PRIVATE EDUCATION PROVISION AND PUBLIC FINANCE:
THE NETHERLANDS

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ABSTRACT

One of the key features of the Dutch education system is freedom of education – freedom to establish schools and organize teaching. Almost 70 percent of schools in the Netherlands are administered by private school boards, and all schools are government funded equally. This allows school choice. Using an instrument to identify school choice, it is shown that the Dutch system promotes academic performance. The Instrumental Variables results show that private school attendance is associated with higher test scores. Private school size effects in math, reading and science achievement are 0.17, 0.28 and 0.18.

INTRODUCTION

One of the key features of the Dutch education system is freedom of education – freedom to establish schools, determine the principles on which the school is based, and organize classroom teaching. In fact, the Netherlands has one of the oldest national systems based on school choice in the world. Although all schools in the Netherlands are government funded, most are administered by private school boards. As a result, most children in the Netherlands attend private schools, a trend that has been increasing over the past 150 years. Parents can choose among several schools.

In the United States, school choice is often promoted as a means of increasing competition in the school system (Friedman 1955). It is believed that competition will lead to efficiency gains as schools – public and private – compete for students and try to improve quality while reducing expenses (Hoxby 2003; Neal 2002). By encouraging more private schools, school choice allows school managers to become innovative and thereby bring improvements to the learning process. Public schools, in order to attract the resources that come with students, will need to improve. Thus, school choice will lead to improved learning outcomes and increased efficiency. Opponents claim that under a choice system private providers will be unaccountable to taxpayers and the public. Claims of efficiency gains are also questioned. Further, opponents sometimes claim that choice will lead to privatization and less public (government) control of education (Ladd 2002). The United States literature on school choice is extensive (see Peterson 2009 for a recent review). The international literature is small, but growing (see Barrera-Osorio and Patrinos 2009 for a recent review).

Most of the literature, however, has focused on small-scale choice systems (such as in a number of cities in the United States). Denmark's large and mature school choice system has

been researched (Andersen 2005; Andersen and Serritzlew 2006; Nannestad 2004; Rangvid 2008). They all reach the conclusion that, despite increments in competition, private schools do not perform academically better than public ones. For the case of Sweden, Ahlin (2003) estimates the effect of a general school choice reform on student performance. Using a rich set of individual level data, increased school competition is shown to have statistically significant positive effects on student performance in mathematics, but no significant effects in English and Swedish. Interacting school competition with student characteristics, the results indicate that immigrant students and those in need of special education tend to gain more from increased school competition than others, while adverse effects on students from less-educated families are found in terms of English and Swedish performance. Also for Sweden, Sandström and Bergström (2004) analyze the effects of competition on public schools using data on 28,000 ninth graders. They account for potential endogeneity of the share of students attending independent schools by using instrumental variable estimation. Their findings support the hypothesis that results in public schools improve due to competition. Research on Chile's universal school choice model has been subject to a high level of scrutiny. The research is controversial, with several early articles presenting data to show that subsidized, private schools obtain higher standardized test scores than do public schools (Rodriguez 1988; Aedo and Larrañaga 1994; Aedo 1997). A second batch of studies uses individual level information with large samples (Bravo et al. 1999; Carnoy and McEwan 2000; Mizala and Romaguera 2000; Gallegos 2002; Vegas 2002). Several studies advance the previous estimations, with strategies to overcome the problem of self-selection. Sapelli and Vial (2002, 2004) have taken into account some of the deficiencies of previous studies, especially in terms of lack of control for selection bias, homogeneous treatment effects, and assumptions of equal funding for voucher schools.

These studies present small average treatment effects but large treatment on the treated effects. They also reject the hypothesis that peer effects explain the positive results. Hsieh and Urquiola (2006), however, using several instruments and over-time data, find no evidence that choice improved average educational outcomes as measured by test scores, repetition rates and years of schooling. They find that the voucher program led to increased sorting, as the best public school students left for the private sector. Gallegos (2006) explains that the differences in results can be attributed to changes in the voucher and education systems in the mid-1990s. He uses information on the number of Catholic priests in 1950 and the institution of the voucher system in 1981 as an exogenous determinant of the supply of voucher schools and shows that vouchers increase test scores. For Colombia's targeted secondary school voucher program, researchers take advantage of a randomized design (Angrist et al. 2002, 2006). Voucher beneficiaries had higher educational attainment: they were 10 percent more likely to finish the 8th grade three years after they won the vouchers; 5 to 6 percent less likely to repeat a grade; they scored 0.2 standard deviations higher on achievement tests than non-voucher students; and they were 20 percent more likely to take the college entrance exam than students who had not won a voucher in the lottery.

The Netherlands provides an ideal situation to examine the effects of school choice in a long-standing system. Interestingly, the issue of choice in the Netherlands has been under-studied (but see Ritzen et al. 1997; Himmler 2009). In the Dutch national school choice system, policy is determined centrally but the administration and management of schools is decentralized to the school level. The central government exercises ultimate control over both public and private schools. Students from the Netherlands do exceptionally well on international academic achievement tests such as TIMSS and PISA. The country achieves high scores even after

controlling for national income and expenditure per student. On average, private schools perform better than public schools. Thus, the system is not only successful academically but is also cost effective, yielding good results at relatively low cost. The substantial degree of competition in the system is one determinant of its high academic achievement rates. Thus, a large school choice system can promote efficiency and equity without necessarily leading to privatization or to reduced public scrutiny. It is shown here that a significant part of the high achievement of Dutch students in international achievement tests may be due to private school attendance. The selection problem is addressed with information on the act of school choice in the Netherlands. When an instrument for school choice is used it is shown that private school attendance is associated with higher test scores. Private school size effects in math, reading and science are high and significant, close to 0.2 of a standard deviation in math and science, and almost 0.3 of a standard deviation in reading.

THE NETHERLANDS' SCHOOL CHOICE SYSTEM: AN OVERVIEW

The current Dutch education system, established in 1917, allows parents to choose whatever school they wish for their children while the state pays most of the cost. Freedom of education is guaranteed under Article 23 of the Constitution, which ended the state monopoly in education early on in the Netherlands. Along with school choice, all parts of social life were segmented – often referred to as "pillarisation" (*verzuiling*), in the literature – for a period as long as 1870 to 1960 as part of a political compromise (James 1984). Not only were schools organized along political and religious lines (Roman Catholic, Protestant, liberal and social-democratic), but so too were other aspects, such as political parties, trade unions, business associations, professional groups, sports clubs, and so on. While the segmentation has ended,

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interestingly enough, schools continue to be oriented in a particular way, despite the fact that Dutch society has changed considerably. Nevertheless, freedom of education in the Netherlands was not originally based so much on principals of equality and liberalism, but rather on freedom of religion, in a more conservative perspective (Patrinos 2002).

The majority of schools are private, usually managed by a foundation or church. Municipal authorities are the competent local authority for schools in the area. All schools are governed by a legally recognized authority (school board). The school board is responsible for implementing legislation and regulations in schools. There is, despite school choice and diversity of supply, no significant elite school sector (Karsten et al. 1995). It is required that primary and secondary schools receiving public funds must be not-for-profit. Nevertheless, school boards are able to retain surplus earnings. There are a few for-profit schools, representing less than 1 percent of total enrollments (Hirsch 2002), but they are too small to receive government funds.

There is relative ease of entry of new providers. A small number of parents can and do propose to start a school. Government is required to provide initial capital costs and ongoing expenses, while the municipality provides buildings. A small fund for operating expenses that the school may allocate at its discretion among activities such as maintenance, cleaning, heating, libraries and teaching aids also exists. The sum is determined separately by each municipality, which must then give all schools the same per capita amount. The requisite number of parents required to set up a school varies according to population density, ranging from 200 for small municipalities to 337 for The Hague.

Each family is entitled to choose the school – public or private – they wish their children to attend and the state pays. The main impediment to choice is distance, although parents are

free to choose a school anywhere in their city of residence or indeed anywhere in the country since there are no catchment areas. A school cannot refuse to admit a child if parents are unable or unwilling to pay. Once it is certain that a child is to be admitted to the school, a written contract must be drawn up between the school and the parents, stating what the parental contribution is to be used for and what will happen if it is not paid in full. According to Denessen et al. (2005), choice in the Netherlands is obligatory; all parents must make a choice.

Money follows students and each school receives for each student enrolled a sum equivalent to the per capita cost of public schooling (Patrinos 2002). The funding covers specified amounts of teacher salaries and other expenses. The number of teachers to which a school is entitled depends on its number of students. Municipal schools charge small fees during the compulsory stage of schooling. Schools are fully accountable to the parents for the use of fees collected. Other private contributions and sponsorship are allowed, but no advertising materials are permitted, and schools may not become dependent on sponsors (Droog 2001; de Vijlder 2001). The central government pays most of the running costs. Limited local government discretion is allowed, but municipalities organize and pay for minority language teaching. The financing procedure is somewhat different at the secondary level. All teacher salaries and building costs are covered directly by the municipality. In addition, municipal and private secondary general schools that are included in the Minister of Education's three-year plan get the same discretionary fund per capita. Since 80-90 percent of all current school expenditures are for teacher salaries, this immediately places the bulk of budgetary decisions in the hands of the central government.

Central control is exercised over both public and private schools. The system is characterized by a large central staff; many school advisory services and coordination bodies; a

strong Inspectorate; and stringent regulations. While the freedom to organize teaching means that schools are free to determine how to teach, the Ministry of Education, Culture and Science does, however, impose a number of statutory standards in relation to the quality of education. These prescribe the subjects to be studied, the attainment targets, and the content of national examinations. There are also rules about the number of teaching periods per year, teacher training and qualifications, the rights of parents and pupils to have a say in school matters, and the planning and reporting obligations of schools. As a rule, schools enjoy considerable freedom in the choice of textbooks and materials and in the way they manage their affairs. School discretion is limited only by employment laws; teacher qualifications, pay and conditions; and building standards. The Education Inspectorate is charged by the Minister of Education with supervising the manner in which schools fulfill their responsibilities.

Information on school quality is widely disseminated. In 1997, the daily newspaper *Trouw* (www.trouw.nl) went to court for the right to publish Education Inspectorate results. When *Trouw* published the results of all schools later that year, the newspaper was sold out in a matter of hours. This demonstrates the significant demand for information on school quality. From then on this newspaper published articles on the quality of schools every year and it also opened a website so that citizens could view this information all year round. A survey in 1998 reported that 91 percent of respondents believed that Inspectorate reports should be made public. The increased transparency led to drastic changes in the Inspectorate service. The agency decided that it would also publish the results of school inspections itself. The Inspectorate redefined itself and stated that one of its tasks was to provide citizens with independent and reliable information about the quality of schools (Meijer 2007). The Inspectorate opened a website and first published quantitative information concerning the quality of schools – the so-

called Quality Cards – in 1998 (http://www.kwaliteitskaart.nl). Approximately 200 inspectors make more than 10,000 visits to schools every year. While observing lessons, the inspectors also assess teaching methods. Every year, the Inspectorate submits around 25 reports, including the annual Education Report, to the Minister, the State Secretaries and the Parliament. The results of the Inspectorate reports can be used to put schools on notice if quality is poor, and action is taken by the Ministry of Education if schools do not improve. Curiously, it was once believed that parents did not want test data published (Louis and van Velzen 1991).

The Dutch system is relatively efficient. Education in the Netherlands is free for the compulsory years of schooling. At all levels of education, the Dutch government spends at the OECD average (OECD 2009). Expenditure per student in United States PPP dollars in 2005 at the primary, secondary and post-secondary non-tertiary education level in the Netherlands is 7,045. This is just about the OECD average, which is 7,065, and about the same as Germany, 7,039 and Australia, 7,142, but significantly less than Denmark, 8,997, the United States, 9,769 and Norway, 9,975. Education spending as a proportion of GDP is 4.8 percent, which is below the OECD average of 5.0 percent. Thus, achievement levels are high, while relative costs are low.

School choice in the Netherlands manifests itself in the existence of a large number of private schooling options for parents and their children. This competition may lead to, among other things, schools becoming more effective in managing personnel, teaching students, promoting school efficiency, managing budgets, and involving parents as appropriate. Private schools are widely believed to be more effective and efficient at promoting learning (Friedman 1955; Patrinos et al. 2009). That is, attendance at a private school can lead to superior performance. Given the predominance and growing significance of private schools in the

Netherlands, and the ease of entry of new providers, this might be a useful measure of the effect of school choice on outcomes. In fact, Dutch private schools outperform public schools despite 100 years of competition and equal funding to both sectors.

TRENDS AND EFFECTS OF SCHOOL CHOICE

The Netherlands scores high in international academic achievement tests. For example, in the IEA's Trends in International Mathematics and Science Study (TIMSS), the Netherlands scores near the top in both math and science. In math, the Netherlands ranked 8th, 5th and 5th in 1995, 1999 and 2003. In science, the Netherlands ranked 6th, 5th and 7th in 1995, 1999 and 2003. Also, in mathematics and science achievement in the final years of secondary school, carried out by TIMSS in 1995 in 21 countries, the Netherlands was the top performing country. The Netherlands achieves high scores in TIMSS, in comparison to other countries, even when controlling for level of national income (as well as expenditure per student).

In the OECD's Programme for International Student Assessment (PISA), the Netherlands does very well. In all three subjects, math, science and reading, the Netherlands consistently scores above the OECD average. In math, the Netherlands ranks fourth of all participating countries, scoring 0.3 of a standard deviation above the OECD average. In science, the Netherlands ranks 8th and in reading 11th (see Table 1). Private schools, especially Catholic and Protestant schools, perform better than public schools (see, for example, Dijkstra et al. 2001). Despite the fact that there is no elite school sector, there is some evidence of higher quality in private schools, especially Catholic and Protestant secondary schools (Dronkers 1995). A careful analysis of school performance in the Netherlands shows that Catholic schools do out-perform other schools, especially public schools (Levin 2002). The superior performance holds

even after controlling for educational practices and selection. The results show that Catholic schools do perform better, while schooling choice is available and affordable for the majority of families.

The first indication of the importance of private schooling is the increased enrollment over time. Most children in the Netherlands now attend private schools (Figures 1 and 2) and the trend over the past 150 years is increasing. Most school boards are Catholic or Protestant, but there are also Jewish, Islamic, Hindu and humanist schools in the Netherlands. While 35 percent are public, 29 and 27 percent are Catholic and Protestant (Hupe and Meijs 2000). There are also private non-denominational schools that are run by an association or foundation but are not based on any specific religious or ideological beliefs. Like some public schools, many privately-run schools base their teaching on specific educational principles.

In the Netherlands, in order to survive, private schools must add value by improving learning outcomes of students since they are not allowed to select pupils. Thus, private schools must prove themselves by being able to raise student performance, including for students from more disadvantaged backgrounds. The system provides incentives for teaching the more disadvantaged. While all schools receive funding related to student enrollment, a weighted funding formula is used to deal with disadvantage. For every ethnic minority student, a school receives 1.9 times the amount paid for other children; native children from disadvantaged backgrounds receive 1.25 times the amount (Ritzen and others 1997; see Leuven et al. 2007 for an evaluation). Private schools can and do supplement public funding by charging ancillary fees; however, this right is severely limited. There is no evidence of refusing at-risk students (Karsten and Meijer 1999). Relatively resource-poor schools try to cut costs by improving efficiency,

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such as more extensive methods of teaching – by increasing class sizes, giving more homework, and doing less group work (Karsten and Meijer 1999).

School choice leads to competition, which is expected to benefit private schools the most given their ability to react to changes in the market and the relative ease of entry into the Dutch education market. Private schools can more easily dismiss ineffective teachers, for example. Private schools may be more likely to use achievement data to evaluate teachers. They may also take a more direct role in establishing teachers' salary increases. In addition, parents may be more involved in discussions on budget formulation at the school level. But in the Netherlands even public schools may be more autonomous than elsewhere. While difficult, public schools are able to fire teachers. Also, public schools use test results to evaluate personnel. Some public schools even set teacher salaries, and parents may be more involved in discussions on budget formulation at the public school as well. Then the question becomes how does the Dutch system impact private and public schools differently?

There are still reasons to believe that the Dutch system of public finance and school choice would give an advantage to private schools. From the international literature it is known that private schools excel because of the greater concentration of academic course-taking among students (Hoffer 2009). Private schools are expected to be more effective for students from more disadvantaged backgrounds (Coleman et al. 1982). Moreover, expanded choices allow parents to find schools that better match their preferences for safety, discipline and moral instruction (Neal 2009). Also, private schools tend to organize themselves as communities rather than bureaucracies, as most urban and sub-urban public schools do. Religious private schools tend to have shared values, a common agenda, and caring relationships – all characteristic of the communal organizational form. These are linked to high levels of teacher commitment, student

engagement, and student achievement (Marks 2009). Private schools tend to hold high expectations of students and organizing student curricular experience to emphasize academic course work.

These reasons have been put forward for the superior performance of private schools in the Netherlands as well. It is shown that private schools perform well because of better educational administration, a stronger value-oriented community between parents and schools, and a more deliberate choice of religious schools (Dronkers 2001). Longitudinal research shows that students with an initial disadvantage perform better in Catholic schools because of effective discipline, stringent educational demands, and less political pressure (Van Laarhoven 1990). More recent research demonstrates that pupils from the lower social strata perform better in private government-dependent schools than in public or private-independent schools (Corten and Dronkers 2006). The main explanation appears to be a better school climate in private government-dependent schools. Private government-dependent schools are more effective for pupils from more disadvantaged backgrounds. Since most private government-dependent schools are religious schools, they have more opportunities to form functional communities (Corten and Dronkers 2006). In the Netherlands, on average, private schools perform better than public schools – despite 100 years of competition and equal funding to both sectors – and all perform significantly above the OECD mean. Figure 3 shows the advantage of private schools in PISA 2006. Therefore, attendance at a private school is expected to lead to superior academic performance.

Data and Coverage

In the analysis that follows, the Netherlands data come from the 2006 round of PISA, a student assessment jointly developed by participating countries to assess and compare student

achievement based on a standardized and highly reliable framework. The detailed description of the assessment framework, cautious procedures of translation and supervision of country specific implementation, and careful calibration of student scores based on response items and collected background variables, supports the view that PISA is a valid framework for assessing student achievement. The survey is realized as representative to the population of interest in a two-stage stratified sample with random sampling of schools and within each school. Survey weights reflect the different probabilities of schools and students to be sampled. The domains of reading, mathematical and scientific literacy are covered not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in adult life, particularly in the labor market (OECD 2007).

Descriptive statistics are presented in Table 2. Most schools in the Netherlands PISA 2006 sample are private. Most schools can fire a teacher, which is not unexpected since most schools are private, but in the Netherlands almost all schools can fire teachers. Achievement data is used to evaluate teachers in most schools, with almost three-quarters doing so. The high degree of school-based management is also evident, as more than 80 percent of schools report that they can set teacher salary increases. Few schools directly involve parents in school budget decisions, at only 9 percent overall. Teachers in the Netherlands are certified, and few schools are located in rural areas. In terms of differences between public and private schools, there is a slightly higher probability that public schools can fire teachers in the Netherlands, and parental involvement in school budget decisions is higher in public schools. Religion is more important for choosing private schools. The student-teacher ratio is slightly lower in private schools. Private school students have mothers who are relatively less educated, suggesting that private schools are catering to students from less advantaged backgrounds. Only 26 percent of the

mothers of private school students have a university education, while more than 33 percent of the mothers of public school students have a university education.

Measuring the Effects of Choice on Achievement

Controlling for a series of institutional, school, student and family characteristics, and running a series of OLS regressions, it turns out that private school attendance is a positive and significant explanatory variable, except in the case of science where it has no effect (Table 3). Private school attendance increases test scores in math by 5 points and by 4 points in reading. Given the PISA scale – mean OECD score of 500 and standard deviation of 100 points – these are small, but significant, size effects.

Other institutional variables have a strong effect, such as firing teachers, especially in science. The effect varies from 20 points in reading, or 0.20 of a standard deviation, to 43 in math and 73 in science. Assessment is important in the Netherlands and many schools use achievement information to assess progress. This has a small but positive and significant effect on outcomes. Also, schools setting teacher salary increases are associated with higher test scores. Overall, an 8 to 10 point increase is associated with schools setting teacher increases. Parental involvement in school budget decisions is associated with higher scores, raising achievement by 11 points in math, to 14 points in science, and by 16 points in reading. The OLS analysis suggests that institutional factors are important for determining achievement. It is important to bear in mind that the OLS results are correlations, and not causal relationships. This requires one to turn now to the identification problem.

Identification

Private school attendance is associated with self-selection in the Netherlands given universal school choice, so one cannot attribute from the regression results that private schools

contribute to the increase in test scores. There are two main channels through which a school choice program can increase learning outcomes: the mechanism it uses to sort students and the across-school competition it creates. For the first channel, choice programs may allow a better fit between parental preferences and schools. Presumably, families will enroll their children in high-performing schools, either leaving or not applying to low-performing schools. This allocation mechanism will induce students to improve educational outcomes because they will be in better schools. For the second channel, choice may induce competition for students across schools. Low-performing schools will be forced to increase their quality in order to retain and attract students who will otherwise enroll in better schools (Hoxby 2003; Neal 2002).

The average learning outcome will then depend on the average outcomes of students who stay in the low-performing schools (expellers) and those who move to the high-performing schools (receivers) (Nechyba 1999, 2000; Epple and Romano 1998). On top of this sorting mechanism of students, competition across schools will tend to increase the quality of education. Again, schools will compete for students which may lead to improved learning outcomes. Final outcomes will depend on the net effect of these margins.

The typical estimation of the effect of a choice program on learning outcomes will have the form:

$$Y_{i,j,t} = \beta_0 + \beta_1 * X_{i,t} + \beta_2 * Z_{j,t} + \beta_3 * D_{i,j,t} + \varepsilon_{i,j,t} \tag{1}$$

where $Y_{i,t}$ is any variable capturing learning outcomes such as standardized test scores for individual i in school j at time t; $X_{i,t}$ are a set of socioeconomic characteristics of the individual; $Z_{j,t}$ are characteristics of the school such as teachers; $D_{i,j,t}$ is a dummy variable indicating

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whether the individual chose a private school or not; $\varepsilon_{i,j,t}$ comprises all unobservable characteristics of the school and individual that can affect learning outcomes.

The fundamental problem in estimating the impact of private school choice with equation (1) is selection bias – students (and their families) self-select into schools and schools may select students. Under these conditions, a comparison between students who participate and those who do not confounds the effects of private school choice, with the initial differences in characteristics between participants and non-participants. For example, it is possible to expect that better informed households are more likely to actively choose schools. Students from these households may perform differently than less active choosers. Therefore, any observed final educational outcomes not only comprise the results from private school attendance but also the inherent differences in characteristics of the families or students. Besides students self-selecting into private schools, the schools themselves may be selecting students, reinforcing the problem of identifying impacts. An evaluation of the choice program with this behavior may thus confound the impact with the differences in the characteristics of the schools. Therefore, a simple comparison between students in private schools and those in public schools may pick up not only the differences in the educational outcomes due to choice, but also the differences in the characteristics of the two groups of schools. In the Netherlands, fortunately for the purposes of evaluation, schools do not select nor reject students and all schools are part of the choice program. Therefore, selection by schools is not an issue in the evaluation of private school choice in the Netherlands. But parents do choose schools, so there would be self-selection bias.

In short, the main objective of this type of estimation is to identify β_3. If students are not assigned randomly, then it is very likely that the unobservable characteristics are correlated with the dummy that indicates whether or not the individual chooses a private school. In this case,

$E(\varepsilon_{i,j,t} / D_{i,j,t}) \neq 0$, and ordinary least squares (OLS) estimators are biased. This can be described as a problem of causality. If D is determined with self-selected individuals, and the most able ones are choosing private schools, then D can be causing Y. On the other hand, Y as indicative of ability can be *causing D*, in the sense that more able individuals are choosing private schools. Therefore, the causality direction is unclear. Another perspective of the problem is to see bias as the consequence of omitted variables. In this case $\varepsilon_{i,j,t}$ captures all the unobservable variables at the school and individual level that affect Y. If it were possible to control for all the variables such as $E(\varepsilon_{i,j,t} / D_{i,j,t}) = 0$, then OLS would be unbiased. In other words, if one could control for all the key variables that determine private participation, then estimates by OLS will be unbiased. The direction of the bias in simple comparisons between students in private schools and other students is not clear.

The problem of bias in the estimation of equation (1) has multiple solutions. If randomization and regression discontinuity techniques are not an option, then one must opt for other methods, such as instrumental variables, Heckman correction models, difference-in-difference estimators, and matching estimators. They are all based on strong assumptions (Angrist and Imbens 1995; Athey and Imbens 2006; Heckman 1976; Heckman, Ichimura and Todd 1998; Rosenbaum and Rubin 1983). In the Netherlands, there is no pre-program data, given the long standing nature of the program. There are also no exclusion criteria, since all families and students have access to all schools, schools do not reject applicants, and there are no top up fees.

Our empirical strategy is to locate a variable that matters for the treatment status or more generally for participation – relevance of the instrument – but that is not correlated with the outcomes of interest given treatment – exclusion restriction. The instrument will control for the

endogeneity in the choice variable (enter a private school) that arises from selection on unobservables. In student achievement regressions, school choice is usually instrumented with variables related to the cost of schooling: price of schooling and distance to the school. These variables might violate the exclusion restriction, however, if distance is correlated with absences or tardiness – likely to affect learning – or if the price of schooling also depends on the demand for schooling. Another possibility when past (pre-program) data are available is to use lagged (pre-program) values of participation determinants as instruments. But because past determinants are strongly correlated with current determinants, however, they are arguably weak instruments (Blundell and Costa Dias 2000; Davidson and MacKinnon 2003). Researchers investigating universal choice programs have used various techniques to create treatment groups. Instrumental variables have been used in the cases of Denmark and Sweden, such as the degree of competition. Others have used school location and find mixed effects across country (Vandenberghe and Robin 2004). Religion has also been used as an instrument. In Chile, Gallegos (2006) used religion and showed that an increase of one in the ratio of voucher-to-public schools increases test scores by about 0.14 standard deviations. West and Woessmann (2008) argue that nineteenth-century Catholic doctrine strongly opposed state schooling and show that countries with larger shares of Catholics in 1900 (but without a Catholic state religion) tend to have larger shares of privately-operated schools today. They show that larger shares of privately-operated schools lead to better student achievement in mathematics, science and reading, and to lower total education spending, even after controlling for current Catholic shares (West and Woessmann 2008; see also Card et al. 2008; Evans and Schwab 1995; Neal 1997; Jepsen 2003; Sander 1996 on the use of Catholic shares as instruments; and see Cohen-Zada 2009 for an alternative instrument that uses historical Catholic share of population as an

instrument; but see Altonji, Elder, and Taber (2005) on cautions about using such instruments). Thus, an instrumental variables approach is undertaken to address the causality issue. A good instrument, however, should be good at predicting choice, but not achievement.

Here information on the act of school choice in the Netherlands is used. There is a diversity of providers in the Dutch market. In addition to public schools, managed at the municipal level, the private school sector is composed of religious and secular schools. The religious school sector is dominated by Catholic and Protestant managed schools, but includes other providers as well. In fact, two-thirds of all schools in the Netherlands are private. Moreover, most private schools are religious in nature, at 91 percent; and religious schools make up 59 percent of all schools in the Netherlands. There is evidence that parents are active choosers, basing their decision at times on religion. According to research, more than 50 percent of parents choose schools based on religion (Teelken 1998). This suggests that religion would be a good instrument for private school choice. Himmler (2009) used an Instrumental Variables approach for analyzing school achievement in the Netherlands. He controlled for the possible endogeneity of Catholic school competition to public school quality. He found a positive link between competition intensity and academic achievement in secondary school.

Fortunately, PISA 2006 asks the school principal if parents' endorsement of the instructional or religious philosophy of the school is taken into consideration at the time of admission, meaning that parents express an interest in the religious orientation of the school (see PISA School questionnaire). In the analysis that follows, this variable is used as an instrument for parental preference or choice based on religion. In the Netherlands, according to PISA 2006, 38 percent of parents choose schools based on religion. It appears that religion is a good variable

for predicting private school choice, but not a determining factor of academic performance. In an equation of the form:

$$D_{i,j,t} = \beta_0 + \beta_1 RELIGION_{i,t} \qquad (2)$$

Where D is private school attendance, *Religion* is a 0,1 dummy variable and if 1, means that parents choose schools based on religion and 0 otherwise, as derived from the PISA questionnaire, it is estimated that *Religion* is a good predictor of private school choice:

$$D = 0.54 + 0.37 \; RELIGION, \; R\text{-}squared = 0.145$$
$$(0.03)$$

At the same time, *Religion* it is not very much correlated with achievement:

$$Y_{math} = 523.2 + 19.7 \; RELIGION, \; R\text{-}squared = 0.0124$$
$$(4.8)$$

$$Y_{reading} = 497.6 + 24.3 \; RELIGION, \; R\text{-}squared = 0.0159$$
$$(5.1)$$

$$Y_{science} = 517.8 + 18.6 \; RELIGION, \; R\text{-}squared = 0.0095$$
$$(5.4)$$

The variable *Religion*, therefore, is used as an instrument for private school attendance. The impact of private school attendance is estimated using Instrumental Variables. The IV results indicate that private school attendance may be associated with higher test scores (Table 4). The IV estimate of the effectiveness of private schools is apparently higher than in the base (OLS) equation. In fact, the IV effect is at least three times what one obtains in the OLS regressions. Moreover, the effect size is higher and the private school variable becomes positive and significant in the case of science. Private school size effects in math, reading and science achievement are 0.17, 0.28 and 0.18, all significant. Given PISA's scaling, this is close to 0.2 of a standard deviation in the case of math and science, and almost 0.3 of a standard deviation in

reading. In other words, these are large effect size effects, indicating that school choice may contribute to achievement in the Netherlands.

In the case of math outcomes, private school attendance is associated with a significant effect size of 0.17 of a standard deviation. This is much higher than what one obtains with OLS. It is also interesting that there is a substantial change in at least one of the institutional variables. That is, the coefficient on firing teachers is reduced by 20 percent, or 9 points, while at the same time private schooling increases three-fold, or by 12 points. In reading, the impact of private schooling is much higher in the IV results. In fact, when instrumented private school attendance has a six times higher effect size than in OLS. Also for reading, the impact of firing teachers is substantially reduced in the IV results, by more than 87 percent, or 18 points; at the same time, the impact of private schooling increased by 24 points. In science, when estimated using OLS, private schooling had no effect, and the coefficient was insignificant. Moreover, the impact of firing teachers was huge, at over 70 points. In the IV results, however, the firing teachers variable is substantially reduced, falling by more than 24 points. At the same time, the private schooling effect increases from an insignificant effect in OLS, to a large, positive and significant effect in the IV results. The private school effects are large and significant, suggesting that private schools may have a positive effect on learning outcomes, even controlling for institutional factors and a host of other controls.

Therefore, one may reject the null hypothesis that private schools have no impact on cognitive ability. The estimated results suggest that private school choice is beneficial for improving cognitive ability. The difference between the OLS and IV results further suggest that private schooling's impact works through the competition that the Dutch system promotes. Parents are able to choose among a variety of providers, thus ensuring that tastes and preferences

are catered to and they are able to afford the private school option since all costs are covered by the government. The competitive funding system promotes innovation, efficiency and excellence. The competition that is created in the Dutch market leads to efficiency gains as schools are able to cater to different markets and parents exercise their choice to find the provider for their children that best fits their needs. Overall, the system boasts high average attainment levels. That is, achievement is high for all groups, with the average score of Dutch students significantly above the OECD average in all three subjects.

The question that remains is why one would obtain such a large impact of private school attendance when the absolute differential is small? In other words, the raw test score differentials and OLS results are only slightly higher for private schools; yet when one controls for selection, large effects are estimated. The answer may lie in the fact that the competition that is created in the market leads to efficiency gains as schools are able to cater to different markets and parents exercise their choice to find the provider for their children that best fits their needs. In fact, the students of private schools come from slightly less well-off families. This is evident in Table 2 which shows that the mothers of private school students are slightly less well educated than the mothers of students in public schools (see also Figure 4). Therefore, one possibility is that the true private school effect operates via the value it adds for students from relatively less well-off backgrounds.

CONCLUSIONS

School choice is often promoted as a means of increasing competition in the school system. It is believed that competition will lead to efficiency gains as schools – public and private – compete for students and try to improve quality while reducing expenses. By

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encouraging more private schools, school choice allows school managers to become innovative and thereby bring improvements to the learning process. Public schools, in order to attract the resources that come with students, will need to improve. Thus, school choice will lead to improved learning outcomes and increased efficiency. Opponents claim that in a school choice system private providers will be unaccountable to taxpayers and the public. Claims of efficiency gains are also questioned. Further, opponents sometimes claim that choice will lead to privatization and less public (government) control of education.

One of the key features of the Dutch education system is freedom of education – freedom to establish schools, determine the principles on which the school is based, and organize classroom teaching. School choice is made possible through public finance, making it the oldest publicly financed school choice system in the world. The Dutch version of freedom of education allows parents to choose schools, to establish schools, to organize teaching, and to determine the principles of the school. This has resulted in a large number of private schools financed by the state. Moreover, parents can typically choose among several schools. Private schools are non-selective, all schools are equally publicly financed, there is ease of entry of providers into the market, and information flows. Most children in the Netherlands attend privately-managed schools, all of which are non-profit and usually managed by a foundation or church.

Studies of the effectiveness of school choice programs suffer from an inability to control for selection and are usually not able to attribute outcomes to the type of school attended. Since most schools in the Netherlands are private and religion is a key factor associated with parental choice of school, this fact is used to create an instrument by which to measure the effectiveness of private schools in the Netherlands.

Empirical estimates using PISA 2006 data for the Netherlands suggest that private schools may have a large, positive and significant impact on school outcomes. This result is maintained and even becomes much larger when selection is accounted for. Private school size effects in math, reading and science achievement are 0.17, 0.28 and 0.18, all significant. Given PISA's scaling, this is close to 0.2 of a standard deviation in the case of math and science, and almost 0.3 of a standard deviation in reading. In other words, these are large effect size effects, indicating that school choice contributes to achievement in Netherlands. The reasons for an impact, despite the almost equal raw scores in achievement between public and private schools and almost 100 years existence of a system of public finance of private school choice, might have to do with the fact that it is the relatively less well-off that attend private schools in the Netherlands. That is, the mothers of private school students are slightly less well educated than the mothers of students in public schools. Therefore, one possibility is that the private school effect operates via the value it adds for students from relatively less well-off backgrounds.

This study has contributed to the small but growing international literature on the effectiveness of school choice. It was shown that private school choice can have an impact, while at the same time contributing to overall high levels of achievement and equity. Also, the Dutch education system exhibits a strong central education policy role but decentralized school management. While private schools have a positive impact, public schools also perform very well and all schools are associated with high levels of autonomy – for example, ability to fire teachers, setting of teacher salary increases, using achievement data, allowing parental participation – at the school level. Thus, central government control and school choice in a predominantly private schooling environment is possible, and evidently beneficial in terms of academic achievement. Dutch students perform exceptionally well on international academic

achievement tests, whether they are enrolled in public or private schools. Thus, a large school choice system can promote efficiency and equity without necessarily leading to privatization or to reduced public scrutiny – school choice led to heightened demands for information, prompting the education Inspectorate to promote the use of school report cards and wide dissemination of school results.

The Netherlands shows that a large private sector with equal public funding does not necessarily mean decentralization and a weak central role. Choice can coexist with a strong center. Interestingly, as the central government has moved away from any direct provision of education services, its role in policy making, evaluation, and information dissemination has increased. Therefore, the fear of the retreat of the state from matters of importance in education policy with the introduction of market forces is not founded.

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Table 1: PISA 2006 Results

	Math			Science			Reading	
1	Finland	548	Finland	563		Korea	556	
2	Hong Kong	547	Hong Kong	542		Finland	547	
3	Korea	547	Canada	534		Hong Kong	536	
4	**Netherlands**	531	Estonia	531		Canada	527	
5	Switzerland	530	Japan	531		New Zealand	521	
6	Canada	527	New Zealand	530		Ireland	517	
7	Macao, China	525	Australia	527		Australia	513	
8	Liechtenstein	525	**Netherlands**	525		Liechtenstein	510	
9	Japan	523	Liechtenstein	522		Poland	508	
10	New Zealand	522	Korea	522		Sweden	507	
11	Belgium	520	Slovenia	519		**Netherlands**	507	

Source: OECD 2007

	Total		Private		Public	
	Mean	SD	Mean	SD	Mean	SD
School can fire teachers	0.994	(0.080)	1.000	(0.000)	0.979	(0.143)
Achievement data used	0.752	(0.432)	0.750	(0.433)	0.756	(0.430)
Set teacher salary increase	0.809	(0.393)	0.771	(0.420)	0.894	(0.308)
Parents involved in budget	0.088	(0.284)	0.071	(0.257)	0.128	(0.334)
Religion used to select school	0.401	(0.490)	0.536	(0.499)	0.092	(0.290)
Student-teacher ratio	16.325	(4.204)	16.227	(4.584)	16.546	(3.162)
Math class hours	2.888	(1.433)	2.886	(1.444)	2.894	(1.408)
Teachers certified	0.884	(0.191)	0.877	(0.176)	0.900	(0.221)
School location rural	0.026	(0.158)	0.028	(0.164)	0.021	(0.145)
Student Grade						
9th	0.430	(0.495)	0.433	(0.496)	0.423	(0.494)
10th	0.529	(0.499)	0.534	(0.499)	0.517	(0.500)
11th	0.006	(0.075)	0.004	(0.065)	0.009	(0.094)
Age	15.718	(0.285)	15.718	(0.284)	15.717	(0.288)
Female	0.498	(0.500)	0.499	(0.500)	0.494	(0.500)
Mother's education Primary	0.051	(0.220)	0.050	(0.218)	0.053	(0.223)
Lower secondary	0.128	(0.334)	0.127	(0.333)	0.131	(0.337)
Upper secondary	0.518	(0.500)	0.547	(0.498)	0.454	(0.498)
University	0.284	(0.451)	0.261	(0.439)	0.334	(0.472)
Books at home 11-100	0.423	(0.494)	0.425	(0.494)	0.419	(0.494)
101-500	0.456	(0.498)	0.453	(0.497)	0.464	(0.499)
One or more computer at home	0.994	(0.074)	0.996	(0.064)	0.991	(0.092)
N	3,840		2,665		1,175	

Source: PISA 2006

Table 3: Determinants of Learning: GLS

	Math		Reading		Science	
Private school attendance	**4.7**	**(2.2)***	**4.0**	**(2.4)***	**-1.0**	**(2.3)**
Institutional variables:						
School can fire teachers	43.3	(12.4)*	19.9	(13.9)	72.5	(13.5)*
Achievement data used	8.3	(2.3)*	10.6	(2.6)*	6.8	(2.4)*
School sets teacher increase	8.1	(2.5)*	9.9	(2.8)*	7.6	(2.7)*
Parents involved in budget	11.4	(3.5)*	16.0	(3.8)*	13.9	(3.8)*
School variables:						
Student-teacher ratio	4.5	(0.2)*	4.3	(0.3)*	4.5	(0.3)*
Class hours	9.3	(0.7)*	1.2	(0.9)	13.7	(0.6)*
Certified teachers	-8.5	(5.2)	7.7	(5.8)	4.7	(5.6)
Rural	-13.6	(6.3)*	-7.6	(6.9)	-19.2	(6.9)*
Student's grade:						
9	43.4	(5.4)*	59.9	(6.0)*	41.8	(5.8)*
10	102.2	(5.6)*	111.9	(6.2)*	97.4	(6.0)*
11	180.1	(14.3)*	185.1	(16.2)*	163.7	(15.4)*
Student's age	-31.4	(3.9)*	-27.3	(4.4)*	-23.1	(4.2)*
Female	-20.8	(2.0)*	13.1	(2.2)*	-16.9	(2.1)*
Mother's education:						
Primary	27.3	(8.3)*	19.1	(9.3)**	23.8	(9.0)*
Lower secondary	27.7	(7.6)*	19.2	(8.5)*	31.1	(8.3)*
Upper secondary	24.8	(7.3)*	25.1	(8.1)*	34.3	(7.9)*
University	42.3	(7.5)*	39.7	(8.3)*	47.5	(8.1)*
Books at home:						
11–100	26.0	(3.2)*	25.2	(3.6)*	27.5	(3.5)*
101-500	58.7	(3.4)*	54.3	(3.7)*	59.4	(3.6)*
Computer(s) at home	36.8	(13.3)*	29.4	(14.8)**	45.0	(13.7)*
Constant	723.5	(66.7)*	652.3	(73.1)*	528.9	(70.4)*
N (students)	3,866		3,891		3,737	
R-square	0.446		0.349		0.476	

Source: Estimation with GLS from PISA 2006

Notes: Standard errors in parentheses; indicates significances at * 1%, ** 5%, *** 10%

Table 4: IV Estimation of Determinants of Learning, Netherlands

|		Math		Reading		Science
Private		17.4	(5.4)*	28.3	(5.8)*	17.9	(6.0)*
School can fire teachers		34.7	(12.9)*	2.5	(14.3)	48.0	(14.3)*
Achievement data used		8.3	(2.3)*	10.0	(2.6)*	7.1	(2.6)
Schools set teacher increase		9.1	(2.7)*	12.1	(3.0)*	10.3	(3.0)*
Parents involved in budget		13.1	(3.6)*	21.0	(4.0)*	18.4	(4.0)*
Student-teacher ratio		4.5	(0.2)*	4.2	(0.3)*	5.2	(0.3)*
Class hours		9.3	(0.7)*	8.4	(0.8)*	9.2	(0.8)*
Certified teachers		-6.6	(5.2)	11.4	(5.8)	10.6	(5.8)
Rural		-14.1	(6.4)*	-10.2	(7.0)	-24.0	(7.0)*
Student's grade:							
9		42.2	(5.5)*	56.9	(6.1)*	41.9	(6.1)*
10		101.1	(5.7)*	107.6	(6.3)*	94.6	(6.3)*
11		180.5	(14.4)*	176.7	(15.9)*	166.1	(15.9)*
Age		-31.2	(4.0)*	-24.6	(4.4)*	-22.2	(4.4)*
Female		-20.8	(2.0)*	15.2	(2.2)*	-15.8	(2.2)*
Mother's education:							
Primary		26.3	(8.4)*	15.8	(9.3)*	24.3	(9.3)*
Lower secondary		26.4	(7.7)*	16.1	(8.5)*	31.7	(8.5)*
Upper secondary		23.0	(7.4)*	19.6	(8.2)*	31.3	(8.2)*
University		41.8	(7.6)*	36.6	(8.4)*	51.2	(8.4)*
Books at home:							
11–100		25.9	(3.3)*	22.5	(3.6)*	31.5	(3.6)*
101-500		58.7	(3.4)*	50.7	(3.8)*	67.3	(3.7)*
Computer(s) at home		34.3	(13.4)*	26.9	(14.8)*	48.1	(14.8)*
Constant		718.2	(66.3)*	593.8	(73.4)*	504.1	(73.3)*
N		3,840		3,840		3,840	
R^2		0.442		0.352		0.415	
Partial R-sq. for 1st stage		0.166		0.1665		0.1665	
F-test		762.64		762.64		762.64	
[*p*-value]		0.0000		0.000		0.000	
Anderson-Rubin test	F	4.26		6.99		2.66	
	P-val	0.0390		0.0082		0.1033	
	Chi-sq(1)	4.29		7.03		2.67	
	P-val	0.0384		0.0080		0.1022	

Source: Computed from PISA 2006

Notes: Standard errors in parentheses

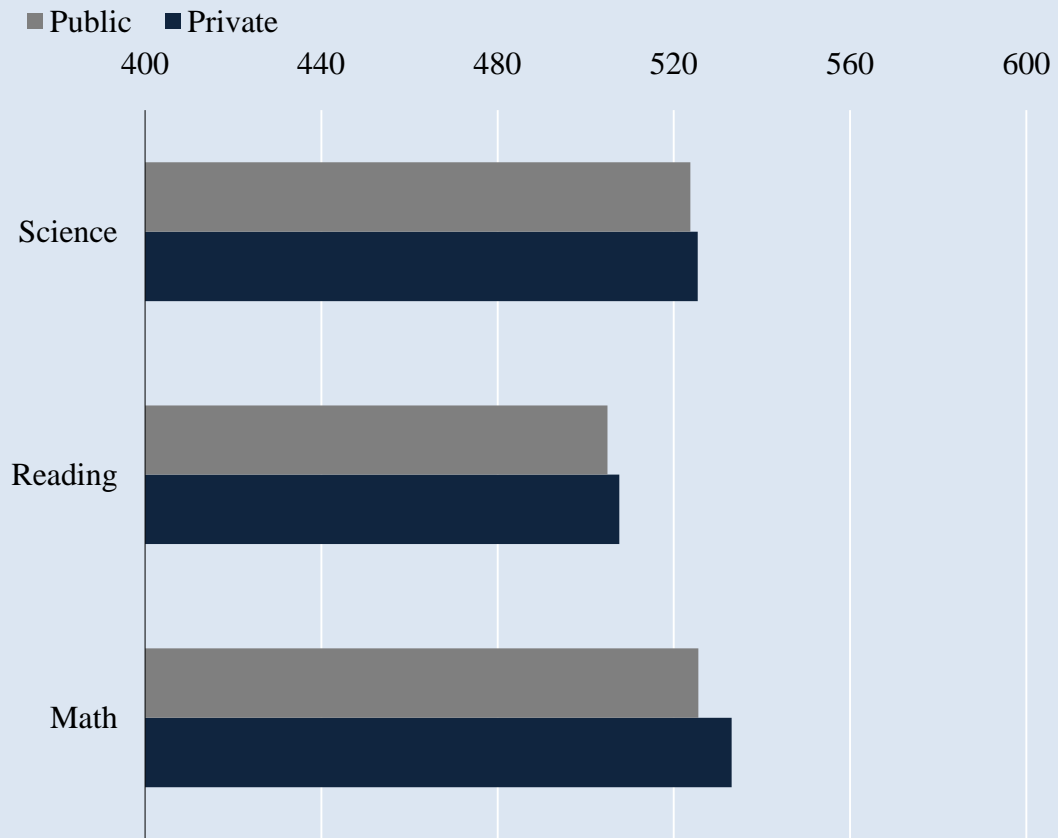Figure 1: Private and Public Enrollment Shares (%), Primary
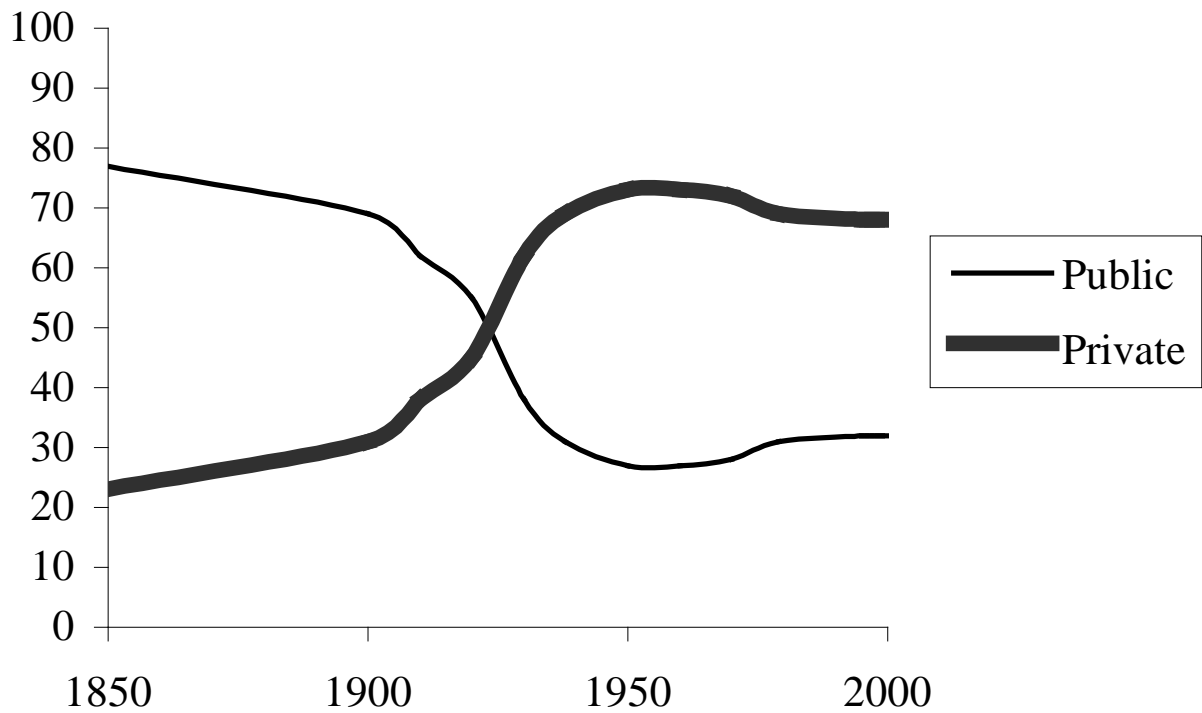
Source: MOE; James 1984; Justesen 2002

Figure 2: Private and Public
Enrollment Shares (%), Secondary
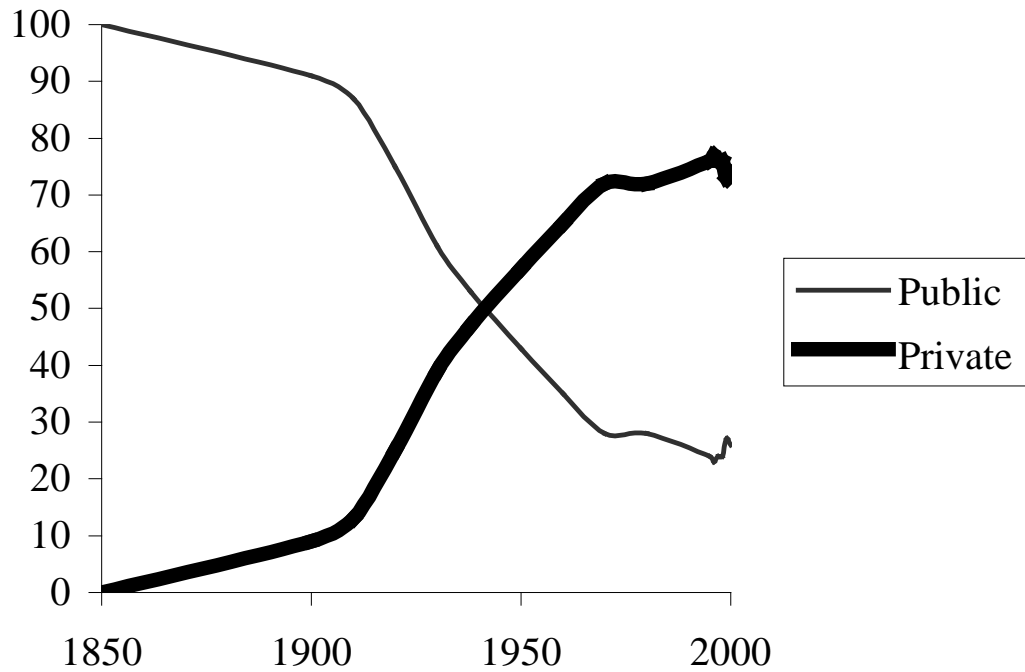
Source: MOE; James 1984; Justesen 2002

Figure 3: PISA Scores, Netherlands, by Type of School

Source: PISA 2006

Figure 4: Mother's education by School Type