Evaluation* 15(4):343–66.

Inglehart, Ronald, and Pippa Norris. 2003. *Rising Tide: Gender Equality and Cultural Change Around the World*. Cambridge: Cambridge University Press.

Jacob, Brian A. 2002. "Where the Boys Aren't: Non-Cognitive Skills, Returns to School and the Gender Gap in Higher Education." *Economics of Education Review* 21(6):589–98.

Jürges, Hendrik, and Kerstin Schneider. 2011. "Why Young Boys Stumble: Early Tracking, Age and Gender Bias in the German School System." *German Economic Review* 12(4):371–94.

Keulers, Esther H. H., Elisabeth A. T. Evers, Peter Stiers, and Jelle Jolles. 2010. "Age, Sex, and Pubertal Phase Influence Mentalizing About Emotions and Actions in Adolescents." *Developmental Neuropsychology* 35(5):555–69.

LeTendre, Gerald K., Barbara K. Hofer, and Hidetada Shimizu. 2003. "What Is Tracking? Cultural Expectations in the United States, Germany, and Japan." *American Educational Research Journal* 40(1):43–89.

Lucas, Samuel R. 2001. "Effectively Maintained Inequality: Educational Transitions, Track Mobility, and Social Background Effects." *American Journal of Sociology* 106(6):1642–90.

Machin, Stephan, and Sandra McNally. 2005. "Gender and Student Achievement in English Schools." *Oxford Review of Economic Policy* 21(3):357–72.

McDaniel, Anne E. 2008. "Measuring Gender Egalitarianism: The Attitudinal Difference between Men and Women." *International Journal of Sociology* 38(1):58–80.

———. 2010. "Cross-National Gender Gaps in Educational Expectations: The Influence of National-Level Gender Ideology and Educational Systems." *Comparative Education Review* 54(1):27–50.

Morris, Edward W. 2008. "'Rednecks,' 'Rutters,' and 'Rithmetic': Social Class, Masculinity and Schooling in a Rural Context." *Gender & Society* 22(6):728–51.

———. 2012. *Learning the Hard Way: Masculinity, Place, and the Gender Gap in Education*. New Brunswick, NJ: Rutgers University Press.

OECD. 2005. *Enhancing the Performance of the Service Sector*. Paris: OECD.

———. 2007. *No More Failures: Ten Steps to Equity in Education*. Paris: OECD.

_____. 2011. *Report on the Gender Initiative: Gender Equality in Education, Employment and Entrepreneurship*. Paris: OECD.

_____. 2015. *Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success*. Paris: OECD.

O'Mahony, Mary, and Marcel P. Timmer. 2009. "Output, Input and Productivity Measures at the Industry Level: The EU KLEMS Database." *Economic Journal* 119(538):F374–403.

Pauly, Edward, Hilary Kopp, and Joshua Haimson. 1994. *Home-Grown Lessons: Innovative Programs Linking Work and High School: School-to-Work Transition Project*. New York: Manpower Demonstration Research Corporation.

Pekkarinen, Tuomas. 2008. "Gender Differences in Educational Attainment: Evidence on the Role of Tracking from a Finnish Quasi-Experiment." *Scandinavian Journal of Economics* 110(4):807–25.

Pharris-Ciurej, Nikolas, Charles Hirschman, and Joseph Willhoft. 2012. "The 9th Grade Shock and the High School Dropout Crisis." *Social Science Research* 41(3):709–30.

Sammons, Pamela. 1995. "Gender, Ethnic and Socio-Economic Differences in Attainment and Progress: A Longitudinal Analysis of Student Achievement over 9 Years." *British Educational Research Journal* 21(4):465–85.

Schmidt-Catran, Alexander W. 2016. "Economic Inequality and Public Demand for Redistribution: Combining Cross-Sectional and Longitudinal Evidence." *Socio-Economic Review* 14(1):119–40.

Schmidt-Catran, Alexander W., and Malcolm Fairbrother. 2016. "The Random Effects in Multilevel Models: Getting Them Wrong and Getting Them Right." *European Sociological Review* 31(1):23–38.

Swain, Jon. 2005. "Masculinities in Education." In *Handbook of Studies on Men & Masculinities*, edited by Michael S. Kimmel, Jeff Hearn, and Raewyn W. Connell, 213–29. Thousand Oaks, CA: Sage.

Van de Werfhorst, Herman G., and Jonathan J. B. Mijs. 2010. "Achievement Inequality and the Institutional Structure of Educational Systems: A Comparative Perspective." *Annual Review of Sociology* 36:407–28.

Vanfossen, Beth E., James D. Jones, and Joan Z. Spade. 1987. "Curriculum Tracking and Status Maintenance." *Sociology of Education* 60(2):104–22.

Verbeek, Marno J. C. M. 2004. *A Guide to Modern Econometrics*, 2nd ed. Chichester, UK: John Wiley and Sons.

Vincent-Lancrin, Stéphan. 2008. "The Reversal of Gender Inequalities in Higher Education: An On-Going Trend." In *Higher Education to 2030, Volume 1: Demography*, edited by Organization for Economic Co-operation and Development (OECD), 265–98. Paris: OECD.

Weiss, Christopher C., and Peter S. Bearman. 2007. "Fresh Starts: Reinvestigating the Effects of the Transition to High School on Student Outcomes." *American Journal of Education* 113(3):395–421.

West, Candace, and Don H. Zimmerman. 1987. "Doing Gender." *Gender & Society* 1(2):125–51.