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The Impact of Community Schools on Student Dropout in Pre-vocational Education

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Dropout prevention is highly ranked on the political agenda in many countries. It remains unclear, however, how dropout can be effectively reduced, as many different factors are determining student dropout. Community schools recognize this and modernize education such that it better accommodates students' personal needs. As a result these schools cooperate more with external organizations, stimulate parental involvement in the educational process and organize more extracurricular activities. Despite the increasing number of community schools, there is no empirical evidence that these schools reduce student dropout. This study examines the impact of Dutch community schools on student dropout. It focuses in particular on pre-vocational education, because dropout is particularly high in this educational track. Moreover, the focus is on the city of Rotterdam because this city is a forerunner in the Netherlands in establishing community schools. Unique registration data are used on all Rotterdam students who were enrolled in pre-vocational education between 2004 and 2008. The impact of community schools is identified by exploiting the fact that community schools were created not before the beginning of the school year 2006/2007. This enables us to estimate the community school impact by means of a difference-in-differences estimation model combined with an iterative matching approach. The estimation results suggest that community schools are as effective as regular schools with respect to dropout reduction. Community school subsidies do not seem to contribute to reducing dropout.

JEL-code: I21, C21, C23

Keywords: Dropout; community schools; pre-vocational education; difference-in-differences; matching

1 Introduction

The importance of dropout prevention and reduction is continuously highlighted: in Europe, by the Lisbon Goals (2000) of the European Council that stipulate that the percentage of dropout students should halve between 2002 and 2010. More recently, this objective has been reformulated by the Europe 2020 flagship initiative 'Youth on the Move' which has the objective of lowering the number of students leaving school without a higher secondary degree to eight percent (European Commission, 2010). In the meanwhile, the

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United States have invested 50 million dollar into the federal discretionary grant program High School Graduation Initiative (U.S. Department of Education, 2009). The importance assigned to counteracting dropout is, amongst others, because of the costs involved at the personal, societal and the fiscal level (De Witte and Rogge, 2011). At the personal level, dropouts are more likely to become unemployed (Gesthuizen, 2004; Solga, 2002; Rumberger and Lamb, 2003; Strom and Boster, 2007; Van der Steeg and Webbink, 2006), have lower lifetime earnings (McNeal, 1995), and a lower health status (Groot and Maassen van den Brink, 2007; McNeal, 1995). At the societal level, the costs of dropout entail a higher risk for criminal involvement (Lochner and Moretti, 2004; Strom and Boster, 2007; Groot and Maassen van den Brink, 2010), lower social cohesion (e.g., Milligan et al., 2004), lower economic growth (Hanushek and Wößmann, 2007), and lower levels of political and social participation (McNeal, 1995). Finally, at the fiscal level higher dropout rates entail lower tax revenues and higher expenditures for social benefits, such as unemployment and health benefits (see Psacharopoulos, 2007, who provides an overview of the fiscal costs of dropout). Despite the recognition that reducing dropout is of importance and despite the efforts made to reduce and to prevent dropout, many students still leave secondary and vocational education without a diploma.

Although various measures have been taken to reduce and prevent dropout, it is unclear how dropout can be effectively reduced or prevented, mainly because it is not the result of one specific problem, but an accumulation of various problems that students experience at home, in their neighborhood or at school (Rumberger, 2001; Thyssen et al., 2010). Community schools recognize that a variety of factors are underlying educational problems and may eventually lead to student dropout (Dyson and Raffo, 2007). Therefore, these schools attempt to modernize education such that it better accommodates students' personal needs and provide a more attractive learning environment. The community school concept originated in the US, but similar concepts have emerged in many other countries (e.g., 'extended' schools in the UK, 'broad' schools in the Netherlands, and 'all-day' schools in Germany). The educational program of community schools tends to be more holistic than the program offered by more traditional schools, in the sense that the students' family and social environment are closely involved.

Community schools can be characterized as a combination of three activities: cooperation with external organizations, parental involvement, and extracurricular activities. It has been shown that higher student attendance and lower student dropout is observed if schools cooperate more intensely with external institutions, such as youth care and health services (Epstein & Sheldon, 2002). More parental involvement in the educational process is positively correlated with the probability of leaving secondary education with a diploma (Eagle, 1989; Epstein, 1992). Finally, the empirical literature suggests that extracurricular activities reduce student dropout and the benefits of extracurricular involvement tend to be highest for students in deprived neighborhoods (Mahoney and Cairns, 1997; Davalos, Chavez, and Guardiola, 1999). An extensive review by Heers et al. (2011) on the effectiveness of community schools shows that these three educational interventions separately may contribute to counteract student dropout. However, the review, at the same time, concludes that community school interventions are usually not well defined and, moreover, it concludes that the empirical evidence on the effectiveness of the different community school activities tends to be merely descriptive. As a result there is a lack of empirical evidence that community schools improve the academic achievement of students or reduce or prevent dropout in secondary education, even though a rapid increase in the number of community schools is observed. For example, in the US, there are approximately 5,000 community schools (Coalition for Community Schools, 2012) and, in the Netherlands, there

are approximately 1,600 (of the 7,480 in total) community schools in primary and 420 (of 646) in secondary education (Oberon, 2012).

The objective of this study is to examine if community schools in the Netherlands have effectively reduced dropout in pre-vocational education. The focus is on the pre-vocational education track, because dropout is particularly high in this educational track. Moreover, this study focuses on student dropout for the city of Rotterdam, because this city is a forerunner in the Netherlands with many community schools.

For this purpose, unique registration data of the Ministry of Education are used containing all Rotterdam students who were enrolled in pre-vocational education between 2004 and 2008 (i.e. four school years). To identify the impact of community schools this study exploits that community schools, as defined by the community school development subsidies, were not created before the beginning of school year 2006/2007. This setting enables us to estimate the community school impact on student dropout by means of a difference-in-differences estimation model. Moreover, as the student population of community schools differs from the student population of comparison schools we, moreover, apply an iterative matching procedure developed by De Witte, Van Klaveren and Smets (2011) and De Witte and Van Klaveren (2012a) to ensure that only comparable students are compared in the difference-in-differences analysis. This is required as the descriptive statistics indicate that the difference in student population is not caused by students who selectively attend community schools, but is caused by the fact that community schools offer different (and higher-level) learning tracks within pre-vocational education.

Finally, we emphasize that the community school intervention that is evaluated in this study is not well defined as there is no uniform definition of community schools. Dutch community schools receive a community school development subsidy by the municipality of Rotterdam. As outlined above, Dutch community schools can be characterized as a combination of three activities, namely cooperation with external organizations, parental involvement, and extracurricular activities. These activities are financed by the received subsidy. If community schools offer a more effective education package than traditional schools, in the sense that it reduces dropout, the estimation results should indicate this.

The paper is structured as follows. Section 2 presents Dutch secondary education, the data and the descriptive statistics. Section 3 deals with selection into community schools. Section 4 describes the identification strategy and the estimation model. Section 5 describes the results. Section 6 concludes.

2 Dutch secondary education, data, and descriptives

2.1 Dutch secondary education

In the Netherlands, children are assigned to different secondary education levels at the age of twelve. Elementary schools give a secondary school level advice, which is based on (1) test scores achieved by children on a standardized national test in the final year of elementary school, and (2) based on the schools' personal judgment on the ability of the child. Children are assigned to three different educational tracks after elementary school: pre-vocational education, senior general secondary education and pre-university education.[1] Pre-vocational education takes four years and prepares children for vocational education, senior general secondary education takes five years and prepares children for higher professional education and pre-university

[1] These education levels are in the Netherlands referred to as, respectively, *Voorbereidend wetenschappelijk onderwijs* (VMBO), *Hoger algemeen voortgezet onderwijs* (HAVO) and *Voorbereidend wetenschappelijk onderwijs* (VWO).

education takes six years and prepares children for academic education at universities.

This study focuses on pre-vocational education, the lowest secondary educational track with the highest dropout rates. This is the biggest track, attended by more students than all the other tracks (Van der Veen, 2011). Within this education level, four learning tracks are distinguished that each take four years: a basic track, a middle-management track, a mixed track, and a theoretical track. The basic track is the least theoretical and lowest level track. The middle-management track is meant for students who learn theory best by applying it. The mixed educational track focuses on students who have least difficulty with studying and who want to prepare themselves for a particular profession. This track combines theoretical and practical education. The theoretical educational track is relatively the most difficult track. To be accepted in this education track students must have achieved a certain test score on the standardized national test.[2] For the other educational tracks no minimal test score is required. Finally, it is also possible that a student follows a combination of the above mentioned four tracks.

Finally, it is worth mentioning that a particularity of the Dutch education system is the freedom of school choice. This element of the Dutch education system is comparable to US-American charter schools that can be attended by choice, this means that students do not have to live in a particular catchment area in order to be eligible for attending a school in this area (Imberman, 2011). Thus, students receive a secondary school level advice from their elementary school, but usually the same educational track is offered by several schools such that students together with their parents can freely choose a particular secondary school. In the empirical analysis it is important to take into account this free school choice, because as a result community schools may attract a selective student population. If community schools are considered as 'better' schools they may attract 'better' students, while relatively better students may avoid these community schools if they are considered as schools for disadvantaged children. In Rotterdam, this is stated not to be the target group, as community schools are intended to develop the talents of all students.

2.2 Community school subsidy and used data

Community schools receive a *community school development* subsidy by the municipality of Rotterdam. To receive a subsidy, schools have to apply by submitting an activity plan and a description of their vision. The subsidies do not specifically focus at dropout reduction. The amount a school receives ranges from 40 to 80 Euro per student and includes a base amount of up to 60,000 Euro. 75 percent of the subsidy is spent on community school activities and 50 to 70 percent of the community school students participate in activities that are financed via this subsidy. Even though regular schools may have community school facilities and activities as well (e.g. offer extracurricular activities), these schools generally do not offer the same amount of these activities or facilities to their students.

Because there was no accurate estimate of the number of students who dropped out of secondary education, the Ministry of Education developed a student tracking system. In this system, Dutch students receive a personal identification number which allows the central government to track students along their educational careers (De Witte and Van Klaveren, 2012a). This study uses information from this tracking system, which is called the Bron data [Basis Register Onderwijsnummer], to examine how many students are dropping out of secondary education. These registration data contain information for all students in sec-

[2] To be precise: children must have a test score of at least 528 to be admitted to the theoretical track of the pre-vocational education track.

ondary education for the school years 2004/2005 to 2007/2008 on student dropout, student characteristics (e.g., ethnicity, gender, family structure), and contain information on the neighborhood (by means of the zip code).

Table 1 illustrates when community school development subsidies were given during the observed school years. The table indicates a 1 if community school subsidies were given and a 0 if no community school subsidies were given. The table shows that subsidies were only given in the school years 2006/2007 and 2007/2008. Schools are labeled as community schools if they received a community school subsidy in or after the school year 2006/2007. To distinguish both school types, subsidized schools are also referred to as community schools before the provision of the subsidy. The particular difference-in-differences setting displayed by Table 1 is exploited in this study.

Table 1: **Community school subsidies per school year**

	2004/2005	2005/2006	2006/2007	2007/2008
	No subsidies		Subsidies	
Regular School	0	0	0	0
Community School	0	0	1	1

Table 2 shows the data structure for seven student cohorts that we observe. Each student cohort represents the educational careers over the observation period of students who were enrolled in the same grade during a particular school year. This data structure is of importance because in Section 4 we match regular school students to community school students conditionally on background characteristics and the cohort identifier in Table 2.

Students in the fourth cohort start with the pre-vocational education track in school year 2004/2005 and would normally graduate after four years. Students in cohorts 5, 6 and 7 begin their pre-vocational education later than school year 2004/2005 and, as a result, we do not observe whether these students graduate. We do, however, observe whether these students drop out during the observation period. Under normal circumstances, students in the first three cohorts graduate before school year 2007/2008, because they began their pre-vocational education track in school year 2003/2004 or earlier. For these students we created the 'artificial' grades 5, 6, and 7 (printed in italics) such that we can identify the dropout status for all students in school year 2007/2008.

The group of students who are observed during all four school years are referred to as the *balanced panel*. The number of students in this balanced panel decreases over the observed school years. This happens because students switched schools (either to another school outside Rotterdam or to another education track) or repeated a grade. The number of students in cohorts 5, 6, and 7 that are indicated by *observations inflowing panel* includes students who start with pre-vocational education in the school year 2005/2006 or later. The table shows that 2,908 students begin with a pre-vocational education track in school year 2005/2006 and that in the following years the inflowing panel grows somewhat as more students enter pre-vocational education.

Table 2: **Cohorts, grades and frequencies**

	Grades				
Cohort	2004/2005	2005/2006	2006/2007	2007/2008	Sub-group
1	4	*5*	*6*	*7*	Balanced panel
2	3	4	*5*	*6*	
3	2	3	4	*5*	
4	1	2	3	4	
5	-	1	2	3	Inflowing panel
6	-	-	1	2	
7	-	-	-	1	
Students in balanced panel	12,857	12,905	12,604	12,166	
Students in inflowing panel		2,908	5,334	7,193	
Students per year	12,835	15,813	17,938	19,359	
Total observations			65,967		

2.3 Student characteristics

In Table 3 we compare the student population of community schools (CS) with the student population of regular schools (RS) for the different school years. The table shows the means and standard deviations (SD) of several student characteristics that are related to dropout, and shows the proportion of students who dropped out of pre-vocational education. We note that the registration data used in this study contain information on all students, and therefore observed differences between the two considered student populations are by definition representative. Below we highlight the most important differences between the student populations of community schools and regular schools.

The association between students' socio-economic background and academic achievement is well documented (OECD, 2011; Baker, Goesling and Letendre, 2002; Crane, 1996; Sirin, 2005). In particular, students with a lower socio-economic status are more likely to drop out of education (e.g. Sirin, 2005). The student characteristics in Table 3 that are related to socio-economic status are ethnic minority status, living in a single parent family, living in a disadvantageous area and residential value (i.e. the average housing value in the neighborhood where students live)[3]. The table clearly shows that community schools have a disadvantageous student population in the sense that students are more often non-Dutch, live in single parent families, live in disadvantageous areas[4] and live in houses with a lower residential value. In contrast to what we expect, the final table row shows that community school dropout is lower than regular school dropout, even though community schools have a disadvantageous student population. It is, however, not possible to link these observations to the performance of community or regular schools. First of all, because community schools started to exist from school year 2006/2007 and, second, because the student proportions in different pre-vocational tracks differ between both school types. Later in this section we come back to the last point.

When we focus on changes in the student population that occur over time, the table shows that both school types have a student population of approximately the same age, but community school students tend to be somewhat younger as of the school year 2005/2006. Moreover, the table indicates that the student population of regular schools changes with respect to ethnic minority, living in a single parent family and

[3]The table shows the value divided by a thousand.

[4]Disadvantageous areas are areas that are labeled as deprived areas by the government and to improve the situation these areas receive additional subsidies.

living in disadvantageous area, between the school years 2004/2005 and 2005/2006 and that the population remains the same after school year 2005/2006. The change in population characteristics is caused by the students who were not in pre-vocational education in school year 2004/2005 and started their pre-vocational education in a later school year (i.e. students of the inflowing panel). For this study, it is important to recognize that the observation that the community school student population remains rather constant over time, and that the regular school student population changes over time may point to a selection effect, where certain types of students are more likely to select themselves in a regular or community school.

Table 3: **Student characteristics by school type and school year**

	2004/2005		2005/2006		2006/2007		2007/2008	
	CS	RS	CS	RS	CS	RS	CS	RS
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)
Male	.51	.52*	.51	.53**	.51	.53**	.51	.53**
	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)
Ethnic minority	.63	.47***	.65	.39***	.66	.39***	.66	.39***
	(.48)	(.50)	(.48)	(.49)	(.48)	(.49)	(.47)	(.49)
Single parent	.11	.09***	.12	.09***	.12	.09***	.12	.09***
	(.31)	(.29)	(.32)	(.29)	(.32)	(.29)	(.32)	(.29)
Disadvantageous area	.49	.30***	.49	.22***	.49	.21***	.49	.20***
	(.50)	(.46)	(.50)	(.41)	(.50)	(.41)	(.50)	(.40)
Residential value	138.74	149.72***	139.59	152.57***	140.46	153.99***	140.50	154.99***
	(44.93)	(47.73)	(46.02)	(49.04)	(47.37	(49.91)	(47.71)	(50.22)
Age	14.28	14.26	14.49	14.57***	14.64	14.73***	14.79	14.87***
	(1.20)	(1.23)	(1.23)	(1.22)	(1.25)	(1.17)	(1.23)	(1.15)
Dropout	.02	.04***	.04	.07***	.05	.07***	.06	.08***
	(.14)	(.20)	(.25)	(.20)	(.21)	(.26)	(.23)	(.27)
Nr of obs per type/year	7,931	4,926	11,013	4,800	12,570	5,368	13,545	5,814
Nr of obs per year	12,857		15,813		17,938		19,359	
Total nr of obs	65,967							

Note 1: */**/*** means that regular schools differ significantly from community schools at the 10/5/1 percent level.

Note 2: CS refers to community schools and RS refers to regular schools.

In Section 2.3 we have explained that students in pre-vocational education are assigned to different tracks within the pre-vocational education track, mainly based on the test score children have obtained in primary education on a standardized national test. Table 3 shows how students are distributed over the different educational tracks within pre-vocational education, separately for community schools and regular schools. The first four tracks presented in the first column are the standard tracks offered by schools, and the last track, labeled as 'combined', represents different combinations of the four standard tracks.

The table shows that community school and regular school students are very differently distributed over the education tracks. Regular school students are mostly assigned to a basic vocational, middle management or a theoretical track and are about equally distributed over these tracks. Even though community school students are often assigned to a basic vocational or a middle management track, almost half of the community school students are assigned to the theoretical track. With 0.46, the proportion is considerably higher than the proportion of students that is assigned to this track in regular schools (about 0.29) in 2008. It is crucial to take into account the observed differences in Table 4 when evaluating the impact of community schools

on dropout. On the one hand, theoretical track students in community schools are less likely to drop out of education as these students have achieved higher test scores on the national test in primary education, but on the other hand, they may be more likely to drop out of education because the theoretical track is a more difficult track. Because students can always switch to lower (or higher) educational tracks within pre-vocational education we consider it to be more likely that the higher proportion of theoretical track students is associated with less dropout, which appears to be consistent with the dropout proportions presented in Table 4.

Table 4: **Educational tracks by school type and school year**

Track	2004/2005		2005/2006		2006/2007		2007/2008	
	CS	RS	CS	RS	CS	RS	CS	RS
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)
Basic vocational	.10	.21	.12	.24	.13	.26	.14	.27
	(.30)	(.40)	(.33)	(.43)	(.33)	(.44)	(.35)	(.44)
Middle management	.18	.23	.19	.25	.20	.28	.22	.28
	(.384)	(.42)	(.39)	(.44)	(.40)	(.45)	(.41)	(.45)
Mixed	.07	.06	.08	.05	.07	.04	.060	.04
	(.26)	(.24)	(.27)	(.21)	(.25)	(.20)	(.24)	(.20)
Theoretical	.46	.26	.45	.27	.46	.27	.46	.29
	(.50)	(.44)	(.50)	(.44)	(.50)	(.45)	(.50)	(.45)
Combined	.18	.24	.16	.20	.14	.15	.13	.12
	(.39)	(.43)	(.37)	(.40)	(.35)	(.36)	(.33)	(.33)
Nr of observations per type/year	7,931	4,926	11,013	4,800	12,570	5,368	13,545	5,814
Nr of obs per year	12,857		15,813		17,938		19,359	
Nr of obs	65,967							

Note 1: Standard deviations are printed in parentheses.

Note 2: CS refers to community schools and RS refers to regular schools.

In conclusion, the descriptive statistics of Tables 3 and 4 indicate that community school students are more likely to drop out because of disadvantageous background characteristics, but at the same time community school students more often follow a theoretical track, which implies a lower dropout risk. The lower dropout rates for community schools in Table 3 may therefore indicate that community schools are doing a good job (because they keep students with disadvantageous characteristics in education) or that community schools have better performing students who are by definition less likely to drop out. In order to estimate the impact of community schools on student dropout we should therefore control for the latter.

3 Selection into community schools

In Section 2 we referred to the freedom of school choice in Dutch secondary education and explained that community schools may attract a selective student group. This section examines whether there is selective participation in community school education as it may bias the measured impact of community schools on dropout. Community schools may, for example, attract better students (over time) because schools improve their education program using the community school subsidies. We would measure the impact of being a community school, as well as the impact of having a better student population, if we would compare dropout

between regular and community schools.

Moreover, it is possible that better schools attract better students and, at the same time, are more successful in applying for community school subsidies. By comparing dropout between community schools and regular schools we measure the impact of differences in school quality and the impact of community schools.

To examine if there is selective participation of students in community school education, we examine the background characteristics of the students who enter community and regular schools in each school year (i.e. first graders). If there is selection into community school education we should observe that student background characteristics change over the school years and, for example, that better students select themselves into community schools.

Table 5 shows the means and standard deviations of the background characteristics for first graders per school year separately for community schools and regular schools. The table only presents background characteristics that can be associated with the socio-economic status of students, because these characteristics are informative for whether there is selective participation in community school education. The table shows that the characteristics of community school first graders are very similar to those presented in Table 3 and do not vary over the school years. Schools which became community schools in either 2006/2007 or 2007/2008 thus attracted a similar student population during the entire observation period. We conclude that there is no selective participation in community school education based on observed characteristics of first grade students because this requires that characteristics of the student population change over the years.

The results for regular schools are similar to those of Table 3 and indicate that the characteristics of the average student become somewhat more disadvantageous between the school years 2004/2005 and 2005/2006 and remain the same after the school year 2005/2006. An exception is the proportion of students that come from single parent families. This proportion tends to increase slightly over the school years.

Table 5: **First graders' characteristics by school type and school year**

	2004/2005		2005/2006		2006/2007		2007/2008	
	CS	RS	CS	RS	CS	RS	CS	RS
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)
Ethnic minority	.63	.46***	.68	.38***	.67	.39***	.68	.37***
	(.48)	(.50)	(.47)	(.49)	(.47)	(.49)	(.47)	(.48)
Single parent	.11	.09*	.12	.10	.14	.12	.14	.13
	(.31)	(.28)	(.33)	(.30)	(.34)	(.32)	(.35)	(.33)
Disadvantageous area	.51	.26***	.51	.17***	.49	.13***	.51	.12***
	(.50)	(.44)	(.50)	(.38)	(.50)	(.34)	(.50)	(.33)
Residential value	139.66	149.69***	139.21	156.12***	142.39	154.50***	140.28	161.22***
	(48.51)	(44.08)	(47.23)	(55.48)	(50.70)	(46.84)	(49.81)	(54.49)
Nr of obs per type/year	1,727	991	2,113	760	1,658	504	1,138	388
Nr of obs per year	2,718		2,873		2,162		1,526	
Total nr of obs	9,279							

Note 1: */**/*** means that regular schools differ significantly from community school at the 10/5/1 percent level.
Note 2: CS refers to community schools and RS refers to regular schools.

Table 6 shows how first graders are distributed over the different education tracks within pre-vocational education in each school year. Compared to Table 4, we again observe that community school students

more often follow a theoretical learning track than regular school students. As discussed in Section 2.3 it is likely that in a dropout comparison between community schools and regular schools this will translate into a relatively lower dropout rate for community schools. However, the table does not support the hypothesis that better students select themselves in community schools over time, because the proportion of students who follow a theoretical learning track decreases over time. We can, however, not exclude the above-mentioned possibility that community schools were simply better schools in the past, and have therefore attracted more students that follow a theoretical learning track and were also more successful in applying for community school subsidies.

An interesting difference with respect to the proportions in Table 4 is that first graders more often choose combined learning tracks and that this goes at the expense of the proportion of students who follow a basic vocational or middle management learning track.

Table 6: **Educational tracks attended by first graders by school type and school year**

Track	2004/2005		2005/2006		2006/2007		2007/2008	
	CS	RS	CS	RS	CS	RS	CS	RS
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)
Basic vocational	.02	.06	.04	.09	.02	.06	.03	.14
	(.14)	(.24)	(.21)	(.29)	(.13)	(.23)	(.17)	(.35)
Middle management	.09	.08	.08	.09	.08	.11	.04	.06
	(.29)	(.27)	(.27)	(.28)	(.27)	(.31)	(.18)	(.25)
Mixed	.07	.01	.06	.01	0	0	0	.01
	(.25)	(.10)	(.23)	(.11)	(-)	(-)	(-)	(.11)
Theoretical	.39	.25	.41	.22	.42	.18	.31	.08
	(.49)	(.43)	(.49)	(.42)	(.49)	(.39)	(.46)	(.27)
Combined	.43	.60	.41	.58	.48	.65	.62	.70
	(.50)	(.49)	(.49)	(.49)	(.50)	(.48)	(.48)	(.46)
Nr of observations per type/year	1,727	991	2,113	760	1,658	504	1,138	388
Nr of obs per year	2,718		2,873		2,162		1,526	
Total nr of obs	9,279							

Note 1: Standard deviations are printed in parentheses.

Note 2: CS refers to community schools and RS refers to regular schools.

4 Identification strategy and estimation model

In this section, we outline the identification strategy to estimate the impact of community school education on students' dropout probabilities. The intuition of the identification strategy is presented in Table 7. Outcome measure $y_{it,C}$ indicates if student i dropped out of pre-vocational education in school year t[5], and subscript C refers to the school type, where C =1 refers to students who go to a school that becomes a community school in $t = 2007$ or 2008, and $C = 0$ refers to students who go to a regular school. The community school cells for $t = 2007$ and $t = 2008$ are colored grey to indicate that community schools receive subsidies only in these years.

We first outline the identification strategy by considering only the school years 2006 and 2007. Later we

[5]For convenience we refer to school year 2004/2005 as 2005, and refer to later school years in a similar fashion.

Table 7: **Intuition of the identification strategy**

	School year:			
	$t = 2005$	$t = 2006$	$t = 2007$	$t = 2008$
Regular School ($C = 0$)	$y_{it,0}$	$y_{it,0}$	$y_{it,0}$	$y_{it,0}$
Community School ($C = 1$)	$y_{it,1}$	$y_{it,1}$	$y_{it,1}$	$y_{it,1}$

straightforwardly extend the estimation model such that all school years are considered.[6] We conveniently choose the school years 2006 and 2007 because in 2006 no subsidies were given and in 2007 community school subsidies were given. It follows that the community school impact on student dropout can be estimated by means of a difference-in-differences (DiD) strategy. In this DiD setting dropout differences are compared between 2006 and 2007 (i.e. the first difference) and between students from community schools and regular schools (i.e. the second differences). The non-parametric estimate for the community school impact for student i can be written as:

$$[y_{i2007,1} - y_{i2006,1}|C_i = 1] - [y_{i2007,0} - y_{i2006,0}|C_i = 0].$$

The left-hand side represents the difference in dropout between 2007 and 2006 for students who attended a community school. The right-hand side represents the reference group and presents the dropout difference between 2007 and 2006 for students who attended a regular school. As discussed in Section 3, we should take into account that community school students have different background characteristics than regular school students and therefore the following parametric regression model is estimated:

$$y_{it} = \alpha_0 + \alpha_1 C_i + \alpha_2 T_{it} + \alpha_3 C_i \cdot T_{it} + X_{it}^{'}\beta + \epsilon_i, \qquad t = 2006, 2007,\ i = 1, ..., N. \tag{1}$$

Community school indicator C_i equals 1 if student i attended a community school and zero otherwise. T is a school year indicator which is 1 for school year 2007 and 0 for school year 2006. X_i are student and school background characteristics that may influence y_{it}, besides the community school and school year indicators and ϵ_i is a normally distributed zero-mean constant variance error term.

The first-difference estimation parameters are α_1 and α_2. These parameters measure, respectively, the dropout difference between community schools and regular schools for school year 2006, and the dropout differences between 2006 and 2007. The impact of community schools on student dropout is measured by α_3, the parameter of interest. Essentially, this parameter measures whether student dropout differences between community schools and regular schools for school year 2006 are different from those for school year 2007, while taking into account student population differences and constant dropout differences between 2006 and 2007.

To consider also the other school years, we reformulate the estimation model in 1 as follows:

$$y_{it} = \alpha_0 + \alpha_1 C_i + \sum_{t=2006}^{2008} \alpha_2 T_{it} + \sum_{t=2006}^{2008} \alpha_3 C_i \cdot T_{it} + X_{it}^{'}\beta + \epsilon_i, \qquad t = 2005, ..., 2008,\ i = 1, ..., N. \tag{2}$$

The model now includes school year indicators for the school years 2006 to 2008, such that the reference

[6] We follow De Witte and Van Klaveren (2012b) in deriving the (difference-in-differences) estimation model.

school year is 2005. The model includes three interaction effects: one interaction effect for each year, except for the reference year. Similar to equation 1, $\alpha_1$measures the student dropout differences between community schools and regular schools for school year 2005 (the reference year). The interaction effect associated with school year 2006 (i.e. $\alpha_{3,2006}$) essentially measures if the dropout difference between community schools and regular for school year 2005 are different than those for school year 2006, while controlling for student population differences and constant dropout differences over time. Because schools did not receive any community school subsidies in 2006 (see Table 7) estimation parameter $\alpha_{3,2006}$ should not be statistically and significantly different from α_1. Community school subsidies were, however, given to schools in 2007 and 2008 and if community schools effectively reduced student dropout in these years we should find that $\alpha_{3,2007}$ and $\alpha_{3,2008}$ are both greater than α_1 and $\alpha_{3,2006}$.

Until now we left undiscussed that the model assumes that individual error terms, ϵ_i, are independently distributed and that this assumption is unlikely to hold. In the empirical analysis we therefore cluster the standard errors at the student level, such that we take into account that the error terms per student are correlated. Additionally and as a robustness check, we estimated the model with clustered standard errors at the school level. Because the estimation results were similar to those when using clustered standard errors at the student level, we only show the latter results.

Because community school status is measured at the school level, it is not possible to estimate a school fixed effect model. However, we can control for constant effects of (un)observed school and students characteristics that may influence dropout by estimating a student fixed effect model.

The estimation parameter, α_3, in the the DiD model measures the causal impact of community schools on student dropout if community school students are comparable to regular school students in both observable and unobservable characteristics. Because students are not randomly assigned to community and regular schools it is not possible to show that both student populations are comparable in their unobservable characteristics. Sections 2 and 3, moreover, show that community school students are systematically different from regular school students in the learning tracks that they follow and in several background characteristics. As a consequence the community school student population includes students who are non-comparable to any student in the regular school student population, and even though we control for population differences when estimating equation 2, these differences may still impose a bias on the measured community school impact on student dropout (see De Witte, Van Klaveren and Smets, 2011 and De Witte and Van Klaveren, 2012a for an elaborate discussion). The regular school student population, therefore, does not accurately represent the counterfactual outcome for community school students because characteristic differences influence the probability of attending a community school, as well as the probability of dropping out of pre-vocational education. Therefore, this study adopts an iterative matching approach, developed by De Witte, Van Klaveren and Smets (2011), which is outlined below.

Matching procedure

This study adopts a nearest neighbor matching approach using Mahalanobis distances.[7] Essentially, this matching approach matches each community school student to the best look-alike regular school student based on a vector of observable background characteristics, $\mathbf{x}$. These background characteristics are similar to the background characteristics included in equation 2, or more specifically, are similar to the background

[7] This subsection relies on De Witte, Van Klaveren and Smets (2011) and Cameron and Trivedi (2005).

characteristics that are mentioned in Tables 3 and 4. This study matches students based on observable characteristics in school year 2007/2008, because all students in the observation period are observed in this school year and not in earlier school years (see also the cohorts that are defined in Table 2). The background characteristics we match on are gender, ethnic minority, single parent, disadvantageous area, educational track, grade, cohort and the school level characteristics school size and the proportion of ethnic minority students in the school.

Let N_C and N_R denote the number of students in, respectively, community schools (C) and regular schools (R). The matching approach gives weights to the j^{th} observation, that could serve as a potential match for the i^{th} community school observation. The weight-function is denoted by $w(i,j)$ with $\sum_j w(i,j) = 1$. The matching estimator of the average treatment effect on the treated is then

$$\Delta = \frac{1}{N_C} \sum_{i \in \{I=1\}} [y_{1,i} - \sum_j w(i,j) \cdot y_{0,j}], \tag{3}$$

where $0 < w(i,j) \leq 1$, $I = 1$ is the set of community school students and j is a student of the set of regular school students. The weights are obtained by using a Mahalanobis distance measure that minimizes the distance between observed characteristics of students:

$$w(i,j) = 1 \text{ if } j = \arg \min_{j=1,\ldots,N^R} (\mathbf{x_i} - \mathbf{x_j})' \Sigma^{-1} (\mathbf{x_i} - \mathbf{x_j}), \tag{4}$$

where Σ^{-1} represents the within sample covariance matrix and where $w(i,j) = 1$ if a match is possible. A major advantage of the Mahalanobis distance measure is that it is fully non-parametric. Therefore the established matches do not rely on any functional form or distribution, which is convenient as there is no *a priori* information on the relationship between observable characteristics and student dropout (Yatchew, 1998). Assuming a functional form could have imposed specification bias on the estimated community school impact.

We could have used alternative estimators, such as kernel or propensity score estimators. These alternative matching estimators are not necessarily inferior to Mahalanobis matching (see Cameron and Trivedi, 2005 and Zhao, 2004 for an elaborate description on the advantages and disadvantages of different matching estimators). To test the robustness of our results, we applied kernel and propensity score matching and found that the empirical results generated by these alternative matching estimators were comparable to those generated by the Mahalanobis matching estimator.

Iterative matching procedure

There are more community school students than regular school students and, as a consequence, it is not possible to match all community students to regular school students if we do not allow regular school students to be matched multiple times to community school students (i.e. matching with replacement). However, if we allow regular school students to be matched more than once to community school students then a small group of regular school students may drive the estimated effect. In a first attempt to overcome this problem we perform the matching analysis twice and first match regular school students to community school students (matching model I.) and then match community school students to regular students (matching model II.,

which we refer to as *inverse matching*). It is important to recognize, that matching model I. estimates the average treatment effect on the treated (ATET), while matching model II. estimates the average treatment effect of the untreated (ATEU). Thereby the matching models estimate the impact of community school education on student dropout for two different types of student populations, namely those representing community school students (matching model I.) and those representing regular school students (matching model II.). The advantage of matching model II. is that we draw students from the larger sized community school pool and match these students to the regular school students such that on average the quality of the match increases.

For matching model II. it is, however, still the case that the student size of the community school population is not much bigger than the student size of the regular school population and, thus, it may still be that a small group of community school students drives the estimated effect. To account for this we simulate the distribution of the matching estimator by using an iterative matching procedure. Below we describe the matching procedure for matching model I. and this procedure runs as follows. In step one, 200 community school students are selected at random (based on a variable that assigns a pseudo random number to each student drawn from a uniform distribution). In step two, regular school students are matched. In step three, we determine the average treatment effect on the treated using equations 3 and 4. We the repeat these three steps 500 times such that the distribution of the treatment effect on the treated is simulated. The mean of this distribution corresponds to the estimated treatment effect, while its standard deviation indicates the reliability of the estimate. The distribution of the matching estimator is, moreover, not necessarily normally distributed.

To test the robustness of this iterative matching procedure we repeated the procedure and varied the number of students that are in step one selected at random (i.e. we selected 50 and 100 students). The smaller the number of students that are randomly selected in step 1, the smaller is the probability that one single community school student is matched multiple times to multiple regular school students. We found that the iterative matching results remain approximately the same if we vary the number of students that are randomly selected in step one, and therefore this study shows only the estimation results when 200 regular school students are selected at random.[8]

To obtain a consistent estimate from the difference-in-differences estimation the common trends assumption has to be met. This assumption implies that if the treated had not been treated they would have experienced a change in outcomes equal to that observed among the non-treated (Blundell and Costa Dias, 2009). Due to the combination of a DiD analysis and a matching analysis the common trend assumption is relaxed (Blundell and Costa Dias, 2009; see also Heckman, Ichimura and Todd, 1997). If there are different trends for different students (e.g., given their background characteristics which put them at-risk for dropout), then this applies to both community school and regular school students. Therefore, the matching reduces the likelihood of having different underlying common trends.

Matching results and changes in background characteristics over time

Students are matched based on observable student and school characteristics for the school year 2007/2008, because all students in the observation period are observed in this school year and not necessarily in earlier school years. We should, however, take into account that schools became community schools in school year

[8] The results in case we selected 50 or 100 community school students are available upon request.

2006/2007 or 2007/2008 and if students select themselves non-randomly into community schools, student background characteristics may have changed over time. Therefore, we estimate the DiD estimation model (i.e. equation 2) for the sample produced by the iterative matching procedure and control for student and school characteristics over time. In this way we examine if the matching estimator is affected by changes in background characteristics over time.

To ensure that the DiD estimation results for the full population are comparable to the results for the sample that is constructed by the iterative matching procedure (in terms of standard errors) it is important that both samples contain the same number of student observations (i.e. about 65,000). If we recognize that each iteration uses information on 400 students (i.e. 200 community school students and 200 regular school students) and take into account that, on average, students are in the data for 3.34 years, it follows that we should randomly select data from 49 of the 500 iterations. These 49 iterations provide us with information of approximately 400·3,34·49 = 65,464 students.[9]

5 Estimation results

Table 8 presents the estimation results when we estimate equation 2 with and without control variables. The estimation results naturally indicate that student dropout increased over time which reflects that more students of the rather balanced student panel drop out of pre-vocational education during the observation period. The community school indicator α_1 shows that community school dropout was lower than regular school dropout in school year 2004/2005. In Section 4, we explained that the parameters of interest are the parameters associated with the interaction variables. Therefore, we mention these parameters of interest between brackets in Table 8. Community school subsidies were given to schools in the school years 2007 and 2008 (i.e. school years 2006/2007 and 2007/2008) and if community schools effectively reduced student dropout in these years we should find that $\alpha_{3,2007}$ and $\alpha_{3,2008}$ are both lower than α_1 and $\alpha_{3,2006}$.

[9] The deviation from this number in the actual population is due to the fact the selected students are not exactly 3,34 years in the data.

Table 8: **Empirical results: full population**

	(1) Coef. (SE)	(2) Coef. (SE)
Community school [α_1]	-.312***	-.329***
	(.451)	(.056)
Year 2006	.229***	.290***
	(.020)	(.024)
Year 2007	.274***	.437***
	(.023)	(.028)
Year 2008	.311	.580***
	(.025)	(.031)
CS*2006 [$\alpha_{3,2006}$]	.055*	.072*
	(.033)	(.040)
CS*2007 [$\alpha_{3,2007}$]	.102***	.131***
	(.036)	(.044)
CS*2008 [$\alpha_{3,2008}$]	.130***	.163***
	(.038)	(.047)
Constant	-1.725***	-9.150***
	(.032)	(.317)
Clustered student-level SEs	Yes	Yes
Controls	No	Yes
Pseudo R^2	0.0147	0.1625
Nr of observations	65,967	65,967

Note 1: */**/*** means statistically significant at the 10/5/1 percent level.
Note 2: CS refers to community schools and RS refers to regular schools.

The estimation results do not support that $\alpha_{3,2007}$ and $\alpha_{3,2008}$ are both lower than α_1 and $\alpha_{3,2006}$, and indicate that dropout differences between community schools and regular schools diminished over time. In Section 3 we have shown, however, that community schools structurally offer more theoretical learning tracks than regular schools, and have moreover a relatively disadvantageous student population. The estimation results shown in Table 8 therefore include regular school students that are non-comparable to community school students and this may impose a bias on the measured community school impact on student dropout. To address this problem we adopted the iterative matching procedure as described in Section 4.

The student characteristics for the matched community and regular schools and for the original population and the constructed control sample are shown in Table 9. By construction of the iterative matching procedure, the characteristics of matched regular school students are similar to those of the matched school population. This holds for all school years. Therefore, if we estimate the difference-in-differences model (i.e. equation 2), we accurately control for differences in background characteristics.

Table 9: **Student characteristics for full population and matched sample type and school year**

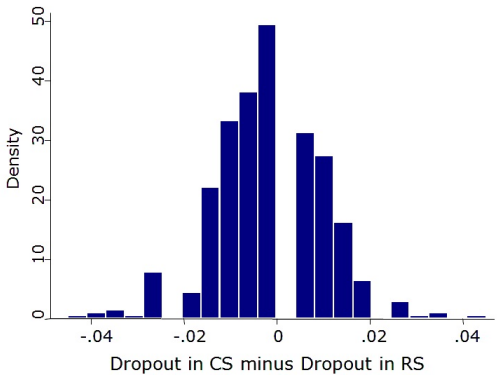
		2004/2005		2005/2006		2006/2007		2007/2008	
		CS	RS	CS	RS	CS	RS	CS	RS
		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
		(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)
Male	Population	.51	.52	.51	.5	.51	.53	.51	.53
		(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)
	Matched	.50	.48	.50	.49	.50	.50	.50	.50
		(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)
Ethnic minority	Population	.63	.47	.65	.39	.66	.39	.66	.39
		(.48)	(.50)	(.48)	(.49)	(.48)	(.49)	(.47)	(.49)
	Matched	.64	.60	.66	.60	.66	.60	.66	.60
		(.48)	(.49)	(.47)	(.49)	(.47)	(.49)	(.49)	(.47)
Single parent	Population	.11	.09	.12	.09	.12	.09	.12	.09
		(.31)	(.29)	(.32)	(.29)	(.32)	(.29)	(.32)	(.29)
	Matched	.11	.10	.11	.11	.12	.12	.12	.12
		(.31)	(.30)	(.32)	(.32)	(.31)	(.32)	(.32)	(.32)
Disadvantageous area	Population	.49	.30	.49	.22	.49	.21	.49	.20
		(.50)	(.46)	(.50)	(.41)	(.50)	(.41)	(.50)	(.40)
	Matched	.50	.46	.51	.43	.50	.42	.50	.44
		(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)
Residential value	Population	138.74	149.72	139.59	152.57	140.46	153.99	140.50	154.99
		(44.93)	(47.73)	(46.02)	(49.04)	(47.37	(49.91)	(47.71)	(50.22)
	Matched	137.30	132.90	138.35	131.76	139.32	132.83	140.12	132.45
		(43.56)	(33.57)	(44.99)	(32.36)	(46.53)	(34.13)	(47.57)	(34.00)
Age	Population	14.28	14.26	14.49	14.57	14.64	14.73	14.79	14.87
		(1.20)	(1.23)	(1.23)	(1.22)	(1.25)	(1.17)	(1.23)	(1.15)
	Matched	14.26	14.19	14.45	14.42	14.59	14.60	14.78	14.70
		(1.20)	(1.14)	(1.25)	(1.18)	(1.26)	(1.13)	(1.22)	(1.16)
Dropout	Population	.02	.04	.04	.07	.05	.07	.06	.08
		(.14)	(.20)	(.25)	(.20)	(.21)	(.26)	(.23)	(.27)
	Matched	.02	.02	.04	.05	.05	.05	.06	.06
		(.15)	(.14)	(.20)	(.21)	(.22)	(.22)	(.23)	(.23)

Note: CS refers to community schools and RS refers to regular schools.

Figure 1 shows the distribution of the average treatment effect on the treated for the school year 2007/2008 based on the 500 simulations. The figure shows the simulated dropout difference between community school students and matched regular school students. Intuitively, a negative value means that the average dropout is lower in community schools and a positive value means that the average dropout is higher in community schools. The mean dropout difference is -.00131 with a standard deviation of .012. This suggests that on average there is less dropout in community schools for the simulated sample for the school year 2008. The result of the Shapiro-Wilk test (W = .994) indicates that the distribution of the ATET is not normally distributed. Therefore, we apply a non-parametric Wilcoxon signed-rank test to test whether the mean dropout difference is significantly different from zero. The test statistic indicates that the distribution of the mean differs significantly from zero (z=-2.406; p = 0.0161).

The iterative matching procedure is performed for 2008 and therefore it may happen that changes in population background characteristics that influence the probability of attending a community school as

Figure 1: Distribution of the average treatment effect on the treated



well as dropping out of pre-vocational education drive the matching results. Therefore, we take into account the observed changes in background characteristics that occur over time by estimating the difference-in-differences model for the matched sample.

The difference-in-differences estimation results are shown in Table 10. Column (1) presents the full population results of Table 8. Column (2) presents the estimation results when we estimate the difference-in-differences model for the matched sample where we match regular schools students to community school students (i.e. Model I.). Column (3) shows the matching results where we match community school students to regular school students (i.e. Model II.). The community school indicator for the matched samples (2) and (3) shows that community school dropout is not statistically different from dropout in regular schools in school year 2004/2005. This is as expected, because schools did not receive community school subsidies in this school year and because the matching analysis ensured that community school students are compared to comparable regular school students. In these estimations, the standard errors are clustered by student-id.

The estimation results in columns (2) and (3) indicate that $\alpha_{3,2007}$ and $\alpha_{3,2008}$ are negative but not significantly different from α_1. This suggests that community schools perform as good as regular schools with regard to reducing dropout. Moreover, the estimation results for the matched sample show that the estimation results for the full population are biased in the sense that community schools seem to perform 'less well', (i.e. dropout differences between community schools and regular schools diminished over time), even though this is caused by the fact that non-comparable regular students are compared to community school students. Overall, our findings indicate that compared to regular schools community schools are neither more nor less effective in reducing dropout in pre-vocational education.[10] [11]

[10] We have carried out the same analysis for all matched observations as well as for the balanced sub-sample. The results correspond to those presented in table 9.

[11] The results are consistent if we leave out the school year 2004/2005 and use 2005/2006 as the base year.

Table 10: **Probit estimation for the full population and the matched samples**

	(1)	(2)	(3)
	Full population	Matched samples	
		Matching model I.	Matching model II.
	Coef.	Coef.	Coef.
	(SE)	(SE)	(SE)
Community school [α_1]	-.329***	.063	.037
	(.056)	(.102)	(.100)
Year 2006	.290***	.477***	.320***
	(.024)	(.077)	(.036)
Year 2007	.437***	.637***	.478**
	(.028)	(.081)	(.042)
Year 2008	.580***	.774***	.626***
	(.031)	(.086)	(.049)
CS*2006 [$\alpha_{3,2006}$]	.072*	-.064	-.108*
	(.040)	(.089)	(.063)
CS*2007 [$\alpha_{3,2007}$]	.131***	-.034	-.073
	(.044)	(.093)	(.083)
CS*2008 [$\alpha_{3,2008}$]	.163***	.005	-.078
	(.047)	(.095)	(.090)
Constant	-9.150***	-8.639***	-10.531***
	(.317)	(.680)	(.737)
Clustered student-level SEs	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Pseudo R^2	0.1625	0.1758	0.1896
Nr of obs	65,967	65,489	67,676

Note 1: */**/*** means statistically significant at the 10/5/1 percent level.

Note 2: CS refers to community schools and RS refers to regular schools.

6 Conclusion

The importance of dropout prevention and reduction is continuously highlighted by policymakers and schools. As a consequence, various measures are taken to prevent and reduce dropout, but it remains unclear how dropout can be effectively reduced or prevented, mainly because it is not the result of one specific problem, but an accumulation of various problems that students are experiencing at home, in their neighborhood or at school. Community schools arose in many countries and recognize that a variety of factors are underlying educational problems and may eventually lead to student dropout. These schools offer a more holistic educational program to accommodate students in their personal needs, and practically this means that these schools cooperate more with external organizations, stimulate parental involvement in the educational process and organize more extracurricular activities. However, despite the increasing number of community schools, there has been no empirical evidence that these schools improve student achievement or reduce student dropout more than regular schools.

This study examines the impact of Dutch community schools in Rotterdam on student dropout and focuses on pre-vocational education, as dropout is particularly high in this educational track. Community schools are schools that receive community school subsidies of the municipality of Rotterdam for the various activities that they undertake to improve students' educational outcomes. In order to estimate the impact of

these subsidies on student dropout, unique registration data of the Ministry of Education are used in which Rotterdam students enrolled in pre-vocational education were tracked between the school years 2004/2005 and 2007/2008.

To identify the community school impact on student dropout we exploit that community school subsidies were not given before the beginning of school year 2006/2007. This setting allows us to estimate the community school impact by means of a difference-in-differences estimation model.

The difference-in-differences estimates show that community schools perform worse than regular schools in the sense that dropout differences between community and regular schools diminished over time, while community school dropout was lower than regular school dropout in 2005. However, the descriptive statistics show that community schools structurally offer more theoretical learning tracks (i.e. more difficult learning tracks within pre-vocational education) than regular schools, and have moreover a relatively disadvantageous student population. Therefore, the community school student population includes students who are non-comparable to any student in the regular school student population which imposes a bias on the measured community school impact.

To address this problem the difference-in-differences estimation model is combined with an iterative matching procedure that ensures that only comparable regular school students are compared with community school students. The empirical findings when a more fair comparison is made between community school and regular school students show that community schools were as effective as regular schools in reducing student dropout. We therefore conclude that community schools are as effective as regular schools in reducing dropout in pre-vocational education and that the community school subsidy does not seem to have contributed to reduce student dropout.

We emphasize that community school students may benefit from community school education in a different way, as community schools presumably offer a more attractive learning environment. As argued above, community schools have a more holistic view on children's education and development than regular schools. An advantage of this holistic view is that it focuses on students, their families and on students' environment. A disadvantage of the holistic view is that community school programs do not define accurately which activities are undertaken and how these activities improve students' educational outcomes. Therefore, to be evaluated rigorously on their effectiveness community school programs and their objectives have to be more clearly defined.

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