FACTORS THAT INFLUENCE STUDENT ACHIEVEMENT AT PRIMARY LEVEL EDUCATION IN TURKEY AT PROVINCIAL LEVEL

by

SADIK CANER PIRNAL

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APPROVED BY:

İzak Atiyas .....

(Thesis Supervisor)

Alpay Filiztekin .....

Emre Hatipoğlu .....

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Keywords: Education Production Function, Primary Education, Education System in Turkey, Schooling, Class Size, Public Expenditures

Abstract

Being a convenient technique in analyzing and evaluating educational policies of the states, education production functions have been approved and used by many scholars. Therefore, this study engages with that technique by referring to the existing literature in order to identify the reasons behind the high variance among provinces of Turkey, in student achievements. Primary level education is the main concern of this paper. An econometric analysis is applied by using data of identified variables, in relation to the student achievements. To provide a base for this application, the structure of Turkish education system is explained. In addition, a comparison of the education system of Turkey with other selected countries is provided.

According to the results of the econometric analysis, this study finds out that multiple variables have been responsible for the variance in student achievement among provinces in Turkey. School enrollment rate, educational status of the families, class size, student teacher ratio, and variable regarding the Kurdish population have all influenced student achievement at primary level education. Nevertheless, variables on socio-economic status of the provinces and school resources including class size and student teacher ratio have been more influential. On the other hand, findings on public expenditure variable have led to an important conclusion. This study shows that the centralized educational policy of Turkey has not responded to the high variance problem in student achievement. In this respect, alternative education systems including a decentralized structure should be taken into consideration to provide a more efficient education to the citizens of the Turkey.

TÜRKİYE'DE İLKÖĞRETİM SEVİYESİNDEKİ ÖĞRENCİ BAŞARISININ İLLERE GÖRE DEĞİŞİMİNİ ETKİLEYEN FAKTÖRLER

Sadık Caner Pırnal

Kamu Politikaları, Yüksek Lisans Tezi, 2014

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Anahtar Kelimeler: Eğitim Üretim Fonksiyonu, İlköğretim Düzeyi Eğitim, Türkiye'de Eğitim Sistemi, Okullaşma, Sınıf Mevcudu, Kamu Harcamaları

Özet

Ülkelerin eğitim politikalarının analizinde ve değerlendirmesinde uygun bir teknik olan eğitim-üretim fonksiyonu birçok akademisyen tarafından onaylanmakta ve kullanılmaktadır. Bu nedenle, bu çalışmada Türkiye'deki iller arası öğrenci başarısı farklılıklarının ardında yatan sebepleri tanımlamak için var olan çalışmalara da dayanarak eğitim-üretim fonksiyonu kullanılmaktadır. Çalışmanın ana odak noktası ilköğretim seviyesindeki eğitimi kapsamakta ve öğrenci başarı farklılıklarına bağlı olarak ortaya çıkan veriler ile ekonometrik bir analiz uygulanmaktadır. Bu uygulamaya temel hazırlamak amacıyla Türk eğitim sistemi açıklanırken, ek olarak Türkiye ile diğer seçilmiş ülkelerin eğitim sistemi karşılaştırmalı olarak incelenmektedir.

Ekonometrik analiz sonucu ortaya çıkan veriler ile birlikte bu çalışma Türkiye'de iller arası öğrenci başarıları arasındaki ortaya çıkaran farklı etmenleri bulmaktadır. Okula kayıt oranı, ailelerin eğitim durumları, sınıftaki öğrenci sayısı, öğrenci-öğretmen oranı ve Kürt nüfusu ilköğretimde öğrenci başarısını etkileyen etmenler olarak yer almaktadır. Bununla birlikte, bölgelerin sosyo-ekonomik durumları, sınıf nüfusları ve öğrenci-öğretmen oranı gibi okul kaynakları içinde yer alan etmenler daha etkili olmaktadır. Diğer yandan, kamu harcamaları bulguları önemli sonuçlar ortaya çıkarmakta ve bu çalışma Türkiye'deki öğrenci başarısını etkilemekte olan değişkenlerin sebep olduğu problemlere merkezi eğitim sisteminin karşılık veremediğini göstermektedir. Sonuç olarak, vatandaşlara daha etkili ve verimli eğitim sağlanması için ademi merkezi sistemler gibi alternatif eğitim sistemleri dikkate alınmalıdır.

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ABBREVIATIONS

OECD	The Organisation for Economic Co-operation and Development
USD	United States Dollar
EU	European Union
SBS-OYP	Placement Test – Secondary Education Placement Score
PISA	Programme for International Student Assessment
SEGE	Socio-Economic Development Index
OLS	Ordinary Least Squares
TÜİK	Turkish Statistical Institute
DPT	State Planning Organisation
UNESCO	The United Nations Educational, Scientific and Cultural Organization
GPA	Grade Point Average
2SLS	Two-Stage Least Squares
US	United States
SPA	Special Provincial Administration

1. INTRODUCTION

> The existing research suggests inefficiency in the provision of schooling. It does not indicate that schools do not matter. Nor does it indicate that money and resources never impact achievement. The accumulated research surrounding estimation of education production functions simply says there currently is no clear, systematic relationship between resources and student outcomes.
>
> E.A.Hanushek (2008)

Economics of education has a wide range of literature, which evolved especially by the fourth quarter of the 20th century. Although the neo-liberal stream, the dominant ideology since then, demands a minimal government, public education is still widespread all around the world. Indeed, public education maintains its dominant position as scholars produce argument in favor of it (Tomlinson, 1986). The delivery of education, therefore, requires effective public policy analysis in order to define and address negativities. It is the fact that education is a costly good. Guidance of economics at this point is essential, especially under the consideration of human capital framework, which promotes the importance of cost-benefit analysis in education (Mincer, 1989).

For the time being, the researchers who have been carrying out the analysis related to public education policies, have developed models to interpret determinant factors on education systems. Allocation of resources to different areas, which are spared for educational services to maximize productivity in the field of education, is the primary goal behind the studies using the technique of using models (Levin H. M., 1989). However,

studies in the field of education counter with limitations mainly caused by lack of data availability and unobservable ingredients of the educational processes. While these obstacles exist, this study engages with the public education delivery in Turkey by using the available data provided by the public institutions and research organizations. The question of; even though Turkey has an intensely centralized education system, why there are considerable variances at student achievements at primary level between the provinces, is tried to be answered by this study.

Depending on former literature on the field of input-output analysis in education, by considering both physical and political conditions; this piece presents findings on variables' effects the national test score achievements of primary level students in Turkey at the provincial level. By collecting data units, which were published by the Ministry of National Education, TÜİK, and international organizations such as OECD and UNESCO, this paper analyzes effects of schooling ratio, per pupil teacher ratio, class size, ethnicity, per pupil public expenditure on primary education, and a socioeconomic development measure on student achievements. "Test of Secondary Education" (SBS) is the output variable at which the data for the year of 2009 is available for all the 81 provinces in Turkey. Variations on these variables have allowed econometric models, which have been constructed in the study, to determine the effects of them on student achievement. Thus, policy implications based on these results are expected to be substantive.

Rest of the sections will present the structure of the Turkish education system, a comparison on the educational sector between selected countries and Turkey, data and the model, results, and conclusions, respectively. Although it is explained in detail at the findings section, higher schooling rate, lesser student teacher ratio, smaller class-size increase students' achievements. Social-economic development index measure refers to an umbrella variable for the rest, and it presents significant numbers. On the other hand, according to the findings of this paper there is a negative correlation between public investment and student achievement. This substantial result indicates that implemented expenditure policy of the central government is inefficient.

2. EDUCATION PRODUCTION FUNCTION IN THE EXISTING LITERATURE

The main concern of this thesis is to examine the causes of inequality of educational outcomes among the 81 province of Turkey. The thesis uses, an econometric model to identify the causes of inequality. The model is the education production function and has been extensively used in the literature to understand the determinants of educational performance. The results will be used as tools in the policy-making processes and the method has inspired many studies (Hanushek, 1979). Scholars have used the production function approach to explaining degrees of influences on educational performance of different educational inputs. Most of the studies have aimed to provide frameworks that can be used to assess the efficiency of the school operations.

Efforts to detect the influence of educational inputs on educational outcomes has initially focused on the schools in the USA. The distinction between studies, which have been carried out before and after the Hanushek paper, could be made by detecting the differences between inputs and outputs. As outputs, in some studies, cognitive outputs such as standardized test scores and composite achievements, and in the others non-cognitive outputs such as student attitudes, educational aspirations, and dropouts have been used. Some other have used the both at the same time. In the field of inputs, some carry out the distinction between student inputs and school inputs. Again, some studies have used both at the same time.

For the Quality Measurement Project, (Goodman, 1959), classifications for both institutional and student potentials had been made. Standard Achievement Test results were used as the output measure. Along these instruments, including IQ results and subject test scores, socio-economic status of the community were used to interpret determinants of educational outcomes on a sample selected from Iowa. Findings of this study pointed out that institutional potential, educational process, and outputs should be considered within the educational complex in assessing school systems. According to the presented coefficients of the authors used, there was a positive correlation between expenditure and effectiveness

of the education system. Findings of the study also supported the idea that the characteristics of teachers and parents also significantly affected student achievement.

California State Senate's Fact Finding Committee on Revenue and Taxation published a report, (Benson et.al., 1965), that used reading test as a standardized achievement test, a cognitive output, and 21 variables including both student and school inputs were employed as inputs. The interpretation between opportunity and accountability occurred as the result of the report that was derived by the correlation between student background and reading test results. Conclusion of the study was that in schools where the state and local authorities operates harmoniously, educational services became more effective.

Together with the John Hopkins University, Coleman (1966) conducted a study to find out the best educational policy to ensure equality among different groups. The report utilized all three tests' results; verbal, reading, and mathematics, as cognitive outputs, in addition to general information of students. A total of 41 inputs were also included in the study while the largest proportion of these were filled by school conditions and student background information, respectively. In terms of the conditions of the related time period, the report pointed out that, segregation among schools caused variation in student achievements. Depending on the variables, including class size, conditions, infrastructure available in schools and the sufficiency of the educational personnel; the study pointed out that the quality of African-American schools of the time were not equal to the schools that white students attended.

A year later another comprehensive study took its place within the literature that measured educational aspirations that reflect motivations (Burkhead et. al., 1967). In this case, students' willingness to attend tertiary education after high school was taken as a motivation. Three different models were employed within this study: at the first study both aspirations and dropout rates were used as outputs, at the second study dropout rates were used, and at the third study high school continuation rates and full time job status of graduates were used. The results of this study showed that within the sample from Atlanta state, there was a negative correlation between student-teacher ratio and student achievement.

Another article was presented, in which authors stated that the influence of Coleman Report on their study as they tried to explain determinants of scholastic achievement (Bowles and Levin, 1968). The study used Reading and Verbal test scores as the only outputs. With eight non-correlating variables, they constructed a different perspective for the same purpose of the existing literature. As a result, the study concluded that the sample should be rich enough in order to make significant input-output analysis.

The end of the 60s was the period of a boom in input-output studies and another article influenced the literature, which examined the high school level public education system of Iowa state (Cohn, 1968). Results of a local test were exploited while a theory of estimation of an optimal class size was developed. A variation of per student expenditure by referring to the attendance cost was included into the model of this study. Besides this uniqueness, the overall goal of the paper was to measure the efficiency of public expenditure on education. Thus, this study showed that by using a production function, an optimal class-size could be estimated.

A similar study was built on the data from West Virginian primary and secondary schools, published and received attention (Raymond, 1968). GPA and American College Test results were used as outputs, while student backgrounds consisted the vast majority of the variables that were used as inputs. Profiles of teachers were also included within the model as economic influence on student achievement was analyzed by using the data collected from 5,000 students. This study engaged the data collected from West Virginia and provided two different conclusions. Firstly, input variables were not always precise to cover all the aspects of educational quality. The second conclusion was that increasing teacher salaries could improve the quality of education.

Other than the published articles on different states regarding the student achievement analysis, US public institutions also used production function models. Importance of the school inputs on the public school achievement within the New York state was inquired (Kiesling, 1969). Series of school inputs were used intensely, compared to student characteristics. Another article by the public department also took its place within the literature a year later and studied the relationship between teacher sources and student characteristics (Michelson, 1970). The report that was conducted by Kiesling stated

that teacher-pupil ratio consistently affected student achievement negatively. Also, Michelson interpreted with the results of his simple linear regression analysis that same inputs would not give same outputs on the children coming from different backgrounds.

Another study was developed by a team of researchers, which focused on the correlation between socioeconomic status, academic resources, school resources, and success in life after school (Guthrie et.al., 1971). The paper expressed that the financial status of the student and public expenditure were the most important determinants. In that sense, equality of education depended on the equality of economic status of the students' families. On the other hand, public expenditure from a closer authority to the district level would be more efficient as these characteristics, including family status, should be addressed much specifically than state authorities do. On the same issue and at the same year another article employed the same methodology to point out the political economy of the public schools (Katzman, 1971). Tuckman (1971) approached the economic side of the issue from another perspective, and he combined ethnicity variable with the economic situation. This technique increased significance of the study as well as of the production function methodology. The results also supported specified expenditure schemes targeting different groups with different backgrounds.

The study of Hanushek (1972), upgraded the literature on education production function studies. The piece is considered as one of the most comprehensive works within the field while combining methodologies of the existing literature. Hanushek stated that "From a production function, it is possible to make decisions about the educational policy". The study, therefore, presented a guideline for the policy makers and explained every stage of the policy cycle. US public institutions followed the path that Hanushek had pointed, and series of studies were carried out later on (Mayeske et.al., 1972).

A series of other studies deployed education production function technique into the different samples and data. Simultaneous equation model was built on the Coleman Report with a greater focus on student achievements that was provided to the literature (Boardman et. al., 1974). This study emphasized that there were strong relationships between parents' attitudes, efficacy, student motivation, and student achievement. The conclusion of the study was that both family and school characteristics played significant roles on student

achievement. Cohn and Milman (1975) presented a larger model compared to the other studies. In order to explain the economic dimension of education, the model used eight different student attitude measures as dependent variables, while emphasizing school resources on the right-hand side. The study found significant results and took one step further and argued that regression-based school management schemes were available as an option for technocrats that were designing the education system. Using composite achievement as output, another study was published as egalitarianism was the theme of the study (Summers & Wolfe, 1977). Inclusion of peer group characteristics made the study unique within the literature. The study concluded that, while with larger and comprehensive data better findings could be provided, family characteristics and race determined the level of influence of the school inputs, including public expenditure.

In the contemporary era, the literature could be divided into two groups; some added new techniques to the model, while others used the model with new data. In the fifth annual meeting of the American Economic Association, a new modeling technique for multiple outputs in education production functions was presented (Chizmar & Zak, 1983). With this new technique, high multicollinearity problem in the models was tried to be solved. Vinod's adaptation model, OLS, and 2SLS models were employed. Conclusion of the study showed that all three techniques have their own advantages and disadvantages. Another study deployed the technique for a country comparison between Kenya and Tanzania with United Kingdom, in order to explore the effect of the economic situation on educational achievements (Armitage & Sabot, 1987). The authors stated that their results supported the argument that the socioeconomic background of students determined the significance of the other variables.

Monk (1989) pointed out the dominance of the education production functions within the field of educational policy making processes. The piece divided the existing literature into two by calling one group "The Estimation Approach" and the other "The Gateway approach" to make distinction between the studies that tried to show the maximum of the educational achievement and the ones focused on economic theories, respectively. With a critical approach, this study acknowledged the usefulness of the econometric strategy of analyzing student achievements with a production function. On the

other hand, the author also stated that there was a risk that education production functions could give misleading results if the data was limited and the results were nevertheless significant.

Article of Berger and Toma (1994) undertook a state level analysis and showed, with the input-output models that economic expenditure was not highly correlated with the student achievement. This study used SAT performances from 1972 to 1990. According to the authors, the effects of higher certification requirements for teachers and higher expenditure on education did not have a significant effect on student achievement. Income level analysis similar to the (Armitage & Sabot, 1987) paper was made on Ghana, in order to show the necessity for improving the school quality (Glewwe & Jacoby1994). Usage of cost-benefit analysis on the education system along with the production function made the existing approach further refined. Another major study focused on the equality of schools in terms of educational quality within the USA. (Argys, Rees, & Brewer, 1996). NCES survey used which is made with the aim of tracking strategies in education. The education policy of the US government defined as to provide the advantages of the education system equally to all citizens. Student achievements were taken as the indicator of equality in education. An econometric model developed by taking student achievements as outputs and interpret the coefficients as the result of the educational policy. It compared student outcomes with educational resources and contributed to the literature on education production functions while increased the reliability of this research strategy (Greenwald, Hedges, & Laine, 1996; Feinstein & Symons, 1999; Krueger, 1999; Krohn & O'Connor, 2005).

The goal of this paper is to understand reasons behind the inequality of student achievement between provinces of Turkey. Studies mentioned above reflect that education production function and input-output modeling strategy are appropriate techniques in order to find the answer to this question. With the available data, the methodology that emerged from the existing literature can be used, and a model based on input-output analysis can be deployed, in order to explain this divergence within the Turkish Education System. As will be discussed in the conclusion section, we find that our results are in general consistent with the results obtained in the literature.

3. STRUCTURE OF TURKISH EDUCATION SYSTEM

In terms of the scope of authority that legal entities have over the education system, Turkey has a considerably centralized education government structure. The Ministry of National Education is the superior legal entity, as it is responsible for every aspect of the educational system from pre-primary to secondary level education. Analyzing the underlying explanations of this settlement and the related legal structure about the Turkish education system will contribute to our efforts to understand the dynamics of centralization of the system. In addition, knowing the core structure is in the benefit of this study as long as these may address source of the existing problems. Lastly, this section could be seen as an appetizer before the main course, the econometric study, because it provides background for some the variables used in the regression models.

The official definition of the responsibilities of the Ministry of National Education is: "to plan the education and training services in the Republic of Turkey, programming, implementing, controlling and keeping the education system under surveillance. Organizing and conducting services related to education and training which will be held abroad, as well as sheltering of youth in education and training issues besides addressing their dietary needs and give financial support to them. Building and opening of all kinds of formal and non-formal education institutions and allow the opening of the remaining higher education institutions and organizations and also hiring and monitoring the educational personnel. Carrying out the other duties defined in law." This definition alone clearly points outs the scope of centralization of the Turkish education system.

Box 1: Legal Structure of Education System in Turkey

Education in Turkey, as justice, security and health, is one of the major policy fields that the state is responsible for with the highest supervision of the government. The central government is the highest authority on the field of education, while provincial

and international organizations have limited influence on the field. There are two divisions of the education in Turkey provided to the society:

A) Formal Education

Similar to the international code, formal education is provided to students at specific age groups and levels. The contents of the course are shaped according to the common targets of the public strategy and provided to the citizens under the roof of schools.

There are four levels of Formal Education:

1) Pre-school: Pre-school education is the optional level of the education system in Turkey, which targets the group that is not mandatory for primary schooling yet. Pre-school education institutions exist as independent kindergartens, schools for only girls linked with related vocational schools or preparation schools linked with other educational institutions. The purpose of pre-school education is to ensure children's at least a minimum level of physical, mental, emotional development and acquisition of good habits. Eliminating unfavorable environmental conditions away from the children and ensuring a good and correct speaking of the mother tongue, which is accepted only as Turkish, are other key elements of the pre-school education. Specifically, the target age group is 3 to 5.

2) Primary Education: The age group of six to 14 is the target of this level of education and training of children. The main aim of the primary education is to raise good citizens by the provision of basic knowledge, skills, behaviors and habits that are required to obtain a national morality in accordance with individuals' abilities, talents, and interests. Primary education is mandatory for all individuals who reached the compulsory starting age defined by the law. Currently, the length of primary education is eight years.

3) Secondary Education: As a continuation of the primary education, secondary education consist all; general, vocational, and technical four-year institutions. Giving students a minimum common culture, awareness on problems of the community and practical skills to promote and to seek solutions against these problems are the main goals of the secondary level of education. Individual development is also expected to contribute to economic and cultural development of the country while preparing students to their professions, general living, and business life if applicable. If students are having vocational or technical secondary education, they are being prepared for a professional business work life with specified trainings. Men's technical schools, technical secondary schools for girls, commerce and tourism schools, and divinity high schools consist this part of the secondary education schools. If students are having general secondary education, it is expected to be the final preparation step before the tertiary education. General high schools, Anatolian high schools, science high schools, teacher training schools, sports schools, fine arts high schools, and schools with multiple programs include the public side of the general secondary education schools.

4) Tertiary Education: This level of education, which refers to the higher education, is at least two years of education based on the top-level scientific research fields. Training practitioners and experts on various fields are the main goal of tertiary level education. Universities, faculties, institutes, colleges, conservatories, vocational schools and research centers consist of the higher education application. Higher Education has different types as formal, public, and outside training. Turkey follows the international standards on the levels of higher education and institutions provide Bachelor Degree, Masters, Ph.D. and other additional programs.

B) Non-formal Education:

Non-formal education is the mechanism that refers to other education applications. It is dedicated both to individuals, who did not integrate into the formal education

system, or to those who need education that is not available or limited within the standard educational institutions. Non-formal education compromises public education, apprenticeship training, and distant education. Public education centers, apprenticeship training centers, practical art schools for the girls, maturation institutes, industry practice art schools, vocational training centers, adult technical training centers, private courses, and other private education institutions including training and demonstration schools, private vocational schools, vocational training centers, private science and art centers, open high school are the available educational entities, which are suitable for the non-formal education division.

In explaining historical developments, considering the period of 1923-2023 will provide a large-scale perspective to this section, which reflects the structure of the education system in Turkey. While mentioning about developments, pointing out the focal events and situations and relating them with the policy cycle of education is the method of this section.

By knowing the central manner of the model, positioning the center as the initiator of the reforms is relevant. Almost in every decade, the structure of education system has been reformed and the last reform has targeted the duration of the compulsory education, which is now called the "4+4+4" Education System that has come into force with the 2012-2013 academic year. These reforms are made to address emerging problems in both national and local levels. In this respect, analyzing the historical development process of Turkey is crucial in examining the causes and effects of the educational reforms.

Nevertheless, the most influential document regarding the education model was created in 1924. The Law on Unification of Education, which came into force on March 3, 1924, was a very comprehensive law, which structured the entire Turkish education system. The most significant part of the law was the ones that ensured the elimination of religious matters from education. The law abolished district schools and also Madrasas, which were religious based schools. While these institutions were closed down, under the control of the Ministry of National Education, colleges, schools with foreign language, private schools, reformed public schools, and high schools were engaged into the education system. Before the law, three different categories of educational institutions operated in an autonomous

way. The religious school was in the first category, the more innovative schools and high schools were in the second category, and the colleges and foreign schools were in the third category. The Law on Unification of Education appointed Ministry of Education on top of these schools by merging the system in a centralized way. Furthermore, all other educational affairs and organizational and administrative work were left to the Ministry. This situation meant absolute centralization of the Turkish education system.

Although The Law on Unification of Education structured the base of centralization, a more specified document was introduced to the system later on 1926. The Law on Organization of the Ministry of Education, known as Law number 789, was adopted and explained the scope of authority of central institutions. One of the most flashing articles in the law was about opening of the new schools. Law permitted launching of new schools without getting the permission of the Ministry of Education. Moreover, the curricula of secondary education schools, which had been linked to Ministry of Education, were going to be prepared by the central bureaucrats. In this point, one of the goals again was to create a secular curriculum to ensure ideology of the government was positively persuaded by the society.

Another law, which formulated the operation of Village Institutes, was adopted on April 17, 1940. These institutions were established with the Law on Village Institutes, no.3803, and targeted the development of rural parts around the entire state to reach a total national development level in the end. This policy could be considered as the most decentralized policy of Turkish Education history, even though the institutes were bound to the center. Village Institutes were opened in accordance with specific needs of the regions. However, the life of these schools ended shortly, mainly due to political reasons. On 1954, these institutions were closed and linked to teacher training high schools, which composed the harsh signs of the centralism.

Further laws that regulated the education systems were also introduced. The Primary Education Law of 1961, which was specifically explaining the structure of the system while defining the duration of education to financial matters, was adopted. Another law, named Basic Law of National Education, was adopted in 1973, which was announced as a bi-leveled, formal and informal, structure of the education system. Also, in 1986, another law concerning Vocational schools called Vocational Education Law was

introduced. The law emphasized on the authority of the Ministry on vocational schools while Vocational Education Board was also introduced to the system. The responsibilities of the Board as a sub-agency of the Education Ministry almost covered the entire system on vocational education.

The legacy of the 1926 law on the organization of the ministry had been lasted until 1992, when Law on Organization and Duties of Ministry of National Education, as a reformation on the previous law set, was adopted. It is important to note that, at the first article of the law, a reference to the Law on Unification of Education had been made and had been defined as a guideline for future developments. After defining the almost traditional goals of the Ministry of National Education, at the third article the schematic structure of the education system was defined. Central, provincial, foreign, and affiliated organizations were the major sections of the organization. In this sense, while the ministry had bodies on different levels, the entire system was dedicated to the central government. The Higher Education Board also had been an important issue since there were active debates continuing the institution. In other words, the authorization of the ministry had been a major policy on education. Turkey had the highest degree of centralization of education as the legal documents were also showing the level of centralization.

Many further reforms and additional regulations in every aspect of education have been introduced later on. The structure of the ministry, local institutions and agencies, duration of and starting age to primary school, the Higher Education Board, religious schools, foreign schools and private schools have been controversial issues and topics of political debates. There are many publications on these issues. However, the rest of this paper will specifically analyze the centralization policy of Turkey on education as a Welfare State. Both advantages and disadvantages of the system are explained. Further details on structure of local authorities are also presented while explaining the outcomes. Also, both theoretical and statistical outcomes are given. Education has been used as a major tool for creating the optimal policy environment and has been at the heart of the new Turkish Ideology since the earlier republican era (Okçabol, 2005). Despite all these factors mentioned above that chronologically explain the highly centralized structure of the education system in Turkey, existing inequalities among student achievement between

different provinces should be addressed deeply as the scope of the problem seems to be greater than its visible bodies.

Since the establishment of Turkish Republic, the laws explained above have been enacted into the field of education. With a number of amendments and abandonments of some earlier laws including the law on the Village Institutions, central government has been given the superior authority. Currently, legal duties of the central government clearly define the authority structure of the Turkish education system. Implementing and monitoring the educational processes are the core duties of the Ministry. On the other hand, the potent duty and at the same time the power of the Ministry of National Education is to determine, implement, monitor and update the evaluation of the national education policy for each and every educational level. Along these strategic duties, ensuring equality in providing education to citizens is the main social policy of the state in the field of education.

Ministry of National Education has the right to decide on the initiation of new school constructions and openings. Moreover, maintenance of the school infrastructures and tools are subject to decisions of the Ministry. Decisions on the educational personnel including teacher appointments are done by an entity that operates under the Ministry called Educational Personnel Planning and Evaluation Council. With the authority of the Council, all strategic policies on educational personnel for every level are taken inside the Ministry.

On provincial and district level, directorates operate as the sub-entities of the Ministry. With this structure, coordination and communication between schools and center are focused to be more efficient. While they are allowed making suggestions on schools in relation with their responsibility of monitoring, they do not have an enforcement of power over the system. The function of these bodies is to ensure the implementation of the policies and directives of the superior body is delivered. In addition, with their presence, it is aimed to increase efficiency in collecting information and management capacity of the Ministry.

Another sub-body that plays a role in the field of education are the Special Provincial Administrations (SPAs). Each SPA has to have a commission on education, according to the law. These institutions exist at the provincial level, and they are the

subcontractors of the Ministry of National Education in the sense that these entities are implements the educational programs declared by the Ministry. The SPAs made infrastructural expenditures, including construction of schools.

International reports mentioned several problems in the operation of the education system in Turkey. Unequal allocation of financial resources among regions has affected students' learning opportunities negatively, and reforms on allocation policies have been required (OECD, 2007). Besides economic inequalities, education in native language has become an important debate at the political level. Despite the fact that Kurdish language departments have been opened in two universities in Turkey, the process towards a bilingual education has not been initiated yet. In this sense, the student, whose mother tongue is not Turkish, will be identified in this paper by using a qualitative variable on the Kurdish population.

The main question of this study, which investigated determinants of the variation between students' achievements, targeted several variables. School enrollment rate is one of the variables that reflect the situation on equality of opportunity of children in reaching educational services. Family backgrounds of the students are another important indicator and addressed by the inclusion of school completion rate variables into the econometric model presented in Section 5. Sufficiency and equality in availability of educational personnel to all students is also questioned within this paper. Data of class size and student-teacher ratio variables were used. As the output of the educational policies, PISA scores at international level and SBS scores at domestic level used for the comparison between student achievements. In Section 4, a comparative analysis made with the inclusion of these variables. An econometric model used and findings of this analysis given in the Section 6 while detailed descriptions on the variables are available in Section 5.

4. COMPARISON OF TURKISH EDUCATION SYSTEM WITH THE OTHER COUNTRIES

In policy analysis, referring to a comparative study has been a common practice. This has been the case due to the theory that the developing countries follow the path of the developed countries and developed countries stand as models for the developing ones. Regarding the educational resources and attainment, several indicators are selected and are investigated throughout this work, and a comparative analysis at international level is completed in this section. Turkey is a country, which belongs to the league of developing countries. Statistics of selected countries on the selected variables enable a comparison in the study and present an international dimension. At the same time, interpretations of Turkish students' level of achievement within the explained environment were given.

Creating a balance between needs and interests is the major duty of the government within the policy making process on education. Knowing this fact, government needs to justify investments to educational policies by obtaining desired outcomes as a result of the investments such as improvements in the level of students' achievement. In this sense, several variables and their position at the investment side of the equilibrium are explained. Additionally, statistics of Turkey and other countries on these variables are compared.

One of the core variables, which scholars and policy makers emphasize on, is the school enrollment rate. Enrollment rate is crucial for this study because the main concern is equity through the student achievement while, after all, schooling could be an avenue of social mobility (Mare, 1994). Statistics show that there is a high difference between the school enrollment rates of different countries. Numbers from Turkey are ominous according to the statistics of the years from 2009 to 2012. OECD statistics show that especially for the students between ages of 15-19, enrollment rates among Turkish students are far lower than the developed countries (See Appendix-A). Turkey is the second worst country, before Mexico, among the OECD countries according to the available data. While the OECD average school enrollment rate is over 80% among the specified age group, in Turkey the percentage drops around 50s-60s%. In my opinion, there could be two sources behind these numbers. First one might be the choice of the families. In other words, many

of the non-attendees may think that it is not worth to sacrifice additional years for education instead of starting to bring income to the family. The second reason might be the insufficiency of primary school education resources. From this perspective, a huge difference between students' achievements among provinces at the primary level supports the second argument, while it indirectly contributes the first one.

Statistics on years of schooling are another variable used in the comparison of Turkish education system with other in an international environment. According to the data taken from UNESCO, among the population over the age of 25, the average year of schooling in Turkey is 7.56 at 2012, which has increased from 6.63 since 2009. This situation indicates that in Turkey, culture of education and enrollments to schools have been considerably low. According to the data taken from the same source, years of the schooling average of Turkey is at the bottom of entire European geography, while the average among EU countries has been around 10. It seems to be the case that regarding this indicator; Turkey belongs to the league of Middle Eastern countries, where the average has been around 6 for the same years.

Regarding the educational attainment and enrollment, another major indicator is the proportion of tertiary degree attainders among the whole society. The comparison of Turkey with other OECD countries and some other non-OECD countries (see Appendix-B) shows the fact that, numbers from Turkey for the years between 2009 and 2012 were only higher than Brazil. Tertiary education attainment rate in Turkey is lower around 17% than the OECD average, with the numbers between 12% and 15%. This situation reflects not only a lack of high-level education infrastructure but also a low demand for high skilled people. Further studies are required to confirm these impressions, although, this need occurs as another sign of trivialness of education in Turkey.

Looking at the school resources from Turkey and comparing these numbers with other countries are other important tools for this section of the study. Class size and teacher-student ratio are parallel indicators, which have been used by many studies within the field of educational policy (Krueger, 2003). Data for the year of 2012 from OECD is stepping out as a reliable source for these variables (see Appendix C). To illustrate, 23.97 is the class size average at primary level schools in Turkey while this number is 21.34 on average among OECD countries. On the other hand, although a sort of overlap is expected

between class size and teacher-pupil ratio, average of Turkey is much higher than the average of other countries within the OECD. At the year of 2012, 15.34 is the OECD average while one teacher available for 20.34 students in Turkey on average. These numbers raise questions about the distribution strategy of teachers to the classes, which should be prepared in accordance with their expertise. At the same time, given numbers on class size and teacher-pupil ratio indicators reflects disparity, while threatening educational quality at the primary level.

As the education system of Turkey is highly centralized, public expenditure per student points out the allocated public resources. At this point, the magnitude of teacher salaries has consisted more than 80% of the expenditure on primary education. Despite the Turkish officials' argument, which claims that the government spending a lot on education, the numbers have shown that Turkey spent around the quarter of the OECD average on per primary school student (see Appendix-D). For example in 2011, Turkey spent 2217.52 USD per primary level student, while the OECD average was 8295.83 USD. When we look at the teacher salaries, the difference is quite reduced. In Turkey, yearly salary of a teacher with 15 years of experience is 26.677.69 USD, while the average is reached to 39,023.86 USD among entire OECD countries for the year of 2012. This shortened gap shows that other countries spend less on personal expenses, while Turkey stocks on salaries and does not spend on educational development, as far as the numbers are indicating.

Matching these expenditures on education and stating their size within the total public expenditure of the countries would add an extra dimension and clarify the situation. OECD numbers show that, in 2011, Turkey spent 10.87% of its total public expenditure to education while the OECD average was 12.89%. The numbers indicates that Turkey's public expenditure on education was similar to the countries with high educational achievement, (Japan 9.11%, Spain 10.5%, Austria 11.41%, Netherlands 11.89%) despite the fact that Turkish students achieve significantly lower than the students from these countries. On the other hand, other less achieving countries, which are lower than Turkey, spend much higher than the OECD average as they try to cope with the rest of the countries (Mexico 20.48%, Brazil 19.19%). These statistics indicate that Turkey's public expenditure on education, as the percent within the total expenditure, was questionably low.

The input variables that are compared above exist within the educational systems of the countries while international examination test PISA would provide a comparison on the outputs of the education systems. 15 years old students' average achievements in PISA vary enormously among different countries. Thus, differences in the indicators explained above are quiet correlated with the variation of PISA scores (see Appendix–E). In the score types of the PISA test, reading, mathematics, and science, average of the Turkish students are 464.19, 445.45 and 453.91 for the year of 2009, 475.49, 447.98 and 463.41 for the year of 2012 respectively. Among OECD countries, Turkey is only better than Chile, Mexico, and Serbia. When we compare Turkey with the latest members of the EU, Croatia, Bulgaria, and Romania, average scores of Turkish students are around 30 points better than Bulgarian and Romanians while 20-30 points worse than Croatia. Despite this difference, it could be argued that Turkey belongs to this group when we look at the percentile rankings. Greece and Cyprus also belong to this group according to the results. It should be noted that all of these countries are statistically significant below the OECD average (OECD, 2014).

All of the statistics and information presented in this section are clearly showing that Turkey is far behind the developed countries in terms of educational resources and attainment. Furthermore, the numbers do not indicate that Turkey is trying to fix this situation as there is not a drastic input improvement, which would increase student achievements of the Turkish students. In a highly centralized educational environment, these statistics should be enough to convince policy makers to invest and emphasize on educational development. Following sections will present that there have been an intriguing variance between different provinces in terms of student achievements. Education production function method used to find the reasons behind this difference by knowing the legal framework and position of Turkey within the international environment.

5. DATA AND DESCRIPTIVE STATISTICS

The analysis given on the existing literature, which were written on educational production functions showed that a set of variables were commonly used by the scholars to define determinants on education systems. At the same time, regression models were dominant within the literature as the nature of the production functions allowed researchers to obtain significant results to base their interpretations. The variables that were included in the models were often selected from a range of common variables, which explained student characteristics and school conditions. However, construction of an input-output model was costly for many researchers due to the requirement of collecting appropriate and sufficient data. In this respect, this study is also limited to the available data collected by public institutions of Turkey and reliable international organizations.

Education production function method is adopted by this study, as it is inspired from the existing literature explained at section two. In order to find the reason behind the high differences between student achievements at the primary level among the 81 provinces in Turkey, SBS test results, that are integrated with the grades obtained during the primary school grades, are used as the output of the model and are regressed to the available variables. At the right hand side of the equation, the inputs, schooling rate at primary level education, high school completion rates, tertiary level education completion rates, teacher-pupil ratio, class size, a dummy for the Kurdish population, public investment on primary education, and Socio Econnomic Development Index (SEGE) scores of the provinces are used. Rest of this section presents explanations on these variables and statistics are given.

OLS regression technique is used and to adjust the sense of the variables; variations used among given the variables. Also, some interaction terms are added to check the status of the interaction effects. The complete model is noted as the following:

$$SBSOYP_{pi} = \beta_1 + \beta_2\ SCHOOLINGRATE_{pi} + \beta_3\ HSCOMP_{pi} + \beta_4\ TERTCOMP_{pi} + \beta_5\ TEACHPUP_{pi} + \beta_6\ CLASSIZE_{pi} + \beta_7\ DTPDUM_{pi} + \beta_8\ PUBLICEXP_{pi} + \beta_9\ SEGE_{pi} + \epsilon_i$$

5.1 Secondary Level Education Placement Scores (SBS)

In order to place students at high schools, including Anatolian High Schools, Science High Schools, Vocational Schools, and Private Schools, Ministry of National Education uses assessment and evaluation model depending on the grades and centralized test scores of primary schools' students, which they have received during the last three years of their primary level education. Weighted grade averages of the students from these years and SBS exam score, which was the name of the explained exam during the year of 2009, have constituted placement score of the students. According to the weighted grades, a ranking of students occurs. 7th and 8th grader's SBS examination scores during the last two years of primary education, and averages that the students have during the 6th, 7th, and 8th grades constitute the output data points of the provinces. The averages of these numbers of the provinces are taken as the dependent variable of the education production function that is employed in this study. 500 is the highest number for this score type, while the difference between the maximum and minimum observations is around 70. The top and bottom five provinces are given at defined columns in Table-6 in Appendix-F.

Placement of SBS scores on the left-hand side of the equation is a common strategy adopted by the existing literature, where the test scores are often used as the dependent variable. Finding the influences of the input variables on this dependent variable is the main goal of this study, and consequently, causes of the critical differences between student achievements from different provinces are tried to be clarified. Relationship between effects of school and student resources on student achievement is the main tool to sort out the question that this research focuses on.

5.2 Schooling Rate

Schooling rate or school enrollment ratio is another major concern of the studies engaged within the field of education. This variable has been commonly used in the literature. The variable measures both the student characteristics and school resources. Schooling variable is used depending on the assumption, in which the schooling rate

depends on the available infrastructure provided by the state and other sources. This theory is more acceptable within environments of underdeveloped and developing countries, where rural areas still consist major parts of the whole country. Knowing the fact that Turkey is still a developing country, this situation has been a serious issue since several decades ago especially at the eastern parts of the Turkey, although improvements should be done on the educational infrastructure. Development plans that are prepared by the central government have given priorities to building schools and increasing available educational resources by referring the situation at the previous sentence. The numbers are expected to improve at the end of the each planning period.

From another perspective, school enrollment rate is a choice, although in this paper it is not the case because of the legal framework that make primary schooling a must for every citizen. However, choice factor always exists, which affects motivation and therefore influences student success in most of the cases (Edwards, 1975). In my opinion, to measure the choice dimension on the schooling rate precisely, educational infrastructure shouldn't be an issue for the subject state. In such an example, the socio-economic gap between the compared provinces should be lower. Within this framework, assessing the choice effect on Turkish education structure is not an easy task to complete.

Nevertheless, from both perspectives, school enrollment rates are seen as one of the major indicators of educational systems. The primary school enrollment rates' statistics of provinces are included in the model for this reason. The expected schooling rate is 100% as the primary schooling is compulsory. However, none of the provinces realized the expected value while the variance is more than 10% between the top and bottom province of Turkey. In order to take the SBS test, you should be an enrolled student to the education system. In that sense, an argument telling that the non-enrolled population does not affect the student achievement. From another perspective higher enrollment rate means higher probability of successful students in the sense that in well established education systems higher enrollment rates were recorded. The top and bottom five provinces in primary schooling rate in Turkey for the year 2009 are given at Table-7 in Appendix F. It should be noted that there is a natural correlation between this variable and teacher-pupil ratio, while they are not identical.

5.3 School Completion Rate Variables

Inclusion of the variables, which corresponds to the family backgrounds of the students are crucial in order to eliminate various type of biases including selection bias from the education production functions. Wealth and educational status of the family is a great determinant on children even if the degree of this influence is not certain (Rumberger, 1983). Most of the time, state or country based comprehensive surveys are available for or made by the researchers to expand the dataset used for the production function studies. However, this is not the case for Turkey and this study. Despite this fact, in order to not to miss the family background influence, percent of the high school and tertiary education graduates in provinces are included into the dataset. The main reason behind this inclusion is to check the student achievements with the families' educational status.

While a high school and tertiary level graduation rates are around 22% and 8% respectively, variations between the provinces are higher than 10%. Due to the correlation between the two variables, they are included into the models separately. The top and bottom five provinces in high school and higher education completion rates in Turkey for the year 2009 are given at Table-8 in Appendixes-F.

5.4 Student/Teacher Ratio

Smaller student over teacher ratio is expected to increase student achievement. This is mainly related with the work overload of the teachers and is reserved the focus on the students (OECD, Education at Glance, 2011). Also, student-teacher ratio or Pupil-Teacher ratio is one of the factors that determine the range of school resources (Graddy & Stevens, 2005). In order to examine the importance of the ratio in the Turkish case, where variation is high among provinces, this variable is also added into the model, while it is believed that the lesser of this ratio is better, especially if we assume that teachers are identical.

The variation is extremely high between the top and bottom schools in 2009 while the statistics of provinces are given at Table-9 in Appendixes-F. Some unique situations should be noted to understand the causes of diversity, maybe in an unexpected way. In most developed metropolitan cities such as Istanbul, Ankara, Izmir, student/teacher ratios are

much higher due to crowdedness of the population. On the other hand, ratios are lower than the average at many rural cities, where the enrollment rates and number of students are also low. There is a high correlation between class size and student/teacher ratio, but they are two different indicators explaining the variation significantly from slightly different point of views.

5.5 Class Size

Educational policies addresses to extended concerns over class size. Even though debates are ongoing, an optimal class size has not been defined yet. Smaller class sizes are expected to allow teachers to concentrate on each student and to spend less time in classroom management, same as student teacher ratio, thereby providing better instruction according to individual needs which may further be addressed as a factor which increases educational quality (OECD, 2012). According to the existing literature, diminishing the class size also reduces the disruption time and increases the time for productive learning (Lazear, 2001). Due to the high correlation between this variable and the teacher-pupil ratios, these two variables are used separately.

Reducing class size is a costly policy and in larger countries like Turkey, from teachers to infrastructures the size of the costs will be much higher and such a policy will require some time to realize. Also, the optimal class size is unique for each country. However, between regions and provinces, there should not be huge differences regarding class size. In a centralized education system, of which Turkey is the perfect example, this variation should be much lower. But, again there are enormous variances between provinces in average class-sizes, thirty-eight students are between top and bottom provinces, while the top and bottom five provinces are presented at Table 10 in Appendixes-F. It seems that the time constraint is a barrier in front of policy makers especially at the rural areas. Also, expenditures will show the attitude of the policy makers at the related section in this paper.

5.6 Kurdish Provinces Variable

In societies where more than one major ethnic group exists, multilingualism is an issue, and this issue reaches peak in the field of education. In Turkey, the Turkish population is around 70-75%, and the Kurdish population is around 18%, and other minorities are around 7-12% (Central Intelligence Agency, 2013). On the other hand, as the legal framework is presented, formal education language is provided only in Turkish with a few elective foreign language courses, including the Kurdish language.

Minorities in countries are often regarded as disadvantaged portions of the societies. In Turkey, the most significant minority is the Kurdish population. At the same time, the region that Kurdish people are in the majority, development levels are considerably low. These regions are identified by using a proxy, which are the votes of the Kurdish party DTP in the 2009 local elections. A Dummy variable is created by using the election data, while the provinces that DTP won in the elections get 1 and others 0. Among 81, there were eight provinces that DTP won: Diyarbakır, Hakkari, Siirt, Tunceli, Van, Batman, Şırnak, Iğdır and all of these provinces are located at southeastern Turkey.

5.7 Per-Student Public Expenditure

Turkey as a constitutionally social state has been responsible for providing free and quality education to its citizens. Parallel to this legal framework, education is among the largest budgetary items and most of the time the largest one. These facts are enough to include expenditures on education as a must variable for the constructed model. In addition, the existing literature, including the earlier ones, has included public expenditure as an important school input.

Therefore, average public expenses for the years from 2005 to 2009 in the educational services at provincial level are included into the model. The data consists of a total per student expenditure on primary level education minus teacher salaries and social security payments. Elimination of the salaries from the variable is crucial as more than 80% of the expenditure on education goes to salaries and interpreting the remaining part will

give a brief idea on government's policies on education. Interpretation of this variable also contributes to the goal of identification of the education policy of the center, as the budgets have been dominantly prepared by the central government. The allocation of the higher proportion of the budget to teacher salaries leads to the correlation between this variable and teacher-student ratio with class size. This correlation's effects are tried to be eliminated by dropping each variable at different models and also by using the second type of expenditure variable, which are total expenses minus the salaries.

5.8 Socio-Economic Development Index (SEGE)

According to the many scholars, socio-economic situation of the parents of the students influences their learning outcomes significantly (Jacob & Lefgren, 2007). In order to adapt a variable that responds to these effects to overcome the omission problem, a multi layered variable, SEGE study, is used. SEGE is the source that has been used to compare socio-economic development of the Turkish Provinces in this paper. This variable corroborates the significances of the other variables and this characteristic of a variable, despite the high correlation, makes it functional.

Turkish Ministry of Development has engaged into most common datasets of international organizations and has created its indicator set and has sorted provinces in Turkey, according to the results that they get from the index. A total of 61 indicators from different classified fields is used including demographic, employment, educational, health, competition and innovation capacity, fiscal, accessibility, and quality of life are included (Ministry of Development, 2013).

SEGE is an umbrella variable for the rest of the variables in the model that is used in this paper. Among the indicators which constitute the SEGE score, directly or indirectly other variables are included. First and last five provinces and their scores are given at the Table-5 at Appendix-F. Development is a key theme for SEGE and the conformity with the school resources' variables is obviously visible at the rankings of the provinces.

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Sources of the data which has been collected and has been used in this paper are TÜİK, OECD, and DPT. Data for all variables in this paper belongs to the year 2009, except SEGE values that belong to the year of 2011. Data for each legal 81 provinces in Turkey has been collected for each of the variable. The data for the provincial SBS results are obtained from the Ministry of National Education. While the test results stand alone as the output, none of the many background characteristics that influence student achievement operates separately (Rothstein, 2010). In this sense, one of the technical limitations within this model is the correlation between the independent variables. The matrix of correlation coefficients is presented in Table 1. As presented in the matrix, the highest correlation, 0.93, exists between student/teacher ratio and class size. Also tertiary level education and SEGE are highly correlated with each other, 0.87. On the other hand, all of these determinants are within the agendas of public policy making in the field of education. All of these variables are included in the model.

These are the only variables, which are taken as inputs of the Turkish education system due to the availability of reliable data. However, if a more detailed survey is made including bullet points related with the parent choices, student preferences, and regional policies, the omitted variable bias, if exists, may be eliminated.

Table 1 – Correlation Matrix of the Variables

	SBS OYP	Schooling Rate	HighSchool Comp.	Tertiary Comp.	Student/ Teacher	Class Size	DTP Dummy	PerPupil Expen.	SEGE2011
SBS OYP	1								
Schooling Rate	0.4643	1							
High School Comp.	0.5693	0.3648	1						
Tertiary Comp.	0.7091	0.5468	0.8070	1					
Student/ Teacher	-0.7111	-0.1450	-0.3570	-0.3689	1				
Class Size	-0.6757	-0.0875	-0.2675	-0.2603	0.9308	1			
DTP Dummy	-0.4614	-0.2334	-0.1246	-0.3311	0.3774	0.3803	1		
PerPupil Expen.	-0.0755	-0.3120	-0.0380	-0.2971	-0.4101	-0.4164	0.2389	1	
SEGE2011	0.6178	0.5767	0.6424	0.8798	-0.1434	-0.0888	-0.3928	-0.4829	1

5.9 Limitations of the Study

The next section presents findings of this study. However, there are several limitations on these findings and results which restrict interpretations. First of all, sample size could be larger but due to unavailability of data on SBS results, except for the year of 2009 at provincial level, the data on output is limited by one year. Moreover, SPAs have expenditures on education on behalf of the government as explained at section three; however data on these expenditures are not publicly available. However, lack of available data and structural changes on these entities are done during the last decade have prevented the study to include this expenditure to the dataset.

On the technical limitations, there are two points which have restricted acuity of the finding of the study. First of all, OLS regression is used in the study. An OLS regression represents linear correlations among the variable. The variables are used in this study, such as education level of the family and public expenditure are not linearly affecting student achievements. Despite this fact, due to the reason that OLS models are the most dominant and proven econometric technique that have been used in the existing literature, this study has also deployed the same technique.

Another important limitation is that the study may suffer from selection biases. Our dependent variable is the SBS score. However this variable only partially reflects educational success in a province since in some provinces students do not even make it to the stage where they actually take the placement exam. So the study unavoidably concentrates on those parts of the student population who are able to take the exam and who are therefore already more successful (or have higher socio-economic resources) than the rest of the student population. This obviously creates a selection bias and this shortcoming should be kept in mind when the results are interpreted.

Finally, focusing on provinces clearly has limitations because variability within provinces may be large and the study cannot take account of this variability. Although these limitations are undeniable, the findings of this study should not be underestimated. Education production function method is not a popular approach among the studies on

Turkish education. In this sense, results of this study provide another point of view and open a window into the problems of the Turkish education system.

6. FINDINGS

Six different models have been created by altering the baseline model given at the beginning of the section. Variables have been interpreted on the provincial data which has also been presented earlier. The results for the regressions, robust regressions and regression only with the provinces with Turkish dominant populations has been given respectively (see Table-1, Table-2, and Table-3). Simple linear regression is used, as the general tradition of the existing literature. In addition to the variables discussed above, interaction terms are included between schooling rate and class size, and DTP dummy and per-student public expenditure, as a measure against selection bias.

In the first regression, Table 2 Column 1, which all of the variables have been included, schooling rate, high school completion rate, tertiary completion rate, DTP dummy variable, and SEGE have positive coefficients while among those that have positive effects only the SEGE variable has been significant at 0.05 level. Teacher Student Ratio, class size and per student public investment variables have negative coefficients, all significant at 0.05 level. Among the significant variables, coefficient of student teacher ratio variable is higher than others in terms of magnitude. Class size also has a considerable influence. These coefficients and magnitudes show that in the provinces where class student teacher ratio and class size are lower, students achieve higher scores. SEGE variable has a high correlation with other variables, as seen in Table 1, especially with the variables in this model that have insignificant coefficients. This situation means that the inclusion of SEGE in the model almost neutralizes the influences of other variables, as SEGE variable actually embraces the other variables. Per student expenditure without the teacher salaries has a negative and significant coefficient. This result is interesting and may be interpreted in two different ways.. The first is that expenditure policy of the central government is not efficient since provinces that receive more funding have lower student achievements. The second (and perhaps consistent with the first) possibility is that the causality runs in the opposite direction and therefore the model is misspecified: In other words, it could be that the central government spends more in provinces where student achievement is low and this is captured by the negative coefficient.

The same model has been regressed by eliminating gross outliers according to the Cook's distance>1 by using Stata software (Table 3 Column 1, a robust regression. In the output of the regression, the significances of class size and per student investment variables are increased to level $p<0.01$. There are also some changes in magnitudes of the coefficients. While the magnitude of the coefficient of teacher student ratio is decreased, class size variable, per pupil expenditure variable and SEGE variable are increased. This change can be interpreted as in the first regression without robust control; the influence of the student teacher ratio has been slightly overestimated. Another variation of the same model with the same variables is produced by excluding the provinces that Kurdish population is dominant (Table 4 Column 1). When we compare, the significant coefficients of the variables, the magnitudes of all of the coefficients are increased. Also, the significance of the per-student investment variable is increased top<0.01 level. This fact indicates that the influence of ethnicity reduces the influence of other variables.

In the second regression (Table 2, Column 2), tertiary level education completion rate variable, student teacher ratio variable, and SEGE variable have been excluded from the model. This exclusion of tertiary level education completion variable has been made in order to eliminate the correlation between this variable with a high school completion rate. Similarly, student teacher ratio variable has been excluded to eliminate its correlation with the class size variable. Also, SEGE variable is dropped from the model to eliminate the correlation of it between the other variables. With these changes, the schooling rate, high school completion rate, class size, per pupil investment average variables have become significant at $p<0.01$ level. Furthermore, the magnitudes of the coefficients are increased significantly. For example, as available on the regression table, the coefficients of schooling rate and class size variables have been increased more than 100%. Also, the coefficient of high school completion rate has been increased almost nine times compare to the first model. In this sense, the influences of the variables have been reflected in the second model more explicitly.

The coefficients in the robust regression of the same model have been changed slightly for the all variables but the DTP qualitative variable (Table 3, Column 2). DTP variable increases by more than 100% and becomes significant at $p<0.05$ level. This change gives an idea about the outlying data points of the Kurdish provinces, in the sense that their

high influence on the student achievement. When these outliers are eliminated from the dataset, and the model regress, the negative effect of being a student at a Kurdish province distinctly becomes visible. In the results of the regression without the Kurdish provinces (Table 4, Column 2), the coefficients slightly change at reasonable level, parallel to the decrease in the R-squared value of the regression. This points out that, the negativity and positivity of a significant variable only slightly change in accordance with the ethnicity of the dominant population. In the meanwhile, DTP dummy variable covers the influence of the Kurdish factor.

The third model consists of independent variables of schooling rate, tertiary level completion rate, student teacher ratio, DTP dummy variable, and per student investment average beside the SBSOYP dependent variable (Table 2, Column 3). Third model is symmetric to the second model in terms of school completion rates and class size and student teacher ratio variables. When we compare the coefficients of these variables in model 2 and 3, it is clearly visible that having a high tertiary education completion rate is more influential than a high school completion rate for the provinces. Also, student teacher ratio variable is more influential than the class size, according to the coefficients.

In the robust version of the third model, several changes occur in the level of significances and magnitudes of the coefficients (Table 3, Column 3). Schooling rate variable becomes significant at $p<0.1$ level, while the coefficient increases nearly 30%. Tertiary level education completion rate variable's coefficient decreases almost 40%. However, the influence of this variable should not be underestimated. The story for the rest of the variables is similar to the second model where the significance level of DTP dummy increases. In addition, coefficient of the per pupil public investment variable becomes significant at the level of $p<0.01$. In the regression of this model without the Kurdish provinces data (Table 4, Column 3), beside minimal changes in size of the coefficients, the only considerable change is the increasing level of significance of the per-student public expenditure variable top<0.01 level. This increase may show that central government's educational investment on the Turkish provinces is more inefficient than DTP provinces or may reflect reverse causality where poor results drive higher expenditures, in which case the model is misspecified.

In the fourth model which has been regressed with the variables of schooling rate, high school completion rate, class size, DTP dummy, and interaction term consists of schooling rate and class size (Table 2, Column 4), only two variables, high school completion rate and DTP dummy are significant at the levels of $p<0.01$ and $p<0.05$, respectively. This means that, inclusion of the interaction term have not increased the significance of the and there has not a critical missing element, before this term is added to the model. Even in the robust regression for the same model (Table 3, Column 4), while the coefficient of the interaction term between schooling rate and class size has become significant, the schooling rate remains insignificant and negative dissimilar to the other models. Nonetheless, in the third version of the model, the one without the Kurdish provinces (Table 4, Column 4), level of significance of the significant variables at the robust regression decreases. This situation clarifies that there is no additional dimension that the interaction term adds to the findings.

The fifth model has introduced a new interaction term between DTP dummy and the per student public investment average variable (Table 2, Column 5). Coefficients of all of the variables are significant in this model where the coefficient of schooling rate is significant at $p<0.1$ level, both DTP qualitative variable and DTP and public expenditure interaction term are significant at $p<0.05$ level, and finally tertiary level education completion rate, class size, and per student investment variables are significant at $p<0.01$ level. While this model is the only one among others which all of the variables are significant, the significance of the interaction term led to an important finding. Note that the size of the coefficient of the interaction term is almost equal to the coefficient of expenditures alone but of opposite sign so that the net effect of expenditures in Kurdish provinces is zero! This may be reflecting an interesting situation where while poor performance may be driving public expenditures elsewhere in Turkey, this is not the case in the Kurdish provinces. However, In the robust regression of the fifth model (Table 3, column 5), interaction term losses its significance along with the schooling rate variable. In the regression of the same model without the eight provinces with Kurdish populations, there is not any significant change on coefficients. In this sense, the finding of the second model, which has explained that there is not any clear discrepancy between Turkish and Kurdish provinces in terms of these variables, is strengthened with the fifth model.

In the sixth regression (Table 2, Column 6), SEGE variable has been included into the model again. The significance level of SEGE variable at $p<0.01$ level proves the comprehensiveness of the variable as mentioned in section 5.8. Regarding the coefficients of the other variables, an important indication on the student teacher ratio is come into prominence. The significance of the variable at $p<0.01$ level and the magnitude of the coefficient reflect that the variable provides a dimension, which is not covered by the SEGE variable. In the robust regression of the sixth mode (Table 3, Column 6), the only visible change is an increase in the level of significance of per student public investment variable top<0.01 level. This situation reflects that the scope of the SEGE variable does not allow any drastic changes among the coefficients of other variables. Again, the comprehensiveness of the variable plays an important role here in this situation. At the same time, the regression of the model without the Kurdish provinces (Table 4, Column 6) also support this finding as there have not been any significant changes among the coefficients of the variables.

When we interpret the variables alone, schooling rate increases the student achievement except in the model which schooling rate and class size interaction term included. Among the variables, which has been included to the study to cover family backgrounds of the students, tertiary education completion rate has more influence over the high school completion rate according to the comparison that is made between the second and third models. Statistics point out that tertiary education completion rates are lower than high school completion rates, but provinces with higher rates at both tend to have higher SBS score averages. Regarding the school inputs, effect of the class size and student teacher ratio are much visible than the other variables as the variance among provinces has been higher. The magnitude of the coefficients, namely the influence of the student teacher ratio, is slightly higher than the class size despite the fact that the original averages of the student teacher ratio have been lower than the class size averages. In this sense, we can argue that student teacher ratio is more effective. When we look at the DTP dummy variable, the coefficients were negative in the models, which the SEGE variable is not included. This shows that the situation of the Kurdish provinces is highly dependent on their socio-economic development statuses. Nevertheless, the students at Kurdish provinces have achieved less at the SBS. Mostly correlated with the other variables, estimating the

average student achievement by looking at the SEGE variable is possible. Due to its wide-reaching content, this variable is the most precise variable within the model.

Table-2 Regression Results

VARIABLES	(1) SBSOYP	(2) SBSOYP	(3) SBSOYP	(4) SBSOYP	(5) SBSOYP	(6) SBSOYP
SchoolingRate	0.693	1.444***	0.851*	0.620	0.756*	-
	(0.459)	(0.469)	(0.479)	(1.294)	(0.445)	
HighSchoolComp	0.171	1.313***	-	1.316***	-	0.237
	(0.416)	(0.274)		(0.299)		(0.331)
TertiaryComp	0.840	-	2.650***	-	2.751***	-
	(1.280)		(0.581)		(0.545)	
StudentTeacherRatio	-1.186**	-	-2.211***	-	-	-2.479***
	(0.585)		(0.290)			(0.227)
Class Size	-0.682**	-1.226***	-	-5.746	-1.206***	-
	(0.275)	(0.144)		(4.460)	(0.134)	
DTPDummy	1.208	-3.287	-2.054	-7.784**	-14.18**	-
	(3.522)	(3.690)	(3.528)	(3.717)	(6.065)	
PerPupilInvestmentAvg	-0.0258**	-0.0399***	-0.0279**	-	-0.0478***	-0.0255**
	(0.0117)	(0.0113)	(0.0119)		(0.0139)	(0.0113)
SEGE2011	0.000109**	-	-	-	-	0.000152***
	(5.18e-05)					(3.32e-05)
Schooling * ClassSize	-	-	-	0.0496	-	-
				(0.0459)		
DTPDummy*PerPupilInvestmentAvg	-	-	-	-	0.0478**	-
					(0.0186)	
Constant	280.2***	185.9***	258.6***	249.0*	259.4***	359.9***
	(47.14)	(45.89)	(46.71)	(126.0)	(43.48)	(8.885)
Observations	81	81	81	81	81	81
R-squared	0.813	0.761	0.778	0.726	0.813	0.791

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table-3 Robust Regression Results

VARIABLES	(1) SBSOYP	(2) SBSOYP	(3) SBSOYP	(4) SBSOYP	(5) SBSOYP	(6) SBSOYP
Schooling Rate	0.564	1.041***	0.657	-0.325	0.585	-
	(0.345)	(0.392)	(0.406)	(1.016)	(0.371)	
HighSchoolComp	0.00425	0.959***	-	1.083***	-	-0.00759
	(0.306)	(0.230)		(0.235)		(0.269)
TertiaryComp	0.700	-	1.883***	-	2.542***	-
	(0.930)		(0.492)		(0.430)	
StudentTeacherRatio	-0.983**	-	-2.285***	-	-	-2.571***
	(0.425)		(0.238)			(0.184)
Class Size	-0.832***	-1.280***	-	-9.071**	-1.200***	-
	(0.201)	(0.115)		(3.501)	(0.105)	
DTPDummy	-2.085	-7.548**	-5.312*	-6.296**	-3.587	-
	(2.656)	(3.028)	(3.021)	(2.917)	(6.993)	
PerPupilInvestmentAvg	-0.0356***	-0.0507***	-0.0394***	-	-0.0360***	-0.0359***
	(0.0102)	(0.0112)	(0.0119)		(0.0109)	(0.0109)
SEGE2011	0.000114**	-	-	-	-	0.000132***
	(3.77e-05)					(2.63e-05)
Schooling*Class Size	-	-	-	0.0831**	-	-
				(0.0361)		
DTPDummy*PerPupilInvestmentAvg	-	-	-	-	-0.00945	-
					(0.0281)	
Constant	299.7***	236.4***	287.7***	348.2***	275.5***	369.3***
	(35.90)	(39.49)	(40.50)	(98.92)	(36.04)	(7.801)
Observations	80	80	80	81	80	80
R-squared	0.889	0.836	0.831	0.811	0.873	0.848

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table-4 Regression Results with ethnically Turkish Provinces

VARIABLES	(1) SBSOYP	(2) SBSOYP	(3) SBSOYP	(4) SBSOYP	(5) SBSOYP	(6) SBSOYP
SchoolingRate	0.520	1.176**	0.694	-0.0795	0.647	-
	(0.458)	(0.481)	(0.489)	(1.395)	(0.465)	
HighSchoolComp	0.0725	1.034***	-	1.281***		0.139
	(0.399)	(0.287)		(0.330)		(0.334)
TertiaryComp	0.653	-	2.198***	-	2.788***	-
	(1.198)		(0.590)		(0.527)	
StudentTeacherRatio	-1.311**	-	-2.369***	-		-2.590***
	(0.558)		(0.282)			(0.254)
ClassSize	-0.701**	-1.322***	-	-8.997*	-1.223***	-
	(0.266)	(0.141)		(5.319)	(0.133)	
o.DTPDummy	-	-	-	-	-	-
PerPupilInvestmentAvg	-0.0474***	-0.0646***	-0.0480***	-	-0.0493***	-0.0430***
	(0.0136)	(0.0138)	(0.0143)		(0.0134)	(0.0136)
SEGE2011	0.000101**	-	-	-	-	0.000137***
	(4.83e-05)					(3.28e-05)
Schooling*Class Size	-	-	-	0.0829	-	-
				(0.0547)		
o.DTPDummy*PerPupilInvestment	-	-	-		-	-
Constant	308.0***	225.2***	284.6***	318.1**	270.6***	367.8***
	(46.62)	(47.73)	(47.81)	(136.9)	(45.13)	(10.43)
Observations	73	73	73	73	73	73
R-squared	0.787	0.719	0.737	0.640	0.762	0.760

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

7. CONCLUSIONS

According to the findings based on the explained data and econometric model, existing central educational policies could not respond the problem of high variance within student achievements among provinces in Turkey. It is expected that the variance has been lower in Turkey since the system is highly centralized. Educational production function technique is applied with the usage of available data and the factors on the variance problem tried to be clarified throughout this study. Without reinventing the wheel, literature on the same field analyzed and legal framework of the Turkish education system presented to comprehend the scope of authority structure of the government in the field of education. Comparison of the statistics from Turkey on educational variables with the other countries has allowed us to see the position of Turkey and it has been deduced that Turkey could not achieve a success in the field of education, while educational resources are considerably low.

SBS results could be taken as the output of implemented system for the primary level education. According to the results, schooling rates significantly affect student achievement in Turkey. A closer enrollment rate to the 100% percent, which is expected, will not only lower the gap between provinces but it is also expected to improve PISA scores of the Turkish students. Regarding the family backgrounds, school completion rates were a determinant factor on student achievement. Actually, increasing numbers of universities are expected to improve the earlier levels of education in the long run. Not at the level of the developed countries yet, but the improvements and investment has been made, while actualizing the strategy of at least one university at every province would be an acceptable policy, according to the results. However, as Turkey is far behind the OECD average on student achievement, the ongoing policy has been initiated by the central government should continue at the long run.

School resources, class size and student teacher ratio, are crucial in order to lower student achievement variance between the provinces. It is the fact that average numbers of these resources has came out to be widely different according to statistics of the provinces.

The overall average of Turkey could be fixed around to the current average, but all of the provinces should be bridged up at this level in order to respond to the variance in student achievement among provinces problem. On the other hand, parallel to the development levels, Kurdish-dominated provinces are at the bottom of the list of the student achievement. According to the coefficients that are presented as the outputs of the regressions, studying in a Kurdish province seems to be a disadvantage for a student.

Public expenditure on education is the most controversial issue in the existing literature and this study supports the idea that public expenditure has not always improved the achievement. Besides this argument, Turkey is spending less than the OECD average, and this is expected to influence negatively the level of student achievements. It is stated couple of times in this paper that teacher salaries are the vast majority of the allocated budget. The remaining minor part is included in the model, and it seems that it is significant and negatively affecting student achievement. This finding indicates that the expenditure policy of the central government is not efficient at all. Socio-Economic Development levels of the provinces are crucial, as the SEGE shows, and the government should overcome variances on this.

The study finds out that causes of the variances among the student achievement could not be load up on a single variable, such as the umbrella variable, SEGE, which is highly significant. Variances on schooling, educational status of the families, class size, student teacher ratio, DTP variable all cause variances among provinces. Rather than improving averages of Turkey is the absolute target, closing the gap between the top and bottom provinces should be the priority of the policy makers. While further studies with more extensive data should be done in order to give more precise conclusions, it is obvious that there is a high variance between student achievements when we compare the provincial averages in Turkey. Within this environment, this study shows that the centralized educational policy of Turkey has not responded this problem. Alternative education systems including a decentralized structure should be taken under consideration to provide a more efficient education to the Turkish citizens.

APPENDIX – A

School Enrollment Rate Among 15-19 year-olds (%)				
Country	2009	2010	2011	2012
Australia	79.98	81.37	83.9	86.52
Austria	79.42	78.4	78.34	78.85
Belgium	93.21	93.3	93.75	93.96
Canada	80.79	80.54	82.15	-
Chile	72.98	74.84	76.05	75.99
Czech Republic	89.21	90.2	90.18	90.17
Denmark	83.6	85.02	86.53	87.38
Estonia	84.62	86.53	86.7	86.14
Finland	86.85	86.83	86.73	85.92
France	84.01	84.18	84.41	83.63
Germany	88.49	89.45	91.85	89.68
Greece	-	83.44	83.76	85.33
Hungary	89.9	91.65	92.41	92.71
Iceland	84.93	87.79	87.44	88.43
Ireland	92.05	95.7	92.98	93.27
Israel	64.16	64.59	64.1	64.6
Italy	81.79	83.27	81.29	80.79
Japan	-	-	-	-
Korea	87.49	85.87	86.46	86.76
Luxembourg	-	76.69	-	76.64
Mexico	51.89	53.78	55.56	53.19
Netherlands	89.68	90.67	92.65	93.25
New Zealand	79.44	80.88	81.42	82.52
Norway	85.91	86.27	86.38	86.7
Poland	92.74	92.73	92.74	92.48
Portugal	84.62	86.38	87.33	86.51
Slovak Republic	85.05	85.3	85.04	85.38
Slovenia	91.09	91.78	92.47	92.27
Spain	81.38	84.29	85.95	86.36
Sweden	86.97	86.37	85.9	85.64
Switzerland	84.66	85.09	85.03	83.83
Turkey	53.48	56.23	63.81	58.96
United Kingdom	73.67	77.4	78.26	78.4
United States	80.9	81.7	80.26	80.91
OECD - Average	82.09	83.01	83.86	83.54
Argentina	70.43	73.25	73.25	-
Brazil	75.38	76.42	76.9	77.66
China	-	32.77	33.66	34.1
Colombia	-	-	-	43.22
India	-	-	-	-

Indonesia	62.44	60.03	67.49	70.67
Latvia	-	-	-	93.52
Russia	-	-	77.6	83.01
Saudi Arabia	-	87.14	-	84.33
South Africa	-	-	-	77.13
Data extracted from OECD.stat 2014				

APPENDIX – B

People attained a tertiary education degree. 25-64 year-olds (%)				
Country	2009	2010	2011	2012
Australia	36.88	37.6	38.34	41.28
Austria	19.04	19.28	19.34	19.98
Belgium	33.39	34.98	34.61	35.31
Canada	49.5	50.59	51.32	52.58
Chile	24.37	26.81	17.81	-
Czech Republic	15.54	16.76	18.24	19.27
Denmark	32.44	33.26	33.7	34.78
Estonia	35.96	35.32	36.75	37.31
Finland	37.26	38.14	39.31	39.66
France	28.58	29	29.76	30.85
Germany	26.38	26.6	27.56	28.12
Greece	23.52	24.64	26.05	26.68
Hungary	19.86	20.12	21.12	22.04
Iceland	32.75	32.54	33.86	35.2
Ireland	35.82	37.58	38.16	39.69
Israel	44.88	45.56	46.39	46.44
Italy	14.51	14.8	14.93	15.7
Japan	43.76	44.8	46.36	46.61
Korea	38.66	39.71	40.4	41.73
Luxembourg	34.79	35.47	37.03	39.11
Mexico	16.98	16.91	17.32	18.06
Netherlands	32.78	31.93	32.08	32.94
New Zealand	40.06	40.66	39.33	40.58
Norway	36.69	37.28	38.05	38.56
Poland	21.15	22.46	23.28	24.51
Portugal	14.66	15.44	17.25	18.53
Slovak Republic	15.76	17.32	18.76	18.97
Slovenia	23.31	23.71	25.09	26.43
Spain	29.69	30.67	31.57	32.31
Sweden	33.06	33.86	35.17	35.69
Switzerland	35.02	35.25	35.2	36.58
Turkey	12.71	13.11	14.03	15.29
United Kingdom	36.98	38.18	39.41	40.97
United States	41.21	41.66	42.44	43.05
OECD - Average	29.94	30.65	31.18	32.57
Argentina	-	-	-	-
Brazil	10.86	-	11.61	12.95
China	-	3.57	-	-

Colombia	-	-	19.74	-
India	-	-	-	-
Indonesia	-	-	7.88	-
Latvia	-	-	-	29.22
Russia	-	-	53.48	53.48
Saudi Arabia	-	-	-	-
South Africa	-	-	-	6.35
Data extracted from OECD.stat 2014				

APPENDIX – C

	Class Size Primary School	Teacher-Pupil Ratio Primary School
Country	2012	2012
Australia	23.57	15.53
Austria	18.27	12.03
Belgium	-	12.54
Canada	-	-
Chile	30.27	22.13
Czech Republic	19.81	18.85
Denmark	20.62	-
Estonia	16.98	13.08
Finland	19.4	13.55
France	22.74	18.94
Germany	20.99	16.01
Greece	17.25	-
Hungary	20.93	10.7
Iceland	18.75	10.24
Ireland	24.43	16.17
Israel	26.95	15.2
Italy	19.19	12.12
Japan	27.68	17.74
Korea	25.15	18.4
Luxembourg	15.72	9.22
Mexico	19.78	28.01
Netherlands	22.6	15.84
New Zealand	-	16.38
Norway	-	10.3
Poland	18.4	10.98
Portugal	20.76	11.87
Slovak Republic	17.3	16.77
Slovenia	18.68	15.88
Spain	21.39	13.42
Sweden	-	11.78
Switzerland	-	-
Turkey	23.97	20.13
United Kingdom	25.12	21.13
United States	21.13	15.31
OECD - Average	21.34	15.34
Argentina	-	-
Brazil	23.7	21.68
China	38.48	17.47

Colombia	-	-
India	-	-
Indonesia	23.18	25.24
Latvia	15.73	11.02
Russia	18.09	20.08
Saudi Arabia	-	10.88
South Africa	-	-
Data extracted from OECD.stat 2014		

APPENDIX – D

	Public Expenditure per Student Primary Education USD	Average Teacher Salary (15 years of Experience) USD
Country	2011	2012
Australia	8671.18	51288.99
Austria	10599.72	42994.13
Belgium	9280.9	-
Canada	9232.08	58494.75
Chile	4551.12	24724.84
Czech Republic	4587.01	19362.87
Denmark	9433.52	51121.92
Estonia	5328.22	12525.03
Finland	8159.25	39444.78
France	6916.95	33994.18
Germany	7578.92	62194.97
Greece	-	26616.56
Hungary	4566.42	13519.8
Iceland	10338.66	28742.32
Ireland	8520.04	55147.86
Israel	6822.57	29413.49
Italy	8448.49	33569.98
Japan	8280.33	47561.33
Korea	6975.85	50145.39
Luxembourg	23871.22	98788.44
Mexico	2621.95	20296.11
Netherlands	8035.94	54864.64
New Zealand	8084.06	43049.74
Norway	12458.78	38772.65
Poland	6233.41	18160.37
Portugal	5865.39	34693.72
Slovak Republic	5516.87	13364.51
Slovenia	9260.11	32818.96
Spain	7287.62	41861.68
Sweden	10295.09	35114.57
Switzerland	12907.41	-
Turkey	2217.57	26677.69
United Kingdom	9857.3	-
United States	10958.46	45997.61
OECD - Average	8295.83	39023.86
Argentina	2167.31	-
Brazil	2673.48	-
China	-	-
Colombia	2041	-

India	-	-
Indonesia	586.9	1974.05
Latvia	4981.82	-
Russian Federation	-	-
Saudi Arabia	-	-
South Africa	-	-
Data extracted from OECD.stat 2014		

APPENDIX – E

PISA SCORES	Reading		Mathematics		Science	
Country Name	2009	2012	2009	2012	2009	2012
Australia	514.90	511.80	514.34	504.15	527.27	521.49
Austria	470.28	489.61	495.91	505.54	494.33	505.78
Belgium	505.95	508.62	515.27	514.53	506.58	504.87
Canada	524.24	523.12	526.81	518.07	528.70	525.46
Chile	449.37	441.40	421.06	422.63	447.47	444.93
Czech Republic	478.19	492.89	492.81	498.96	500.50	508.30
Denmark	494.92	496.13	503.28	500.03	499.34	498.47
Estonia	500.96	516.29	512.10	520.55	527.83	541.40
Finland	535.88	524.02	540.50	518.75	554.08	545.44
France	495.62	505.48	496.78	494.98	498.23	498.97
Germany	497.31	507.68	512.78	513.53	520.41	524.12
Greece	482.78	477.20	466.10	452.97	470.12	466.72
Hungary	494.18	488.46	490.17	477.04	502.64	494.30
Iceland	500.28	482.52	506.67	492.80	495.60	478.15
Ireland	495.64	523.17	487.14	501.50	507.98	522.00
Israel	473.99	485.80	446.86	466.48	454.85	470.07
Italy	486.05	489.75	482.91	485.32	488.83	493.54
Japan	519.86	538.05	528.99	536.41	539.43	546.74
Korea. Rep.	539.27	535.79	546.23	553.77	537.99	537.79
Luxembourg	472.17	487.81	489.07	489.85	483.93	491.22
Mexico	425.27	423.55	418.51	413.28	415.91	414.92
Netherlands	508.40	511.23	525.84	522.97	522.22	522.06
New Zealand	520.88	512.19	519.30	499.75	532.01	515.64
Norway	503.23	503.94	497.96	489.37	499.88	494.52
Poland	500.48	518.19	494.80	517.50	508.07	525.82
Portugal	489.33	487.76	486.89	487.06	492.95	489.27
Serbia	442.02	446.13	442.38	448.86	442.79	444.80
Slovak Republic	477.44	462.77	496.68	481.64	490.27	471.19
Slovenia	483.08	481.32	501.47	501.13	511.76	514.14
Spain	481.04	487.94	483.49	484.32	488.25	496.45
Sweden	497.45	483.34	494.24	478.26	495.11	484.80
Switzerland	500.50	509.04	533.96	530.93	516.57	515.30
Turkey	464.19	475.49	445.45	447.98	453.91	463.41
United Kingdom	494.18	499.32	492.41	493.93	513.71	514.13
United States	499.83	497.58	487.40	481.37	502.00	497.41
Argentina	398.26	395.98	388.07	388.43	400.84	405.63
Brazil	411.75	410.12	385.81	391.46	405.40	404.71
Hong Kong	533.15	544.60	554.53	561.24	549.03	554.94
Colombia	413.18	403.40	380.85	376.49	401.75	398.68

India	-	-	-	-	-	-
Indonesia	401.71	396.12	371.30	375.11	382.57	381.91
Latvia	483.96	488.69	481.95	490.57	493.88	502.19
Russia	459.40	475.15	467.81	482.17	478.30	486.30
Saudi Arabia	-	-	-	-	-	-
South Africa	-	-	-	-	-	-
Data extracted from OECD.stat 2014						

APPENDIX – F

Table 5: SEGE Statistics 2011			
Top Provinces		Bottom Provinces	
Province	SEGE Points	Province	SEGE Points
34 İstanbul	171245	13 Bitlis	-59739
06 Ankara	133247	73 Şırnak	-63983
35 İzmir	92423	30 Hakkari	-64263
41 Kocaeli	85219	04 Ağrı	-65364
16 Bursa	57950	49 Muş	-66496

Table 6: SBS-OBP Averages 2009 - Turkey			
Top Provinces		Bottom Provinces	
Province	AOP Score	Province	AOP Score
15 Burdur	336.328	73 Şırnak	278.327
22 Edirne	329.78	36 Kars	272.432
26 Eskişehir	329.062	30 Hakkari	269.289
62 Tunceli	328.008	21 Diyarbakır	266.982
32 Isparta	327.49	63 Şanlıurfa	262.404

Table 7: School Enrollment Rates 2009 - Turkey			
Top Provinces		Bottom Provinces	
Province	Schooling %	Province	Schooling %
06 Ankara	99.94	60 Tokat	93.39
34 İstanbul	99.73	63 Şanlıurfa	93.39
41 Kocaeli	99.65	30 Hakkari	90.23
05 Amasya	99.64	66 Yozgat	90.03
09 Aydın	99.57	18 Çankırı	89.12

Table 8: School Completion Rates 2009 - Turkey							
Top Provinces				Bottom Provinces			
Province	High Sch. Comp. %	Province	Tertiary Comp. %	Province	High Sch. Comp. %	Province	Tertiary Comp. %
06 Ankara	27.63	06 Ankara	15.44	73 Şırnak	14.17	65 Van	3.7
62 Tunceli	27.39	35 İzmir	11.32	65 Van	12.74	47 Mardin	3.6
26 Eskişehir	27.37	26 Eskişehir	11.17	49 Muş	11.98	63 Şanlıurfa	3.21
71 Kırıkkale	25.08	34 İstanbul	10.56	04 Ağrı	11.22	04 Ağrı	3.04
77 Yalova	24.28	07 Antalya	9.83	63 Şanlıurfa	10.58	49 Muş	2.88

Table 9: Teacher-Student Ratio 2009 - Turkey			
Top Provinces		Bottom Provinces	
Province	Teacher-Student Ratio	Province	Teacher-Student Ratio
62 Tunceli	11.67	73 Şırnak	30.84
40 Kırşehir	14.45	27 Gaziantep	30.97
15 Burdur	15.07	04 Ağrı	31.08
50 Nevşehir	15.10	65 Van	31.20
05 Amasya	15.38	63 Şanlıurfa	33.63

Table 10: Average Class Size 2009 - Turkey			
Top Provinces		Bottom Provinces	
Province	Class Size	Province	Class Size
62 Tunceli	15	73 Şırnak	44
15 Burdur	16	65 Van	45
69 Bayburt	16	34 İstanbul	46
08 Artvin	17	27 Gaziantep	46
75 Ardahan	17	63 Şanlıurfa	53

Table 11: Public Expenditure Average without Salaries Per Student 2005 to 2009			
Top Provinces		Bottom Provinces	
Province	Public Exp.	Province	Public Exp
62 Tunceli	766.4558452	06 Ankara	110.618155
75 Ardahan	445.3086514	59 Tekirdağ	109.4485072
29 Gümüşhane	432.0120815	16 Bursa	107.322287
30 Hakkari	427.4901737	35 İzmir	103.9733562
69 Bayburt	408.1739323	34 İstanbul	47.95737916

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