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ABSTRACT

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This paper studies the relationship between the timing of tracking of pupils into vocational and academic secondary education and gender differences in educational attainment and income. We argue that in a system that streams students into vocational and academic tracks relatively late (age 15-16), girls are more likely to choose the academic track than boys because of gender differences in the timing of puberty. We exploit the Finnish comprehensive school reform of the 1970's to analyze this hypothesis. This reform postponed the tracking of students from the age of 10-11 to 15-16 and was adopted gradually by municipalities so that we can observe members of the same cohorts in both systems. We find that the postponement of the tracking age increased gender differences in the probability of choosing the academic secondary education and in the probability of continuing into academic tertiary education. The reform had particularly negative effects on boys from non-academic family backgrounds. Finally, the reform decreased the gender wage gap in adult income by four percentage points.

JEL Classification: I20, J16

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1 Introduction

On many measures of educational attainment, women have caught up with or, in many countries, surpassed men in the past few decades. For example, today both in the United States and in many countries of the European Union well over 50% of the students in the academic higher education are women. This development is particularly interesting in the light of increasing returns to education that have been well documented in the literature.[1] Given these considerable changes in the returns, one would expect the female dominance in higher education to have significant effects on the relative economic position of women.

Yet this gradual increase in the female educational attainment has received surprisingly little attention in the literature. The few papers that directly address the issue have focused on gender differences in college attendance in the US. But these explanations fail to account for interesting cross-country differences in the relative educational attainment of women. In the European Union, for example, the percentage of women in higher education is particularly high in the Nordic countries whereas it is substantially lower in some of the continental countries. These cross-country differences suggest that the structure of the educational system may have something to do with the differences in the educational attainment of girls and boys.

In this paper, we examine the effect of the structure of the educational system on gender differences in educational attainment. More specifically, we focus on the effect of tracking age. Most educational systems stream pupils into general or vocational tracks in secondary school. Typically, only one of these tracks, the general or academic track, enables the pupils to continue into academic tertiary education. The age at which this type of tracking is done varies across countries and may or may not coincide with the end of full-time compulsory education. Here, we argue that in systems where tracking is done relatively late, typically at the age of 16, girls are more likely to choose the academic secondary education than boys because of gender differences in the timing of puberty.

Boys and girls are more or less at the same stage of cognitive and psychological development before the age of 11, but after this their developments momentarily diverge. Girls enter puberty on average two years earlier than boys and by the age of 14 most girls are at the end of puberty. Boys, on the other hand, and especially the late-maturers among them, are going through important physical and psychological changes at that age and these changes are known to have adverse effects on course grades and educational aspirations. Hence, in educational systems where the choice between general and vocational educational tracks is done at around the age of 14 to 16, boys and girls are forced to make educational investment decisions at a time when the information they receive on their academic abilities and their aspirations can be very different.

Our strategy is to use the comprehensive school reform that was conducted in Finland during 1972-1977 as a quasi-experiment to test this argument. This reform transformed the Finnish educational system from an early tracking system to a late tracking system. Whereas in the old system the students were split into general and vocational tracks at the age of 11, in the new system this decision was postponed to the age of 16. This reform was conducted gradually by municipalities so that we observe individuals in cohorts born between 1961-1965 in both systems. Using this within cohort variation in the age at which the choice between the general and vocational tracks is made, we examine how this reform affected gender differences in the probabilities of choosing the academic track and continuing into academic post-secondary education as well the effects of the reform on adult income of men and women.

Our results show that the postponement of tracking had a positive effect on the girls' probability of choosing the academic track while for boys this effect was negative. As

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[1]See, for example Katz and Autor (1999) and Acemoglu (2002).

a result of this reform the gender difference in the probability of going into academic secondary education increased by three percentage points in favour of girls. This corresponds to a 25 % increase in the gender difference. The negative effect on boys was particularly strong among families where fathers had no academic education. Similarly, the reform also increased the gender difference in the probability of going into academic tertiary education by two percentage points in favour of girls. Finally, gender wage gap decreased by four percentage points as a result of the reform.

To the best of our knowledge, this paper is the first one to examine the effect of the educational systems on the gender differences in educational attainment. Most of the previous literature on gender differences in educational attainment has focused on the developing countries where the households typically invest less on their daughters' education than that of their sons.[2] On the other hand, the literature on developed countries, where the gender differences have been reversed, is scarce. We are aware of only two papers that directly examine the gender gap in educational attainment: Charles and Luoh (2003) as well as Jacob (2002) focus on the gender differences in college attendance in the United States and attempt to explain these differences with the gender differences in the wage dispersion of college graduates and in non-cognitive skills.

The strategy adopted here has similarities to studies in the vast literature that uses differences in educational systems across regions and countries for a variety of purposes.[3] Most interestingly, from our point of view, Meghir and Palme (2004), Aakvik et al (2003), as well as Black et al (2005) use Swedish and Norwegian educational reforms, respectively, to study the inter-generational transmission of education and the heterogeneity of the returns to education. These reforms were very similar to the Finnish reform studied here. However, we are aware of only two papers that explicitly study the consequences of the tracking of pupils into different educational tracks. Dustmann (2004) uses German data and argues that in a system, such as the German one, where tracking takes place at a very early age, the social mobility through education is low. Hanushek and Wößmann (2005) examine the effect of tracking age on the performance of students with international PISA test score data.

The economic consequences of the early experiences in one's life have recently caught the attention of the economists. Carneiro and Heckman (2003), for example, stress that the most successful policy interventions in education are done early when the cognitive skills of individuals are still developing. Other authors have emphasized the importance of adolescent experience. Persico et al (2004) show that the contemporaneous correlation between adult height and adult income disappears when one controls for teenage height of individuals. They interpret this result as indicating that one's social status during teenage years, which is positively correlated with teenage height, has a positive effect on adult economic outcomes. In a related paper, Galeotti and Müller (2005) provide direct evidence on the positive effects of social popularity during teenage years. These studies show that adolescent experiences can have long-lasting economic consequences. This paper is an attempt to highlight one particular channel through which these effects may work: individuals make important educational choices during adolescence and these choices are affected by the pace of physical and psychological changes during adolescence.

How educational systems treat individuals at different stages of their development has been a concern among educationalists for a long time. Indeed, one the leading scholars of adolescent development, J.M.Tanner, argued in his 1961 book "Education and Physical

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[2]For example, a special issue of the Journal of Human Resources looks at this issue. See, Harris and Willis (1994) on Taiwan, Deolalikar (1994) on Indonesia, and Vijverberg (1994) on Côte d'Ivoire.

[3]In particluar, the studies that use variation in compulsory schooling estimate returns to education such as the influential study by Angrist and Krueger (1991) and more recent papers by Oreopoulos (2003) as well as Pischke and von Wachter (2004).

Growth" for an educational system that would treat individuals according to their developmental as opposed to chronological age. Gender differences in the timing of puberty are probably among the most robust biological differences in the development of boys and girls. At the chronological age of 14 to 16 girls are on average older than boys as measured by developmental age. Yet, educational systems tend to treat boys and girls equally despite these differences in the pace of physical and psychological development. We believe that the Finnish comprehensive school reform, because of its quasi-experimental nature, provides an excellent setting to examine the economic effects of the interaction of late tracking and gender differences in the timing of puberty.

Structure of the paper is as follows. In the following section, we discuss cross-country differences in educational systems and the gender gap in educational attainment. In this section, we also describe the Finnish comprehensive school reform in detail. We then move on to discuss the theoretical arguments for the existence of the gender gap before we present the data and discuss the results in the fifth section. The sixth section concludes.

2   Educational systems in the industrialised countries

Unlike in the most widely studied American system, where the pupils are not streamed into different educational tracks before they leave secondary education, in Europe most of the educational systems stream pupils into general and vocational tracks before the end of upper secondary school. These tracking decision have long term consequences since typically only the pupils that have chosen the academic track in the secondary school are eligible to continue to higher academic education at the tertiary level. Switching between tracks in the secondary school is usually considered costly if not altogether impossible.

The tracking is done either at the start or at the end of the lower secondary school and the age at which it is done varies across countries. Broadly speaking, we can divide the European educational systems into three groups. The first group of countries - Austria and Germany -resemble the Finnish pre-reform educational system. There the tracking is done at the transition from the primary to lower secondary school at the age of 10. We call these countries the "early tracking" countries. At the other extreme are the countries that keep their lower secondary education integrated and track pupils at the transition from lower to upper secondary school. The latest age at which this happens is 16. We call the countries with this kind of system - Denmark, Spain, Finland, Iceland, Norway, and Sweden - the "late tracking" countries. The rest of the Western European countries track pupils during lower secondary school at some point during ages 12 to 15.

Table 1 reports the tracking ages and summary statistics on the gender differences in education in Western European countries. One can distinguish gender differences at two levels. First of all, there are gender differences in the number of students that choose the academic track that enables them to continue to tertiary education. These differences are reported in the second column. Second, the number of students that end up attending tertiary education institutions may differ by gender and these differences are reported in the third column.

Table 1 reveals a clear pattern between gender differences in educational attainment and the tracking age. Along all the dimensions that gender differences are measured in table 1 the percentage of women tends to be higher in the late tracking than in the early tracking countries. In the late tracking countries, women are in a clear majority among the pupils who continue into the upper secondary education and in these countries their majority is larger in the academic track. Finally, the percentage of women in the tertiary education is close to 60% in the late tracking countries while men are still in a slight majority in Germany.

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These differences between early- and late-tracking countries suggest that educational systems may have different effects on men and women. Naturally, cross-country differences shouldn't be interpreted as evidence on the different effects of tracking age on the educational investment decisions of boys and girls. It is very likely that there are a multitude of factors that vary across countries and also have an effect on the gender differences in educational attainment. This is why in the analysis below, we focus on a single country, Finland, and exploit the educational reform that postponed the selection between the general and vocational tracks by five years for a part of the population as a natural experiment.

3   Finnish comprehensive school reform of 1972-1977

The Finnish pre-reform and post-reform educational systems are depicted in table 2. Finland followed the rest of the Nordic countries in the 1970's and implemented a thorough reform of its secondary education system. The Swedish and Norwegian reforms are described in detail in Meghir and Palme (2004) and Aakvik et al (2003) respectively. These reforms were influenced by the expansion of secondary schooling in the United States. The aim of the reforms was to extend the years of compulsory schooling to same levels as in other industrialised countries and to widen the access to general secondary education.

The Finnish pre-reform educational system dated back to 1921. Compulsory education in this system was provided by six year long folk school. Pupils entered the folk school at the age of 7 and in the fourth grade, at the age of 10-11, they could apply to the lower general secondary school which provided eligibility for upper general secondary school and subsequently to academic tertiary education. The access to the academic secondary education was based on the pupil's school achievement. The pupils who chose not to apply remained in folk school for two more years after which the compulsory education was finished. After this, the folk school students could still continue at civic school, which offered a two- or three-year education. After civic school, it was possible to move up to vocational school.

The school system was reformed in the 1970s. This reform introduced a new curriculum and changed the structure of the educational system. The previous folk school, civic school and lower secondary school were replaced by a nine-year comprehensive school offering general basic education. Now, all the pupils followed the same curriculum in the same establishments and the tracking into general and vocational tracks was postponed until the age of 16. At the same time, upper secondary school was separated from secondary school to form a distinct form of institution.

The reform was not adopted simultaneously in all the Finnish municipalities. There was a considerable amount of resistance to the reform and as a compromise it was agreed to carry out the transition into the comprehensive school gradually by municipalities. This gradual adoption of the new system was supposed to allow for the smooth transition to the new system. The transition took place between 1972 and 1977 so that in each municipality that adopted the reform, the pupils from the first to the fifth grade (i.e. pupils aged 7-11) in the folk school were immediately affected by the reform.

Table 3 illustrates how the reform affected cohorts born between 1960-1966 in different municipalities. The shaded areas in the table indicate cells that were enrolled in the post-reform educational system. Since the individuals born in 1960 were in the sixth grade in 1972, the year the reform started, the members of this cohort were not affected by the reform. However, the 1961 cohort was in the fifth grade in year 1972 and individuals living in the municipalities that adopted the reform that year were enrolled in the new system. Similarly, in the 1962 cohort the individuals in the municipalities that adopted the reform in 1972 and 1973 were enrolled in the system. Table 3 conveniently illustrates the

difference-in-differences setting that we will use in our analysis below. More specifically, within cohorts 1961-1965 we have variation in the tracking age across municipalities that adopted the reform between 1972-1977 and within municipalities there is variation in the tracking age across cohorts 1960-1966.

The adoption of the reform was, in principle, dictated by the geographical location of the municipality. Figure 1 illustrates how the reform spread through the Finnish municipalities during 1972-1977. The first municipalities that adopted the reform in 1972 were predominantly situated in the province of Lapland, the extreme north of the country. In 1973 the reform was mostly adopted in the north-eastern regions. From thereon the reform spread so that it was adopted in 1974 in the northwest, in 1975 in south-east, in 1976 in the south-west and finally in 1977 in the capital Helsinki and its surrounding suburbs.

The geographical ordering of the adoption of the reform means that the adoption order is correlated with municipal income and education levels. Northern and eastern regions of Finland have typically lower levels of income and education than the more urbanised southern and western regions. This problem is illustrated in table 4 where we report the average taxable income of the adult population and the percentage of individuals with tertiary degrees in pre-and post reform municipalities by reform years. As is clear from table 4, the municipalities that adopt the post-reform system first have clearly lower education and income levels than the municipalities that adopt the new system later. This pattern highlights the importance of controlling for municipal fixed effects in our regressions below.

4   Motivation

Standard models of the demand for education view education as an investment. When deciding between different levels of education the students weigh forgone earnings and direct costs of education (both monetary and psychic) against the future gains from completed education. What is common to these models is that educational investments are usually treated as one-off decisions where there is no uncertainty about whether the individual will finish the program of schooling or not. Moreover, education is treated as homogeneous so that differences across fields of education are not addressed.

But in practice education consists of a series of sequential choices concerning the amount and the type of education. At various stages, the individuals are faced with the decision of whether to drop out of education or whether to choose a particular educational track. In the developed countries, these choices typically are made during the secondary schooling and at the transition from secondary to tertiary education

Altonji (1993) has presented a model that treats education as sequential choice and that allows for uncertainty about whether one is able to finish the chosen education programme or not. The model was originally designed to analyze the choice of whether to attend college and the choice of college major, but it suits our context as well. Basically, the model views individuals as choosing between dropping out (working) or attending school at two levels, that in our case would be general and vocational, and describes how new information about ones preferences and academic performance influences the decision of whether to continue to upper secondary education and which track to follow.

In the context of Altonji's model, the factors that can give rise to gender differences in the choice of track are gender differences in the academic performance and in one's beliefs about the ability to finish the general educational track. If boys' school performance is, on average, lower and they believe that this reflects their true academic ability, it would not be surprising to see boys as less likely to choose the academic educational track.
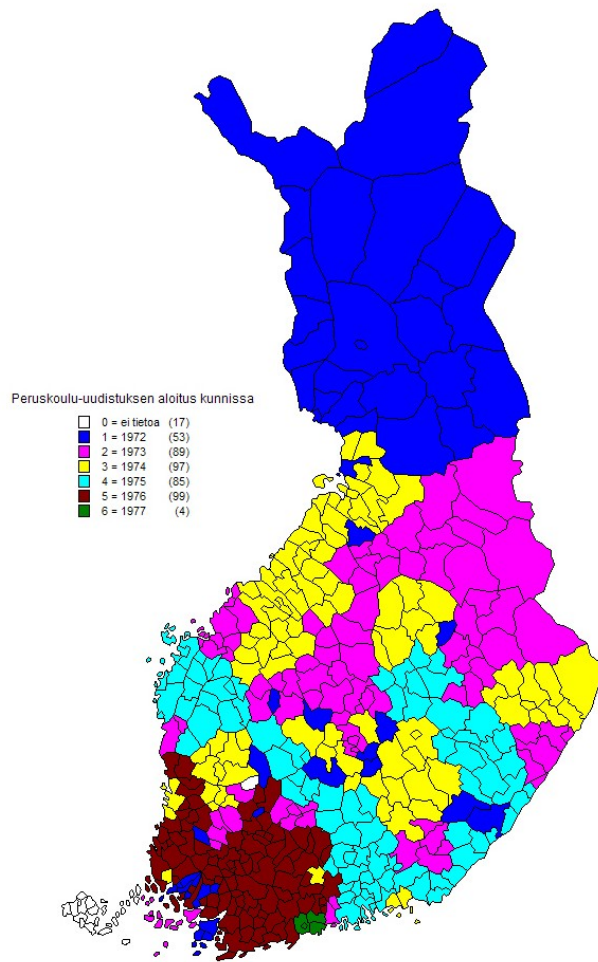
Figure 1: The adoption of the comprehensive school reform by the municipalities, 1972-1977.
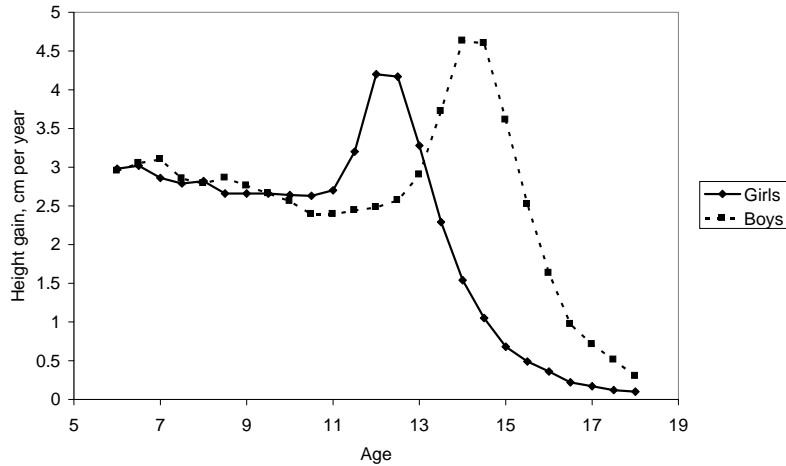
Figure 2: Adolescent spurt in height growth for normally maturing boys and girls. Figure from Tanner (1961). Data from Shuttleworth (1939).

The gender differences in the timing of adolescence may give rise to such gender differences in academic performance and educational aspirations. In fact, there is a substantial body of literature in the education and psychology literature that document the diverging development of boys and girls around the age of 12 to 16.[4] First of all, it is well known that girls enter puberty on average 1.5 to 2 years earlier than boys: the average starting age of puberty for girls in the developed countries is 12 or 13 whereas for boys it is 14. Figure 1 shows the average height gain of boys and girls who mature near the gender-specific population means. The spurt in height gain is usually strongly correlated with other physical changes at adolescence. Figure 1 clearly shows the gender difference in the timing of this spurt. Tanner (1961) stresses that from the age of 10 and a half onwards girls are approximately two years older than boys in terms of developmental age. Second, several studies have found that school achievement, in terms of grades, falls over the adolescent years. In particular, studies such as Duke et al (1982) and Dubas et al (1991) have found that late-maturing boys between the ages of 13 and 17 rank lower than their peers on IQ, standardised achievement tests, and educational expectations and aspirations. Burgess et al (2004) document a consistent gender gap, across both the attainment and ability distribution, in performance tests in favour of girls in the English schools at the age 14-16.

These gender differences in pubertal timing have lead some authors, such as Waber (1977), to suggest that early pubertal timing can lead to persistent sex differences in cognition, but these claims have not been supported by subsequent work. However, pubertal timing does not have to cause persistent gender differences in order to have lasting effects on the educational attainment in late tracking educational systems. All that matters is that at the time when the decision between general and vocational track is made, girls and boys differ in their achievement and aspirations. We interpret the psychological literature as suggesting that they do. We thus expect to see larger gender differences in educational attainment in the favour of women in the late tracking systems than in the early tracking systems

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[4]For a survey of the literature, see Petersen (1988) and Leffert and Petersen (1995).

5 Data and results

As the previous sections show, the Finnish comprehensive school reform of the 1970's provides a promising natural experiment setting in which to test the effect of the postponement of tracking on male and female students. In this section, we briefly describe the data that we use to study the gender differences in educational attainment. We then present the results on the effect of the reform on the probability of choosing the academic track and continuing into tertiary education as well as adult income.

5.1 Data

The data that we use in this paper come from the Finnish Longitudinal Census Data Files (FLCD). FLCD are a data source provided by the Statistics Finland that in principle contains information on all the 6.3 million individuals who had legal residence in Finland during the census years 1970, 1975, 1980, 1985, 1990, 1995 and 2000. The data come from register-based censuses that are made possible by the systems of personal identity codes. The data contain information on the economic activity, education, income, and dwelling conditions of the individuals. Furthermore, the household identifiers can be used to link family members to each other.

We have access to a 10% sample of the cohorts born in 1960-1966. This sample contains information on 52 549 individuals. The information on the individual's birthday and the municipality of residence were used to determine whether the individuals was affected by the comprehensive school reform or not. The criterion to be classified as affected by the reform was to be in a fifth grade or below at the year when the municipality adopted the reform. Altogether 23 474 individuals (45%) in our data fall into the treatment group.[5]

Since the information on income and educational attainment in the data come from government register they can be considered as highly reliable. However, especially the education variables do have their drawbacks. As is typical for these kind of register data, we have only information on the completed degrees obtained. Thus, we cannot observe drop-outs in our data. Educational attainment is presented in the data as a five-digit code giving details about the level and the field of education, degree, programme of study and major subject. Using this information and our knowledge of the Finnish educational system we are able to determine whether the individual chose the academic or vocational track in the secondary school. The income measure that we use is the income subject to state taxation in the year 2000. The source of this information is the Finnish tax administration.

5.2 Results

We are interested in evaluating the impact of the reform on three outcome variables: the probability that the individual chooses the academic track in the secondary school, the probability that the individual chooses to continue into academic tertiary education after the secondary school, and income in year 2000. To examine the effect of the reform on the gender differences in each of these variables, we estimate the effect of the reform on males and females and calculate the effect on the gender difference. Finally, to allow for heterogeneous effects by parental background we repeat the analysis in subgroups individuals with high- and low-educated fathers.

In table 5, we report some descriptive evidence on the effects of the reform on our primary outcome variable of interest: the gender differences in the probability of choosing the academic track. The first thing to notice from the table is that since we have data on

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[5]552 individuals moved out of the country and 90 individuals died before their treatment status could be determined.

the cohorts 1960-1966 we have pre- and post-reform observations on all the municipalities in our data. Thus, the first row in table 5 corresponding to the 1960 cohort gives the average baseline gender difference in the probability of choosing the academic track. In cohorts 1961-1965, there are observations on both pre- and post-reform municipalities. Gender differences tend to be larger in the post-reform municipalities although the difference in the gender difference is only significant in the 1965 cohort. When we come to the cohort born in 1966, all the municipalities have adopted the post-reform system. A crude way of evaluating the impact of the reform on the gender difference is to compare the 1960 and 1966 cohorts. This comparison implies that the reform increased gender differences by 2.4 percentage points. Finally, in the last row of table 5, we have calculated the pooled probabilities in pre- and post-reform groups. The gender difference is 3 percentage points higher in the post-reform group.

To estimate the effect of the reform on our outcome variables of interest, we run following linear difference-in-differences regressions:

$$Y_{icm} = b_0 + b_1' c_i + \alpha_1 r_{icm} + (b_2 + b_3' c_i + \alpha_2 r_{icm}) * F_i + \gamma' m_i + e_{icm} \qquad (1)$$

where Y_{icm} is the outcome variable of the individual i belonging to cohort c and living in municipality m, c_i and m_i are the cohort and municipality dummies, and r_{icm} is a dummy that takes value 1 if the individual belongs to a cohort that went through the post-reform system in the municipality m. We interact the constant, the cohort dummies, and the effect of the reform with the female dummy F_i to look at the different effects of the reform by gender.

All the regressions are estimated by OLS. Thus, when Y_{icm} is a binary variable, as it is in the case of the probability of choosing the academic track or continuing into academic tertiary education, we are running linear probability models. Although we are aware of the drawbacks of the linear probability models, we chose this estimation method because the analysis of interactions is much more straightforward in the linear case than it is with non-linear models. Nevertheless, the estimation of (1) by probit gave qualitatively very similar results. Standard errors are computed allowing for clustering at the municipality level.

5.2.1 The effect of the reform on educational choices

Table 6 reports the estimated effects of the reform on the educational choices of the individuals. We report the results for the whole sample, by gender, and the effect on the gender difference. To allow for heterogeneous effects by family background, we also report the effects in the subgroups of individuals with academic and non-academic fathers. Academic fathers refer to parents that had chosen the academic track in their own childhood.

As can be seen from panel A of table 6, the overall effect of the reform on the probability of choosing the academic track is negligible. This is also true, when we break down the overall effect by parental background. Even thought the overall effect on individuals with non-academic fathers is negative it is not significant. However, breaking down the effect by gender reveals some clear differences. The effect is slightly negative for boys and slightly positive for girls. This translates to a 3.6 percentage point increase in the gender difference. Furthermore, the negative overall effect on boys is driven by the strong negative effect that the reform had on the boys from non-academic backgrounds. The gender difference in this category increased by almost five percentage points. For girls, on the other hand, the effect is positive irrespective of the family background.

The different effects of the reform on the probability of choosing the academic track by gender are reflected in the probability of attending academic tertiary education as

well. Panel B of table 6 reports the effect of the reform on this probability. Again, the overall effect is zero and the effect on boys is slightly negative whereas it is clearly positive for girls. The gender difference in the probability of continuing into academic tertiary education increased by 1.8 percentage points as a result of the reform. Now, the positive effect on girls is coming predominantly from girls with academic family background.

5.2.2 The effect of the reform on income

In table 7 we report the similar decomposition of the effects of the reform on log income in 2000. We use all taxable earnings of the individuals as our income variable. This includes wage and capital income as well as transfers.

The overall effect of the reform on income is zero. There is some indication that the overall effect would be negative on the individuals from non-academic families but the effect is not significant. But the decomposition of the effect by gender reveals once again differences. The reform decreased male earnings by 2.9 percentage points and while for women it had a weak positive effect. The gender wage gap decrease by 4.1 percentage points as a results of the reform. Given that the raw gender wage gap in these cohorts is 28% this translates into a 14% decrease in the gender wage gap.

The fall in the gender wage gap was particularly strong among individuals from academic background. This is the group where the girls were encouraged to continue into academic tertiary education by the reform. The gender wage gap among individuals from academic background decreased by nearly six percentage points.

6 Conclusions

Gender differences in educational attainment have received little attention in the economics literature despite the increasing returns to education in recent decades. Here, we examine the hypothesis according to which the female dominance in higher education can be, at least partly, explained by the age at which students are streamed into general and vocational educational tracks. We argue that the educational systems that stream students late, that is around the age of 16, tend to favour girls because of gender differences in the timing of puberty. Girls are momentarily ahead of boys in both biological and psychological development at the ages of 14 to 16 and this may be reflected in long term educational outcomes, if important decisions are taken at that age.

Finnish comprehensive school reform of the 1970's can be used to analyse this hypothesis. This reform postponed the tracking age from 11 to 16 and was adopted gradually by provinces so that we can observe members of the same cohort in different systems. We use Finnish census data to study the effects of the reform on the educational attainment of men and women in the cohorts that contain individuals from both pre- and post-reform educational systems. We find that the reform increased the gender difference in the probability of choosing the academic track in the secondary school and in the probability of continuing into academic tertiary education. As a result of the reform, the gender wage gap decreased by four percentage points.

The effects of the reform also differed by family background. Particularly negatively affected were the boys from families where the father had no academic education. Their probability of choosing the academic track decreased by three percentage points and this led to a negative effect on income of the same magnitude. It is plausible that these boys would be the most vulnerable to puberty shock on academic achievement and aspirations. While the negative effects on puberty may be dampened by the family background effects among boys from academic families, the boys from non-academic families are less likely to receive such encouragement from their homes.

11

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Table 1 Tracking age and the proportion of women in upper secondary and tertiary education in European countries 1998-2003.

	(1) Tracking age	(2) Proportion of women in upper general secondary education	(3) Proportion of women in tertiary education
	Early tracking		
Austria	10	0.547	0.513
Germany	10	0.546	0.482
	In between		
Luxembourg	12	0.547	0.522
Netherlands	12	0.532	0.500
Belgium	14	0.540	0.527
France	13	0.560	0.545
Greece	15	0.544	0.506
Italy	14	0.543	0.556
Portugal	15	0.550	0.565
	Late tracking		
Denmark	16	0.569	0.568
Spain	16	0.537	0.529
Finland	16	0.576	0.538
Iceland	16	0.585	0.623
Norway	16	0.563	0.585
Sweden	16	0.582	0.584

Note: Tracking age refers to the age at which pupils are streamed into vocational and general secondary education. Proportion of women in upper secondary education is the share of women in the educational track that enables the student to participate in the academic tertiary education. Proportion of women in tertiary education is the share of women in the population of students in the tertiary education institutions. Source: Eurostat.

Table 2 Finnish educational systems

The pre-reform system

Age

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Folk school				General secondary school								Universities						
						Civic school			Vocational schools									

The post reform-system

Age

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Comprehensive school									General secondary school			Universities						
									Vocational school			Higher vocational education						

Table 3 The adoption of the reform by cohorts

Birth cohort	1972	1973	1974	1975	1976	1977
			The reform year			
1960	6th grade	-	-	-	-	-
	N=606	N=905	N=1,262	N=1,401	N=1,334	N=804
1961	5th grade	6th grade	7th grade	8th grade	9th grade	-
	N=577	N=969	N=1,362	N=1,283	N=1,401	N=816
1962	4th grade	5th grade	6th grade	7th grade	8th grade	9th grade
	N=645	N=939	N=1,339	N=1,331	N=1,431	N=791
1963	3rd grade	4th grade	5th grade	6th grade	7th grade	8th grade
	N=645	N=913	N=1,297	N=1,409	N=1,485	N=819
1964	2nd grade	3rd grade	4th grade	5th grade	6th grade	7th grade
	N=592	N=907	N=1,299	N=1,352	N=1,481	N=854
1965	1st grade	2nd grade	3rd grade	4th grade	5th grade	6th grade
	N=553	N=872	N=1,234	N=1,349	N=1,338	N=868
1966	-	1st grade	2nd grade	3rd grade	4th grade	5th grade
	N=550	N=771	N=1,204	N=1,267	N=1,409	N=844

Note: The shaded areas indicate cells that adopted the post-reform educational system. N refers to the sample size in each cell in the data that are used in the analysis.

Table 4 Mean municipal education in the pre- and post-reform municipalities

Birth Cohort	Pre-reform			Post-reform		
	% individuals	Mean municipal education	Mean municipal income	% individuals	Mean municipal education	Mean municipal income
1960	100	10.15	9 423	0.00	.	
1961	91	10.44	9 553	9	7.89	8 235
1962	75	11.04	9 957	25	7.75	7 905
1963	56	12.02	10 638	44	8.12	8 091
1964	36	13.75	11 680	64	8.649	8 467
1965	14	19.47	14 385	86	9.12	8 897
1966	0	.		100	10.55	9 647

% individuals refers to the percentage of the cohort that falls into each category. Mean municipal education is the average percentage of individuals with a tertiary degree in the municipalities in 1980. Mean municipal income is the average taxable income in the municipalities in 1980 in euros.

Table 5 Differences in the percentage of individuals who finish upper general secondary school across cohorts, reform status and gender

	Pre-reform			Post-reform			
	Male	Female	Difference	Male	Female	Difference	Difference in gender difference
1960	.349	.488	.140** (.013)				
1961	.365	.500	.135** (.014)	.325	.483	.158** (.043)	.023 (.045)
1962	.393	.507	.113** (.015)	.326	.468	.143** (.025)	.030 (.030)
1963	.379	.521	.142** (.017)	.345	.513	.168** (.019)	.027 (.025)
1964	.427	.532	.105** (.021)	.367	.524	.161** (.016)	.057** (.026)
1965	.464	.578	.114** (.035)	.368	.518	.149** (.014)	.035 (.038)
1966				.375	.538	.164** (.014)	
Total	.378	.508	.130** (.007)	.360	.519	.159** (.007)	.030** (.010)

Note: Cells report the proportion of individuals who finished the upper general secondary education with a diploma. Standard errors are in parentheses.

Table 6 The effect of the reform on educational choices

A) The probability of choosing the academic track

	(1) All	(2) Men	(3) Women	(4) Gender difference
The whole sample (N=39 088)	-0.001 (0.009)	-0.016 (0.011)	0.020 (0.011)	0.036 (0.014)
Non-academic fathers (N=21 524)	-0.011 (0.012)	-0.032 (0.014)	0.017 (0.015)	0.048 (0.018)
Academic fathers (N=17 564)	0.005 (0.013)	-0.002 (0.016)	0.016 (0.016)	0.018 (0.020)

B) The probability of continuing into academic tertiary education

	(1) All	(2) Men	(3) Women	(4) Gender difference
The whole sample (N=39 088)	0.006 (0.005)	-0.003 (0.006)	0.015 (0.007)	0.018 (0.009)
Non-academic fathers (N=21 524)	0.001 (0.006)	0.001 (0.008)	0.002 (0.008)	0.001 (0.010)
Academic fathers (N=17 564)	0.010 (0.009)	-0.008 (0.010)	0.028 (0.012)	0.036 (0.014)

The column (1) reports the coefficient of the reform dummy from the regression (3) without female interactions. Columns (2) and (3) report the coefficients of the reform dummy from the regression (3) interacted with male and female dummies, respectively. Column (4) reports the coefficient of the reform dummy from the regression (3) interacted with the female dummy only. "Non-academic fathers" refers to individuals whose fathers haven't chosen the academic track. "Academic fathers" refers to individuals whose fathers have chosen the academic track. In panel A, the dependent variable is a dummy that takes value one if the individual chose the academic track. In panel B, the dependent variable is a dummy that takes value one if the individual chose to continue to academic tertiary education.

Table 7 The effect of the reform on log taxable income in 2000, euros

	(1) All	(2) Men	(3) Women	(4) Gender difference
The whole sample	-0.004	-0.029	0.012	0.041
(N=38 556)	(0.012)	(0.016)	(0.015)	(0.020)
Non-academic fathers	-0.013	-0.032	-0.004	0.028
(N=21 252)	(0.016)	(0.021)	(0.018)	(0.024)
Academic fathers	0.005	-0.027	0.030	0.058
(N=17 304)	(0.018)	(0.024)	(0.022)	(0.029)

The column (1) reports the coefficient of the reform dummy from the regression (3) without female interactions. Columns (2) and (3) report the coefficients of the reform dummy from the regression (3) interacted with male and female dummies, respectively. Column (4) reports the coefficient of the reform dummy from the regression (3) interacted with the female dummy only. "Non-academic fathers" refers to individuals whose fathers haven't chosen the academic track. "Academic fathers" refers to individuals whose fathers have chosen the academic track.