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Differences in Scholastic Achievement of Public, Private Government-Dependent, and Private Independent Schools

A Cross-National Analysis

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The gross differences in scholastic achievement among public, private government-dependent, and private independent schools in 22 countries are analyzed with Programme for International Student Assessment 2000 data. In a multilevel approach, the authors estimate these sector effects, controlling for sociological characteristics of students and parents, school composition, teaching and learning conditions of schools, and students' and principals' perception of the climate of their schools. The main explanation of their gross differences in scholastic achievement is the better social composition of private schools, both government dependent and independent. But pupils at private government-dependent schools have a higher net educational achievement than do comparable pupils at public schools with the same social composition. The explanation of these remaining net differences in scholastic achievement seems to be their better school climate. These net differences in scholastic achievement between public and private school sectors are equal across nations, despite historical differences of educational systems.

Keywords: *school effectiveness; private versus public schools; cross-national comparison; added value; school vouchers; secondary education*

The differences in scholastic achievement of public and private schools have been the topic of a large number of studies in the educational sciences, sociology, and economics, mostly in the United States but also, to some extent, in Europe. In this literature, the distinctions among public schools,

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private government-dependent schools, and private independent schools are particularly important. First, in many countries, these three types of schools exist alongside each other, especially in Europe, where it was the unintended outcome of the 19th century struggle between the state and churches on the ownership and financing of schooling. Second, the functions of these three types of schools can significantly differ, depending on social, religious, or ethnic groups that charter these types of public and private schools. Third, the distinction between public schools and private government-dependent schools also relates to current policy debates about organizing and financing collective goods such as education.

Although there are many exceptions, the general trend of this research of the differences in scholastic achievement of private and public schools can be summarized as follows: Pupils at private government-dependent schools (often religious schools) have higher cognitive outcomes than those in public schools, even after allowing for the social and cultural composition of these schools. Pupils at private independent schools have lower cognitive outcomes than public schools, but only after allowing for the social and cultural composition of these schools (for Europe, see Dronkers, 2004).

Although the differences in scholastic achievement of public and private schools is relevant for nearly all modern countries, no cross-national research has been conducted on the differences in scholastic achievement of different types of schools. This lack of cross-national research is partly because of the dominance of American research on the topic and partly because of the strong nation-state orientation of the social sciences. Yet another contributing factor may be the political sensitivity of the possible lower scholastic achievement of public schools, especially in Europe. The only overview available is made by Dronkers (2004), who reviews the differences in scholastic achievement between religious state-funded schools and public schools in a number

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of single-country studies, including Belgium, France, Germany, Hungary, the Netherlands, and Scotland.

There is, however, a need for cross-national research. To understand the causes of these differences in scholastic achievement between public and private schools, one must have sufficient variation of various school characteristics. As this variation is often lacking within a single state because of nationwide regulations that restrict the range of variation among schools, single-country studies may fail to capture the "real" effects of private and public schools.

Our aims in this article are therefore threefold. First, we attempt a systematic empirical test of the degree of scholastic achievement differences in reading performance of individual students in public and private secondary schools in 22 comparable countries, taking into account the characteristics of students and parents and compositional characteristics of schools. Second, we try to explain these differences in scholastic achievement according to the characteristics of students and schools, which relates to administrative, learning, and teaching conditions and the school climate. Third, we test whether or not these differences in scholastic achievement are equal in these 22 countries.

For the analyses, we use data from the Programme for International Student Assessment (PISA) 2000 survey conducted by the Organisation for Economic Co-operation and Development (OECD), which are currently the best available data for such a cross-national comparison, although they still have notable limitations. After discussing the possible explanation of differences in scholastic achievement of private and public schools and the variables of the PISA data, we apply multilevel analyses for the correct estimation of the net differences among these three school sectors across 22 countries.

Public Schools, Private Independent Schools, and Private Government-Dependent Schools

As a consequence of the struggle between the church and the state within many European societies, private schools can have different relations with the state. The most fundamental aspect of this relationship is the degree to which private schools are funded by the (local, regional, national) government, alongside student fees, donations, sponsorship, and parental fund-raising. In a number of societies, private schools have a juridical right to state funding, given that they meet certain conditions. In some cases this right is enshrined in constitutional law (Germany, the Netherlands), whereas in others this right is accorded by normal law (France, Hungary). This right of funding of private

schools by the state also means a restriction of the autonomy of these funded private schools. Although these restrictions differ from society to society and vary according to the degree of state funding, one can say that, in general, this decreases the autonomy of these schools regarding their curriculum, modes of examination, payment of teachers, and admission of students. But their free space to improve the quality of their school is still larger than that of public schools.

Alongside these private government-dependent schools, there exist in a number of countries private schools that do not get funding from the (local, regional, national) government. Financially, they are fully dependent on student fees, donations, sponsorships, and parental fund-raising. However, their school autonomy can still be restricted in two ways. First, authorities might set criteria even for independent private schools to ensure some minimum quality of the socialization of the next generation. Second, even independent private schools function within a societal context and are partly determined by it. For example, entrance criteria for universities will restrict the autonomy of a private school's curriculum. However, private school autonomy will be the largest in their student admission policies, especially given the importance of student fees for the financing of these schools.

Given the different conditions for private independent and private government-dependent schools and their opportunities for competition with public schools, we consequently distinguish among independent private schools, private government-dependent schools, and public schools. By doing so, we can test whether these two types of private schools are simply interchangeable forms of private schools. Vandenberghe and Robin (2004) do not make this distinction between private independent and private government-dependent schools. They report that private education does not generate benefits, but this might be a consequence of failing to make this distinction.

We acknowledge that this distinction among public, private government-dependent, and private independent schools is still crude, especially because the history and evolution of these various types can be quite different in the various societies: church versus market oriented, one church versus various churches, strong versus weak connection with various political parties, strongly contested versus broadly accepted, recent growth versus a long-standing existence. Also, their actual constitutional arrangements will be quite different: based on constitutional right versus policy agreement, strong versus weak control by state authorities. Therefore, it is important to consider the effectiveness of the various conditions of teaching and learning, such as educational and material resources and degree of school autonomy, as we do. For this reason, we also test whether these differences in scholastic achievement

are equal in the various countries. It might be possible that public, private government-dependent, and private independent schools have the same function in modern society despite the different history and constitutional arrangements.

Explanations of Scholastic Achievement Differences Between Public and Private Schools

The literature on the possible causes of scholastic achievement differences among schools is extensive. Although we cannot review this complete literature, we draw on the most recent overviews (Sammons, Hillman, & Mortimore, 1995; Scheerens & Bosker, 1997; Teddlie & Reynolds, 2000). Thus, for example, Coleman, Hoffer, and Kilgore (1982) analyzed the scholastic achievement differences between public and Catholic schools in the United States, whereas Coleman and Hoffer (1987) and Bryk, Lee, and Holland (1993) provided comprehensive follow-up studies on these same differences. Dronkers (2004), meanwhile, reviewed the empirical evidence of scholastic achievement differences among public, Catholic, and Protestant schools in Europe. Below, we summarize only the most debated causes of these differences as a subsequent basis for selecting the relevant variables on students, parents, and schools for analyzing and interpreting them.

Differences in Student Characteristics and School Composition

Given the higher probability that private schools will request fees from parents, the social background of students in private and public schools will vary, especially in terms of the occupational, educational, and financial characteristics of parents. Consequently, more students from a more favorable background will go to private schools, which in turn might improve the social composition of the school population. More students of a favorable background will increase the opportunities of reaching higher levels of scholastic achievement as a result of a higher level at the start of secondary school and the better social composition of the schools, which improves teaching and learning conditions (especially more teaching because of a lower level of nonacademic disturbances). This will promote a potentially better reputation of academic quality for private schools in comparison to public schools, thus attracting different students and further improving the social composition of the schools. We try to allow for as many social background characteristics as possible and for the social composition of the student body of schools.

Different Conditions for Teaching, Learning, and School Administration

Public and private schools differ in their administration and conditions for teaching and learning. Although public schools are fully dependent on the state for their finances and their administration, private schools depend more on student fees and private charity and on the state for additional support. It is not self-evident that private schools have optimal conditions compared to public schools (e.g., the student–staff ratio), but differences in these conditions might influence scholastic achievement. There is also a variation in educational administration between public and private schools (especially in the degree of bureaucratization; Hofman, 1993), and this can also help explain some of the differences in educational performance. These differences do not refer to the formal differences in educational administration but rather to the tendency for stronger informal relations between board and teachers in private schools, which may partly explain the better performance of their pupils. We try to take these differences in administration and learning and teaching conditions into consideration by allowing for various aspects of these school characteristics.

Different School Climates

Given the possible differences in students, parents, social composition of the school population, school administration, and conditions for teaching and learning between public and private schools, different patterns of behavior from teachers and students might develop. These different behavioral patterns will promote more or less shared beliefs about what students should learn, about the proper norms of instruction, and about how students and teachers should relate to each other. These patterns, which form the basis of a school climate, might affect the effectiveness of teaching and learning within these schools. These patterns may also affect teacher morale, which can also influence teaching effectiveness. We try to consider these differences in school climate by considering various indicators of the behavior of teachers and students, from the perspectives of both the students and the principals.

Different Histories and Societies

As said in the introduction section, the main argument for this cross-national analysis is the need for sufficient variation of various school characteristics to capture the real effect of private and public schools. But these school

characteristics and their relations with private and public schools vary across societies as a consequence of the different historical trajectories and the social and cultural makeup of these societies and their educational systems. The development of private and public schools on the European continent is the unintended result of three processes in these societies: the struggle between the state and the established churches in Europe, the fight between the 18th-century *anciens régimes* (most of which had one state church and suppressed religious minorities) and 19th-century liberal governments, and the emergence of new socioeconomic classes in the 19th century (skilled workers, craftsmen, laborers) who rejected the dominant classes, whether liberal or conservative. In societies such as Austria-Hungary,[1] Belgium, Denmark, France, Germany, the Netherlands, and Spain, these processes had more or less comparable outcomes (although the moment of its introduction strongly varied), with the establishment of public and private government-dependent school sectors (often religious (not only Catholic or Protestant, but also Jewish or Islamic) or with specific pedagogical ideology (Montessori) that offer parents a choice of schools with more or less the same curriculum and usually similar financial costs. However, the size of the public and private government-dependent school sectors greatly varies among these societies for specific historical reasons, and private schools disappeared in some of them (Czech Republic, Hungary) under communist regimes, to reemerge after their breakdown (Dronkers & Robert, 2004b). Also, the existence of a private independent school sector varies among these European societies. In some societies (the Netherlands, Denmark), the private independent sector disappeared, probably because of strong competition with the private government-dependent schools, whereas in other societies (France, Italy, Spain), they exist along with the other school sectors, offering educational services for special groups (elites, dropouts from public schools). The position of these two private school sectors in England and its former colonies (New Zealand) is quite different from that of those in continental Europe. Archer (1984) has explained this Anglo-Saxon deviation by its stronger confidence on the market to organize and finance schools, which resulted in a relatively large private independent school sector. The debate in the United States on school choice and subsidizing private schools by the state is more recent. Parental choice and state-funded private schools are often advocated in the United States as a means of introducing competition for pupils among schools and decreasing the level of bureaucracy, thereby improving the quality of teaching and reducing the cost of education (Chubb & Moe, 1990). The other argument is that schools should offer young people an education that is in accordance with the way of life of their parents, which is another argument used in the

United States and which comes closer to the European tradition of government-dependent religious schools (Godwin & Kemerer, 2002). Given the diversity of the histories and arguments of private and public schools in the various societies, one might expect significant differences in their scholastic achievements across societies, and we test whether this is the case.

However, one can also argue that education in postindustrial societies has become a major dimension of inequality, alongside occupation and wealth. In all of these societies, formal or informal school choice (either directly by choosing schools or indirectly by choosing school districts through housing choices) has become an important way for parents to influence the educational success of their children and thus the reproduction of the intergenerational inequality. This importance of parental school choice (whatever the educational system is) forces public and private schools in all of these societies to be attractive and thus as educationally effective as possible. Private schools have more opportunities to become more effective than do public schools because of their more effective school administration and better school climate. As the long-term consequence of this competition, private schools in all these societies have on average a comparably higher net scholastic achievement despite the original differences in histories of these public and private schools.

Use of PISA Data and Measures

Data

Our analysis is based on the PISA 2000 survey organized by the OECD under the OECD Program for International Student Assessment. This research aimed to provide internationally comparable evidence on the performance of 15-year-old students in all the OECD countries and some other countries (e.g., Brazil, Russia, and Switzerland). The data file used for the empirical analysis is exactly the same, which the OECD has made available on the Internet for the purpose of secondary analysis. The PISA database was collected in response to the need for internationally comparable evidence of student performance within a common framework that was internationally agreed on. Selection of the measures was made on the basis of advice from substantive and statistical expert panels and results from extensive pilot studies. Substantial efforts and resources were devoted to achieving cultural and linguistic breath in the assessment materials, stringent quality-assurance mechanisms were applied in the translation of materials into different languages, and the data were collected under independently supervised test

conditions. Paper-and-pencil assessments consisted of a combination of multiple-choice items and written responses. The database comprises data collected in 2000 in 32 countries. Although all students completed the reading assessment items (which were the focus of the 2000 data collection), only random samples of students completed the mathematical assessments. Therefore, we report here on only the reading score as the indicator of differences in scholastic achievement.[2] In addition to the original variables derived from the survey, OECD researchers have developed numerous aggregated measures based on students' and school principals' responses, and these variables were also added to the dataset. Information on these aggregated measures, including their reliability and internal consistency, is available from the Manual for the PISA 2000 Database and from the PISA 2000 Technical Report (OECD, 2001a, 2001b). We decided to use these broadly accepted measures rather than developing our own (potentially more contestable) indicators. We refer the reader for more information on the sampling design, the measurement of the variables, and the reliability of the variables to these two OECD reports and will confine ourselves to reporting the adjustments we made to the data.

The strength of the PISA 2000 data is their cross-national comparability. The OECD has developed a scheme to compare the outcomes of various educational systems by making use of the experiences of earlier efforts to compare cross-national educational results (American Educational Research Association, Third International Mathematics and Science Study). By using a multilateral approach to develop this scheme, it has avoided a one-sided measurement, and its results are widely recognized throughout the participating countries. Although one can doubt whether the PISA indicators cover all particularities of the education systems of each analyzed country, they are the most reliable and valid data for a cross-national comparison across a large number of comparable societies. A weakness of the PISA 2000 data is the cross-sectional nature of the collected data. It is a one-moment picture of the 15-year-old students; we do not know anything about their further development, nor about their earlier education experiences and outcomes. It is widely recognized that a longitudinal measurement of educational outcomes in relation to school characteristics is superior to a cross-sectional measurement because longitudinal data better allow for the consideration of unmeasured variables and self-selection. Unfortunately, such a cross-national and longitudinal data set is not available and will probably not be available in the coming years. Moreover, we know from the history of the study of school effectiveness that the higher scholastic achievement of nonpublic schools is lower in longitudinal data but that the direction of the results is equal to those

obtained with cross-sectional data (e.g., the analogy between the outcomes of Coleman et al. [1982] using cross-sectional data and those of Coleman and Hoffer [1987] using longitudinal data). Therefore, we think that an analysis of these special cross-sectional data is worthwhile, scientifically interesting, and academically relevant.

Private and Public Schools

We have selected a certain number of countries to be included in this analysis. We chose countries where both the public and private sectors of education are developed and those that represent a wide range of comparable societies. The countries we have selected are, in alphabetical order, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States (see Table 1 for our final data set). We did not select Latin American or Asian countries, although there sometimes exist important nonpublic sectors (e.g., Brazil, South Korea), because of the different stages of their social and economic development and their different educational traditions. We also did not select countries from the former Soviet Union (e.g., Russia or Baltic states) because their societies and their educational systems underwent mayor transformations after the breakdown of the Soviet communist regime in 1990s. Our selection is thus restricted to "first-world" countries that have more or less a common historical and educational background to avoid any possible disturbance by a lack of equivalence of the characteristics of students, parents, and schools because of major societal transformations or different stages of development.[3]

We also distinguish between private independent schools and private government-dependent schools. This division within the private school sector was developed earlier by the OECD and was applied by the PISA survey. Given the importance and acceptance of this distinction for policy makers (the public character of the board, the amount of funding by states) and the history of private education in these countries (Dronkers, 2004), we did not develop a division of our own. The schools are classified as either public or private solely according to whether a public agency or a private entity has the ultimate power to make decisions concerning the institution's affairs. An institution is classified as public if it is (a) directly controlled and managed by a public education authority or agency or (b) controlled and managed either by a government agency directly or by a governing body (council, committee, etc.), most of whose members are appointed by a public authority

Table 1
Percentages of Students and the Absolute Number of Schools by
School Sector and Country in the Final Unweighted Data Set

Country[a]	School Sector Private Independent		N of Cases Private Government Dependent		Unweighted Public			
	%[b]	n[c]	%	n	%	n		
Austria	5.6	11	5.6	9	88.8	183	4,250	203
Belgium	0.5	1	74.6	147	24.9	54	6,042	202
Czech Republic	0.4	2	6.1	20	93.5	205	5,133	227
Denmark	—		23.0	51	77.0	158	3,831	209
Finland	—		3.1	6	96.9	149	4,812	155
France	7.9	12	14.3	24	77.8	117	4,013	153
Germany	—		4.3	8	95.7	184	4,304	192
Greece	3.3	5	—		96.7	146	4,322	151
Hungary	0.7	1	4.2	7	95.1	174	4,634	182
Ireland	2.9	4	60.2	79	36.9	54	3,737	137
Italy	4.2	8	0.6	1	95.2	152	4,547	161
Luxembourg	—		11.6	3	88.4	19	3,065	22
The Netherlands	—		75.2	66	24.8	23	2,198	89
New Zealand	4.4	6	0.1	1	95.6	137	3,372	144
Norway	—		0.9	3	99.1	162	3,835	165
Poland	2.5	5	—		97.5	120	3,505	125
Portugal	1.9	4	5.4	7	92.7	136	4,271	147
Spain	8.6	15	29.5	50	61.9	109	5,570	174
Sweden	—		3.4	6	96.6	148	4,264	154
Switzerland	3.9	18	1.9	7	94.2	241	5,600	266
United Kingdom	4.9	16	—		95.1	321	8,392	337
United States	3.7	5	1.1	1	95.2	110	2,746	116
Total	2.7	250	14.0	520	83.3	4,130	96,443	4,900

a. $N = 22$.
b. Percentage of students.
c. Absolute number of schools.

or elected by a public franchise. In contrast, an institution is classified as private if it is controlled and managed by a nongovernmental organization (e.g., a church, trade union, or business enterprise) or if its governing board mostly consists of members not selected by a public agency. The terms *government dependent* and *independent* refer only to the degree of a private school's dependence on funding from government sources; they do not directly refer

to the degree of government direction or regulation. A government-dependent private school is one that receives more than 50% of its core funding from government agencies. An independent private school is one that receives less than 50% of its core funding from government agencies. *Core funding* refers to the funds that support the basic educational services of the schools. It does not include funds specifically provided for research projects, payments for services purchased or contracted by private organizations, or fees and subsidies received for ancillary services, such as lodging and meals.

Unfortunately, the PISA survey has no indicator of the possible religious nature of the schools. As a consequence, we cannot directly test the Coleman and Hoffer (1987) thesis on the higher scholastic achievement of Catholic schools. But in the majority of the analyzed countries (the United States is an exception at this point), the private government-dependent schools will be mostly religious-oriented schools (Catholic or Protestant) and the private independent schools will be religiously neutral enterprises. So comparing the scholastic achievement of public, private government-dependent, and private independent schools is only an indirect test of the thesis that Catholic or Protestant schools are more effective.[4]

Data Preparation

We weighted the PISA data in such a way that they are representative for each country.[5] To not get biased estimates in the statistical models because of the different number of cases, we gave each country an equal number of cases ($n = 3,000$).[6]

These selections and the handling of cases with missing values resulted in 96,443 unweighted students (66,000 weighted students) with valid measurement of the relevant variables in 4,900 (unweighted and weighted) schools in 22 countries (see Table 1). All analyses are based on this number of students and schools. In all, 15 countries had private independent schools and 19 countries had private government-dependent schools. This means that we have enough units at the highest level (country) to make reliable estimates in a random coefficient mode1 (Snijders & Bosker, 1999, pp. 43-44).

Variables

We refer to the PISA 2000 technical report for more information on the measurement of the variables and the scales based on them. Because of the lack of space, we discuss only those aspects of the variables and data that are directly important for the understanding of our analysis. We do not present

or discuss the tables with independent variables by school sector, also because of lack of space, but they are available from the authors or at the Center for Education Reform home page.

Dependent variables. The most complete indicator of student performance in PISA 2000 is the reading scale. It gives information on the reading proficiency of students, which is based on retrieving information from a text, interpreting a text, and reflecting on a text or evaluating it based on numerous tasks. This measure was constructed by applying weighted maximum likelihood estimates and was translated into a score with a mean of 500 and a standard deviation of 100, using the five plausible values (Warm, 1985). In addition, the PISA file contains measurement error variables for both the reading ability. We include this error term for reading in our multilevel analysis to allow for possible measurement error of the performance variable.

Sociological characteristics of students and parents. Most of the independent variables used to predict students' achievement are combined indices developed by PISA. These were also constructed by applying weighted maximum likelihood estimates and were standardized in such a way to have a mean of 0 and a standard deviation of 1 at the international level of all countries. Below, we give the reliability of these scales (Cronbach's α) as given by PISA as the mean for *all* OECD countries (not just a more homogenous selection of countries). All variables have a higher α than the normally accepted threshold (.5), and the majority have a high α. The first set of independent variables involves students' and parents' sociological characteristics. We differentiate between males and females in the analysis. Despite a slight variation, we consider school grade and age (measured in months in the data).[7] In keeping with established traditions of social mobility and status attainment research, we include the father's and mother's occupation and education as indicators of social origin. Occupation is measured in the data by the International Socioeconomic Index (ISEI; (Ganzeboom, de Graaf, Treiman, & De Leeuw, 1992), whereas education is measured by the International Standard Classification of Education scale (OECD, 1999). Further information on family background includes the number of siblings and the family structure, which distinguishes between nuclear families and other family constructions. The cultural climate of the family is expected to be an important factor of students' performance. In this regard, the PISA survey provides information on how frequently parents discuss political and social issues, books, films, and television programs with their offspring. PISA has combined these individual items into an index labeled parents' cultural communication ($\alpha = .55$). Similarly, students were

asked to report on how frequently parents discuss school issues with them, eat together with them around the table, or spend time talking to them at all. PISA combines these variables in an index labeled parents' social communication ($\alpha = .58$). In line with studies on cultural capita1 (Bourdieu, 1983; DiMaggio, 1982), possession-related classical culture contributes to the cultural level of the family. The PISA index on family cultural possession ($\alpha = .59$) is based on having classical literature, books of poetry, and works of art at home. In addition to cultural possessions, financial capital can also be of importance for educational outcomes. Because a direct measure of parental income is quite unreliable given that it is the students in the school who report on it, a family wealth index ($\alpha = .70$) has been constructed based on the presence of a dishwasher, television, cellular phone, car, computer, and link to the Internet at home. Because the research aims to explore the predictors of students' performance, we need to consider students' educational circumstances at home. This is measured by the PISA index labeled home educational resources ($\alpha = .36$), which considers whether or not the student has a desk and a quiet place for study at home and if the family has a dictionary, textbooks, and calculators.

School composition. Because the intention of this analysis is to compare students' performance in comparable public and private schools, we must also consider the social composition of the school population. To achieve this goal, we computed three aggregated variables from individual students' characteristics: the school average of father's occupational status (ISEI), the school average of family's wealth, and the school average of parents' cultural communication. These three aggregated indices of school compositions cover the three most important dimensions of inequality in school composition (financial, occupational, cultural). Adding more aggregated indices does not change our results.

The next indicator of school composition is the proportion of girls in the school. Religious schools, which are more often private schools, tend to more often be single-sex schools. Finally, a series of variables indicate the place of residence for the student, ranging from small municipality (inhabitants of less than 3,000) to a capital city. It is included in the analysis for the same reason as proportion of girls: Religion in most societies is stronger outside the big cities, and thus religious schools tend to be more common in the countryside.

Teaching and learning conditions in school and school administration. Indicators for the administrative, teaching, and learning conditions in schools are also considered as variables in the analysis of differences in scholastic

achievement. This type of information was provided in the PISA survey by school principals. They were asked to report on the number of teaching weeks per year, the number of class periods per week, and the number of teaching minutes per class; the hours of schooling per year variable summarizes this information. The availability of human capital in the school is another factor that may affect students' performance. We use two indicators to measure conditions in the school in this respect—school size (the total number of students in that school) and student–teacher ratio (total number of students divided by the total number of teachers in the school). The schools' instructional resources score ($\alpha = .85$) is based on principals' reports on the availability or lack of teaching materials, multimedia resources, science laboratory equipment, and facilities for fine art education. Furthermore, the schools' material resources index ($\alpha = .79$) draws on the principals' reports on physical infrastructure: condition of the school buildings, quality of the heating, cooling, and lighting systems, and availability or lack of space (e.g., classrooms) in the school. In addition, principals' perceptions were elicited on the shortage of teachers in general and, in particular, for languages, mathematics, and sciences. This information is summarized in the index of shortage of teachers ($\alpha = .88$).

Finally, autonomy also denotes a crucial part of teaching and learning conditions in the school and may have an influence on students' achievement. The school autonomy index ($\alpha = .77$) is derived from a number of questions on which school principals were asked to state whether or not different activities, such as hiring or firing teachers, deciding on teachers' salaries and their raises, deciding on the school budget, deciding on students' admission to the school, choosing textbooks, offering courses, and determining the content of the courses, are the responsibilities of the school or not. Principals also reported on whether or not teachers can take part in the kind of activities mentioned above. These answers served as a basis for the teacher autonomy index ($\alpha = .73$), an indicator of teachers' participation in decision making.

Students' attitudes on the school climate. The attitudes of students on the climate of their school constitute a set of independent variables that builds the context for their learning. The PISA survey collected information on these individual student attitudes. Students were asked about how well students get along with teachers, how much teachers are interested in students, how much they listen to what students have to say, and how fairly they treat students. PISA combined these questions in the teacher–student relationship index ($\alpha = .79$). Students' performance is affected by the general climate in the school and in the class. It matters if the teacher has to wait until students quietly sit down at the beginning of the class, if students do not start to work

when the class begins, if students do not listen to what teacher says, and if there is noise or disorder during the class. The school disciplinary climate index ($\alpha = .81$) is based on the individual students' responses to these questions. Another aspect is how much the teacher wants students to work hard, how much he or she tells them they can work better, and how much he or she dislikes it if students do not work well. Students' responses to these questions are combined in the achievement pressure index ($\alpha = .54$). An overall indicator of the student–school relationship emerges from the questions on how much the individual student feels like an outsider in the school or feels awkward in the place, how easily he or she can make friends there, how much he or she feels liked by the other students, and how lonely he or she feels. The PISA index titled sense of belonging in the school ($\alpha = .77$) provides combined information on this.

Principals' perception on the school climate. School climate is also represented by another set of school related variables that can influence student performance and thus explain differences in scholastic achievement. The PISA survey asked school principals to express their general perceptions of both teacher-related and student-related factors affecting the school climate. Teacher related factors include high or low expectations of the teachers toward their students, teacher absenteeism, frequency of changes in the teaching staff, teachers' encouragement of students to achieve better, or strictness with the students. Student-related factors include student absenteeism, disruption of or skipping of classes, lack of respect for teachers, use of alcohol or drugs, and intimidation of other students. These indicators are combined into two indices labeled teacher misbehavior ($\alpha = .83$) and student misbehavior ($\alpha = .81$). Finally, the teacher morale index ($\alpha = .79$) expresses principals' perceptions of teachers' morale, of teachers' enthusiasm, of how much teachers take pride in the school, and of how much they value academic achievement.

Controls or Explanations?

Some of these characteristics and indicators of schools, such as teaching and learning conditions, students' attitudes, or principals' perceptions of school climate, can also be considered as possible (intermediary) outcomes of the differences between public and private schools and are not just control variables, such as students' and parents' characteristics or social composition of the school. Therefore, we treat them as intermediary outcomes by adding them in separate steps after the more sociological variables of students and parents and the school composition indicators. However, we believe that these intermediary variables, important as they are, should not be the final dependent variables

of school effectiveness analyses. Real acquired knowledge and skills, such as reading, are more appropriate final indicators of school effectiveness, whereas school climate, learning and teaching conditions, and behavioral and attitudinal characteristics of parents and students are only instruments to reach these final goals of schooling. Therefore, we restrict ourselves in this article to the dependent variable of reading.

Selection or Endogenous Variable?

In our analyses, we assume that going to a public or a private school does not affect the scores on the independent variables. For instance, this assumption means that the *relative* amount of parental cultural communication (not the absolute) was already fixed before their children chose a public or a private school. Within this assumption, the *relative* differences in the scores on the independent variables of children on private and public schools are only the consequences of the selection or self-selection of certain students for certain schools. This assumption can be wrong because schools are supposed to change the characteristics of their pupils while they are attending those schools, and private schools might produce more change than public schools. This might be true for disciplinary climate, achievement pressure, and sense of belonging in a school. In this case, the causal direction is no longer self-evident; the independent variable is also endogenous. Despite the possible risk of including endogenous variables into the equation and thus partly incorrectly specifying the effects of those independent variables, we include these variables in the equation, assuming that the effects of these variables are fully caused by selection or self-selection. This assumption can lead to an underestimation of the scholastic achievement differences between public and private schools because a possible school effect (the relatively increased amount of parental cultural communication) is fully attributed to entrance selection. But this underestimation occurs only if the effect of entrance selection at the door and the school effect are working toward the same direction (thus, private schools select more students with higher amounts of parental cultural communication than public schools, and moreover these private schools manage to increase the amount of parental cultural communication relatively more than public schools). If entrance selection at the door and school effect are contradictory (private schools select more students with higher amounts of parental cultural communication than public schools, but they are less able to relatively increase that amount of parental cultural communication than public schools), then the measured scholastic achievement differences might be overestimated. The independent variables of this article, which might possibly be endogenous, all

Table 2
Means for Reading Score and Its Error Term by
School Sector, on Weighted Data

School Sector	Private Independent		Private Government Dependent		Public		Total		Between Group Variance $(df = 2)$[a]
	M	SD	M	SD	M	SD	M	SD	
Reading score	547.8[b]	90.7[c]	521.4[b]	93.3[c]	496.4	99.3	501.6	98.9	482.56
Error term of reading score	33.6[b]	9.4[c]	32.4[b]	9.0	32.1	9.7	32.2	9.6	26.36

a. All between group variances are significant ($p < .0001$).
b. Significant differences of mean compared to public schools (t test with unequal variances; $p < .05$).
c. Significant difference of standard deviation compared to public schools (Levene's test; $p < .05$).

have the characteristic that the possible entrance selection at the door and the possible private school effect are working in the same direction. Consequently, the results of this article are conservative estimates for the strength of the net scholastic achievement differences between private and public schools because all private school effects are treated as though they are selection effects and are thus subtracted from the real net scholastic achievement differences between public and private schools.

Descriptive Results

Dependent Variables

Table 2 shows the means and standard deviations for the reading score and for its error terms by school sector. The data reveal that the reading score is significantly higher in the two types of private schools compared to the public schools, indicating the higher achievement of students in private education.

Private and Public Schools

Table 1 shows the distribution of the types of schools in the 22 countries included in the analysis. On average, 83% of the students analyzed here attend public schools, about 14% of them study in private government-dependent schools, and only about 3% attend private independent schools.

Table 3

Unadjusted and Adjusted Means for Reading by School Sectors and Countries and Their Between-Group Variance, on Weighted Data

Country	School Sector	Reading (Unadjusted)	Between-Group Variance		Reading (Adjusted)[a]	Between-Group Variance	
			F	Significance		F	Significance
Austria	Private independent	533.5	10.93	.00	515.5	1.05	.35
	Private government dependent	528.9			515.7		
	Public	506.6			508.5		
Belgium	Private independent	576.2	106.78	.00	556.2	69.79	.00
	Private government dependent	526.8			522.8		
	Public	465.7			477.8		
Czech Republic	Private independent	559.8	1.56	.21	515.9	0.15	.86
	Private government dependent	502.9			502.3		
	Public	500.6			500.8		
Denmark	Private independent	—	0.39	.53	—	3.97	.05
	Private government dependent	496.8			493.2		
	Public	499.4			500.6		
Finland	Private independent	—	0.17	.68	—	0.23	.63
	Private government dependent	548.3			540.1		
	Public	544.2			544.5		
France	Private independent	516.3	3.10	.04	504.6	0.09	.91
	Private government dependent	498.8			502.1		
	Public	501.6			502.2		
Germany	Private independent	—	57.53	.00	—	16.42	.00

(continued)

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Table 3 (continued)

Country	School Sector	Reading (Unadjusted)	Between-Group Variance		Reading (Adjusted)[a]	Between-Group Variance	
			F	Significance		F	Significance
	Private government dependent	558.3			520.2		
	Public	482.4			484.0		
Greece	Private independent	547.9	10.93	.00	510.5	18.83	.00
	Private government dependent	—			—		
	Public	473.1			474.8		
Hungary	Private independent	403.1	4.28	.01	426.7	2.40	.09
	Private government dependent	492.9			482.6		
	Public	482.5			482.9		
Ireland	Private independent	583.7	80.06	.00	557.1	30.47	.00
	Private government dependent	539.9			534.8		
	Public	501.7			511.2		
Italy	Private independent	512.1	12.34	.00	498.9	4.92	.01
	Private government dependent	420.4			442.0		
	Public	488.4			488.9		
Luxembourg	Private independent	—	0.42	.52	—	6.32	.01
	Private government dependent	446.5			437.6		
	Public	450.3			451.6		
Netherlands	Private independent	—	42.73	.00	—	32.53	.00
	Private government dependent	536.6			535.2		
	Public	512.5			516.3		
New Zealand	Private independent	596.4	31.66	.00	557.8	6.56	.00
	Private government dependent	397.2			449.4		
	Public	528.2			530.1		

(continued)

Table 3 (continued)

Country	School Sector	Reading (Unadjusted)	Between-Group Variance		Reading (Adjusted)[a]	Between-Group Variance	
			F	Significance		F	Significance
Norway	Private independent	—	2.14	.14	—	2.50	.11
	Private government dependent	529.5			528.7		
	Public	505.6			505.6		
Poland	Private independent	500.6	3.39	.07	479.7	0.04	.84
	Private government dependent	—			—		
	Public	481.1			481.7		
Portugal	Private independent	512.9	4.51	.01	476.4	1.32	.27
	Private government dependent	483.3			484.0		
	Public	473.2			473.7		
Spain	Private independent	541.7	73.80	.00	509.2	12.60	.00
	Private government dependent	503.6			500.3		
	Public	481.2			487.7		
Sweden	Private independent	—	2.81	.09	—	0.12	.73
	Private government dependent	531.0			518.6		
	Public	515.3			515.7		
Switzerland	Private independent	519.3	6.44	.00	480.4	2.99	.05
	Private government dependent	528.4			515.6		
	Public	494.2			496.3		
United Kingdom	Private independent	612.6	260.04	.00	571.4	77.85	.00
	Private government dependent	—			—		
	Public	514.8			519.1		
United States	Private independent	541.8	10.70	.00	525.0	5.83	.00
	Private government dependent	530.2			536.4		
	Public	502.8			503.6		

a. Adjusted reading scores are estimated by ANOVA (multiple classification analysis tables). The controls included in the analysis are gender (male), father's and mother's socioeconomic index (international socioeconomic index), father's and mother's education, parental academic interest, cultural possession in the family, family wealth, home educational resources, and family type (nuclear family vs. other).

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Table 3 shows that the unadjusted differences in the mean of the reading scores among both forms of private schools and public schools are significant for 15 countries based on the between-group variances. The nonsignificant differences in the other 7 countries do not seem to be related to the variation of the private–public sector distribution in the 22 countries; neither do they strongly deviate from the significant ones. Given this result and the number of respondents of the analyzed countries, our results cannot be explained by a few outliers.

In the last column of Table 3, we show the differences in the reading score per country, which are now adjusted for the sociological characteristics of students and parents.[8] Countries still have significantly different scores among both forms of their private schools and their public schools. The adjusted reading scores of students of private government-dependent schools of Italy, Luxembourg, and New Zealand are significantly lower than those of public schools; in all other 19 countries, they are equal or higher. The adjusted reading scores of students of private independent schools of Switzerland are lower than those of public schools; in all other 21 countries, they are equal or higher.

Multilevel Analyses

Nested Multilevel Models

As said before, here we show only the multilevel results for reading; those for math, which do not give fundamentally different outcomes, are available in our European University Institute working paper. We use multilevel analyses (MlwiN 1.1) with four levels: (a) test (reading outcomes as dependent variables and the standard deviations of the error of these outcomes), (b) students (students' and parents' characteristics, students' views on school climate), (c) schools (government-dependent private schools and private independent schools as two dummy variables, social composition, administrative, teaching, and learning conditions, principals' perceptions of school climate), and (d) country (no specific variables) (Rasbash et al., 2000). At the lowest level, we have the reading weighted likelihood estimates as the dependent variable and the standard deviation of the error of this estimate. The variance at the lowest level is fixed at 1.00. This procedure results in a measurement model of the next level of the students (see Hox, 2002). It gives a more reliable estimation of the true score of the students because the model takes the measured error into account. The advantages of separately using this measurement model for reading in terms of the reliability of the estimates are larger than

the advantages of the more simple combined mathematic and reading score because the measurement model takes care of a substantial part of the variance at the student level.

All these models assume that the parameters of the private independent and private dependent dummies are fixed at the country level. This means that these effects are estimated with the assumption that they do not significantly vary among the 22 countries. However, if the parameters of the private independent and private dependent dummies at the country level happen to be significantly random, then the differences in reading scores among students from private independent, private government-dependent, and public schools are not equal for a significant number of countries. We test for the possibility of random variance of the slope of the private independent and private dependent dummies in all models independently and separately, and the results are reported in Table 4. This table also gives the relationship between the slope of the relevant dummy and the level of the intercept of that model, which allows us to see whether the variations of the slope of the dummy can be explained by a bottom or a ceiling effect. A significant relationship between the slope of the relevant dummy and the level of the intercept indicates that the slope and the intercept are not independent. A positive relationship suggests a bottom effect; the slope of this school variable is higher if the intercept of that school is higher. A negative relationship suggests a ceiling effect; the slope of this school variable is higher if the intercept of that school is lower. We test the significance of the slope of the private independent and private dependent dummies at the country level but not the significance of the variances of the slopes of other independent variables because that is not the focus of this article. (Corten and Dronkers [2006] address whether the slopes of the social characteristics of the students vary among public, private government-dependent, and private independent schools.)

Model 1: Without any control. A model without any independent variables has a variance of 7,398 (58% at student level, 36% at school level, and 6% at country level), and the log likelihood is 1116967.

The first model of Table 5 shows that students in private independent schools and private government-dependent schools have higher scores in the reading test than do students at public schools. Furthermore, students in private independent schools have higher scores than do students in private government-dependent schools. Although reported in another form, the coefficients of Model 1 are analogous to the results of Table 2. The interesting point of Model 1 is that these school sector variables reduce the variance both at the school level and at the country level (2% of the total variance). This suggests

Table 4

The Random Coefficients and Their Variances of the Private Independent School and Private Government-Dependent School Variables at Country Level (With Public Schools Reference) in the Different Models

	Model	Δ Log Likelihood	Parameter	SE	Variance Slope	SE	Covariance Intercept and Slope	SE
Private independent	1	15	44	8	663	381	467	183
Private independent	2	10	19	6	268	193	−193	167
Private independent	3	14	−20	5	232	149	−224	145
Private independent	4	11	−19	5	214	142	−225	144
Private independent	5	9	−19	5	199	135	−207	139
Private independent	6	9	−21	5	179	124	−206	134
Private government dependent	1	18	20	6	306	186	−113	123
Private government dependent	2	15	12	4	158	101	−15	115
Private government dependent	3	12	5	3	70	52	−24	82
Private government dependent	4	9	5	3	62	49	−3	80
Private government dependent	5	10	4	3	64	49	1	80
Private government dependent	6	11	2	3	68	50	43	80

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Table 5
The Fixed Coefficients of Nested Multilevel Equations With Reading Score as the Dependent Variable and With the Error Term Included

	1		2		3		4		5		6	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Constant	491.2	6.7	286.0	14.9	163.0	15.9	162.6	16.6	166.1	16.5	183.5	16.5
Private independent	40.6	5.3	22.8	4.0	−17.0	3.5	−15.8	3.6	−16.3	3.6	−17.7	3.5
Private government dependent	22.9	3.3	13.9	2.5	5.1	2.1	6.1	2.1	5.6	2.1	3.7	2.1
Public	Ref		Ref		Ref		Ref		Ref		Ref	
Student's school grade			49.7	0.5	38.7	0.5	38.6	0.5	38.4	0.5	38.4	0.5
Male			−19.1	0.5	−18.4	0.5	−18.5	0.5	−18.2	0.5	−18.3	0.5
Mother's international socioeconomic index × 10			4.2	0.2	3.7	0.2	3.7	0.2	3.7	0.2	3.7	0.1
Father's international socioeconomic index × 10			3.1	0.2	2.9	0.2	2.9	0.2	2.9	0.2	2.9	0.2
Age in months			−0.9	0.1	−0.9	0.7	−0.9	0.1	−0.9	0.1	−0.9	0.1
Number of siblings			−3.5	0.2	−3.4	0.2	−3.4	0.2	−3.4	0.2	−3.4	0.2
Father's education			1.3	0.2	1.2	0.2	1.2	0.2	1.1	0.2	1.1	0.2
Mother's education			2.3	0.2	2.2	0.2	2.2	0.2	2.2	0.2	2.2	0.2
Family wealth			−4.0	0.3	−4.4	0.3	−4.4	0.3	−4.1	0.3	−4.1	0.3
Parental cultural communication			8.3	0.3	7.8	0.3	7.8	0.3	7.8	0.3	7.8	0.3
Parental social communication			−1.5	0.3	−1.4	0.3	−1.4	0.3	−1.9	0.3	−1.9	0.3
Family cultural possessions			5.6	0.3	5.4	0.3	5.4	0.3	5.3	0.3	5.3	0.3
Home educational resources			7.8	0.3	7.9	0.3	7.9	0.3	7.5	0.3	7.5	0.3
Nuclear family			6.2	0.5	6.3	0.5	6.3	0.5	5.8	0.5	5.8	0.5

(continued)

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Table 5 (continued)

	1		2		3		4		5		6	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
School father's international socioeconomic index					2.5	0.1	2.4	0.1	2.3	0.1	2.1	0.1
School family wealth					17.6	2.1	17.1	2.1	17.3	2.1	16.0	2.1
School parental cultural communication					24.6	2.2	25.0	2.2	24.5	2.2	22.1	2.2
School in capital city					Ref		Ref		Ref		Ref	
School in city > 1,000,000					1.1	3.5	0.3	3.5	0.5	3.5	-0.4	3.4
School in city 100,000 to 1,000,000					6.9	2.9	6.3	2.8	6.1	2.8	5.1	2.8
School in town 15,000 to 100,000					14.3	2.7	14.3	2.7	14.1	2.7	11.6	2.6
School in small town 3,000 to 15,000					16.4	2.8	17.0	2.8	16.7	2.8	13.6	2.7
School in village < 3,000					22.1	3.1	23.1	3.1	22.4	3.1	16.7	3.0
% of girls in school × 10					1.8	0.3	1.8	0.3	1.7	0.3	1.4	0.3
School size × 100							0.5	0.2	0.5	0.2	0.6	0.2
Total schooling hours year × 100							0.6	0.4	0.6	0.4	0.5	0.4
School size ÷ number of teachers × 10							-2.4	1.5	-2.4	1.5	-3.7	1.5
Instructional resources							-2.3	0.7	-2.2	0.7	-1.9	0.7
Shortage of teachers							-2.8	0.6	-2.7	0.6	-1.8	0.7
School autonomy							-1.5	0.8	-1.6	0.8	-1.5	0.8
Teacher participation decisions							-0.7	0.7	-0.7	0.7	-0.8	0.7
Material resources							0.7	0.7	0.6	0.7	1.4	0.7
School disciplinary climate									-2.4	0.2	-2.3	0.2

(continued)

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Table 5 (continued)

	1		2		3		4		5		6	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Achievement pressure									−2.3	0.2	−2.3	0.2
Teacher–student relationship									2.3	0.3	2.3	0.3
Sense of belonging in school									1.7	0.2	1.7	0.2
Teacher misbehavior										4.7	0.8	0.8
Student misbehavior											−10.1	0.6
Teacher morale											1.5	1.6
Country % pupils at private independent schools	−0.3	1.4	−3.4	1.6	−3.2	1.5	−3.4	1.6	−3.4	1.5	−3.3	
Country % pupils at private government-dependent schools	0.2	0.2	0.3	0.2	0.4	0.2	0.3	0.2	0.3	0.2	0.3	0.2
Variance at country level	361	115	516	159	471	145	486	150	477	147	492	152
Variance at school level	2,587	67	1,406	38	875	25	858	25	851	25	799	23
Variance at student level	4,290	25	3,559	21	3,558	21	3,560	21	3,538	21	3,538	21
Total variance	7238		5481		4904		4904		4866		4829	
−2 log likelihood	1116866		1101022		1099573		1099514		1099049		1098869	

that differences in reading scores among countries are partly explained by the existence of these school sectors. Table 4 shows that these different effects of private independent schools and private government-dependent schools do not significantly vary among countries. The variances of the random slopes are not at least twice as large as their standard errors, and thus the variance of the slopes does not significantly deviate from the coefficient at the country level. Also, the change in the log likelihood by allowing random effects is small compared to the extra degrees of freedom. The small and inconsequential differences between the parameters from the same model between Tables 4 and 5 are because of the applied estimation procedure, fixed across countries in Table 5, free across countries in Table 4. However, there is a significant positive relationship between the different effects of private independent schools and the intercept.

We included two country-level variables to test whether these private school effects could not be explained by the degree of availability of these private schools in the various countries. But the inclusion or exclusion of the percentages of pupils attending private independent schools and private government-dependent schools does not significantly change any parameter.[9]

Model 2: Controlling for students' and parental social characteristics. In Model 2, we consider the effects of private independent schools and private government-dependent schools for the social characteristics of students and parents only.

The sociological characteristics of the students and their parents (Model 2 in Table 5) do not fully explain the higher scores in the reading test of students in private independent and private government-dependent schools, but these variables explain about half of the original advantages in reading tests of students in private independent schools and private government-dependent schools. Therefore, the differences in these individual student characteristics among schools only partly explain the higher scholastic achievement of private independent schools and private government-dependent schools.

Model 3: Controlling for school composition. In Model 3, we consider the social composition of schools as additional. This is a vital step in the assessment of the effects of schools, given that the selection or self-selection and allocation processes of schools and parents mean that the social composition of schools will strongly differ. This differential social composition will partly determine opportunities within schools to teach and to learn at a certain level, independently from the individual characteristics of students and parents, because it influences the real time spent on teaching and the level of nonacademic disturbances. The results from Model 3 show the importance of allowing

for the social composition of the school in explaining the higher scores of students in private independent and private government-dependent schools. In fact, the scores of students in private independent schools can be fully explained by the social composition of these schools. This means that private independent schools are not necessarily stronger in their teaching than public schools but rather that the former schools attract on average more children from the higher classes of society (in terms of occupational status, wealth, cultural communication), which in turn creates a better opportunity environment for learning and teaching. The negative sign for private independent schools in Model 3 indicates that the scholastic achievements of pupils in these schools are lower than those of students in public schools with the same social composition.

The same is not equally true for private government-dependent schools. Although the strength of the positive coefficient substantially decreases (by more than 60%) by accounting for the social composition of the schools, it remains positive and significant for reading.

In Model 3, we also account for other compositional characteristics of schools, such as gender composition and the location of the school. Although these variables have significant effects, they are not responsible for the switch of the sign of the coefficient with regard to private independent schools.

The results from Model 3 can therefore be interpreted as reliable estimates of the net scholastic achievements of both forms of private schools, taking into consideration the characteristics of students and parents and the school composition.

Model 4: Administrative, learning and teaching conditions. In the next model, Model 4, we try to expand using the different administrative, learning, and teaching conditions in these schools.

Although a number of these conditions affect the reading scores, they do not influence the strength of the negative effect of private independent schools. Neither the learning nor the teaching conditions explain the higher net scholastic achievements of the private government-dependent schools.

Models 5 and 6: School climate as explanations. In the next two models, Models 5 and 6, we try to explain the differences by the different school climates of these schools, either as perceived by the student and expressed in their attitudes (Model 5) or as seen by the principals (Model 6).

Although school climate affects the reading scores, it does not influence the strength of the negative effect of private independent schools. The higher net scholastic achievement of the private government-dependent school (taking

into account the characteristics of students and parents and the school compo-
sition) is mostly explained by their better school climate, as seen by the
principals. When these school climate variables are added to the equation
in Model 6, the effect of private government-dependent schools becomes
substantially smaller and almost insignificant.

The inclusion or exclusion of the percentages of pupils attending private
independent schools and private government-dependent schools does not
significantly change any parameter of private independent schools and private
government-dependent schools. Interestingly, however, the percentage of pupils
attending private independent schools per country has a small significant and
negative effect on the reading score.

Random variances of slopes. In Table 4, we can see that the effects of private
independent schools and private government-dependent schools did not vary
significantly between countries in any of the models. The variance of the slopes
is not at least twice as large as their standard errors, and thus the variance of
the slopes does not significantly deviate from the fixed coefficient at the country
level. Also, the changes in the log likelihood by allowing random effects are
too small compared to the extra degrees of freedom. This means that the effects
of private independent schools and private government-dependent schools
are more or less equal for the analyzed countries.

In the last column of Table 4, we find no significant variance between the
slopes of private independent schools and private government-dependent
schools and the intercepts of the models. If they were significantly correlated,
this would mean that the variations in these slopes were related to the height
of the intercept. The insignificant variance between slopes and intercept means
that ceiling or bottom effects cannot explain the coefficients of these variables
in the different models. This result is important for the interpretation of the
lower scholastic achievement of private independent schools after accounting
for student and parental characteristics and school composition because it indi-
cates that this lower scholastic achievement is not a statistical artifact caused
by ceiling effects.

Conclusions of the Analysis

The main differences in the gross scholastic achievements of private and
public schools in these 22 countries can be explained by differences in their
student intake and by the related differences in school composition. But our
analysis also shows that private government-dependent schools have a higher

net scholastic achievement in reading than do comparable public schools with the same students, parents, and social composition. This higher scholastic achievement is also substantial because the reading score difference between attending a public or a private government-dependent school is equal to the negative effect of having two more siblings. The explanation is the existence of a better school climate in the former versus the latter. The different administrative, learning, and teaching conditions in private government-dependent and public schools do not explain differences in this net scholastic achievement. This does not mean that private government-dependent schools do not have a more favorable student intake and social composition or that it explains the largest part of the higher gross educational outcomes of their students. Rather, it only means that next to student characteristics and social composition, the more favorable school climate does provide the explanation of the net higher educational outcomes of students from private government-dependent schools, in comparison to both public and private independent schools with the same students, same composition, and same conditions.

Contrary to this, our analysis also reveals that private independent schools have lower scholastic achievement than do public schools with the same students, parents, and social composition. However, poorer learning and teaching conditions, or a more negative school climate, cannot explain this lower scholastic achievement. The explanation of their initially higher scholastic achievement is the better social composition of these schools. This better social composition increases the educational outcomes of the students of these schools significantly above the level of other types of schools, as shown in the analyses without school composition as a control variable. It might be that this strong positive effect of better social composition reduces the necessity for private independent schools to increase their scholastic achievement further because even with a lower net scholastic achievement their students still obtain high levels of educational outcomes thanks to the better social composition of these schools. Parents who are willing to pay a substantial fee will perceive this positive effect of the social composition of these private independent schools as a positive aspect of these institutions. In that case, a higher net scholastic achievement of schools is less important for choosing parents, as long as the final scholastic attainment of their children is not substantially lower than they wish. Moreover, this favorable effect of school composition gives these private independent schools extra teaching and learning time, which can be devoted to the acquisition of qualifications other than the purely scholastic ones (e.g., teamwork, competition, leadership, cultural capital). This lower net scholastic achievement of private independent schools cannot be explained by a ceiling

effect given the insignificant variance between the slope of the private inde-pendent school variable and its intercept.

These results cannot be explained by the degree of availability of the two types of private schools in these countries: Inclusion of these macro availability indicators did not influence the differences in educational achievement.

These different outcomes underline the different functions of private inde-pendent and private government-dependent schools within the educational systems of these countries. It is, therefore, a mistake to treat these two types of schools as equal in their relation to the market of students or as interchangeable forms of private schools, as done by Vandenberghe and Robin (2004). On the contrary, private independent schools do not need to be more effective because their composition is so favorable that a further increase of scholastic scores would be inefficient because of their low marginal productivity. Private inde-pendent schools are good because they can "attract" the best means of pro-duction (students, school composition) that can sufficiently guarantee high scholastic outcomes. Private government-dependent schools also have more favorable students and school composition, but there apparently are not enough to ensure high scholastic outcomes. They also must develop a better school climate to increase their scholastic achievement. Apparently, their marginal productivity is still not so low as to make the investment in a better school climate inefficient. Private government-dependent schools cannot fully attract the best means of production (possibly as a consequence of their dependence on the government or the constraints of their religion or ideology) but also use the school climate as a means of acquiring a competitive edge for attracting students and parents from the public school sector. Stated differently, private independent schools attract such a high surplus of production means from their students and their parents that they can allow themselves to be less effec-tive and to give time and money to extracurricular qualifications needed by the next generation of the rich and powerful (not necessarily only in a financial respect). Private government-dependent schools use both the means to attract a surplus of production means and a favorable school climate to produce better educational outcomes, needed by upwardly mobile students or by weaker students.

The effects of private independent and private government-dependent schools are more or less equal in the various countries in question. This means that none of these countries are exceptional regarding the deviating educational outcomes of their private independent or private government-dependent schools, whatever the historical background and origin of the nonpublic schools or their current constitutional arrangements. The higher scholastic

achievement of the private government-dependent sector does not vary with the size of this sector. The difference in their scholastic achievement in countries such as Belgium and the Netherlands with a more sizeable proportion of private government-dependent schools is as large as the difference in their scholastic achievement in the United States or Italy, with tiny private government-dependent sectors. The size of the private and public sectors does not explain the scholastic achievement of the private government-dependent schools. However, a large private independent sector decreases the reading score of all schools in that country. This universal effect of private independent and private government-dependent schools suggests that these differences in scholastic achievement may be a consequence of postindustrial societies, wherein education has become a major dimension of inequality, alongside occupation and wealth. In these societies, formal and informal school choice has become an important means for mobility along the educational inequality dimension, and private government-dependent schools, whatever their history, have on average a better school climate and thus a more or less higher net scholastic achievement.

Policy Implications

As said earlier, we cannot make the distinction between secular and religious private schools because of an omission in the PISA data collection. In the future, we should be able to make this essential distinction, which has proven to be important in earlier research in America and Europe.[10] That would allow us to test whether the higher net scholastic achievement of private government-dependent schools is related either to the religious background of the school, teachers, or parents or to the private character of the schools. Dutch research on scholastic achievement differences between secular private government-dependent schools, Catholic or Protestant government-dependent schools, and public schools suggests that students in the former schools have lower scholastic results after accounting for student intake and school composition (Koopman & Dronkers, 1994). Another important future research question would be whether this higher net scholastic achievement of private government-dependent schools is also true for noncognitive outcomes such as religious and moral attitudes of the pupils. Dronkers (2004) reports that religious schools in Europe are more effective in cognitive but not affective outcomes. If this outcome were confirmed cross-nationally, it would shed light on the increasing popularity of religious schools in very secularized societies such as France and the Netherlands. Future research might also test

the Coleman and Hoffer (1987) thesis that religious schools are especially more effective for students from the lower social classes. Another analysis of the same PISA data suggests that private government schools are more effective for pupils from families with low levels of cultural possessions (Corten & Dronkers, 2006).

However, it is important to bear in mind that these results do not necessarily mean that an educational system with a high percentage of private government-dependent schools is more efficient as a system, providing the best education to all children. We did not find any significant positive effect of the size of the private independent school sector on the reading score. As we have seen, the social composition of private schools explains an important part of the higher educational outcomes of their pupils. If the social composition of schools within an educational system is very polarized between public schools and private schools, such an educational system will be less efficient because the public school pupils attain lower educational outcomes than they would attain in a less polarized system. In that case, the lower educational outcomes of public schools pupils might not be compensated by the higher educational outcomes of private school pupils. Thus, this educational system will be less efficient for that society as a whole than an educational system without private schools or a less polarized school composition. But a polarized school composition between the public and private school sectors is not unique for educational systems with an important private school sector, as shown by the U.S. educational system, where financing of public education differs because of varying local taxation and a forced school choice within the public sector. And the Dutch educational system, with a large private sector financed by the same means as the public sector, combined with free school choice between and within the public and private sectors, shows that polarized school composition can also exist within both the public and private school sectors alike.

It is also important to bear in mind that an educational system with a large private government-dependent school sector is not necessarily a cheaper educational system. The rights to state grants in the private sector can lead to a larger number of small schools in the same neighborhood. A large number of small schools means that they cannot profit from the normal economy-of-scale advantages and thus that this educational system can be less efficient. The Dutch educational system (at least at the primary school level) is an example of this lower financial efficiency, and this is because of a large number of small schools in the same neighborhood as a consequence of the established rights of the private government-dependent school sector (Dronkers, 1995).

Within a balanced context, without too many rights in the private sector, a private provider of collective goods such as education can produce better outcomes for two reasons. First, because of a larger vulnerability for competition in educational markets, the private provider has to be more concerned about the quality of this collective good than does a public provider. Second, a private provider also has more space for influencing the quality of its product than a public provider, which has more legal and political constraints and obligations other than those related to the school (other public services such as fire departments, police departments, sport facilities, and cultural activities). The better outcomes of private providers in supplying this kind of collective good are, however, conditional and can be constrained by a public context (e.g., financing, regulations, final examinations, etc.) that aims to avoid very strong differences in the social composition of schools. If these constraints are absent, a private provider of this type of collective good might be temped to obtain a higher quality, not through organization and efficiency but by "buying" only the best means of production, for example, students and school composition.

Notes

1. In 2000, four countries of the former Austrian-Hungarian Imperium participated in the Programme for International Student Assessment (PISA): Austria, Czech Republic, Hungary, and Poland.

2. However, the results for the smaller data set with valid math scores are presented in our European University Institute working paper (SPS 2003/13; http://hdl.handle.net/1814/1360). Basically, the results for the scholastic achievement differences among public, private government-dependent, and private independent schools are similar, although less outspoken for math.

3. The public PISA 2000 data for Australia and Canada do not give the distinction between private and public schools.

4. The empirical evidence reviewed by Dronkers (2004) shows that, in Europe, Catholic and Protestant schools both have a higher school effectiveness compared to public schools, including after controlling for student characteristics.

5. The student weights for this normalizing are given by PISA 2000.

6. We choose 3,000 because the United States, Luxembourg, and the Netherlands (countries with the lowest number of pupils) were around this number.

7. In fact, age is taken as a serious explanatory variable for students' performance even if the grade of the target population was defined in a narrow way (15 years old). This is why a very precise measure of age in months is applied to the data, and only a 3-month testing window was allowed for the data collection in the countries to ensure the accuracy of students' age at the time of assessment.

8. See Note for Table 3.

9. Dummies (yes–no private independent sector, yes–no private dependent sector) instead of percentages gave the same results.

10. But not yet in PISA 2003.

References

Archer, M. S. (1984). *Social origins of educational systems*. London: Sage.

Bourdieu, P. (1983). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258)*.* New York: Greenwood .

Bryk, A. S., Lee, V. E., & Holland, P. B. (1993). *Catholic schools and the common good.* Cambridge, MA: Harvard University Press.

Chubb, J. E., & Moe, T. M. (1990). *Politics, markets, and America's schools*. Washington, DC: Brookings Institution.

Coleman, J. S., & Hoffer, T. (1987). *Public and private high schools. The impact of communities.* New York: Basic Books.

Coleman, J. S., Hoffer, T. B., & Kilgore, S. (1982). *High school achievement: Public, Catholic, and other private schools compared.* New York: Basic Books.

Corten, R., & Dronkers, J. (2006). School achievement of pupils from the lower strata in public, private government-dependent and private government-independent schools: A cross-national test of the Coleman-Hoffer thesis. *Educational Research and Evaluation*, *12*, 179-208.

DiMaggio, P. (1982). Cultural capital and school success: The impact of status culture participation on the grades of U.S. high school students. *American Sociological Review*, *47*, 189-201.

Dronkers, J. (1995). The existence of parental choice in the Netherlands. *Educational Policy*, *9*, 227-243.

Dronkers, J. (2004). Do public and religious schools really differ? Assessing the European evidence. In P. J. Wolf & S. Macedo (Eds.), *Educating citizens: International perspectives on civic values and school choice* (pp. 287-312). Washington, DC: Brookings Institution.

Dronkers, J., & Robert, P. (2004a). De effectiviteit van openbaar en bijzonder onderwijs: Een crossnationale analyse [Effectiveness differences between public and private schools: A cross-national analysis]. *Mens en Maatschappij*, *79*, 170-192.

Dronkers, J., & Robert, P. (2004b). Has educational sector any impact on school effectiveness in Hungary? A comparison of the public and the newly established religious grammar schools. *European Societies*, *6*, 205-236.

Ganzeboom, H. B. G., de Graaf, P., Treiman, D. J., & De Leeuw, J. (1992). A standard international socio-economic index of occupational status. *Social Science Research, 21*, 1-56.

Godwin, R. K., & Kemerer, F. R. (2002). *School choice tradeoffs. Liberty, equity, and diversity.* Austin: University of Texas Press.

Hofman, R. H. (1993). *Effectief schoolbestuur. Een studie naar de bijdrage van schoolbesturen aan de effectiviteit van basisscholen* [Effective school administration. A study on the contributions of school boards to school effectiveness]. Groningen, the Netherlands: RION.

Hox, J. (2002). *Multivariate analysis. Techniques and applications*. Mahwah, NJ: Lawrence Erlbaum.

Koopman, P., & Dronkers, J. (1994). De effectiviteit van algemeen bijzondere scholen in het algemeen voortgezet onderwijs [The effectiveness of secular private schools in secondary education]. *Pedagogische Studiën*, *71*, 420-441.

Organisation for Economic Co-operation and Development. (1999). *Classifying educational programmes. Manual for ISCED97 implementation for OECD countries.* Paris: Author.

Organisation for Economic Co-operation and Development. (2001a). *Manual for the PISA 2000 database*. Paris: Author.

Organisation for Economic Co-operation and Development. (2001b). *PISA 2000 technical report*. Paris: Author.

Rasbash, J., Browne, W., Goldstein, H., Yang, M., Plewis, I., Healy, M., et al. (2000). *A user's guide to MLwiN 1.1.* London: University of London, Institute of Education.

Sammons, P., Hillman, J., & Mortimore, P. (1995). *Key characteristics of effective schools: A review of school effectiveness research.* London: Office for Standards in Education and Institute of Education.

Scheerens, J., & Bosker, R. (1997). *The foundations of educational effectiveness.* Kidlington, UK: Pergamon.

Snijders, T., & Bosker, R. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modelling.* Thousand Oaks, CA: Sage.

Teddlie, C., & Reynolds, D. (2000). *The international handbook of school effectiveness research.* London: Falmer.

Vandenberghe, V., & Robin, S. (2004). Evaluating the effectiveness of private education across countries: A comparison of methods. *Labour Economics*, *11*, 487-506.

Warm, T. A. (1985). *Weighted maximum likelihood estimation of ability in item response theory with tests finite length.* Oklahoma City, OK: U.S. Coast Guard Institute.

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