How objective are school advices?

Parental pressure in the absence of The End of Primary School Test

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Abstract

Standardized tests might provide teachers with a benchmark for giving school advices for students in primary education. This paper examined whether parents exert more influence on the school advice of teachers in primary education when schools do not participate in a standardized test. The possible parental pressure on the teacher has been measured by the variable 'education of parents'. It could be that parents want to influence the teacher to get a higher advice for their child. In order to measure this, data from the COOL5-18 program in the Netherlands from the period 2008-2014 has been used. No clear effect of education of parents on the school advice has been found. Moreover, it became clear that, after three years, pupils from schools that do not use the Citotest do not have a lower level of education than the school initially advised.

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1   Introduction

Early tracking systems in education might have long-term consequences for students. Being in a low- or high track usually plays a decisive role when it comes to future education and occupational decisions. In such a tracking system, a proper allocation of talent is a key challenge and various instruments should therefore be used. This paper evaluates instruments that play a role in the transition from primary to secondary education in the Netherlands. In the Netherlands, pupils go to primary education until about the age of twelve. After that, pupils have to choose an appropriate level of secondary education which corresponds to their capabilities. During the final grade of primary education, the school gives an advice on which track of secondary education pupils will likely be most successful. The school's advice is important and necessary to enter secondary education. Secondary schools should follow the advice of primary schools and schools are not allowed to refuse pupils based on their test scores[1]; pupils may only be placed according to the school's advice or, alternatively, on a higher level of education.

An important instrument to give a reasonable advice is the 'End of Primary School Test', in the Netherlands better known as Citotest[2]. This research project tries to examine whether there is a greater role for parents in influencing the advice of the teacher for secondary education in the Netherlands if no Citotest has been used. The direct reason for this research project is the recent change of timing of the Citotest in the Netherlands. Previously, the Citotest took place in February; from 2015 onwards, however, it takes place between the 15th of April and the 15th of May. Moreover, there are currently two alternatives for the Citotest and primary schools are obliged to use one of these three in the final grade. In contrast, until 2014, primary schools in the Netherlands were not obliged to use the Citotest. However, before the recent change, approximately 85 percent of the primary schools used the Citotest voluntary.

By changing the timing of the end test also the school advice (provided by the teacher) is becoming more important in the transition from primary to secondary education. Therefore,

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[1] Explanation (in Dutch) can be found on the following website:
https://www.rijksoverheid.nl/onderwerpen/toelating-middelbare-school/inhoud/toelating-voortgezet-onderwijs-gebaseerd-op-schooladvies
[2] In the remainder of this paper this word or 'end test' will be used instead of the full description (End of Primary School Test).

the other main 'instrument' is the teacher. He or she observes the pupils every school day and should therefore be able to indicate their capacities and opportunities. In addition, it could be the case that a third party can influence the school advice, namely the pupils' parents. For instance, it is possible that they try to influence the teacher to get their child in a higher track in secondary education. Recently, the inspection of education published a report on the developments in the Netherlands during 2014 and 2015 to which we will return in detail later. All the above discussed 'instruments' are present in this report of the inspection.

The goal of this paper is to investigate whether the effect of parents on student advice is more important in schools that do not use the Citotest than schools that do use the Citotest. We test the assumption that, without their children taking part in the Citotest, parents try to influence the teacher in order to get a higher advice with respect to secondary education for their children. It is interesting to find out whether it is more likely that highly educated parents put more pressure on teachers to increase the advice in final grade of the primary schools (if there is no Citotest). In the second part of the analysis it will be investigated whether school advices given by teachers at schools that use the Citotest are a better predictor of a student's position in education three years later than the school advices from teachers at schools that do not use the Citotest. To this aim the quality of the decision (school advice) compared to the pupils' level of education after three years in secondary education will be evaluated.

The remainder of this paper is organized as follows: the next chapter will provide a highlight of the relevant literature. The third chapter will explain the institutional context (system of education) in the Netherlands. The following two chapters will discuss the used data and explain the empirical strategy. The sixth chapter will give some background information about (the characteristics of) schools which do not use the Citotest. After that, chapter seven will provide the estimation results and discuss the outcomes. The second part of chapter seven will try to evaluate the quality of the school advice three years after the advice was given in the presence or absence of the Citotest. The final chapter will draw a conclusion, discuss limitations and give recommendations for further research.

2 Previous literature

For decades, economics and other sciences have shown great interest in the development and changes of educational systems. Main contributions are linked to the term 'school accountability' which is described in the literature as a process in which the schools' performances are measured based on pupils' performances (see for a clear explanation and overview Figlio and Loeb, 2008). These authors present, for instance, key features that have an influence on the effectiveness of policies related to accountability. They also give an overview of the research literature on the effects of test-based accountability on students and teachers. In this chapter, three important aspects will be discussed, namely the moment of tracking in education, effects of central exams, and parental preferences in education. First, tracking refers to the moment of transition from primary education to secondary education. Therefore, regarding the subject of this paper, tracking is a relevant aspect given the timing of the Citotest during the final year of primary school in the Netherlands. Secondly, the effect of tests itself such as the Citotest can influence the pupils' achievements. Therefore, literature on the effect of central exams in general will be examined. Lastly, the preferences of parents indicate, given the aim of this research, what parents want regarding the track of secondary education their children have to follow.

2.1 Early tracking

First of all, tracking, in the Netherlands defined as 'early tracking'. In the Netherlands, tracking takes place in the final year of primary education (approximately around the age of twelve). A tracking system has a problem in the sense that pupils can be misallocated to tracks because of information that is incomplete at the moment of tracking. Hanushek and Wößmann (2006) investigated, using a difference-in-differences model, whether tracking has an effect on performance and inequality. Based on their results, they concluded that early tracking seems to increase the educational inequality. Although they are more careful when it comes to performance, there seems to be a tendency that early tracking reduces mean performance. A report of the OECD (2012), which focusses on the Netherlands, discusses several recommendations and improvements about the education system in the Netherlands. For instance, instead of using early tracking in primary education, the report recommends that it

would be better to select pupils in secondary education. This recommendation is in line with the findings of Hanushek and Wöβmann as mentioned above.

Brunello and Checchi (2007) investigated the relationship between school tracking and equality of opportunity in what they characterize as new international evidence. According to the authors, increasing the age of first selection or reducing the number of available tracks could perhaps generate an increase of intergenerational mobility in educational attainment, but could also lead to more social exclusion for people of a lower socio-economic- or disadvantaged background.

Dustmann et al. (2014) investigate the effects of attending a more advanced track in secondary education on education in the long run and outcomes in the labor market. Germany has according to the authors a very rigorous tracking system, because of the fact that tracking takes place at early age. However, they find no evidence for more favorable long-term outcomes for the students which attending a more advanced track. The authors attribute this result to the up- and downgrading of student once they are in secondary education and more information on their potential is available. Therefore, flexibilities in a tracking system are important to revise the initial track choices.

Piopiunik (2014) evaluate a school reform in German state of Bavaria in 2000 that changed the moment of tracking. Tracking takes place two years earlier (in grade 4 instead of grade 6). According to the author the results indicate that the reform reduced the performance of students. Besides that, it is also find that the share of very low-performing students increased after the reform in low-track schools.

A special case about elite and nonelite schools with respect to tracking is studied by Guyon (2012). They use a natural experiment of the increase in the size of the elite track. The elite track became possible for a group that was previously only at the margin of being admitted. This increase was followed by a significant improvement in average educational outcomes.

2.2 The effect of central exams

Secondly, what does previous literature say about the effect of central exams on the achievements of pupils? This paper highlights several important contributions. Jürges et al. (2005), for instance, by using a difference-in-differences framework, evaluated the German

school system that includes schools without exit examination as well as schools with an exit examination. They concluded that pupils at schools with exit examinations perform better than pupils at schools without exit examinations. In addition, Ludger Woesmann (2005) made use of student-level micro databases of three international achievement tests in order to estimate the effect of external exit exams on the performance of a pupil. The author found heterogeneity in the effect of central exams in three dimensions, namely pupil, school, and time. Moreover, Jürges and Schneider (2010) studied the causal effect of state-mandated central exit examinations on pupil's performance in Germany and found a small positive effect of the examinations on pupils' performances.

Also more recent studies are available and will be discussed now. Bol et al. (2014) for instance, study in what manner central examinations (in tracked educational systems) have an effect on the association between tracking and inequality. They describe two interesting findings. First, they find that the socioeconomic status of parents has a larger effect on student achievement in tracked educational systems, in contrast to systems without central examinations. Second, the authors argue that central examinations give a good indication for schools regarding their performance, which:

- gives an incentive for schools to allocate pupils to tracks based on mare objective indicators, and
- can lead to more investment in lower-track pupils.

The conclusion of this paper is that central exams have an attenuating effect on the stronger impact of parental status on the performance of pupils. Schwerdt and Woessmann (2015) have evaluated central compared to local exams nature in secondary education in Germany. This is possible because of the fact that students from states with and without central exams are participating in the same labor market. By using a difference-in-differences model they estimate whether the earnings difference between individuals differ given the kind of exam (central or local). They find the earnings increase by six percent on central exams and two percent on local exams.

2.3 Parental preferences in education

Thirdly, parental preferences in education will be addressed; this is the most relevant part of the literature within this paper in terms of the Dutch situation regarding the Citotest. Dustmann (2004) used micro data in order to examine a possible association between the education of the parents and their profession on the one hand, and the choice regarding the track in secondary school on the other. A relevant finding within the context of this paper is the following: the background of parents, including their education, is strongly related to the track choice in which a child continues in secondary education. From this point of view, it could be argued that highly educated parents want their children to go into a higher track in secondary school. This assumption will be tested later on in the sections below.

Another interesting point related to the preferences in education of parents can be wealth. Tamm (2007) tried to find out whether parents use money as a means to get a higher secondary school track for their children. According to the main findings, there is no positive causal effect of income of parents on secondary school track choice; in addition, differences in incomes of household are only driven by unobserved factors (for example, differences in the sense of motivation).

The last papers which will be discussed in this chapter are about the background of parents. Riphahn and Schieferdecker (2010) analyze the role of parental background with respect to transitions towards tertiary education in Germany. Their conclusion is the following: income of parents significantly affects the transition of students to tertiary education. However, the impact of this effect have lost magnitude over time according to the authors. Two other authors Boll and Hoffmann (2015) explore whether the employment of parents has an extra effect on the school achievement of their children, above the other known effects of education, namely income and demography. Their results indicate that there are no clear income associations. However, there is a substantial effect of the fathers' job prestige.

The next section continues with an explanation of the Dutch institutional context.

3   The institutional context

3.1 Educational systems in the Netherlands

From the age of five children in the Netherlands are obliged to attend school (full-time). However, children usually start attending school at the age of four. Until the age of sixteen, full-time education is compulsory. Moreover, it is still required to attend some form of education on a part-time basis until the age of eighteen (senior secondary vocational education (MBO)). Normally, children aged four to twelve go to primary education. After that, between the age of twelve and eighteen, pupils attend secondary education in which the length of education depends on the track they follow. The senior secondary vocational education (mentioned earlier) is generally for pupils from sixteen up to twenty years old; senior general secondary education provides access to higher professional education (HBO) and pre-university education allows one to enter university education (WO). A schematic presentation of the Dutch system is shown in Figure 1 below.

Figure 1   The Dutch education system in a schematic form
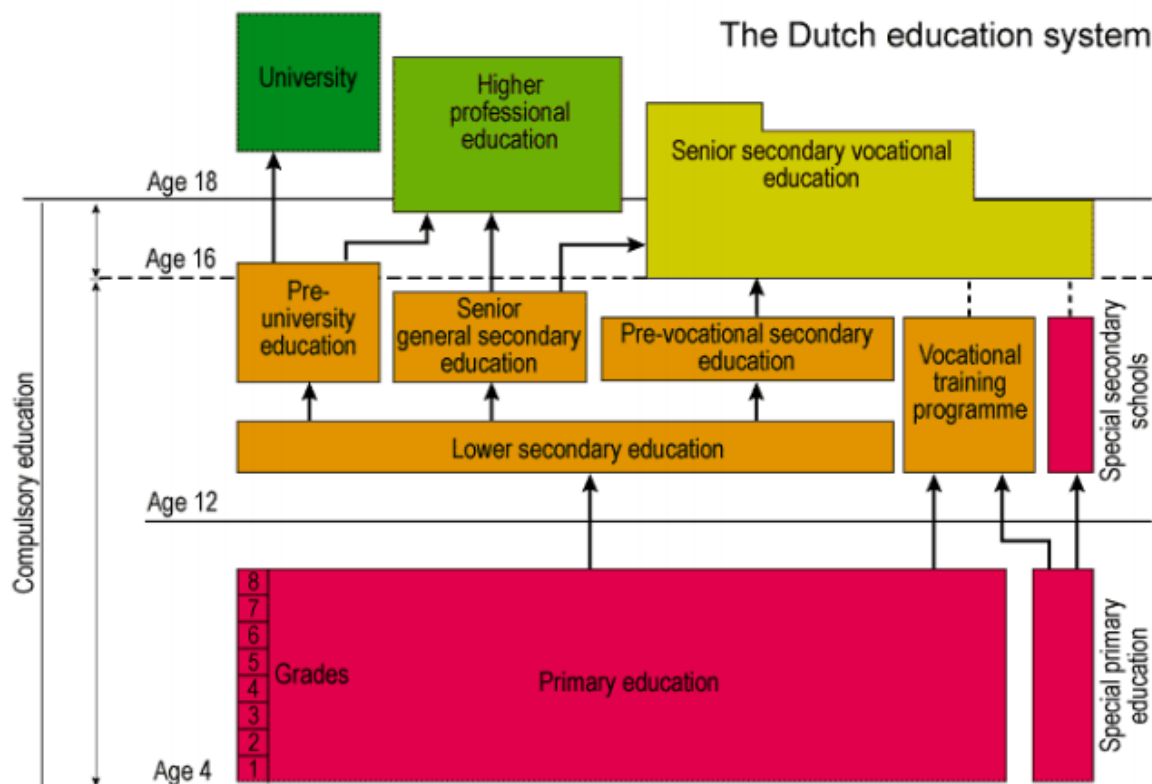
Source: Cito, The Netherlands

3.2 Purpose of the Citotest

After eight years of primary education, children in the Netherlands proceed to secondary education. Secondary education can be divided into three main educational tracks:

- Pre-vocational secondary education (VMBO)
- Senior general education (HAVO)
- Pre-university education (VWO)

It is the task of the primary school to issue an advice on which track of secondary education is suitable for each individual child; wishes of parents and pupils are taken into consideration as well to come to a final advice. However, since such advice could be considered subjective, there is a possibility to use independent tests that provide a more objective view of a pupil's capacities; a well-known test in the Netherlands is the Citotest which gives information about the abilities of a pupil. Some schools, however, have not used the Citotest or any other kind of end test. Do these schools use alternatives to come to an advice? Other test or questionnaires are available[3] and could be used throughout the year; this gives the opportunity to take a test before the actual date of advice.

Although the main role to come to an advice is dedicated to the teacher in the final grade of primary school, schools are always obliged to use a student information system[4]. This system already starts in the first grade and collects information that is relevant for pupils' progress and development during their period in primary education. Based on these data as well as the teacher's experiences, schools are able to give a reasonable advice. Nevertheless, since parents know their children best, parental advice is important for the teacher to choose the right track.

3.3 Actual discussion

The current discussion in the Netherlands regarding the timing of, and the Citotest itself is interesting. Last April, the inspection of education in the Netherlands which belongs to the Ministry of Education, Culture and Science, published a report called 'the State of Education in the Netherlands 2014/2015' (2016). In 2013, the government decided to make the end test

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[3] NIO test and SVL / Schoolvragenlijst (questionnaire)
[4] In Dutch: leerlingvolgsysteem (LVS)

less important by changing the timing of the test (see the introduction), aiming to make the school advice, instead of the end test, leading. However, the inspection pointed out a negative consequence of this change for children from highly educated parents now get a higher school advice compared to children from lower educated parents. Although this was already the case before the changes in 2013, the inspection argues that the effect seems stronger. They looked at a group of pupils who all have an IQ that matches pre-vocational secondary education (VMBO); contrary to the pupils who have low educated parents, pupils in this group who have highly educated parents are frequently found in senior general education (HAVO) as well as pre-university education (VWO) (at the start of secondary education).

4   Data

Data in this study was collected in the so-called COOL-project (COOL 5-18[5]). This project is the successor of the PRIMA (Longitudinal Data Collection Primary Education) program. The goal of this project was to collect data in order to describe and explain the development of children (age 5-18) during their school period regarding all different levels of education. On average, the datasets consisted of information about 500 primary schools and 35,000 pupils. The project gave information about pupils in grade 2, 5, and 8. The present paper focuses solely on the pupils in the final grade of primary education.

Within the COOL program there are two different samples, a reference and an additional sample. Together they are referred to as the total sample. The aim of the reference group is to make it possible to extend the results and consequently considered them relevant for the total population of schools. On the contrary, the additional sample pays attention to schools which have proportionally more pupils with a lower socio-economic background and other particular schools.

Within this paper a school is defined as 'without Citotest' if all their pupils do not take this test in the final year. In the total of the three datasets, 133 schools within the COOL program did not use the Citotest. Table 1 presents the percentage of schools without the Citotest as well as the number of pupils in the final year of primary school.

Table 1   Schools[6] without Citotest and total number of pupils in final year

Dataset	# school in sample*	# without CITO	Percentage of total	# of pupil in final year
2007-2008	550	80	14.5%	11609
2010-2011	553	72	13.0%	12538
2013-2014	437	39	8.9%	10058

* 9 schools are present in all three datasets

Each of the three total samples consist of around 8% of the total population of primary school in the Netherlands. The COOL program consist of data over three different school years,

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[5] For readability, only 'COOL' will be used in the remainder of this chapter.
[6] 13 out of the 133 schools belong to the additional sample of schools instead of the reference group.

namely 2007/2008, 2010/2011, and 2013/2014. These three datasets are pooled in order to do the estimation which will be discussed below.

The most important variables are the outflow schemes of the pupils in the final year of primary school including the final advice with respect to secondary school, the education level of the parent(s) and personal characteristics and background. The advice for secondary education will be used as the outcome variable in the estimation.

The school advice is divided into six categories:

1) Lower part of pre-vocational secondary education (VMBO-PRO – VMBO-LWO)
2) Upper part of pre-vocational secondary education (VMBO-BBL – VMBO-TL)
3) Pre-vocational secondary education / senior general secondary education (VMBO/HAVO)
4) Senior general secondary education (HAVO)
5) Senior general secondary education / pre-university education (HAVO/VWO)
6) Pre-university education (VWO)

Another important variable is the dummy variable (yes or no) whether the primary school uses the CITO-test or not. The main variable which can explain the behavior of parents when trying to influence the teacher is the education of parents. Parents' level of education will be measured in four categories: 1) max. primary education (LO), 2) max. lower senior secondary vocational education (LBO), 3) max. senior secondary vocational education (MBO), and 4) higher professional education and university (HBO/WO). The following control variables will be used in the estimation: year of research, gender, year of birth, duration of stay in the Netherlands, composition of the family, and socio-economic background. In addition, in order to control for pupils' abilities, scores with respect to mathematics and literacy tests are added to the estimation. The variables as mentioned above are used in the empirical strategy which will be described in the following section.

It is interesting to find out what the situation of pupils is three years later in secondary education. In other words, on which track is a pupil active in the third year of secondary education. By using data of the COOL-program (for secondary education), it is possible to observe pupils in 2008 as well as 2011. Therefore, two variables are important:

1) Participation in COOL-program (2008);
2) Type (level) of secondary education in third year.

Table 2   The same pupils in final grade primary education three years later

	Final grade primary education	Third year secondary education
Total # pupils	10,292	2,290
Pupils without Citotest	2,097 / 20.4% of total	430 / 18.8% of total
Pupils with Citotest	8,195 / 79.6% of total	1,860 / 81.2% of total

The dataset of 2008 consists of 10,292 school advices for pupils; 22.3% (2,290) of the same pupils can be tracked three years later. It could be concluded that the proportion within the two groups, with and without Citotest, as shown in Table 2, is equal.

Since it is now possible to evaluate the quality of the school advice, a new variable (quality of the decision) is defined. This new variable is given a value of zero if the school advice equals the level of education in secondary school. If, after three years, the advice is above the level of education, the variable is defined as -1, and if the advice is below the level of education, as 1.

5   Empirical strategy

Part I

The first part of the analysis focuses on the question whether parents exert more influence on teachers in schools that do not use the Citotest. It will be estimated whether using the Citotest as well as parents' education have a significant effect on the advice for secondary education (outcome variable). In addition, since interaction can play an important role as well, the interaction term between the variable Citotest times the parents' level of education will be created out of the data. This parameter (α_3) measures whether parental education has a different effect in schools that do not take the Citotest. Since this is the parameter of our main interest, the following equation will be estimated:

$$Y_i = \alpha_0 + \alpha_1 C_i + \alpha_2 P_i + \alpha_3 C_i * P_i + \alpha_4 X_i + \varepsilon_i \tag{1}$$

Where:
- Y_i = advice for secondary education (outcome variable);
- C_i = Use of Citotest (yes or no, dummy variable);
- P_i = education of parent(s);
- X_i = set of relevant control variables with respect to the pupil;
- ε_i = the error term.

In addition, two more separate control variables will extend the estimation. In Equation 2, a literacy score (L_i) and a math score (M_i) will be added to the estimation as presented below. These control variables will be added in order to take pupils' ability into account. Moreover, it is important to add these variables to the estimation because parts of the effect could otherwise be a result of differences in ability. Moreover, literacy and math are important indicators of a pupil's ability. This implies the following assumption: higher test scores mean that pupils' ability will be higher. Therefore, the following equation will be estimated:

$$Y_i = \alpha_0 + \alpha_1 C_i + \alpha_2 P_i + \alpha_3 C_i * P_i + \alpha_4 X_i + \alpha_5 L_i + \alpha_6 M_i + \varepsilon_i \tag{2}$$

Part II

Next, the quality of the advice is interesting to examine. Hence, are advices from schools that use the Citotest are a better predictor of educational performance in the next years than the advices from schools that do not use the Citotest? To this aim it will be checked whether the educational position three years later matches with the school advice of the teacher at the end of primary education. The dependent variable in the second part of the estimation is the quality of the decision (as discussed in the previous chapter). Since more than two dependent variable categories are present, a multinomial logistic regression model will be used. The probability of belonging to one of these categories is in general given by the following estimation:

$$\Pr(Y_i = j) = \frac{\exp(x_i B_j)}{\sum_i^j \exp(x_i B_j)} \tag{3}$$

In this section, the quality of the school advice which was given to the pupils in final year of primary school will be estimated and evaluated. An additional dataset with data from secondary education is used to make it possible to judge the quality of the school advice in comparison to the type of education three years later.

In the estimations, the same control variables (as mentioned above in part I) are used. The base outcome in Equation 4 and 5 below takes the value zero $(Y_i = 0)$; in other words, the school advice is equal to the level of education in the third year of secondary school. If the school advice is above the level of education the dependent variable takes the value -1, and if the school advice is lower than the level of education three years later, it has the value 1. The outcome variable has three categories which cannot be ordered $(Y_i = -1, 0 \ or \ 1)$. Therefore, the multinomial logistic regression method will be used. The estimation according to this method gives two intercepts and two slope coefficients for the different variables. Although equation 4 and 5 below show the full model, the variables will be estimated in three steps. The first step only contains the dummy variable (use of Citotest, C_i) and the control variables. In the second step, the school advice variable (S_i) will be added. The third step will estimate the interaction effect between use of the Citotest and the school advice. This model consists of the following two equations:

$$\ln\left(\frac{P(Y_i=-1)}{P(Y_i=0)}\right) = \beta_0 + \beta_1 C_i + \beta_2 S_i + \beta_3 C_i * S_i + \beta_4 X_i + \varepsilon_i \tag{4}$$

$$\ln\left(\frac{P(Y_i=1)}{P(Y_i=0)}\right) = \beta_0' + \beta_1'C_i + \beta_2'S_i + \beta_3'C_i * S_i + \beta_4'X_i + \varepsilon_i \qquad (5)$$

Where:

- Y_i = Quality of the decision (outcome variable);

- C_i = Use of Citotest (yes or no, dummy variable);

- S_i = School advice;

- X_i = set of relevant control variables with respect to the pupil;

- ε_i = the error term.

6 Background – Comparison schools with and without Citotest

This section compares schools with and without Citotest. Are there any specific characteristics which determine a school without Citotest? Table 3 shows a mean comparison on several school characteristics and also on for instance education of parents and the school advice in the year 2008.

Table 3   Summary statistics of schools that do and don't participate in Citotest (2008)

	Overall	# 550	*Yes*	# 470	*No*	# 80	Sign.
	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.	
Use of Citotest	0.8545	(0.0150)					
Sample	0.2727	(0.0190)	0.3085	(0.0213)	0.0625	(0.0272)	***
Urbanization	1.9564	(0.0555)	2.0149	(0.0597)	1.6125	(0.1461)	***
School score	1.5382	(0.0902)	1.6872	(0.1003)	0.6625	(0.1630)	***
Denomination	1.1164	(0.0433)	1.1404	(0.0476)	0.9750	(0.1022)	*
Control variables							
% Boy (gender)	0.5030	(0.0054)	0.5031	(0.0060)	0.5022	(0.0128)	
Year of birth	1995.526	(0.0063)	1995.515	(0.0070)	1995.579	(0.0142)	***
Stay in the Netherlands	0.0751	(0.0038)	0.0804	(0.0043)	0.0510	(0.0085)	***
Composition of family	0.1048	(0.0036)	0.1071	(0.0041)	0.0940	(0.0083)	***
Socio econ. Background	2.7206	(0.0178)	2.6439	(0.0198)	3.0741	(0.0393)	***
Math scores	116.3412	(0.0947)	116.8976	(0.1056)	115.0032	(0.2372)	***
Literacy scores	54.8588	(0.1594)	54.7117	(0.1844)	54.1965	(0.3606)	
Education parents	1.9118	(0.0098)	1.8796	(0.0110)	2.0586	(0.0213)	***
School advice	2.1575	(0.0172)	2.1409	(0.0190)	2.2329	(0.0402)	**

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$

It could be concluded that roughly 85 percent of the schools in 2008 use the Citotest. All variables shown in the table have been tested on significance between the yes (470) and the no (80) group of schools using a t-test. However, only the variables that differ significantly will be discussed. The first variable in the table gives information about the sample to which a school belongs. Contrary to the additional sample, the reference group consists of relatively more schools that do not use the Citotest. The second variable gives information about the urbanization in the school's neighborhood. Schools that use the Citotest are more often located in regions that have more urbanization. The most striking difference is visible in the school score. Schools without Citotest score significantly lower than schools that use the

Citotest: 0.6625 vs. 1.6872. This seems to indicate that schools without Citotest have fewer pupils with a lower socio-economic background. The variable denomination is only significant different between the groups if the alpha is set at 0.1 and therefore, the denomination of the school is not that important in explaining the differences (between the yes and no group). The control variables are also shown in the table. On average, pupils in the no group are older (year of birth) and have been longer in the Netherlands than pupils in other groups. Within the no group, the pupils' family composition is more often complete, and the pupils' socio-economic background is higher in comparison to pupils in other groups. Regarding the pupils' test scores only the math scores differ significantly between the two groups; pupils' math scores are higher in schools that use the Citotest. Furthermore, the average education of parents at these schools is lower than schools that do not use the Citotest. In addition, it could be observed that the school advice is slightly higher at schools that do not use the Citotest.

Table 4 presents a more detailed overview of the characteristics of schools that do not use the Citotest.

Table 4   Subdivision of schools without Citotest with respect to region, urbanization, score of the school and denomination

Province	# Schools*	Urbanization	# Schools	School score	# Schools	Denomination	# Schools
Drenthe	11	No	38	100-109	98	Protestant	36
Flevoland	1	Little	29	110-119	18	Public	51
Friesland	8	Moderate	19	120-139	10	Roman Catholic	33
Gelderland	10	Strong	42	140-159	2	Remaining	13
Groningen	2	Very strong	5	> 159	5		
Limburg	5						
Noord-Brabant	11						
Noord-Holland	49						
Overijssel	9						
Utrecht	4						
Zeeland	9						
Zuid-Holland	14						

* The total of the (different) schools in the combined dataset is 133.

No specific group of schools regarding characteristics can be filtered from the table. Apparently, all kind of schools decided to do not make use of the Citotest which makes it unlikely to get a clear pattern from the data.

7   Results

This chapter presents the main estimation result and is divided into two part. First, the effect of the influence of parents on the school advice of teachers in primary education will be estimated. In the second part, estimates are performed on the fact whether the advice of teachers at schools that use the Citotest is a better predictor of a student's position in education three years later.

Part I

7.1 Estimation of the effect on school advice

First, a simple regression with the school advice in the final year of primary education as outcome (dependent) variable has been run. The independent variables, use of the Citotest (yes or no), and the education of the parents, have been estimated as well as the interaction between these two. The year of data collection (2008, 2011 or 2014) was the only control variable to start with. As mentioned above, the focus has been on the variable of our main interest: the interaction between use of the Citotest and education of parents.

Table 5   Estimation of the effect of use of the Citotest and education of parents on school advice

Outcome variable: school advice				
	(1)	(2)	(3)	(4)
1 Use of Citotest (yes or no)	0.4714***	0.4122***	0.1181	0.1053
	(0.0909)	(0.0853)	(0.0749)	(0.0742)
2 Education of parents	0.7641***	0.1635***	0.2750***	0.0902*
	(0.0430)	(0.0587)	(0.0315)	(0.0478)
3 Interaction between use of Citotest (1)	-0.1244**	-0.0924**	-0.0314	-0.0208
and education (2)	(0.0489)	(0.0456)	(0.0342)	(0.0215)
4 Math scores			0.0555**	0.0541***
			(0.0016)	(0.0008)
5 Literacy scores			0.0391**	0.0382***
			(0.0013)	(0.0041)
Control for year of data collection	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Observations	22,180	22,180	22,180	22,180

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$

In Table 5, the standard errors are robust which reduces the significance of the results. The first column of this table shows the results of the simple regression. All three variables differ significantly from 0. On average, schools that use the Citotest give a higher advice than school that do not. Moreover, parents' level of education has a positive effect on the outcome variable advice. Furthermore, in this case, the interaction term implies that parents' level of education is less important in schools that use the Citotest. In the second column, the estimation is extended with specific, individual controls. Although the variables remain significant, the coefficients are clearly lower, especially the parents' level of education. If, however, the test scores for math and literacy (to control for the ability of the pupils) in column 3 and 4 are added, the interaction term is no longer significant and the effect itself becomes smaller (-0.0208 in the estimation with all controls). Based on the data, it could therefore be concluded that parental education has no different effect when schools do not use the Citotest.

7.2 A more detailed estimation of the effect on school advice

It was investigated whether the results of the estimation change when another specification for the parents' level of education and the interaction term was used. The lowest category, in this case parents with the lowest education (max. primary education (LO)), was automatically omitted. Therefore, the three dummies represent the following levels of education:

- ➢ Dummy 1 - max. lower senior secondary vocational education (LBO),
- ➢ Dummy 2 - max. senior secondary vocational education (MBO) and
- ➢ Dummy 3 - higher professional education and university (HBO/WO).

Table 6   **Detailed estimation of the effect of the education of parents and interaction term on school advice**

Outcome variable: school advice				
	(1)	(2)	(3)	(4)
1 Use of Citotest (yes or no)	0.5946***	0.4862***	0.0926	0.0795
	(0.1132)	(0.1110)	(0.0801)	(0.0550)
2 Education of parents (dummy 1)	0.4084***	0.1910	0.0056	-0.0206
	(0.1203)	(0.1193)	(0.0850)	(0.0854)
3 Education of parents (dummy 2)	1.0873 ***	0.5312***	0.2545***	0.2347**
	(0.1112)	(0.1316)	(0.0788)	(0.0942)
4 Education of parents (dummy 3)	2.0412***	1.1970***	0.6458***	0.6553***
	(0.1132)	(0.1705)	(0.0806)	(0.1221)
5 Interaction (dummy 1)	-0.3653***	-0.2565**	-0.0208	0.1329
	(0.1297)	(0.1271)	(0.0916)	(0.0909)
6 Interaction (dummy 2)	-0.4245***	-0.2999***	-0.0629	-0.0172
	(0.1194)	(0.1171)	(0.0844)	(0.0838)
7 Interaction (dummy 3)	-0.4354***	-0.3329***	-0.0444	-0.0102
	(0.1216)	(0.1192)	(0.0860)	(0.0854)
8 Math scores			0.0550***	0.0537***
			(0.0008)	(0.0008)
9 Literacy scores			0.0388***	0.0382***
			(0.0005)	(0.0005)
Control for year of data collection	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Observations	22,180	22,180	22,180	22,180

Notes: *** p≤0.01, ** p≤0.05, * p≤0.1

The first two columns of table 6 show that almost all variables are significant; only the first dummy of the parents' level of education in the second column is insignificant. Moreover, the coefficients that belong to the dummies are higher when the level of education is higher. This seems to imply that it is quite likely that results of parents with the highest level of education will differ, depending on the use of the Citotest. Will the results stay the same if ability will be controlled? In order to answer this question, test scores on math and literature were added in table 6 as control variables. Consequently, the results of the first two columns are no longer valid since the coefficients of the interaction dummies are no longer significant. Therefore, the same conclusion as the one in table 4 could be drawn.

7.3 School advice divided into two categories

After examining the two independent variables above, the definition of the outcome variable (school advice) will be changed. The variable school advice until the advice of pre-vocational secondary education (VMBO) will be defined as 0; pre-vocational secondary education / senior general secondary education (VMBO/HAVO) until pre-university education (VWO) will be defined as 1. Therefore, the outcome variable will be a dummy variable in the following estimation.

Table 7   Estimation with variable school advice divided into two categories (0 or 1)

Outcome variable: school advice				
	(1)	(2)	(3)	(4)
1 Use of Citotest (yes or no)	0.1179***	0.1022***	0.0210	0.0178
	(0.0216)	(0.0212)	(0.0171)	(0.0480)
2 Education of parents	0.2124***	0.0642**	0.0803***	0.0439***
	(0.0089)	(0.0151)	(0.0201)	(0.0121)
3 Interaction between use of Citotest (1) and education (2)	-0.0353***	-0.0270***	-0.0100	-0.0074
	(0.0097)	(0.0095)	(0.0217)	(0.0077)
4 Math scores			0.0155***	0.0151***
			(0.0003)	(0.0003)
5 Literacy scores			0.0103***	0.0100***
			(0.0002)	(0.0002)
Control for year of data collection	yes	yes	yes	yes
Individual controls	no	yes	no	yes
Observations	22,180	22,180	22,180	22,180

Notes: *** p≤0.01, ** p≤0.05, * p≤0.1

As we have seen in the previous two subsections, the variables are again significant as long as the test scores are not used in the estimation. However, although other coefficients and significance levels in table 7 are similar to the tables shown earlier in this chapter, the coefficients are lower. Based on table 7, the results are as follows: after the math and literacy test scores were added, the coefficients are no longer significant and the coefficient of the interaction term becomes almost 0. Moreover, no different effect of parental education at schools that do not use the Citotest has been found.

Part II

In this part of this chapter the quality of the advice is will be examined. It is interesting if the advices from schools that use the Citotest are a better predictor of educational performance in the next years than the advices from schools that do not use the Citotest. In order to do this, the data of secondary education will be used to check whether the educational position three years later matches with the school advice of the teacher at the end of primary education.

7.4 Quality of the school advice evaluated three years later

Table 8 gives an overview in percentages of how many pupils (out of 2.290 total) get a certain advice ranked according to its quality. Moreover, the table shows the division between the two groups with (Cito=1) or without (Cito=0) Citotest. The value -1 means that the advice is above the level of education in secondary school. A value of 0 is given if the school advice equals the level of education, and 1 is given when the advice is below the level of education.

Table 8   **School advice compared to level of education three years later in secondary education (SE)**

Quality of the decision		Cito = 0	Cito = 1	Total
School advice > level SE	-1	11.4%	15.4%	14.7%
School advice = level SE	0	73.0%	71.1%	71.4%
School advice < level SE	1	15.6%	13.5%	13.9%

First of all, it could be observed that, after three years, more than 70 percent of the pupils are active on the level that corresponds to the school advice given in primary school. Moreover, the group without Citotest has a slightly higher percentage compared to the other group. In addition, schools that use the Citotest more often advise above the level of education in secondary schools compared to school without the test (15.4% vs. 11.4%). However, the opposite is the case when schools advise below the level of education; whereas 15.6 percent of the pupils from schools without the Citotest are active on a lower level of education than the school initially advised, only 13.5 percent of the other group are active on a lower level.

After this new outcome variable has been looked at in detail, the remainder of this chapter will focus on the results of the estimation. Table 9 below shows the estimation of the quality of the decision (school advice) by using a multinomial logistic regression model. The first step is an estimation with the dummy variable (use of Citotest) and the control variables math, and literacy test scores. After that, the variable school advice will be added to the estimation. The third step will then estimate the interaction effect between the use of the Citotest and the school advice.

Table 9   **Estimation of the quality of the school advice compared to the level of education three years later in secondary education (SE)**

Outcome variable: quality of decision	Advice > level SE (-1)	Advice < level SE (1)
Base outcome: school advice = level SE (0)	(1)	(2)
1.1 Use of Citotest (yes or no)	0.2849*	-0.0529
	(0.1692)	(0.1542)
2.1 Use of Citotest (yes or no)	0.2887*	0.0062
	(0.1698)	(0.1593)
2.2 School advice	0.2252***	-0.7102***
	(0.0600)	(0.0730)
3.1 Use Citotest (yes or no)	0.5316*	-0.0288
	(0.3167)	(0.2462)
3.2 School advice	0.3041***	-0.7343***
	(0.1036)	(0.1205)
3.3 Interaction between use of Citotest (1)	-0.0953	0.0310
and school advice (2)	(0.1022)	(0.1231)
Individual controls	yes	yes
Math and literacy scores	yes	yes
Observations	2,290	2,290

Notes: *** p≤0.01, ** p≤0.05, * p≤0.1

The results of Table 9 above will be discussed relative to the base outcome. Recall that the base outcome means that the school advice in final year of primary education is equal to the level of education three years later in secondary education.

Advice above level of secondary education (-1) relative to the base outcome (0)

Use of Citotest - This estimated coefficient is positive and compares schools with and without Citotest relative to the base outcome. In other words, schools with Citotest are more likely to give an advice above the level of education in secondary education. However, these coefficients are only significantly different from 0 if the alpha level is set at 0.1.

School advice – Both the estimated coefficients are positive and significantly different from zero, even if the alpha level is set at 0.01. The estimated coefficients compare schools with and without Citotest relative to the base outcome; a higher advice will probably result in pupils getting an advice below the level of education three years later.

Interaction term – Estimated coefficient is not significantly different from zero.

Advice below level of secondary education (1) relative to the base outcome (0)

Use of Citotest – Contrary to the coefficient of 'use of Citotest' above, this coefficient in this model has not been found to be statistically different from 0 given that the other variables in the model are held constant.

School advice – This estimated coefficient is negative and compares schools with and without Citotest relative to the base outcome. The higher the advice the more likely it is that the probability decreases that a pupil get an advice above the level of education three years later. The regression coefficient for school advice has been found to be statistically different from zero for an advice below the level of education relative to the base outcome (at an alpha level of 0.01).

Interaction term – Estimated coefficient is not significantly different from zero.

In addition to the data in table 9, a new variant according to the same steps as above was estimated. Since only two categories are now examined, the normal regression method was used. The first column compares the value -1 relative to the other possible outcomes, 0 and 1. Therefore, if the variable quality of decision equals -1, the outcome variable is defined as 1 or as 0 (dummy variable). In contrast, the second column estimates the possibility that the outcome variable equals 1 relative to the other possible outcomes (-1 and 0). A dummy

variable defined as 1 if the value equals -1 and as 0 for the other values was again created. The results are shown in table 10 below.

Table 10   Quality of the decision estimated in two categories

Outcome variable: quality of decision	Advice ≥ level SE (-1)	Advice ≤ level SE (1)
	(1)	(2)
1.1 Use of Citotest (yes or no)	-0.0323*	-0.0129
	(0.0187)	(0.0183)
2.1 Use of Citotest (yes or no)	-0.0308*	-0.0096
	(0.0186)	(0.0179)
2.2 School advice	-0.0367***	-0.0722***
	(0.0071)	(0.0068)
3.1 Use of Citotest (yes or no)	-0.0500	-0.0306
	(0.0328)	(0.0315)
3.2 School advice	-0.0430***	-0.0792***
	(0.0114)	(0.0109)
3.3 Interaction between use of Citotest (1)	0.0081	0.0089
and school advice (2)	(0.0114)	(0.0109)
Individual controls	yes	yes
Math and literacy scores	yes	yes
Observations	2,290	2,290

Notes: *** p≤0.01, ** p≤0.05, * p≤0.1

<u>Advice above level of secondary education (-1) relative to the other values (0 and 1)</u>

Use of Citotest - The estimated coefficient (small and negative) does not significantly differ from 0 in the full model. The other coefficients differ only significantly from 0 if the alpha level is set at 0.1. If a school use the Citotest, then the probability of an advice above the level of secondary education is lower.

School advice – Both of the estimated coefficients are positive and differ significantly from 0, even if the alpha level is set at 0.01. The estimated coefficients mean that the higher the advice, the lower the probability that pupils getting an advice above the level of education three years later.

Interaction term – The estimated coefficient does not differ significantly from 0.

Advice below level of secondary education (1) relative to the other values (-1 and 0)

Use of Citotest – None of the estimated coefficients for this variable differs significantly from zero. The coefficient can be interpreted as follows: if a school use the Citotest, then the probability of an advice below the level of secondary education is lower.

School advice – Both of the estimated coefficients are positive and differ significantly from 0, even if the alpha level is set at 0.01. These estimated coefficients are negative and mean (in contrast to the ones above) that the higher the advice, the lower the probability that pupils getting an advice below the level of education three years later.

Interaction term – The estimated coefficient does not differ significantly from 0.

8   Conclusion

This paper has investigated whether parents exert more influence on the school advice of teachers in primary education when schools do not participate in a standardized test. The possible parental pressure on the teacher has been measured by the variable 'education of parents'. Except for part II, the results in section 7 are based on regressions with the school advice as outcome variable. The parameter that was focused on in the first part was the variable 'Use of Citotest (yes or no)' times the parents' education. This parameter measured whether parental education has a different effect on the school advice at schools that do not use the Citotest compared to schools that use the Citotest. Significant results have been found as long as the ability of pupils (by test scores on math and literacy) has been controlled for. As soon as these control variables were added in the estimations, the coefficients for the interaction term were no longer statistically different from 0. Other variable specifications for instance, education, interaction term, and the outcome variable as dummies, provide the same results. Therefore, no clear effect of parents' education on the school advice has been found. The second part of the analysis has compared the school advice with the level of education three years later. This comparison is interesting because it is informative about the predictive value of the school advice in schools that use or do not use the Citotest. The focus was on the long-term effects, by evaluated the quality of the school advice after three years. Based on these evaluations, it could be concluded that schools without Citotest do not give more advices above pupils' level in secondary education compared to schools with the Citotest.

Limitations and Recommendations

This study has some limitations which have to be pointed out; due to the nature of the study, it is not possible to generalize the results; more tests are needed to confirm the outcome of the estimations. Moreover, due to the data, 75 percent of the data from three years later had been lost. Therefore, the estimation of the multinomial logistic regression should contain more data about the level of education in the third year of secondary education in order to check the quality of the school advice as given in primary school; further research, preferably including all pupils in the Netherlands, would therefore be recommendable. In addition, this study evaluated the influence of parents' education on the school advice; it would be interesting to extend this model by estimating the effect of parents' income on the school advices.

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