



Contents lists available at ScienceDirect

Labour Economics

journal homepage: www.elsevier.com/locate/econbaseThe early inception of labor market gender differences[☆]

Peter Kooreman

Tilburg University, The Netherlands

ARTICLE INFO

Article history:

Received 12 March 2008

Received in revised form 9 July 2008

Accepted 17 July 2008

Available online xxx

JEL classification:

J16

J22

Keywords:

Labor market

Gender differences

Teenage behavior

ABSTRACT

This paper analyzes gender differences in jobs while in school using school-class-based samples, a setting in which education differences, “glass ceilings”, and career interruptions due to parenthood are irrelevant. I find that in this early stage of life boys already earn substantially more than girls. The earnings gap cannot be explained by differences in participation rates and hours of work, nor by gender wage gaps within job types. It is entirely due to the fact that girls work more in job types with relatively low wages, in particular babysitting. During the period considered, 1984–2001, the gender patterns of jobs while in school largely remained unchanged.

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1. Introduction

An extensive and still growing literature documents and analyzes gender differences in labor markets; see e.g. [Blau and Kahn \(2000, 2003, 2004\)](#) and [Bayard et al. \(2003\)](#) for recent contributions. Within this large literature, no paper seems to have analyzed in detail any gender differences in the earliest experiences of individuals with the labor market: jobs while in school. In this paper I analyze such differences using Dutch school-class-based samples from the period 1984 to 2001.

Although jobs while in school may be of limited economic importance, they are of special interest since some of the common explanations for occupational gender segregation and gender wage gaps are irrelevant at this stage of individuals' lives. First, boy–girl differences cannot be explained by gender differences in promotion opportunities (“glass ceilings”) given the nature and relatively short durations of jobs while in school. Secondly, boy–girl differences cannot be explained by career interruptions due to parenthood – all individuals considered in this paper attend high school, live with their parent(s), and do not have children themselves. Thirdly, the availability of school-class-based samples allows for a comparison of the behavior of boys and girls who are in the same school class and have

virtually identical education levels. Consequently, any differences in behavior cannot be attributed to differences in education. Thus, analyzing jobs while in school may help to understand a part of the nature of labor market gender differences.

I find that in this early stage of life boys already earn substantially more than girls. The earnings gap cannot be explained by differences in participation rates and hours of work, or by gender wage gaps within job types. It is entirely due to the fact that girls work more in job types with relatively low wages, in particular babysitting. The gender patterns of jobs while in school largely remained unchanged during the almost two decades considered. In particular, participation rates and hours in babysitting show no systematic change for girls in all academic levels within high school, even though the wage rate of babysitting has decreased relative to the wage rates of other job types.

2. The NSYS data

The empirical analysis is based on the *Nationaal Scholierenonderzoek* (Dutch National School Youth Surveys, NSYS), a survey based on random samples of school classes in the Netherlands. We use data from the surveys conducted in 1984, 1990, 1992, 1994, 1996, 1999, and 2001. All students in a sampled school class participate in the survey in principle. Yet, some of them are excluded from the data, for example because a student was absent on the day when the questionnaires were filled out. The survey contains information on time use, income and jobs, expenditures, family background, and on social and psychological aspects of teenage life. There is limited information on parents and on siblings. The seven editions of the

[☆] I thank seminar participants at the University of Amsterdam, UCSB, UCLA, USC, Claremont McKenna, and RAND, as well as anonymous referees and an editor for helpful comments.

E-mail address: p.kooreman@uvt.nl.

Table 1
Participation rates, hours, earnings, and wages; pooled data, with additional controls^a

	Participation ^b		Hours/week ^c		Earnings/week ^{c,d}		Wages/hour ^c	
Girl dummy	-0.019	-0.019	-0.029	-0.019	-0.379*	-0.363*	-0.351*	-0.344*
	(0.025)	(0.025)	(0.052)	(0.052)	(0.056)	(0.055)	(0.051)	(0.051)
Girl dummy* (year-1984)	0.001	0.001	0.000	-0.000	0.015*	0.016*	0.015*	0.016*
	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Age		0.009		0.080*		0.169*		0.089*
		(0.006)		(0.013)		(0.014)		(0.013)
Non-Dutch		-0.144*		0.065		0.078		0.012
		(0.016)		(0.040)		(0.043)		(0.039)
Complete family		0.038*		-0.025		-0.042		-0.017
		(0.014)		(0.029)		(0.031)		(0.029)
Father's working hours		0.0003		0.001*		0.0004		-0.001
		(0.0003)		(0.001)		(0.0006)		(0.001)
Mother's working hours		0.0006*		0.004*		0.003*		-0.001
		(0.0002)		(0.0005)		(0.001)		(0.000)
# classes:	2175							
# observations	18,938							

^aRegression with class-specific fixed effects; standard errors in parentheses; * indicates significance at the 5% level; for hours, earnings, and wages, the dependent variable is the natural logarithm.

^b1990–2001: positive hours and positive earnings; 1984: positive earnings (no hours information available).

^cParticipants only. Earnings and wages in nominal guilders.

^d1984–1992: Respondents were asked to report monthly earnings. These numbers have been converted to weekly earnings (multiplied by 12/52); 1994–2001: Respondents were asked to report weekly earnings.

Table 2
Participation rates, hours, earnings, and wages; per year and pooled

	1984	1990	1992	1994	1996	1999	2001	Pooled
<i>Participation^{a)}</i>								
Boys	0.483	0.497	0.530	0.532	0.533	0.585	0.586	0.524
Girls	0.429	0.449	0.501	0.500	0.539	0.568	0.535	0.487
Girl dummy ^{b)}	-0.066*	-0.033*	-0.018	-0.027*	0.010	-0.002	-0.049	-0.055*
	(0.016)	(0.014)	(0.014)	(0.014)	(0.018)	(0.022)	(0.027)	(0.013)
Girl dummy* trend	-	-	-	-	-	-	-	0.003*
								(0.001)
<i>Hours/week</i>								
Median boys ^{c)}		8.00	8.00	8.00	8.00	10.00	10.00	8.00
Median girls ^{c)}	-	8.00	8.00	8.00	8.00	9.00	10.00	8.00
Girl dummy ^{b)}		-0.075*	-0.056*	0.009	-0.031	0.027	-0.085	-0.083
		(0.037)	(0.028)	(0.027)	(0.035)	(0.036)	(0.049)	(0.045)
Girl dummy* trend		-	-	-	-	-	-	0.005
								(0.004)
<i>Earnings/week^{d)}</i>								
Median boys ^{c)}	27.69	49.62	47.63	51.00	51.00	75.00	80.00	50.00
Median girls ^{c)}	23.08	34.73	39.69	45.50	42.00	64.00	65.00	39.69
Girl dummy ^{b)}	-0.260*	-0.332*	-0.227*	-0.216*	-0.214*	-0.068	-0.184*	-0.317*
	(0.053)	(0.031)	(0.031)	(0.030)	(0.038)	(0.050)	(0.065)	(0.032)
Girl dummy* trend	-	-	-	-	-	-	-	0.010*
								(0.003)
<i>Wages/hour</i>								
Median boys ^{c)}		6.20	5.95	6.94	7.00	8.00	8.64	6.82
Median girls ^{c)}	-	4.96	5.05	5.71	5.63	6.73	7.20	5.63
Girl dummy ^{b)}		-0.257*	-0.171*	-0.224*	-0.183*	-0.095*	-0.099	-0.323*
		(0.037)	(0.028)	(0.024)	(0.029)	(0.043)	(0.052)	(0.044)
Girl dummy* trend		-	-	-	-	-	-	0.013*
								(0.004)
USD/guilder	0.31	0.55	0.57	0.55	0.59	0.48	0.41	-
fraction of girls	0.533	0.503	0.488	0.477	0.478	0.446	0.463	0.491
# classes	430	632	399	607	316	305	140	2829
# observations	5605	7019	5992	6906	3810	2870	1465	33,667

^{a)}1990–2001: positive hours and positive earnings; 1984: positive earnings (no hours information available).

^{b)}Coefficient on girl dummy; regression with class-specific fixed effects; standard errors in parentheses; * indicates significance at the 5 percent level; for hours, earnings, and wages, the dependent variable is the natural logarithm.

^{c)}Participants only. Earnings and wages in nominal guilders.

^{d)}1984–1992: Respondents were asked to report monthly earnings. These numbers have been converted to weekly earnings (multiplied by 12/52); 1994–2001: Respondents were asked to report weekly earnings.

NSYS are largely similar, although there have been changes in the wording of some questions (as indicated in the notes to the tables below). For the present analysis, all students aged 16, 17, or 18 were selected if they were in a class with at least one other student aged 16, 17, or 18. Most of these students are in their one but final or final high school year, and live with their parents. Pooled over all years available, the subsample used in this paper has information on 33,667

students in 2829 different classes. The NSYS shows decreasing sample sizes after 1994, and has not been repeated in the same format since 2001.¹

¹ The written survey has been replaced by an internet survey, the first of which has been completed by 5500 students in 2004. However, this new NSYS is not school class based. See Kooreman (2007) for an analysis of other aspects of teenage behavior based on the NSYS.

The Dutch secondary education system distinguishes between three academic levels. High schools usually compose classes on the basis of these academic levels as of grade 8.² While there might still be some educational gender differences within the same class (boys and girls might take different subjects in the small elective part of the curriculum, or they may have had different primary educations), the men and women considered here are more homogeneous in terms of cognitive abilities and education than in any other study on labor market gender differences.

The school-class-based nature of the data allows for controlling for education differences to a much greater extent than is possible in most other studies. Typically, empirical papers on gender gaps include dummies for a limited number of education levels as explanatory variables, which inevitably entails a high degree of education heterogeneity within a given education level.³ By including class-specific fixed effects, as in the present paper, one controls for a large number of education related factors, such as teacher quality, school resources, details of curricular content, academic competitiveness, and school neighborhood characteristics.

Due to the combination of its school-class-based nature, the level of detail on jobs while in school, and the time span covered, the Dutch NSYS is a unique source of information on the earliest experiences of individuals with the labor market.

3. Gender differences in jobs while in school

Table 1 reports regression results for participation rates, earnings, hours, and wages for all years pooled. The explanatory variables of central interest are a girl dummy and an interaction term of the girl dummy and a time trend (defined as the calendar year minus 1984). The coefficient on this interaction term reveals whether there have been any significant changes in gender gaps over time. In addition, a number of other controls have been included: age, a dummy for being non-Dutch, a dummy for complete family (both parents present), father's working hours/week, and mother's working hours/week. Inclusion of these additional covariates strongly reduces the number of observations because of item non-response (from 33,667 to 18,938). Parental education has not been included since this would further reduce the number of observations; about one third of high school teens do not know their parents' education level. Other candidate covariates were not included because they were not asked in all years (like parental ages) or because they were not asked in any year (like family income). All regressions control for class-specific fixed effects (in almost all cases the random effects model was rejected against the fixed effects model on the basis of Hausman tests). Note that these absorb variables like school level and urbanization.

As Table 1 shows, the inclusion of the additional covariates does not have a notable effect on the girl dummy or girl dummy trend coefficients. For this reason and because of the strong sample size reduction when the additional covariates are included, all results reported in the sequel are based on specifications with only the girl dummy, the girl dummy trend variable, and class-specific fixed effects as explanatory variables. Table 2 reports these results (with the larger sample size) for all years of the NSYS pooled, as well as for each year separately. In addition to the

² A class is defined as a group of students in a given grade and academic level within a school, who – for a majority of subjects – attend classes together, at the same time, in the same class room, with the same teacher. The levels are VMBO (vocational training), HAVO (intermediate), and VWO (academic). Enrollment in a university requires graduation in VWO (*Voorbereidend Wetenschappelijk Onderwijs*, which stands for Preparatory Academic Education). A minority of schools offers only a subset of the levels.

³ One of many examples is Blau and DeVaro (2006). As in most other studies on gender pay gaps, education is represented by broad categories like “Less than high school”, “High school”, and “College degree or more”. These education levels are highly heterogeneous. For example, if two respondents both have the value “high school”, this typically refers to two very different high schools, possibly in very different parts of the country, with different teachers, and possibly even in different years. In particular, it is impossible to tell the difference between “high school” for female respondent and “high school” for male respondents. The fixed effect regressions in the present paper effectively include a separate dummy variable for each class/year/school combination.

Table 3
Job type specific participation rates^a

	1990	1992	1994	1996	1999	2001	Pooled
<i>Babysitting</i>							
Boys	0.029	0.044	0.037	0.042	0.039	0.053	0.038
Girls	0.137	0.265	0.175	0.218	0.190	0.177	0.192
Girl dummy ^b	0.112*	0.222*	0.151*	0.176*	0.146*	0.123*	0.159*
	(0.008)	(0.010)	(0.008)	(0.012)	(0.013)	(0.018)	(0.013)
Girl dummy*trend	–	–	–	–	–	–	0.000 (0.001)
<i>Store/supermarket</i>							
Boys	0.122	0.149	0.136	0.152	0.179	0.227	0.147
Girls	0.171	0.203	0.189	0.185	0.263	0.239	0.196
Girl dummy ^b	0.040*	0.042*	0.040*	0.037*	0.077*	–0.007	0.044*
	(0.010)	(0.011)	(0.010)	(0.014)	(0.018)	(0.024)	(0.016)
Girl dummy*trend	–	–	–	–	–	–	–0.000 (0.002)
<i>Newspaper delivery</i>							
Boys	0.152	0.152	0.167	0.185	0.144	0.102	0.157
Girls	0.082	0.064	0.066	0.088	0.069	0.040	0.072
Girl dummy ^b	–0.082*	–0.090*	–0.103*	–0.090*	–0.082*	–0.065*	–0.096*
	(0.009)	(0.009)	(0.009)	(0.012)	(0.014)	(0.015)	(0.014)
Girl dummy*trend	–	–	–	–	–	–	0.001 (0.001)
<i>Restaurant/cafe</i>							
Boys	0.059	0.089	0.076	0.067	0.092	0.086	0.076
Girls	0.080	0.099	0.074	0.075	0.110	0.105	0.086
Girl dummy ^b	0.015*	0.009	–0.006	0.009	0.023	0.013	0.006
	(0.007)	(0.008)	(0.007)	(0.009)	(0.013)	(0.017)	(0.012)
Girl dummy*trend	–	–	–	–	–	–	0.000 (0.001)
Fraction of girls	0.503	0.488	0.477	0.478	0.446	0.463	0.491
# of classes	632	399	607	316	305	140	2829
# of observations	7019	5992	6906	3810	2870	1465	33,667

^a1984: no information on job types available.

1990 and 1992: participation: respondent reports to work in job type (“What kind of work do you do most of the time?”) and has positive (total) earnings (no information on job type specific earnings available).

1994–2001: participation: respondent reports positive job type specific earnings (“What kind of (paid) work do you do sometimes? (You can check more than one item.)”) and positive job type specific hours.

^bCoefficient on girl dummy; regression with class-specific fixed effects; standard errors in parentheses; * indicates significance at the 5 percent level.

regression coefficients, levels (medians for earnings, hours, and wages) for all dependent variables are reported, for boys and for girls.

In the 17-year period considered, the participation rate increased for both genders, but slightly more rapidly for girls than for boys.⁴ There have been few significant gender differences in terms of hours/week (conditional on participation) throughout the period considered. However, as shown by the results for earnings and wages, boys earn substantially more than girls, although the gaps narrowed somewhat. In 1984 boys earned about 30% more than girls, while at the millennium change the gap was approximately half as large. The orders of magnitude of the gaps are similar to those reported in Dustmann et al. (1997) and Pablonia (2001).

Tables 3 and 4 shed light on the sources of these gender earnings and wage differences. Table 3 reports participation rates for the four most popular job types: working in a store or supermarket, babysitting, delivering newspapers, and working in a restaurant or café (participation rates for other job type are generally below 0.05). Boys and girls appear to have very different job type specific participation rates: Girls primarily participate in store/supermarket work and in babysitting, whereas boys primarily deliver newspapers. The gender differences in participation rates are largest for babysitting. About 85% of all babysitting is done by girls.⁵

⁴ The time trend is essentially identified by seven observations. As Donald and Lang (2007) point out, standard asymptotics provide a poor approximation to the finite sample distribution. More accurate inference is obtained by regressing seven separate girl coefficients for each year on a constant and a time trend. In that case, the girl dummy*time trend is insignificant for participation, significant at the 10 percent level for earnings, and significant at the 5 percent level for wages.

⁵ Table 3, last column, first two rows: $0.192/(0.038+0.192)=0.835$. Average numbers of hours of babysitting per week are about the same for boys and girls, conditional on

The corresponding girl dummies are highly significant, and large and stable over time. The insignificant coefficients on the interaction terms of the girl dummy and the time trend show that there have not been any changes in the gender patterns in terms of types of jobs.

The job type specific wages in Table 4 reveal three empirical patterns of interest. First, there are large wage differences between job types. In all years for which job type specific wages could be computed, the ranking from low to high pay shows a plausible pattern given the nature of the jobs: babysitting, store/supermarket, restaurant, and newspaper delivery, for boys as well as for girls. Second, between 1994 and 2001, the relative wage of babysitting compared to other job types decreased substantially. The median hourly wage rate for babysitting girls remained constant in nominal terms (and thus even declined in real terms), whereas their nominal median wage rate for working in a restaurant increased by 25% in the same period. Third, boys and girls appear to earn equal wages in all job types, except newspaper delivery. As newspaper delivery is typically done using a bicycle and pays per copy delivered, this gap might be related to differences in physical aptitude. The gender patterns in labor market outcomes therefore partly reflect different comparative advantages of boys and girls. Note, finally, that the interpretation of the wage results is complicated by two factors. First, wages of boys and girls for a given job type may refer to different types of activities. For example, in supermarkets boys are more involved in loading and unloading and less in cashiering. Second, gender gaps in observed wages (i.e. conditional on choosing a job type) generally differ from gender gaps in potential (offered) wages, which may be more interesting from a policy perspective.

Table 4
Job type specific wages^a

	1994	1996	1999	2001	Pooled
<i>Babysitting</i>					
Median wage boys	5.00 [133]	5.00 [23]	5.00 [23]	6.25 [42]	5.00 [221]
Median wage girls	5.00 [577]	5.00 [130]	5.00 [82]	5.00 [120]	5.00 [909]
Girl dummy ^b	-0.041 (0.072)	-0.120 (0.119)	-0.226 (0.160)	0.087 (0.107)	-0.060 (0.065)
Girl dummy*trend	-	-	-	-	0.012 (0.018)
<i>Store/supermarket</i>					
Median wage boys	6.25 [490]	6.25 [152]	7.59 [122]	8.00 [179]	6.67 [943]
Median wage girls	5.83 [622]	6.25 [153]	7.14 [136]	7.00 [162]	6.25 [1073]
Girl dummy ^b	-0.075 (0.039)	-0.083 (0.069)	-0.001 (0.086)	-0.140* (0.068)	-0.070 (0.036)
Girl dummy*trend	-	-	-	-	-0.005 (0.010)
<i>Newspaper delivery</i>					
Median wage boys	8.75 [603]	9.08 [140]	10.36 [68]	11.67 [80]	9.33 [891]
Median wage girls	7.50 [217]	7.50 [48]	10.00 [23]	10.00 [27]	8.00 [315]
Girl dummy ^b	-0.233* (0.076)	-0.056 (0.169)	0.026 (0.202)	-0.469 (0.251)	-0.199* (0.075)
Girl dummy*trend	-	-	-	-	0.005 (0.030)
<i>Restaurant</i>					
Median wage boys	7.50 [273]	8.00 [79]	9.00 [69]	9.38 [68]	8.00 [489]
Median wage girls	6.67 [244]	7.14 [51]	7.50 [55]	8.33 [71]	7.14 [421]
Girl dummy ^b	-0.061 (0.076)	-0.055 (0.107)	-0.197 (0.164)	0.026 (0.182)	-0.069 (0.077)
Girl dummy*trend	-	-	-	-	0.004 (0.021)

^a1984, 1990, 1992: no job type specific earnings and wages available; numbers of observations on which the median is based in square brackets.

^bCoefficient on girl dummy; regression with class-specific fixed effects; standard errors in parentheses; * indicates significance at the 5 percent level.

Table 5
Job type specific participation rates: VVO versus other academic levels^a

	Pooled (1990–2001)		
<i>Babysitting</i>			
Girl ^b	0.159* (0.013)	0.153* (0.015)	
Girl*trend	0.000 (0.001)	-0.001 (0.001)	
Girl*VVO	-	0.031 (0.025)	
Girl*VVO*trend	-	0.002 (0.002)	
p-value (H ₀ : no VVO effect)			0.000
<i>Store/supermarket</i>			
Girl dummy ^b	0.044* (0.016)	0.036 (0.018)	
Girl dummy*trend	-0.000 (0.002)	0.000 (0.002)	
Girl*VVO	-	0.031 (0.031)	
Girl*VVO*trend	-	-0.002 (0.003)	
p-value (H ₀ : no VVO effect)	-		0.597
<i>Newspaper delivery</i>			
Girl dummy ^b	-0.096* (0.014)	-0.097* (0.015)	
Girl dummy*trend	0.001 (0.001)	0.001 (0.001)	
Girl*VVO	-	0.002 (0.026)	
Girl*VVO*trend	-	-0.001 (0.002)	
p-value (H ₀ : no VVO effect)	-		0.853
<i>Restaurant/cafe</i>			
Girl dummy ^b	0.006 (0.012)	0.002 (0.013)	
Girl dummy*trend	0.000 (0.001)	0.001 (0.001)	
Girl*VVO	-	0.016 (0.022)	
Girl*VVO*trend	-	-0.001 (0.002)	
p-value (H ₀ : no VVO effect)	-		0.695
	All	VVO	
Fraction of girls	0.491	0.499	
# of classes	2829	395	
# of observations	33,667	6299	

^{a,b}See Table 3 for footnotes.

In addition to different comparative advantages, gender differences in preferences are likely to play a role, in supply as well as demand. For example, parents may believe that girls make better babysitters than boys. Preferences may also be affected by (perceived) on-the-job risks. For example, babysitting is generally considered to be a safer type of job than delivering newspapers, especially for girls. Thus, public safety issues are likely to play a role in occupational gender segregation.⁶

The question arises whether the gender patterns vary with the academic level of a school class. To address this question, regressions were run that allow the gender-related coefficients to be different for classes in VVO (the highest academic level in high school). The regressions show that students in VVO do not behave differently from other students, except in terms of participation. Girls in VVO participate more than other girls, such that there is no participation gender gap for

⁶ A reviewer conjectured that earnings' differences could be caused by the fact that girls negotiate less assertively than boys. However, the data do not support this view, given the absence of significant gender wage gaps within job types (except for newspaper delivery, which is paid on a per copy basis). See Jacobsen (2007) for theories on occupational gender segregation.

students in VWO. This can be fully attributed to the fact that girls in VWO participate more in babysitting than other girls; see Table 5. Thus it appears that the prevalence and persistence of traditional gender roles in jobs while in school is even stronger for higher education levels.

4. Discussion

The gender earnings gap is an important motivation for the strong commitment of many governments to advancing equal education opportunities, equal pay acts, and child care policies.⁷ But the results in this paper show that young women work in lower-paying occupations despite equal education, despite the irrelevance of “glass ceilings”, and despite the irrelevance of career interruptions due to parenthood. This suggests that even if all three types of policies would be effective, a substantial amount of occupational gender segregation – with the associated gender earnings gap – will remain to exist.

An important question is to which extent gender differences in jobs while in school are connected to gender differences in jobs later in life. Arguably, different job types lead to different accumulation of human capital. For example, delivering newspapers daily, early in the morning, might build self-discipline and dutifulness, worker characteristics valued by employers (see e.g. Bowles et al., 2001). Similarly, gender differences in experiences with caring for young children might have an effect on how tasks are shared within the household once teenagers have become parents themselves. The results of the few empirical papers on this topic are mixed. Ruhm (1997) finds that jobs held during the senior year of high school are associated with higher future earnings, wages, and occupational status. Hotz et al. (2002) (considering men only) question whether the correlations found in this literature represent causal effects. Tyler (2003) reports a negative relationship between working more hours in jobs during the school year on near-to-immediate academic outcomes. None of these studies take an explicit gender perspective, nor do they account for the heterogeneity in job types.

Clearly, further insights in the relationship between human capital accumulated in jobs while in school (largely different for boys and girls) and human capital acquired at school (much more similar for boys and girls), and the effects of both on later life and career require panel data, preferably covering several decades.

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⁷ In the Netherlands – the country where the present paper’s data have been collected – the Lubbers administration widely advertised the slogan “*A smart girl is prepared for her future*” (riming in Dutch) during the early 1990s. This national campaign focused on girls aged 15 and 16, and encouraged them to pursue higher education and careers in typical male professions.