Education Vouchers
- An International Comparison

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Abstract

Different kinds of education vouchers have been implemented in several countries with the objective of enhancing school choice and improving the quality of education through competition among schools. This paper gives an overview of 19 voucher programs and identifies factors that enhance the effect of vouchers on the quality of education, as well as factors that limit this effect. Reviewing the literature on education vouchers, I describe the design of each voucher system and its functioning in practice, as well as outcomes in terms of quality of education as measured by academic achievement. Based on this analysis, factors found to contribute to the well-functioning of a voucher scheme are: the inclusion of as many schools as possible, publication of external school evaluations, a higher voucher value for poor students or alternatively targeted vouchers to low-income families and limited but precise and strictly enforced requirements on participating schools. Factors that hinder the success of a voucher scheme by restricting competition among schools are: high entry barriers for new schools, unequal funding of public and private schools, a low participation rate of private schools and the lack of private schools in certain areas.

I. Introduction

The basic idea of education vouchers, most prominently brought forward by Milton Friedman, consists of free school choice for students, which creates competition among schools; this in turn improves the quality of education provided. Students are given a voucher equivalent to a certain amount of money, which they can use at a school of their choice; or alternatively, schools receive funding proportional to the number of students enrolled. In both cases, schools have a monetary incentive to attract as many students as possible and should try to offer high quality of teaching in order to meet this goal.

There are various ways in which voucher programs have been implemented around the world, sometimes only as small pilot programs, in other cases on the scale of a whole country. The aim of this paper is to compare different designs of voucher programs and to describe factors that contribute to the success or failure of a voucher program in terms of improving the quality of education. Section II of the paper includes case studies on 21 voucher programs from 14 countries (see chart 1), describing the design of each voucher scheme and its observed consequences. The sample of countries included has been compiled from different sources in the literature on education vouchers. My selection of countries is based on the definition of a voucher scheme as a system in which school funding is directly linked to the number of students enrolled in each school, in order to promote school choice.[1] Funding is give as vouchers to students or as

[1] I include programs targeted specifically at poor students, because those programs are likely to foster school choice by increasing the options available to those who are otherwise most restricted in their choice due to a lack of resources.
The programs in Bangladesh and Guatemala that are exclusively targeted at girls do not strictly conform to my definition of a voucher program because they have the goal of increasing female enrolment rather than advancing school choice and competition. Nevertheless, an overview of these programs is given, as they are referred to as voucher programs in the literature and they have proven to be successful educational reforms in terms of their objectives.

direct funding to schools, proportional to enrolment. Part III gives an overview of the effects of the respective voucher program on academic achievement as a measure of quality of education, for those countries for which research is available. Based on the empirical findings in the two preceding sections, the last part of the paper summarises some factors that have proven to be obstacles to the functioning of a voucher system as well as factors that contributed to a positive impact of vouchers on the quality of education.

Chart 1: Overview of Voucher Programs

Country/ Region		Scope	Schools Included	Target Group
Chile		Countrywide	Public and private	All students
Colombia			Private	Low-income
Cote d'Ivoire			Private	High achievement
Czech Republic			Public and private	All students
Denmark			Public and private	All students
Netherlands			Public and private	All students
Puerto Rico			Public and private	Low-income
Sweden			Public and private	All students
Bangladesh		Regional/ small scale	Private	Girls
Guatemala			Public	Girls, low-income
Italy			Private	Depends on region: low-income or high achievement
UK	England & Wales		Public	All students
USA	Charlotte, NC		Private	Low-income
	Cleveland, Ohio		Public and private	Low-income
	Dayton, Ohio		Public and private	Low-income
	Florida		Public and private	Students in "failing" schools
	Milwaukee, WI		Private	Low-income
	New York City		Private	Low-income
	Vermont		Public and private	Towns without public school
	Washington, DC		Private	Low-income
New Zealand			Private	Low-income

II. Case Studies

1. Bangladesh

Private primary school enrolment in Bangladesh was around 39% of total primary enrolment in 2002 and 2002. Private enrolment at the level of secondary schools is very high; it amounts to around 96% (EdStats; EFA).

The Female Secondary School Assistance Project (FSSAP) was introduced in 1993 with the goal of increasing female secondary school enrolment as well as women's status in society and economy. The program is motivated by low female school enrolment and early withdrawal from school, which is particularly pronounced at the post-primary level, as only 33% of secondary school students are girls. A similar program[2] implemented on a smaller scale between 1982 and 1992 proved to be successful[3] and served as a model for this larger project. FSSAP consists of several components; the main one is a stipend program for girls attending grades 6-10. It is

[2] Female Education Scholarship Project

[3] It increased female enrolment as well as attendance and reduced drop-out rates, but increased repetition rates.

designed to lower the direct costs of schooling for girls in order to decrease gender disparity in secondary education. The stipend program covers more than 400 districts[4] and is funded by the Government of Bangladesh as well as by public international development organisations, such as the International Development Agency associated to the World Bank. Any girl who lives in one of these districts and has completed grade 5 is eligible for the program.[5] The stipend consists of two parts: Tuition subsidies are paid directly to the schools, the rest of the stipend is paid into a saving account set up for each girl in a local bank. The girl is responsible for withdrawing the money twice a year to pay additional fees to the school, for instance for examinations. The total amount paid per year to each student is US$12 in grade 6, US$13.5 in grade 7, US$15 in grade 8, US$30.25 in grade 9 and US$ 36.25 in grade 10. The stipend covers 30-54% of direct school expenses. A girl participating in the program must attend school at least 75 percent of school days, achieve at least 45 percent marks on average in annual examinations and stay unmarried until the final grade 10 examinations. Parents need to agree to these conditions. Participating schools must commit to help create public awareness and encourage girls to enrol, issue warnings to girls not fulfilling the requirements, not charge additional tuition from voucher students (they can charge other fees), assist students to fill out the application form for the program and maintain a roster book to assign a unique ID number to each applicant (Liang 1996).

Between 1994 and 2000 the number of participating students increased from 187,320 to almost 900,000. In areas covered by FSSAP, girls now make up 54% of secondary school students. As a result of the program, female attendance rates have improved significantly to 91%, compared to 86% for boys, and the proportion of girls achieving pass marks in school examinations is now 89%, compared to 81% for boys.

2. Chile

Private education plays an important role in the Chilean school system, with about half of the students attending private institutions.[6] Private household expenditure on education is also relatively high, with 42.6% of total expenditure on educational institutions being covered by private households (*Education at a Glance 2004*).

In 1981, as part of a broader program of liberalising the economy, the Pinochet government introduced an educational voucher system and simultaneously decentralised the public school sector by transferring the administration of public schools from the Ministry of Education to the municipalities (Contreras 2002; Hsieh 2003). The objectives of the program were, first, to foster competition among schools, thereby improving the quality of education, and second, to reduce government spending on education (QPEC Factfile n.d.).[7]

The voucher program is publicly funded and applies to all school-age children who attend participating primary and secondary schools. Funding is allocated to public and private schools on an equal basis, strictly proportional to the number of students enrolled in each school (Contreras 2002; Gauri and Vawda 2004; Hsieh 2003; West 1997). For private voucher schools, the money is directly paid to the schools. For public schools, it is given to the respective local administration, i.e. usually to the municipality, which distributes it among the public schools in its district; however this distribution does not necessarily reflect the exact differences in enrolment across schools in

[4] In 282 districts it is funded by the government, in 118 districts by the International Development Agency and in 7 districts by the Norwegian Agency for Development Cooperation.

[5] During the earlier project, income targeting was tried, but it was not successful because relatively well-off and influential community members whose daughters were excluded withdrew support for the program.

[6] Private enrolment as % of total enrolment was 45.5% at the primary school level, 49.7% at the secondary school level in 2001 (EFA); 46.51% at the primary school level in 2002 (EdStats).

[7] Public spending on education initially decreased from 5.3% of GNP in 1985 to 3.7% in 1990, but later spending increased again to over 5% of GNP (QPEC Factfile).

this municipality (Auguste and Valenzuela 2003). The value of the voucher varies depending on location and level of education of the school (Carnoy and McEwan 1999). Initially, private schools were not allowed to charge additional tuition above the voucher value, but as the real value of the voucher declined due to inflation,[8] this regulation was abolished in 1993. Now private voucher schools may charge tuition;[9] the voucher value is lower for schools with higher tuition fees (Auguste and Valenzuela 2003; Carnoy and McEwan 1999).[10] Even though the value of the voucher is equal for public and private schools, public schools receive more government funding in reality via additional subsidies. For instance, no public school closed due to a loss of students, because if necessary, public schools have received extra funding to pay their teacher salaries (Sapelli 2005). Further, the government gives targeted subsidies to public schools in low-income areas, e.g. for textbooks, school materials and food. These subsidies are 'nonportable', i.e. they are tied to a specific school, so that a student who changes to a different school will not be able to benefit from these subsidies anymore. This works as a disincentive for students to exercise school choice (Sapelli 2005; Sapelli and Torche Fecha 2002).

There is a high degree of government regulation of private schools, e.g. concerning school administration, curricula, buildings and education of teachers. Also entry into the market is restricted, as establishing a new private schools requires government approval, which is only granted if there is no excess supply of schools; in addition it implies regulation of staff, teaching materials and buildings. Teacher salaries are centrally negotiated and therefore cannot be decided upon autonomously by the school (Merrifield 2005). On the other hand, as opposed to public schools that have to admit all students they can accommodate within their capacity, private voucher schools may freely set admission criteria (Auguste and Valenzuela 2003). With the introduction of the reforms in the 1980s, hiring and firing of teachers was facilitated, as public school teachers' contracts were revoked, they lost their status as civil servants and had to give up a number of rights.[11] Private school teachers also lost some legal rights, such as minimum wage guarantees and provisions for annual wage adjustment (Carnoy and McEwan 1999). Abolishing the teachers' union and thereby suppressing potential opposition by teachers was possible because Chile was ruled by a military regime at this time (Auguste and Valenzuela 2003; Carnoy and McEwan 1999). The teachers' union was reintroduced by the new (democratic) government that came into power in 1990. The government also increased minimum teacher wages as well as the voucher value (Auguste and Valenzuela 2003).

As a consequence of the voucher program, the number of pupils enrolled in private voucher schools increased from 15% of total enrolment in the early 1980s to 33% in 1996; today almost one half of Chilean students attend private schools. Accordingly, enrolment in public schools declined, but almost no public school closed (Gauri and Vawda 2004). In 1996, about 91% of students were enrolled in public and private voucher schools (Carnoy and McEwan 1999), so most

[8] The voucher value was initially corrected for inflation, but after the economic crisis in the early 1980s this was not upheld anymore.

[9] Despite public schools not charging tuition their average resources per student are close to those of private voucher schools (US$ 172.5 per year per student for public schools vs. US$ 181.1 for voucher schools in 2000, including voucher payments). One reason for this is that after 1990 targeted subsidies were introduced for low performing schools, which in fact benefited mostly public schools. Some public schools also receive additional funding from the municipalities (Auguste and Valenzuela 2003).

[10] In 2000, 71% of the voucher schools charged tuition. Since 1997, these schools are legally required to have an explicit scholarship policy; effectively 66% of their students paid tuition in 2000 (Auguste and Valenzuela 2003).

[11] Public school teachers' salaries and working conditions were no longer determined by the *Escala Única de Remuneraciones* but by the more liberal *Código de Trabajo.* This implied a loss of "guarantees of job security, the right to salary during vacations, standard wage scales, a 30 hour work-week, and the right to collectively bargain" (Carnoy and Ewan 1999, p.5).

of the schooling taking place in Chile is voucher-financed. However, those private schools, which have chosen not to participate in the voucher program, are predominantly the 'elite' schools with the highest academic achievement levels (Hsieh 2003; Contreras 2002).[12]

3. Colombia

In Colombia, private education plays a less important role than in Chile; nevertheless around one fifth of Colombian students are enrolled in private schools.[13]

As in the case of Chile, the voucher scheme is a part of a lager reform program aimed at decentralisation and privatisation of public services; it has been in place since 1992. The introduction of educational vouchers in particular was motivated by the fact that public schools had reached capacity limits and that the secondary enrolment rate was only 75% overall (and as low as 55% for the poorest quintile of the population). The main goal of the voucher scheme was to enable poor students to attend secondary school in areas where public schools had reached capacity limits and thereby to quickly increase school capacity and secondary school enrolment rates (Angrist et al. 2002; Gauri and Vawda 2004).[14]

Accordingly, the Colombian voucher system is specifically targeted at students from low-income families, more specifically at students entering the sixth grade and living in low-income areas, who have previously attended public primary schools and who do not find a place in public secondary schools (Gauri and Vawda 2004; Turbay 2000).[15] These students receive vouchers – cofinanced by the national government (covering 80% of the costs) and participating municipalities (covering 20%) – to be used to pay for tuition at private schools. The municipalities are responsible for administration and financing of vouchers. The allocation of vouchers among municipalities is determined by agreements between the government and the municipalities, taking into account the total number of vouchers available in the specific year, the local necessities as well as the estimated number of free places in local private schools (Turbay 2000).

Before applying for a voucher, a student has to be accepted by a private school that takes part in the program. If the local demand exceeds the municipal allotment, vouchers are allocated among applicants by lottery.[16] In 1997, vouchers were given to 125,000 students, corresponding to one percent of national secondary enrolment (Gauri and Vawda 2004). Students receive vouchers three times a year and forward them to their school directors; these get paid the value of the voucher from the ministry and the municipalities (Turbay 2000). The value of the voucher was initially set at an amount equal to the full tuition at low-cost private schools. However, it was not indexed to inflation; therefore, in 1998 vouchers covered only about 50% of tuition and had to be supplemented by private means. Once a voucher has been awarded to a student, the funding is

[12] These schools had mostly been charging tuition fees before the reforms, as opposed to other private schools (mainly religious ones) that did not charge tuition and received state subsidies (covering about 30% of their costs in 1980) even before the voucher program was introduced (Carnoy and Ewan 1999; Hsieh 2003).

[13] Private enrolment as a share of total enrolment was 18.8% at the primary school level and 28.1% at the secondary level in 2001, according to EFA; according to EdStats the figures for 2002 are 17.09% and 24.07% respectively.

[14] In 2002 the government started another reform initiative called 'revolucion educativa', under which 1.5 million new places in schools were planned to be created by 2006, partly targeted at students from vulnerable parts of the population (Ministerio de Educacion National). By 2005 43% of these have been installed (*eltiempo.com*).

[15] A neighbourhood is classified as 'low-income' if it falls into the two lowest socio-economic strata (on a scale of 6 strata); residence in the neighbourhood has to be proven by presenting a utility bill (Angrist et al. 2002).

[16] The municipalities decide on the number of vouchers, subject to a maximum allocated to them by the national government (Angrist et al. 2002).

automatically renewed until the end of secondary school if the student keeps being promoted to the next grade.

In order to receive voucher funds, a school has to be situated in one of the participating towns, which include all major cities. Almost 50% of private schools in the 10 largest cities accepted vouchers in 1993 (Angrist et al. 2002), but most 'elite' private schools did not participate in the program. New for-profit private schools emerged after the introduction of educational vouchers; however, based on concerns about the low quality for-profit schools were excluded from the program in 1996. Funding for public schools was not reduced if enrolment decreased due to the voucher scheme (Angrist et al. 2002; Gauri and Vawda 2004).

According to information from the Colombian Ministry of Education (La revolucion educativa. Plan sectorial 2002-2006.), secondary enrolment increased during the time the voucher program was in place.[17] Between 1992 and 1997, a relatively large increase in secondary enrolment from about 55% to about 65% took place. When interpreting this, it has to be taken into account that there is a general upward trend in secondary enrolment between 1960 and 2002; however the increase is particularly pronounced during the early 1990s, after the introduction of the voucher program.

Angrist et al. (2005) report a positive effect of winning a voucher on secondary school completion rates as well as on academic achievement (see III.2.).

4. Cote d'Ivoire

In Cote d'Ivoire, 10.9% of primary school students attended private schools in 2001 and 2002 (EFA; EdStats)[18] and 36.2% of secondary school students received private education in 1995 (EFA).

Under the voucher program, 42% of private school students receive direct or indirect public funding (Gauri and Vawda 2004). At the primary school level, state subsidies are paid to private schools. For secondary school education, vouchers are given to students to attend private schools; these are classified into "authorized" and "chartered/associated", only "chartered/associated" schools are eligible for public subsidies (Sakellariou and Patrinos 2004).

At the primary level, the amount of funding is negotiated with umbrella groups for religious and secular schools and varies with school location and tuition fees[19] and is only loosely linked to enrolment numbers. In 1999, these state subsidies for primary schools amounted to US$40–66 per student.

At the secondary level, funding is directly tied to enrolment, as the state sponsors specific students to attend private secondary schools. The value of this voucher was US$200 at lower secondary schools and US$233 at higher-secondary schools in 1999. This amount is higher than the tuition fees at low-cost secondary schools and about 1/10 of tuition at the best private schools (Gauri and Vawda 2004; Sakellariou and Patrinos 2004). There are certain criteria a private school has to meet in order to qualify for public funding. These conditions are: The school must have been in operation for at least 5 years, it must have certified teachers for at least the last 3 years and class size has to be limited to a maximum of 45 students. Furthermore, the schools' tuition fees may not exceed 40,000 CFA Francs[20] (US$67) per year outside Abidjan or 30,000 CFA Francs

[17] These figures for secondary enrolment in 1992 are different from those given by Angrist et al. (The ministry reports 55% while Angrist et al. report 75%.)

[18] According to Gauri and Vawda (2004), 13% of primary school pupils are enrolled in private schools.

[19] Higher funding is paid to schools outside Abidjan (the largest city and former capital of the country); the higher the amount of tuition charged, the lower the subsidy the school receives.

[20] CFA Francs = Communauté financière de l'Afrique Francs

(US$50) in Abidjan and the school must have achieved at least national average success rates in examinations for the last 3 years (Sakellariou and Patrinos 2004).

One particularity of the education system in Cote d'Ivoire is the high share of religious institutions among private schools. In addition to tuition fees and public funding, these schools receive money from church funds. About 50% of the private education sector consists of religious school; most of them are Catholic. At the primary school level, religious schools outnumber secular schools; at the secondary level the opposite applies. Religious schools have a reputation for the highest quality; in particular students at some high-level Catholic schools achieve very good test scores (Sakellariou and Patrinos 2004).

5. Czech Republic

In the Czech Republic, private enrolment is very low at the primary level, around 1% of total primary enrolment in 2001 and 2002 (EFA; EdStats). For private secondary schools, sources slightly differ, reporting around 6-13% of total secondary enrolment within the time period from mid 1990s to 2002.[21] Private household expenditure on education was 6.1% of total expenditure on educational institutions in 2001 (*Education at a Glance 2004*).

The introduction of a voucher scheme in the Czech education system was motivated by the end of communism and an excess demand for education. Additionally, pedagogical weaknesses were seen in the public school system and some parents distrusted public schools due to the role these had played in the communist system. The scheme applies to all students, in private as well as in public schools. All schools receive public funding based on the number of students enrolled. However, payments are not equal for public and private schools. Public funds to private schools are allocated in two ways: First, they receive some base support corresponding to 50% of public school funding per student; second, private schools are awarded supplementary support tied to their quality, which is assessed by local school offices based on fixed criteria. In total, private schools receive 60-90% of public school funding per student; they are allowed to charge additional tuition (Filer and Munich 2000).

As a consequence of the voucher scheme, Filer and Munich (2000) report little increase in private primary schooling, but a relatively large impact at the secondary school level. By the mid 1990s, the number of private secondary schools had increased from 0% in 1990 to 25% of secondary schools, enrolling around 13% of secondary students.

Nevertheless, the quality of private schools is not perceived as better than that of public schools, except by mothers of private school students (Filer and Munich 2000).

6. Denmark

In Denmark, the share of students attending private schools in 2001 was 11% of total enrolment both at the primary and the secondary school level (EFA). 3.9% of total educational expenditure in 2001 originated from private households (*Education at a Glance 2004*). Students are assigned to a public school by the municipalities (for primary schools) or by the counties (for secondary schools). Free school choice among different public schools is gradually introduced; authorities can allow for school choice but do not have to. However, there is free school choice among public specialised vocational schools and every student has the constitutional right to opt out of the public system in order to attend a private school (Justesen 2002; Hepburn n.d.).

The objectives of the voucher system are to improve consumer responsiveness in the educational market and to enhance efficiency and student performance. The system applies to all students attending private primary and secondary schools and public vocational schools. Since

[21] The figures are: 13% in mid 1990s (Filer and Munich 2000); 9.8% in 1998 (Gauri and Vawda 2004); 6.7% in 2002 (EFA); 7.09% in 2002 (EdStats).

1992,[22] private primary and secondary schools receive a public per capita subsidy for each student, which covers 80-85% of the costs (Justesen 2002). For the remaining amount, the government does not only allow, but even requires private schools to charge tuition above the value of the voucher, except in case of undue financial hardship for the parents (Gauri and Vawda 2004). Low-income families can apply for exemption from tuition fees at private schools (Justesen 2002). The value of the voucher varies with the size of the school (smaller schools receive up to 1.45 times higher per capita funding), the age of the students and the age of the teachers (Hepburn n.d.). Funding of public vocational schools is allocated via a 'taximeter system' based on student enrolment and covers 100% of the costs.

In general, a private school has to meet a number of criteria to be eligible for public funding. It must be managed by a board with a parent majority and has to follow national guidelines on the curriculum, on national exams as well as on teacher salaries and teaching time. Additionally, the school must enrol a minimum of 28 students and has to be independent from other schools. On the other hand, private schools are free in deciding on religious, ideological and pedagogical principles. Furthermore, despite adhering to general guidelines on the curriculum they can emphasise specific subjects or offer additional ones (Bergstroem and Sandstroem n.d.; Justesen 2002). While the quality of public and private schools is generally equal, private schools distinguish themselves by alternatives approaches to education (Hepburn n.d.).

According to Justesen (2002), during the 1990s the number of private schools increased by 8% whereas the number of public schools declined by 6% as a consequence of the voucher scheme. This process has been facilitated by the legal system that sets little restrictions on opening a new private school. Among public schools, with the exception of vocational schools, there is little competition as there is no free school choice (Justesen 2002). Between public and private schools, however, a competition effect can be observed. Government schools adopt some practices of private schools, such as more parental involvement by establishing school boards with a majority of parent members. Additionally, free choice among public schools within a municipality is gradually introduced (Hepburn n.d.). After the introduction of the voucher system, private schools have become affordable to all strata of society (Justesen 2002) and the public perception of the quality of government schools has improved (Hepburn n.d.).

7. Guatemala

In Guatemala, private primary school enrolment is about 12% of total enrolment (EFA; EdStats). For private secondary enrolment, sources differ and report between 56% (EFA) and 74% (EdStats).

The project 'Eduque a la nina' is aimed at increasing female enrolment. It was motivated by a low enrolment rate and high dropout rate for girls in rural primary schools as well as by a high illiteracy rate of over 59% among rural women. The program was started in 1993 as one of several projects by the organisation "Asociación Eduquemos a la Niña", which was founded by a public-private cooperation to improve girls' education. "Eduque a la nina" is designed as pilot project over a period of three years. It is intended to test the effectiveness of 3 different approaches, one of them includes a voucher program. Funding comes from both public and private sources.

The program was implemented in 12 rural communities; it included 349 girls in 1994 and 478 girls in 1995. The target communities are chosen for having the highest differences between male and female school attendance and graduation rates. The program is aimed at girls enrolled in a public primary school there, preferably in grade 1, 2 or 3. The girls are aged between 7 and

[22] Before 1992, private schools were reimbursed with a fixed percentage of their expenditures, which proved to be too bureaucratic and did not provide any incentive for an efficient use of financial resources (Justesen 2002).

14 years, come from a low-income family and need to have approval of their parents. Girls meeting these criteria are identified by a parent committee and by schoolteachers; then selection of the most needy girls takes place based on a socio-economic survey of each candidate's parents. Stipends are given to 40% of girls in the school at maximum. The voucher has a value of $4 per month for 11 months a year and renewal for the following year is conditional on promotion to the next grade.

The attendance rate of girls in schools that enrol scholarship recipients is 87.9%, which is much higher than the rate of 71.4% in schools without the voucher program. It is even higher than attendance rate of boys in schools included in the program, which is 84.1%. The voucher program resulted in lower dropout rates, but did not have any effect on completion of the school year. Higher failure rates were observed in schools participating in the program.

8. Italy

In Italy, private enrolment was about 7% at the primary and about 5% at the secondary school level in 2001 and 2002 (EdStats; EFA). The share of private household expenditure on education in terms of total expenditure on educational institutions was 8% in 2001 (*Education at a Glance 2004*).

Educational vouchers meant to improve school choice have been introduced in Italy between 2001 and 2003 in eight out of twenty regions.[23] The exact design differs across regions, but in all of them the government subsidises tuition fees at private primary and secondary schools. In most regions this is organised as an ex-post reimbursement of tuition expenses given to students. The value of the voucher differs considerably across the country. The national government provides funding of 150-200€ per student, depending on the total number of applicants, but this amount can be supplemented by regional funds; therefore the amount students receive varies across the country. Five regions have an upper limit to the voucher value, which ranges from 1875€ (upper secondary school in Piedmont for a poor household) to 210€ (primary school in Veneto for a middle income household). Generally, the voucher covers 25-80% of tuition fees, so tuition fees are not restricted the voucher amount. In all except for two regions, eligibility for the voucher program depends on family income, i.e. a student only qualifies for a voucher if the family income is below a certain threshold. In the remaining two regions, eligibility is based on academic achievement. A school receiving voucher funds has to be certified, i.e. legally recognised by the government. This requires approval of the curriculum by the Ministry of Education and implies open admission to all solvent students who apply (Brunello and Checchi 2005).

Brunello and Checchi (2005) find a trend towards higher private enrolment as a consequence of education vouchers. However, they voice concerns about the potential of the voucher program to increase the quality of public schools by private competition, because they find private schools to be rather of lower than higher quality compared to government schools. Overall, as vouchers are still a very new concept in Italy, their impact on the quality of education in public and private schools cannot be assessed yet.

9. The Netherlands

In the Netherlands, around 68% of primary school students were enrolled in private schools in 2001 and 2002 (EdStats; EFA; Justesen 2002). For secondary school students, the share is slightly higher with 73-83% in the same years.[24] Compared to these figures, private household

[23] Nine regions adopted legislation for a voucher program and eight of these allocated funds to it for actual implementation.

[24] For 2001: 83.2% according to EFA and 73.0% according to Justesen. For 2002, EdStats reports 83.26%.

expenditure on education is very low, amounting to 5.7% of total expenditure on education (*Education at a Glance 2004*).

The Dutch voucher system applies to all students subject to compulsory education (West 1997). Government funds are paid to both public and private schools based on the number of students enrolled; schools are not allowed to charge additional tuition fees. Equal public funding to public and private schools is guaranteed by the constitution. In the calculation of funding, students are weighted by socio-economic background,[25] so that more money is paid for enrolling poorer students.

There are detailed regulations on schools in order to be eligible for public funding. They must follow a fixed curriculum and conduct national exams at the end of primary and secondary school. Class size as well as teacher qualifications and salaries are equally subject to regulation. Furthermore, a minimum school size is required: A new primary school must enrol at least 333 students in cities and 200 students in rural areas for a period of five years to qualify for government funding; similar legislation has been adopted for already existing schools. Nevertheless, private schools are granted a certain amount of freedom, as they can freely decide on teaching methods, course books and material; they may set admission criteria and are free to choose the content of 120 teaching hours per year (Justesen 2002).

After the guarantee of equal funding to public and private schools had been adopted into the constitution in 1917, the number of private schools increased and within few years 70% of students attended private schools. The equal funding base for all students implies entirely free school choice for all students and therefore a high degree of competition among both public and private schools (Justesen 2002). There are different opinions on whether the voucher system has fostered social differentiation across schools. While Justesen (2002) finds no significant difference between public and private schools concerning the social composition of the student body, Fiske and Ladd (2000) report growing ethnic segregation between schools.

10. New Zealand

In New Zealand, around 2% of primary school students[26] receive private schooling. The corresponding share of secondary school students was 11.3% in 2001 (EFA).

A pilot voucher program was carried out as part of a more general reform of the education system towards gradual liberalisation and decentralisation, known as 'Tomorrow's Schools'. This reform includes the transformation of government schools into de-zoned charter schools, the creation of an autonomous government agency (Educational Review Office) to assess the schools and the small voucher program for low-income students. The national curriculum guidelines were also changed. Direct funding to schools for all expenses on a per pupil basis was opposed by teachers' unions. However, a stepwise implementation in some schools proved successful, therefore this way of funding was expanded up to 23% of schools in 1998. Nevertheless, teacher salaries remain funded by the government according to actual expenses and are negotiated between schools and the ministry of education. As a part of the reform, school choice among public schools has been entirely liberalised (Fancy 2004; Gauri and Vawda 2004; Hepburn n.d.).

The objective of the pilot voucher program was to improve educational achievement of low-income families and give them the possibility to obtain the education of their choice. Publicly funded vouchers to pay tuition fees at private schools were given to 160 students from families with an income below NZ$25,000. There was excess demand, therefore not all applicants received a place in the program. The vouchers cover the full private school tuition in addition to an allowance of NZ$900 for primary students and NZ$1,100 for secondary students, which is intended to cover additional expenses, e.g. on uniforms, books and extra-curricular activities.

[25] classified into 5 categories

[26] 2% in 2001 (EFA), 2.06% in 2002 (EdStats)

In the process of decentralisation, authority has been transferred from the central Department of Education to individual schools managed by parent elected boards (Hepburn n.d.; West 1997). Schools have free control over teacher hiring, operating budgets, selection of academic missions, student fees and local fundraising (Gauri and Vawda 2004).

Due to its limited scale, the pilot voucher program as such cannot be expected to have a significant impact on overall quality of education in the country. However, since the deregulation of school choice, there is a certain degree of competition among public schools, as the amount of operating funds as well as salary scales and prestige for principals are linked to the number of students enrolled (Gauri and Vawda 2004). On the other hand, a restriction on competition is posed by the regulation that no new school is allowed to open if there is sufficient space in existing schools (Hepburn n.d.).

Some problems have been observed during the implementation of the educational reforms in New Zealand; these should not be regarded as consequences of the voucher program in a narrow sense but rather as resulting from the overall reforms, including school choice. First, the supply of education is restricted by a rule that no new schools are allowed to open if there is space in existing schools; this has led to some students and teachers being stuck in low quality schools because better schools have reached capacity limits (Hepburn n.d.). Second, there is a higher degree of socio-economic stratification across schools, as schools serving mainly disadvantaged groups experience declining enrolment and higher shares of minority students, while there is rising enrolment and steady or falling shares of minority students in schools serving advantaged populations (Gauri and Vawda 2004). This development poses a problem, because it led to a concentration of difficult-to-teach students in some public schools in low-income urban areas. Despite the poor quality of these schools, the government did not close them for political reasons; no new schools were established in these areas and the schools had problems in retaining and attracting high quality teachers (Fiske and Ladd 2000). Experience form New Zealand also indicates that enrolment may not be a perfect indicator of school quality because, as described above, the socio-economic composition of the student body plays an important role in explaining rising or falling enrolment figures (Gauri and Vawda 2004).

11. Puerto Rico

In Puerto Rico, an education voucher program has been carried out for two school years, in 1993 and 1994; in 1995 the program had to be ended because it was ruled unconstitutional by the Supreme Court. School choice among public schools has been liberalised as part of the reform program; additionally 40 public schools transformed into self-governing "community schools" (Heritage Foundation). The voucher program was targeted at students from low-income families, defined as having a family income below $18,000. If demand exceeded supply, vouchers were allocated by lottery. The vouchers were financed by the government and could be used at both public and private schools (West 1997). 1,809 vouchers with an absolute value of up to $1,500 were distributed in 1993;[27] in 1994 the number was raised to 14,101 vouchers (Heritage Foundation).

The Supreme Court ruled the voucher program unconstitutional after a lawsuit by teachers' unions,[28] therefore the program was stopped in 1995. The verdict referred only to the voucher program as such; school choice among public schools was permitted to continue (Heritage Foundation).

[27] Out of these, 1,108 vouchers were used to transfer between public schools, 317 to move from private to public schools and 311 to move from public to private schools.

[28] In the case 'Asociacion de Maestros de P.R. v. Arsenio Torres' on November 30, 1994

12. Sweden

In Sweden, private enrolment at the primary school level was 4.6% in 2001 (EFA) and 5.1% in 2002 (EdStats). At the secondary school level, 3.9% of students attended private schools in 2001 (EFA). Private household expenditure on education is very low, it was 0.1% in 2001 (*Education at a Glance 2004*). Simultaneously with the voucher system, free choice among public schools has been introduced (Hepburn n.d.).

The voucher program applies to all children subject to compulsory education at the primary and secondary level. Every school approved by the National Agency for Education is entitled to public funding. Private schools receive money from municipal school boards equal to per pupil funding in public schools.[29] This principle of equal funding for public and private schools was introduced in 1992 for primary and lower secondary schools, in 1994 for upper secondary schools (Bergstroem and Sandstroem n.d.; Hepburn n.d.; West 1997) .[30] Since then, the amount of tuition private schools can charge is restricted to the value of the voucher (Hepburn n.d.). There are several other requirements on schools: They must follow a national curriculum and are supervised by the National Assembly of Education; they must accept students on a first-come, first-served basis and students are required to take local government examinations four times during their academic careers (Hepburn n.d.; West 1997). On the other hand, there are no restrictions on how a school should be owned or managed. Schools do not need to be independent, i.e. several schools can be owned by the same entity or company. Schools are also allowed to make profit (Bergstroem and Sandstroem n.d.).

As a consequence of the voucher scheme, the number of private schools has increased considerably.[31] Entrance barriers in the educational market are low, because there are few legal restrictions on opening a private school; however there is increasing government regulation of private schools once they have been established (Bergstroem and Sandstroem n.d.; Hepburn n.d.). Studying the socio-economic composition of schools reveals that parents of private school pupils are better educated than those of public school pupils, and they avoid schools with larger shares of non-Nordic immigrants (Gauri and Vawda 2004).

After the introduction of the voucher system, schools were given a large degree of autonomy. Although certain requirements on schools existed, such as achievement targets and the rule that teaching should be non-confessional, there was little supervision of schools. As achievement targets were not met and there was public concern about the quality as well as about practices in some religious schools, demand for stricter regulation and more government intervention arose. This leads Sandstroem (2005) to conclude that minimal but strict regulation is necessary to ensure private school independence in the long term.

13. England and Wales (UK)

In the United Kingdom, the share of private primary enrolment in terms of total primary enrolment was 4.9% in 2001 (EFA) and 2002 (EdStats). The figures for secondary private enrolment in 2001 are 52.4% in 2001 (EFA) and 58.3% in 2002 (EdStats). Private household expenditure in the UK amounts to 13% of total expenditure on education in 2001 (*Education at a Glance 2004*).

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[29] A problem reported about this distribution mechanism is that municipal school boards were sometimes reluctant to hand over funds, that were previously used for municipal schools, to private schools (Hepburn).

[30] The relative amount of private school funding changed twice between 1991 and 1997: from 85% to 75% to 100% of municipal schools' funding per student.

[31] According to different sources, the number of private schools is growing by 0.5 -1.0% per year; i.e. educating about 3500 more students every year (Hepburn). The share of private schools increased from 1% in 1991 to 4% in 2002 (Gauri and Vawda 2004). Between 1992/93 and 2002 the private school sector expanded from 106 to 488 private primary and lower secondary schools and from 16 to 149 upper secondary schools (Bergstroem and Sandstroem).

Between 1979 and 1997, the Conservative government introduced several reforms in the education system in England and Wales. These were aimed at increasing the diversity of provision of education and at reducing state activity in this sector. In 1980 the "Assisted Places Scheme" was created, which financially supported poor students with high academic achievement to attend high quality private schools. However, the reach of the program was limited (it included 30,000 students in 1995) and it was abolished by the next government in 1998. An education voucher program was introduced as part of the "Education Reform Act" in 1988. The program includes only public schools; for these 75% of school funding is allocated based on age-weighted student numbers. Public schools are not allowed to charge tuition, therefore public funding covers the full costs of education. In theory there is free school choice, but in practice there may be bureaucratic obstacles, which differ across districts depending on the Local Education Authorities (LEAs). Schools have to follow a common national curriculum and national tests, but they have been given more autonomy over issues of management and administration, such as the budget. Additionally, schools could choose to become independent grant-maintained schools receiving funds directly from the central government instead of the LEAs; however, in 1998 the LEAs regained influence and grant-maintained schools were again controlled by the LEAs.

The voucher system has created some competition among public schools, but this competition is limited due to the 'surplus places rule' stating that no new school can be established as long as there are places available in an existing near by school. The voucher program has had little effect on competition between public and private schools, as private schools are not included in the voucher scheme. This means that there are some very good public schools, but there also exist some, especially in low-income areas, that offer very low quality of education. The latter hardly face an incentive for improvement due to the surplus rule preventing new public schools to emerge and the absence of real competition by private schools (Justesen 2002).

After the introduction of vouchers, some studies find increased socio-economic segregation among schools; however others argue that segregation had taken place already before, based on residential areas (Gauri and Vawda 2004).

14. USA

In the USA, private enrolment as a share of total enrolment in 2001 and 2002 was around 10% for primary schools and around 9% for secondary schools.[32] Private household investment in education as a percentage of total investment in educational institutions was 18.8% in 2001 (*Education at a Glance 2004*). School choice among public schools is restricted: Students receive free education only in the public school in their district; they can attend a public school in a different district but have to pay tuition there. Several different voucher programs have been implemented in the USA on the state or community level.

a. Charlotte, North Carolina

In Charlotte, in the school year 1999/2000 a voucher program took place aimed at giving low-income students the opportunity to attend a private school. It was privately funded by the Children's scholarship fund and vouchers were given to both primary and secondary school students. Vouchers with a value of up to $1,700 were awarded by lottery. Out of 801 lottery winners, 388 used the voucher (Greene 2002).

b. Cleveland, Ohio

In Cleveland, vouchers financed by public funds are given to low-income students within the Cleveland City school district. Vouchers are allocated by lottery and can be used at both public

[32] For primary schools: 10.3% in 2001 (EFA) and 10.81% in 2002 (EdStats); for secondary schools: 8.8% in 2001 (EFA) and 9.15% in 2002 (EdStats).

and private schools (Hepburn n.d.; West 1997). The value of the voucher given to each student is based on the amount of tuition charged by the private school of his or her choice; for families with an income below 200% of the poverty line, 90% of tuition is paid, for families with a higher income the voucher covers 75% of tuition. The total amount of tuition charged may not be higher than $2,500 (Hanauer 2002). This corresponds to slightly more than 1/3 of per capita cost at public schools (Hepburn n.d.). Vouchers take the form of checks payable to the parents of 'scholarship' students (West 1997). The voucher program faced considerable opposition by a teachers' union: A lawsuit by the American Federation of Teachers and others impeded the process of the lottery until 2 weeks before the beginning of the school year (Hepburn n.d.).

c. Dayton, Ohio

The voucher program in Dayton is also targeted at low-income students. Vouchers can be used to attend public and private primary and secondary schools. In 1998/99 vouchers were given to 765 students. The program is privately funded by 'Parents Advancing Choice in Education' and since 1999 also by the 'Children's Scholarship Fund'. In the first year, the vouchers covered 50% of tuition at private schools, up to a maximum of $1,200. Later the amount could be increased as more funds became available (Howell et al. 2000).

d. Florida

The objective of the voucher program in Florida is to create an incentive for low-performing public schools to improve their quality of education. In order to achieve this, students attending a public school, which has been classified as failing (i.e. as "F" on a scale from "A" to "F") twice within a period of 4 years based on student achievement tests, are offered vouchers to attend a different public or private school of their choice. Between 1998 and 2003 10 schools were labelled as failing, making their students eligible for vouchers. By subjecting these schools to competition of other public and private schools for students and the funding associated with them, the voucher program generates an incentive for the school to improve. The vouchers are financed by public funding and amount to $4,000 (Gauri and Vawda 2004; Greene and Winters 2003).

e. Milwaukee, Wisconsin

The introduction of the voucher program in Milwaukee was motivated by high drop-out rates, low test scores and high disparity in educational opportunity between Milwaukee's low-income and middle-income families (Hepburn n.d.). To be eligible for vouchers, students must come from households with a maximum income corresponding to 1.75 times the poverty line and they must not have attended a private school or a school outside the Milwaukee Public School District the year before (Witte and Torn 1994)[33]. The selection of voucher recipients among eligible low-income applicants is done by the schools at a random basis (Hepburn n.d.). Vouchers can be used at private, non-sectarian schools (West 1997). They are given to primary and secondary school students; most recipients are enrolled in prekindergarten to grade 8. The scope of the program is limited to a maximum of 1.5% of public school students in the district, corresponding to 1,450 students in 1994-95.

For each participating student, schools receive the same per capita funding as Milwaukee public schools instead of tuition; schools are not allowed to charge voucher students additional tuition fees (Witte and Torn 1997). The value of the voucher increased gradually from $2,446 in 1990/91 to $4,696 in 1997/98 (Molnar 1999). There are a number of restrictions on schools that receive voucher funds. They have to limit the share of voucher students to 65% of their student body; in the selection of students, they may not discriminate on the basis of race, religion, gender,

[33] Since 1995, students in kindergarten to grade 3 are eligible also if they have already been attending a private school before (Witte and Torn 1995).

prior achievement or prior behavioural records, i.e. if classes are oversubscribed, students must be selected at random. Schools must meet at least one standard set for attendance, parental involvement, student achievement on standardised tests or grade progress and they must be private and non-sectarian without religious affiliation or training (Witte and Torn 1997).

The voucher program led to the establishment of one new private school and to the survival and expansion of several others, which might otherwise have had problems to stay in existence. The program has not had any influence on the number of public schools in the area, as the scope of the program is very small compared to number of students in public schools (Witte and Torn 1997).

f. New York City

The New York City voucher program took place once as a privately funded project initiated by the 'School Choice Scholarships Foundation' (SCSF). It was targeted at children from low-income families enrolled in kindergarten to grade 4 in New York City public schools. 1,300 scholarships were given out; each of them had a value of up to $1,400 per year for a period of three years. This funding covered tuition only partially (Howell et al. 2000; Krueger and Zhu 2002).

g. Vermont

In Vermont, a voucher program is in place for students in towns without a public school or without enough public school capacity to accommodate all local students. These primary and secondary school students are given vouchers paid from public funds to pay for tuition at public or private schools. The voucher value varies with school type, i.e. according to whether the student attends elementary school, middle school or high school; it is about equal to government per capita spending in public schools. In 1998/99 vouchers were given to 6,505 students in 90 towns and 83 private schools were part of the program. Private schools must be 'approved' to qualify for public funding. This implies regulations concerning health and safety measures, financial capacity, and staffing and support services; furthermore, schools must administer the 'New Standards Reference Exam' to voucher students (Sternberg 2001).[34]

h. Washington, D.C.

The voucher program in Washington D.C. is targeted at students from low-income families who live in Washington D.C. and are entering kindergarten to grade 8. Vouchers are privately financed by the 'Washington Scholarship Fund' and since 1999 also by the 'Children's Scholarship Fund'. Recipients selected by lottery[35] are given vouchers, which cover 60% of their tuition expenses up to a limit of $1,700. The students' family income has to be at or below the poverty line to receive this amount of funding; families with an income above the poverty line receive smaller scholarships, but students are not eligible if the family income is more than 2.5 times the poverty line (Howell et al. 2000).

[34] A similar system exists in Maine. Also in this state, students in districts without a public school receive public funding to attend public or private schools in other school districts (Heritage Foundation, Maine).
[35] In the first year, 53% of the lottery winners used the vouchers.

III. The Impact of Different Voucher Programs on Academic Achievement

1. Chile

Contreras (2002) uses individual level scores for 1998 from the Academic Aptitude Test (PAA[36]) to assess the impact of attending a private voucher school on academic achievement. This college entrance examination was taken by about 80% of the students who were in the fourth year of secondary school. By ordinary least squares (OLS) controlling for age and parental education, Contreras shows a small positive effect of attending a private voucher school on test scores. In order to better capture the achievement effect of vouchers enabling students to attend private voucher schools, he then performs a Two Stage Least Squares analysis (TSLS), which accounts for the availability of a voucher school in the student's community.[37] The results of the TSLS show that when controlling for the degree of school choice students have in reality (operationalised as school availability at the community level), the positive impact of the probability of attending a private voucher school on achievement is higher than the effect of attending a private voucher school as calculated by OLS. Therefore, Contreras concludes that the voucher system increases academic achievement as measured by the PAA.

While Contreras' (2002) findings show that overall students in private voucher schools perform better than their counterparts in public schools, Tokman Ramos' (2002) analysis shows that this claim does not hold for the subgroup of students from a low socio-economic background. Tokman Ramos (2002) uses scores in standardised tests, averaged on the school level, in his analysis of the efficiency of private voucher schools compared to public schools. The scores describe fourth graders' achievement in mathematics and Spanish in 1996. Comparing achievement across school types, Tokman Ramos finds that scores in private non-voucher schools are significantly higher than in voucher schools and public schools; however private voucher schools perform only slightly and not significantly[38] better than public schools. In the rest of the analysis, only private voucher schools and public schools are compared. Based on several regression models, the author concludes that students from lower socio-economic background perform better in public than in private voucher schools, but students from a more advantaged background will do better in a private voucher school than in a public school.

Students at private voucher schools come from families with a higher average income than students in public schools (Tokman Ramos 2002). Therefore, Tokman Ramos' findings are consistent with Contreras' conclusion that students who use vouchers to attend private voucher schools benefit academically.

Both of the cited studies focus on a comparison between private voucher schools and public schools. However, the finding that students in voucher schools have higher average test scores is a relative measure of achievement, which leaves open two questions. First, changes in absolute achievement for these students need to be determined; for example the difference between school types might simply be due to sorting of students, the students with higher ability attending private voucher schools. Second, it is necessary to know if the overall average

[36] Prueba de Aptitud Académica

[37] In the first stage, the respective probabilities for attending a private non-voucher school or a private voucher school are calculated based on the predictors: parents' education (as a measure of household resources), age and school availability (expressed in two dummy variables: private non-voucher school available in the community [yes/no]; private voucher school available [yes/no]).
In the second stage, there are two models: In specification A, individual PAA scores are predicted by age, age squared, parental education and the predicted probabilities from the first stage. In specification B, some community characteristics are added as predictors; these characteristics are: Population density, community total population and community average per capita income.

[38] At the 0.95 level

achievement in the country has increased as a consequence of the voucher scheme; otherwise there is the possibility that vouchers might benefit recipients who are enabled to attend private voucher schools but have a negative effect on the students remaining in public schools. This information is needed to assess whether the voucher scheme has improved the quality of education on the whole.

According to Carnoy and McEwan (1999) a high concentration of private schools in a community had a small positive effect on test scores in public schools in the capital city, equal to 0.2 standard deviations in test scores over 15 years. In the rest of the country they find a small negative effect.

Auguste and Valenzuela (2003) test the effect of competition created by voucher schools on average achievement on the county level as well as the effect of competition on sorting of students across schools. Data on individual scores in standardised achievement tests is obtained from the System of Information and Measurement of the Educational Quality (SIME) for the eighth grade and the year 2000. The authors use instrumental variable estimation to regress the test scores averaged at the county respectively school level on the degree of competition among schools (measured as the market share of the private sector). The results show a moderate positive effect of competition on average achievement in the county.[39] Further, concerning the sorting aspect, competition results in larger social stratification across schools as measured by parents' education.[40] Auguste and Valenzuela also report differences in achievement across school types; students in private non-voucher schools have higher test scores than those in private voucher schools, and these in turn have higher test scores than public school students. The results of the data analysis reveal that competition amplifies these differences.[41]

Overall, Auguste and Valenzuela (2003) conclude from their estimates at the district level that competition from private schools improves the quality of education. Even though competition leads to higher social stratification and larger differences in academic outcomes across school types, average achievement in the district increases with competition.

Looking at the country as a whole, Hsieh and Urquiola (2003) find no change in national aggregate indicators of educational achievement after introducing the voucher program. First, the median score of Chilean students in the TIMSS[42] study has not changed relative to the median score in other countries between 1970 and 1999.[43] Second, based on their own analysis of data for 150 Chilean municipalities, they find that academic achievement did not rise faster in communities with a larger expansion of private education, i.e. a higher impact of the voucher program. On the contrary, average repetition rates appear to have worsened in these municipalities relative to other areas.

Carnoy (1997) also assesses the development of overall academic achievement in Chile after the introduction of the voucher system. He reports that achievement in Spanish and mathematics measured by average scores of pupils in grade 4 in nationally standardised achievement tests fell between 1982 and 1988. For the period after 1988, Carnoy reports different results based on two studies by Rounds Parry and by Espinola: Analysing the average results of

[39] An increase of competition by one standard deviation corresponds to an increase of approximately 0.4 standard deviations in average achievement on the county level.

[40] An increase of competition by one standard deviation is associated with 0.7 standard deviations increase in the distance between the average years of parents' schooling in families of public school students and the county average.

[41] An increase of competition by one standard deviation corresponds to an increase of approximately 0.5 standard deviations in the distance between the average score in public schools and the county average.

[42] Trends in International Mathematics and Science Study (formerly Third International Mathematics and Science Study), see www.timss.org.

[43] The Chilean voucher system has existed since 1981 (see case studies).

the standardised achievement tests in 1990, the conclusion can be reached that average achievement in 1990 was back at the same level as in 1982; however the second study cited by Carnoy (1997) reports declining average test scores between 1988 and 1990. Both of these studies find that in middle-income areas, private schools had higher average achievement than public schools, but in the lowest-income areas, average scores were higher in public than in private schools. In 1990, public spending on education as well as the value of the voucher were raised by a new government. In addition, schools in low-income areas received targeted funding and technical assistance. After this, Carnoy (1997) describes an increase in test scores between 1990 and 1992 in public as well as in private schools. Overall, he concludes that average test scores have stayed constant or increased slightly during the first 13 years in which the voucher system has been in existence, i.e. between 1981 and 1994.

Gallego (2002) looks at the effect of competition among schools on the quality of public schools and private voucher schools. He criticises the two studies by Carnoy and McEwans and by Hsieh and Urquiola. Concerning the Carnoy and McEwans study, he challenges the validity of the results based on the following methodological concerns: First, in their dependent variable the authors use test scores taken at different points in time, which are not comparable. Second, in the econometric analysis Carnoy and McEwans use differencing, which is unfortunate in Gallego's eyes, as it eliminates constant between group differences that are important in analysing competition effects. He also points out that differentiating the data twice makes it difficult to interpret estimated coefficients.

Concerning the study by Hsieh and Urquiola, Gallego points out that the authors focus on a time period comprising the first years (up to 1990/1992) after the introduction of the voucher system, which might affect the results as the system was still in the process of establishment. Further, Gallego criticises that the study does not control for endogeneity of private sector participation, so that it remains unclear whether the estimated correlations are based on causal relationships.

Based on these points of criticism, in his own study Gallego used data for shorter time intervals and for a later time period and he controls for endogeneity of the market share of the private sector. In his analysis he uses data of 5000 schools on the standardised achievement test SIMCE for the period 1994-1997. Controlling for several variables concerning characteristics of the schools analysed, e.g. related to socio-economic status and urbanicity, Gallego finds a significant[44] effect of competition on average test scores at the school level. Running separate regression models for the subgroup of public schools and the subgroup of private voucher schools, Gallego finds that the effect of competition is stronger for private voucher schools than for public schools. He offers the explanation that private voucher schools face stronger incentives to respond to competition than do public schools. Furthermore, for public schools the effect becomes insignificant in the later years analysed (1996/1997), which Gallego explains by the targeted funding to low performing schools that was introduced during the 1990s. As the program mainly benefited public schools and was potentially focused on those in disadvantaged rural areas, where there is little competition by private schools, its effect on public school quality in areas with low competition might have surmounted a positive effect of competition in other areas and distorted the coefficients.

On the whole, Gallego (2002) finds a positive effect of competition on achievement at the school level; this effect is stronger for private voucher schools than for public schools.

To sum up, the research on the Chilean voucher program suggests that students achieve better academic results in voucher schools than in public schools; this holds true only for students from a higher socio-economic background, who make up most of the enrolment in private voucher schools. Furthermore, competition by private voucher schools improves overall achievement at the

[44] At the 0.95 level

district level, despite leading to higher disparities across school types. Also at the school level, competition from private voucher schools has a positive impact on educational quality; this effect is stronger for private voucher schools than for public schools. On the contrary, at the national level there is no or at most slight improvement in academic achievement.

A possible interpretation of these findings is that the basic logic of the voucher system worked in practice: Competition form private schools improves the overall quality of education in the system, which can be shown both at the district level and at the level of individual schools. However, the introduction of education vouchers may not be incentive enough for the creation of private schools everywhere in the country, in particular not in rural and low-income areas. The lack of private schools and therefore of competition in a large part of the country may be the reason why no overall increase in achievement can be observed. Even though the voucher system has had the desired effect in those areas where competition took place, these areas may be too few to affect aggregate measures on a national scale.

2. Colombia

In Colombia, the achievement level in voucher schools is very close to test scores in public schools and significantly lower than in non-voucher private schools.[45] The student-teacher ratio and available facilities are similar in voucher schools and public schools; furthermore, many teachers at voucher schools are former public school teachers (Angrist et al. 2002).

In a later study, Angrist et al. (2005) find a positive effect of winning a voucher on secondary school completion rates as well as on test scores. They regress registration for the college entrance exam ICFES on an indicator for whether the applicant won a voucher, controlling for age and sex of the student. The results show that participation in the voucher program increased the probability of registering for the college entrance exam by 5-7 percentage points (equivalent to a 15-20% increase in probability). Further, Angrist et al. (2005) find a significant positive effect of winning a voucher on test scores in the ICFES, both for language and maths. The observed size of the effect depends on the way in which selection bias is adjusted for; the latter is necessary because voucher winners were more likely to take the test than students who had lost the lottery.

3. Denmark

David-Evans et al. (2004) criticise the Danish public school system for relatively low achievement results in international comparison,[46] which range around the international average and are mostly lower than scores in comparable countries like other Scandinavian countries, Canada and the UK.[47] In addition, they point out the "the lack of a strong culture of student evaluation and consequent inadequate feedback" (p.4). The authors describe teachers' dedication as well as the decentralised system, which gives room for innovation, as strengths of the system. In spite of this, they disapprove of "too little sharing of good practice" (p.4) among schools, which hinders the spread of new ideas.

[45] As mentioned in the case study, also a couple of new, for-profit private schools emerged in response to the voucher program, which were considered to be of very low quality. Therefore for-profit schools were excluded from the program.

[46] The Danish average scores in the studies quoted are: IEA Literacy Test 1991: 3rd grade score: 475, 8th grade score: 525; IEA TIMSS 1994: mathematics: 502, science: 478; OECD PISA 2000: reading: 497, mathematics: 514. All scores are relative to an international average of 500.

[47] Their criticism focuses on public schools because these make up almost 90% of all schools.

4. New Zealand

Studies on the effect on achievement of the voucher program as such are not available for New Zealand. Due to the small scale of the program, it can neither be expected to see changes in national aggregate measures of achievement that are attributable to the voucher program. However, figures on parental satisfaction point towards a success of the voucher program. 82% of the parents are satisfied with their children's education and 97% of voucher students' parents are satisfied with their children's education at independent schools. In addition, the majority of principals and teachers believe that the reforms had a positive impact on pupils' learning as well as on teaching content and teaching style (Hepburn n.d.).

5. Sweden

In Sweden, Bergstroem and Sandstroem (2002) describe a positive effect of competition by private schools on academic achievement in public schools, which is statistically significant in half of the cases studied. The data used includes information on grades, test results and socio-economic background of 28,000 students in ninth grade, for both public and private schools in the academic year 1997/1998. Regression analyses are carried out both on the individual level and on the level of average scores in municipalities. Both ways, controlling for several variables such as parents' education and income as well as the initial public school quality in the municipality, the authors find that in all cases they studied, the academic achievement of students in public schools is better the higher the share of students attending private schools in the municipality.

6. England and Wales (United Kingdom)

According to Gauri and Vawda (2004), in England and Wales academic achievement increased during the time when the voucher system has been in place. However, there are different opinions on whether this is attributable to competition; the increase might for instance be caused by the newly introduced practice of publishing nationwide testing and school inspection results (Gauri and Vawda 2004).

7. USA

a. Charlotte, North Carolina

After the program had been in place for one year, voucher students had 5.9% higher test scores in maths and 6.5% higher scores in reading than public school students. This is equivalent to saying that achievement increased by 0.25 standard deviations.

The quality of teachers is higher in private schools and overall parental satisfaction with their child's school is higher for voucher students than for public school students. Private schools offer fewer facilities than public schools, but nevertheless parents report higher satisfaction with private school facilities than with the facilities offered in public schools. The reason for this may be that private schools focus on providing those facilities that parents value the most (Greene 2002).

b. Cleveland, Ohio

Also in Cleveland, voucher students and their parents are more satisfied with their schools than public school students. Concerning the impact of the voucher program on academic achievement, the results are mixed. Controlling for prior achievement and demographics, there was no significant effect on third grade achievement after one year, but a significant positive impact could be seen in language and science after two years. On the other hand, students in newly founded private schools had significantly lower achievement after 2 years than both public and other private school students (Molnar 1999; Hepburn n.d.).

c. Dayton, Ohio; New York City; Washington DC

The outcomes of these three voucher programs, which are all privately funded and targeted at low-income students, are similar. In none of them, a significant effect on test scores could be observed for non-African American students who used vouchers to switch to private schools. Based on aggregate data from all three cities taken together, there is a significant improvement in test scores in the subgroup of African-American voucher students. Results are also reported separately for each of the three cities and each of the two years studied.

In Dayton, only reading performance in the second year of analysis is significantly higher.

In New York, there is a significant positive effect on maths and reading scores for African-Americans in both years studied.

For African-American students in Washington DC, a significant positive effect on maths and reading scores can be seen in the second year. In the first year, the effect on maths scores is also significantly positive, while there is a significant negative effect on reading. The positive effect appears mainly for younger students (grades 2-5),[48] the negative effect is only significant for older students (grades 6-8).[49]

The corresponding effects of being offered a voucher are about half the size of the impact of switching to a private school; this can be explained by the fact that only about 50% of the students who are offered a voucher actually switch to private school. Concerning the statistical significance, the results for being offered a voucher are very similar to those for switching to a private school in each of the cities (Howell et al. 2000).

Krueger and Zhu (2002) challenge the validity of these results. Reanalysing the data, they find that the positive effect of vouchers on African-American students disappears when the whole sample of African-Americans students is included instead of only those students for whom baseline scores are available.[50] The difference in test scores between African-Americans who were offered a voucher and those not offered a voucher becomes statistically insignificant at the 0.05 level when all African-American students are included in the analysis. Furthermore, Krueger and Zhu (2002) point out that the effect of voucher depends on the definition of the ethnic group. Initially, a student was assigned to the group of African-Americans if the mother was African-American. However, when also those students with an African-American father are included, the achievement effect of vouchers becomes statistically insignificant.

d. Florida

In Florida, all schools that were classified as failing improved their performance (Gauri and Vawda 2004). Greene and Winters (2003) categorise schools into 5 groups based on the degree of threat from voucher competition each school encounters. Analysing these categories in terms of test scores, they conclude that low-performing schools improved directly proportional to the probability of being eligible for vouchers, which means that those schools whose students were already receiving vouchers progressed the most (Greene and Winters 2003).

e. Milwaukee, Wisconsin

In their assessment of the Milwaukee voucher program four years after its introduction, Witte and Torn (1994) find the academic achievement of voucher students to be about equal to the achievement of public school students. They run a regression analysis controlling for several

[48] The positive effect is significant at the 0.01 level for maths in both years and at the 0.05 level for reading in the second year; for older students it is only significant at the 0.1 level in maths in the second year.

[49] The negative effect is significant at the 0.01 level for older students in the first years.

[50] Most students did a baseline achievement test before the beginning of the program. However, all children in kindergarten and 11% of those initially in grades 1-4 did not take this test and were excluded form the earlier analysis. Including them leads to a 44% increase in sample size.

factors such as gender, race, income, grade and prior achievement and arrived at opposing conclusions concerning the differences in between voucher students and public school students; most of these findings are statistically insignificant. When they introduced the number of years during which voucher students had been in private school as an additional control variable, some coefficients changed signs and the results were not statistically significant. The only differences in favour of the program are slightly higher attendance of voucher students and high parental satisfaction with the private schools and the program as well as higher parental involvement in school activities. The same pattern – no differences in achievement but variation in parental satisfaction and involvement – was found comparing students offered a voucher to those not offered a voucher.

In contradiction to these findings, Greene et al. (1997), after analysing the same time period, report significant effects of the voucher program on academic achievement for students having been in the program for three and four years. The authors estimate the impact of vouchers after 1, 2, 3 and 4 years based on the Iowa test of basic skills. Controlling for gender and several other factors, they find statistically significant differences in test scores between public schools students who had lost the voucher lottery and students having used vouchers at private schools for three and four years.

As quoted by Gauri and Vawda (2004) as well as by Molnar (1999), Rouse finds this effect only for mathematics scores.[51] Controlling for estimated ability and family characteristics, she does not find a significant difference in reading scores between voucher students and public school students. In mathematics, Rouse reports significantly higher scores for voucher students after three and four years (Molnar 1999).

VI. Factors Influencing Success and Failure of Voucher Programs

1. Factors that Limit the Impact of Vouchers on the Quality of Education

a. 'Surplus Places Rule'

Vouchers are intended to improve school quality by creating a competitive environment. This competition is limited if there is a rule in place which prohibits founding a new school as long as there are free places in an existing school in the area, such as in England and New Zealand. In these two countries the 'surplus places rule' applies to public schools. While there is free school choice among public schools, no or only few vouchers exist to attend private schools. This combination implies little competitive pressure on low-performing public schools and hence little incentive for them to improve.

A problem in completely liberalising the supply of education is that it does not only apply to the possibility of opening new schools but also to closing down of schools that perform poorly. This aspect may be difficult to implement politically, as the closure of a school is likely to face opposition, in particular by teachers.

b. Additional Subsidies to Public Schools

In his analysis of the Chilean voucher system, Sapelli (2005) points out that competition is restricted due to the design of the voucher program. First, private schools face a high degree of

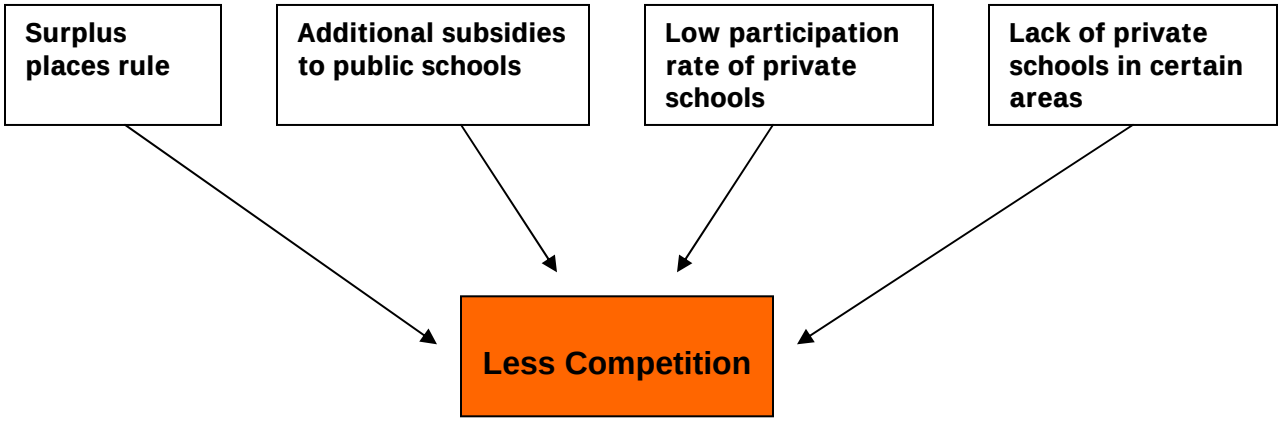
[51] See Molnar (1999) for an in depth comparison of the studies by Witte and Torn (1994), Greene et al. (1997) and Rouse.

government regulation and effectively less per capita funding[52] than government schools, which prevents them from responding to consumer demand as effectively as they ideally could.

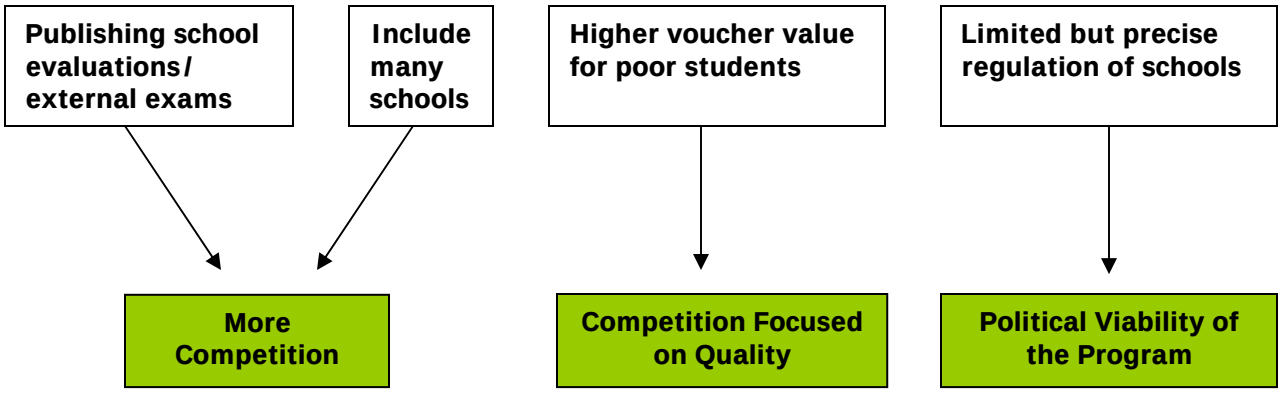
Second, public schools do not only receive additional funding, but also badly performing schools are partly compensated for the lost funding due to leaving students, in order to enable them to pay their teacher salaries. This undermines the incentives for improvement inherent in the voucher system.

Chart 2: Factors

Factors that limit the impact of vouchers on quality of education:



Factors that enhance the impact of vouchers on quality of education:



c. Low Participation Rate of Private Schools in the Voucher Program

Provided a voucher system includes private schools (i.e. either vouchers can only be used at private schools or they apply to both public and private institutions), competition should create pressure on public schools to improve their quality. This, together with a higher share of enrolment in potentially better private schools, should raise the overall quality of education in the system. However, this mechanism may not work if a large share of private schools chooses not to accept education vouchers. In this case, the number of effective competitors is limited.

[52] Formally, the amount of voucher funding is equal for public and private schools, but public schools are given additional subsidies.

Furthermore, those schools that do not participate in the voucher program are usually the best private schools, as can be seen in countries like Colombia and Chile. This means that not only the quantity but also the quality of competing schools is lower, creating less incentive for good performance for schools within the voucher system; simultaneously, the effect of higher private enrolment on overall average achievement will be lower than otherwise possible.

Another problem linked to this aspect is the emergence of new private schools of very low quality, which are founded to make use of the voucher funding. This pattern has been observed in Colombia as well as in Cleveland, Ohio in the US, which contradicts the theoretical assumption that students will use vouchers to choose the best schools.

d. Lack of Private Schools in Certain Areas

Competition based on enrolment numbers presumes that there is a sufficient number of schools available within an acceptable distance to give students a real choice. This assumption can be met either by the existence of different schools from the beginning or by new (usually private) schools created after the introduction of vouchers. In Chile, there seems to be a positive effect of competition by private voucher schools on the overall quality of education in a given district. At the same time, in rural areas there are hardly any private schools; even the introduction of the voucher scheme did apparently not create enough incentives for new schools to be established. Accordingly, these areas have not benefited from the vouchers, due to a lack of school choice available in practice.

On a speculative basis, the lack of private schools and therefore the lack of competition in rural areas can also be regarded as a reason why the Chilean voucher scheme has not resulted in a better quality of education in the country as a whole. Despite the existence of a positive effect of competition in some areas, the number of districts in which competition actually takes place may be too small to affect overall measures of achievement.

2. Factors that Enhance the Impact of Vouchers on the Quality of Education

a. Publishing School Evaluations/ External Exams

Evaluations of the performance of individual schools based on achievement by the government or by another independent agency may create incentives to offer better quality of teaching. For example, in England and in Florida it has been observed that the practice of publishing school evaluations has contributed to the improvement of the overall quality of education. Publicly accessible evaluations can complement voucher schemes; either as a direct criterion of eligibility for vouchers as in Florida, or by providing better information about school quality to students, enabling them to make an informed choice. Potentially, this might also counteract the tendency towards low-quality private voucher schools that has been observed in Colombia and Cleveland, Ohio.

The beneficial effect of external evaluation of school performance is also supported by Woessmann (2005). In his comparison of international standardised test scores across more than 30 countries, he finds a positive effect of external exit exams on academic achievement; 'external' in this context refers to exams designed by independent institutions, which can be either public or private.[53]

[53] An interesting aspect of his findings is an interaction effect between school autonomy and external exams. Without central exams, school autonomy over teacher salaries has a negative effect on achievement. However, in the presence of central exams this effect is turned around and autonomy over teacher salaries improves achievement.

b. Limited but Concise Regulation of Schools

In order to ensure the independence of private schools in the long run as well as the credibility of the voucher system, it is necessary to impose few but precise requirements on schools that receive voucher funding. This insight is brought forward by Sandstroem (2005) based on the Swedish experience. According to him, compliance with these rules, which can e.g. be quality standards or requirements on the curriculum such as keeping religion and science separate, should be strictly enforced by the government. In Sweden this was initially not the case, which made opponents of the voucher program ask for stricter regulation of private schools and for exclusion of confessional schools, as national achievement targets had not been met and some religious schools were accused of violating the requirement of non-confessional teaching.[54]

The Netherlands provides an example of a well-functioning voucher system that has a certain number of detailed requirements on participating schools. Despite the regulations, the system allows for diversity among schools.

c. Higher Voucher Value for Poor Students

Under a voucher system, schools appear to have an incentive to preferably select students from a high socio-economic background, in order to derive a competitive advantage from the social composition of their student body, which often plays an important role in students' and parents' choice of a school. Evidence for this can be seen in Chile and New Zealand. Accordingly, competition is to some degree based on socio-economic status rather than the quality of education. This phenomenon decreases the benefits of vouchers for two reasons, one because it diverts school administrators' attention from improving the quality of education, and second because the extreme social stratification across schools may lead to serious problems, as the example of New Zealand shows.

To prevent this, Gauri and Vawda (2004) propose to link the value of the voucher to socio-economic background, if administratively possible, and pay a higher amount for enrolling disadvantaged students, as it is done in the Netherlands.[55]

d. Include as Many Public and Private Schools as Possible

The degree of competition among schools will be higher the more schools participate, because the number of competitors will be larger. This argument is also linked to the aspect of private school participation mentioned earlier, as including as many schools as possible implies also high quality private schools, which raises the level at which schools compete. Successful voucher programs for instance in the Netherlands or in Sweden include most of these countries' schools, both public and private. On the other hand, less favourable outcomes have been observed in voucher systems restricted to public schools, as in England,[56] or in countries where a considerable number of private schools has chosen not to participate in the program, as in Chile or Colombia.

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[54] In response to this, the Swedish authorities defined 'non-confessional' teaching more clearly; they did not ban religious instruction in schools but required to keep it apart from teaching other subjects.

[55] For countries in which differentiating the voucher value is administratively not possible, Gauri and Vawda (2004) propose restricting voucher eligibility to low-income students. However, this may not address the problem of schools competing based on social status instead of based on quality. Schools might still try to attract high-income students, as the voucher amount (+ possibly additional tuition payments) they receive for enrolling low-income students might still be lower than or equal to the amount received from private payments by high income students.

[56] Overall achievement in England improved, but there are poorly performing public schools that do not have any incentive for improvement, as in New Zealand.

V. Conclusion

To sum up, education voucher systems in practice have led to very different consequences. Their success in improving the quality of education in the country or area where they are implemented seems to depend crucially on the particular features of the voucher scheme and on the general conditions of the education system.

Several factors should be kept in mind when designing a voucher scheme. First, as many public and private schools as possible should be included into the voucher system to ensure a high degree of competition and a high level of quality at which competition takes place. Second, information available to students as well as incentives to schools will be improved further by publishing external school evaluations. Third, a way to direct the focus of competition to the quality of education (and away from attracting students from high social strata) is to assign a higher voucher value to students from a lower socio-economic background or, alternatively, to give vouchers exclusively to this group of students. Fourth, limited but clear and strictly enforced requirements on participating schools are important to guarantee the political viability of the program. Such concise rules ensure some public control of how tax-money is spent and avoid the presence of single schools with low quality or radical ideology, which could undermine the credibility of the whole system.

On the other hand, a number of obstacles to competition have been observed, which lower incentives for providing high quality and thereby prevent the system from developing its full potential. One hindrance is posed by entry restrictions in the educational market, e.g. by the 'surplus places rule' which prohibits the establishment of a new school if there are free places in existing schools. Second, unequal funding of public and private schools distorts competition. Third, a low participation rate of private schools, in particular of top-quality private schools, will lower the level of quality at which schools in the system compete and reduce incentives for improvement. Fourth, a lack of private schools in specific areas, for instance in the countryside, may exclude these areas from the benefits of the voucher system, as the existence of education vouchers may not be incentive enough to guarantee the creation of new private schools in these regions.

Remembering these factors that have shown to improve respectively to diminish the success of voucher schemes may lead to a sounder design of a new voucher system or give hints towards improving existing structures.

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