THE EFFECTS OF PRIVATE SCHOOLS ON PUBLIC SCHOOL
ACHIEVEMENT

A Master's Thesis

by
SIRMA KOLLU

The Department of
Economics
Bilkent University
Ankara
January 2006

To MUMMY and DADDY

THE EFFECTS OF PRIVATE SCHOOLS ON PUBLIC SCHOOL
ACHIEVEMENT

The Institute of Economics and Social Sciences
of
Bilkent University

by

SIRMA KOLLU

In Partial Fulfillment of the Requirements for the Degree of
MASTER OF ARTS

in

THE DEPARTMENT OF ECONOMICS
BİLKENT UNIVERSITY
ANKARA

January 2006

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

Asst. Prof. Çağla Ökten
Supervisor

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

Asst. Prof. Ümit Özlale
Examining Comittee Member

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

Asst. Prof. Zahide Karakitapoğlu Aygün
Examining Comittee Member

Approval of the Institute of Economics and Social Sciences

Prof. Erdal Erel
Director

ABSTRACT

THE EFFECTS OF PRIVATE SCHOOLS ON PUBLIC SCHOOL
ACHIEVEMENT

Kollu, Sırma
M.A., Department of Economics
Supervisor: Asst. Prof. Çağla Ökten

January 2006

This thesis analyzes the effects of private schooling on public school quality. The share of private schools in Turkish education system has been continuously increasing especially after the extension of compulsory primary education to uninterrupted eight years in 1997. While new regulations are being considered by the government regarding encouraging private schooling, the share of private schools will increase and the importance of the relationship between private and public education will also increase.

In this study, the effects of private schools on public high school achievement, which is measured by Student Selection Examination (ÖSS), in 2003 in Turkey are estimated. Both the percentage of students attending private schools and alternative of it, the percentage of private schools, are treated as endogenous variables in the model. Private school achievement in previous year is used to identify a two-stage model. The empirical results showed that private schools have negative effect on public school achievement.

Keywords: Competition, Education, Private schools, Public school achievement.

ÖZET

ÖZEL OKULLARIN DEVLET OKULU BAŞARISI ÜZERİNDEKİ ETKİSİ

Kollu, Sırma

Yüksek Lisans, Ekonomi Bölümü

Tez Yöneticisi: Yrd. Doç. Çağla Ökten

Ocak 2006

Bu çalışma, özel okulların, devlet okullarının niteliği üzerindeki etkilerini incelemiştir. Özellikle zorunlu eğitimin 1997 yılında kesintisiz sekiz yıla çıkarılmasından sonra, Türk eğitim sisteminde, özel okulların payı devamlı olarak artmaktadır. Hükümetin özel okulların teşvik edilmesini amaçlayan yeni düzenlemeler üzerinde çalışması, özel okul payının ileride daha fazla artmasına yol açacak ve özel ile devlet okulları arasındaki ilişki daha da önem kazanacaktır.

Bu çalışmada, 2003 yılı için Türkiye'de özel okulların, Öğrenci Seçme Sınavı ile ölçülen devlet liseleri başarısı üzerideki etkisi incelenmiştir. Gerek özel okula giden öğrenci yüzdesi gerekse bunun alternatifi olarak kullanılan özel okul yüzdesi içsel değişkenler olarak kullanılmıştır. Bir önceki yıl özel okul başarısı iki aşamalı modeli belirlemek için kullanılmıştır. Deneysel bulgular özel okulların devlet okulu başarısı üzerinde olumsuz etkileri olduğunu göstermiştir.

Anahtar Kelimeler: Rekabet, Eğitim, Özel okullar, Devlet okulu başarısı.

ACKNOWLEDGEMENTS

I would like to express my gratitude to Asst. Prof. Çağla Ökten, my supervisor, for her guidance and contribution during preparation of my thesis.

I am grateful to my family for their support and tolerance.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

In this study we analyze the determinants of public school quality in Turkey. We primarily focus on how the prevalence of private schools affects the public school achievement. The relationship between private and public sector in education system is very important since private sector in Turkey has grown over the years. We specifically analyze the effect of private schooling in secondary education level on public high school achievement, as the percentage of private high schools grows faster than the whole education sector. Besides, in order to encourage private schooling, the Ministry of National Education considers possible revisions regarding the regulations about private schools (Milliyet)[1]. Therefore, investigating the effect of private education on public schools will be even a more important issue, as the share of private schools increases.

An increase in the size of the private sector would not only lessen the burden on the public schools by decreasing the amount of the students but also lead public schools to compete as private schools offer better standards and achieve high success. On the other hand, as private sector grows, high quality teachers and successful students, who can afford tuition fees, would be attracted by private

---

[1] Milliyet Newspaper, 18 October 2005.

schools and this would result in a decrease in public school achievement level. The findings of the literature also show this ambiguity by presenting conflicting results regarding the sign and the significance of the coefficient measuring the private school sector. Our goal is to find out which of these effects are more relevant in Turkey.

We use the Student Selection Examination (SSE) scores to measure the educational outcome and estimate our regressions with both quantitative and verbal test scores of public high schools. In order to avoid selection bias we exclude the public high schools admitting students by central examinations. The determinant of public school achievement, receiving priority consideration, is the size of the private school sector and measured by two alternative ways, percentage of private students attending private high schools and percentage of private high schools. Other determinants can be classified as school and city variables, where school variables measure the characteristics of the public school such as student per classroom and city variables reflect the characteristics of the city, in which the relevant public high school is located, such as Gross Domestic Product (GDP) per capita. In order to avoid possible endogeneity between public school achievement and size of the private sector, that is the level of public school achievement might affect the private school attendance, private sector is treated as an endogenous determinant of educational outcomes and public school achievement is estimated using both ordinary least squares (OLS) and two-stage least squares (2SLS). After controlling for the endogeneity problem, our estimation results show that private schooling has a negative impact on public school achievement in high school level in Turkey.

The organization of the paper is as follows. The next section gives information about the education system and the role of private schooling in Turkey. Section 3 discusses the conceptual framework. Section 4 and 5 describe the data and the model, respectively. Empirical results are presented in section 6. Finally section 7 concludes the thesis.

CHAPTER 2

EDUCATION SYSTEM IN TURKEY

The Ministry of National Education of Turkish education system was founded in 1857 during the Ottoman period under Council of Ministers. This was the first education organization at the level of Ministry. After the opening of Turkish Parliament on 23 April 1920, the "Ministry of Instruction" was organized as one of the eleven ministries of the government under Act No. 3, which was passed on May 2, 1920. In 1920, the Ministry of Instruction consisted of five units: The Program Committee, Department of Primary Education, Department of Secondary Education, Office of Turkish Antiquities, and Registry and Statistics Office. Since 1920, the national education policy has been carried on under various structures: It was "The Ministry of Instruction" between 1923 and 1935; "The Ministry of Culture" between 1935 and 1941; "The Ministry of Instruction" between 1941 and 1946; "The Ministry of National Education" after 1946; "The Ministry of Instruction" between 1950and 1960; "The Ministry of National Education" after 1960; "The Ministry of National Education, Youth and Sports" after 1983; and it is "The Ministry of National Education" since 1989. Today the Ministry of National Education (Ministry) consists of four divisions: Central, provincial, overseas and affiliated organizations. Due to the Law no. 3797 on the Organization and Duties of the Ministry of National Education, the Ministry of National Education has provincial

organizations in 81 cities and 924 towns, 70 of them being the central towns of metropolitan cities. The Ministry of National Education has representation offices in 21 countries with 20 education undersecretaries and 18 education attaches (National Education Statistics (NES), 2005).

Today, Turkish education system has four major education levels in formal education: Pre-primary education, primary education, secondary education and higher education.

— Pre-primary education

— Primary education

- Public primary schools

- Private primary schools

  - Turkish private primary schools

  - Minority primary schools

  - Foreign primary schools

  - International primary schools

— Secondary education

- General secondary education

  - Public high schools

    · High schools

    · Foreign language weighted high schools (FLW High schools)

    · Anatolian high schools

    · Science high schools

  - Private high schools

    · Turkish private high schools

- Private high schools

- Private Anatolian high schools

- Private science high schools

  · Minority high schools

  · Foreign high schools

  · International high schools

- Vocational and technical secondary education

— Higher Education

- Universities

- Institutes

- Higher schools

- Vocational higher schools

- Conservatories

- Research and application centers

2.1 Pre-Primary Education

Pre-primary education involves the education of children in the age group of three to five. There are two types of pre-primary education institutions: Kindergartens are the independent pre-primary education institutions whereas, nursery-classes are established as parts of other education institutions. Besides the kindergartens and nursery-classes financed by government, there are also institutions financed privately. Private institutions are either Turkish, minority, foreign or

international institutions (Pre-Primary Education Institutions Regulations)[2]. Although pre-primary education is not a part of the compulsory education in Turkey, by the next level of education becoming compulsory in 1970's had a positive impact on pre-primary education. In 1970's, pre-primary education indicators had an extreme jump and the number of students in pre-primary education institutions grew 15 times[3] and the average number of students per teacher improved from 26.5 to 17.9 during this period (NES, 2005). Today, there are 434,771 students in 16,016 pre-primary education institutions, 48 percent of them are female. Only 4 percent of the students in pre-primary education attend private institutions (NES, 2005). The average number of students per teacher in public institutions is 23 whereas the number is 12.5 for private institutions (NES, 2005). Pre-primary education institutions are established to prepare children for the next level of education, which is called primary education.

2.2 Primary Education

Primary education is the only level of education that is compulsory. Primary education became compulsory in 1970's and it has included five years of education until 1997. Today it consists of eight years of uninterrupted education and aims education of children in the age group of six to fourteen by the relevant stipulations in Law no. 4306, which was passed on 18 august 1997[4]. Primary education is given to female and male students together in public primary schools and financed by

---

[2] This regulation was published in 25486 numbered and 08.06.2004 dated official gazette and also attainable at http://ooegm.meb.gov.tr
[3] http://meb.gov.tr/stats/eskiistatistikler.html
[4] http://iogm.meb.gov.tr

government. Although every Turkish citizen has a right to get primary education in public primary schools, there are also private primary schools, in which education of children are financed by the parents. In 1997, the average number of students per teacher was around 30 and today it is 26.5 in aggregate, where 9.6 for private primary schools and 26.6 for public primary schools (NES, 2005). Schooling ratio in primary education was 86.4 percent in 1970 and by the help of the legislation about compulsory education; it regularly increased and reached to 99.8 percent in 1997[5].

There are three types of private primary schools besides the Turkish private primary schools: International, minorities and foreign primary schools. 1.67 percent of students in primary education are attending private primary schools (NES, 2005).

2.3 Secondary Education

Secondary education includes all education institutions of a general or vocational and technical character of at least three[6] years after primary education. Making primary education compulsory also had an effect on secondary schooling ratios. It was around 20 percent in 1970 and reached to nearly 60 percent in 1997. The schooling ratio of secondary education had a big improvement during 1980's and doubled itself. Nevertheless, the indicators of general secondary education did not go well enough; although schooling ratio of general secondary education, which is the ratio of students attending general secondary education to the secondary

---

[5] http://apk.meb.gov.tr
[6] In accordance with the acts on EU integration, by the 184 numbered 07.06.2005 dated sentence of the Board of Higher Discipline, education period for all secondary education institutes was increased to four years.

school-age population, had doubled itself until 1997, it hardly managed 30 percent in 1997[7].

Today there are 3,039,449 students in 6861 schools in secondary education and 1,937,055 of these students, are having general secondary education in 2,991 schools. In 2005, 21 percent of students are having secondary education and 63 percent of these students are in general secondary education. The average number of students per teacher is 18.1 in secondary education, while it is 20.7 for general secondary education. 4 percentage of general secondary education belongs to private sector having 7.9 students per teacher while public sector achieved 19 students per teacher. In public general secondary education, high schools and FLW high schools have a common share of 83 percent, Anatolian high schools have 12 and science high schools have 1 percentage share (NES, 2005).

2.3.1 Public High Schools

Every Turkish citizen, who was awarded by primary education diploma, has right to continue his or her secondary education in high schools. In some high schools foreign language weighted education is given depending on the physical resources, these institutes are called foreign language weighted high schools. The students, who are more successful relative to their peers, are assigned by school administrations to attend FLW high schools. On the other hand students, who want to attend Anatolian or science high schools, must take and succeed in the central

---

[7] http://apk.meb.gov.tr

examination, Secondary Education Institutes Examination (SIE), which is done by the Student Selection and Placement Center (SSPC)[8].

Anatolian high schools were first established in 1955 under the name of Instruction Colleges (*Maarif Koleji*). In 1955 there were Instruction Colleges only in six cities, which were İstanbul, İzmir, Eskişehir, Diyarbakır, Konya and Samsun, each having one. In 1975 the name of these schools was converted to Anatolian High Schools. Today there are 442 schools in all of the 81 cities of Turkey with 14,442 teachers and 191,931 students, where 47 percent of them are female. Anatolian high schools include at least three years of education in addition to the prep school for foreign language[9]. The objectives are to prepare students to higher education considering the interests and aptitudes they have and to provide education of foreign language so that students to use their knowledge in following the scientific and technological developments around the world. Although every 8th grade student can apply to Anatolian high schools, a student must succeed in SIE. Before December 2004, in addition to the success in SIE, the weighted averages of a student's 4th, 5th, 6th and 7th grade GPA's had also effect on placement. Student per classroom is set not to exceed 30 for all grades including prep; by considering not only the physical capacity and equipment of each school but also the number of teachers in all branches especially in foreign languages. Foreign language is the instruction language in mathematics and science courses. If there is inadequate number of teachers, who are capable of instructing in foreign language, all courses are held in Turkish (Anatolian High Schools Regulations)[10].

---

[8] http://ogm.meb.gov.tr, School Information, High Schools.
[9] http://ogm.meb.gov.tr, School Information, Anatolian High Schools.
[10]This regulation was published in 23867 numbered and 05.11.1999 dated official gazette and also attainable at http://ogm.meb.gov.tr

First science high school was established in 1964 in Ankara by the help of Ford Foundation. There can be at most one science high school in a city and 70 cities in Turkey have them. Science high schools are coeducational[11] boarding schools. Although students may not use this option due to parents' preferences, institutions are obliged to provide coeducation[12]. Total enrollments are set as not to exceed 96 in a year and student per classroom is set at 24 for each and every science high schools in Turkey. Like the Anatolian high schools, science high schools also include at least three years of education in addition to the prep school for foreign language. The objectives of science high schools are; to prepare the students, who have high intelligence level and are talented in math and science areas, to higher education and to provide opportunities for students to participate in scientific and technological works. Although they are not as assertive as Anatolian high schools, to provide knowledge of foreign language at a sufficient level to follow the scientific and technological developments around the world is another goal for science high schools.

Every student, who has a weighted average of 4.00 out of 5.00 in Turkish, math and science courses at the end of 6th and 7th grades, can apply for science high schools. In addition, since September 2003, applicants must also achieve to make at least 3.00 out of 5.00 in each of these three courses at the end of 6th and 7th grades. In order the applicants to enroll in science high schools; they must first succeed in SIE like all other applicants for Anatolian high schools. However science high school applicants not only must answer some additional questions, which are designed to

---

[11] Coeducation is the education of students of both sexes at the same institution.
[12] http://ogm.gov.tr, School Information, Science High Schools.

measure the level of intelligence, but also are subject to another treatment in which answers to math and science are more weighted while calculating their scores. Administrative units are highly selective about the teachers they hire just like in the case of student decisions. Teachers must have at least four-year undergraduate diplomas, at least five-year experience in teaching, high reputation in records, no serious disciplinary penalties. Moreover, having a graduate diploma, grade of C in foreign language qualifier exam for public personnel, being honored by a mention or by bonus and having a certificate of in service training are all plus in hiring decisions. Besides the elite students and teachers, training programs make also these schools privileged. For 10th and 11th grades, the weight of science courses is designed not to be less than 60 percent of total hours of education. Applied laboratory courses are weighted compared to other types of high schools. In addition attending seminars and participating in projects are not only encouraged but also participating in at least an individual or group project regarding math or science courses is a must. On the other hand, foreign language education does not have a priority as it has in Anatolian high schools. Only the technical terms that are used in math and science courses are taught to students (Science High Schools Regulations)[13]. Consequently, every year, approximately 700,000 students take SIE. Not more than a percentage of these students have a chance to enroll in science high schools (Milliyet)[14]. Today, there are 14,940 students and 1,160 teachers in 70 science high schools in Turkey, 33 % of the students are female (NES, 2005).

---

[13] This regulation was published in 23579 numbered and 10.01.1999 dated official gazette and also attainable at http://ogm.meb.gov.tr

[14] Milliyet Newspaper, 17 August 2005.

2.3.2 Private High Schools

Private schools have a considerable history in Turkish education system. The first private school was established during the Ottoman period as a minority school. The motive of giving permission to minority schools in 1,453 was to provide minorities, who live in the empire territory, opportunities to have education and training of their own religion in their native language. Consequently, the first minority school began to education in 1,454 under the name of Fener Greek School. Different ethnic groups like the Armenians, Greeks and Jewish people benefited from these schools, each was supported by resident members of their societies, religious order and by country of origins. After minority schools, foreign countries, especially the overseas countries like Brazil and U.S.A demanded their citizens to have their own schools in Ottoman Empire in order to have education and training in their native languages during their very long stays in the empire. As a result, in 1583, the first foreign school was founded in Istanbul under the name of St. Benoit by French missionaries. Subsequently, many foreign countries like America, France, England, Italy, Austria, Germany, Russia Bulgaria and Iran financed their own foreign schools in Ottoman Empire. Having more and more foreign schools became a competition between these countries (Ertuğrul, 1998). In 1900, the number of students in foreign schools sponsored by only the American missionaries was around 20.000 in more than 400 American schools (Ortaylı, 1982), while there were around 7.000 students in only 69 Ottoman schools. Moreover, in those years, the number of foreign schools was around 2.000, when we add the minority schools the number was 10.000 (Sezer, 1999).

Until the end of 18th century, only the foreigners and minorities had been attending to foreign schools. However, later Muslim residents also attended to these schools of foreigners. The reasons of foreign schools being so attractive were firstly that the education quality of Ottoman schools was far behind the modern education standards. Ottoman schools were very inadequate in number and quality to satisfy all the citizens. The inadequacy of Ottoman schools were admitted even by the central government, so that the Ottoman Empire sent an ambassador to Paris to investigate the modern system of education and how they could improve the current system in 1721. Moreover, the foreign schools provided an opportunity to have at least one foreign language. In addition, foreigners had grown in Muslims' esteem because of the failures of the Ottoman Empire in the areas of military and finance. Thus the success of foreigners in every area became a common belief. Finally, the idea of being a member of some elite society made many parents, who could afford the expenses, to send their children to foreign schools. All of these beliefs behind the appreciation of foreign schools were well founded. The graduates of foreign schools did create a well educated, productive elite society having at least one foreign language and members of this elite group had many senior positions both in public and private sector (Ertuğrul, 1998; Odabaşı, 2003).

On the other hand, these schools of both minorities and foreigners were claimed to harm the national values and to impose the values of their own. By the establishment of Republic of Turkey, many of these minority and foreign schools were closed and some of them were allowed to work under the supervision of Ministry of National Education due to the Lausanne Pact. The main concern of the very young Republic, which was founded in 1923, was to have the unionized secular

education system, having high minimum standards. To achieve this goal first all institutions giving religious education of any religion were closed (Vahapoğlu, 1990; Tozlu, 1991). Then Turkish was made the common language of education. Last, all minority and foreign schools were passed into the control of Ministry of National Education. To have a control over these schools was tried also during the Ottoman period but it did not turn into reality. For example according to the census, which was done by the order of Sultan Abdulhamid II, during the late 1800's, only 51 protestant schools had license out of 392 protestant schools. However, the Republic of Turkey did apply strict policies and did shut down the institutions, which did not act in accordance to the regulations. Many of these schools were shut down, some were adapted into Anatolian high schools like Lycée de Galatasaray and few remain (Ertuğrul, 1998).

The action of westernization started during the Ottoman period and created a keen interest towards foreign schools. By the end of Ottoman period, minority schools were allowed only for foreign citizens or members of minority groups. However, westernization period did not end as the Ottoman period did. The demand for western education institutions, which provide more attentive education in addition to foreign language education, created its own supply and initiated the Turkish private schools. The Turkish Parliament gave utterance to this demand and encouraged people to play a role in financing these private schools in 1925. Consequently, the first Turkish private school was founded in 1928 in Ankara, under the name of TED Ankara College[15]. Today, there are 14 foreign, 9 minority, 4 international and 600 Turkish private high schools in Turkey (NES, 2005). The list of

---

[15] www.ted.org.tr, History.

non-Turkish high schools is given in Table 1 and as shown in Table 1, these schools are mostly located in İstanbul, İzmir and Ankara, where most of the foreigners live in.

Table 1. List of Private High Schools Excluding Turkish Private Schools in 2005

	Name of Institutions	**Location**
International High Schools		
	Prvt. Independent international School	Ankara
	Prvt. International School of Bilkent	Ankara
	Prvt. International School of MEF	İstanbul
	Prvt. International School of Kapi	İstanbul
Minority High Schools		
Armenian High Schools	Prvt. Getronogan Armenian High School	İstanbul
	Prvt. Sahakyan Nunyan Armenian High School	İstanbul
	Prvt. Surp Haç Armenian High School	İstanbul
Greek High Schools	Prvt. Greek High School for boys of Heybeliada	İstanbul
	Prvt. Greek High School of Zapyon	İstanbul
	Prvt. Greek High School of Zoğrafyon	İstanbul
	Prvt. Greek High School of Fener	İstanbul
	Prvt. Greek Dame High School of Yuvakimyon	İstanbul
Jewish High Schools	Prvt. Jewish High School	İstanbul
Foreign High Schools		
American High Schools	Prvt. Tarsus American College	Mersin
	Prvt. American Robert College	İstanbul
	Prvt. Üsküdar American College	İstanbul
	Prvt. İzmir American College	İzmir
German High Schools	Prvt. German College	İstanbul
Austrian High Schools	Prvt. Saint George Austrian College	İstanbul
İtalian High Schools	Prvt. Galileo Galilei Italian College	İstanbul
	Prvt. Italian College	İstanbul
French High Schools	Prvt. Saint Benoit French Lycée	İstanbul
	Prvt. Saint Pulcherie French Lycée	İstanbul
	Prvt. Saint Joseph French Lycée	İstanbul
	Prvt. Notre Dame De Sion French Lycée	İstanbul
	Prvt. Saint Michel French Lycée	İstanbul
	Prvt. Saint Joseph French Lycée	İzmir
Total	**27**	**4**

Source: Official web site of Ministry of National Education;
http://ookgm.meb.gov.tr/OkulListe.aspx

16

Table 2 shows the student and teacher numbers in private high schools. Foreign high school institutions are the biggest in capacity among non-Turkish high schools. Number of students per institution is 23 for International high schools and 88 for Minority high schools, where it is 514 for foreign high schools, thus the percentage of students in foreign high schools is 89 percent of all students in non-Turkish high schools. Foreign schools are popular because they are no longer only for foreigners but also appeal to Turkish citizens and claim to give the best instruction in foreign languages (Ertuğrul, 1998). Thus it will be more appropriate if the foreign schools are considered within Turkish private schools now on. The regulations regarding private schools were discouraging foreign schooling until 1985 and foreign countries had also stopped financing these schools by 1923, thus minority and foreign schools did not grow in number while the number of Turkish private schools continuously grows. As a result, today 95 % of students attending private schools are in Turkish private schools (NES, 2005).

Table 2. Student and Teacher Statistics of Private High Schools in 2005

	Number of Institutions	Number of Students			Number of
		Male	Female	Total	
International High Schools	4	55	38	93	
Minority High Schools	9	304	492	796	107
Foreign High Schools	14	3359	3848	7207	758
Turkish Private High Schools	600	3494	27121	6206	8022
Total	627	3866	31499	7016	8887

Source: National Education Statistics, 2004-2005 and official web site of Ministry of National Education; http://ookgm.meb.gov.tr/OkulListe.aspx

It is important to note that Foreign and Minority schools have been very successful in achieving their goals. They achieved their claims of creating an elite

society, many of their graduates became diplomats, politicians, ambassadors, ministers, prime ministers, artists, musicians, poets, painters, writers and so on (Ertuğrul,1998). Now, Turkish private schools have the claim with foreign schools, but it is for sure that they all provide better standards of education compared to many of public schools.

The reason behind encouraging private sector was to reduce the burden of the public sector in financing public education; however the aims and required standards of private schools are regulated by law, and private education institutions are run under control and supervision of Ministry in accordance with related law and regulations. Every private school follows the syllabus, which is prepared by the school authority and also approved by the ministry. The length of a course is set to 45 minutes and any education material, which is not recommended by the ministry, is not allowed to be used in courses. Every private school has to provide a library available to students. Private schools must be coeducational institutions and the number of students per classroom must have an upper bound of 40 students. The number of foreign students cannot exceed 20% of number of Turkish students and every private school must grant scholarship to students between 2 and 10 % of its student capacity. The private schools giving education in foreign language generally admit students based on the results of central examination for private secondary schools (CEPSS) (Private Schools Regulations)[16]. In 2005, the exam took place in 15 cities and 32,040 students took it, this number was 21,050 in previous year so the increase in demand for private secondary education is around 50 %, which indicates

---

[16] This regulation was published in 25883 numbered and 22.07.2005 dated official gazette and also attainable at http://ookgm.meb.gov.tr

a considerable increase in the demand for private institutions. By this central examination, around 5,000 successful students were placed in 98 schools (Milliyet)[17].

All the regulations about the standards of and admissions to private science schools are same as public science high schools. Today, there are 70,163 students and 8,888 teachers in 627 private secondary education institutions (NES, 2005).

2.4 Higher Education

Secondary education is followed by higher education of at least two years. Higher education institutions are established not only by the state as public corporations having autonomy in teaching and research but also by private foundations as non-profit organizations. Today there are three types of higher education institutions: universities, military and police colleges and academies, and vocational schools affiliated with ministries. Universities are the main higher education institutions, which have units as faculties, graduate schools, schools of higher education, conservatories, two-year vocational training schools and centers for applied work and research. High level educational activities, scientific research and publications are carried out in universities (NES, 2005).

---

[17] Milliyet Newspaper. 6 July 2005

2.5 Student Selection Examination

Admissions to higher education are mostly done in accordance with the examinations organized by SSPC. Before the 1950's, the number of applicants to higher education was not high enough to require a central examination. The grades from graduation examinations at the end of secondary education were used as the criterion for selection. Once the number of applicants exceeded the capacity, faculties had to address different methods in admissions. Each faculty started to organize their own student selection examinations in addition to the grades from graduation examinations. The time consuming nature and difficulties in evaluations of essay type examinations, having examinations of more than a faculty at a time had proved to be inadequate. Consequently, the higher education institutions began to search for more objective methods in application, evaluation, and placement. Finally The Interuniversity Board set up The Interuniversity Student Selection and Placement Center to select among the applicants considering the limited capacity of universities. Thus the centralized system for admission of students to the institutions of higher education started in the 1973-1974 academic year.

In both 1973-1974 and 1974-1975 academic years, student selection examinations were held in two sessions on the same day; one in the morning, the other in the afternoon. From 1976 to 1980, student selection exam was made up of a single session. In 1981, the center was attached to The Higher Education Council under the name of The Student Selection and Placement Center, in accordance with The Higher Education Law. Between 1981 and 1998, student selection examination was turned into two-stage system, in which the first stage was Student Selection

Examination (SSE) and the second stage was Student Placement Examination (SPE)

two months after the SSE.

Table 3. The Number of Applicants in the Student Selection and Placement Examination and Those Placed in Programs of Higher Education Between 1980 and 1998.

Year	Number of Applicants	Number of Those Placed	Percentage (%)
1980	466.963	41.574	8,90
1981	420.850	54.818	13,03
1982	408.573	72.983	17,86
1983	361.158	105.158	29,12
1984	436.175	148.766	34,11
1985	480.633	156.065	32,47
1986	503.481	165.817	32,93
1987	628.089	174.269	27,75
1988	693.277	188.183	27,14
1989	824.128	193.665	23,50
1990	892.975	196.253	21,98
1991	876.633	199.735	22,78
1992	979.602	260.303	26,57
1993	1.154.571	414.732	35,92
1994	1.249.965	370.826	29,67
1995	1.265.103	383.974	30,35
1996	1.399.061	412.260	29,47
1997	1.349.518	445.290	33,00
1998	1.359.579	425.612	31,30

Source: Official we site of the Student Selection and Placement Center;
http://www.osym.gov.tr/BelgeGoster.aspx?DIL=1&BELGEBAGLANTIANAH=169

Beginning with the 1999 administration, the second stage had dropped and the

entrance examination system is based on a one-stage examination under the name of

SSE. Any Turkish citizen, who has a high school diploma or who is in the final year

of such a school is qualified to apply for SSE. The objectives of SSE is firstly to select those candidates who will be considered in the placement decisions and then to select and place those candidates in the higher education programs of their highest preferences compatible with their relevant weighted composites as the criterion. SSE consists of two tests. One is designed to measure the verbal abilities and the other is designed to measure the quantitative abilities of the candidates. There are approximately 90 items in each of these tests and candidates are expected to take both tests. The components of the verbal test are proficiency in Turkish, history, geography and philosophy where the components of the quantitative test are mathematics, physics, chemistry and biology.

In the evaluation of the tests, the number of correct and incorrect answers in both the verbal and the quantitative tests and their sub tests are counted separately. The raw score for each section is obtained by subtracting one fourth of the number of incorrect answers from the number of correct answers. Then, as a preparation for the calculation of the composite scores to be used in the selection and placement decisions, each candidate's verbal and quantitative raw scores are transformed to standard T scores (a score scale with an arithmetic mean of 50 and standard deviation of 10). This transformation is carried by using the arithmetic means and standard deviations of the respective score distributions for candidates who are in the last year of secondary education. Essentially, candidates are evaluated on the basis of not only their performance on the SSE but also their academic achievement in high school. Thus each candidate's high school grade-point average is also transformed to a standard T score in order to achieve uniformity in the units of measurements to be weighted. The arithmetic mean and standard deviation are calculated from the grade-

point average distribution of the high school which the candidate has attended. The purpose of this calculation is first to minimize the discrepancies that may arise because of the differences in grading between schools and then to counterbalance the differences between schools in the resources for effective learning.

After the completion of score transformations, three different composite scores are calculated for each candidate to be used in placement of the candidate to four-year undergraduate program or two-year vocational higher school program, considering with the preferences of each candidate. These composite scores are verbal SSE score in which the answers in verbal sections are weighted relatively heavily for students in verbal programs in their high schools, quantitative SSE score in which the answers in quantitative sections are weighted for students in quantitative programs in their high schools and equally weighted SSE score in which the answers in mathematics and Turkish are weighted for students in equally weighted programs in their high schools. In year 2003, a minimum composite score of 120.000 points is stipulated for qualification to be considered for placement in the four-year undergraduate programs. The candidates having composite scores between 105.000 and 119.999 points are offered a restricted choice of higher education programs. Candidates whose composite scores are 105.000 or above receive the preference form for listing their preferences on programs[18].

The graduates of vocational and technical high schools are encouraged to continue to their professions in relevant vocational higher school programs and receive a favorable weight for their high school grade-point averages when they are

---

[18] www.osym.gov.tr. About OSYM.

being considered for placement in higher education programs in the field of their high school education. Because the vocational and technical high schools have completely different curriculum from general secondary education institutions, it would be inappropriate to aggregate the vocational and technical high schools with general high schools. To search for the effect of private vocational and technical schooling on the success of public vocational and technical schools might be an alternative study but the number of private vocational and technical high schools is not sufficient for such a study, besides the primary goal of vocational and technical high schools is not to prepare students to higher education, but to create man power for labor market[19].

In 2004, the number of applicants in SSE was 1,786,883. 28 percent of these applicants were in senior classes in high schools, while 37 percent of applicants, who were placed in undergraduate programs, were seniors (NES, 2005). Not only among seniors but also in total, both public and private science schools are appeared to be the most successful schools in training the students who were placed in undergraduate programs as presented in Table 4.

---

[19] http://etogm.meb.gov.tr and http://ktogm.meb.gov.tr

Table 4. Percentage of Those Placed in Undergraduate Programs by School Types

	Seniors			Total		
	Number of Applicants	Number of Those Placed	%	Number of Applicants	Number of Those Placed	%
High Schools	344.005	16.119	4,69	891.187	64.622	7,25
FLW High Schools	50.371	11.115	22,07	111.567	28.084	25,17
Private High Schools	22.403	10.037	44,80	38.448	13.396	34,84
Anatolian High Schools	69.724	31.268	44,85	126.891	55.136	43,45
Science High Schools	3.591	2.629	73,21	5.371	3.389	63,10
Private Science High Schools	2.590	1.830	70,66	3.770	2.217	58,81

Source: National Education Statistics, 2004-2005.

Nevertheless, science high schools and Anatolian high schools admit students after a series of elimination process; one can say that their success would be anticipated. On the other hand, success of Private high schools is the highest among those do not stipulate exams in admission when both the percentage of students who are placed in undergraduate programs and the difference between private and public school SSE scores are considered as in Figure 1[20]. Each bar indicates the difference between average private school achievement and average public school achievement in SSE quantitative test scores for a city, in which private high schools are established.

---

[20] The result remains for both verbal and quantitative test scores, 2002.
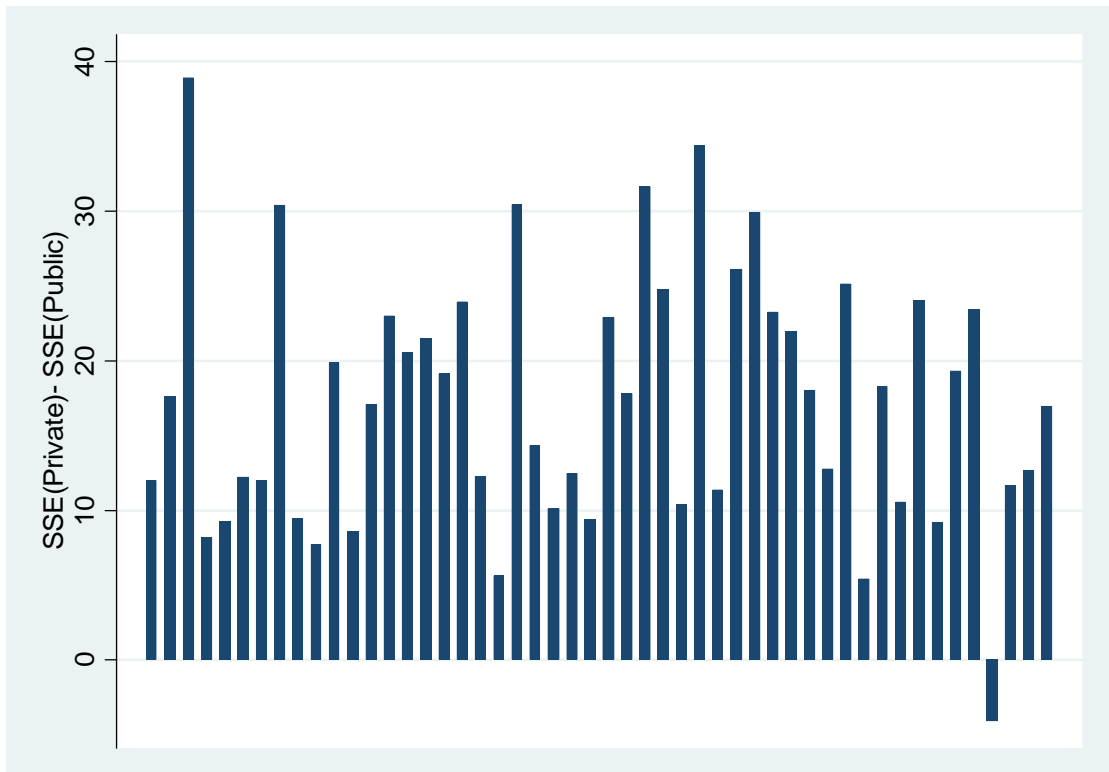
Figure 1. The Difference Between SSE Scores of Private and Public Schools in 2002

Private schools offer high standards of education which is stipulated by law, provide the best foreign language education, opportunities for their students to participate in various social activities, have different rules regarding discipline and higher expectations regarding homework and achieve to place their senior students to undergraduate programs with higher percentage than double of public high schools as shown in Table 4. Because of all, there has always been demand for private education as long as the parents can afford. Figure 2 presents the share of private schools in whole education sector in percentages.

Source: Calculated from National Education Statistics, for relevant years.
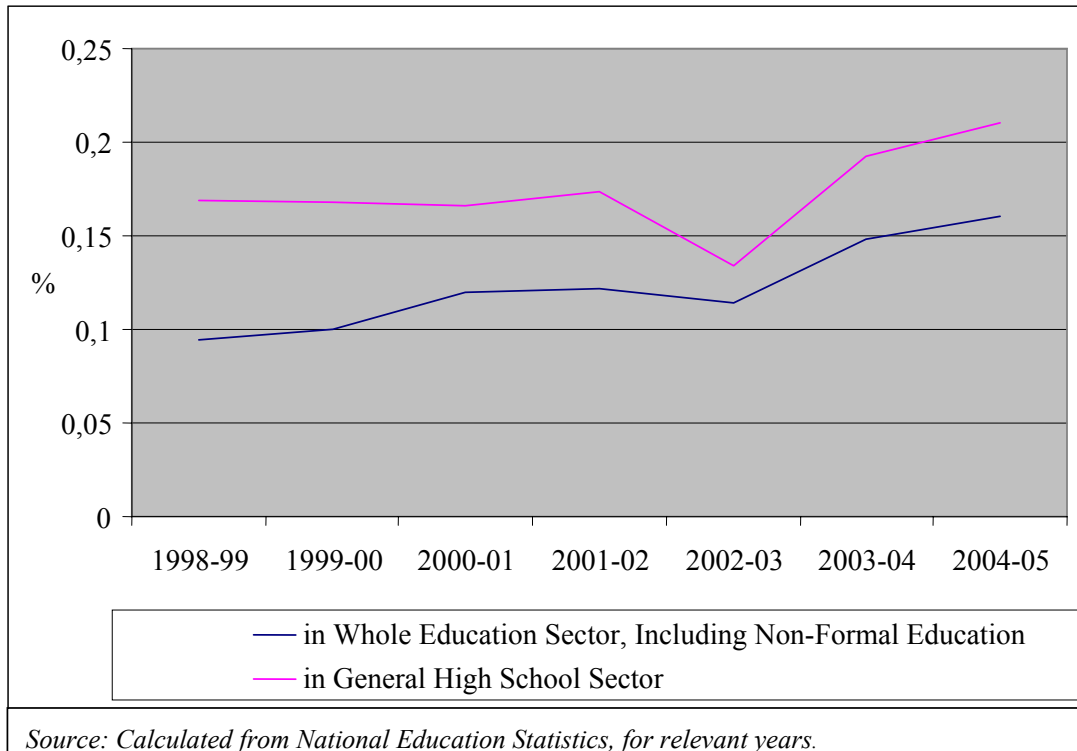
Figure 2. Percentage Share of Private Schools by Years

Share of private schools seems to follow an increasing pattern according to Figure 2. Some of this increase in the share of private schools is because the compulsory education was extended from 5 to 8 years of uninterrupted education. Before the extension, students had chances to change schools at three different grades, at the beginning of 1st, 6th and 9th grades. Moreover, most of the private schools admit students relying on the results of CEPSS and in the past this examination had been done just before 6th grade. Thus private schools mostly admitted students at the beginning of 1st and 6th grades. Once the compulsory education was extended to eight years, schools can admit students either at the beginning of 1st grade or at the beginning of 9th grade. Since parents consider that 9th grade is too late to start foreign language instruction; they prefer sending their children to private schools earlier than before. As a result, first demand for then the share of private schools increase as shown in Figure 2. Moreover, the increase in the

percentage of private schools in general high school sector is greater than the whole

education sector. As the share of private schools increases, investigating the effect of

private education on public schools will be even a more important issue.

CHAPTER 3

CONCEPTUAL FRAMEWORK

Friedman (1962), Friedman and Friedman (1981) argued that private schooling has a positive effect on the quality of public education through competitive pressures. However empirical literature gives conflicting results on the effect of private schooling on public education. Although there are studies consistent with Friedman's argument (Hoxby, 1994, 1996, 2001; Brokaw, Gale and Merz, 1995; Arum, 1996; Dee, 1998; Mizala and Romaguera, 2000), there are also studies that find no significant effect of private schooling on public education (Sander, 1999; Jepsen, 2000; McEwan, 2000; Geller, Sjoquist and Walker, 2001; Sander, 2001; Jepsen, 2002). Besides, McMillan (1999) and Rangazas (1997) found that private schools have negative impact on public schools.

Even though the measures do not capture skill differences very well, measured differences in quality of teachers indicate a positive relationship between teacher skills and student performance (Glewwe and Jacoby, 1994; Betts and Morell, 1999). Moreover this effect is said to be stable over time (Hanushek, 1992). Since teachers differ dramatically in their effectiveness (Hanushek, 1971, 1986), relatively high salaries to teachers in private schools would cause a competition among all teachers, which would end up with the hire of most talented and skilled teachers in private

schools. Eventually the quality of public school teachers may fall as private education sector grows (Ballou, 1996) and schools would fight against this pressure (Hoxby, 2002). By increasing the salaries, public schools can keep on hiring well-qualified teachers (Hoxby, 1996); however in unionized school districts they cannot achieve to hire well-qualified teachers even if they increase the salaries (Figlio, 2002).

On the other hand, larger private school sector would increase the quality of public education through competitive pressures. Although Hanushek, Rivkin and Taylor (1996) present evidence that school quality differences are not systematically related to school resources, high quality of private schools, which are financed by parents, might lead to higher educational outcomes in private schools (Lewis and Wanner, 1979; Coleman, Hoffer and Kilgore, 1982; Teachman, 1987; Card and Krueger, 1992; Arum, 1996; Mizala and Romaguera, 2000; McEwans, 2000; Alderman, Orazem and Paterno, 2001; Jepsen and Jepsen, 2001; Sander, 2001). Public schools would eventually respond to the changes in the sector and intend to increase quality in order to catch up with private schools. Besides the competition from private schools, even more competition in the public school sector increases the quality of public education (Borland and Howsen, 1992; Grosskopf et al. 1998). In addition, increasing private school sector would relieve the burden on public education by decreasing the mass amount of students in public school sector. Although this does not have a significant effect on per pupil expenditures in the public sector according to Hoxby (1998), Poterba (1998) points out an increase in public school spending per pupil.

Furthermore, higher standards of education would attract not only the teachers but also the students. One can expect that successful students would respond more to higher standards in private school than low ability students. Consequently higher ability students tend to enroll in private schools (Figlio and Stone, 2001). This would result in a way consistent with Epple and Romano (1999) that, students with the lowest ability and lowest family income end up concentrated in public schools. Besides this incentive of students towards private schools would directly reduce public school achievement by reducing the number of high achieving students in public schools, it would be reduced also because of negative peer group effect. Relatively high abilities of schoolmates increase the abilities of others. When students with higher abilities are gone, this will also reduce the performance of those that remain in public schools (Hanushek, Kain, Markman and Rivkin, 2001; Hoxby, 2002).

Moreover, there are several other variables, such as family background, income and size that affect educational performance of children. Hanushek (1992) finds that parents compensate lower ability children within family. One might argue that parents have impact not only on lower ability children but also on each and every child they have as relevant studies of Lam and Schoeni (1993) and Hanushek (2001) states. On the other hand, Card and Krueger (1992) do not find any effect of parental education on student performance when school quality measures are held constant. Moreover, in the same study, Hanushek (1992) finds that neither the work behavior of the mother nor the single parenthood has any impact on educational performance of the children. However, Hanushek (2001), Altonji and Dunn (1996) identify the positive relationship between parental schooling and educational performance of

children later. In addition single parenthood tends to be negatively related to educational performance (Becker, 1991). Although family income seems to have no impact on educational outcomes (Card and Krueger, 1992), it may affect indirectly through affecting school resources or its influence might be hidden in the effect of family size on educational performance of children, which is found to be negative (Hanushek, 1992, 2001).

Several methods of measuring educational outcomes are used in the literature and discussed in the next section. We use average test scores of public schools as the dependent variable to measure the student achievement level. While explaining the possible effects of competitive pressures from private sector on student achievement, the main problem, which is faced by many researchers, is that the variable measuring the private schooling, thus competition, might be endogenous with public school achievement. In order to solve this problem, some of the studies use value-added approach (Bryk, Lee and Holland, 1993; Coleman, Hoffer and Kilgore, 1982), and Hanushek and Taylor (1990) show that value-added models reduce selection bias. Value-added models include also the past achievement level of the student or the school, which that student is attending, thus they can measure the improvement made by that particular student. Another method to deal with this endogeneity problem is to implement two-stage least squares approach. Thus at least one variable, which affects private school attendance and is uncorrelated with public school achievement, is needed. Most of the studies use being Catholic, the percentage Catholic in the county, percentage of church members, density of Catholic churches in the county, etc. as instrumental variables (Sander, 1995, 1999; Sander and Krautmann, 1999; Jepsen, 2000, 2002). However, religion cannot be used as instrumental variable in

Turkish case since religion can only be a determinant for vocational high schools in the field of religion.

Another country specific issue is the determination of the school types, which are used in this study. Most of the studies separate the data into two depending on whether the school is public school or financed privately. However in Turkey, both public and private science high schools and Anatolian high schools, which are financed publicly, admit students by central examinations. Since this would result in a selectivity issue, we drop both public and private science high schools and Anatolian high schools from our sample. The data includes public FLW high schools and public high schools. There is still a selection bias since FLW high schools admit the students considering their previously obtained grades. In order to manage this problem we include a dummy variable indicating whether the school is FLW or not. According to the new regulations, by June 2005, also public FLW high schools will admit students by central examination and their names will be changed to Anatolian high schools. This transformation of public FLW high schools to Anatolian high schools will increase the amount of Anatolian high schools, thus may decrease the quality of education and students in the long run. If this will be the case in the future, Anatolian high schools can then be included in the sample but not in present conditions.

CHAPTER 4

DATA

Various types of indicators can be used as left-hand side variable, the educational outcomes. Many of the studies in the literature use test scores measuring the performance of students as Hanushek (1992), Arum (1996), Sander (1999), Mizala and Romaguera (2000), Figlio and Stone (2001), Hanushek, Kain, Markman and Rivkin (2001) and Jepsen (2002), while Glewwe and Jacoby (1994), McEwan (2000), Sander (2001) and Goldhaber and Brewer (1997) preferring specifically the scores of math tests. Hanushek (1992), Hanushek, Rivkin and Taylor (1996) and Hanushek, Kain and Rivkin (2004) choose the standardized the test scores, whereas Sander (1996) uses the number of correct answers. As alternatives for student achievement, educational and occupational attainment, especially wages, (Lewis and Wanner, 1979; Lam and Schoeni, 1993), enrollment rates (Glewwe and Jacoby, 1994; Alderman, Orazem and Paterno, 2001; Lloyd, Mete and Sathar, 2005), high school completion and higher education attendance (Hoxby, 1994; Evans and Schwab, 1995; Neal, 1997; McEwan, 2000), high school drop-out rates (Sander and Krautmann, 1995) and additional years of schooling (Card and Krueger, 1992) are used in the literature. Here in this study, we use the test scores as left-hand side variable in order to measure the educational outcomes; however we neither use the standardized test scores nor the number of correct answers. We use the number of

correct answers minus one fourth of incorrect answers, namely the raw scores. Because SSE is the most widely held examination among high schools in Turkey, neither the questions, evaluation, date nor time changes from person to person and from city to city and provides many observations among Turkey, we prefer to use SSE raw scores data, which includes 2203 numbers of observations, as left-hand side variable to measure the student achievement level at school level. The data set does not include schools having no senior grade students or number of applicants less than five. As the variables that might have effect on public school achievement level, we have the private school competition in that city, other city variables and the school variables.

In this study, our major analysis is to find out how private schooling affects public school achievement level. In this sense, there are several alternatives to measure the competition. Jepsen (2000) used the distance of the public school to the nearest private school; however in our case it would not be possible to find this data for Turkey. Moreover, we argue that the distance to the nearest private school does not affect the decisions of parents on whether sending their children to private schools or not, but affects to which private school they will send their children, once they decided to choose private schooling. Even if the decision of parents on sending their children to private schools is affected by the distance to the nearest private school, it would be more reasonable to have such effect for elementary schools but not for high schools (James, 1987). Therefore, it would be more convenient to use a variable, which measures the size of the private sector in education system within a city.

There are basically two different ways to measure the size of the private sector in the literature; one is to use the percentage of school-age population attending private schools and the other is to use the percentage of private schools for the relevant demographical area. Arum (1996), Sander (1999) and Jepsen (2000) use elementary and secondary school students for the former measure, while Hoxby (1994) uses high school students and Geller, Sjoquist and Walker (2001) and Jepsen (2002) use grade specific variables. Elementary and secondary schooling used in these studies refer to the eight-year uninterrupted compulsory education, namely the primary education in Turkey. One might argue that the private elementary and secondary school student population would reflect more or less the future private school population in high schools, since there are studies, which find positive relation between private schools and college attendance (McEwan, 2000). However, the denominator, which is the total primary school population while calculating the percentage of primary education school-age population attending in private schools, would not truly reflect the amount for high schools, since primary education is compulsory and high schools are not. Therefore we argue that the percentage of high school students attending private schools is a better measure in explaining the effect of private sector size on public high schools' achievement levels as Hoxby (1994) did.

In addition to the percentage of students attending private schools, we also use the percentage of private schools in another model as a measure of competition as in Geller, Sjoquist and Walker (2001). The reason of having a model with an alternative measure of competition is that we believe that percentage of private schools may

even be a better measure since the more school options available, the greater the competitive pressure.

While estimating the effect of private sector on public school achievement level, the dependent variable is measured at the school level in Turkey in 2002-2003 academic year, which is obtained from the Student Selection and Placement Center (SSPC). The size of the private sector, both the percentage of school-age population attending private high schools and the percentage of private schools are measured at the city level in 2002-2003 academic year. The measures for competition are computed using the yearly publication of the Ministry of National Education, namely the National Education Statistics 2002-2003. Other control variables can be classified as school variables and city variables. School variables include the number of students per classroom, the number of students in the school and a dummy variable indicating whether the school is FLW or not. The number of students and classrooms are taken from the Ministry of National Education for 2002-2003 academic year for each public high school. Unfortunately, the data taken from the Ministry of National Education do not include a distinction between FLW and non-FLW sections of the school and presents the aggregate numbers of students and classrooms. Here we calculate the weighted numbers of students and classrooms according to the number of SSE applicants of schools[21]. Moreover, because of the mismatch of the data sets

---

[21] We have the number of applicants from each public high school, including the FLW sections. The number of classrooms and the number of students data is also available for each public high school but without indicating how many of them belong to the FLW or non-FLW sections. In order not to lose number of observations, we calculate their weighted averages. To calculate the number of students in non-FLW section of a particular school, we multiply number of applicants from the non-FLW section of the school with total number of students, including those in non-FLW and FLW sections of that school, then divide it by sum of number of applicants from non-FLW and FLW sections of that school. The calculation is similar for FLW sections and the number of classrooms of non-FLW and FLW sections of schools.

from SSPC and the Ministry, 72 observations are lost thus the number of observations decreases to 2131.

City variables include per capita income, the percentage of residents older than 22, who are college graduates, the percentage of roads that are asphalt-paved, population density and dummy variables indicating the geographical region in which the city is located, while Turkey is divided into seven geographical regions, which are Aegean, Black Sea, Central Anatolia, East Anatolia, Marmara, Mediterranean and South East Anatolia. All the city variables are taken from the results of 2000 Census, which are gathered by State Planning Organization. The summary of the statistics are presented in Table 5.

Table 5. Summary Statistics

Variables	Mean			
	All	FLW Sections	Non-FLW Sections of Schools with FLW	Schools without FLW
Dependent Variables				
SSE Quantitative	160.03	178.93	155.26	149.07
	(16.60)	(11.52)	(7.09)	(12.06)
SSE Verbal	186.46	201.88	183.69	176.65
	(16.74)	(10.84)	(9.43)	(16.34)
Percentage of Private High	3.24	3.68	3.67	2.57
School Students	(2.49)	(2.60)	(2.59)	(2.17)
Percentage of Private High	13.28	15.11	15.07	10.50
Schools	(10.26)	(10.52)	(10.48)	(9.23)
School Variables				
Number of Students per	43.13	49.73	50.15	32.63
Classroom	(25.21)	(22.60)	(23.48)	(24.84)

Table 5. (cont'd)

Number of Students	578.39	340.50	922.89	498.40
	(533.81)	(213.13)	(553.64)	(559.50)
Being FLW	0.31	-	-	-
	(0.46)			
City Variables				
GDP per capita (YTL)	1,853.71	2,034.87	2,031.43	1,577.37
	(797.56)	(799.32)	(801.42)	(710.37)
Percentage of College Graduate	8.19	8.81	8.80	7.23
Residents Older Than 22	(3.31)	(3.58)	(3.59)	(2.55)
Percentage of Asphalt-Paved	93.82	94.97	94.95	92.08
Roads	(7.28)	(6.39)	(6.40)	(8.18)
Population Density (person/km^2)	329.57	391.71	386.00	238.25
	(593.88)	(641.15)	(635.14)	(505.74)
Aegean	0.14	0.17	0.17	0.10
	(0.35)	(0.38)	(0.38)	(0.30)
Black Sea	0.13	0.14	0.14	0.12
	(0.34)	(0.35)	(0.35)	(0.32)
Central Anatolia	0.20	0.19	0.19	0.21
	(0.40)	(0.39)	(0.40)	(0.41)
East Anatolia	0.09	0.05	0.05	0.17
	(0.29)	(0.21)	(0.21)	(0.37)
Mediterranean	0.13	0.12	0.12	0.15
	(0.34)	(0.33)	(0.33)	(0.36)
Southeast Anatolia	0.07	0.05	0.05	0.11
	(0.25)	(0.21)	(0.21)	(0.31)
Instrumental Variables				
Average Number of Students per	7.63	7.64	7.65	7.60
Classroom in Private High Schools	(5.17)	(4.81)	(4.82)	(5.67)
Average Number of Students per	8.72	8.52	8.54	9.00
Teacher in Private High Schools	(5.69)	(5.11)	(5.13)	(6.46)
Average SSE Quantitative Scores	105.18	107.98	107.85	100.97
of Private High School	(45.27)	(41.68)	(41.86)	(49.95)
Average SSE Verbal Scores of	104.13	107.73	107.58	98.71
Private High School	(44.77)	(41.54)	(41.71)	(48.79)
Number of Observations	2131	649	643	839

Note: Standard Deviations in parentheses.

CHAPTER 5

METHODOLOGY

The basic empirical model, which is used in identifying the effect of private schooling on public school achievement, is estimated by ordinary-least squares (OLS) and presented as:

(1) $\qquad Y_{ij} = \alpha + \beta_1 P_j + \beta_2 S_i + \beta_3 C_j + \varepsilon_{ij}$

where i and j stand for the relevant high school and city, respectively. The variable Y_{ij} represents the academic achievement in the ith public high school in the jth city. Although the math scores are usually considered more school-specific, we estimate our regressions with both quantitative and verbal test scores of public high schools. The variable P_j represents the percentage of students attending private high schools in jth city. In some specifications we use percentage of private schools in jth city. The vector S_i includes the characteristics of the ith public school, which are number of student per classroom, number of students in the ith public school and a dummy for whether the ith public school is a FLW or not. The vector C_j includes the characteristics of the jth city namely per capita GDP, the percentage of residents older than 22 who are college graduates, the percentage of roads that are asphalt-paved,

population density and a dummy variable indicating the geographical region in which the jth city is located. There are also determinants of educational outcomes, which we cannot observe, such as the quality of teachers, number of teachers and parental background. Effects of such determinants would be included in ε_{ij}, which is the unobserved error term.

Because there might be endogeneity between P_j and Y_{ij}, that is the level of public school achievement might affect the private school attendance, P_j is treated as an endogenous determinant of educational outcomes and Y_{ij} is estimated using two-stage least squares. Thus the model becomes:

$$(2) \qquad Y_{ij} = \alpha + \beta_1 \hat{P}_j + \beta_2 S_i + \beta_3 C_j + \varepsilon_{ij}$$

where $\hat{P}_j$ is predicted using additional exogenous variables that are related to P_j and unrelated to the error term. The number of students per classroom, the number of students per teacher in private high schools and the private high school achievement, which are all averages at the city level for 2003 except for the private school achievement. Since we expect the achievement of private high schools in previous year affects the decision process of parents in sending their children to private high schools in the next year, we use the private school achievement in year 2002. The variable of private achievement is calculated as the weighted averages of private high school average SSE scores in relevant city using the data obtained from SSPC, where the numbers of students per classroom and per teacher are calculated by dividing the total number of students attending private high school in the jth city

by the total number of classrooms and the total number of teachers hired in private high schools in the jth city. The summary of the statistics is presented in Table 5.

The number of students per classroom is expected to measure the effect of resources on educational outcomes and we expect a negative relationship between the number students per classroom and SSE scores of public high schools. However, the literature presents conflicting results regarding the effect of the average instructional expenditures per student, also measures the resource effect, or the number of students per classroom on educational outcomes. The number of students measures the size of the relevant public high school. The greater the school size, the more difficult to maintain the discipline and to manage the school. Therefore we expect the number of students in a school to have a negative effect on school achievement. Moreover, being FLW is expected to have positive effect since the most successful students among the applicants to the high schools are admitted to the FLW sections of high schools.

Moreover, city variables like per capita GDP, the percentage of college graduate residents older than 22 and the percentage of asphalt-paved roads are expected to have positive effect on student achievement level since per capita GDP measures the income effect and the percentage of asphalt-paved roads measures the effect of infrastructure and the level of public goods on educational outcomes. In addition, the percentage of college graduate residents older than 22 measures the education level of the relevant city, is a proxy for the education level of the possible parents in the city and we expect as education level in a city increases the student achievement increases as well, relying on the literature (Sander, 1999). Population

density is usually high in cities having high rates of domestic immigrants thus reflects the excess demand for education in a sense, moreover expecting less income and education level for immigrants to have would not be unrealistic, thus increasing demand for public education. Therefore, we expect student achievement decreases as population density increases. Moreover, there is a possibility that the immigrants attach more importance to education than the residents in the same socioeconomic level since they immigrated to improve their standards. We expect the effect of geographical regions on student achievement would be negative relative to the Marmara Region since it is the most successful region in SSE.

CHAPTER 6

EMPIRICAL RESULTS

OLS estimates of SSE quantitative and verbal scores in first two columns of Table 6 indicate that the percentage of students in private high schools has no significant effect on the measures of student achievement. The results for quantitative test scores show significant positive coefficients for number of students per classroom, number of students, being FLW section of a high school, GDP per capita, percentage of college graduate residents older than 22, percentage of asphalt-paved roads. Since FLW sections are admitting relatively higher achieving students, the significantly positive coefficient of being the FLW section of a high school is consistent with our expectations. Moreover, the coefficients of GDP per capita, percentage of college graduate residents older than 22 and percentage of asphalt-paved roads are also consistent with our expectations, since the income and education levels of the possible parents and the level of public goods are expected to have positive impact on educational outcomes. The coefficient of population density is negative but insignificantly different from zero. The effect of population density might be negative because private schools are more in areas having high population densities. All regions have positive effect on student achievement relative to Marmara Region. The coefficients of Black Sea, Central Anatolia and East Anatolia are significant. The results for the verbal test scores show also significant positive

coefficients for number of students, being FLW section of a high school, GDP per capita, percentage of asphalt-paved roads, Black Sea and Central Anatolia. The coefficients of number of students per classroom percentage of college graduate residents older than 22 and East Anatolia lose their insignificance. The effect of Aegean becomes significant on verbal test scores. The coefficient of Southeast is significantly negative.

Table 6. OLS and 2SLS Estimates of Students Achievement Using Percentage of Private High School Students

Variables	OLS		2SLS	
	SSE Quantitative	SSE Verbal	SSE Quantitative	SSE Verbal
Percentage of Private High School Students	0.245	0.116	-0.049	-1.261***
	(1.29)	(0.48)	(-1.53)	(-3.09)
Number of Students per Classroom	0.065***	0.012	0.067***	0.016
	(5.07)	(0.76)	(5.21)	(1.00)
Number of Students	0.004***	0.005***	0.004***	0.005***
	(6.78)	(5.78)	(6.83)	(5.84)
Being FLW	27.169***	22.634***	27.217***	22.724***
	(47.25)	(30.97)	(47.14)	(30.84)
GDP per capita	0.001**	0.001*	0.002***	0.002***
	(2.37)	(1.91)	(2.93)	(2.76)
Percentage of College Graduate Residents Older Than 22	0.506***	0.056	0.730***	0.474***
	(4.20)	(0.37)	(5.06)	(2.58)
Percentage of Asphalt-Paved Roads	0.124***	0.194***	0.141***	0.226***
	(3.04)	(3.73)	(3.41)	(4.27)
Population Density	-0.0003	-0.001	0.001	0.002*
	(-0.53)	(-1.07)	(1.39)	(1.80)
Aegean	1.651	4.312***	3.560***	7.867***
	(1.60)	(3.29)	(2.88)	(5.01)
Black Sea	3.845***	3.353**	4.380***	4.351***
	(3.73)	(2.56)	(4.16)	(3.24)
Central Anatolia	2.169**	2.879*	3.542***	5.436***
	(2.05)	(2.14)	(3.03)	(3.65)
East Anatolia	3.919***	0.518	4.843***	2.238
	(2.84)	(0.30)	(3.41)	(1.24)
Mediterranean	0.296	0.331	0.860	1.381
	(0.29)	(0.26)	(0.83)	(1.05)
Southeast Anatolia	2.028	-5.422***	3.157**	-3.320*
	(1.54)	(-3.24)	(2.29)	(-1.89)
Constant	126.17	154.15	122.98	148.20
Adj R^2	0.64	0.43	N.A.	N.A.
N	2131	2131	2131	2131

Instrumental Variables: Average Number of Students per Classroom in Private Schools in j^{th} city
  Average Number of Students per Teacher in Private Schools in j^{th} city
  Average SSE Score of Private Schools in j^{th} city.

Note: t-Statistics in parentheses.
*Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

However, the two-stage least squares estimates of educational outcomes indicate that the percentage of students in private high schools has negative effect on public school achievement as presented in last two columns of Table 6 and even significantly negative effect on SSE verbal test scores. The results show that if the percentage of students attending private high schools increases by 0.1 units, SSE quantitative and verbal test scores of public high schools would decrease around 0.005 and 1.26 units, respectively. The effect of number of students per classroom is still significantly positive for 2SLS estimates of SSE quantitative test scores, while it is still insignificant for SSE verbal test scores. This insignificant relationship between number of students per classroom and verbal test scores might be expected since the quantitative skills are considered more school-specific rather than verbal skills (Sander, 1999). The results for the quantitative test scores show that except for Mediterranean Region, all regions have positive coefficients, which means all regions but Mediterranean have positive impact on public school achievement relative to Marmara Region. Meanwhile, the coefficients of the regions, in which people have limited Turkish ability relative to Marmara Region, differ from quantitative test score estimates. The effect of East Anatolia is insignificant for verbal test scores and the effect of Southeast Anatolia is significantly negative. Because Marmara has the greatest average test scores among all other regions, while the regions in the east have the worst, we expected the relative effects of other regions would be negative. However, we use different methods[22] to measure the relative effects of regions and we claim that our findings regarding relative effects of regions are robust. Here we would note that this relationship occurs after a number of

---

[22] We used nomenclature of territorial units for statistics (National Education Statistics, 2005), which divides seven geographical regions into their sub-regions, socioeconomic development index (Research on Socioeconomic Rankings of Province and Regions, 2003) and possible combinations of them. However, the results remain unchanged.

other variables that relate to geographical regions have been taken into account such as GDP per capita and percentage of college graduates and the size of the private sector. The relative effects of regions are positive for regions having less small private education sector as shown in Figure 3.
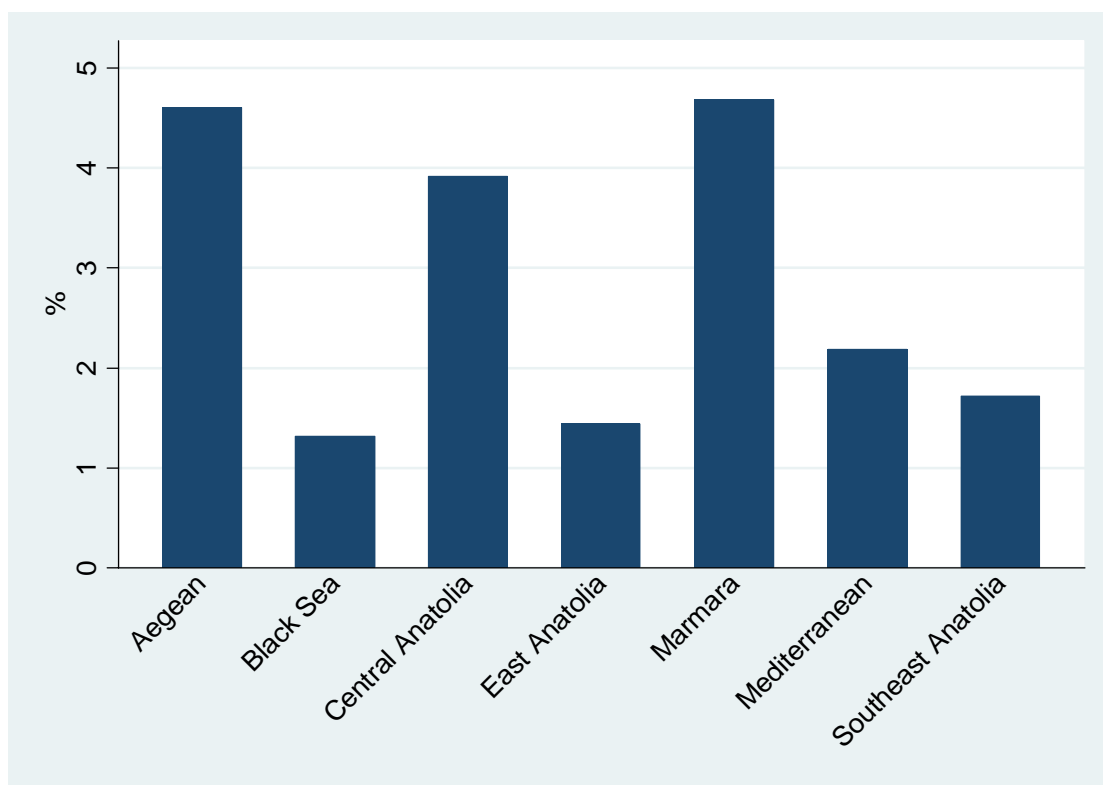
Figure 3. The Percentage of Students Attending Private High Schools by Regions

The effect of percentage of college graduate residents older than 22 becomes significant and the significance of income effect increases also for verbal test score estimates after controlling for the endogeneity. This is the case because there is also a relationship between income, education and attitude toward education and private schooling. When we control the demand for private schools, this relationship no longer causes a problem. Although it is a very modest effect, the effect of population density is now positive and significant for verbal test scores. Here, we cannot

measure the teacher effect. Teachers might prefer central cities to live and those are dense cities. Thus the quality or number of teachers might increase in cities having high population densities.

The surprising results are the positive relationship of student achievement with number of student per classroom and number of students. We suspect of a possible mismatch of the calculated number of student per classroom data with the actual data for this unexpected relationship. Although the relationship with number of students is very modest, we check for the robustness of school-level variables. We estimate the educational outcomes by using percentage of students attending private high schools, but first excluding the FLW sections of high schools from the sample and adding a dummy variable indicating the relevant public school has a FLW section or not, then excluding both FLW schools and schools having FLW sections from the sample. The results of the estimations for selected variables are presented in Table 7 and Table 8, respectively.

Table 7. The Results of OLS and 2SLS Estimates of Student Achievement Using Percentage of Private High School Students, Excluding FLW's, for Selected Variables

	OLS		2SLS	
Variables	SSE Quantitative	SSE Verbal	SSE Quantitative	SSE Verbal
Percentage of Private	-0.007	-0.026	-0.595	-1.457***
High School Students	(-0.03)	(-0.09)	(-1.60)	(-2.84)
Number of Students	0.047***	0.023	0.048***	0.025
per Classroom	(2.77)	(0.99)	(2.79)	(1.04)
Number of Students	0.004***	0.002***	0.004***	0.003***
	(5.34)	(2.81)	(5.41)	(2.94)
Adj R^2	0.19	0.12	N.A.	N.A.
N	1482	1482	1482	1482

Instrumental Variables: Average Number of Students per Classroom in Private Schools in j^{th} city
Average Number of Students per Teacher in Private Schools in j^{th} city
Average SSE Score of Private Schools in j^{th} city.

Table 8. The Results of OLS and 2SLS Estimates of Student Achievement Using Percentage of Private High School Students, Excluding Schools Having FLW Sections, for Selected Variables

Variables	OLS		2SLS	
	SSE Quantitative	SSE Verbal	SSE Quantitative	SSE Verbal
Percentage of Private	-0.176	-0.319	-1.022*	-1.855**
High School Students	(-0.50)	(-0.65)	(-1.80)	(-2.36)
Number of Students	0.038	0.020	0.040	0.025
per Classroom	(1.23)	(0.47)	(1.31)	(0.58)
Number of Students	0.006***	0.004**	0.006***	0.004**
	(4.04)	(2.10)	(4.02)	(2.08)
Adj R^2	0.11	0.05	N.A.	N.A.
N	839	839	839	839

Instrumental Variables: Average Number of Students per Classroom in Private Schools in j^{th} city
Average Number of Students per Teacher in Private Schools in j^{th} city
Average SSE Score of Private Schools in j^{th} city.

The effect of number of students per classroom is positive in all estimations. Moreover, when we exclude the FLW sections from the sample (Table 7), it is significant for quantitative test scores and insignificant for verbal test scores just like for the original model. However, when we drop all schools having FLW sections from the sample, the effect is insignificant for both types of test scores under both OLS and 2SLS estimation methods. Since the sign of the coefficient remains unchanged for non-calculated sample, we can claim that the positive effect of number of students per classroom is robust and the effect being significant for schools having FLW sections and being FLW sections is because of the positive peer effect since schools without FLW sections have the less achieving students as seen in Table 5. Besides, the coefficient of number of students remains significantly positive in all estimations. Since we can measure neither the quality nor the number of teachers in public schools, here we would note that as the size of the school increases, the expenditure per student would decrease and both the number of

teachers and the variety of fields of teachers would increase. Therefore, a positive relationship between the school size and achievement might be reasonable when it is impossible to measure the effect of teachers.

Most important of all, the effect of private schooling on public school achievement is negative for both OLS and 2SLS estimation methods when we have not only non-FLW sections (Table 7) but also schools without FLW sections (Table 8). Because of the cream-skimming effect of FLW sections among public high schools admitting students without central examination, this is robust effect of private schooling on public school achievement after controlling for selection bias caused by FLW sections. Under 2SLS estimation method, if percentage of students attending private high schools increases 0.1 units, SSE quantitative and verbal test scores of public high schools would decrease nearly 0.6 and 1.5, respectively, when we exclude FLW sections from the sample. Moreover the amount of the decrease in SSE quantitative and verbal test scores of public high schools would be 1.02 and 1.9 when we have only the public schools without FLW sections. Every year approximately two million people apply for SSE and only around 10% of them achieve to enroll in a four-year undergraduate program. Since the competition between the applicants is so high, each and every unit of SSE scores matters a lot.

Besides, the effect is significant for 2SLS estimates of schools without FLW sections. Because FLW sections are responses of public education sector to competitive pressures from private schools, we know that public high schools having FLW sections are more where private schools are dense. Thus, public high schools face competitive pressure from both FLW sections and private schools, since both

students and teachers would prefer FLW high schools. Although the coefficient is not significant, we find that the effect of percentage of students in private high schools on the number of students in FLW sections is positive. Therefore, the significance level of private schooling is higher when we have only the public schools without FLW sections.

When we use percentage of private high schools in order to measure private sector, the OLS and 2SLS estimates of quantitative and verbal test scores, presented in Table 9, indicate very similar results with the estimates obtained by using the percentage of students attending private high schools. The 2SLS results show that the percentage of private high schools has negative effect on public school achievement and the effect is significant for verbal test scores but insignificant for quantitative test scores as we have in the original model. The pattern in the results for the other coefficients is about the same as the pattern in the original model as well.

Table 9. OLS and 2SLS Estimates of Students Achievement Using Percentage of Private High Schools

Variables	OLS		2SLS	
	SSE Quantitative	SSE Verbal	SSE Quantitative	SSE Verbal
Percentage of Private	0.055	0.025	-0.093	-0.238*
High Schools	(1.22)	(0.43)	(-0.88)	(-1.83)
Number of Students	0.064***	0.012	0.069***	0.020
per Classroom	(4.96)	(0.72)	(5.18)	(1.20)
Number of Students	0.004***	0.005***	0.004***	0.005***
	(6.79)	(5.79)	(6.81)	(5.82)
Being FLW	27.182***	22.641***	27.189***	22.653***
	(47.28)	(30.98)	(47.17)	(30.84)
GDP per capita	0.001**	0.001*	0.001***	0.002**
	(2.43)	(1.94)	(2.76)	(2.45)
Percentage of College Graduate	0.518***	0.064	0.685***	0.361*
Residents Older Than 22	(4.41)	(0.43)	(4.30)	(1.81)
Percentage of Asphalt-Paved	0.120***	0.192***	0.146***	0.237***
Roads	(2.91)	(3.66)	(3.27)	(4.20)
Population Density	-0.0003	-0.001	0.001	0.001
	(-0.46)	(-1.05)	(0.91)	(1.03)
Aegean	2.093**	4.527***	2.606***	5.438***
	(2.27)	(3.87)	(2.66)	(4.37)
Black Sea	3.989***	3.423***	4.078***	3.581***
	(3.90)	(2.63)	(3.97)	(2.74)
Central Anatolia	2.479**	3.030**	2.870***	3.725***
	(2.46)	(2.37)	(2.76)	(2.82)
East Anatolia	4.183***	0.644	4.298***	0.849
	(3.08)	(0.37)	(3.15)	(0.49)
Mediterranean	0.483	0.419	0.485	0.423
	(0.48)	(0.33)	(0.48)	(0.33)
Southeast Anatolia	2.076	-5.391***	2.951**	-3.834**
	(1.58)	(-3.23)	(2.06)	(-2.11)
Constant	126.27	154.16	123.17	148.66
Adj R^2	0.64	0.43	N.A.	N.A.
N	2131	2131	2131	2131

Instrumental Variables: Average Number of Students per Classroom in Private Schools in j[th] city
Average Number of Students per Teacher in Private Schools in j[th] city
Average SSE Score of Private Schools in j[th] city.

Note: t-Statistics in parentheses.
*Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Before concluding, we would mention that the first-stage regressions indicate that the instrumental variables have significantly positive effect on the endogenous variable, private schooling. The results of first stage regressions are shown in Table A1 in Appendix A. Moreover, when we include the instrumental variables to the original OLS estimations, the results show that there are no significant relationship between the instrumental variables and public school achievement except for average number of student per classroom in private high schools. However, we argue that average number of student per classroom in private high schools theoretically has no direct effect on public school achievement. The results are shown in Table A2 in AppendixA.

CHAPTER 7

CONCLUSION

Our results do not support the hypothesis that private schools directly raise the quality of public education through competitive pressures. Moreover, the findings support negative relationship between private schooling and public school achievement and magnitude of the negative effect of private schooling is greater for schools without FLW sections. Therefore, our findings also support the cream-skimming effects of FLW high schools. One possible explanation of our results is that the negative effect of private schooling such as attracting higher ability students and higher quality teachers, dominates the positive effects through competitive pressures.

Our findings also show that number of students per classroom and number of students both have positive effects on public school achievement. Although it is not an expected result, we claim their robustness and explain this unexpected result with the unobserved school quality determinants. In addition, being a FLW section has significantly positive impact on public school achievement. Moreover, determinants measuring the income education and infrastructure effects have positive effects while population density has no significant effect on educational outcomes of public schools. After controlling for other city variables, all regions have positive effect on

public school achievement relative to Marmara Region, except Southeast Anatolia. Aegean, Black Sea and Central Anatolia have significantly positive effect, while Southeast Anatolia has significantly negative impact on public school achievement in verbal tests relative to Marmara Region, where limited Turkish Ability has been observed.

One of the shortcomings in our estimation strategy is that the school level variables are not only few but also calculated variables. Although the school-level variables might lead mismatches with actual data, we check and finally claim their robustness. However, neither the number nor the quality of teachers can be observed thus it is impossible for us to measure their impacts on public school achievement. Moreover, variables measuring city characteristics such as GDP per capita might not be ideal to use, however they are not available for school or school district levels. In addition there are other several determinants of student achievement, which cannot be included in this study such as the family background, size or income.

As concluding remarks, this study has contributions to education economics literature presenting evidence from Turkey and finding negative effect of private schooling on public school achievement. Today new regulations are being considered by the government regarding encouraging private schools. However, before implementing such education policies, there should be more studies analyzing and investigating the effects of private schooling on public school quality. If the anticipated effects will be consistent with our findings then complementary

regulations will be needed to compensate the public sector in addition to encouraging private schooling. We would also like to mention that both percentage of students in private schools and percentage of private schools are small in Turkey for the time being. As private sector grows in Turkey, the effect of private schooling on public school achievement may also change.

BIBLIOGRAPHY

Alderman H., P. F.Orazem, and E. M. Paterno. 2001. "School Quality, School Cost and the Public/Private School Choice of Low-Income Household in Pakistan," *The Journal of Human Resources*. 36(2): 304-326.

Altonji, J. G. and T. A. Dunn. 1996. "The Effects of Family Characteristics on the Return to Education," *The Review of Economics and Statistics*. 78(4): 692-704.

Arum, R. 1996. "Do Private Schools Force Public Schools to Compete?" *American Sociological Review*. 61(1): 29-46.

Ballou, D. 1996. "Do Public Schools Hire the Best Applicants?" *The Quarterly Journal of Economics*. 111(1): 97-133.

Becker, G. S. 1991. *A Treatise on the Family*. Cambridge: Harvard University Press.

Betts, J. R. and D. Morell. 1999. "The Determinants of Undergraduate Grade Point Average: The Relative Importance of Family Background, High School Resources and Peer Group Effects," *The Journal of Human Resources*. 34(2): 268-293.

Borland, M. V. and R. M.Howsen. 1992. "Student Academic Achievement and the Degree of Market Concentration in Education," *Economics of Education Review*. 11(1): 31-39.

Brokaw, A. J., J. R. Gale and T. E. Merz. 1995. "Competition and the Level of Expenditures: K through 12 Public Schools in Michigan," *The Journal of Economics (MVEA)*. 21(1): 99-103.

Bryk, A. S., V. E. Lee and P. B. Holland. 1993. *Catholic Schools and the Common Good*. Cambridge: Harvard University Press.

Card, D. and A. B. Krueger. 1992. "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States," *The Journal of Political Economy*. 100(1): 1-40.

Coleman, J., T. Hoffer and S. Kilgore. 1982. *High School Achievement.* New York: Basic Book.

Dee, T. S. 1998. "Competition and the Quality of Public Schools," *Economics of Education Review*. 17(1): 151-200.

Epple, D. and R. E. Romano. 1998. "Competition Between Private and Public Schools, Vouchers and Peer-Group Effects," *American Economic Review.* 88(1): 33-62.

Ertuğrul, H. 1998. *Azınlık ve Yabancı Okulları: Türk Toplumuna Etkisi.* İstanbul: Nesil.

Evans, W. N. and R. M. Schwab. 1995. "Finishing High School and Starting College: Do Catholic Schools Make a Difference?" *Quarterly Journal of Economics.* 110(4): 941-974.

Figlio, D. N. 2002. "Can Public Schools Buy Better-Qualified Teachers?" *Industrial and Labor Reltions Review*. 55(4): 686-699.

Figlio, D. N. and J. A. Stone. 2001. "Can Public Policy Affect Private School Cream Skimming," *Journal of Urban Economics*. 49(2): 240-266.

Freidman, M. 1962. *Capitalism and Freedom*. Chicago: University of Chicago Press.

Friedman, M. and R. Friedman. 1981. *Free to Choose*. New York: Avon Books.

Geller, C. R., D. L. Sjoquist and M. B. Walker. 2001. "The Effect of Private School Competition on Public School Performance," *National Center for the Study of Privatization in Education Teachers College, Columbia University*. Occasional Paper no.15.

Glewwe, P. and H. Jacoby. 1994. "Student Achievement and Schooling Choice in Low-Income Countries: Evidence from Ghana," *The Journal of Human Resources*. 29(3): 843-864.

Goldhaber, D. D. and D. J. Brewer. 1997. "Why Don't Schools and Teachers Seem to Matter? Assessing the Impact of Unobservables on Educational Productivity," *The Journal of Human Resources*. 32(3): 505-523.

Grosskopf, S., K. Hayes, L. L. Taylor and W. L. Weber. 1998. "Allocative Inefficiency and School Competition" Unpublished Working Paper.

Hanushek, E. A. 1971. "Teacher Characteristics and Gains in Student Achievement: Estimation Using Micro Data," *The American Economic Review*. 61(2): 280-288.

----------1986. "The Economics of Schooling," *Journal of Economic Literature*. 24(3): 1141-1177.

----------1992. "The Trade-Off Between Child Quantity and Quality," *The Journal of Political Economy*. 100(1): 84-117.

----------2001. "Black-White Achievement Differences and Governmental Interventions," *American Economic Review*. 91(2): 24.

Hanushek, E. A, J. F. Kain, J. B. Markman and S. G. Rivkin. "Does Peer Ability Affect Student Acchievement?" *National Bureau of Economic Research*. Inc. NBER, Working Paper no. 8502.

Hanushek, Eric A., J. F. Kain and S. G. Rivkin. 2004. "Why Public Schools Lose Teachers," *Journal of Human Resources*. 39(2): 326-354.

Hanushek, E. A., S. G. Rivkin and L. Taylor. 1996. "Aggregation and the Estimated Effects of School Resources," *The Review of Economics and Statistics*. 78(4): 611-627.

Hanushek, E. A. and L. Taylor. 1990. "Alternative Assessments of the Performance of Schools," *The Journal of Human Resources*. 25: 179-201.

Hoxby, C. M. 1994. "Do Private Schools Provide Competition for Public Schools?" *National Bureau of Economic Research*, Inc. NBER. Working Paper no.4978.

----------1996. "How Teachers' Unions Affect Education Production," *Quarterly Journal of Economics.* 111(3): 671-718.

----------1998. "The Economics of School Reform" *National Bureau of Economic Research*, Inc. NBER.

----------2000. "Does Competition Among Public Schools Benefit Students and Tax Payers?" *American Economic Review.* 90: 1209-1238.

----------2002. "Would School Choice Change the Teaching Profession?" *The Journal of Human Resources*. 37(4): 846-891.

State Planning Organization. 2003. *İllerin ve Bölgelerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması*. Ankara: Yayin No. DPT: 2671.

James, E. 1987. "The Public/Private Division of Responsibility for Education: An International Comparison," *Economics of Education*. 6(1): 1-14.

Jepsen, C. A. and L. K. Jepsen. 2001. "Re-Examining the Effects of Parental Characteristics on Educational Attainment for a Minor Child," *Journal of Forensic Economics*. 14(2): 141-154.

Jepsen, C. A. 2000. "The Private Schooling Market and its Effects on Student Achievement," Unpublished PhD Dissertation. Northwestern: Northwestern University.

Jepsen, C. A. 2002. "The Role of Aggregation in Estimating the Effects of Private School Competition on Student Achievement," *Journal of Urban Economics*. 52(3): 477-500.

Lam, D. and R. F. Schoeni. 1993. "Effects of Family Background on Earnings and Returns to Schooling: Evidence from Brazil," *The Journal of Political Economy*. 101(4): 710-740.

Lewis, L. S. and R. A. Wanner. 1979. "Private Schooling and the Status Attainment Process," *Sociology of Education*. 52(2): 99-112.

Lloyd, C. B., C. Mete and Z. A. Sathar. 2005. "The Effect of Gender Differences in Primary School Access, Type and Quality on the Decision to Enroll in Rural Pakistan," *Economic Developmental Cultural Change.* 53(3): 685-710.

McEwan, P. J. 2000. "Comparing the Effectiveness of Public and Private Schools: A review of Evidence and Interpretations," *National Center for the Study of Privatization in Education Teachers College, Columbia University*, Occasional Paper no.3.

McMillan, R. 1999. "Competition, Parental Involvement and Public School Performance" Unpublished PhD Dissertation. Stanford: Stanford University.

Ministry of National Education, Republic of Turkey. 2003. *National Education Statistics*. Ankara: Devlet Kitapları Müdürlüğü.

----------2004. *National Education Statistics*. Ankara: Devlet Kitapları Müdürlüğü.

----------2005. *National Education Statistics*. Ankara: Devlet Kitapları Müdürlüğü.

Mizala, A. and P. Romaguera. 2000. "School Performance and Choice: the Chilean Experience," *The Journal of Human Resources*. 35(2): 392-417.

Neal, D. 1997. "The Effects of Catholic Secondary Schooling on Educational Attainment." *Journal of Labor Economics.* 15(1): 98-123.

Odabaşı, H. 2003. *Her Okuldan Adam Çıkmaz: Ekol Okullar*. İstanbul: Zaman Kitap.

Ortaylı, İ. 1982. *Osmanlı İmparatorluğu'nda Amerikan Okulları Üzerine Bazı Gözlemler*. Ankara: TODAİE.

Poterba, J. M. 1998. "Demographic Change, Intergenerational Linkages and Public Education," *The American Economic Review.* 88(2): 315-320.

Rangazas, P. 1997. "Competition and Private School Vouchers," *Education Economics.* 5(3).

Sander, W. 1995. *The Catholic Family: Marriage, Children and Human Capital.* Boulder: Westview Press.

----------1996. "Catholic Grade Schools and Academic Achievement," *Journal of Human Resources*. 31(3): 540-548.

----------1999. "Private Schools and Public School Achievement," *The Journal of Human Resources*. 34(4): 697-709.

----------2001. "The Effects of Catholic Schools on Religiosity, Education and Competition" *National Center for the Study of Privatization in Education Teachers College, Columbia University*. Occasional Paper no.32.

Sander, W. and A. C. Krautmann. 1995. "Catholic Schools, Dropout Rates and Educational Attainment," *Economic Inquiry*. 33(2): 217-233.

----------1999. "Grades and Student Evaluations of Teachers," *Economics of Education Review*. 18: 59-63.

Sezer, A. 1999. "Osmanlı Dönemi Misyonerlik Faaliyetleri," In Güler Eren, eds., *Osmanlı*. Yeni Türkiye Yayını, 2: 181-192.

Teachman, J. D. 1987. "Family Background, Educational Resources and Educational Attainment," *American Sociological Review*. 52(4): 548-557.

Tozlu, N. 1991. *Kültür ve Eğitim Tarihimizde Yabancı Okullar*. Ankara: Akçağ.

Vahapoğlu, M. H. 1990. *Osmanlı'dan Günümüze Azınlık ve Yabancı Okulları: Yönetimleri Açısından*. Ankara: Türk Kültürünü Araştırma Enstitüsü.

Table A1. First Stage Regression Results

Variables	Percentage of Private High School Students		Percentage of Private High Schools	
	(1)	(2)	(1)	(2)
Average Number of Students per Classroom in Private High Schools	0.001*** (15.59)	0.0008*** (15.48)	0.0006*** (2.60)	0.0006** (2.28)
Average Number of Students per Teacher in Private High Schools	0.0001** (2.11)	0.0001** (2.16)	0.0009*** (3.84)	0.0008*** (3.84)
Average SSE Quantitative Scores of Private High School	-0.0001*** (11.73)	-	0.0004*** (12.35)	-
Average SSE Verbal Scores of Private High School	-	0.0001*** (12.68)	-	0.0004*** (13.62)
Number of Students per Classroom	0.00003*** (2.60)	0.00003*** (2.65)	0.0003*** (5.09)	0.0003*** (5.17)
Number of Students	0.000002 (-0.34)	-0.000003 (-0.44)	0.000004 (0.14)	0.000001 (0.03)
Being FLW	0.0005 (0.86)	0.0004 (0.79)	0.0008 (0.34)	0.0007 (0.27)
GDP per capita	0.000004*** (9.59)	0.000004*** (9.28)	0.00001*** (6.17)	0.00001*** (5.83)
Percentage of College Graduate Residents Older Than 22	0.003*** (25.19)	0.003*** (24.94)	0.009*** (20.76)	0.010*** (20.49)
Percentage of Asphalt-Paved Roads	0.0003*** (6.96)	0.0003*** (6.86)	0.0019*** (10.67)	0.002*** (10.61)
Population Density	0.00002*** (40.18)	0.00002*** (40.42)	0.0001*** (35.29)	0.0001*** (35.59)
Aegean	0.022*** (25.82)	0.022*** (25.65)	0.024*** (5.85)	0.022*** (5.57)

Table A1. (cont'd)

Black Sea	0.009***	0.009***	0.015***	0.017***
	(9.33)	(9.59)	(3.39)	(3.69)
Central Anatolia	0.017***	0.017***	0.026***	0.028***
	(17.44)	(17.84)	(5.81)	(6.28)
East Aantolia	0.011***	0.011***	0.011*	0.012**
	(8.62)	(8.81)	(1.81)	(2.01)
Mediterranean	0.005***	0.005***	-0.008*	-0.007
	(5.25)	(5.44)	(-1.82)	(-1.63)
Southeast Anatolia	0.013***	0.013***	0.053***	0.055***
	(10.20)	(10.46)	(8.85)	(9.19)
Constant	-0.55	-0.05	-0.26	-0.26
Adj R^2	0.87	0.87	0.82	0.83
N	2131	2131	2131	2131

Note: t-Statistics in parentheses.
*Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Table A2. OLS Estimates of Student Achievement Including the Instrumental Variables

	(1)		(2)	
	SSE	SSE	SSE	SSE
Variables	Quantitative	Verbal	Quantitative	Verbal
Percentage of Private	0.643***	0.878***	-	-
High School Students	(2.73)	(2.93)		
Percentage of Private	-	-	0.089*	0.089
High Schools			(1.78)	(1.39)
Number of Students	0.062***	0.004	0.061***	0.004
Per Classroom	(4.80)	(0.25)	(4.73)	(0.26)
Number of Students	0.004***	0.004***	0.004***	0.005***
	(6.95)	(6.19)	(6.92)	(6.15)
Being FLW	27.210***	22.767***	27.232***	22.797***
	(47.32)	(31.28)	(47.32)	(31.28)
GDP per capita	0.001*	0.001	0.001**	0.001
	(1.84)	(1.11)	(2.18)	(1.53)
Percentage of College Graduate	0.445***	-0.047	0.519***	0.085
Residents Older Than 22	(3.63)	(-0.30)	(4.40)	(0.57)
Percentage of Asphalt-Paved	0.116***	0.182***	0.116***	0.188***
Roads	(2.82)	(3.51)	(2.78)	(3.56)

Table A2. (cont'd)

Population Density	-0.001	-0.002**	-0.001	-0.001
	(-1.39)	(-2.38)	(-0.65)	(-1.32)
Aegean	1.031	2.936**	2.238**	4.650***
	(0.97)	(2.19)	(2.40)	(3.94)
Black Sea	3.553***	2.664**	3.992***	3.321**
	(3.35)	(1.98)	(3.83)	(2.51)
Central Anatolia	1.870*	2.066	2.708***	3.309**
	(1.69)	(1.47)	(2.60)	(2.49)
East Aantolia	3.920***	0.447	4.531***	1.321
	(2.79)	(0.25)	(3.28)	(0.75)
Mediterranean	0.247	-0.092	0.638	0.422
	(0.24)	(-0.07)	(0.62)	(0.33)
Southeast Anatolia	1.649	-6.925***	2.013	-6.247***
	(1.16)	(-3.86)	(1.43)	(-3.50)
Average Number of Students	-0.173***	-0.371***	-0.126*	-0.305***
Per Classroom in	(-2.87)	(-4.88)	(-2.20)	(-4.22)
Private High Schools				
Average Number of Students	0.021	0.130*	0.020	0.131*
Per Teacher in	(0.39)	(1.92)	(0.37)	(1.93)
Private High Schools				
Average SSE Quantitative	-0.002	-	-0.0002	-
Scores of Private	(-0.23)		(-0.02)	
High Schools				
Average SSE Verbal Scores of	-	-0.007	-	-0.004
Private High Schools		(-0.76)		(-0.38)
Constant	128.44	158.15	127.22	155.67
Adj R^2	0.65	0.44	0.64	0.44
N	2131	2131	2131	2131

Note: t-Statistics in parentheses.
*Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

APPENDIX B

CEPSS: Central Examination for Private Secondary Schools

FLW: Foreign Language Weighted

GDP: Gross Domestic Product

Ministry: Ministry of National Education

NES: National Education Statistics

OLS: Ordinary Least Squares

SIE: Secondary Education Institutes Examination

SSE: Student Selection Examination

SSPC: Student Selection and Placement Center

2SLS: Two-Stage Least Squares